



Project Manual and Specifications

**Tiger Hollow Stadium Track and
Synthetic Turf Field Replacement and
Scotts Ridge Synthetic Turf Field
Replacement Project**

Ridgefield, CT

Town Bid #2021-20

May 5, 2021 - Bid

KAESTLE BOOS
associates, inc

416 Slater Road, P.O. Box 2590
New Britain, CT 06050-2590
Phone: 860-229-0361
Fax: 860-229-5303

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PROJECT MANUAL AND SPECIFICATIONS

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INVITATION TO BID

**TIGER HOLLOW STADIUM AND SCOTTS RIDGE FIELD AND TRACK REPLACEMENTS
RIDGEFIELD HIGH SCHOOL
SCOTTS RIDGE MIDDLE SCHOOL
RIDGEFIELD, CT**

The Town of Ridgefield invites all interested parties to submit sealed bids on the following:

BID DUE DATE: Thursday, May 27, 2021
BID DUE TIME: 11 :00 AM
BID ITEM: Synthetic Turf Fields and Track Replacement
BID NUMBER: 2021-20

Terms and conditions as well as the description of items being bid are stated in the project Drawings and Manual. **Project Documents are available at www.ridgefieldct.org in the Purchasing section under Departments.**

The return bid must be marked and addressed to the following email:

PURCHASING@RIDGEFIELDCT.ORG
TOWN OF RIDGEFIELD
DIRECTOR OF PURCHASING
BID NUMBER: 2021-20

Bids must be received no later than the date and time stated above at the Purchasing Director's office via email. **For further information, contact Jacob Muller at (203) 431-2720 or E-Mail at purchasing@ridgefieldct.org.**

The Town will reject bids received after the date and time noted above. All Bidders will receive a confirmatory email stating the bid were received and compliant with the bid due date, based on the time stamp of the email from the bidder's submission.

Results may be viewed at www.ridgefieldct.org in the Purchasing Section under Departments after the bid opening.

All Requests for Information (RFI) are to be emailed to the attention of Eric Roise at eroise@kba-architects.com. RFIs must be received no later than **Wednesday, May 19, 2021 at 1:00 p.m. – Last day to receive Questions. All questions will be answered in writing.**

Bidder interviews will be scheduled for May 28, 2021. All bidders shall keep these dates available for a scope review meeting (via ZOOM or Microsoft Teams). Bidders to be interviewed shall be notified within 12 hours of bid opening.

Bids may be held by the Town of Ridgefield for a period not to exceed sixty (60) days from the opening of bids for the purpose of reviewing the bids and investigating the qualifications of bidders prior to the awarding of the contract.

INSTRUCTION TO BIDDERS

TIGER HOLLOW STADIUM AND SCOTTS RIDGE FIELD AND TRACK REPLACEMENTS

RIDGEFIELD HIGH SCHOOL SCOTTS RIDGE MIDDLE SCHOOL RIDGEFIELD, CT

TOWN OF RIDGEFIELD CONNECTICUT

BOARD OF SELECTMEN

KEY EVENT DATES

- **BID DOCUMENTS AVAILABLE**: after noon on Friday May 7, 2021
- **NON-MANDATORY Pre-Bid Construction Meeting**: Thursday, May 13, 2021 at 11:00 am.
- **FINAL QUESTIONS BY CONTRACTORS**: Wednesday, May 19, 2021 5:00 p.m.
- **FINAL ADDENDUM ISSUED**: Thursday, May 20, 2021.
- **BID OPENING**: Thursday May 27th, 2021 11:00 am.
- **BIDDER SCOPE REVIEWS**: Friday, May 28 2021, Time TBD

1. **Please Note:** Due to The Town of Ridgefield COVID-19 policies and protocols all bids will be submitted electronically by email to purchasing@ridgefieldct.org
2. Withdrawals of or amendments to bids received later than the time and date specified for bid opening will not be considered.
3. The Board of Selectmen of the Town of Ridgefield reserves the right to accept or reject any or all options, bids or proposals; to waive any technicality in any bid or part thereof, and to accept any bid deemed to be in the best interest of the Town of Ridgefield, Connecticut.
4. All Bidders will receive a confirmatory email stating the bid were received and compliant with the bid due date, based on the time stamp of the fax or email from the bidders submission.
5. Bids may be held by the Town of Ridgefield for a period not to exceed sixty (60) days from the opening of bids for the purpose of reviewing the bids and investigating the qualifications of bidders prior to the awarding of the contract.
6. Insurance requirements, if any, must be submitted with the bid. This includes any Hold Harmless requirements as well as Certificates of Insurance for the full amounts specified. **Unauthorized changes** to these forms, i.e. adding, striking out and/or changing any words, language or limits **will cause the bidder to be disqualified.**

Please Note: Certificates of Insurance, if required, **MUST** name the Town of Ridgefield as **Additional Insured**. Failure to do so will mean disqualification from the Bid. There will no exceptions.

7. **Permits:** It is the Contractor's responsibility to obtain any necessary permits prior to the start of construction. All work shall be completed in compliance with the latest edition of the prevailing fire prevention and building codes in effect in the State of Connecticut, the latest edition of the State of Connecticut Department of Transportation Standard Specifications for Roads, Bridges and Incidental Construction, Town of Ridgefield Road Construction Standards, or as set forth in these specifications.
8. **Emergency Work:** The Contractor shall file with the Engineer a telephone number of a person authorized by him who may be contacted regarding emergency work at the job site that may be required during non-working hours for reasons of public safety. The person shall be readily available and have full authority to deal with any emergency that may occur.
9. **Sales Tax:** In accordance with the provisions of Special Act No. 77-98, as amended, and Section 12-412(a) of the Connecticut General Statutes, sales of tangible personal property and services to the Town are not subject to the Connecticut Sales and Use Tax, and such tax shall not be included as part of the bid.
10. **Contractor's Qualification Statement:** The Contractor's Qualification Statement must be filled out as part of the bid package and the experience and references listed therein will be one of the determining factors in the awarding of the bid.
11. **Hold Harmless Agreement:** In order for the bid to be considered valid, the Contractor **must** sign the enclosed hold harmless agreement. Bids submitted without the signed hold harmless agreement will be rejected.
12. **Prevailing Wage Rates:** This project **IS** subject to the State of Connecticut's prevailing wage rates.
13. **SBE/MBE and Contract Compliance Requirements:** This project **is not** subject to the State of Connecticut SBE/MBE set aside and contract compliance requirements.
14. **Time of Completion:** All work must be completed within the following schedule:
 - a. Construction Start: June 14, 2021
 - b. Substantial Completion:
 - i. Scotts Ridge Field: August 15, 2021
 - ii. Tiger Hollow Stadium Track and Field: September 23, 2021
 - c. Final Completion:
 - i. Scotts Ridge Field: September 17, 2021
 - ii. Tiger Hollow Stadium Track and Field: October 22, 2021

15. **Bidder's Qualification Statement:** Each Bidder shall submit on the form furnished for that purpose (a copy of which is included in the Contract Documents) a Bidder's qualification statement, his/her experience record in the type of work embraced in the Contract, and his/her organization and equipment available for the work contemplated, and other pertinent information so contained on said form, and when specifically requested, the Town of Ridgefield shall have the right to take such steps as it deems necessary to determine the ability of the Bidder to perform his/her obligations under the Contract, and the Bidder shall furnish the Town of Ridgefield all such information and data for this purpose as it may request. The right is reserved to reject any Bid where an investigation of the available evidence or information does not satisfy the Town of Ridgefield that the Bidder is qualified to carry out properly the terms of the Contract.

To be considered qualified, bidders must have prior experience consisting of no less than five (5) synthetic turf athletic fields that are 75,000 sf or greater and 3 (three) urethane surfaced running tracks. Synthetic turf field construction shall have consisted of laser graded base, concrete anchor curbing and drainage stone with flat panel underdrain system. Track construction experience shall consist of construction of asphalt base, long/triple jump runways and pits, high jump, and concrete edge curbing with any type of urethane surfacing. Bidders must provide verification of experience with Form of Proposal and Bidders Qualification Statement.

16. **Bonds:** A Payment and Performance bond in the full amount of the Proposal will be required of the successful bidder. The bond must be in the form of a surety bond of a type satisfactory to the Town of Ridgefield. All sureties must be listed on the most recent IRS Circular 570. The bond shall be delivered to the Director Purchasing before commencing work.
17. **Bid Bond:** A Bid Bond is not required.
18. **Alternate Bids:** No Alternate or Supplementary Bids will be considered unless such Bids are specifically requested in the Supplemental Specifications and shown on the Bid Proposal Form.
19. **Unit Prices:** The unit prices for each of the several items in the proposal of each bidder shall include it's prorated share of overhead so that the sum of the products obtained by multiplying the quantity shown for each item by the unit price represents the total bid. Any bid not conforming to this requirement may be rejected as informal. The special attention of all bidders is called to this provision, for should conditions make it necessary to revise the quantities, increase or decrease thereof may be made without limit, and adjustment and compensation shall be made on the basis of the unit prices for such items.
20. **Non-Collusion Affidavit:** Each Bidder submitting a Bid to the Town of Ridgefield for the work contemplated by the Documents, on which bidding is based, shall execute and attach thereto the Non-Collusion Affidavit on the form herein provided, to the effect that he/she has not colluded with any other person, firm or corporation in regard to any Bid submitted.

Before executing any Subcontract, the successful Bidder shall submit the name of any proposed Subcontractor for prior approval and an affidavit in the form provided herein.

21. **Act Concerning Workers Compensation:** Effective October 1, 1986, an Act concerning Workers' compensation insurance requirements for Contractors on public works projects and state licenses requires that municipalities, prior to entering into contractual obligation for construction or repair of any public works project, must obtain the evidence that the Contractor can prove that he/she is not liable to the State for any workers' compensation payments.
22. **Withdrawal of Bids:** Bids may be withdrawn personally or on written or telefax request dispatched by the bidder in time for delivery in the normal course of business prior to the time fixed for opening, provided that written confirmation of any telefax withdrawal over the signature of the bidder is placed in the mail and postmarked prior to the time set for bid opening. Negligence on the part of the bidder in preparing his/her bid confers no right of withdrawal or modification of his/her bid after such bid has been opened.
23. **Familiarity with Laws, Site Conditions, and Documents:** Each bidder is required to be familiar with and to comply with the terms and conditions of the specifications and all other Contract Documents and with all Federal, State and Local Laws, Ordinances or Regulations, which in any manner relate to the performance of the work in accordance with the Contract.
24. **Errors, Interpretations, and Addenda:** Should a bidder find any omissions, discrepancies, or errors in the Specifications or other Contract Documents or should he/she be in doubt as to the meaning of the Specifications or other Contract Documents, he/she should immediately notify the Town of Ridgefield's Authorized Representative which may correct, amend, or clarify such documents by a written interpretation or addendum. No oral interpretations shall be made to any bidder and no oral statement of the Town of Ridgefield shall be effective to modify any of the provisions of the Contract Documents.
25. **Employee Discrimination:** The Contractor agrees and warrants that in the performance of this Contract, he/she will not discriminate or permit discrimination against any person or groups of persons on the grounds of race, color, religion or national origin, age, marital status, sex, or physical disability, including, but not limited to, blindness, unless it is shown by such Contractor that such disability prevents performance of the work involved in any manner prohibited by the laws of the United States or the State of Connecticut and further agrees to provide such information requested by the Town concerning the employment practices and procedures of the Contract as related to the provisions of this section.
26. **Subcontractors:** The bidder is specifically advised that any person, firm, or other party to whom it is proposed to award a subcontract under this Contract must be acceptable to the Town of Ridgefield and that approval of the proposed subcontract award cannot be given by the Town unless and until the successful bidder submits all information and evidence requested by the Town regarding the proposed subcontractor. Although the bidder is not required to attach such information and evidence to his/her bid, the bidder is hereby advised of this requirement so that appropriate action will be taken to prevent subsequent delay in subcontract awards.

All contracts made by the Contractor with subcontractors shall be governed by the terms and conditions of the prime Contract. The Contractor shall see to it that his/her subcontractors are fully informed in regard to these terms and conditions.

27. **Execution of Contract:** If notified of the acceptance of this proposal within the acceptance period of ninety (90) days, the bidder agrees to execute the contract and all related documents for this work within seven (7) of receipt of the "Notice to Proceed."
28. **Time Requirement:** Time is a major factor for the completion of this contract. All work must be completed within the time limitations stipulated in the Supplemental Conditions. A monetary penalty as stipulated in the Supplemental Conditions will be imposed for work under this contract not completed within the aforementioned time period.
29. **Right of The Town to Terminate Contract:** In the event that any of the provisions of this Contract are violated by the Contractor, or by any of his/her subcontractors, the Town of Ridgefield may serve written notice upon the Contractor of its intention to terminate the Contract, such notices to contain the reasons for such intention to terminate the contract, and unless within five days after the serving of such notice upon the Contractor, such violation or delay shall cease and satisfactory arrangement for correction be made, the Contract shall, upon expiration of said five days, cease and terminate. In the event of any such termination, the Town of Ridgefield shall immediately serve notice thereof upon the Contractor.
30. **Payments:** Monthly estimates and/or invoices shall be furnished to the Town of Ridgefield for verification and approval of the amount of work done and the amount earned by the Contractor. An amount of 95% of the estimated amount due, less any payments previously made and/or any monies to be held will be paid to the Contractor. The balance will be retained by the Town of Ridgefield until final completion of the work. Final payment will not be made until final completion and acceptance by the Town of all work covered by the contract. The Contractor agrees that he will indemnify and save the Town of Ridgefield harmless for all claims growing out of the lawful demands of subcontractors, laborers, suppliers, and assignees.
31. **Project Warranty:** The Contractor shall warranty all work, labor, and materials under the contract of this project for a period of two (2) years from the date of the executed Substantial Completion. The project warranty shall be independent of any other manufacturer or product warranty specified herein.
32. **Site Visit:** A non-mandatory site walk is scheduled for Thursday, May 13, 2021 at 11:00 am. Attendees shall meet at the Tiger Hollow Stadium lower parking lot. The site walk will proceed to the Scotts Ridge Field following Tiger Hollow Stadium.

33. **Project Locations:** The projects are located at:

- a. **Tiger Hollow Stadium, Ridgefield High School, 700 N Salem Road, Ridgefield, CT**
- b. **Scotts Ridge Field, Scotts Ridge Middle School, 750 N Salem Road, Ridgefield, CT**

34. **Bid Submissions:** The following items shall be submitted for a bid to be considered complete:

- a. Executed Bid Form sheets
- b. Executed Hold Harmless Agreement
- c. Certificates of Insurance in conformance to Item 6 above
- d. Contractor's List of Subcontractor's (if none, state none)
- e. Executed Non-Collusive Agreement
- f. Contractor's Qualification Statement, sufficient to meet the minimum project qualifications stated herein.
- g. Fracking Waste Disclosure Statement
- h. Bid Submittals

Additional Specifications:

- 1. All generating equipment shall be certified by Underwriter Laboratories (UL). The system shall be comprised of UL listed components.
- 2. The design, construction, and finalized installation shall be completed in accordance with the latest applicable version of the National Electrical Code (NEC), Uniform Building Code (UBC), International Building Code (IBC), American Society of Civil Engineers (ASCE), American Society of Mechanical Engineers (ASME), American Society for Testing and Materials (ASTM), American National Standards Institute (ANSI), Underwriters Laboratory (UL), Institute of Electrical and Electronics Engineers (IEEE), American Concrete Institute (ACI), Connecticut Occupational Safety and Health (ConnOSHA), all Federal, State, and Local construction and interconnections codes, the specific requirements of the CT Green Bank, and the connected utility.
- 3. The Contractor shall obtain all required permits prior to the start of construction. The permit fees will be waived as part of this project.
- 4. The material supplier shall thoroughly inspect the installation to ensure compliance with all applicable safety regulations and proper equipment operation.

5. The Contractor shall conform to all OSHA safety requirements with respect to the system's installation, site, and worker safety.
6. The Contractor shall protect the public during all phases of the project.

Miscellaneous:

7. The Board of Selectmen of the Town of Ridgefield reserves the right to accept or reject any or all options, bids or proposals; to waive any technicality in any proposal or part thereof, and to accept any proposal deemed to be in the best interest of the Town of Ridgefield. The Board of Selectmen may reject any proposal not deemed to be in its best interest of the Town of Ridgefield.
8. The Town of Ridgefield is not liable for any cost incurred for the preparation of proposals or submission of samples by the firms submitting proposals for the work requested in this bid document or request for proposals.
9. It is the Contractor's responsibility to determine the exact amount of effort required to meet the project's intent and reflect that effort in his submitted bid.
10. By submitting a bid, the Contractor acknowledges that he has visited the site and is aware of the conditions involved in meeting the project's intent.
11. The Town reserves the right to eliminate any item, quantity, or portion of the work that it deems to be in the best interest of the Town.
12. Any inconsistencies shall be reported to the Town Engineer and the Town's Agent, Kaestle Boos Associates, inc., Eric Roise at eroise@kba-architects.com. The Town Engineer and/or its Agent shall make the final decision on any inconsistencies and their intent.
13. In accordance with the provisions of Special Act No. 77-98, as amended, and Section 12412(a) of the Connecticut General Statutes, sales of tangible personal property and services to the Town are not subject to the Connecticut Sales and Use Tax, and such tax shall not be included as part of the bid.

END OF SECTION

FORM OF PROPOSAL

BID #2021-20

TIGER HOLLOW STADIUM AND SCOTTS RIDGE FIELD AND TRACK REPLACEMENTS

RIDGEFIELD, CT

**TO: Town of Ridgefield, Purchasing Department
Mr. Jacob Muller, Director of Facilities and Purchasing
PURCHASING@RIDGEFIELDCT.ORG**

Pursuant to and in compliance with your "Invitation to Bid" relating thereto, the undersigned,

(Name of Firm)

having visited the site and carefully examined the Drawings, Bidding Documents and complete Specifications **dated May 5 2021** together with all Addenda issued and received prior to scheduled closing time for recipient of Bids as prepared by the Architects, KAESTLE BOOS ASSOCIATES, INC., 416 Slater Road, New Britain, Connecticut, hereby offers and agrees as follows:

To provide all labor, materials, and all else whatsoever necessary to erect and properly finish all work in connection with the Tiger Hollow Stadium and Scotts Ridge Field and Track Replacement Project to the satisfaction of the Architect and Owner.

QUALIFICATIONS:

By submitting this proposal, the bidder certifies that he/she meets or exceeds the required qualifications. Bidders must have prior experience consisting of the successful construction and/or replacement of no less than five (5) synthetic turf athletic fields that are 65,000 sf or greater and two (2) tracks within the past five (5) years. Synthetic turf field construction and/or replacement shall have consisted of laser grading of the field base stone, concrete anchor curbing, and synthetic turf field underdrain systems. Track construction experience shall consist of construction of asphalt base, long/triple jump runways and pits, high jump, and concrete edge curbing. Bidders must provide verification of experience with this Form of Proposal and include a completed Bidders Qualification Statement with this proposal.

BID
TIGER HOLLOW AND SCOTTS RIDGE FIELD AND TRACK REPLACEMENTS
RIDGEFIELD HIGH SCHOOL
RIDGEFIELD, CT

Bid Item A - Scotts Ridge Middle School Field Replacement

	(\$)	
<i>written amount</i>				<i>numerals</i>

Bid Item B – Tiger Hollow Stadium Field Replacement

	(\$)	
<i>written amount</i>				<i>numerals</i>

Bid Item C – Tiger Hollow Stadium Track Replacement

	(\$)	
<i>written amount</i>				<i>numerals</i>

Bid Item D – Tiger Hollow Stadium Miscellaneous Improvements

	(\$)	
<i>written amount</i>				<i>numerals</i>

BASE BID TOTAL (*Bid Items A, B, C, D, and all allowances under Section 010000-Summary*)

	(\$)	
<i>written amount</i>				<i>numerals</i>

to provide all labor, materials, and all else whatsoever necessary to construct all base bid improvements described in the specifications.

Turf Manufacturer/Installer carried in Bid: _____

Track Surfacing Manufacturer/Installer carried in Bid: _____

If awarded this Contract, we will execute a Contract with the **Town of Ridgefield**.

The Undersigned Also Agrees as Follows:

First: To do any extra work not covered by the above schedule of prices, which may be ordered by the Engineer and to accept as full compensation therefor such prices as may be agreed upon in writing by the Engineer and the Contractor in accordance with Article 5, “General Conditions”.

Second: Within seven (7) days from the date of the “Notice to Proceed”, to execute the Contract and to furnish to the Owner a satisfactory performance and payment bond in the sum of the full amount of the contract.

ALTERNATES

The undersigned Bidder further proposes and agrees that should the following Alternates be accepted and included in the Contract, the amount of the Lump Sum Bid, as heretofore stated, shall be adjusted by the amount of said Alternates. All materials and workmanship shall be in strict accordance with the Drawings and Specifications and shall be in place prices. Refer to specification section 01 23 00 Alternates and the drawings for a detailed information and narratives for the scope of each Alternate.

Scotts Ridge Middle School Field Replacement

Alternate No. 1: DEDUCT: Synthetic Turf System with Pad: Deduct \$ _____ (net change)

Alternate No. 2: ADD: Fencing Repairs and Mesh Replacement: Add \$ _____

Alternate No. 3: ADD: Ball Netting System: Add \$ _____

Alternate No. 4: ADD: Field Top Stone: Add \$ _____

Alternate No. 5: ADD: Field Perimeter Collector Drain: Add \$ _____

Tiger Hollow Stadium Field Replacement

Alternate No. 6: DEDUCT: Synthetic Turf System without Pad: Deduct \$ _____ (net change)

Alternate No. 7: ADD: Field Top Stone: Add \$ _____

Alternate No. 8: ADD: Field Perimeter Collector Drain: Add \$ _____

Tiger Hollow Stadium Track Replacement

Alternate No. 9: ADD: Track and Field Equipment: Add \$ _____

Alternate No. 10: DEDUCT: Structural Spray Track System: Deduct \$ _____ (net change)

Alternate No. 11: DEDUCT: Track Color Change: Red Polyurethane Bound Layered Impermeable

Running Track Surface with Embedded EPDM Finish

(sandwich system): Deduct \$ _____ (net change)

UNIT PRICES

Should the amount of improvements required be increased or decreased due to special considerations found at the site or because of a request of the Town of Ridgefield, the undersigned agrees that the following supplemental UNIT PRICES will be the basic price in place for computing the EXTRA or CREDIT. Each UNIT PRICE shall include all equipment, tools, labor, permits, fees, etc., incidental to the installation and completion of the work involved. Refer to specification section 01 22 00 Unit Costs for detailed information for the scope of each Unit Cost Item.

The amounts shown are net changes to the Contract for the quantity of additional work and include the Contractor's and any Subcontractor's amounts for overhead and profit. For deleted work, the net credit to the Contract shall be 10% less. All work is to be accomplished in accordance with applicable Sections of the Specifications.

C.Y. = cubic yard

S.F. = square foot

S.Y. = square yard

S.F.F.= square foot face of exposed wall

L.F. = linear foot

EA = Each

ITEMS

1. Mass Earth Excavation	\$_____ (CY)
2. Granular Fill	\$_____ (CY)
3. Processed Aggregate	\$_____ (CY)
4. Collector Pipe Stone	\$_____ (CY)
5. Field Base, Bottom Stone	\$_____ (CY)
6. Field Base, Top Stone	\$_____ (CY)
7. Concrete Anchor Curbing	\$_____ (LF)
8. Track Slot Drain and Anchor Curbing	\$_____ (LF)
9. Flat Panel Drain	\$_____ (LF)
10. Geotextile Filter Fabric	\$_____ (SF)
11. 4' High Black Vinyl Coated Chain-Link Fencing	\$_____ (LF)
12. 6' High Black Vinyl Coated Chain-Link Fencing	\$_____ (LF)
13. Full Depth Track Base	\$_____ (SY)
14. Walkway Asphalt Pavement	\$_____ (SY)

CONTRACT TIME

The undersigned Bidder hereby certifies that Substantial Completion and Final Completion will be achieved in accordance with the time designated in the General Conditions of the Contract for Construction.

The undersigned hereby certifies that they can furnish labor that can work in harmony with all other elements of labor employed or to be employed on the work.

The Bid includes Addenda listed below and they are hereby acknowledged:

Addendum No. # _____ Dated _____

Addendum No. # _____ Dated _____

Addendum No. # _____ Dated _____

SIGNATURE

Contractor Firm

Printed Name and Title

Authorized Signature

Business Address

City, State, and Zip code

Office Telephone Number

Mobile Telephone Number

Email

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STATEMENT OF BIDDER'S QUALIFICATIONS
(To be submitted by the Bidder on separate sheets WITH THE BID)

To be considered for this proposal the bidder must be able to certify that he/she meets or exceeds the required qualifications. Bidders must have prior specific experience consisting of the successful construction of no less than five (5) infilled synthetic turf athletic fields that are 55,000 sf or greater in the past 5 years and construction of no less than two (2) urethan surfaced running tracks. Synthetic turf field construction shall have consisted of synthetic turf, infill, laser graded base, and anchor curbing. Track construction shall have consisted of asphalt paved base, track events, and rubberized surfacing. Project Superintendent shall be the same as all reference projects. Material supplier/installation experience is not acceptable for General Contractor qualifications. Bidders must provide verification of experience with the bid documents and include the information requested in this Qualification Statement to be considered a responsive bidder.

All questions must be answered, and the data given must be clear and comprehensive. This statement must be notarized. The Bidder may submit any additional information he desires.

1. Name of Bidder and IRS Employers Identification Number.
2. Permanent main office address.
3. When organized.
4. If a corporation, where incorporated.
5. How many years have you been engaged in the contracting business under your present firm or trade name?
6. Have you ever failed to complete any work awarded to you? If so, where and why?
7. List any pending or current litigation that involves your company.
8. List any past litigation involving your company within the past five (5) years.
9. List five (5) successful synthetic turf field construction projects in the past five (5) years.
10. List two (2) successful track construction projects in the past five (5) years.
11. List all the ASBA certified field builders employed (or subcontracted) by your firm.
12. Background and experience of the principal members of your organization, including the officers and Project Superintendent.
13. Will you, upon request, fill out a detailed financial statement and furnish any other information that may be required by the Owner.
14. Include the following certification on qualification statements: The undersigned hereby authorizes and requests any person, firm, or corporation to furnish any information requested by the Owner in verification of the recitals comprising this Statement of Bidder's Qualifications.

Dated at _____ This _____ day of _____, 201__.

(Name of Bidder)

By _____

Title _____

Enclose answers on separate pages with your Bid

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HOLD HARMLESS AGREEMENT

The undersigned covenants and agrees to and shall at all times indemnify, protect and save harmless the Town of Ridgefield from and against all costs or expenses resulting from any and all losses, damages, detriments, claims, demands, cost and charges including attorneys fees the Town of Ridgefield may directly or indirectly suffer, sustain or be subjected to by reason or on account of the work to be performed pursuant to this Contract or any activities in connection with said Contract whether such losses and damages be suffered or sustained by the Town of Ridgefield directly or by its employees, licenses or invitees or be suffered or sustained by other persons or corporations who may seek to hold the Town of Ridgefield liable therefore.

The Contractor shall comply with the Provisions of the Immigration Reform and Control Act of 1986 effective and enforceable as of June 6, 1987 which Act makes unlawful the hiring for employment or subcontracting individuals failing to provide documentation of legal eligibility to work in the United States. The Contractor shall hold the Town of Ridgefield harmless for the failure of the Contractor to comply with the provisions of said Act.

IN WITNESS WHEREOF, the parties hereto have set their hand and seal this on the _____ day of _____

Signed, Sealed and Delivered in the
Presence of:

Signed:

Notary Public

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APPENDIX - INSURANCE REQUIREMENTS

Each bidder shall carry and maintain the following insurance coverage during the period of the contract: The Certificate of Insurance for the Limits of Liability stated below should be submitted with your bid to the Purchasing Department at Town Hall. **Bidders may not perform any work until all insurance requirements are met.**

1. **Comprehensive General Liability Insurance** as will protect him, the Town, and any subcontractor performing work covered by this Contract, from claims for damages for personal injury, including accidental or wrongful death, as well as claims for property damages, which may arise from operations under this Contract whether such operations be by himself or by any subcontractor or by anyone directly or indirectly employed by either of them. Liability insurance shall include premises and operations, products, contractual, owners, and contractor's protective. The minimum amounts of such insurance shall be as follows:
 - Bodily Injury Liability and Property Damage Liability:
\$1,000,000 each occurrence.
 - **The Town shall be named as an Additional Insured**
This **MUST** be stated explicitly on the Certificate or you will be **disqualified**
2. **Worker's Compensation Insurance and Employer's Liability** for all of his employees, employed at the site and in case any work is sublet, the Contractor shall require the subcontractor similarly to provide Workmen's Compensation Insurance for all employees of the later unless such employees are covered by the protection afforded by the Contractor.
 - Worker's Compensation and Employer Liability:
Statutory Limits
3. **Comprehensive Auto Liability Insurance:**
 - **Bodily Injury Insurance and Property Damage Insurance** covering the operation of all Motor Vehicles owned, hired and/or non-owned by the Contractor, or used by the Contractor in the Prosecution of the work under the Contract, shall be in the minimum of **\$1,000,000 each occurrence.**

All policies relating to this Contract shall be so written so that the Town shall be notified of cancellation or change at least thirty (30) days prior to the effective

date for each policy and type of coverage except for nonpayment which shall be ten (10) days prior to the cancellation. Renewal certificate covering the renewal of all policies expiring during the life of the Contract shall be filed with the Town not less than ten (10) days before the expiration of such policies. Failure to do so will result in work stoppage and possible contract cancellation.

Purchasing Department
Town of Ridgefield, 400 Main Street, Ridgefield, CT 06877
203-431-2720 & purchasing@ridgefieldct.org

FRACKING WASTE ORDINANCE NOTICE

On January 9, 2019, The Town of Ridgefield approved and adopted an Ordinance prohibiting the storage, disposal or use of fracking waste on Town of Ridgefield land and/or projects. The complete Ordinance can be viewed at the Town Clerk's Office located at 400 Main Street, Ridgefield, CT or on the town website at the following link;

<https://ecode360.com/RI2176/laws/LF1067113.pdf#search=fracking>

Bidders shall follow this Ordinance in preparation and submission of their bid.

- 1.) No materials containing natural gas or oil waste shall be utilized in providing and retaining services to construct or maintain publicly owned and/or maintained road or real property with the Town of Ridgefield.
- 2.) No materials containing natural gas or oil waste shall be utilized in the purchase or acquisition of materials to construct or maintain publicly owned and/or maintained road or real property with the Town of Ridgefield.
- 3.) We _____ hereby submit a bid for materials, equipment and/or labor for the Town of Ridgefield. The bid is for bid documents titled _____. We hereby certify under penalty of perjury that no natural gas waste or oil waste will be used by the undersigned bidder or any contractor, sub-contractor, agent or vendor agent in connection with the bid; nor will the undersigned bidder or any sub-contractor, agent or vendor agent thereof apply any natural gas waste or oil waste to any road or real property within the Town of Ridgefield as a result of the submittal of this bid if selected.

4.) The successful bidder shall submit certificates of origin for project materials, fill and other.

Signed and sealed in
the presence of:

Contractor

By_____

Date_____

IN WITNESS WHEREOF, the parties hereto have set their hand and seal this
day on the_____ day of_____

Signed, Seated and Delivered in the
Presence of:

Signed:

Notary Public

CONTRACTOR'S LIST OF SUBCONTRACTORS

List below the subcontractors intended to be utilized for this project. This page must be completed and submitted with the bid.

1. Firm: _____

Firm's Address: _____

Contact: Name _____ Telephone _____

Type of Work to be Performed: _____

2. Firm: _____

Firm's Address: _____

Contact: Name _____ Telephone _____

Type of Work to be Performed: _____

3. Firm: _____

Firm's Address: _____

Contact: Name _____ Telephone _____

Type of Work to be Performed: _____

4. Firm: _____

Firm's Address: _____

Contact: Name _____ Telephone _____

Type of Work to be Performed: _____

Company: _____

Bid Title: _____

Street: _____

Bid No.: _____

City, State: _____

Telephone No.: _____

CONTRACTOR'S LIST OF SUBCONTRACTORS

List below the subcontractors intended to be utilized for this project. This page must be completed and submitted with the bid.

1. Firm: _____

Firm's Address: _____

Contact: Name _____ Telephone _____

Type of Work to be Performed: _____

2. Firm: _____

Firm's Address: _____

Contact: Name _____ Telephone _____

Type of Work to be Performed: _____

3. Firm: _____

Firm's Address: _____

Contact: Name _____ Telephone _____

Type of Work to be Performed: _____

4. Firm: _____

Firm's Address: _____

Contact: Name _____ Telephone _____

Type of Work to be Performed: _____

Company: _____

Bid Title: _____

Street: _____

Bid No.: _____

City, State: _____

Telephone No.: _____

CONTRACTOR'S QUALIFICATION STATEMENT

List below references for similar projects, including all information requested. This page must be completed and submitted with the bid.

1. Client: _____

Project Address: _____

Approximate Value: _____ Date: Started _____ Completed _____

Contact: Name _____ Telephone _____

2. Client: _____

Project Address: _____

Approximate Value: _____ Date: Started _____ Completed _____

Contact: Name _____ Telephone _____

3. Client: _____

Project Address: _____

Approximate Value: _____ Date: Started _____ Completed _____

Contact: Name _____ Telephone _____

4. Client: _____

Project Address: _____

Approximate Value: _____ Date: Started _____ Completed _____

Contact: Name _____ Telephone _____

Company: _____ *Bid Title:* _____

Street: _____ *Bid No.:* _____

City, State: _____ *Telephone No.:* _____

CONTRACTOR'S QUALIFICATION STATEMENT

List below references for similar projects, including all information requested. This page must be completed and submitted with the bid.

5. Client: _____

Project Address: _____

Approximate Value: _____ Date: Started _____ Completed _____

Contact: Name _____ Telephone _____

6. Client: _____

Project Address: _____

Approximate Value: _____ Date: Started _____ Completed _____

Contact: Name _____ Telephone _____

7. Client: _____

Project Address: _____

Approximate Value: _____ Date: Started _____ Completed _____

Contact: Name _____ Telephone _____

8. Client: _____

Project Address: _____

Approximate Value: _____ Date: Started _____ Completed _____

Contact: Name _____ Telephone _____

Company: _____ *Bid Title:* _____

Street: _____ *Bid No.:* _____

City, State: _____ *Telephone No.:* _____

CONTRACTOR'S QUALIFICATION STATEMENT

List below references for similar projects, including all information requested. This page must be completed and submitted with the bid.

9. Client: _____

Project Address: _____

Approximate Value: _____ Date: Started _____ Completed _____

Contact: Name _____ Telephone _____

10. Client: _____

Project Address: _____

Approximate Value: _____ Date: Started _____ Completed _____

Contact: Name _____ Telephone _____

11. Client: _____

Project Address: _____

Approximate Value: _____ Date: Started _____ Completed _____

Contact: Name _____ Telephone _____

12. Client: _____

Project Address: _____

Approximate Value: _____ Date: Started _____ Completed _____

Contact: Name _____ Telephone _____

Company: _____ *Bid Title:* _____

Street: _____ *Bid No.:* _____

City, State: _____ *Telephone No.:* _____

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SUPPLEMENTAL GENERAL CONDITIONS, BUILDINGS**1. CONTRACTOR'S UNDERSTANDING:**

It is understood and agreed that the Contractor has, by careful examination, satisfied himself as to the nature and location of the work, the conformation of the ground, the character quality and quantity of materials to be encountered, the character of equipment and facilities needed preliminary to and during the prosecution of the work, the general and local conditions, and all other matters which can in any way affect the work under this Contract. No verbal agreement or conversation with any officer, agent or employee of the Owner, either before or after the execution of this contract, shall affect or modify any of the terms or obligations herein contained.

2. DEFINITIONS:**OWNER:**

The word "Owner" when it appears in the Contract Documents shall mean The Town of Ridgefield, Connecticut.

ENGINEER:

The word "Engineer" when it appears in the contract Documents shall mean: Jacob Muller, Facilities Director, or his specifically designated Agent.

CONTRACTOR:

The word "Contractor" when it appears in the Contract Documents shall mean the party to whom the Contract has been awarded.

3. MATERIALS, APPLIANCES AND EMPLOYEES:

The Contractor shall at all times endorse strict discipline and good order among his employees and shall not employ on the work any unfit person or any one not skilled in the work assigned to him.

4. PROTECTION OF WORK AND PROPERTY:

The Contractor shall continuously maintain adequate protection of all his work from damage and shall protect the Owner's property from injury or loss arising in connection with this Contract. He shall make good any such damage, injury or loss, except such as may be directly due to errors in the Contract Documents or caused by agents or employees of the Owner. He shall adequately protect adjacent property as provided by

law and the Contract Documents. He shall provide and maintain all passageways, guard fences, lights and other facilities for protection required by public authority or local conditions.

In an emergency affecting the safety of life or of the work or of adjoining property, the Contractor, without special instruction or authorization from the Engineer, is hereby permitted to act at his discretion, to prevent such threatened loss or injury, and he shall so act, without appeal, if so instructed or authorized. Any compensation claimed by the Contractor on account of emergency work, shall be determined by agreement or arbitration.

5. CHANGES IN THE WORK:

The Owner, without invalidating the Contract, may order extra work or make changes by altering, adding to or deducting from the work, the Contract Sum being adjusted accordingly. All such work shall be executed under the conditions of the original Contract except that any claim for extension of time caused thereby shall be adjusted at the time of ordering such change.

In giving instructions, the Engineer shall have authority to make minor changes in the work, not involving extra cost, and not inconsistent with the purposes of the work, but otherwise, except in an emergency, endangering life or property, no extra work or change shall be made unless in pursuance of a written order by the Engineer, and no claim for an addition to the Contract Sum shall be valid unless so ordered.

The value of any such extra work or change shall be determined in one or more of the following ways:

- (a) By estimate and acceptance in a lump sum.
- (b) By unit prices named in the Contract subsequently agreed upon.
- (c) By cost and percentage or by cost and a fixed fee.

If none of the above methods is agreed upon, the Contractor, provided he receives an order as above, shall proceed with the work. In such case, and also under case (c), he shall keep and present in such form as the Engineer may direct, a correct account of the net cost of labor and materials, together with vouchers. In any case, the Engineer shall certify to the amount, including reasonable allowance for overhead and profit, due to the Contractor. Pending final determination of value, payments on account of changes shall be made on the Engineer's estimate.

6. CLAIMS FOR EXTRA COST:

If the Contractor claims that any instructions by drawings or otherwise involve extra cost under this Contract, he shall give the Engineer written notice thereof within a reasonable

time after the receipt of such instructions and in any event before proceeding to execute the work, except in emergency endangering life or property, and the procedure shall then be as provided for changes in the work. No such claim shall be valid unless so made.

7. SUSPENSION OF WORK:

The Owner may at any time suspend the work, or any part thereof by giving 24 hours notice to the Contractor in writing. The work shall be resumed by the Contractor within ten (10) days after the date fixed in the written notice from the owner to the Contractor to do so. The Owner shall reimburse the Contractor for expense incurred by the Contractor in connection with the work under this contract as a result of such suspension.

8. THE OWNER'S RIGHT TO DO WORK:

If the Contractor should neglect to prosecute the work properly or fail to perform any provision of this Contract, the Owner, after three days written notice to the Contractor may, without prejudice to any other remedy he may have, make good such deficiencies and may deduct the cost thereof from the payment then or thereafter due the Contractor.

9. PAYMENTS WITHHELD:

The Owner may withhold or, on account of subsequently discovered evidence, nullify the whole or part of any certificate to such extent as may be necessary to protect him from loss on account of the following:

- (a) Defective work not remedied.
- (b) Claims filed or reasonable evidence indicating probable filing of claims.
- (c) Failure of the Contractor to make payments properly to subcontractors or for material or labor.
- (d) A reasonable doubt that the Contract can be completed for the balance then unpaid.
- (e) Damage to another Contractor.

When the above grounds are removed, payment shall be made for amount withheld because of them.

10. CONTRACTOR'S LIABILITY INSURANCE:

The Contractor shall maintain such insurance as will protect him from claims under workmen's compensation acts and from any other claims for damages for personal injury, including death, which may arise from operations under this Contract, whether such operations be by himself or by any subcontractor or anyone directly or indirectly employed by either of them. Certificates of such insurance shall be filed with the engineer, if he so requires and shall be subject to his approval for adequacy of protection.

11. INDEMNITY:

The Contractor shall indemnify and save harmless the Owner from and against all losses and all claims, demands, payments, suits, actions, recoveries and judgments of every nature and description brought or recovered against him, by reason of any act or omission of the said Contractor, his agents or employees, in the execution of the work or in the guarding of it.

The Contractor shall and is hereby authorized to maintain and pay for such insurance, issued in the name of the Owner, as will protect the Owner from his contingent liability under this Contract, and the Owner's right to force against the Contractor any provision of this article shall be contingent upon the full compliance by the Owner with the terms of such insurance policy or policies, a copy of which shall be deposited with the Owner.

12. DAMAGES:

Any claim for damage arising under this Contract shall be made in writing to the party liable within a reasonable time of the first observance of such damage and not later than the time of final payment, except as expressly stipulated otherwise in the case of faulty work or materials and shall be adjusted by agreement or arbitration.

13. ASSIGNMENT:

Neither party to the Contract shall assign the Contract or sublet it as a whole without the written consent of the other, nor shall the Contractor assign any moneys due to or to become due to him hereunder, without the previous written consent of the Engineer.

14. ENGINEER'S STATUS:

The Engineer shall have general supervision and direction of the work. He has authority to stop the work whenever such stoppage may be necessary to insure the proper execution of the Contract. He shall also have authority to reject all work and materials which do not conform to the Contract, to direct the application of forces to any portion of the work, as in his judgment is required, and to order the force increased or diminished, and to decide questions which arise in the execution of the work.

15. METHOD OF PAYMENT:

At the end of each calendar month, the Contractor shall submit to the Engineer a requisition for payment which requisition shall be based upon the actual amount of the work performed during the previous month. The requisition may include materials stored on the site but not installed. The Engineer shall, within ten (10) days, check the requisition against his review of the work which has been done and submit it to the Owner, a written statement as to the validity of the requisition. The Owner shall then pay to the Contractor **ninety-five percent (95%)** of the amount stated in the Engineer's report. **No payment shall be made until the Contractor has satisfied all prevailing wage reporting requirements if prevailing wages are a part of this contract.**

16. FINAL PAYMENT:

When the Contract has been completed, the Contractor shall notify the Engineer in writing. Upon receipt of this notification, the Engineer shall proceed to make final measurements of the work done under the provisions of this Contract. The Engineer shall then submit to the Owner a written statement setting forth these final measurements and the amount due the Contractor consistent with the unit prices and lump sum bid in the Proposal. The Owner shall within sixty (60) days pay to the Contractor this sum except that he may deduct any moneys which are to be retained under the terms of the Contract for repairs or otherwise.

17. ORDER OF THE WORK:

The order of the work shall be subject to the approval of the Engineer in all cases. The Contractor may be required to submit a work schedule in writing to the Engineer for his approval.

18. (OMITTED)**19. PROTECTION TO PUBLIC:**

The Contractor shall conduct the work in such a manner as to offer minimum disturbance to the traveling public. He shall not close off traffic without specific permission of the Engineer and shall provide flagmen if such becomes necessary, in the opinion of the Engineer. Proper barricades, lights, and other protective devices shall be supplied at the Contractor's expense and properly maintained during the entire course of the work.

20. GUARANTEE:

The Contractor guarantees that the work to be done under this Contract and the materials furnished by him and used in the construction of the project are free from defects or flaws. The guarantee is for a term of one (1) year from and after the date upon which the final estimate of the Engineer is formally approved by the party of the first part. It is hereby agreed and understood that this guarantee shall not include any repairs made necessary by any cause or causes other than defective materials furnished by or defective work done by the Contractor.

21. RATE OF PROGRESS AND TIME OF COMPLETION:

The Contractor shall commence work within seven (7) days after receipt of the Notice to Proceed and, unless an extension of time shall be made in the manner herein provided, shall progress therewith to final completion within *sixty (60) consecutive calendar days* after receipt of the Notice to Proceed excluding the time required to complete soil remediation by others.

22. EXTENSION OF TIME:

The Contractor expressly covenants and agrees that, in undertaking to complete the work within the time specified, he has taken into consideration and made allowance for all of the ordinary delays and hindrances incident to such work, whether growing out of delays

in securing materials, workmen, or otherwise. Should the Contractor, however, be substantially delayed in the prosecution and completion of the work by any changes, additions, or omissions therein ordered in writing by the engineer, or by fire, lightning, earthquake, tornado, cyclone, riot, insurrection of war, or by the abandonment of the work by the workmen engaged therein, through no fault of the Contractor, or by the discharge of all or any material number of workmen in consequence of difficulties arising between the Contractor and such workmen, or by the neglect, delay, or default of any other contractor of the town, then the Contractor may, within five (5) days after the occurrence of the delay for which he claims allowance, notify the Engineer in writing, and thereupon, and otherwise, the Contractor shall be allowed such additional time for the completion of the work, as the Engineer in his discretion shall award in writing, and his decision shall be final and conclusive upon the parties. Such additional time shall be the sole and exclusive remedy for any delay claimed by the Contractor.

23. SALES TAX:

In accordance with the provisions of Special Act No. 77-98, as amended, and Section 12-412(a) of the Connecticut General Statutes, sales of tangible personal property and services to the Town are not subject to the Connecticut Sales and Use Tax, and such tax shall not be included as part of the bid.

24. Termination of the Contract:

If the Owner fails to make payment thereon for a period of 30 days, the Contractor may, upon seven additional days written notice to the Owner, terminate the Contract and recover from the Owner payment for work executed and for proven loss with respect to materials, equipment tools, and construction equipment and machinery, including reasonable overhead, profit and damages applicable to the project.

If the contractor defaults or persistently fails or neglects to carry out the work in accordance with the Contract Documents or fails to perform a provision of the Contract, the Owner, after seven days written notice to the Contractor and without prejudice to any other remedy the Owner may have, may make good such deficiencies and may deduct the cost thereof, including compensation for the Engineer's services and expenses made necessary thereby, from the payment then or thereafter due the Contractor. Alternatively, at the Owner's option, and upon certification by the Engineer that sufficient cause exists to justify such action, the Owner may terminate the Contract and take possession of the site and of all materials, equipment, tools, and construction equipment and machinery thereon owned by the Contractor and may finish the Work by whatever method the Owner may deem expedient. If the unpaid balance of the Contract Sum exceeds costs of finishing the Work, including compensation for the Engineer's services and expenses made necessary thereby, such excess shall be paid to the Contractor, but if such costs exceed such unpaid balance, the Contractor shall pay the difference to the Owner.

SECTION 01 10 00 – SUMMARY

PART 1 - GENERAL

1.1 RELATED DOCUMENTS

1. Instructions to Bidders, AIA Document A201, “General Conditions of the Contract for Construction, 2007 Edition as amended, and Division 01 General Requirements are bound herein, are hereby made a part of this Section, and shall be binding on all Contractors and Subcontractors who perform this work.

1.2 SUMMARY

A. This Section includes the following:

1. Project information.
2. Work covered by the Contract Documents.
3. Work under other contracts.
4. Use of premises.
5. Owner's occupancy requirements.
6. Work restrictions.
7. Specification formats and conventions.

B. Related Sections include the following:

1. Division 01 Section “Temporary Facilities and Controls” for limitations and procedures governing temporary use of Owner’s facilities.

1.3 PROJECT INFORMATION

A. Project Identification: The Project consists of the following:

a. TIGER HOLLOW STADIUM FIELD AND TRACK REPLACEMENT

- i. Project Location: **Ridgefield High School, 700 N Salem Road, Ridgefield, CT**

b. SCOTTS RIDGE FIELD REPLACEMENT

1. Project Location: **Scotts Ridge Middle School, 750 N Salem Road, Ridgefield, CT**

B. Owner's Representative:

Jacob Muller
Director of Facilities and Purchasing
Town of Ridgefield
400 Main Street, Ridgefield, CT 06877
purchasing@ridgefieldct.org

C. Architect/Town Agent Identification:

Eric Roise, Project Manager
Kaestle Boos Associates, Inc., New Britain, CT
eroise@kaestleboos-architects.com

Luke McCoy, Principal
Kaestle Boos Associates, Inc., New Britain, CT
lmccoy@kaestleboos-architects.com

1.4 WORK COVERED BY THE CONTRACT DOCUMENTS

A. The Work includes but is not necessarily limited to:

1. This project consists of replacing the synthetic turf field and track, including, milling, and repaving the asphalt running track base at Tiger Hollow Stadium at Ridgefield High School. The project also includes the replacement of the synthetic turf field at Scotts Ridge Middle School on the Scotts Ridge Middle School Campus. Other work includes minor grading, paving, fencing and athletic accessories work at both sites.
2. The bid drawings, bid documents and project manual for '**TIGER HOLLOW STADIUM AND SCOTTS RIDGE FIELD AND TRACK REPLACEMENTS RIDGEFIELD HIGH SCHOOL**' as modified by addenda are hereby incorporated into this specification in whole. All Materials, installation and warranties required for a working; acceptable athletic facility shall be included in the bid price.

1.5 WORK SEQUENCE

- A. General: The Contractor shall utilize the proposed Schedule as the basis for a detailed construction schedule, to be submitted to the Owner, Architect, and Owner's Representative for review and approval. The schedule must clearly demonstrate the proper sequencing of construction and relocation activities, and how operational and environmental conditions will be satisfactorily maintained in all occupied spaces.
- B. A Pre-Bid Conference will be held on Thursday May 13, 2021 at 11:00 A.M. at the lower parking lot at Tiger Hollow Stadium at Ridgefield High School. Attendees will then proceed to the Scotts Ridge Field after Tiger Hollow. The pre-bid conference is non-mandatory; however it is recommended that all Bidders attend.
- C. The Sequence of work is to be completed per the following schedule:

Bids Due

Thursday, May 27, 2021 at 11:00 am

- | | |
|--------------------------------------|----------------------|
| a. Bidder Interviews / Scope Reviews | Friday, May 28, 2021 |
| b. City and Contractor Executions | June 1 - 11, 2021 |

Construction (June - September 2021)

COMPLETED BY:

- | | |
|--|--------------------|
| a. Construction Start (no sooner than): | June 14, 2021 |
| b. Substantial Completion: | |
| a. Scotts Ridge Field: | August 15, 2021 |
| b. Tiger Hollow Stadium Track and Field: | September 23, 2021 |
| c. Final Completion: | |
| a. Scotts Ridge Field: | September 17, 2021 |
| b. Tiger Hollow Stadium Track and Field: | October 22, 2021 |

1.6 CONTRACTOR USE OF PREMISES

- A. General: Contractor shall have limited use of premises for construction operations as indicated on Drawings by the Contract limits.
- B. Use of Site: Confine operations to areas within Contract limits indicated. Do not disturb portions of the Project site beyond areas in which Work is indicated.
 - 1. Confine the parking of workmen's and construction vehicles, and the storage of construction materials to a designated on site staging area determined by the **Architect and Owner**
 - 2. Keep driveways and entrances clear and available to Owner, Owner's employees, and emergency vehicles at all times. Staging at access ways may be required in order to permit completion of the work of this Project. Do not use these areas for parking or storage of materials.
 - 3. Schedule deliveries to minimize space and time requirements for storage of materials and equipment on-site.
 - 4. Employees may be required to submit to and pass a COREY check to be able to work on the school site.
 - 5. **Access drives down to Tiger Hollow Field shall be made available for exclusive use by the contractor. Town will provide traffic control signage and temporary barricades on up hill egresses. Contractor shall not be held accountable for conditions of access roads south of Tiger Hollow lower access gate.**
- C. Site Security: Continuously maintain the security of the site and the Work. Cooperate with the Owner in particularly sensitive areas where security and special safeguards are required.
 - 1. Provide security guards or patrols as necessary for adequate protection of the interests of the Contractor, Owner, and the general public on the site, or in public ways around the site.
 - 2. Ensure that all gates and other openings are secured at the end of each work day.
 - 3. Ensure property signage is installed to signify the project areas is closed.

1.7 OWNER OCCUPANCY

- A. Completion Requirements: Timely completion of the project is critical. Aggressive construction scheduling and careful monitoring of crucial path milestones cannot be overemphasized.
- B. Partial Owner Occupancy: Owner will occupy the remainder of School site during entire construction period, with the exception of areas under construction. Cooperate with Owner during construction operations to minimize conflicts and facilitate Owner usage. Perform the Work so as not to interfere with Owner's operations. Maintain existing exits, unless otherwise directed by authorities having jurisdiction.
 - 1. Maintain access to existing walkways, driveway, concession building, and other adjacent occupied or used facilities. Do not close or obstruct walkways, corridors, or other occupied or used facilities without written permission from Owner, and authorities having jurisdiction.
 - 2. Provide not less than 72 hours' notice to Owner and Architect of activities that will affect Owner's operations.

1.8 MATERIALS OWNERSHIP

- A. Except for materials indicated to be stockpiled, salvaged, or to remain Owner's property, cleared and demolished materials shall become Contractor's property and shall be removed from the site.

1.9 WORK RESTRICTIONS

- A. On-Site Work Hours: Work shall be generally performed during normal business working hours of 7:00 a.m. to 6:00 p.m., Monday through Friday, except otherwise indicated.
1. Extended, Holiday & Weekend Hours:
(8:00 am to 4:00 pm maximum weekend) as Approved by Owner
 2. **The owner may restrict certain days when no work can occur on site. (e.g. graduation, testing days, etc)**
 3. **Deliveries shall be coordinated to not conflict with daily student drop-off and pick-up.**
 4. **Field lights may be used upon request.**

1.10 CODES, STANDARDS AND PERMITS

- A. All work under this contract shall conform to all codes and standards in effect as of the date of receipt of Bids which are applicable to this Project. All work shall further conform to specific requirements and interpretations of local authorities having jurisdiction over the Project, These Codes, standards, and authorities are referred to collectively as "the governing codes and authorities", and similar terms, throughout the Specifications. Determination of applicable codes and standards and of the authorities having jurisdiction, shall be the responsibility of each Contractor, as shall be the analysis of all such codes and standards in regard to their applicability to the Project for the purposes of determining necessary construction to conform to such code requirements, for securing all approvals and permits necessary to proceed with construction, and to obtain all permits necessary for the Owner to occupy the facilities for their intended use. In the case of conflicts between the requirements of different codes and standards, the most restrictive or stringent requirements shall be met.

1. The Contractor shall maintain at the site, for the duration of the construction operations at the site, two (2) copies of all relevant codes and standards listed herein or determined to be applicable to the work. Maintain one copy of such codes in the Construction Manager's site office, for the exclusive use of the Owner the Architect and its consultants.

- B. The codes that were used in the design of the Project are as follows:

1. State of Connecticut State Building Code
2. National Fire Protection Association (NFPA) codes and standards.
3. Architectural Access Board 521 CMR, as amended (AAB)
4. The Americans with Disabilities Act, Title II, including ADA Regulations.
5. ADA Standards for Accessible Design, 28 CFR 36 (7-1-94 Edition) ADA Accessibility Guidelines (ADAAG).
6. Section 504, Rehabilitation Act 1973 including 504 Regulations.
7. Uniform Federal Accessibility Standards, 41 CFR 101-19.6.

- C. Code Enforcement and Approvals: Secure the general building permit for the work. Conform to all conditions and requirements of the permit and code enforcement authorities. Provide names and license numbers of its responsible representatives to complete application for permit.

1.11 SPECIFICATION FORMATS AND CONVENTIONS

- A. These Specifications with the accompanying Drawings are intended to describe and illustrate all material, labor, and equipment necessary to complete ‘TIGER HOLLOW AND SCOTTS RIDGE FIELD AND TRACK REPLACEMENTS’ at Ridgefield High School.
- B. Specification Format: The Specifications are organized into Divisions and Sections using the 48-division format and CSI/CSC’s “MasterFormat” numbering system.
 - 1. Section Identification: The Specifications use Section numbers and titles to help cross-referencing in the Contract Documents. Sections in the Project Manual are in numeric sequence; however, the sequence is incomplete because all available Section numbers are not used. Consult the table of contents at the beginning of the Project Manual to determine numbers and names of Sections in the Contract Documents.
 - 2. Division 01: Sections in Division 01 govern the execution of the Work of all Sections in the Specifications.
- C. Specification Content: The Specifications use certain conventions for the style of language and the intended meaning of certain terms, words, and phrases when used in particular situations. These conventions are as follows:
 - 1. Abbreviated Language: Language used in the Specifications and other Contract Documents is abbreviated. Words and meanings shall be interpreted as appropriate. Words implied, but not stated, shall be inferred as the sense requires. Singular words shall be interpreted as plural, and plural words shall be interpreted as singular where applicable as the context of the Contract Documents indicates.
 - 2. Imperative mood and streamlined language are generally used in the Specifications. Requirements expressed in the imperative mood are to be performed by Contractor. Occasionally, the indicative or subjunctive mood may be used in the Section Text for clarity to describe responsibilities that must be fulfilled indirectly by Contractor or by others when so noted.
 - a. The words "shall," "shall be," or "shall comply with," depending on the context, are implied where a colon (:) is used within a sentence or phrase.
- D. In general, the Specifications will describe the “quality” of the work and the Drawings, the “extent” of the work. The Drawings and Specifications are cooperative and supplementary, however, and each item of the work is not necessarily mentioned in both the Drawings and the Specifications. All work necessary to complete the project, so described, is to be included in this Contract.
- E. In case of disagreement between Drawings and Specifications, or within either document itself, the Architect shall construe the Documents to require the better quality or greater quantity of work for the Owner that can reasonably be construed therefrom. Any work done by the Contractor without consulting the Architect, when the same requires a decision, shall be done at the Contractor’s risk.

1.12 SOCIAL SECURITY TAXES

- A. The Contractor and each Subcontractor shall pay the taxes measured by the wages of all their employees as required by the Federal Social Security Act all amendments thereto, and accept the exclusive liability for said taxes. The Contractor shall also indemnify and hold the Owner, and its respective officers, agents and servants, and the Architect harmless on account of any tax measured

by the wages aforesaid of employees of the Contractor and his Subcontractors, assessed against the Owner under authority of said law.

1.13 UNEMPLOYMENT INSURANCE

- A. The Contractor and each Subcontractor shall pay unemployment insurance measured by the wages of his employees as required by law and accept the exclusive liability for said contributions. The Contractor shall also indemnify and hold harmless the Owner, and the Architect on account of any contribution measured by the wages of aforesaid employees of the Contractor and his Subcontractors, assessed against the Owner under authority of law.

1.14 PREVAILING WAGES

- A. This is a prevailing wage project and is subject to prevailing wage requirements as outlined in the attached sections

1.15 ALLOWANCES:

- A. The contractor shall carry the following sum as an allowance in his base bid cost. Allowances shall be used at the discretion of the Architect. Unused allowance amounts shall be credited back to the Owner.
- B. The Contractor shall carry an allowance of \$60,000 in his base bid for miscellaneous earthwork and paving.
- C. Allowance shall be included in base bid (e.g. "your best price" + allowance = Base bid) on proposal form

1.16 OCCUPATIONAL SAFETY AND HEALTH ACT

- D. The Contractor shall comply with the requirements of the Occupational Safety and Health Act of 1970 and the Construction Safety Act of 1969, including all standards and regulations which have been promulgated by the Governmental Authorities which administer such Acts and said requirements, standards and regulations are incorporated herein by reference.
1. The Contractor shall comply with M.G.L. Chapter 306 of the Acts of 2004, which requires that everyone employed at the job site to complete a course in construction safety and health approved by the U.S. Occupational Safety and Health Administration, known as the "OSHA-10 hour course".
- E. The Contractor shall comply with said regulations, requirements and standards and require and be directly responsible for compliance therewith on the part of his agents, employees material men and Subcontractors; and shall directly receive and be responsible for all citations, assessments, fines or penalties which may be incurred by reason of his agents, employees, material men or Subcontractors failing to so comply.
- F. The Contractor shall indemnify the Owner and Architect and save them harmless from any and all losses, costs and expenses, including fines and reasonable attorney's fees incurred by the Owner, the Construction Manager and Architect by reason of the real or alleged violation of such laws. Ordinances, regulations and directives, Federal, State, and Local, which are currently in effect or which become effective in the future, by the Contractor, his Subcontractors or material men.

RIDGEFIELD HIGH SCHOOL
RIDGEFIELD, CT
KBA #21001.00

TIGER HOLLOW AND SCOTTS RIDGE
FIELD AND TRACK REPLACEMENTS

PART 2 - PRODUCTS (Not applicable)

PART 3 - EXECUTION (Not applicable)

END OF SECTION 01 10 00

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SECTION 01 22 00 — UNIT PRICES

PART 1 - GENERAL

1.1 RELATED DOCUMENTS

- A. The Contractor, Subcontractors, and/or suppliers providing goods and services referenced in or related to this Section shall also be bound by the Related Documents identified in Division 01 Section "Summary."

1.2 SUMMARY

- A. This Section includes administrative and procedural requirements for unit prices.
- B. Related Sections include the following:
 - 1. Division 01 Section "Contract Modification Procedures" for procedures for submitting and handling Change Orders.
 - 2. Division 01 Section "Quality Requirements" for general testing and inspecting requirements.

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.
- B. Abbreviations: The following abbreviations for units of measurement are used in unit prices:
 - 1. C.Y.: cubic yard
 - 2. S.Y.: square yard
 - 3. S.F.: square foot
 - 4. L.F.: linear foot
 - 5. EA.: each
 - 6. LB.: pound

1.4 PROCEDURES

- A. Unit prices include all necessary material, plus cost for delivery, installation, insurance, overhead and profit.
 - 1. Unit price amounts are net changes in the Contract Sum for additional work and include the Contractor's and any Subcontractor's amount for overhead and profit.
 - 2. For deleted work, the net credit to the Contract Sum shall be 10% less.

- B. 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.
- C. List of Unit Prices: A list of unit prices is included in Part 3. Specification Sections referenced in the schedule contain requirements for materials described under each unit price

PART 2 - PRODUCTS (NOT USED)

PART 3 - EXECUTION

3.1 LIST OF UNIT PRICES

- A. Provide the following unit prices as listed on the Bid Form:
 - 1. Mass Earth Excavation:
 - a. Description: Mass Earth Excavation including the completion of the excavation, formation and compaction of the subgrade, and the disposal of surplus or unsuitable material according to Division 31 Section "Earth Moving."
 - b. Unit of Measurement: C.Y.
 - 2. Granular Base Fill:
 - a. Description: Granular base fill (in place) including compaction according to Division 31 Section "Earth Moving."
 - b. Unit of Measurement: C.Y.
 - 3. Processed Aggregate:
 - a. Description: Processed Aggregate (in place) including compaction according to Division 31 Section "Earth Moving."
 - b. Unit of Measurement: C.Y.
 - 4. Collector Pipe Stone:
 - a. Description: Field base stone according to Division 33 Section "Field Subdrainage system"
 - b. Unit of Measurement: C.Y.

5. Field Base Stone:
 - a. Description: Field base stone according to Division 33 Section "Field Subdrainage system"
 - b. Unit of Measurement: C.Y.
6. Field Top Stone:
 - a. Description: Field base stone according to Division 33 Section "Field Subdrainage system"
 - b. Unit of Measurement: C.Y.
7. Concrete Anchor Curbing:
 - a. Description: Synthetic turf system concrete anchor curb (6" wide x 12" deep), including forming, concrete, rebar, labor, and finishing according to Drawing L4.03 Detail "5 Main Field Perimeter Collector Drain"
 - b. Unit of Measurement: L.F.
8. Flat Panel Drain:
 - a. Description: Flat panel drain, including manufacturing, shipping, and installation according to Division 33 Section "Field Subdrainage System."
 - b. Unit of Measurement: L.F.
9. Geotextile Fabric
 - a. Description: Geotextile fabric, including manufacturing, shipping, and installation according to Division 33 Section "Field Subdrainage System."
 - b. Unit of Measurement: S.F.
10. 4' High Black Vinyl Chain-Link Fencing:
 - a. Description: Contractor shall provide the additional cost for the materials, labor, and other items necessary for the installation of a complete fencing system including, but not limited to excavation, footings, posts, caps, fabric, top and bottom rails, tension rods, ties and repair of disturbed areas, according to Division 32 sections.
 - b. Unit of Measurement: L.F.
11. 6' High Galvanized Chain-Link Fencing:
 - a. Description: Contractor shall provide the additional cost for the materials, labor, and other items necessary for the installation of a complete fencing system including, but not limited to excavation, footings, posts, caps, fabric, top and bottom rails, tension rods, ties and repair of disturbed areas, according to Division 32 sections.

- b. Unit of Measurement: L.F.

12. Full Depth Track Base:

- a. Description: Contractor shall provide the additional cost for the materials, labor, and other items necessary for the installation of a complete section as asphalt and base including, but not limited to excavation, compaction, testing, and repair of disturbed areas, according to Detail #6 Sheet L4.01 and Division 32 specification sections.
- b. Unit of Measurement: S.Y.

13. Walkway Asphalt Pavement:

- a. Description: Contractor shall provide the additional cost for the materials, labor, and other items necessary for the installation of a complete section of asphalt walkway and base including, but not limited to excavation, compaction, testing, and repair of disturbed areas, according to Detail #3 Sheet L4.01 and Division 32 specification sections.
- b. Unit of Measurement: S.Y.

END OF SECTION 01 22 00

SECTION 01 23 00 - ALTERNATES

PART 1 - GENERAL

1.1 RELATED DOCUMENTS

- A. The Contractor, Subcontractors, and/or suppliers providing goods and services referenced in or related to this Section shall also be bound by the Related Documents identified in Division 01 Section "Summary."

1.2 SUMMARY

- A. This Section includes administrative and procedural requirements for alternates.

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.

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 No. 1: ADD: SCOTTS RIDGE FIELD: Synthetic Turf system with Resilient pad
Contractor shall provide the addition cost for the materials, labor, and other items necessary for providing and installing a 2" synthetic turf with resilient underlayment pad in lieu of the base bid 2.5" turf and infill. Include all adjustments to infill and grading volumes as well as adjustments to the existing anchor curb. Refer to the Specifications and Details #7 and #8 Sheet L4.03.
- B. Alternate No. 2 ADD: Scotts Ridge Fencing Repairs:
Contractor shall provide the NET addition cost for the materials, labor, and other items necessary for removal of existing chain link fabric, bent posts and rails and replacement with new 6 gauge black PVC coated fence fabric and rails for all field perimeter fence (various heights) at Scotts Ridge Field. New fence fabric, rails and accessories shall be per the specifications and fencing details shown on sheets L4.04 and L4.05.
- C. Alternate No. 3 ADD: Scotts Ridge 30' Ht. Ball Netting System
Contractor shall provide the addition cost for the materials, labor, and other items necessary for a complete, installed and fully functional 30' height ball netting system as shown on the site drawings, detailed on sheet L4.06 and as Specified.
- D. Alternate No. 4 ADD: Field Tops Stone (Scotts Ridge): Contractor shall provide the additional cost for the materials, labor, and other items necessary for the placement of an additional ½" depth of field top stone as described in section 33 46 16 and shown on the project drawings for the entire area of Synthetic turf at the Scotts Ridge field.
- E. Alternate No. 5 ADD: Field Collector Drain Remediation (Scotts Ridge): Contractor shall provide the additional cost for the materials, labor, installation, grading, testing and other items necessary for the remediation of the drainage stone over the existing collector pipe per the Specifications and as shown on detail #6 sheet L4.05.
-
- F. Alternate No. 6: (DEDUCT): TIGER HOLLOW STADIUM Turf: Contractor shall provide the NET credit cost for the materials, labor, and other items necessary for providing and installing a 2.5" synthetic turf installed directly on base stone (with out resilient underlayment pad) in lieu of the base bid turf, pad, curbing shims and infill. Include all adjustments to infill and grading volumes as well as adjustments to the existing anchor curb. Refer to the Specifications and Details #7 and #8 Sheet L4.03.
- G. Alternate No. 7 ADD: Field Tops Stone (Tiger Hollow): Contractor shall provide the additional cost for the materials, labor, and other items necessary for the placement of an additional ½" depth of field top stone as described in section 33 46 16 and shown on the project drawings for the entire area of Synthetic turf at the Tiger Hollow Stadium field.

- H. Alternate No. 8 ADD: Field Collector Drain Remediation (Tiger Hollow): Contractor shall provide the additional cost for the materials, labor, installation, grading, testing and other items necessary for the remediation of the drainage stone over the existing collector pipe per the Specifications and as shown on detail #6 sheet L4.05.
-
- I. Alternate No. 9: ADD: Track and Field Equipment: Contractor shall provide the cost for the materials, assembly, labor, and other items necessary for providing and installing equipment noted as 'alternate' in specification sections 32 86 00 Athletic Field Equipment and 32 86 10 Track and Field Equipment.
- J. Alternate No. 10: (DEDUCT): Structural Spray Track Surfacing: Contractor shall provide the NET credit cost for the materials, assembly, labor, and other items necessary for providing and installing a structural spray type track surfacing as specified in section 32 18 23.31 Polyurethane Running track Surfacing – Structural Spray (color: red) in lieu of the Polyurethane Sandwich type system specified as Base Bid.
- K. Alternate No. 11: (DEDUCT): Track Surfacing Colors: Contractor shall provide the NET credit cost for the materials, labor, and other items necessary for providing and installing a solid Red colored track in lieu of the Grey and Orange Track specified in Section 32 18 23.33 Polyurethane Running track Surfacing – Embedded Sandwich System.

END OF SECTION 01 23 00

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SECTION 01 26 00 - CONTRACT MODIFICATION PROCEDURES

PART 1 - GENERAL

1.1 RELATED DOCUMENTS

- A. The Contractor, Subcontractors, and/or suppliers providing goods and services referenced in or related to this Section shall also be bound by the Related Documents identified in Division 01 Section "Summary."

1.2 SUMMARY

- A. This Section specifies administrative and procedural requirements for handling and processing Contract modifications.
- B. Related Sections include the following:
 - 1. Division 01 Section "Product Requirements" for administrative procedures for handling requests for substitutions made after Contract award.

1.3 MINOR CHANGES IN THE WORK

- A. Architect will issue supplemental instructions authorizing Minor Changes in the Work, not involving adjustment to the Contract Sum or the Contract Time, as follows:
 - 1. **"Architect's Supplemental Instruction" (ASI)** form, included at end of Part 3, is an Owner/Architect-initiated supplemental instruction.
 - a. Architect's Supplemental Instructions, including attachments, will be issued to the contractor electronically via email, in the form of a "portable document file" (.PDF).

1.4 CONTRACTOR REQUEST FOR INFORMATION

- A. Contractor-Initiated Requests for Information: If clarification is required to the Contract Documents, the Contractor may submit a "Request for Information" (RFI) to the Architect. This request will be responded to by the Architect with a "Response to Request for Information" (RRFI) form.
 - 1. RFI forms shall be submitted in a typewritten, standardized format, including title and description, and sequentially numbered.
 - 2. Submit RFI, including attachments, electronically in the form of a "portable document file" (.PDF).
 - 3. RFI forms are not to be submitted as requests for shop drawing approval. Comply with requirements in Division 01 Section "Submittal Procedures."
 - 4. **"Response to Request for Information" (RRFI)**, included at the end of Part 3, will be issued in response to Contractor's Request for Information (RFI).

- a. A Response to Request for Information (RRFI), including attachments, will be issued to the contractor electronically via email, in the form of a “portable document file” (.PDF).
 - b. If the RRFI directs the Contractor to carry out the Work with no change in Contract Sum or Contract Time, but the Contractor anticipates a change associated with the Work, the Contractor must submit to the Architect in writing within 5 days of receipt of the RRFI, the reason for the anticipated change in Contract Sum and/or Contract Time. A change in Contract Time must be submitted with a revised CPM Schedule in accordance with Division 01 Section “Construction Progress Documentation.”
- B. The Contractor shall review any RFI’s submitted by Subcontractors prior to submission to the Architect to ensure such RFI’s are not already clearly and unambiguously answered in the Contract Documents.
1. The Contractor shall pay for the Architect’s time and expenses for reviewing RFI’s which are already clearly answered or inferable from the Contract Documents in accordance with the Architect’s standard rates. Such payments will be paid by the Contractor through the Owner.

1.5 PROPOSAL REQUESTS

- A. Owner-Initiated Proposal Requests: Architect will issue a detailed description of proposed changes in the Work that may require adjustment to the Contract Sum or the Contract Time. If necessary, the description will include supplemental or revised Drawings and Specifications.
1. **“Proposal Requests” (PR)** included at the end of Part 3, including attachments, will be issued to the contractor electronically via email, in the form of a “portable document file” (.PDF).
 2. Proposal Requests issued by the Architect are for information only. Do not consider them instructions either to stop work in progress or to execute the proposed change.
- B. Contractor-Initiated Proposals: If latent or unforeseen conditions require modifications to the Contract, Contractor may propose changes by first submitting a “Request for Information” (RFI) to Architect. This request will be responded to by the Architect with a “Response to Request for Information” form, wherein the Contractor may submit a Change Order Proposal.
1. Include a statement outlining reasons for the change and the effect of the change on the Work. Provide a complete description of the proposed change. Indicate the effect of the proposed change on the Contract Sum and the Contract Time.
 2. Include a list of quantities of products required or eliminated and unit costs, with total amount of purchases and credits to be made; and the labor hours for each class of labor at the hour rate. If requested, furnish survey data to substantiate quantities.
 3. Indicate applicable taxes, delivery charges, equipment rental, and amounts of trade discounts.
 4. Include an updated Contractor's Construction Schedule that indicates the effect of the change, including, but not limited to, changes in activity duration, start and finish times, and activity relationship. Use available total float before requesting an extension of the Contract Time.

5. Comply with requirements in Division 01 Section "Product Requirements" if the proposed change requires substitution of one product or system for product or system specified.
- C. Change Order Proposal Form: Use CSI Form 13.6A, "Change Order Request (Proposal)," with attachments CSI Form 13.6D, "Proposal Worksheet Summary," and Form 13.6C, "Proposal Worksheet Detail," or similar document acceptable to Architect, for Change Order Proposals.
1. Submit Change Order Proposals (COP), including attachments from vendors and subcontractors and the initiating document, electronically in the form of a "portable document file" (.PDF).
 2. Each Change Order Proposal is to include reference to the initiating document (PR, RRFI, etc.), a title and description, and be sequentially numbered.
 3. **"Response to Change Order Proposal" (RCOP)**, included at the end of Part 3, will be issued in response to Contractor's Change Order Proposal (COP).
 - a. A Response to Change Order Proposal (RCOP) will be issued to the Contractor electronically via email, in the form of a "portable document file" (.PDF).
 - b. Following review of a COP by the Architect, if corrections are required prior to inclusion in a Change Order, resubmit revised COP with revision number and include all backup documentation and the initiating document.
- 1.6 CHANGE ORDER PROCEDURES
- A. On Owner's approval of a Proposal Request, Architect will issue a Change Order for signatures of Owner and Contractor on **AIA Document G701**.
- 1.7 CONSTRUCTION CHANGE DIRECTIVE
- A. Construction Change Directive: Architect may issue a Construction Change Directive on **AIA Document G714**. Construction Change Directive instructs Contractor to proceed with a change in the Work, for subsequent inclusion in a Change Order.
1. Construction Change Directive contains a complete description of change in the Work. It also designates method to be followed to determine change in the Contract Sum or the Contract Time.
- B. Documentation: Maintain detailed records of time and material for work required by the Construction Change Directive.
1. After completion of change, submit a Change Order Proposal associated with the Work of a Construction Change Directive, including an itemized account and supporting data necessary to substantiate cost and time adjustments to the Contract.
 2. The **Architect** will prepare a Change Order upon approval by the Architect and Owner of a Change Order Proposal.

PART 2 - PRODUCTS (Not Used)

PART 3 - EXECUTION

3.1 FORMS

A. The following forms referenced in this Section are attached:

1. ASI – Architect’s Supplemental Instructions, 1 page.
2. RRFI – Response to Request for Information, 1 page.
3. PR – Proposal Request, 1 pageRCOP – Response to Change Order Proposal, 1 page.

END OF SECTION 01 26 00

SECTION 01 29 00 - PAYMENT PROCEDURES

PART 1 - GENERAL

1.1 RELATED DOCUMENTS

- A. The Contractor, Subcontractors, and/or suppliers providing goods and services referenced in or related to this Section shall also be bound by the Related Documents identified in Division 01 Section "Summary."

1.2 SUMMARY

- A. This Section specifies administrative and procedural requirements necessary to prepare and process Applications for Payment.
- B. Related Sections include the following:
 - 1. Division 01 Section "Allowances" for procedural requirements governing handling and processing of allowances.
 - 2. Division 01 Section "Contract Modification Procedures" for administrative procedures for handling changes to the Contract.
 - 3. Division 01 Section "Unit Prices" for administrative requirements governing use of unit prices.

1.3 DEFINITIONS

- A. Schedule of Values: A statement furnished by Contractor allocating portions of the Contract Sum to various portions of the Work and used as the basis for reviewing Contractor's Applications for Payment.

1.4 SCHEDULE OF VALUES

- A. Coordination: Coordinate preparation of the Schedule of Values with preparation of Contractor's Construction Schedule.
 - 1. Correlate line items in the Schedule of Values with other required administrative forms and schedules, including the following:
 - a. Application for Payment forms with Continuation Sheets.
 - b. Submittals Schedule.
 - c. Contractor's Construction Schedule.
 - 2. Submit the Schedule of Values to Architect at earliest possible date but no later than seven days before the date scheduled for submittal of initial Applications for Payment. No payment shall be processed until schedule of values has been submitted and approved by the Architect.

- B. Format and Content: Use the Project Manual table of contents as a guide to establish line items for the Schedule of Values. Provide at least one line item for each Specification Section. For major trades with line item values exceeding \$25000, provide separate line items for identifiable units of work within such trade with a value not exceeding \$25000. Provide separate line items for labor and material.

1. Identification: Include the following Project identification on the Schedule of Values:
 - a. Project name and location.
 - b. Name of Architect.
 - c. Architect's project number.
 - d. Contractor's name and address.
 - e. Date of submittal.
2. Submit draft of AIA Document G702 and AIA Document G703 Continuation Sheets.
3. Arrange the Schedule of Values in tabular form with separate columns to indicate the following for each item listed:
 - a. Related Specification Section or Division.
 - b. Description of the Work.
 - c. Change Orders (numbers) that affect value.
 - d. Dollar value.
 - 1) Percentage of the Contract Sum to nearest one-hundredth percent, adjusted to total 100 percent.
4. Provide a breakdown of the Contract Sum in enough detail to facilitate continued evaluation of Applications for Payment and progress reports. Coordinate with the Project Manual table of contents. Provide several line items for principal subcontract amounts, where appropriate. Include separate line items under required principal subcontracts for operation and maintenance manuals, punch list activities, Project Record Documents, and demonstration and training in the amount of 5 percent of the Contract Sum. Include the following mandatory line items:
 - a. Mobilization
 - b. Demobilization
 - c. Builders Risk Insurance
 - d. Bonds
 - e. Scheduling
 - f. Construction Photographic Documentation
 - g. Field Engineering
 - h. Daily Site Cleanup
 - i. Safety Program
 - j. Full-Time Project Manager
 - k. Full-Time Project Superintendent
 - l. Dumpsters

General Contract O & P (not to be included in each line item).

5. Round amounts to nearest whole dollar; total shall equal the Contract Sum.

6. Provide a separate line item in the Schedule of Values for each part of the Work where Applications for Payment may include materials or equipment purchased or fabricated and stored, but not yet installed.
 - a. Differentiate between items stored on-site and items stored off-site. Include evidence of insurance or bonded warehousing.
7. Provide separate line items in the Schedule of Values for initial cost of materials, for each subsequent stage of completion, and for total installed value of that part of the Work.
8. Allowances: Provide a separate line item in the Schedule of Values for each allowance. Show line-item value of unit-cost allowances, as a product of the unit cost, multiplied by measured quantity. Use information indicated in the Contract Documents to determine quantities.
9. Each item in the Schedule of Values and Applications for Payment shall be complete. Include total cost and proportionate share of general overhead and profit for each item.
 - a. Temporary facilities and other major cost items that are not direct cost of actual work-in-place may be shown either as separate line items in the Schedule of Values or distributed as general overhead expense, at Contractor's option.

1.5 APPLICATIONS FOR PAYMENT

- A. Each Application for Payment shall be consistent with previous applications and payments as certified by Architect and paid for by Owner.
 1. Initial Application for Payment, Application for Payment at time of Substantial Completion, and final Application for Payment involve additional requirements.
- B. Payment Application Times: The date for each progress payment is indicated in the Agreement between Owner and Contractor. The period of construction Work covered by each Application for Payment is the period indicated in the Agreement.
 1. In order to expedite monthly payment during the course of the Project, the Contractor shall review with the Architect a preliminary draft of each Application for Payment before final copies of the Application are formally submitted. The draft copy shall be typed and include the application date and application number. The draft copy shall include the total of each column and extension of each row on the Application as if this was the formal submission. The cover sheet shall include the Original Contract Sum and a summary of Changes to the Contract Sum, retainage, and payments to date as if this was the formal submission.
- C. Payment Application Forms: Use AIA Document G702 and AIA Document G703 Continuation Sheets as form for Applications for Payment.
- D. Application Preparation: Complete every entry on form. Notarize and execute by a person authorized to sign legal documents on behalf of Contractor. Architect will return incomplete applications without action.
 1. Entries shall match data on the Schedule of Values and Contractor's Construction Schedule. Use updated schedules if revisions were made.

2. Include amounts of Change Orders issued before last day of construction period covered by application.
 - a. List each Change Order at the end of the Schedule of Values. Under each Change Order number, list each Change Order Proposal by number with a brief description of the Work and its value.
- E. Transmittal: Submit five signed and notarized original copies of each Application for Payment to Architect by a method ensuring receipt within 24 hours. One copy shall include waivers of lien and similar attachments if required.
 1. Transmit each copy with a transmittal form listing attachments and recording appropriate information about application.
- F. Waivers of Mechanic's Lien: With each Application for Payment, submit waivers of mechanic's liens from subcontractors, sub-subcontractors, and suppliers for construction period covered by the previous application.
 1. Submit partial waivers on each item for amount requested in previous application, after deduction for retainage, on each item.
 2. When an application shows completion of an item, submit final or full waivers.
 3. Owner reserves the right to designate which entities involved in the Work must submit waivers.
 4. Submit final Application for Payment with or preceded by final waivers from every entity involved with performance of the Work covered by the application who is lawfully entitled to a lien.
 5. Waiver Forms: Submit waivers of lien on forms, executed in a manner acceptable to Owner.
- G. Initial Application for Payment: Administrative actions and submittals that must precede or coincide with submittal of first Application for Payment include the following:
 1. List of subcontractors.
 2. Schedule of Values.
 3. Contractor's Construction Schedule (preliminary if not final).
 4. Products list.
 5. Schedule of unit prices.
 6. Submittals Schedule (preliminary if not final).
 7. List of Contractor's staff assignments.
 8. List of Contractor's principal consultants.
 9. Copies of building permits.
 10. Copies of authorizations and licenses from authorities having jurisdiction for performance of the Work.
 11. Initial progress report.
 12. Report of preconstruction conference.
 13. Certificates of insurance and insurance policies.
 14. Performance and payment bonds.
 15. Data needed to acquire Owner's insurance.

- H. Application for Payment at Substantial Completion: After issuing the Certificate of Substantial Completion, submit an Application for Payment showing 100 percent completion for portion of the Work claimed as substantially complete.
 - 1. Include documentation supporting claim that the Work is substantially complete and a statement showing an accounting of changes to the Contract Sum.
 - 2. This application shall reflect Certificates of Partial Substantial Completion issued previously for Owner occupancy of designated portions of the Work.
- I. Final Payment Application: Submit final Application for Payment with releases and supporting documentation not previously submitted and accepted, including, but not limited, to the following:
 - 1. Evidence of completion of Project closeout requirements.
 - 2. Insurance certificates for products and completed operations where required and proof that taxes, fees, and similar obligations were paid.
 - 3. Updated final statement, accounting for final changes to the Contract Sum.
 - 4. AIA Document G706, "Contractor's Affidavit of Payment of Debts and Claims."
 - 5. AIA Document G706A, "Contractor's Affidavit of Release of Liens."
 - 6. AIA Document G707, "Consent of Surety to Final Payment."
 - 7. Evidence that claims have been settled.
 - 8. Final meter readings for utilities, a measured record of stored fuel, and similar data as of date of Substantial Completion or when Owner took possession of and assumed responsibility for corresponding elements of the Work.
 - 9. Final, liquidated damages settlement statement.

PART 2 - PRODUCTS (Not Used)

PART 3 - EXECUTION (Not Used)

END OF SECTION 01 29 00

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SECTION 01 31 00 - PROJECT MANAGEMENT AND COORDINATION

PART 1 - GENERAL

1.1 RELATED DOCUMENTS

- A. The Contractor, Subcontractors, and/or suppliers providing goods and services referenced in or related to this Section shall also be bound by the Related Documents identified in Division 01 Section "Summary."

1.2 SUMMARY

- A. This Section includes administrative provisions for coordinating construction operations on Project including, but not limited to, the following:
 - 1. Coordination Drawings.
 - 2. Contractor's use of Architect's CAD files.
 - 3. Administrative and supervisory personnel.
 - 4. Project meetings.
- B. The Contractor shall participate in coordination requirements. Certain areas of responsibility will be assigned to specific Subcontractors.
- C. Related Sections include the following:
 - 1. Division 01 Section "Execution" for procedures for coordinating general installation and field-engineering services, including establishment of benchmarks and control points.
 - 2. Division 01 Section "Closeout Procedures" for coordinating Contract closeout.

1.3 COORDINATION

- A. Coordination: Coordinate construction operations included in different Sections of the Specifications to ensure efficient and orderly installation of each part of the Work. Coordinate construction operations, included in different Sections that depend on each other for proper installation, connection, and operation.
 - 1. Schedule construction operations in 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 with subcontractors to ensure maximum accessibility for required maintenance, service, and repair.
 - 3. Make adequate provisions to accommodate items scheduled for later installation.
 - 4. Where availability of space is limited, coordinate installation of different components to ensure maximum performance and accessibility for required maintenance, service, and repair of all components, including mechanical and electrical.
 - 5. No claim for extra compensation of extension of Contract time will be allowed for conditions resulting from a lack of said coordination.

- B. Prepare memoranda outlining special procedures required for coordination. Include such items as required notices, reports, and list of attendees at meetings.
 - 1. Prepare similar memoranda for Owner and separate contractors if coordination of their Work is required.
- C. Administrative Procedures: Coordinate scheduling and timing of required administrative procedures with other construction activities and activities of subcontractors to avoid conflicts and to ensure orderly progress of the Work. Such administrative activities include, but are not limited to, the following:
 - 1. Preparation of Contractor's Construction Schedule.
 - 2. Preparation of the Schedule of Values.
 - 3. Installation and removal of temporary facilities and controls.
 - 4. Delivery and processing of submittals.
 - 5. Progress meetings.
 - 6. Preinstallation conferences.
 - 7. Project closeout activities.
 - 8. Startup and adjustment of systems.
 - 9. Project closeout activities.
- D. Conservation: Coordinate construction activities to ensure that operations are carried out with consideration given to conservation of energy, water, and materials.
 - 1. Salvage materials and equipment involved in performance of, but not actually incorporated into, the Work. Refer to other Sections for disposition of salvaged materials that are designated as Owner's property.

1.4 CONTRACTOR'S USE OF ARCHITECT'S DIGITAL DATA FILES

- A. Architect's Digital Data Files: Electronic digital data files of the Contract Drawings will be provided by Architect for Contractor's use in preparing Coordination Drawings.
 - 1. At the Contractor's written request, Architect will furnish Contractor one set of digital data drawing files of the Contract Drawings for use in preparing Coordination Drawings, subject to the terms and conditions of the Contractor's use of CAD Files Agreement attached after this Section.
 - a. Architect makes no representations as to the accuracy or completeness of digital data drawing files as they relate to the Contract Drawings.
 - b. The following digital data files will be furnished for each appropriate discipline:
 - 1) Site Layout Plans.

1.5 ADMINISTRATIVE AND SUPERVISORY PERSONNEL

- A. General: In addition to Project superintendent, provide other administrative and supervisory personnel as required for proper performance of the Work.
- B. Key Personnel Names: Within 7 days of starting construction operations, submit a list of key personnel assignments, including superintendent and other personnel in attendance at Project site.

Identify individuals and their duties and responsibilities; list addresses and telephone numbers, including home and office telephone numbers. Provide names, addresses, and telephone numbers of individuals assigned as standbys in the absence of individuals assigned to Project.

1. Post copies of list in Project meeting room, in temporary field office, and by each temporary telephone. Keep list current at all times.

1.6 CRIMINAL OFFENDER RECORD INFORMATION

- A. CORI Reports: Each and every person in attendance at Project site must complete the CORI Request Form to be provided by the school.

1.7 PROJECT MEETINGS

- A. General: Schedule and conduct weekly meetings and conferences at Project site, unless otherwise indicated.

1. Attendees: Inform participants and others involved, and individuals whose presence is required, of date and time of each meeting.
2. Agenda: Prepare the meeting agenda, and distribute the agenda to all invited attendees.
3. Minutes: Record significant discussions and agreements achieved and distribute the meeting minutes to everyone concerned, including the Owner and Architect within 3 days of the meeting.

- B. Preconstruction Conference: Schedule a preconstruction conference before starting construction, at a time convenient to Owner, Project Manager, and Architect, but no later than 15 days after execution of the Agreement. Hold the conference at Project site or another convenient location. Conduct the meeting to review responsibilities and personnel assignments.

1. Attendees: Authorized representatives of Owner and Architect; Contractor and its superintendent; major subcontractors; suppliers; and other concerned parties shall attend the conference. All participants at the conference shall be familiar with Project and authorized to conclude matters relating to the Work.
2. Agenda: Discuss items of significance that could affect progress, including the following:
 - a. Tentative construction schedule.
 - b. Phasing.
 - c. Critical work sequencing and long-lead items.
 - d. Designation of key personnel and their duties.
 - e. Procedures for processing field decisions and Change Orders.
 - f. Procedures for requests for information (RFIs).
 - g. Procedures for testing and inspecting.
 - h. Procedures for processing Applications for Payment.
 - i. Distribution of the Contract Documents.
 - j. Submittal procedures.
 - k. Preparation of Record Documents.
 - l. Use of the premises and existing building.
 - m. Work restrictions.

- n. Owner's occupancy requirements.
 - o. Responsibility for temporary facilities and controls.
 - p. Parking availability.
 - q. Office, work, and storage areas.
 - r. Equipment deliveries and priorities.
 - s. First aid.
 - t. Security.
 - u. Progress cleaning.
 - v. Working hours.
3. Minutes: The Architect will record and distribute meeting minutes.
- C. Preinstallation Conferences: Conduct a preinstallation conference at Project site before each construction activity that requires coordination with other construction.
- 1. Attendees: Installer and representatives of manufacturers and fabricators involved in or affected by the installation and its coordination or integration with other materials and installations that have preceded or will follow, shall attend the meeting. Advise Architect of scheduled meeting dates.
 - 2. Agenda: Review progress of other construction activities and preparations for the particular activity under consideration, including requirements for the following:
 - a. The Contract Documents.
 - b. Options.
 - c. Related requests for information (RFIs).
 - d. Related Change Orders.
 - e. Purchases.
 - f. Deliveries.
 - g. Submittals.
 - h. Review of mockups.
 - i. Possible conflicts.
 - j. Compatibility problems.
 - k. Time schedules.
 - l. Weather limitations.
 - m. Manufacturer's written recommendations.
 - n. Warranty requirements.
 - o. Compatibility of materials.
 - p. Acceptability of substrates.
 - q. Temporary facilities and controls.
 - r. Space and access limitations.
 - s. Regulations of authorities having jurisdiction.
 - t. Testing and inspecting requirements.
 - u. Installation procedures.
 - v. Coordination with other work.
 - w. Required performance results.
 - x. Protection of adjacent work.
 - y. Protection of construction and personnel.
 - 3. Record significant conference discussions, agreements, and disagreements, including required corrective measures and actions.

4. Reporting: The Contractor shall distribute minutes of the meeting to everyone concerned, including the Owner, Project Manager, and Architect within 3 days of the meeting.
 5. Do not proceed with installation if the conference cannot be successfully concluded. Initiate whatever actions are necessary to resolve impediments to performance of the Work and reconvene the conference at earliest feasible date.
- D. Progress Meetings: Schedule weekly progress meetings. Coordinate dates of meetings with preparation of payment requests.
1. Attendees: In addition to representatives of Owner and Architect, each contractor concerned with current progress or involved in planning, coordination, or performance of future activities shall be represented at these meetings. All participants at the conference shall be familiar with Project and authorized to conclude matters relating to the Work.
 2. Agenda: Review and correct or approve minutes of previous progress meeting. Review other items of significance that could affect progress. Include topics for discussion as appropriate to status of Project.
 - a. Construction Schedule: Review progress since the last meeting. Determine whether each activity is on time, ahead of schedule, or behind schedule, in relation to Contractor's Construction Schedule. Determine how construction behind schedule will be expedited; secure commitments from parties involved to do so. Discuss whether schedule revisions are required to ensure that current and subsequent activities will be completed within the Contract Time.
 - 1) Review schedule for next period.
 - b. Review present and future needs of each entity present, including the following:
 - 1) Interface requirements.
 - 2) Sequence of operations.
 - 3) Status of submittals.
 - 4) Deliveries.
 - 5) Off-site fabrication.
 - 6) Access.
 - 7) Site utilization.
 - 8) Temporary facilities and controls.
 - 9) Work hours.
 - 10) Hazards and risks.
 - 11) Progress cleaning.
 - 12) Quality and work standards.
 - 13) Status of correction of deficient items.
 - 14) Field observations.
 - 15) Requests for information (RFIs).
 - 16) Status of proposal requests.
 - 17) Pending changes.
 - 18) Status of Change Orders.
 - 19) Pending claims and disputes.
 - 20) Documentation of information for payment requests.
 3. Minutes: The Architect will record and distribute the meeting minutes.

- E. Coordination Meetings: Schedule Project coordination meetings at regular intervals. Project coordination meetings are in addition to specific meetings held for other purposes, such as progress meetings and preinstallation conferences.
1. Attendees: In addition to representatives of the Contractor, each subcontractor, supplier, and other entity concerned with current progress or involved in planning, coordination, or performance of future activities shall be represented at these meetings. All participants at the conference shall be familiar with Project and authorized to conclude matters relating to the Work.
 2. Agenda: Review and correct or approve minutes of the previous coordination meeting. Review other items of significance that could affect progress. Include topics for discussion as appropriate to status of Project.
 - a. Contractor's Construction Schedule: Review progress since the last coordination meeting. Determine whether each contract is on time, ahead of schedule, or behind schedule. Determine how construction behind schedule will be expedited; secure commitments from parties involved to do so. Discuss whether schedule revisions are required to ensure that current and subsequent activities will be completed within the Contract Time.
 - b. Schedule Updating: Revise Contractor's Construction Schedule after each coordination meeting where revisions to the schedule have been made or recognized. Issue revised schedule concurrently with report of each meeting.
 - c. Review present and future needs of each contractor present, including the following:
 - 1) Interface requirements.
 - 2) Sequence of operations.
 - 3) Status of submittals.
 - 4) Deliveries.
 - 5) Off-site fabrication.
 - 6) Access.
 - 7) Site utilization.
 - 8) Temporary facilities and controls.
 - 9) Work hours.
 - 10) Hazards and risks.
 - 11) Progress cleaning.
 - 12) Quality and work standards.
 - 13) Change Orders.
 3. Reporting: The Contractor shall record meeting results and distribute copies to everyone in attendance and to others affected by decisions or actions resulting from each meeting.

PART 2 - PRODUCTS (Not Used)

PART 3 - EXECUTION

3.1 FORMS

- A. The following forms referenced in this Section are attached:

1. CAD Files Agreement, 1 page.

END OF SECTION 01 31 00

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CAD FILES AGREEMENT

Date

(address)

Dear (Contractor's Name):

At your request, Kaestle Boos Associates, Inc. ("KBA") will provide electronic files for your convenience and use in the preparation of shop drawings related to the construction of the TIGER HOLLOW AND SCOTTS RIDGE FIELD AND TRACK REPLACEMENTS RIDGEFIELD HIGH SCHOOL, RIDGEFIELD, CT subject to the following terms and conditions.

KBA's electronic files are compatible with AutoCAD Autodesk Architectural Desktop 2018. KBA makes no representation as to the compatibility of these files with your hardware or your software beyond the specified release of the referenced specifications.

Data contained on these electronic files is part of KBA's instruments of service and shall not be used by you or anyone else receiving this data through or from you for any purpose other than as a convenience in the preparation of shop drawings for the referenced project; however, they are not to be used in place of Contractor's shop drawings. Any other use or reuse by you or by others, will be at your sole risk and without liability or legal exposure to KBA. You agree to make no claim and hereby waive, to the fullest extent permitted by law, any claim or cause of action of any nature against KBA, its officers, directors, employees, agents or subconsultants which may arise out of or in connection with your use of the electronic files.

Furthermore, you shall, to the fullest extent permitted by law, indemnify and hold harmless KBA from all claims, damages, losses and expenses, including attorney's fees arising out of or resulting from your use of these electronic files.

These electronic files are not contract documents. Significant differences may exist between these electronic files and corresponding hard copy contract documents due to addenda, change orders or other revisions. KBA makes no representation regarding the accuracy or completeness of the electronic files you receive. In the event that a conflict arises between the signed contract documents prepared by KBA and electronic files, the signed contract documents shall govern. You are responsible for determining if any conflict exists. By your use of these electronic files, you are not relieved of your duty to fully comply with the contract documents, including and without limitation, the need to check, confirm and coordinate all dimensions and details, take field measurements, verify field conditions and coordinate your work with that of other contractors for the project.

Because of the potential that the information presented on the electronic files can be modified, unintentionally or otherwise, KBA reserves the right to remove all indicia of its ownership and/or involvement from each electronic display.

KBA will furnish you electronic files of the following drawing sheets: (Insert list of drawings)

A lump sum fee of \$500.00 will be charged for this service. Payment must be remitted to KBA prior to delivery of the electronic files. The lump sum fee will be charged for each occurrence.

Under no circumstances shall delivery of the electronic files for use by you be deemed a sale by KBA and KBA makes no warranties, either express or implied, of merchantability or fitness for any particular purpose. In no event shall KBA be liable for any loss of profit or any consequential damages.

CONTRACTOR – (PRINTED NAME)

CONTRACTOR – (SIGNATURE)

DATE

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THIS PAGE INTENTIONALLY LEFT BLANK**

SECTION 01 33 00—SUBMITTAL PROCEDURES

PART 1 - GENERAL

1.1 RELATED DOCUMENTS

- A. The Contractor, Subcontractors, and/or suppliers providing goods and services referenced in or related to this Section shall also be bound by the Related Documents identified in Division 01 Section "Summary."

1.2 SUMMARY

- A. Section includes requirements for the submittal schedule and administrative and procedural requirements for submitting Shop Drawings, Product Data, Samples, and other submittals.
- B. Related Sections include the following:
 - 1. Division 01 Section "Payment Procedures" for submitting Applications for Payment and the Schedule of Values.
 - 2. Division 01 Section "Project Management and Coordination" for submitting and distributing meeting and conference minutes and for submitting Coordination Drawings.
 - 3. Division 01 Section "Closeout Procedures" for submitting warranties.
 - 4. Divisions 02 through 33 Sections for specific requirements for submittals in those Sections.

1.3 DEFINITIONS

- A. Action Submittals: Written and graphic information that requires Architect'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.
- C. File Transfer Protocol (FTP): Communications protocol that enables transfer of files to and from another computer over a network and that serves as the basis for standard Internet protocols. An FTP site is a portion of a network located outside of network firewalls within which internal and external users are able to access files.
- D. Portable Document Format (PDF): An open standard file format licensed by Adobe Systems used for representing documents in a device-independent and display resolution-independent fixed-layout document format.

1.4 ACTION SUBMITTALS

- A. Submittal Schedule: Submit a schedule of submittals, arranged in chronological order by dates required by construction schedule. Include time required for review, ordering, manufacturing, fabrication, and delivery when establishing dates. Include additional time required for making

corrections or revisions to submittals noted by Architect and additional time for handling and reviewing submittals required by those corrections.

1. Coordinate submittal schedule with list of subcontracts, the schedule of values, and Contractor's construction schedule.
2. Final Submittal: Submit concurrently with the first complete submittal of Contractor's construction schedule.
 - a. Submit revised submittal schedule to reflect changes in current status and timing for submittals.
3. Format: Arrange the following information in a tabular format:
 - a. Scheduled date for first submittal.
 - b. Specification Section number and title.
 - c. Submittal category: Action; informational.
 - d. Name of subcontractor.
 - e. Description of the Work covered.
 - f. Scheduled date for Architect's final release or approval.
 - g. Scheduled date of fabrication.

1.5 SUBMITTAL ADMINISTRATIVE REQUIREMENTS

- A. General: Electronic copies of CAD Drawings of the Contract Drawings will not be provided by Architect for Contractor's use in preparing submittals, except as permitted in Division 01 Section "Project Management and Coordination" for use in preparing coordination drawings.
- 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. Submit all submittal items required for each Specification Section concurrently unless partial submittals for portions of the Work are indicated on approved submittal schedule.
 - 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 two weeks 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. Intermediate Review: If intermediate submittal is necessary, process it in same manner as initial submittal.

3. Resubmittal Review: Allow two weeks for review of each resubmittal.
 - a. Resubmittals will be reviewed no more than two times at the Owner's expense. Resubmittals which fail to comply with Contract requirements will be reviewed at the Contractor's expense, based on an hourly rate of \$75 per hour, not to exceed \$600 for each subsequent submittal.
 - b. The Owner reserves the right to deduct said reimbursement from the Contractor's application for payment on a monthly basis.
- D. 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 6 by 8 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 and address of Architect.
 - d. Name and address of Contractor.
 - e. Name and address of supplier.
 - f. Name of manufacturer.
 - g. Number and title of appropriate Specification Section.
 - h. Drawing number and detail references, as appropriate.
 - i. Other necessary identification.
 4. Additional Paper Copies: Unless additional copies are required for final submittal, and unless Architect observes noncompliance with provisions in the Contract Documents, initial submittal may serve as final submittal.
 - a. Submit one copy of submittal to concurrent reviewer in addition to specified number of copies to Architect.
 5. Transmittal: Package each submittal individually and appropriately for transmittal and handling. Transmit each submittal using a transmittal form. Architect will return submittals, without review, received from sources other than Contractor.
 - a. Transmittal Form: Provide locations on form for the following information:
 - 1) Revise list below to suit Project.
 - 2) Project name.
 - 3) Date.
 - 4) Destination (To:).
 - 5) Source (From:).
 - 6) Names of subcontractor, manufacturer, and supplier.
 - 7) Category and type of submittal.
 - 8) Submittal purpose and description.
 - 9) Specification Section number and title.
 - 10) Drawing number and detail references, as appropriate.
 - 11) Transmittal number, numbered consecutively.

- 12) Submittal and transmittal distribution record.
- 13) Remarks.
- 14) Signature of transmitter.

E. Electronic Submittals: Identify and incorporate information in each electronic submittal file as follows:

1. Assemble complete submittal package into a single indexed file incorporating submittal requirements of a single Specification Section and transmittal form with links enabling navigation to each item.
2. Name file with submittal number or other unique identifier, including revision identifier.
3. Provide means for insertion to permanently record Contractor's review and approval markings and action taken by Architect.
4. Transmittal Form for Electronic Submittals: Use electronic form acceptable to Owner, containing the following information:
 - a. Project name.
 - b. Date.
 - c. Name and address of Architect.
 - d. Name of Contractor.
 - e. Name of firm or entity that prepared submittal.
 - f. Names of subcontractor, manufacturer, and supplier.
 - g. Category and type of submittal.
 - h. Submittal purpose and description.
 - i. Specification Section number and title.
 - j. Specification paragraph number or drawing designation and generic name for each of multiple items.
 - k. Drawing number and detail references, as appropriate.
 - l. Location(s) where product is to be installed, as appropriate.
 - m. Related physical samples submitted directly.
 - n. Indication of full or partial submittal.
 - o. Transmittal number.
 - p. Submittal and transmittal distribution record.
 - q. Other necessary identification.
 - r. Remarks.

F. Options: Identify options requiring selection by Architect.

G. Deviations and Additional Information: On an attached separate sheet, prepared on Contractor's letterhead, record relevant information, requests for data, revisions other than those requested by Architect on previous submittals, and deviations from requirements in the Contract Documents, including minor variations and limitations. Include same identification information as related submittal.

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 "Approved" or "Approved as Corrected."
- 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 "No Exception Taken" or "Make Corrections Noted" taken by Architect.

PART 2 - PRODUCTS

2.1 SUBMITTAL PROCEDURES

- A. General Submittal Procedure Requirements: Prepare and submit submittals required by individual Specification Sections. Types of submittals are indicated in individual Specification Sections.
 1. Submit electronic submittals via email as PDF electronic files.
 - a. Architect will return annotated file. Annotate and retain one copy of file as an electronic Project record document file.
- 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 catalog cuts.
 - b. Manufacturer's product specifications.
 - c. Standard color charts.
 - d. Statement of compliance with specified referenced standards.
 - e. Testing by recognized testing agency.
 - f. Application of testing agency labels and seals.
 - g. Notation of coordination requirements.
 - h. Availability and delivery time information.
 4. Submit Product Data before or concurrent with Samples.
 5. Submit Product Data in one of the following formats:
 - a. PDF electronic file.
 - b. Five paper copies of Product Data, unless otherwise indicated. Architect will return four copies. Mark up and retain one returned copy as a Project Record Document.
- 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. Schedules.
 - f. Design calculations.
 - g. Compliance with specified standards.
 - h. Notation of dimensions established by field measurement.
 - i. Seal and signature of professional engineer if specified.
 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 but no larger than 30 by 42 inches.
- 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.
 3. 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.
 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 three sets of Samples. Architect will retain two Sample sets; remainder will be returned. Mark up and retain one returned Sample set as a Project Record Sample.
 - 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 sets of paired units that show approximate limits of variations.
- E. Coordination Drawings: Comply with requirements specified in Division 01 Section "Project Management and Coordination."
- F. 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.
- G. 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.
- H. 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.
- I. Product Certificates: Prepare written statements on manufacturer's letterhead certifying that product complies with requirements in the Contract Documents.
- J. Material Certificates: Prepare written statements on manufacturer's letterhead certifying that material complies with requirements in the Contract Documents.
- K. 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.
- L. 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.
- M. 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.
- N. 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.
- O. 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, if any, and term of the coverage.
- P. Material Safety Data Sheets (MSDSs): Submit information as required by law.

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 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.
1. Provide "Combined Contractor/KBA Inc. Submittal Review Stamp" attached after this Section.

3.2 ARCHITECT'S ACTION

- A. General: Architect will not review submittals that do not bear Contractor's approval stamp and will return them without action.
- B. Action Submittals: Architect will review each submittal, make marks to indicate corrections or modifications required, and return it. Architect will stamp each submittal with an action stamp and will mark stamp appropriately to indicate action taken, as follows:
1. "Approved": The portion of Work covered by the submittal may proceed provided it complies with the Contract Documents.
 2. "Approved as Corrected": The portion of Work covered by the submittal may proceed provided it complies with notations or corrections on the submittal, and with the Contract Documents.
 3. "Not Approved" or "Revise and Resubmit": Revise or prepare a new submittal in accordance with notations; resubmit. Do not proceed with that portion of the Work covered by the submittal.

- C. Informational Submittals: Architect will review each submittal and will not return it, or will return it if it does not comply with requirements. Architect will forward each submittal to appropriate party.
- D. Incomplete or partial submittals are not acceptable, will be considered nonresponsive, and will be returned without review.
- E. Submittals not required by the Contract Documents may not be reviewed and may be discarded.

3.3 FORMS

- A. The following form referenced in this Section is attached:
 - 1. Combined Contractor/KBA Inc. Submittal Review Stamp, 1 page.

END OF SECTION 01 33 00

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COMBINED CONTRACTOR AND K.B.A. INC. SUBMITTAL REVIEW STAMP

CONTRACTOR: _____	
PROJECT: _____	
PARAGRAPH. NO.: _____	SUBMITTAL NO.: _____
CONTRACTOR HAS DETERMINED AND VERIFIED MATERIALS, FIELD MEASUREMENTS AND FIELD CONSTRUCTION CRITERIA AND HAS CHECKED AND COORDINATED THE INFORMATION CONTAINED IN THIS SUBMITTAL WITH THE REQUIREMENTS OF THE WORK AND OF THE CONTRACT DOCUMENTS AND RECOMMENDS APPROVAL BY THE ARCHITECT/ENGINEER.	
BY: _____ DATE: _____	

KAESTLE BOOS ASSOC. PROJECT NO.: <u>KBA# 18030.00</u>	
ARCHITECTS/ENGINEERS DATE RECEIVED STAMP:	<div style="border: 1px solid black; width: 200px; height: 80px; margin: 0 auto;"></div>
COMMENTS MADE ON THE SUBMITTALS DURING THIS REVIEW DO NOT RELIEVE THE CONTRACTOR FROM COMPLIANCE WITH REQUIREMENTS OF THE CONTRACT DOCUMENTS. REVIEWING IS ONLY FOR CONFORMANCE WITH THE DESIGN CONCEPT OF THE PROJECT AND COMPLIANCE WITH THE INFORMATION GIVEN IN THE CONTRACT DOCUMENTS. THE CONTRACTOR IS RESPONSIBLE FOR DIMENSIONS TO BE CONFIRMED AND CORRELATED AT THE SITE; FOR INFORMATION THAT PERTAINS SOLELY TO THE FABRICATION PROCESSES OR TO THE MEANS, METHODS, TECHNIQUES, SEQUENCES AND PROCEDURES OF CONSTRUCTION; AND FOR COORDINATION OF THIS WORK WITH THE WORK OF ALL TRADES.	
ACTION STAMP:	<div style="border: 1px solid black; width: 420px; height: 60px; margin: 0 auto;"></div>

↑ TO BE FILLED IN BY THE CONTRACTOR
TO BE FILLED IN BY KAESTLE BOOS ASSOC., INC.
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SECTION 01 40 00 - QUALITY REQUIREMENTS

PART 1 - GENERAL

1.1 RELATED DOCUMENTS

- A. The Contractor, Subcontractors, and/or suppliers providing goods and services referenced in or related to this Section shall also be bound by the Related Documents identified in Division 01 Section "Summary."

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, or authorities having jurisdiction are not limited by provisions of this Section.
- C. Related Sections include the following:
 - 1. Division 01 Section "Construction Progress Documentation" for developing a schedule of required tests and inspections
 - 2. Divisions 02 through 48 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 Project 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. Using a term such as "carpentry" does not imply that certain construction activities must be performed by accredited or unionized individuals of a corresponding generic name, such as "carpenter." It also does not imply that requirements specified apply exclusively to tradespeople of the corresponding generic name.

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 within reasonable limits. To comply with these requirements, indicated numeric values are minimum or maximum, as appropriate, for the context of requirements. Refer uncertainties to Architect for a decision before proceeding.

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.
8. Requirements for obtaining samples.
9. Unique characteristics of each quality-control service.

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. Complete test or inspection data.
9. Test and inspection results and an interpretation of test results.
10. Record of temperature and weather conditions at time of sample taking and testing and inspecting.
11. Comments or professional opinion on whether tested or inspected Work complies with the Contract Document requirements.
12. Name and signature of laboratory inspector.
13. 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, an NVLAP, 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.
 - 2. NVLAP: A testing agency accredited according to NIST's National Voluntary Laboratory Accreditation Program.
- 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. Preconstruction Testing: Where testing agency is indicated to perform preconstruction testing for compliance with specified requirements for performance and test methods, comply with the following:
 - 1. Contractor responsibilities include the following:
 - a. Provide test specimens representative of proposed products and construction.
 - b. Submit specimens in a timely manner with sufficient time for testing and analyzing results to prevent delaying the Work.
 - c. Provide sizes and configurations of test assemblies, mockups, and laboratory mockups to adequately demonstrate capability of products to comply with performance requirements.
 - d. Build site-assembled test assemblies and mockups using installers who will perform same tasks for Project.
 - e. Build laboratory mockups at testing facility using personnel, products, and methods of construction indicated for the completed Work.
 - f. When testing is complete, remove test specimens, assemblies, mockups, and laboratory mockups; do not reuse products on Project.
 - g. Payment for preconstruction testing is the responsibility of the Contractor.

2. Testing Agency Responsibilities: Submit a certified written report of each test, inspection, and similar quality-assurance service to Architect with copy to Contractor. Interpret tests and inspections and state in each report whether tested and inspected work complies with or deviates from the Contract Documents.

1.7 QUALITY CONTROL

- A. Contractor Responsibilities: Where quality-control services are indicated, Contractor shall engage a qualified testing agency to perform these services.
 1. Contractor will furnish Architect 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 by the Contractor.
 3. Costs for retesting and re-inspecting construction that replaces or is necessitated by work that failed to comply with the Contract Documents will be the responsibility of the Contractor at no additional cost to the Owner.
- 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.
 2. Notify testing agencies at least 24 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 Section "Submittal Procedures."
- D. Re-testing/Re-inspecting: Regardless of whether original tests or inspections were Contractor's responsibility, provide quality-control services, including retesting and re-inspecting, for construction that replaced Work that failed to comply with the Contract Documents.
- E. Testing Agency Responsibilities: Cooperate with Architect and Contractor in performance of duties. Provide qualified personnel to perform required tests and inspections.
 1. Notify Architect, and Contractor 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. Provide the following:
1. Access to the Work.
 2. Incidental labor and facilities necessary to facilitate tests and inspections.
 3. Adequate quantities of representative samples of materials that require testing and inspecting. Assist agency in obtaining samples.
 4. Facilities for storage and field curing of test samples.
 5. Delivery of samples to testing agencies.
 6. Preliminary design mix proposed for use for material mixes that require control by testing agency.
 7. 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.

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 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 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 40 00

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SECTION 01 42 00 - REFERENCES

PART 1 - GENERAL

1.1 RELATED DOCUMENTS

- A. The Contractor, Subcontractors, and/or suppliers providing goods and services referenced in or related to this Section shall also be bound by the Related Documents identified in Division 01 Section "Summary."

1.2 DEFINITIONS

- A. General: Basic Contract definitions are included in the Conditions of the Contract.
- B. "Approved": When used to convey Architect's action on Contractor's submittals, applications, and requests, "approved" is limited to Architect's duties and responsibilities as stated in the Conditions of the Contract.
- C. "Directed": A command or instruction by Architect. Other terms including "requested," "authorized," "selected," "approved," "required," and "permitted" have the same meaning as "directed."
- D. "Indicated": Requirements expressed by graphic representations or in written form on Drawings, in Specifications, and in other Contract Documents. Other terms including "shown," "noted," "scheduled," and "specified" have the same meaning as "indicated."
- E. "Regulations": Laws, ordinances, statutes, and lawful orders issued by authorities having jurisdiction, and rules, conventions, and agreements within the construction industry that control performance of the Work.
- F. "Furnish": Supply and deliver to Project site, ready for unloading, unpacking, assembly, installation, and similar operations.
- G. "Install": Operations at Project site including unloading, temporarily storing, unpacking, assembling, erecting, placing, anchoring, applying, working to dimension, finishing, curing, protecting, cleaning, and similar operations.
- H. "Provide": Furnish and install, complete and ready for the intended use.
- I. "Project Site": Space available for performing construction activities. The extent of Project site is shown on Drawings and may or may not be identical with the description of the land on which Project is to be built.

1.3 INDUSTRY STANDARDS

- A. Applicability of Standards: Unless the Contract Documents include more stringent requirements, applicable construction industry standards have the same force and effect as if bound or copied

directly into the Contract Documents to the extent referenced. Such standards are made a part of the Contract Documents by reference.

- B. Publication Dates: Comply with standards in effect as of date of the Contract Documents, unless otherwise indicated.

1.4 ABBREVIATIONS AND ACRONYMS

- A. Industry Organizations: Where abbreviations and acronyms are used in Specifications or other Contract Documents, they shall mean the recognized name of the entities indicated in Gale Research's "Encyclopedia of Associations" or in Columbia Books' "National Trade & Professional Associations of the U.S."

PART 2 - PRODUCTS (Not Used)

PART 3 - EXECUTION (Not Used)

END OF SECTION 01 42 00

SECTION 01 50 00 - TEMPORARY FACILITIES AND CONTROLS

PART 1 - GENERAL

1.1 RELATED DOCUMENTS

- A. The Contractor, Subcontractors, and/or suppliers providing goods and services referenced in or related to this Section shall also be bound by the Related Documents identified in Division 01 Section “Summary.”

1.2 SUMMARY

- A. This Section specifies requirements for temporary utilities, support facilities, and security and protection facilities.
 - 1. Temporary facilities and utilities may include but are not limited to:
 - a. Water service and distribution.
 - b. Temporary electric power and light.
 - c. Storm and sanitary sewer.
 - d. Dewatering facilities and drains.
 - e. Temporary enclosures.
 - f. Temporary Project identification signs.
 - g. Waste disposal services.
 - h. Construction aids and miscellaneous services and facilities.
 - i. Tire cleaning surface.
 - 2. Security and protection facilities may include but are not limited to:
 - a. Barricades, warning signs, lights.
 - b. Enclosure fence for the construction area.
 - c. Environmental protection.
- B. Related Sections include the following:
 - 1. Division 32 Section “Synthetic Grass Sports Surfacing”

1.3 DEFINITIONS

- A. Permanent Enclosure: As determined by Architect, permanent or temporary roofing is complete, insulated, and weathertight; exterior walls are insulated and weathertight; and all openings are closed with permanent construction or substantial temporary closures.

1.4 USE CHARGES

- A. General: Cost or use charges for temporary facilities shall be included in the Contract Sum and paid for by the Contractor unless explicitly stated otherwise in the Contract Documents. Allow other entities to use temporary services and facilities without cost, including, but not limited to, Architect, occupants of Project, testing agencies, and authorities having jurisdiction.

- B. Water Service: Water from Owner's existing water system is available for use without metering and without payment of use charges. Provide connections and extensions of services as required for construction operations.
- C. Electric Power Service: Electric power from Owner's existing system is available for use without metering and without payment of use charges. Provide connections and extensions of services as required for construction operations.
- D. Owners sanitary facilities can be utilized by the contractor.

1.5 QUALITY ASSURANCE

- A. Regulations: Comply with industry standards and applicable laws and regulations of authorities having jurisdiction, including but not limited to:
 - 1. Building Code requirements.
 - 2. Health and safety regulations.
 - 3. Utility company regulations.
 - 4. Police and Fire Department rules.
 - 5. Environmental protection regulations.
- B. Standards: Comply with NFPA Code 241, "Building Construction and Demolition Operations", ANSI-A10 Series standards for "Safety Requirements for Construction and Demolition", OSHA Part 1926, Construction Safety and Health Regulations, and NECA Electrical Design Library "Temporary Electrical Facilities."
 - 1. Refer to "Guidelines for Bid Conditions for Temporary Job Utilities and Services", prepared jointly by AGC and ASC, for industry recommendations.

1.6 PROJECT CONDITIONS

- A. Temporary Utilities (if required): Prepare a schedule indicating dates for implementation and termination of each temporary utility within 15 days of the date established for commencement of the Work.
- B. Conditions of Use: Keep temporary services and facilities clean and neat in appearance. Operate in a safe and efficient manner. Take necessary fire prevention measures. Do not overload facilities, or permit them to interfere with progress. Do not allow hazardous dangerous or unsanitary conditions, or public nuisances to develop or persist on the site.
- C. Prevention of Fire: Take all necessary precautions for the prevention of fire during construction. Keep the area within the contract limits orderly and clean and promptly remove combustible rubbish from the site.
 - 1. Store combustible materials on the site only as established in the Contractor's approved Safety Plan.
 - 2. Comply with all suggestions, official recommendations, and lawful requirements of the local fire department regarding fire protection.

- D. Provide and maintain in good working order under all conditions, suitable and adequate fire protection equipment and services.

PART 2 - PRODUCTS

2.1 MATERIALS

- A. General: Provide new materials; if acceptable to the Architect, undamaged previously used materials in serviceable condition may be used. Provide materials suitable for the use intended.
- B. Lumber and Plywood: Comply with requirements in Division 06 Section "Miscellaneous Rough Carpentry."
 - 1. For signs and directory boards, provide exterior type, Grade B-B High Density Concrete Form Overlay Plywood conforming to PS-1, of sizes and thickness indicated.
 - 2. For fences, barriers, sidewalk bridges and similar uses, provide minimum 5/8" thick exterior plywood.
- C. Paint: Comply with requirements of Division 09 Section "Painting."
 - 1. For sign panels and applying graphics, provide exterior grade alkyd gloss enamel over exterior primer.
- D. Tarpaulins: Provide waterproof, fire-resistant, UL labeled tarpaulins with flame-spread rating of 15 or less. For temporary enclosures provide translucent nylon reinforced laminated polyethylene or polyvinyl chloride fire retardant tarpaulins.
- E. Portable Chain-Link Fencing: Minimum 2-inch, 9-gage, galvanized steel, chain-link fabric fencing; minimum 6 feet high with galvanized steel pipe posts; minimum 2-3/8-inch-OD line posts and 2-7/8-inch OD corner and pull posts, with 1-5/8-inch-OD top and bottom rails. Provide concrete bases for supporting posts.

2.2 EQUIPMENT

- A. General: Provide new equipment; if acceptable to the Architect, undamaged, previously used equipment in serviceable condition may be used. Provide equipment suitable for use intended.
- B. Water Hoses: Provide 3/4" heavy-duty, abrasion-resistant, flexible rubber hoses 100 ft. long, with pressure rating greater than the maximum pressure of the water distribution system; provide adjustable shut-off nozzles at hose discharge.
- C. Fire Extinguishers: Provide hand-carried, portable UL-rated, class "A" fire extinguishers for temporary offices and similar spaces. In other locations provide hand-carried, portable, UL-rated, class "ABC" dry chemical extinguishers, or a combination of extinguishers of NFPA recommended classes for the exposures.
 - 1. Comply with NFPA 10 and 241 for classification, extinguishing agent and size required by location and class of fire exposure.

PART 3 - EXECUTION

3.1 INSTALLATION, GENERAL

- A. Use qualified personnel for installation of temporary facilities. Locate facilities where they will serve the Project adequately and result in minimum interference with performance of the Work. Relocate and modify facilities as required by progress of the work, at no additional cost to the Owner.
- B. Provide each facility ready for use when needed to avoid delay. Maintain and modify as required. Do not remove until facilities are no longer needed, or are replaced by authorized use of completed permanent facilities.

3.2 TEMPORARY UTILITY INSTALLATION

- A. Traffic Controls: Comply with requirements of authorities having jurisdiction.
 - 1. Protect existing site improvements to remain including curbs, pavement, and utilities.
 - 2. Maintain access for fire-fighting equipment and access to fire hydrants.
 - 3. Make all necessary arrangements and pay for the services of police officers and firefighters at the prevailing wage for such services as may be required for traffic control or fire watch for the performance of any portion of the Work.
- B. Parking: Use the Contractor Staging/Work area, as indicated in the Phasing Drawings, for construction personnel.
- C. Project Identification and Temporary Signs: Prepare one project identification and other signs of the size indicated; install signs where indicated to inform the public and persons seeking entrance to the Project. Support on posts or framing of preservative treated wood. Do not permit installation of unauthorized signs.
- D. Collection and Disposal of Waste: Collect waste from construction areas and elsewhere daily. Comply with requirements of NFPA 241 for removal of combustible waste material and debris. Enforce requirements strictly. Do not hold materials more than 7 days during normal weather or 3 days when the temperature is expected to rise above 80 deg F (27 deg C). Handle hazardous, dangerous, or unsanitary waste materials separately from other waste by containerizing properly. Dispose of material in a lawful manner.
 - 1. Provide sufficient quantity of dumpsters at strategic locations within the Contract limit lines for collection of waste from the work of all subcontractors on site.**

3.3 SECURITY AND PROTECTION FACILITIES INSTALLATION

- A. Site Enclosure Fence: Before construction operations begin, furnish and install site enclosure fence and gates in a manner that will prevent people and animals from easily entering site except by entrance gates. Existing gates and Fence can be utilized for this purpose. Supplement existing fence as required to fully secure site. Remove temporary site enclosure fence when the need has ended or prior to substantial completion.

1. Provide vehicle gates at site entrances.
 2. Maintain security by limiting number of keys and restricting distribution to authorized personnel. Provide Owner with one set of keys.
 3. Make all necessary arrangements with Municipal Police department when regular or off-duty police officers will be needed for traffic control for site operations.
- B. Temporary Enclosures: The Contractor shall provide all temporary enclosure for protection of construction in progress and completed, from exposure, foul weather, other construction operations and similar activities.
1. Install tarpaulins securely, with fire-retardant-treated wood framing and other materials. Close openings of 25 square feet or less with plywood or similar materials.
 2. Where temporary wood or plywood enclosure exceeds 100 square feet in area, use UL-labeled fire-retardant treated material for framing and main sheathing.
- C. Protect all new finished surfaces against possible damage from operations under this Contract.
1. Restore or replace all surfaces that are damaged by operations under this Contract to their original condition, to the satisfaction of the Architect, at no additional expense to the Owner.
- D. Temporary Fire Protection: Until fire protection needs are supplied by permanent facilities, install and maintain temporary fire protection facilities of the types needed to protect against reasonably predictable and controllable fire losses. Comply with NFPA 10 "Standard for Portable Fire Extinguishers," and NFPA 241 "Standard for Safeguarding Construction, Alterations and Demolition Operations."
1. Locate fire extinguishers where convenient and effective for their intended purpose, but not less than one extinguisher on each floor at or near each usable stairwell.
 2. Store combustible materials, inflammable materials and volatile liquids in containers in fire-safe containers and locations under the Contractor's control and supervision, or without adequate ventilation and fire protection.
 3. Maintain unobstructed access to fire extinguishers, fire hydrants, temporary fire protection facilities, stairways and other access routes for fighting fires. Prohibit smoking in hazardous fire exposure areas.
 4. Do not permit accumulation of flammable rubbish to remain in the building overnight.
 5. Observe strict safety precautions and provide supervision of welding operations, burning with a torch, combustion type temporary heating units, and similar sources of fire ignition.
 6. No gasoline may be stored in or close to the field at any time.
 7. Comply with requirements of local Fire Department, obtain Hot Work Permit for each day required, and pay all fees and other charges.

3.4 SITE CLEANING AND MAINTENANCE

- A. Perform an inspection of the site, including areas outside of the Site boundaries, with the Owner's Representative present, prior to the start of any Work, to determine the existing conditions.

- B. The Contractor shall take all necessary precautions to prevent the spreading of dirt and dust throughout the area of the Work. During demolition and all other work, take to contain dust and other debris from the Work within the limits of the site under the Contractor's control. Promptly clean up all dirt, dust and debris escaping from the work areas or dropped from vehicles traveling to and from the Work.
 - 1. Equip all vehicles used for transportation to, and removal of material from the site with covers, maintained in good condition, adequate to contain dust and debris within lawful acceptable limits.
 - 2. Provide facilities for preventing the spread of objectionable matter outside the site areas through washing of vehicles and vehicle wheels; decontamination of vehicles transporting hazardous waste containing materials such as asbestos, lead, or other matter; and by all other means necessary.
 - 3. When excavation begins, provide a 24' x 60', or larger as indicated, tire cleaning surface at each construction entrance. Provide adequate drainage and maintain surface for the duration of construction.
 - 4. Contractor shall keep all pavements and areas outside the area of the construction clean of dirt and debris.
- C. Prior to Substantial Completion, remove all spots, stains, dirt and dust from all surfaces, including areas within other buildings and any portion of property of others, which were the result of the work of this project, to the satisfaction of the Architect.
 - 1. Requirements for final cleaning are contained in Division 01 Section, "ACloseout Procedures."
- D. Repair any damage to the site, the property of others or the Owner's equipment caused by the Contractor or its Subcontractors, at no additional cost to the Owner.

3.5 OPERATION, TERMINATION, AND REMOVAL

- A. Supervision: Enforce strict discipline in use of temporary facilities. Limit availability of temporary facilities to essential and intended uses to minimize waste and abuse.
- B. Maintenance: Maintain facilities in good operating condition until removal. Protect from damage by freezing temperatures and similar elements.
 - 1. Maintain operation of temporary enclosures, heating, cooling, humidity control, ventilation, and similar facilities on a 24-hour basis where required to achieve indicated results and to avoid possibility of damage.
 - 2. Protection: Prevent water filled piping from freezing. Maintain markers for underground lines. Protect from damage during excavation operations.
- C. Termination and Removal: Unless the Architect requests that it be maintained longer, remove each temporary facility when the need has ended, or when replaced by authorized use of a permanent facility, or no later than Substantial Completion. Complete or, if necessary, restore permanent construction that may have been delayed because of interference with the temporary facility. Repair damaged Work, clean exposed surfaces and replace construction that cannot be

satisfactorily repaired. Temporary facilities provided by the Contractor shall be removed by the Contractor.

- D. As a condition of the Architect's certification of Substantial Completion, restore site areas of the site damaged by work under this Contract to their condition existing at the start of the work, unless otherwise directed by the Architect.

END OF SECTION 01 50 00

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SUBSTITUTION REQUEST
(After the Bidding Phase)

DATE: _____

Page: 1 of 2

Project: _____ Substitution Request Number: _____

To: _____ From: _____

Re: _____ Date: _____
KBA Project Number: _____
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 years old ☐ More than 10 years old
Differences between proposed substitution and specified product: _____

☐ Point-by-point comparative data attached – REQUIRED BY ARCHITECT

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: _____ (\$ _____)

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

Supporting Data Attached: ☐ Drawings ☐ Product Data ☐ Samples ☐ Tests ☐ Reports ☐ _____

SUBSTITUTION REQUEST

(After the Bidding Phase)

DATE: _____

Page: 2 of 2

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 addition 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 aspects.
-

Submitted by: _____

Signed by: _____

Firm: _____

Address: _____

Telephone: _____

Attachments: _____

ARCHITECTS'S REVIEW AND ACTION

- ☐ Substitution approved - Make submittals in accordance with Specification Section 013300.
- ☐ Substitution approved ad noted - Make submittals in accordance with Specification Section 013300.
- ☐ Substitution rejected – Use specified materials.
- ☐ Substitution Request received too late – Use specified materials.

Signed by: _____ Date: _____

Additional Comments: ☐ Contractor ☐ Subcontractor ☐ Supplier ☐ Manufacturer ☐ Architect ☐ _____

SECTION 01 73 00 - EXECUTION

PART 1 - GENERAL

1.1 RELATED DOCUMENTS

- A. The Contractor, Subcontractors, and/or suppliers providing goods and services referenced in or related to this Section shall also be bound by the Related Documents identified in Division 01 Section "Summary."

1.2 SUMMARY

- A. This Section includes general procedural requirements governing execution of the Work including, but not limited to, the following:
 - 1. Construction layout.
 - 2. Field engineering and surveying.
 - 3. General installation of products.
 - 4. Progress cleaning.
 - 5. Starting and adjusting.
 - 6. Protection of installed construction.
 - 7. Correction of the Work.
- B. Related Sections include the following:
 - 1. Division 01 Section "Submittal Procedures" for submitting surveys.
 - 2. Division 01 Section "Closeout Procedures" for submitting final property survey with Project Record Documents, recording of Owner-accepted deviations from indicated lines and levels, and final cleaning.

1.3 SUBMITTALS

- A. Qualification Data: For land surveyor and professional engineer.
- B. Certificates: Submit certificate signed by land surveyor or professional engineer certifying that location and elevation of improvements comply with requirements.
- C. Final As-Built Project Surveys: Submit two hard copies signed by land surveyor and one AutoCAD (2013 or newer) copy.

1.4 QUALITY ASSURANCE

- A. Land Surveyor Qualifications: A professional, land surveyor who is registered in the State of Connecticut to practice in the State of Connecticut and who is experienced in providing land-surveying services of the kind indicated.

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. Written Report: Where a written report listing conditions detrimental to performance of the Work is required by other Sections, include the following:
 - a. Description of the Work.
 - b. List of detrimental conditions, including substrates.
 - c. List of unacceptable installation tolerances.
 - d. Recommended corrections.
 - 2. Verify compatibility with and suitability of substrates, including compatibility with existing finishes or primers.
 - 3. Examine roughing and finished work prior to proceeding with additional work.
 - 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 Owner 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. Space Requirements: Verify space requirements and dimensions of items shown diagrammatically on Drawings.
- D. 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.

3.3 CONSTRUCTION LAYOUT

- A. Verification: Before proceeding to lay out the Work, verify layout information shown on Drawings, in relation to the property survey and existing benchmarks. If discrepancies are discovered, notify Architect and Project Manager promptly.
- B. General: Engage a land surveyor to lay out the Work using accepted surveying practices.
 - 1. Establish benchmarks and control points to set lines and levels at each story of construction and elsewhere as needed to locate each element of Project.
 - 2. Establish dimensions within tolerances indicated. Do not scale Drawings to obtain required dimensions.
 - 3. Inform installers of lines and levels to which they must comply.
 - 4. Check the location, level and plumb, of every major element as the Work progresses.
 - 5. Notify Architect when deviations from required lines and levels exceed allowable tolerances.
 - 6. Close site surveys with an error of closure equal to or less than the standard established by authorities having jurisdiction.
- C. Site Improvements: Locate and lay out site improvements, including pavements, building structures, drainage structures, piping (inverts and elevations), grading, fill and topsoil placement, utility slopes, and all facility improvements as part of the project.
- D. Record Log: Maintain a log of layout control work. Record deviations from required lines and levels. Include beginning and ending dates and times of surveys, weather conditions, name and duty of each survey party member, and types of instruments and tapes used. Make the log available for reference by Architect.

3.4 FIELD ENGINEERING

- A. Identification: Identify existing benchmarks, control points, and property corners.
- B. Reference Points: Locate existing permanent benchmarks, control points, and similar reference points before beginning the Work. Preserve and protect permanent benchmarks and control points during construction operations.
 - 1. Do not change or relocate existing benchmarks or control points without prior written approval of Architect. Report lost or destroyed permanent benchmarks or control points promptly. Report the need to relocate permanent benchmarks or control points to Architect before proceeding.

2. Replace lost or destroyed permanent benchmarks and control points promptly. Base replacements on the original survey control points.
- C. Benchmarks: Establish and maintain a minimum of two permanent benchmarks on Project site, referenced to data established by survey control points. Comply with authorities having jurisdiction for type and size of benchmark.
1. Record benchmark locations, with horizontal and vertical data, on Project Record Documents.
 2. Where the actual location or elevation of layout points cannot be marked, provide temporary reference points sufficient to locate the Work.
 3. Remove temporary reference points when no longer needed. Restore marked construction to its original condition.

3.5 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 7'-8" in spaces without a suspended ceiling.
- B. Comply with manufacturer's written instructions and recommendations for installing products in applications indicated.
- C. Install products at the time and under conditions that will ensure the best possible results. Maintain conditions required for product performance until Substantial Completion.
- D. 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.
- E. Tools and Equipment: Do not use tools or equipment that produce harmful noise levels.
- F. 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.
- G. 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.

4. All anchors and fasteners used on the exterior of the building and where dampness and corrosion can reasonably be anticipated to be corrosion resistant.
- H. 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.
- I. Hazardous Materials: Use products, cleaners, and installation materials that are not considered hazardous.
 1. All paint used on products to comply with federal regulations controlling the use of volatile organic components. (VOCs).

3.6 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 7 days during normal weather or 3 days if the temperature is expected to rise above 80 deg F.
 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.

3.7 STARTING AND ADJUSTING

- A. Adjust operating components for proper operation without binding. Adjust equipment for proper operation.
- B. Test each piece of equipment to verify proper operation. Test and adjust controls and safeties. Replace damaged and malfunctioning controls and equipment.
- C. 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 Section "Quality Requirements."

3.8 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.

3.9 CORRECTION OF THE WORK

- A. Repair or remove and replace defective construction. Restore damaged substrates and finishes. Comply with requirements in Division 01 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 73 00

SECTION 01 77 00 – CLOSEOUT PROCEDURES

PART 1 – GENERAL

1.1 RELATED DOCUMENTS

- A. The Vendor, Sub-vendors, and/or suppliers providing goods and services referenced in or related to this Section shall also be bound by the Related Documents identified in Division 01 Section “Summary.”

1.2 SUMMARY

- A. This Section includes:
 - 1. General Procedures to be used in administering Final Completion of work.

1.3 FINAL COMPLETION

- A. General Procedures:
 - 1. Prior to submitting final payment, all items must be completed and accepted by the Owner.
 - 2. Submit specific warranties & maintenance agreement information
 - 3. Deliver tools, spare parts, extra stock and similar items.
 - 4. Submit a final invoice.

END OF SECTION 01 77 00

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SECTION 01 78 23 - OPERATION AND MAINTENANCE DATA

PART 1 - GENERAL

1.1 RELATED DOCUMENTS

- A. The Vendor, Sub-vendors, and/or suppliers providing goods and services referenced in or related to this Section shall also be bound by the Related Documents identified in Division 01 Section "Summary."

1.2 SUMMARY

- A. This Section includes administrative and procedural requirements for preparing operation and maintenance manuals, including the following:
 - 1. Operation and maintenance documentation directory.
 - 2. Operation manuals for systems, subsystems, and equipment.
 - 3. Maintenance manuals for the care and maintenance of products, materials, and finishes, systems and equipment.

1.3 DEFINITIONS

- A. System: An organized collection of parts, equipment, or subsystems united by regular interaction.
- B. Subsystem: A portion of a system with characteristics similar to a system.

1.4 SUBMITTALS

- A. Submit one copy of each manual in final form at least 15 days before final inspection. Interior Designer will return copy with comments within 15 days after final inspection.
 - 1. Correct or modify each manual to comply with Interior Designer's comments. Submit 3 copies of each corrected manual within 15 days of receipt of Interior Designer's comments.

1.5 COORDINATION

- A. Where operation and maintenance documentation includes information on installations by more than one factory-authorized service representative, assemble and coordinate information furnished by representatives and prepare manuals.

PART 2 - PRODUCTS

2.1 OPERATION AND MAINTENANCE DOCUMENTATION DIRECTORY

- A. Organization: Include a section in the directory for each of the following:

1. List of documents.
 2. List of systems.
 3. List of equipment.
 4. Table of contents.
- B. List of Systems and Subsystems: List systems alphabetically. Include references to operation and maintenance manuals that contain information about each system.
- C. List of Equipment: List equipment for each system, organized alphabetically by system. For pieces of equipment not part of system, list alphabetically in separate list.
- D. Tables of Contents: Include a table of contents for each emergency, operation, and maintenance manual.

2.2 MANUALS, GENERAL

- A. Organization: Unless otherwise indicated, organize each manual into a separate section for each system and subsystem, and a separate section for each piece of equipment not part of a system. Each manual shall contain the following materials, in the order listed:
1. Title page.
 2. Table of contents.
 3. Manual contents.
- B. Title Page: Enclose title page in transparent plastic sleeve. Include the following information:
1. Subject matter included in manual.
 2. Name and address of Project.
 3. Name and address of Owner.
 4. Date of submittal.
 5. Name, address, and telephone number of Contractor.
 6. Name and address of Architect.
 7. Cross-reference to related systems in other operation and maintenance manuals.
- C. Table of Contents: List each product included in manual, identified by product name, indexed to the content of the volume, and cross-referenced to Specification Section number in Project Manual.
1. If operation or maintenance documentation requires more than one volume to accommodate data, include comprehensive table of contents for all volumes in each volume of the set.
- D. Manual Contents: Organize into sets of manageable size. Arrange contents alphabetically by system, subsystem, and equipment. If possible, assemble instructions for subsystems, equipment, and components of one system into a single binder.
1. Binders: Heavy-duty, 3-ring, vinyl-covered, loose-leaf binders, in thickness necessary to accommodate contents, sized to hold 8-1/2-by-11-inch paper; with clear plastic sleeve on

spine to hold label describing contents and with pockets inside covers to hold folded oversize sheets.

- a. If two or more binders are necessary to accommodate data of a system, organize data in each binder into groupings by subsystem and related components. Cross-reference other binders if necessary to provide essential information for proper operation or maintenance of equipment or system.
 - b. Identify each binder on front and spine, with printed title "OPERATION AND MAINTENANCE MANUAL," Project title or name, and subject matter of contents, including Specification Section number. Indicate volume number for multiple-volume sets.
2. Dividers: Heavy-paper dividers with plastic-covered tabs for each section. Mark each tab to indicate contents. Include typed list of products and major components of equipment included in the section on each divider, cross-referenced to Specification Section number and title of Project Manual.
 3. Protective Plastic Sleeves: Transparent plastic sleeves designed to enclose diagnostic software diskettes for computerized electronic equipment.
 4. Supplementary Text: Prepared on 8-1/2-by-11-inch white bond paper.
 5. Drawings: Attach reinforced, punched binder tabs on drawings and bind with text.
 - a. If oversize drawings are necessary, fold drawings to same size as text pages and use as foldouts.
 - b. If drawings are too large to be used as foldouts, fold and place drawings in labeled envelopes and bind envelopes in rear of manual. At appropriate locations in manual, insert typewritten pages indicating drawing titles, descriptions of contents, and drawing locations.

2.3 OPERATION MANUALS

- A. Content: In addition to requirements in this Section, include operation data required in individual Specification Sections and the following information:
 1. System, subsystem, and equipment descriptions.
 2. Performance and design criteria if Contractor is delegated design responsibility.
 3. Operating standards.
 4. Operating procedures.
 5. Operating logs.
 6. Wiring diagrams.
 7. Precautions against improper use.
 8. License requirements including inspection and renewal dates.
- B. Descriptions: Include the following:
 1. Product name and model number.
 2. Manufacturer's name.
 3. Equipment identification with serial number of each component.
 4. Equipment function.

5. Operating characteristics.
 6. Limiting conditions.
 7. Complete nomenclature and number of replacement parts.
- C. Operating Procedures: Include the following, as applicable:
1. Routine and normal operating instructions.
 2. Regulation and control procedures.
 3. Instructions on stopping.
 4. Normal shutdown instructions.
 5. Required sequences for electric or electronic systems.
 6. Special operating instructions and procedures.
- D. Systems and Equipment Controls: Describe the sequence of operation, and diagram controls as installed.

2.4 PRODUCT MAINTENANCE MANUAL

- A. Content: Organize manual into a separate section for each product, material, and finish. Include source information, product information, maintenance procedures, repair materials and sources, and warranties and bonds, as described below.
- B. Source Information: List each product included in manual identified by product name and arranged to match manual's table of contents. For each product, list name, address, and telephone number of Installer or supplier and maintenance service agent, and cross-reference Specification Section number and title in Project Manual.
- C. Product Information: Include the following, as applicable:
1. Product name and model number.
 2. Manufacturer's name.
 3. Color, pattern, and texture.
 4. Material and chemical composition.
 5. Reordering information for specially manufactured products.
- D. Maintenance Procedures: Include manufacturer's written recommendations and the following:
1. Inspection procedures.
 2. Types of cleaning agents to be used and methods of cleaning.
 3. List of cleaning agents and methods of cleaning detrimental to product.
 4. Schedule for routine cleaning and maintenance.
 5. Repair instructions.
- E. Repair Materials and Sources: Include lists of materials and local sources of materials and related services.
- F. Warranties and Bonds: Include copies of warranties and bonds and lists of circumstances and conditions that would affect validity of warranties or bonds.

1. Include procedures to follow and required notifications for warranty claims.

2.5 SYSTEMS AND EQUIPMENT MAINTENANCE MANUAL

- A. Content: For each system, subsystem, and piece of equipment not part of a system, include source information, manufacturers' maintenance documentation, maintenance procedures, maintenance and service schedules, spare parts list and source information, maintenance service contracts, and warranty and bond information, as described below.
- B. Source Information: List each system, subsystem, and piece of equipment included in manual identified by product name and arranged to match manual's table of contents. For each product, list name, address, and telephone number of Installer or supplier and maintenance service agent, and cross-reference Specification Section number and title in Project Manual.
- C. Manufacturers' Maintenance Documentation: Manufacturers' maintenance documentation including the following information for each component part or piece of equipment:
 1. Standard printed maintenance instructions and bulletins.
 2. Drawings, diagrams, and instructions required for maintenance, including disassembly and component removal, replacement, and assembly.
 3. Identification and nomenclature of parts and components.
 4. List of items recommended to be stocked as spare parts.
- D. Maintenance Procedures: Include the following information and items that detail essential maintenance procedures:
 1. Test and inspection instructions.
 2. Troubleshooting guide.
 3. Precautions against improper maintenance.
 4. Disassembly; component removal, repair, and replacement; and reassembly instructions.
 5. Aligning, adjusting, and checking instructions.
 6. Demonstration and training videotape, if available.
- E. Maintenance and Service Schedules: Include service and lubrication requirements, list of required lubricants for equipment, and separate schedules for preventive and routine maintenance and service with standard time allotment.
 1. Scheduled Maintenance and Service: Tabulate actions for daily, weekly, monthly, quarterly, semiannual, and annual frequencies.
 2. Maintenance and Service Record: Include manufacturers' forms for recording maintenance.
- F. Spare Parts List and Source Information: Include lists of replacement and repair parts, with parts identified and cross-referenced to manufacturers' maintenance documentation and local sources of maintenance materials and related services.
- G. Maintenance Service Contracts: Include copies of maintenance agreements with name and telephone number of service agent.

- H. Warranties and Bonds: Include copies of warranties and bonds and lists of circumstances and conditions that would affect validity of warranties or bonds.

1. Include procedures to follow and required notifications for warranty claims.

PART 3 - EXECUTION

3.1 MANUAL PREPARATION

- A. Operation and Maintenance Documentation Directory: Prepare a separate manual that provides an organized reference to emergency, operation, and maintenance manuals.
- B. Product Maintenance Manual: Assemble a complete set of maintenance data indicating care and maintenance of each product, material, and finish incorporated into the Work.
- C. Operation and Maintenance Manuals: Assemble a complete set of operation and maintenance data indicating operation and maintenance of each system, subsystem, and piece of equipment not part of a system.
1. Engage a factory-authorized service representative to assemble and prepare information for each system, subsystem, and piece of equipment not part of a system.
 2. Prepare a separate manual for each system and subsystem, in the form of an instructional manual for use by Owner's operating personnel.
- D. Manufacturers' Data: Where manuals contain manufacturers' standard printed data, include only sheets pertinent to product or component installed. Mark each sheet to identify each product or component incorporated into the Work. If data include more than one item in a tabular format, identify each item using appropriate references from the Contract Documents. Identify data applicable to the Work and delete references to information not applicable.
1. Prepare supplementary text if manufacturers' standard printed data are not available and where the information is necessary for proper operation and maintenance of equipment or systems.
- E. Drawings: Prepare drawings supplementing manufacturers' printed data to illustrate the relationship of component parts of equipment and systems and to illustrate control sequence and flow diagrams. Coordinate these drawings with information contained in Record Drawings to ensure correct illustration of completed installation.

END OF SECTION 01 78 23

SECTION 02 41 00 — DEMOLITION

PART 1 – GENERAL

1.1 RELATED DOCUMENTS

- A. The Contractor, Subcontractors, and/or suppliers providing goods and services referenced in or related to this Section shall also be bound by the Related Documents identified in Division 01 Section “Summary.”

1.2 DESCRIPTION OF WORK

- A. All labor, material and equipment necessary to complete all phases of demolition work as shown on the Drawings, as specified, and as can be reasonably implied from Drawings, Specifications, and field conditions.
- B. Filling of depressions resulting from demolition activities.
- C. Removal of utilities, drainage structures, drainage piping, pavement, handrails, playscapes, sidewalks and curbing.
- D. Removal and disposal of resulting demolition materials.
- E. Leaving site clean and ready for clearing required to install new construction.
- F. Maintaining streets and walks during demolition and the cleaning of them of debris resulting from demolition.
- G. Temporary shoring, bracing and framing where necessary for demolition work.
- H. Protecting adjoining construction that is to remain.
- I. Patching required as a result of demolition.
- J. Securing and maintaining in force the required permits and the payment of associated fees.
- K. Complying with all regulations for street and walk access and protection and fire access.

1.3 RELATED WORK DESCRIBED ELSEWHERE

- A. Section 31 20 00 – Earth Moving;
- B. Section 31 25 00 – Erosion and Sedimentation Controls.

1.4 QUALITY ASSURANCE

- A. Requirements of Regulatory Agencies:

1. State of Connecticut Basic Building Code;
2. State of Connecticut Department of Health Services;
3. State of Connecticut Department of Energy & Environmental Protection;
4. Utility companies having jurisdiction;
5. Town of Ridgefield, CT.

1.5 JOB CONDITIONS

A. Traffic:

1. Conduct demolition operations and the removal of debris in a manner to ensure minimum interference with roads, streets, walks, and other adjacent occupied or used facilities;
2. Do not close or obstruct streets, walks, or other occupied or used facilities without permission from authorities having jurisdiction;
3. Provide alternate, adequately signed, routes around closed or obstructed traffic ways.
4. Ensure the safe passage of persons around the area of demolition;

B. Conduct operations to buildings, to prevent damage or injury to adjacent buildings, structures, other facilities and persons;

C. Provide shoring, underpinning, excavation supports as necessary to protect structures and all adjacent properties;

D. If applicable, provide and maintain fire protection.

E. Promptly repair damages, to adjacent facilities caused by demolition operations. Replace glass breakage immediately.

F. Maintain existing utilities not scheduled to be removed, keep in service, and protect against damage during demolition operations;

1. Repair and, if necessary replace, services damaged as result of demolition;
2. Do not interrupt existing utilities if encountered serving occupied or used facilities, except when authorized in writing by authorities;
3. Provide temporary services during interruptions to existing utilities, as acceptable to the governing authorities;

4. The contractor shall arrange for any utility shut-offs required. The Contractor shall disconnect and seal utilities before starting demolition operations. Construction related work required by the Utility Companies is included in this Contract. Do not start demolition work until utility disconnections have been completed and verified in writing.

B. Protection:

1. Erect barriers, fences, guard rails, enclosures, chutes, and shoring to protect personnel, structures, and utilities remaining intact.

PART 2 – PRODUCTS

2.01 None required by this Section.

PART 3 – EXECUTION

3.1 PREPARATION

- A. Review all limits of fencing, sedimentation control and other construction barriers with Owner and Engineer prior to installation.
- B. Arrange for, and verify termination, of utility services to include removing meters and capping lines, if necessary.
- C. Where trafficways will be closed or obstructed the Contractor shall provide alternate routes, including adequate signing and striping.
- D. Prior to demolition, removal or abandonment of items within paved areas to remain the Contractor shall sawcut the bituminous concrete pavement.
- E. The Contractor shall obtain all necessary permits from agencies having jurisdiction.

3.2 DEMOLITION

- A. Use water sprinkling, temporary enclosures, and other suitable methods to limit to the lowest practical level the amount of dust and dirt rising and scattering in the air;
 1. Comply with governing regulations pertaining to environmental protection and pollution;
 2. Do not use water when it may create hazardous or objectionable conditions, such as ice, flooding, and pollution.

- B. Remove below grade construction completely and fill below-grade areas and voids from resulting from demolition of structures and pavements.
 - 1. Use satisfactory materials consisting of stone, gravel, and sand, free from debris, trash, materials, roots, and other organic matter.
- C. Prior to placement of fill materials, ensure that areas to be filled are free of standing water, frost, frozen materials, roots and other organic matter.
- D. Place fill materials in horizontal layers generally not exceeding 6" in loose depth. Compact each layer at optimum moisture content of fill material to a density equal to original adjacent ground, unless subsequent excavation for new work is required.
 - 1. After fill placement and compaction, grade surface to meet adjacent contours and to provide flow to surface drainage structures.
 - 2. Where indicated on the Drawings demolish and remove foundation walls and retaining walls to an elevation two feet below existing or proposed finish grade, whichever is lower.
 - 3. Filling will be in conformance with the requirements of Section 31 20 00 – Earth Moving.
- E. Cap, plug with brick and mortar, or remove, as indicated, pipes and other conduits abandoned due to demolition. Holes left in existing structures left from the removal and/or demolition of piping shall also adequately plugged and capped. Coordinate all utility abandonment with affected utility. Perform utility in accordance with requirements of affected utility. Repair trenches and perform work within R.O.W. in accordance with the Town's and utility company's requirements.

3.3 DISPOSAL OF DEMOLISHED MATERIALS

- A. Remove from the site debris, rubbish, and other materials resulting from demolition operations;
 - 1. Storing or burning of materials on the site will not be permitted.
- B. Transport materials of demolished structures and legally dispose of off-site in conformance with regulations of Department of Energy and Environmental Protection, and other regulating agencies as applicable.
 - 1. **Chain of Custody shall be provided for the removal and disposal of the existing synthetic turf system. Contractor is responsible to collect and provide tickets/slips and tracking information for all existing materials from the existing synthetic turf system from the time of removal from the project site to its arrival at the disposal facility.**
- C. Remove demolition debris daily.
- D. Manner of disposal shall comply with all applicable local, state, and federal regulations.

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TIGER HOLLOW AND SCOTTS RIDGE
FIELD AND TRACK REPLACEMENTS

END OF SECTION

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SECTION 03 30 00 - CAST-IN-PLACE CONCRETE

PART 1 - GENERAL

1.1 RELATED DOCUMENTS

- A. The Contractor, Subcontractors, and/or suppliers providing goods and services referenced in or related to this Section shall also be bound by the Related Documents identified in Division 01 Section "Summary."

1.2 SUMMARY

- A. This Section specifies cast-in place concrete, including formwork, reinforcement, concrete materials, mixture design, placement procedures, and finishes in accordance with the Contract Documents and applicable Codes. The work shall include the following:
 - 1. Footings.
 - 2. Foundation walls, Pads, curbing, walls and stairs.
- B. Related Sections include the following:
 - 1. Division 31, Section "Structural Fill"
 - 2. Division 31, Section "Earthwork"

1.3 DEFINITIONS

- A. Cementitious Materials: Portland cement alone or in combination with one or more of the following: blended hydraulic cement, fly ash and other pozzolans, ground granulated blast furnace slag, and silica fume; subject to compliance with requirements.

1.4 QUALITY ASSURANCE

- A. Concrete work shall conform to all requirements of A.C.I. 301-16 "Specifications for Structural Concrete ", published by the American Concrete Institute, Farmington Hills, Michigan, except as modified by the Supplemental Requirements below.
- B. Concrete supplier and Contractor shall certify that they are familiar with the above reference standard, and a copy shall be available on the job. A.C.I Standard 301-16 is available from American Concrete Institute, P.O. Box 9094, Farmington Hills, Michigan 48333-9094.
- C. Manufacturer Qualifications: A firm experienced in manufacturing ready-mixed concrete products and that complies with ASTM C 94/C 94M requirements for production facilities and equipment.

1. Manufacturer certified according to NRMCA's "Certification of Ready Mixed Concrete Production Facilities."
- E. Testing Agency Qualifications: An independent agency, acceptable to authorities having jurisdiction, qualified according to ASTM C 1077 and ASTM E 329 for testing indicated, as documented according to ASTM E 548.
 1. Personnel conducting field tests shall be qualified as ACI Concrete Field Testing Technician, Grade 1, according to ACI CP-01 or an equivalent certification program.
 2. Personnel performing laboratory tests shall be ACI-certified Concrete Strength Testing Technician and Concrete Laboratory Testing Technician - Grade I. Testing Agency laboratory supervisor shall be an ACI-certified Concrete Laboratory Testing Technician - Grade II.
- F. Source Limitations: Obtain each type or class of cementitious material of the same brand from the same manufacturer's plant, obtain aggregate from one source, and obtain admixtures through one source from a single manufacturer.
- G. Concrete Testing Service: Owner engages a qualified independent testing agency to perform material evaluation tests and to design concrete mixtures.
- H. Testing Agency Qualifications: An independent agency, acceptable to authorities having jurisdiction, qualified according to ASTM C 1077 and ASTM E 329 for testing indicated, as documented according to ASTM E 548.
 1. Personnel conducting field tests shall be qualified as ACI Concrete Field Testing Technician, Grade 1, according to ACI CP-01 or an equivalent certification program.
 2. Personnel performing laboratory tests shall be ACI-certified Concrete Strength Testing Technician and Concrete Laboratory Testing Technician - Grade I.
- I. ACI Publications: Comply with the following unless modified by requirements in the Contract Documents:
 1. ACI 117, "Specifications for Tolerances for Concrete Construction and Materials."
- J. Pre-installation Conference: Conduct conference at Project site to comply with requirements in Division 1 Section "Project Management and Coordination."
 1. Before submitting design mixtures, review concrete design mixture and examine procedures for ensuring quality of concrete materials. Require representatives of each entity directly concerned with cast-in-place concrete to attend, including the following:
 - a. Contractor's superintendent.
 - b. Owner's independent testing agency responsible for concrete design mixtures.
 - c. Ready-mix concrete manufacturer.
 - d. Concrete subcontractor.
 2. Review special inspection and testing and inspecting agency procedures for field quality control, concrete finishes and finishing, cold- and hot-weather concreting procedures,

curing procedures, construction contraction and isolation joints, and joint-filler strips, semi rigid joint fillers, forms and form removal limitations, vapor-retarder installation, anchor rod and anchorage device installation tolerances, steel reinforcement installation, floor and slab flatness and levelness measurement, concrete repair procedures, and concrete protection.

1.5 ACTION SUBMITTALS

- A. Product Data: For each type of product indicated.
- B. Design Mixtures: For each concrete mixture. Submit alternate design mixtures when characteristics of materials, Project conditions, weather, test results, or other circumstances warrant adjustments.
 - 1. Indicate amounts of mixing water to be withheld for later addition at Project site.
- C. Steel Reinforcement Shop Drawings: Submit reinforcing steel placing drawings for all reinforced concrete footings, buttresses, piers, walls and tie beams.
 - 1. Shop drawings for the reinforcement detailing, fabricating, bending and placing concrete reinforcement shall comply with ACI 315 “Manual of Standard Practice for Detailing Reinforced Concrete Structures”. All walls shall be drawn in elevation with all reinforcing included in the elevation including corner bars, dropped bars at column and door pockets and openings. The elevations shall be drawn to a minimum of ¼” = 1’-0”.
 - 2. Placing drawings that detail fabrication, bending, and placement. Include bar sizes, lengths, material, grade, bar schedules, stirrup spacing, bent bar diagrams, bar arrangement, splices and laps, mechanical connections, tie spacing, hoop spacing, and supports for concrete reinforcement. “SCHEDULING OF REINFORCING IS PROHIBITED”
 - 3. Subsequent submissions of shop drawings shall be dated and numbered and shall have all revision clearly noted with clouding of each revision.
 - 4. All reinforcing shall be properly labeled and indicated in elevations.
- D. Qualification Data: For Installer, manufacturers, and testing agency.
- E. Material Test Reports: For the following, from a qualified testing agency, indicating compliance with requirements:
 - 1. Aggregates. Include service record data indicating absence of deleterious expansion of concrete due to alkali aggregate reactivity.
- F. Material Certificates: For each of the following, signed by manufacturers:
 - 1. Cementitious materials.
 - 2. Admixtures.
 - 3. Form materials and form-release agents.

4. Steel reinforcement and accessories.
5. Repair materials.

G. Field quality-control test and inspection reports.

1.6 DELIVERY, STORAGE, AND HANDLING

- A. Steel Reinforcement: Deliver, store, and handle steel reinforcement to prevent bending and damage.
- B. Store materials protected from exposure to harmful weather conditions and at a temperature above 40° Fahrenheit.

PART 2 - PRODUCTS

2.1 CONCRETE, GENERAL

ACI Publications: Comply with the following unless modified by requirements in the Contract Documents:

ACI 301-16
ACI 117

2.2 CONCRETE

- A. Concrete compressive strength for foundation walls and footings shall have:
 1. Compressive strength = 4000 psi minimum at 28 days.
 2. Slump = 4" +/- 1"
 3. Air Content = 6 to 8% for all walls, footings and slabs exposed to freezing temperatures.
- B. Source Limitations: Obtain each type or class of cementitious material of the same brand from the same manufacturer's plant, obtain aggregate from single source, and obtain admixtures from single source from single manufacturer.
- C. Cementitious Materials:
 1. Portland Cement: ASTM C 150, Type I/II gray
 2. Flyash ASTM C618 Class C and ACI318-05
 3. Sand ASTM C33 SSD
- D. Normal-Weight Aggregates: ASTM C 33. Class 3S coarse aggregate or better, graded. Provide aggregates from a single source with documented service record data of at least 10 years' satisfactory service in similar applications and service conditions using similar aggregates and cementitious materials.
 1. Maximum Coarse Aggregate Size: ¾" nominal.
 2. Fine Aggregate: Free of materials with deleterious reactivity to alkali in cement.
- E. Water: ASTM C94 and potable.

F. Air-Entraining Admixture: ASTM C 260

1. For Footings, foundation walls, column piers and buttresses and all other concrete exposed to freeze/thaw action. - Air Content: 6 percent, plus or minus 1.5 percent at point of delivery for 3/4-inch nominal maximum aggregate size.

G. Chemical Admixtures: Certified by manufacturer to be compatible with other admixtures and that do not contribute water-soluble chloride ions exceeding those permitted in hardened concrete. Do not use calcium chloride or admixtures containing calcium chloride.

1. Water-Reducing Admixture: ASTM C 494
2. Retarding Admixture: ASTM C 494
3. Water-Reducing and Retarding Admixture: ASTM C 494
4. High-Range, Water-Reducing Admixture: ASTM C 494
5. High-Range, Water-Reducing and Retarding Admixture: ASTM C 494
6. Plasticizing and Retarding Admixture: ASTM C 1017

H. Do not use admixtures containing calcium chloride. All concrete shall contain a water-reducing and densifying admixture such as MASTER BUILDERS POZZOLITH or an approved equal as follows:

1. All admixtures shall be incorporated as an integral part of the mix design.
2. Admixture shall be manufactured by a firm having not less than 10 years experience in manufacturing and field testing of the product

I. Ready-Mixed Concrete: Measure, batch, mix, and deliver concrete according to ASTM C 94/C 94M, and furnish batch ticket information.

1. When air temperature is between 85° and 90° F, reduce mixing and delivery time from 1-1/2 hours to 75 minutes.
2. When air temperature is above 90° F, reduce mixing and delivery time to 60 minutes.

2.3 FORM-FACING MATERIALS

A. Smooth-Formed Finished Concrete: Form-facing panels that will provide continuous, true, and smooth concrete surfaces. Furnish in largest practicable sizes to minimize number of joints.

1. Plywood, metal, or other approved panel materials.
2. Exterior-grade plywood panels, suitable for concrete forms, complying with DOC PS 1, and as follows:
 - a. High-density overlay, Class 1 or better.
 - b. Medium-density overlay, Class 1 or better; mill-release agent treated and edge sealed.
 - c. Structural 1, B-B or better; mill oiled and edge sealed.
 - d. B-B (Concrete Form), Class 1 or better; mill oiled and edge sealed.

B. Rough-Formed Finished Concrete: Plywood, lumber, metal, or another approved material. Provide lumber dressed on at least two edges and one side for tight fit.

- C. Chamfer Strips: Wood, metal, PVC, or rubber strips, 3/4 by 3/4 inch, minimum.
- D. Form-Release Agent: Commercially formulated form-release agent that will not bond with, stain, or adversely affect concrete surfaces and will not impair subsequent treatments of concrete surfaces.
 - 1. Formulate form-release agent with rust inhibitor for steel form-facing materials.
- E. Form Ties: Factory-fabricated, removable or snap-off metal or glass-fiber-reinforced plastic form ties designed to resist lateral pressure of fresh concrete on forms and to prevent spalling of concrete on removal.
 - 1. Furnish units that will leave no corrodible metal closer than 1 inch to the plane of exposed concrete surface.
 - 2. Furnish ties that, when removed, will leave holes no larger than 1 inch in diameter in concrete surface.
 - 3. Furnish ties with integral water-barrier plates to walls indicated to receive dampproofing or waterproofing.

2.4 STEEL REINFORCEMENT

- A. Fabricate steel reinforcement according to CRSI's "Manual of Standard Practice."
- B. Reinforcing Bars: ASTM A 615, Grade 60, deformed.
- C. Plain-Steel Welded Wire Reinforcement: ASTM A 185, plain, fabricated from as-drawn steel wire into flat sheets.

2.5 REINFORCEMENT ACCESSORIES

- A. Bar Supports: Bolsters, chairs, spacers, and other devices for spacing, supporting, and fastening reinforcing bars and welded wire reinforcement in place. Manufacture bar supports from steel wire, plastic, or precast concrete according to CRSI's "Manual of Standard Practice," of greater compressive strength than concrete and as follows:
 - 1. For concrete surfaces exposed to view where legs of wire bar supports contact forms, use CRSI Class 1 plastic-protected steel wire or CRSI Class 2 stainless-steel bar supports.

2.8 CURING MATERIALS

- A. Clear, Solvent-Borne, Membrane-Forming Curing and Sealing Compound: ASTM C 1315, Type 1, Class A.
- B. Clear, Waterborne, Membrane-Forming Curing and Sealing Compound: ASTM C 1315, Type 1, Class A.

2.9 MISCELANEOUS RELATED MATERIALS

- A. Grout for leveling plates shall be "Five Star" non-shrink, nonmetallic grout as manufactured by Five Star Products, or approved equal.
- B. Bonding Agent: ASTM C 1059, Type II, non-re-dispersible, acrylic emulsion or styrene butadiene.
- C. Epoxy Bonding Adhesive: ASTM C 881, two-component epoxy resin, capable of humid curing and bonding to damp surfaces, of class suitable for application temperature and of grade to suit requirements, and as follows:
 - 1. Types IV and V, load bearing, for bonding hardened or freshly mixed concrete to hardened concrete.

PART 3 - EXECUTION

3.1 INSTALLATION, GENERAL

- A. Give the RDP at least 2 working days' notice before placing concrete. Execution shall be in accordance with A.C.I. STANDARD 301-16, except as noted below.
- B. Employ a licensed land surveyor to check elevations of concrete and masonry bearing surfaces, and locations of anchor bolts and similar devices, before structural steel erection work proceeds. Contractor shall submit to the RDP the anchor bolt survey with all discrepancies between elevations, locations, conditions, etc., shown on the drawings and those actually encountered in the field noted on the survey. Do not proceed with erection until corrections have been made or until compensating adjustments to structural steel work have been agreed upon with RDP.

3.2 FORMWORK

- A. Design, erect, shore, brace, and maintain formwork, according to ACI 301, to support vertical, lateral, static, and dynamic loads, and construction loads that might be applied, until structure can support such loads.
- B. Construct formwork so concrete members and structures are of size, shape, alignment, elevation, and position indicated, within tolerance limits of ACI 117.
- C. Limit concrete surface irregularities, designated by ACI 347R as abrupt or gradual, as follows:
 - 1. Class A, 1/8 inch for smooth-formed finished surfaces.
 - 2. Class B, 1/4 inch for rough-formed finished surfaces.
- D. Construct forms tight enough to prevent loss of concrete mortar.

- E. Fabricate forms for easy removal without hammering or prying against concrete surfaces. Provide crush or wrecking plates where stripping may damage cast concrete surfaces. Provide top forms for inclined surfaces steeper than 1.5 horizontal to 1 vertical.
 - 1. Install keyways, reglets, recesses, and the like, for easy removal.
 - 2. Do not use rust-stained steel form-facing material.
- F. Set edge forms, bulkheads, and intermediate screed strips for slabs to achieve required elevations and slopes in finished concrete surfaces. Provide and secure units to support screed strips; use strike-off templates or compacting-type screeds.
- G. Provide temporary openings for cleanouts and inspection ports where interior area of formwork is inaccessible. Close openings with panels tightly fitted to forms and securely braced to prevent loss of concrete mortar. Locate temporary openings in forms at inconspicuous locations.
- H. Chamfer exterior corners and edges of permanently exposed concrete.
- I. Form openings, chases, offsets, sinkages, keyways, reglets, blocking, screeds, and bulkheads required in the Work. Determine sizes and locations from trades providing such items.
- J. Clean forms and adjacent surfaces to receive concrete. Remove chips, wood, sawdust, dirt, and other debris just before placing concrete.
- K. Retighten forms and bracing before placing concrete, as required, to prevent mortar leaks and maintain proper alignment.
- L. Coat contact surfaces of forms with form-release agent, according to manufacturer's written instructions, before placing reinforcement.

3.3 EMBEDDED ITEMS

- A. Place and secure anchorage devices and other embedded items required for adjoining work that is attached to or supported by cast-in-place concrete. Use setting drawings, templates, diagrams, instructions, and directions furnished with items to be embedded.
 - 1. Install anchor rods, accurately located, to elevations required and complying with tolerances in Section 7.5 of AISC's "Code of Standard Practice for Steel Buildings and Bridges."
 - 2. Install dovetail anchor slots in concrete structures as indicated.

3.4 REMOVING AND REUSING FORMS

- A. General: Formwork for sides of beams, walls, columns, and similar parts of the Work that does not support weight of concrete may be removed after cumulatively curing at not less than 50 deg F for 24 hours after placing concrete, if concrete is hard enough to not be damaged by form removal operations and curing and protection operations are maintained.

1. Leave formwork for beam soffits, joists, slabs, and other structural elements that supports weight of concrete in place until concrete has achieved at least 70 percent of its 28-day design compressive strength.
 2. Remove forms only if shores have been arranged to permit removal of forms without loosening or disturbing shores.
- B. Clean and repair surfaces of forms to be reused in the Work. Split, frayed, delaminated, or otherwise damaged form-facing material will not be acceptable for exposed surfaces. Apply new form-release agent.
- C. When forms are reused, clean surfaces, remove fins and laitance, and tighten to close joints. Align and secure joints to avoid offsets. Do not use patched forms for exposed concrete surfaces unless approved by Architect.

3.5 STEEL REINFORCEMENT

- A. General: Comply with CRSI's "Manual of Standard Practice" for placing reinforcement.
1. Do not cut or puncture vapor retarder. Repair damage and reseal vapor retarder before placing concrete.
- B. Clean reinforcement of loose rust and mill scale, earth, ice, and other foreign materials that would reduce bond to concrete.
- C. Accurately position, support, and secure reinforcement against displacement. Locate and support reinforcement with bar supports to maintain minimum concrete cover. Do not tack weld crossing reinforcing bars.
- D. Set wire ties with ends directed into concrete, not toward exposed concrete surfaces.

3.6 JOINTS

- A. General: Construct joints true to line with faces perpendicular to surface plane of concrete.
- B. Construction Joints: Install so strength and appearance of concrete are not impaired, at locations indicated or as approved by Architect.
1. Place joints perpendicular to main reinforcement. Continue reinforcement across construction joints, unless otherwise indicated. Do not continue reinforcement through sides of strip placements of floors and slabs.
 2. Form keyed joints as indicated. Embed keys at least 1-1/2 inches into concrete.
 3. Locate joints for beams, slabs, joists, and girders in the middle third of spans. Offset joints in girders a minimum distance of twice the beam width from a beam-girder intersection.
 4. Space vertical joints in walls as indicated. Locate joints beside piers integral with walls, near corners, and in concealed locations where possible.

5. Use a bonding agent at locations where fresh concrete is placed against hardened or partially hardened concrete surfaces.
6. Use epoxy-bonding adhesive at locations where fresh concrete is placed against hardened or partially hardened concrete surfaces.

3.7 CONCRETE PLACEMENT

- A. Before placing concrete, verify that installation of formwork, reinforcement, and embedded items is complete and that required inspections have been performed.
- B. Do not add water to concrete during delivery, at Project site, or during placement unless approved by RDP.
- C. Deposit concrete continuously in one layer or in horizontal layers of such thickness that no new concrete will be placed on concrete that has hardened enough to cause seams or planes of weakness. If a section cannot be placed continuously, provide construction joints as indicated. Deposit concrete to avoid segregation.
 1. Deposit concrete in horizontal layers of depth to not exceed formwork design pressures and in a manner to avoid inclined construction joints.
 2. Consolidate placed concrete with mechanical vibrating equipment according to ACI 301.
 3. Do not use vibrators to transport concrete inside forms. Insert and withdraw vibrators vertically at uniformly spaced locations to rapidly penetrate placed layer and at least 6 inches into preceding layer. Do not insert vibrators into lower layers of concrete that have begun to lose plasticity. At each insertion, limit duration of vibration to time necessary to consolidate concrete and complete embedment of reinforcement and other embedded items without causing mixture constituents to segregate.
- D. Discharge concrete from mixer within 1 1/2 hours of batching.

3.8 CONCRETE PROTECTING AND CURING

- A. General: Protect freshly placed concrete from premature drying and excessive cold or hot temperatures.
- B. Formed Surfaces: Cure formed concrete surfaces, including foundation walls and footings and other similar surfaces. If forms remain during curing period, moist cure after loosening forms. If removing forms before end of curing period, continue curing for the remainder of the curing period.
- C. Cure concrete according to ACI 308.R-16, by one of the following methods contractor shall be responsible for utilizing an appropriate curing method to achieve the required strength, moisture levels and other parameters.
 1. After placing and finishing, use one or more of the following methods to preserve moisture in the concrete:

- a. Ponding, continuous fogging, or continuous sprinkling;
- b. Application of mats or fabric kept continuously wet;
- c. Continuous application of steam (under 150°F);
- d. Application of sheet materials conforming to ASTM C171;
- e. Curing and Sealing Compound

3.9 COLD AND HOT WEATHER CONCRETE:

- A. Cold-Weather Placement: Comply with ACI 306.1 and as follows. Protect concrete work from physical damage or reduced strength that could be caused by frost, freezing actions, or low temperatures.
 1. When average high and low temperature is expected to fall below 40°F for three successive days, maintain delivered concrete mixture temperature within the temperature range required by ACI 301.
 2. Do not use frozen materials or materials containing ice or snow. Do not place concrete on frozen subgrade or on subgrade containing frozen materials.
 3. Do not use calcium chloride, salt or other materials containing antifreeze agents or chemical accelerators unless otherwise specified and approved in mixture designs.
- B. Hot Weather Placement: Comply with ACI 301 and as follows:
 1. Maintain concrete temperature below 90°F at time of placement. Chilled mixing water or chopped ice may be used to control temperature, provided water equivalent of ice is calculated to total amount of mixing water. Using liquid nitrogen to cool concrete is Contractor's option.
 2. Fog spray forms, steel reinforcement, and subgrade just before placing concrete. Keep subgrade uniformly moist without standing water, soft spots, or dry areas.
 3. Loss of slump, flash set, or cold joints due to temperature of concrete as placed will not be acceptable. When temperature of concrete exceeds 90°F, obtain acceptance by the RDP of proposed precautionary measures to be undertaken. When temperature of steel reinforcement, embedments, or forms is greater than 120°F, fog steel reinforcement, embedments, and forms with water immediately before placing concrete. Remove standing water before placing concrete.

3.10 EMBEDDED ITEM INSTALLATION

- A. Place and secure anchorage devices and other embedded items required for adjoining work that is attached to or supported by cast-in-place concrete. Use setting drawings, templates, diagrams, instructions, and directions furnished with items to be embedded.
 1. Install anchor rods, accurately located, to elevations required and complying with tolerances in Section 7.5 of AISC 303.
 2. Install reglets to receive waterproofing and to receive through-wall flashings in outer face of concrete frame at exterior walls, where flashing is shown at lintels, shelf angles, and other conditions.

3.11 FINISHING FORMED SURFACES

- A. Rough-Formed Finish: As-cast concrete texture imparted by form-facing material with tie holes and defects repaired and patched. Remove fins and other projections that exceed specified limits on formed-surface irregularities.
 - 1. Apply to concrete surfaces not exposed to public view.
- B. Smooth-Formed Finish: As-cast concrete texture imparted by form-facing material, arranged in an orderly and symmetrical manner with a minimum of seams. Repair and patch tie holes and defects. Remove fins and other projections that exceed specified limits on formed-surface irregularities.
 - 1. Apply to concrete surfaces exposed to public view.
- C. Rubbed Finish: Apply the following to smooth-formed finished as-cast concrete where indicated:
 - 1. Smooth-Rubbed Finish: Not later than one day after form removal, moisten concrete surfaces and rub with carborundum brick or another abrasive until producing a uniform color and texture. Do not apply cement grout other than that created by the rubbing process.
- D. Related Unformed Surfaces: At tops of walls, horizontal offsets, and similar unformed surfaces adjacent to formed surfaces, strike off smooth and finish with a texture matching adjacent formed surfaces. Continue final surface treatment of formed surfaces uniformly across adjacent unformed surfaces, unless otherwise indicated.

3.12 MISCELLANEOUS CONCRETE ITEMS

- A. Grout beam bearing plates and column leveling plates after they are set to true levels.
- B. Install Sika Latex acrylic bonding agent in strict accordance with manufacturer's recommendations, including but not limited to the removal of all foreign materials by mechanical means such as chipping or sandblasting, and dampening the surface with clean water before installation.
- C. Filling In: Fill in holes and openings left in concrete structures, unless otherwise indicated, after work of other trades is in place. Mix, place, and cure concrete, as specified, to blend with in-place construction. Provide other miscellaneous concrete filling indicated or required to complete the Work.

3.13 JOINT FILLING

- A. Prepare, clean, and install joint filler according to manufacturer's written instructions.
 - 1. Defer joint filling until concrete has aged at least one month(s). Do not fill joints until construction traffic has permanently ceased.

- B. Remove dirt, debris, saw cuttings, curing compounds, and sealers from joints; leave contact faces of joint clean and dry.
- C. Install semi-rigid joint filler full depth in saw-cut joints and at least 2 inches deep in formed joints. Overfill joint and trim joint filler flush with top of joint after hardening.

3.14 CONCRETE SURFACE REPAIRS

- A. Defective Concrete: Repair and patch defective areas when approved by Architect. Remove and replace concrete that cannot be repaired and patched to Architect's approval.
- B. Patching Mortar: Mix dry-pack patching mortar, consisting of one part portland cement to two and one-half parts fine aggregate passing a No. 16 sieve, using only enough water for handling and placing.
- C. Repairing Formed Surfaces: Surface defects include color and texture irregularities, cracks, spalls, air bubbles, honeycombs, rock pockets, fins and other projections on the surface, and stains and other discolorations that cannot be removed by cleaning.
 - 1. Immediately after form removal, cut out honeycombs, rock pockets, and voids more than 1/2 inch in any dimension in solid concrete, but not less than 1 inch in depth. Make edges of cuts perpendicular to concrete surface. Clean, dampen with water, and brushcoat holes and voids with bonding agent. Fill and compact with patching mortar before bonding agent has dried. Fill form-tie voids with patching mortar or cone plugs secured in place with bonding agent.
 - 2. Repair defects on surfaces exposed to view by blending white portland cement and standard portland cement so that, when dry, patching mortar will match surrounding color. Patch a test area at inconspicuous locations to verify mixture and color match before proceeding with patching. Compact mortar in place and strike off slightly higher than surrounding surface.
 - 3. Repair defects on concealed formed surfaces that affect concrete's durability and structural performance as determined by Architect.
- D. Perform structural repairs of concrete, subject to Architect's approval, using epoxy adhesive and patching mortar.
- E. Repair materials and installation not specified above may be used, subject to Architect's approval.

3.15 FIELD QUALITY CONTROL

- A. Testing and Inspecting: Owner will engage a qualified testing agency to perform tests and to submit reports and the Owner will engage a qualified firm to perform Special Inspections per the Statement of Special Inspections. The Statement of Special Inspections document will be implemented by the RDP.
- B. Inspections:

1. Steel reinforcement placement.
 2. Headed bolts and studs.
 3. Verification of use of required design mixture.
 4. Concrete placement, including conveying and depositing.
 5. Curing procedures and maintenance of curing temperature.
- C. Concrete Tests: Testing of composite samples of fresh concrete obtained according to ASTM C 172 shall be performed according to the following requirements:
1. Testing Frequency: Obtain at least one composite sample for each 60 cu. yd. or fraction thereof of each concrete mixture placed each day.
 - a. When frequency of testing will provide fewer than five compressive-strength tests for each concrete mixture, testing shall be conducted from at least five randomly selected batches or from each batch if fewer than five are used.
 2. Slump: ASTM C 143; one test at point of placement for each composite sample, but not less than one test for each day's pour of each concrete mixture. Perform additional tests when concrete consistency appears to change.
 3. Air Content: ASTM C 231, pressure method, for normal-weight concrete; ASTM C 173, volumetric method, for structural lightweight concrete; one test for each composite sample, but not less than one test for each day's pour of each concrete mixture.
 4. Concrete Temperature: ASTM C 1064 one test hourly when air temperature is 40°F and below and when 80°F and above, and one test for each composite sample.
 5. Unit Weight: ASTM C 567, fresh unit weight of structural lightweight concrete; one test for each composite sample, but not less than one test for each day's pour of each concrete mixture.
 6. Compression Test Specimens: ASTM C 31.
 - a. Cast and laboratory cure two sets of two standard cylinder specimens for each composite sample.
 - b. Compressive-Strength Tests: ASTM C 39/C 39M; test one set of two laboratory-cured specimens at 7 days and one set of two specimens at 28 days.
 - c. A compressive-strength test shall be the average compressive strength from a set of two specimens obtained from same composite sample and tested at age indicated.
 7. Strength of each concrete mixture will be satisfactory if every average of any three consecutive compressive-strength tests equals or exceeds specified compressive strength and no compressive-strength test value falls below specified compressive strength by more than 500 psi.
 8. Test results shall be reported in writing to RDP, concrete manufacturer, and Contractor within 48 hours of testing. Reports of compressive-strength tests shall contain Project identification name and number, date of concrete placement, name of concrete testing and inspecting agency, location of concrete batch in Work, design compressive strength at 28 days, concrete mixture proportions and materials, compressive breaking strength, and type of break for both 7- and 28-day tests.

9. Additional Tests: Testing and inspecting agency shall make additional tests of concrete when test results indicate that slump, air entrainment, compressive strengths, or other requirements have not been met, as directed by Architect. Testing and inspecting agency may conduct tests to determine adequacy of concrete by cored cylinders complying with ASTM C 42/C 42M or by other methods as directed by Architect.
10. Additional testing and inspecting, at Contractor's expense, will be performed to determine compliance of replaced or additional work with specified requirements.
11. Correct deficiencies in the Work that test reports and inspections indicate does not comply with the Contract Documents.

END OF SECTION 03 30 00

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SECTION 26 05 43 - UNDERGROUND DUCTS AND RACEWAYS

PART 1 - GENERAL

1.1 RELATED DOCUMENTS

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

1.2 SUMMARY

- A. Section Includes:
 - 1. Rigid nonmetallic duct.
 - 2. Duct accessories.
 - 3. Polymer concrete handholes and boxes with polymer concrete cover.

1.3 DEFINITIONS

- A. Direct Buried: Duct or a duct bank that is buried in the ground, without any additional casing materials such as concrete.
- B. Duct: A single duct or multiple ducts. Duct may be either installed singly or as component of a duct bank.
- C. Duct Bank:
 - 1. Two or more ducts installed in parallel, with or without additional casing materials.
 - 2. Multiple duct banks.
- D. GRC: Galvanized rigid (steel) conduit.
- E. Trafficways: Locations where vehicular or pedestrian traffic is a normal course of events.

1.4 ACTION SUBMITTALS

- A. Product Data: For each type of product.
 - 1. Duct-bank materials, including spacers and miscellaneous components.
 - 2. Duct, conduits, and their accessories, including elbows, end bells, bends, fittings, and solvent cement.
 - 3. Accessories for handholes.
 - 4. Detectable warning tape.
- B. Shop Drawings:

1. Precast or Factory-Fabricated Underground Utility Structures:
 - a. Plans, elevations, sections, details, attachments to other work, and accessories.
 - b. Duct entry provisions, including locations and duct sizes.
 - c. Frame and cover design and manhole chimneys.
2. Factory-Fabricated Handholes Other Than Precast Concrete:
 - a. Dimensioned plans, sections, and elevations, and fabrication and installation details.
 - b. Duct entry provisions, including locations and duct sizes.
 - c. Cover design.
 - d. Grounding details.

1.5 INFORMATIONAL SUBMITTALS

- A. Coordinate layout and installation of ducts, manholes, and handholes with final arrangement of other utilities, site grading, and surface features as determined in the field.
- B. Coordinate elevations of ducts and duct-bank entrances into manholes, and handholes with final locations and profiles of ducts and duct banks as determined by coordination with other utilities, underground obstructions, and surface features. Revise locations and elevations from those indicated as required to suit field conditions and to ensure that duct runs drain to manholes and handholes, and as approved by Engineer.

1.6 QUALITY ASSURANCE

- A. Testing Agency Qualifications: Qualified according to ASTM E 329 for testing indicated.
- B. Comply with ANSI C2.
- C. Comply with NFPA 70.

1.7 DELIVERY, STORAGE, AND HANDLING

- A. Deliver ducts to Project site with ends capped. Store nonmetallic ducts with supports to prevent bending, warping, and deforming.
- B. Store precast concrete and other factory-fabricated underground utility structures at Project site as recommended by manufacturer to prevent physical damage. Arrange so identification markings are visible.

2.1 RIGID NONMETALLIC DUCT

- A. Underground Plastic Utilities Duct: Type EPC-80-PVC and Type EPC-40-PVC RNC, complying with NEMA TC 2 and UL 651, with matching fittings complying with NEMA TC 3 by same manufacturer as duct.
- B. Basis-of-Design Product: Subject to compliance with requirements, provide product indicated on Drawings or comparable product by one of the following:
 - 1. ARNCO Corp.
 - 2. Beck Manufacturing.
 - 3. CANTEX INC.
 - 4. CertainTeed Corporation.
 - 5. Condux International, Inc.
 - 6. Crown Line Plastics.
 - 7. ElecSys, Inc.
 - 8. Electri-Flex Company.
 - 9. Endot Industries Inc.
 - 10. IPEX USA LLC.
 - 11. Lamson & Sessions.
 - 12. Manhattan/CDT.
 - 13. National Pipe & Plastics.
 - 14. Opti-Com Manufacturing Network, Inc (OMNI).
 - 15. Spiraduct/AFC Cable Systems, Inc.
- C. Listed and labeled as defined in NFPA 70, by a nationally recognized testing laboratory, and marked for intended location and application.
- D. Solvents and Adhesives: As recommended by conduit manufacturer.

2.2 DUCT ACCESSORIES

- A. Duct Spacers: Factory-fabricated, rigid, PVC interlocking spacers; sized for type and size of duct with which used, and selected to provide minimum duct spacing indicated while supporting duct during concreting or backfilling.
 - 1. Basis-of-Design Product: Subject to compliance with requirements, provide product indicated on Drawings or comparable product by one of the following:
 - a. Allied Tube & Conduit; a part of Atkore International.
 - b. CANTEX INC.
 - c. Carlon; a brand of Thomas & Betts Corporation.
 - d. IPEX USA LLC.
 - e. PenCell Plastics.
 - f. Underground Devices, Inc.

- B. Detectable Warning Tape: Comply with requirements for underground-line warning tape specified in Division 31 Section "Earth Moving."

2.3 POLYMER CONCRETE HANDHOLES AND BOXES WITH POLYMER CONCRETE COVER

- A. Description: Molded of sand and aggregate, bound together with a polymer resin, and reinforced with steel or fiberglass or a combination of the two.
- B. Basis-of-Design Product: Subject to compliance with requirements, provide product indicated on Drawings or comparable product by one of the following:
 - 1. Quazite: Hubbell Power Systems, Inc.
 - 2. Armorcast Products Company.
 - 3. NewBasis.
 - 4. Oldcastle Enclosure Solutions.
- C. Standard: Comply with SCTE 77. Handholes and bores to be Tier 22 unless otherwise noted.
- D. Color: Green.
- E. Configuration: Units shall be designed for flush burial and have closed bottom unless otherwise indicated.
- F. Cover: Weatherproof, secured by tamper-resistant locking devices and having structural load rating consistent with enclosure.
- G. Cover Finish: Nonskid finish shall have a minimum coefficient of friction of 0.50.
- H. Cover Legend: Molded lettering, as indicated for each service.
- I. Direct-Buried Wiring Entrance Provisions: Knockouts equipped with insulated bushings or end-bell fittings, selected to suit box material, sized for wiring indicated, and arranged for secure, fixed installation in enclosure wall.
- J. Duct Entrance Provisions: Duct-terminating fittings shall mate with entering duct for secure, fixed installation in enclosure wall.
- K. Handholes shall have factory-installed inserts for cable racks and pulling-in irons.

2.4 SOURCE QUALITY CONTROL

- A. Test and inspect precast concrete utility structures according to ASTM C 1037.
- B. Nonconcrete Handhole and Pull-Box Prototype Test: Test prototypes of manholes and boxes for compliance with SCTE 77. Strength tests shall be for specified tier ratings of products supplied.

1. Strength tests of complete boxes and covers shall be by an independent testing agency or manufacturer. A qualified registered professional engineer shall certify tests by manufacturer.
2. Testing machine pressure gages shall have current calibration certification, complying with ISO 9000 and ISO 10012, and traceable to NIST standards.

PART 3 - EXECUTION

3.1 PREPARATION

- A. Coordinate layout and installation of duct, duct bank, manholes, and handholes with final arrangement of other utilities, site grading, and surface features as determined in the field. Notify Architect if there is a conflict between areas of excavation and existing structures or archaeological sites to remain.
- B. Coordinate elevations of duct and duct-bank entrances into manholes and handholes with final locations and profiles of duct and duct banks, as determined by coordination with other utilities, underground obstructions, and surface features. Revise locations and elevations as required to suit field conditions and to ensure that duct and duct bank will drain to manholes and handholes, and as approved by Architect.
- C. Clear and grub vegetation to be removed, and protect vegetation to remain according to Section 311000 "Site Clearing." Remove and stockpile topsoil for reapplication according to Section 311000 "Site Clearing."

3.2 UNDERGROUND DUCT APPLICATION

- A. Duct for Electrical Cables: Type EPC-80-PVC RNC, direct-buried unless otherwise indicated.

3.3 EARTHWORK

- A. Excavation and Backfill: Comply with Division 31 Section "Earth Moving," but do not use heavy-duty, hydraulic-operated, compaction equipment.
- B. Restoration: Replace area after construction vehicle traffic in immediate area is complete.
- C. Restore surface features at areas disturbed by excavation, and re-establish original grades unless otherwise indicated. Replace removed sod immediately after backfilling is completed.
- D. Restore areas disturbed by trenching, storing of dirt, cable laying, and other work. Restore vegetation and include necessary topsoiling, fertilizing, liming, seeding, sodding, sprigging, and mulching. Comply with Section 329200 "Turf and Grasses" and Section 329300 "Plants."
- E. Cut and patch existing pavement in the path of underground duct, duct bank, and underground structures according to "Cutting and Patching" Article in Section 017300 "Execution."

3.4 DUCT AND DUCT-BANK INSTALLATION

- A. Where indicated on Drawings, install duct, spacers, and accessories into the duct-bank configuration shown. Duct installation requirements in this Section also apply to duct bank.
- B. Install duct according to NEMA TCB 2.
- C. Slope: Pitch duct a minimum slope of 1:300 down toward manholes and handholes and away from buildings and equipment. Slope duct from a high point between two manholes, to drain in both directions.
- D. Curves and Bends:
 - 1. Direct-Buried Duct Banks: Use manufactured GRC long radius sweeps for all bends with a radius of 6 ft. or less. All other bends are to be heated long radius sweeps. Conduit is not to be distorted.
 - 2. Concrete-Encased Duct Banks: Use heated long radius sweeps. Conduit is not to be distorted.
- E. Joints: Use solvent-cemented joints in duct and fittings and make watertight according to manufacturer's written instructions. Stagger couplings so those of adjacent duct do not lie in same plane.
- F. End Bell Entrances to Manholes and Concrete and Polymer Concrete Handholes: Use end bells, spaced approximately 10 inches o.c. for 5-inch duct, and vary proportionately for other duct sizes.
 - 1. Begin change from regular spacing to end-bell spacing 10 feet from the end bell, without reducing duct slope and without forming a trap in the line.
 - 2. Grout end bells into structure walls from both sides to provide watertight entrances.
- G. Terminator Entrances to Manholes and Concrete and Polymer Concrete Handholes: Use manufactured, cast-in-place duct terminators, with entrances into structure spaced approximately 6 inches o.c. for 4-inch duct, and vary proportionately for other duct sizes.
 - 1. Begin change from regular spacing to terminator spacing 10 feet from the terminator, without reducing duct line slope and without forming a trap in the line.
- H. Building Wall Penetrations: Make a transition from underground duct to GRC at least 10 feet outside the building wall, without reducing duct line slope away from the building and without forming a trap in the line. Use fittings manufactured for RNC-to-GRC transition. Install GRC penetrations of building walls as specified in Section 260544 "Sleeves and Sleeve Seals for Electrical Raceways and Cabling."
- I. Sealing: Provide temporary closure at terminations of duct with pulled cables. Seal spare duct at terminations. Use sealing compound and plugs to withstand at least 15-psig hydrostatic pressure.
- J. Pulling Cord: Install 200-lbf- test nylon cord in empty ducts.
- K. Direct-Buried Duct and Duct Bank:

1. Excavate trench bottom to provide firm and uniform support for duct. Comply with requirements in Division 31 Section "Earth Moving" for preparation of trench bottoms for pipes less than 6 inches in nominal diameter.
2. Depth: As indicated on the Contract Documents.
3. Support ducts on duct spacers coordinated with duct size, duct spacing, and outdoor temperature.
4. Spacer Installation: Place spacers close enough to prevent sagging and deforming of duct, with not less than four spacers per 20 feet of duct. Place spacers within 24 inches of duct ends. Stagger spacers approximately 6 inches between tiers. Secure spacers to earth. Tie entire assembly together using fabric straps; do not use tie wires or reinforcing steel that may form conductive or magnetic loops around ducts or duct groups.
5. Install duct with a minimum of 3 inches between ducts for like services and 24 inches between power and communications duct.
6. Install manufactured GRC long radius sweeps for stub-ups, at poles and equipment and at building entrances, and at changes of direction in duct.
 - a. Couple RNC duct to GRC with adapters designed for this purpose, and encase coupling with 3 inches of concrete.
 - b. Stub-ups to Outdoor Equipment: Extend concrete-encased GRC horizontally a minimum of 60 inches from edge of base. Install insulated grounding bushings on terminations at equipment.
 - 1) Stub-ups shall be minimum 4 inches above finished floor and minimum 3 inches from conduit side to edge of slab
 - c. Stub-ups to Indoor Equipment: Extend concrete-encased GRC horizontally a minimum of 60 inches from edge of wall. Install insulated grounding bushings on terminations at equipment.
 - 1) Stub-ups shall be minimum 4 inches above finished floor and no less than 3 inches from conduit side to edge of slab
7. After installing first tier of duct, backfill and compact. Start at tie-in point and work toward end of duct run, leaving ducts at end of run free to move with expansion and contraction as temperature changes during this process. Repeat procedure after placing each tier. After placing last tier, hand place backfill to 4 inches over duct and hand tamp. Firmly tamp backfill around ducts to provide maximum supporting strength. Use hand tamper only. After placing controlled backfill over final tier, make final duct connections at end of run and complete backfilling with normal compaction. Comply with requirements in Section 312000 "Earth Moving" for installation of backfill materials.
 - a. Place minimum 8 inches of sand as a bed for duct. Place sand to a minimum of 12 inches above top level of duct.
- L. Warning Tape: Bury detectable warning tape approximately 18 to 24 inches directly over all direct-buried ducts and duct banks. Align tape parallel to and within 3 inches of centerline of duct bank. Provide an additional warning tape for each 12-inch increment of duct-bank width over a nominal 18 inches. Space additional tapes 12 inches apart, horizontally. Refer to Division 31 Section "Earth Moving."

3.5 INSTALLATION OF HANDHOLES OTHER THAN PRECAST CONCRETE

- A. Install handholes level and plumb and with orientation and depth coordinated with connecting duct, to minimize bends and deflections required for proper entrances. Use handhole extension if required to match depths of duct, and seal joint between handhole and extension as recommended by manufacturer.
- B. Unless otherwise indicated, support units on a level bed of crushed stone as indicated on the drawings and compacted per Division 31 Section "Earth Moving."
- C. Elevation: In paved areas and trafficways, set cover flush with finished grade. Set covers of other handholes 1 inch above finished grade.
- D. Install removable hardware, including pulling eyes, cable stanchions, cable arms, and insulators, as required for installation and support of cables and conductors and as indicated. Select arm lengths to be long enough to provide spare space for future cables, but short enough to preserve adequate working clearances in enclosure.
- E. Field cut openings for duct according to enclosure manufacturer's written instructions. Cut wall of enclosure with a tool designed for material to be cut. Size holes for terminating fittings to be used, and seal around penetrations after fittings are installed.

3.6 FIELD QUALITY CONTROL

- A. Perform the following tests and inspections:
 - 1. Demonstrate capability and compliance with requirements on completion of installation of underground duct, duct bank, and utility structures.
 - 2. Pull solid aluminum or wood test mandrel through duct to prove joint integrity and adequate bend radii, and test for out-of-round duct. Provide a minimum 12-inch- long mandrel equal to duct size minus 1/4 inch. If obstructions are indicated, remove obstructions and retest.
 - 3. Test manhole and handhole grounding to ensure electrical continuity of grounding and bonding connections. Measure and report ground resistance as specified in Section 260526 "Grounding and Bonding for Electrical Systems."
- B. Correct deficiencies and retest as specified above to demonstrate compliance.
- C. Prepare test and inspection reports.

3.7 CLEANING

- A. Pull leather-washer-type duct cleaner, with graduated washer sizes, through full length of duct until duct cleaner indicates that duct is clear of dirt and debris. Follow with rubber duct swab for final cleaning and to assist in spreading lubricant throughout ducts.
- B. Clean internal surfaces of manholes, including sump.
 - 1. Sweep floor, removing dirt and debris.

2. Remove foreign material.

3.8 AS-BUILT DRAWINGS

- A. The Contractor shall provide as-built drawings including as-built ties and markups on a monthly basis. As work progresses, all construction activities shall be documented. The record documents shall include:
 1. All demolition and abandonment of underground utilities and structures.
 2. Location, elevation and type (size and quantity) of installed underground utilities. Location, elevation and type of existing exposed utilities during installation of new work.
 3. The Contractor shall hire the services of a surveyor licensed in the state where the work is being performed to determine parameters stated above or complete work and record the results and update the electronic files. As-builts shall include lateral and vertical (depth) locations of all utilities at 50-foot increments as well as swing ties.
 4. Document installation with photographs in digital format, especially but not limited to, field joints, bedding material, concrete encasement, duct spacers, sweeps, bends and connections to manholes and buildings.
 5. Final documents (drawings and electronic files in AutoCAD format, latest edition) shall be submitted to the designated Owner's Representative not later than 30 days after substantial completion of the project. All comments shall be incorporated to the final documents within 14 days after receiving them from the Owner's Representative. The final record set (hard copy and the electronic files) shall be submitted to the Owner's Representative.

END OF SECTION 26 05 43

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SECTION 31 20 00 – EARTH MOVING

PART 1 - GENERAL

1.1 RELATED DOCUMENTS

- A. The Contractor, Subcontractors, and/or suppliers providing goods and services referenced in or related to this Section shall also be bound by the Related Documents identified in Division 01 Section “Summary.”

1.2 SUMMARY

- A. This Section includes the following:

1. Site excavating, grading, filling, backfilling, compacting, and preparing sub-grades for the entire project including but not limited to: foundations, footings, retaining walls, slab-on-grade components, site utility lines and structures, walks, pavements, lawns, athletic fields and plantings.
2. Granular fill course for walks, curbs, stairs, and other site improvements.
3. Compacted structural fill where indicated on the Structural Drawings or where required below building areas.
4. Foundation drains where indicated on structural drawings.
5. Processed aggregate for pavements and other improvements.
6. Stone screenings for mow strips, warning tracks, walks softball infields, various athletic surfaces, and other site improvements.
7. Crushed Stone for pavements, under building slabs, footings and around foundation drains, including piping in stone wedges.
8. Sand for jumping pits and athletic field construction.
9. General fill for establishing project sub-grades.
10. Excavation of rock and/or boulders, including replacement with suitable earthwork materials.
11. Removal of encountered unsatisfactory soils, including lawful off-site disposal and replacement with suitable earthwork fill material.
12. Utility bedding material for site utilities.
13. Spreading of stockpiled subsoil at all athletic fields.
14. Construction of pea gravel diaphragm at pavement areas where indicated.
15. Securing trenching permit.

- B. Related Sections include the following:

1. Division 01 Section “Temporary Facilities and Controls.”
2. Division 01 Section “Temporary Tree and Plant Protection.”
3. Division 31 Section “Erosion and Sedimentation Control.”
4. Division 31 Section “Trench Excavation and Backfill”.
5. Division 31 Section “Site Clearing”.
6. Division 31 Section “Dewatering”.
7. Division 32 Section “Turf and Grasses”.
8. Division 33 Section “Field Subdrainage System”.
9. Division 33 Section “Storm Drainage System”.

10. Division 26 and 33 Sections for excavating and backfilling buried mechanical and electrical utilities and utility structures.

C. This project is Unclassified –

1. Unclassified excavation shall comprise and include the satisfactory removal and disposal of all materials encountered within the lines and grades shown in the drawings and in the specifications regardless of the nature of the materials, and shall be understood to include but not limited to, earth, topsoil, subsoil, hardpan, fill, foundations, pavements, curbs, piping, footings, bricks, concrete, abandoned drainage and utility structures, debris, and materials classified as unsuitable materials. All excavations and associated backfill within the lines and grades shown in the drawings and in the specifications, except in rock as defined below, shall be included in the base bid.

1.3 DEFINITIONS

A. Backfill: Soil materials used to fill an excavation.

1. Initial Backfill: Backfill placed beside and over pipe in a trench, including haunches to support sides of pipe.
2. Final Backfill: Backfill placed over initial backfill to fill a trench.

B. Base Course: Layer placed between the subbase course and proposed improvements.

C. Bedding Course: Layer placed over the excavated subgrade in a trench before laying pipe.

D. Borrow: Satisfactory soil or earthwork products imported from off-site for use as fill or backfill.

E. Excavation: Removal of material encountered above subgrade elevations.

1. Additional Excavation: Excavation below subgrade elevations as directed by Architect. Additional excavation and replacement material will be paid for according to Contract provisions for changes in the Work.
2. Mass Excavation: Excavations more than 8 feet in width and pits more than 30 feet in either length or width.
3. Unauthorized Excavation: Excavation below subgrade elevations or beyond indicated dimensions without direction by Architect. Unauthorized excavation, as well as remedial work directed by Architect, shall be without additional compensation.

F. Fill: Soil materials used to raise existing grades.

G. Mass Rock or Earth: Excavated material that is greater than 8' in both length and width.

H. Rock (Mass & Rock): Excavated rock material in beds, ledges, unstratified masses, and conglomerate deposits that cannot be removed by rock excavating equipment equivalent to the following in size and performance ratings, without systematic drilling, ram hammering, ripping, or blasting, when permitted:

1. Excavation of Footings, Trenches, and Pits: Late-model, track-mounted hydraulic excavator; Caterpillar 325D or equal, equipped with a 42-inch wide, short-tip-radius rock bucket.

2. Mass Excavation: Late-model, track-mounted loader; Caterpillar 963C or equal; or Late-model, track-mounted hydraulic excavator; Caterpillar 325D or equal, equipped with a 42-inch wide, short-tip-radius rock bucket.
 - I. Boulder: An excavated, individual rock fragment or natural stone with a volume of 1.5 c.y. to 3 c.y. All boulders exceeding 3 c.y. shall be classified as “rock” and shall fall within “mass” or “trench” subcategory based on definitions in this section. Material classified as “Rock” and excavated and paid for shall not be eligible to be classified as “boulder” for additional payment purposes. All excavated boulder material, to be disposed of on-site, or processed for re-use on-site, is not eligible for compensation under allowance and is part of base bid.
 - J. Structures: Buildings, footings, foundations, retaining walls, slabs, tanks, curbs, mechanical and electrical appurtenances, or other man-made stationary features constructed above or below the ground surface.
 - K. Subbase Course: Layer placed between the subgrade and base course for pavement or other site improvements.
 - L. Subgrade: Surface or elevation remaining after completing excavation, or top surface of a fill or backfill immediately below subbase, drainage fill, or topsoil materials.
 - M. Trench Rock or Earth: Excavated material from trench excavations that is less than 8’ (eight feet) in either length or width.
 - N. Utilities include on-site underground pipes, conduits, ducts, and cables, as well as underground services within buildings.
 - O. Form 817: "Standard Specifications for Roads, Bridges, and Incidental Construction", State of Connecticut, Department of Transportation, Form 817”, as revised.
 - P. Unsatisfactory/Unsuitable Soils: Any material generated, excavated and/or collected by earth moving activities or other contract work that does not meet any of the product specifications contained in contract documents.
 - Q. Zone of Influence (ZOI): the planes extending horizontally away from the bottom edges of footings, utilities and other existing and proposed site improvements for a distance of two feet in all directions, then down and away at 1H:1V (horizontal : vertical) slope to the intersection with suitable native soils.
- 1.4 SUBMITTALS
- A. General: Submit the following according to the Conditions of the Contract and Division 1 Specifications Sections.
 - B. Product Data: For the following:
 1. Each type of plastic warning tape.
 2. Drainage fabric.
 3. Separation fabric.

C. Samples: For the following:

1. 50-lb samples, sealed in airtight containers, of each proposed soil material from on-site or borrow sources, for Owner's independent laboratory testing agency. Samples shall be delivered to the site seven (7) calendar days in advance or time planned on incorporating them into the work. Owner's testing lab will confirm submitted test results and compaction curve data.
2. 5-lb sample to Architect's office for visual conformance confirmation.
3. 12-by-12-inch sample of drainage fabric.
4. 12-by-12-inch sample of separation fabric.
5. 4-foot strip of each type of warning tape.

D. Material Test Reports: From an approved qualified testing agency indicating and interpreting test results for compliance of the following with requirements indicated:

1. Complete mechanical/sieve analysis classification according to Form 817 and ASTM D 2487 for every 400 cubic yards of on-site or borrow soil material proposed for fill and backfill. Washed sieve shall be performed for 200 sieve on all materials.
2. Laboratory compaction curve according to ASTM D 1557 for each on-site or borrow soil material proposed for fill and backfill.
3. Report of actual unconfined compressive strength and/or results of bearing tests of each stratum tested.
4. Test sampling shall conform to the requirements of ASTM D-75, and ASTM D-3665.

E. Blasting plan approved by authorities having jurisdiction, for record purposes.

F. Seismic survey agency report, for record purposes.

G. All installation of materials prior to testing and/or review and response by Architect is at Contractor's risk.

1.5 QUALITY ASSURANCE

A. Comply with applicable requirements of NFPA 495, "Explosive Materials Code" and SSHB, Section 120 and State Fire Codes.

B. Seismic Survey Agency: An independent testing agency, acceptable to authorities having jurisdiction, experienced in seismic surveys and blasting procedures to perform the following services:

1. Prepare plan report types of explosive and sizes of charge to be used in each area of rock removal, types of blasting mats, sequence of blasting operations, and procedures that will prevent damage to site improvements and structures on Project site and adjacent properties.
2. Seismographic monitoring services during blasting operations.
3. Prepare a preblast survey of all adjacent properties, including a structural inspection of the buildings and properties and shall include a written and photographic record of existing conditions.
4. Blast operations shall not commence until all reports and plans are received and approved by the Owner and the Architect.

- C. Geotechnical Testing Agency Qualifications: An independent testing agency qualified according to ASTM E 329 to conduct soil materials and rock-definition testing, as documented according to ASTM D 3740 and ASTM E 548.
- D. Pre-excavation Conference: Conduct conference at Project site to comply with requirements in Division 1, Section "Project Coordination".
 - 1. Before commencing earthwork, meet with representatives of the governing authorities, Owner, Architect, Engineer, consultants, independent testing agency, and other concerned entities. Review earthwork procedures and responsibilities including testing and inspection procedures and requirements. Notify participants at least 3 working days prior to convening conference. Record discussions and agreements and furnish a copy to each participant.
- E. Testing: Compaction tests will be required by the Owner and will be paid for by the Owner. No specific testing schedule has been established at this time. If tests indicate that density requirements have not been achieved, the Contractor shall continue compacting.

All retesting in these areas shall be paid for by the Contractor. See Division 1, Section "Quality Control Services". Contractor is required to compensate testing laboratory, directly, for all material test reports.

- F. Density and Compaction Testing: The Contractor is responsible to schedule compaction tests and to allow adequate time for the proper execution of said tests.
- G. Protect all benchmarks, monuments, and property boundary pins. Replace if destroyed by Contractor's operations.

1.6 PROJECT CONDITIONS

- A. Existing Utilities: Do not interrupt utilities serving facilities occupied by Owner or others unless permitted in writing by Architect and then only after arranging to provide temporary utility services according to requirements indicated. Note that school operations must be maintained throughout construction.
 - 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.
 - 3. Contact utility-locator service for area where Project is located before excavating.
- B. Demolish and completely remove from site existing underground utilities indicated to be removed. Coordinate with utility companies to shut off services if lines are active. Contact **Call Before You Dig (1-800-922-4455)** prior to any earthwork or demolition operations.
- C. Contractor is responsible to properly obtain a trenching permit per 520 CMR 14.00 from appropriate local or state agency.

1.7 UNIT PRICES

- A. Rock Measurement: Volume of rock actually removed, measured in original position, but not to exceed the following:

1. 12 inches outside of concrete forms at footings.
 2. 6 inches outside of minimum required dimensions of concrete cast against grade.
 3. Outside dimensions of concrete walls indicated to be cast against rock without forms or exterior waterproofing treatments.
 4. 12 inches outside width and bottom of drainage structures, including catch basins and manholes.
 5. Pavements: bottom elevation of the specified subbase course.
 6. 6 inches beneath pipe in trenches, and 24 inches wider than inside diameter of the pipe.
 7. Planting Areas: 48" below proposed finish elevations area as specified for typical planting installation.
 8. Lawn Areas: 18" below indicated finish grades.
- B. Boulder Measurement: Volume of all boulders excavated and slated for removal from site. Individual boulders to be measured by method mutually agreed upon by the Contractor and Owner.
- C. Limits and measurements do not represent dimensions of excavation requirements mandated by safety and other regulatory agencies. Rock required to be removed to conform to safety regulations will not be measured for payment.

1.8 SUBSURFACE SOIL DATA

- A. No subsurface testing was performed as part of the project pre-design. All base materials and thicknesses shall be assumed to be as specified in previous construction projects.
- B. Contractor may, at his own expense, conduct additional subsurface testing as required for his own information after approval by the Owner.

PART 2 - PRODUCTS

2.1 SOIL MATERIALS

- A. General: Provide borrow soil materials when sufficient satisfactory soil materials are not available from excavations.
- B. Suitable Soils: ASTM D 2487 soil classification groups GW, GP, GM, SW, SP, and SM, or a combination of these group symbols; free of rock or gravel larger than 3 inches in any dimension, debris, waste, frozen materials, vegetation, reclaimed or recycled materials (i.e., asphalt, concrete, glass, etc.), and other deleterious matter. CL, SC, and GC can be used if approved by the Owner's Geotechnical Engineer. (use of recycled asphalt may be permitted for specific soil products as specified and shall be approved for use by Architect)
- C. Unsuitable Soils: ASTM D 2487 soil classification groups GC, SC, MH, CH, OL, OH, and PT, or a combination of these group symbols, and any materials that contain reclaimed or recycled materials (i.e., asphalt, concrete, glass, etc.) unless otherwise specified.
- D. Unsuitable soils also include suitable soils not maintained by the General Contractor within 2 percent of optimum moisture content at time of compaction.

- E. Granular Fill: Form 817 Article M.02.06, Type 'B' is to be used for filling under footings, pavements, and improvements, and subbase under pavements that is required to achieve the rough grades indicated.

1. Provide borrow material as required to meet project specifications.

- F. Structural Fill

1. Structural Fill for fill and backfill below building areas and adjacent to foundation walls except where other materials are specified or detailed. Materials shall be clean bank-run or processed gravel free from recycled material, foreign substances (bricks, concrete, asphalt, etc), frozen material, lumps of clay, loam or vegetable matter, be obtained from a single source and shall meet the following grain size gradation:

<u>Sieve Size</u>	<u>Percentage Passing by Weight</u>
3 inches	100
1 ½"	80-100
½"	50-100
No. 4	30-85
No. 20	15-60
No. 60	5-35
No. 200*	0-10
* 0-5 under sidewalks	

Structural fill shall have a plasticity index of less than 6 and shall be compacted in maximum 9' loose lifts to at least 95 percent of the Modified Proctor maximum dry density (ASTM D1557), with moisture contents within ± 2 percentage points of optimum moisture content.

Fill placed within buildings and within an area extending 5 feet beyond the limits of buildings, including within utility trenches inside buildings, shall consist of Structural Fill.

- G. Crushed Stone: Clean, sound material free of debris, waste, frozen materials and organic material conforming to Form 817, Article M.01.01, No. 6 size as indicated on Drawings.
- H. Porous fill: 3/8" crushed stone, Clean, sound material free of debris, waste, frozen materials and organic material conforming to, Form 817, Article M.01.01 No. 67.
- I. Processed Aggregate: Artificially graded mixture of sound coarse and fine aggregates, containing no more than 15 percent by weight of recycled bituminous concrete. Mixture to be free of debris, waste, frozen materials and organic materials and conform to Form 817, Article M.05.01. . Maximum size of aggregate shall not exceed 2/3 of lift thickness. Broken stone is required; rounded gravel will not be permitted.
- J. Processed Gravel for Subbase, Form 817 Article M.02.06, Type 'B' shall be used as a subbase material for paved areas, including but not limited to roadways, parking lots, asphalt berms, reinforced concrete pads, unit pavers, asphalt walks, concrete walks, and curbs.
- K. Utility Bedding Material: Sand or sandy soil free of debris, waste, frozen materials and organics with 100 percent passing a 3/8-inch sieve and not more than 10 percent passing a No. 200 sieve or as specifically required by applicable utility authority.

L. Field Stone: Naturally weathered rock between 6” – 18” in width and depth used for the construction of stone walls.

M. General Fill: Material used to establish subgrade elevations may be either:

1. Approved soil material available from excavation on site provided material meets specification for general fill as described below, or approved by Architect prior to placement. Maximum size 6”.
2. Approved material, obtained from off-site, certified to conform to the following grain-size gradation:

SQUARE MESH SIEVES	PERCENT PASSING WEIGHT
6”	100
1”	50-100
# 4	20-100
# 20	10-70
# 60	5-45
#200	0-20

3. All material used for general filling shall be clean, free of clay and organic material and capable of satisfactory compaction.
4. If sufficient approved on-site material is not available to meet site elevations indicated, Contractor shall provide additional approved off-site material at no extra cost to Owner.

N. Modified Rock Fill: M2.02.4

O. Stone Screenings: , Form 817, Article M.01.01 ‘Screenings’.

P. Sand for trenching, bedding, concrete and masonry: ASTM C33-03 ‘Fine Aggregate’ type 2NS.

Q. Sand for Long/tiple jump pits shall be rounded, washed river or bank sand conforming to form 817 Article M.05.02-2.0 Sand Cover except material shall 100% pass a number 8 sieve and 0-2% passing the #100 Sieve

R. Subsoil: shall be the existing on site weathered moraine material; typically 12”–24” depth located immediately under the existing topsoil and atop the residual moraine material.

S. Stone: An individual rock fragment or natural stone, with a volume of 0.5 cubic yards to 1.5 cubic yards, obtained from on-site excavation, on-site processing of rock or boulders, or an off-site source. All stone obtained from on-site excavation shall be considered Mass Earth or Trench Earth. All excess stone shall be considered “Unsatisfactory Soils” and shall be legally disposed of off-site.

T. Washed Stone: Crushed stone not to exceed 3”.

2.2 ACCESSORIES

A. Detectable Warning Tape: Acid- and alkali-resistant polyethylene film warning tape manufactured for marking and identifying underground utilities, minimum 6 inches wide and 4 mils thick, continuously inscribed with a description of utility, with metallic core encased in a

protective jacket for corrosion protection, detectable by metal detector when tape is buried up to 30 inches deep; colored as follows:

1. Red: Electric.
 2. Yellow: Gas, oil, steam, and dangerous materials.
 3. Orange: Telephone and other communications.
 4. Blue: Water systems.
 5. Green: Sewer systems.
- B. Drainage Fabric: Non-woven geotextile, specifically manufactured as a drainage geotextile; made from polyolefins, polyesters, or polyamides; and with the following minimum properties determined according to ASTM D 4759 and referenced standard test methods:
1. Grab Tensile Strength: 110 lb/f; ASTM D 4632.
 2. Tear Strength: 40 lb/f; ASTM D 4533.
 3. Puncture Resistance: 50 lb/f; ASTM D 4833.
 4. Water Flow Rate: 150 gpm per sq. ft.; ASTM D 4491.
 5. Apparent Opening Size: No. 50; ASTM D 4751.
- C. Separation Fabric: Woven geotextile, specifically manufactured for use as a separation geotextile; made from polyolefins, polyesters, or polyamides; and with the following minimum properties determined according to ASTM D 4759 and referenced standard test methods:
1. Grab Tensile Strength: 200 lbf; ASTM D 4632.
 2. Tear Strength: 75 lbf; ASTM D 4533.
 3. Puncture Resistance: 90 lbf; ASTM D 4833.
 4. Water Flow Rate: 4 gpm per sq. ft.; ASTM D 4491.
 5. Apparent Opening Size: No. 30; ASTM D 4751.
- D. Foundation Drains: Foundation drainage pipe and fittings shall be 6" inside diameter, 0.254" minimum wall thickness, PVC Perforated Pipe in accordance with ASTM D2729.

PART 3 - EXECUTION

3.1 PREPARATION

- A. Protect structures, utilities, sidewalks, pavements, and other facilities from damage caused by settlement, lateral movement, undermining, washout, and other hazards created by earthwork operations.
- B. Protect subgrades and foundation soils against freezing temperatures or frost. Provide protective insulating materials as necessary.
- C. Provide erosion-control measures to prevent erosion or displacement of soils and discharge of soil-bearing water runoff or airborne dust to adjacent properties and walkways. Refer to Division 31, Section "Sedimentation and Erosion Control".
- D. Provide protective safety barrier around all trees in the work area that are to remain.

3.2 DEWATERING

- A. Prevent surface water and ground water from entering excavations, from ponding on prepared subgrades, and from flooding Project site and surrounding area. Coordinate with project sediment and erosion control requirements.
- B. Protect subgrades from softening, undermining, washout, and damage by rain or water accumulation.
 - 1. Reroute surface water runoff away from excavated areas. Do not allow water to accumulate in excavations. Do not use excavated trenches as temporary drainage ditches.
 - 2. Install a dewatering system to keep subgrades dry and convey ground water away from excavations. Maintain until dewatering is no longer required.

3.3 EXPLOSIVES

- A. Explosives: Obtain written permission from authorities having jurisdiction before bringing explosives to Project site or using explosives on Project site. Secure and pay for all permits as required.
- B. Comply with procedures outlined in paragraph “Quality Assurance”, sub-paragraph “Seismic Survey Agency”, above and Form 817, Section 1.07.08.. No overnight on-site storage of explosives is permitted.
 - 1. Do not damage adjacent structures, property, or site improvements or weaken the bearing capacity of rock subgrade when using explosives.
- C. Provide minimum 48-hours notice to Owner, Architect, abutting properties, and all affected utilities. No blasting is permitted prior to 8:00 a.m. or after 4:00 p.m. or on Holidays, Saturdays or Sundays without written permission of the Owner. Blasting is NOT permitted while school is in session unless otherwise noted.

3.4 EXCAVATION, GENERAL

- A. Unclassified Excavation: Excavation to subgrade elevations regardless of the character of the surface and subsurface conditions encountered, including rock, soil materials, and obstructions. No changes in the Contract Time or contract price will be authorized for rock excavation or removal of obstructions.
 - 1. If excavated materials intended for fill and backfill include unsatisfactory materials and rock, replace with satisfactory soil materials.
 - 2. Contractor will not be entitled to additional time to complete the project or additional compensation, when rock removal is required.
- B. Rock or Unsuitable materials Excavation Procedures:
 - 1. When, during the process of excavation, rock or unsuitable materials are encountered as specified herein, the Contractor shall strictly adhere to the following procedures.
 - 2. Such material shall be uncovered and exposed.
 - 3. The Architect and the Owner shall be notified by the Contractor before proceeding further.

4. The Contractor shall not proceed with the excavation of any material claimed as rock or unsuitables until the material has been classified by the Owner's Representative and cross sectioned as specified below.
 5. The Contractor shall retain a land surveyor acceptable to both the Owner and the Contractor, to take cross sections of rock before removal of same, and to provide computations of cross sections within payline limits.
 6. For unsuitable materials, the Contractor shall excavate down to the limits defined by the Geo-technical engineer, owner or architect and then engage a surveyor to provide the measurement necessary to bring the excavation back up to contract payline limits.
 7. All quantities and classifications shall be measured as compacted in-place material and not as trucked or stockpiled material and must be verified and documented with Owner's Representative or Architect.
 8. Should the Contractor proceed with the excavation without surveyed quantification and classification of the rock, the Contractor shall forfeit the right to payment as rock for the subject material.
 9. Rock excavation materials may be used for fill, only as specifically allowed and approved by the Architect, in accordance with the following paragraph "D".
- C. All areas where rock is removed must be marked on the as-built Drawings. Obtain approval of the Architect before starting work.
- D. If the Contractor intends to utilize excavated rock for site earthwork operations, the Contractor must modify any such material to comply with the specification for the designated specific material, at no cost to the Owner. Boulders may also be modified for use. No material may be used, unless approved by the Architect, prior to placement.
- E. Boulder disposal:
1. Limited on-site, above grade use of boulders is required for site improvements. See plans, specifications and details for specific locations, quantities and installation procedures. Contractor shall coordinate with Architect for boulder selection and final placement and facing.
 2. On-site, below grade boulder disposal is permitted in locations below meadows and large lawn areas. See plans and coordinate with landscape architect for locations. Contractor shall not deviate from following procedure for on-site, below grade disposal.
 - a. Boulders to be buried in areas of fill under lawn and landscape areas only. Contractor to ensure that there are no conflicts with proposed or existing utilities.
 - b. Top of Boulders shall have a minimum 4'-0" cover to finish grade
 - c. There shall be a minimum distance of 4'-0" between boulders.
 - d. Approved fill materials shall be placed between boulders and installed and compacted in compliance with project specifications. Approved fill materials shall be placed above buried boulders in compliance with project specifications.
- F. Rock and boulder disposal:
1. All excess rock and boulders remain the property of the Contractor and must be removed from project site and disposed in a legal manner.
- 3.5 STABILITY OF EXCAVATIONS
- A. Comply with local codes, ordinances and requirements of authorities having jurisdiction to maintain stable excavations.

3.6 SUBGRADE PREPARATION FOR BUILDING FOOTINGS

- A. Contractor shall remove all unsuitable soils, including buried peat, topsoil, subsoil, boulders and existing fill under all building footings. Rock shall be cut at a minimum to 12" beneath the bottom of footings to allow for the placement of Structural fill. The contractor shall place a minimum of 6" (12" where rock is found) of structural fill under all footings and piers.

3.7 SUBGRADE PREPARATION FOR BUILDING SLABS

- A. Contractor shall remove all unsuitable soils, including buried peat, topsoil, subsoil, boulders and existing fill under all building slabs. Rock shall be cut at a minimum to 24" beneath the bottom of slabs to allow for the placement of Structural fill. Exposed boulders shall be removed from the subgrade and the resulting excavation filled with structural fill. The contractor shall place a minimum of 12" of porous or structural fill under all building slabs.

3.8 EXCAVATION FOR STRUCTURES

- A. Excavate to indicated elevations and dimensions within a tolerance of plus or minus [1 inch]. Extend excavations a sufficient distance from structures for placing and removing concrete formwork, for installing services and other construction, and for inspections.
 - 1. Excavations for Footings and Foundations: Do not disturb bottom of excavation. Excavate by hand to final grade just before placing concrete reinforcement. Trim bottoms to required lines and grades to leave solid base to receive other work.
 - 2. Excavation for Underground Tanks, Basins, and Mechanical or Electrical Utility Structures: Excavate to elevations and dimensions indicated within a tolerance of plus or minus 1 inch. Do not disturb bottom of excavations intended for bearing surface.

3.9 EXCAVATION FOR WALKS AND PAVEMENTS AND SLABS ON GRADE

- A. Excavate surfaces under walks and pavements to indicated cross sections, elevations, and grades. In locations where existing fill and organics are located below pavements, the existing fill below pavements should be improved before placing the proposed fill by compacting the exposed subgrade in the existing fill using vibratory compactor imparting a dynamic effort of at least 40 kips. Where soft zones are revealed by the compaction effort and where organic soil is exposed, the soft materials or organic soil shall be removed and replaced with general fill placed to the bottom of the subbase layer.

3.10 APPROVAL OF SUBGRADE

- A. Notify Architect and Owner's Representative when excavations have reached required subgrade.
- B. If unsatisfactory soil is present at sub-grade elevation, continue excavation and replace with compacted backfill or fill material as directed.
 - 1. Additional excavation and replacement material will be paid for according to Contract provisions for changes in the work.

- C. Proof roll subgrade with heavy pneumatic-tired equipment to identify soft pockets and areas of excess yielding. Do not proof roll wet or saturated subgrades. Conform to Section 170. Subgrade must be approved prior to application of any borrow or fill materials.
- D. If it is determined that unsatisfactory soil or excess moisture content is present, continue excavation and replace with compacted free draining backfill or fill material as directed.
- E. Reconstruct subgrades damaged by freezing temperatures, frost, rain, accumulated water, or construction activities, as directed by Architect.
- F. Proof roll all areas under running track with minimum six (6) passes by vibratory roller with minimum 20 tons of dynamic force.

3.11 UNAUTHORIZED EXCAVATION

- A. Fill unauthorized excavation under foundations or wall footings by extending bottom elevation of concrete foundation or footing to excavation bottom, without altering top elevation. Lean concrete fill may be used when approved by Architect.
 - 1. Fill unauthorized excavations under other construction or utility pipe as directed by Architect.

3.12 STORAGE OF SOIL MATERIALS

- A. Stockpile borrow materials and satisfactory excavated/manufactured soil materials. Stockpile soil materials without intermixing. Place, grade, and shape stockpiles to drain surface water. Cover with tarps to prevent windblown dust or temporarily seed as per Division 31 Section "Erosion and Sedimentation Controls".
 - 1. Stockpile soil materials away from edge of excavations. Do not store within drip line of remaining trees.
 - 2. Contamination/intermixing of soil materials is just cause for rejection of material.

3.13 BACKFILL

- A. Place and compact backfill in excavations promptly, but not before completing the following:
 - 1. Acceptance of construction below finish grade including, where applicable, dampproofing, waterproofing, and perimeter insulation and drainage.
 - 2. Surveying locations of underground utilities for record documents.
 - 3. Inspecting, testing, and approving of underground utilities.
 - 4. Removing concrete formwork.
 - 5. Removing trash and debris from excavation.
 - 6. Removing temporary shoring and bracing, and sheeting.
 - 7. Installing permanent or temporary horizontal bracing on horizontally supported walls.

3.14 PLACEMENT OF FILL

- A. Preparation: Remove vegetation, topsoil, debris, unsatisfactory soil materials, obstructions, and deleterious materials from ground surface before placing fills.
- B. Plow, scarify, bench, or break up sloped surfaces steeper than 1 vertical to 4 horizontal so fill material will bond with existing material.
- C. When subgrade or existing ground surface to receive fill has a density less than that required for fill, break up ground surface to depth required, pulverize, moisture-condition or aerate soil and recompact to required density.
- D. Place and compact fill material in maximum 8" lifts. After placement, thoroughly knead all general fill with sheep's foot rollers to break down any remaining chunks of soil prior to vibratory compaction.
- E. Do not deposit fill in areas of standing water. Any pockets of sediment and foreign material are to be removed before filling continues.
- F. Compaction: Each lift shall be compacted. Maintain optimum and proper moisture content to achieve required compaction. Coordinate with Owner on testing schedule throughout earthwork operations.
- G. Fill under lawn areas shall be compacted between 92% and 96% modified AASHTO laboratory density (ASTM D-1557, Method C).
- H. Fill under structures, pavements, and site improvements within 5' of grade shall be compacted to minimum 95% OF MODIFIED AASHTO laboratory density (ASTM D-1557, Method C). Fill under pavement 5 or more feet below grade shall be compacted minimum 92% of modified AASHTO laboratory density (ASTM D-1557, Method C). Under bituminous pavements, compact processed aggregate materials to minimum 98% modified AASHTO laboratory density. All layers of structural fill shall be compacted to a minimum of 95% OF MODIFIED AASHTO laboratory density (ASTM D-1557, Method C).
- I. Special Requirements
 - 1. Remove all accumulated silts and organic material from temporary sedimentation, siltation, and detention basins prior to proceeding with earthwork.
 - 2. Phase all earthwork operations in all key identified slopes so that each slope and bench/terrace is completed, including compaction and stabilization prior to proceeding with next higher slope/bench. Notify Architect, Engineer, and Geotechnical Consultant for inspection of each slope/bench as it is formed and stabilized. Do not proceed with additional embankment/earthwork operation until approved by Owner's Representative and Engineer.
 - 3. Structural fill will be subject to excavation for underfloor utilities prior to the concreting of the floor slab on grade. The excavation, and the subsequent re-filling with structural fill, including compaction, is included in this Contract.

3.15 LOCATION OF STRUCTURAL FILL

- A. Compacted Structural Fill shall occur beneath interior slabs on prepared subgrade as noted above and as indicated on the Structural Drawings unless otherwise noted.

1. Fill beneath the slabs on prepared subgrade shall be a minimum thickness of 12" and of the thickness necessary to bring the grade elevation up to 6" below the underside of the slab on ground from the excavation elevation determined above and indicated on the Contract Documents.
- B. Structural fill shall occur adjacent to new footings as indicated above and as indicated on the Structural Drawings and noted below.
 1. Outside of the foundation walls of the building, this fill shall occur above the footing bottom, a minimum of 3 feet horizontally beyond the edge of the footing, to a height of 8" below finished exterior grade.
 2. Where structural fill occurs beneath exterior wall or column footings along the exterior wall it shall extend beyond the edge of footings a minimum horizontal distance equal to the depth of the fill below the footing plus three feet.
 3. For footings lying wholly outside of the building, (isolated from the main structure), this fill shall occur above the footing bottom, a minimum of 3 feet horizontally beyond the edge of the footings all around, and to a height of 8" below finished exterior grade.
- C. All new utility trenches excavated in existing soils shall be backfilled with structural fill and compacted according to specified requirements. The excavated material must be removed from the building footprint.

3.16 MOISTURE CONTROL (All Soils)

- A. Uniformly moisten or aerate subgrade and each subsequent fill or backfill layer before compaction to within 2 percent of optimum moisture content.
- B. Do not place backfill or fill material on surfaces that are muddy, frozen, or contain frost or ice.
- C. Remove and replace, or scarify and air-dry, all soil material that exceeds optimum moisture content by 2 percent and is too wet to compact to specified dry unit weight.
 1. Stockpile or spread and dry removed wet satisfactory soil material.
- D. The Contractor is alerted that the nature of native materials at this site is such that they are sensitive to moisture. On-site materials are difficult to handle and compact and are easily disturbed when wet. The Contractor shall plan and conduct his excavation and filling operations considering the nature of the on-site materials.

3.17 FILL AND COMPACTION OF MATERIALS

- A. Place materials in layers not more than 8 inches in loose depth for material compacted by heavy compaction equipment (minimum 10 tons static weight, 20 tons dynamic force) and not more than 4 inches in loose depth for material compacted by hand-operated tampers. Otherwise, conform to requirements of paragraph 3.12.
- B. Place backfill and fill materials evenly on all sides of structures to required elevations, and uniformly along the full length of each structure.

- C. Compaction of Crushed Stone which is not suited for field density testing shall be accomplished with two to three passes of a vibratory compactor.
- D. Compaction equipment shall not be of the nature as to cause unstable conditions in the underlying natural soil. Compacting equipment shall be approved for use by the inspector of the Owner's testing laboratory.
- E. Placement of structural fill shall be in layers exceeding thicknesses as noted below before compaction. In addition to the stated degree of compaction, all fill and backfill shall receive at least the compactive effort given in the following table. Application of the minimum compactive effort does not relieve the Contractor from his requirement to achieve the specified degree of compaction.

<u>Compaction Method</u>	<u>Maximum Loose Lift Thickness</u>	<u>Minimum No.Of Passes</u>
Hand operated vibratory plate or light roller in confined areas	6"	4"
Hand operated Vibratory drum rollers weighing at least 1000# in confined areas	8"	4"
Light Vibratory Drum Roller min 3000# dynamic force per foot of drum width	12"	4"
Medium Vibratory Drum Roller min 5000# dynamic force per foot of drum width	12"	4"

- F. Each layer shall be compacted to 95% of maximum dry density as determined by AASHTO Method T 180. Structural fill will be subject to excavation for underfloor utilities prior to the concreting of the floor slab on grade. The excavation, and the subsequent re-filling with structural fill, including compaction, is included in this Contract.

3.18 GRADING

- A. General: Uniformly grade areas to a smooth surface, free from irregular surface changes. Comply with compaction requirements and grade to cross sections, lines, and elevations indicated. Shape pavement base course with required cross sections and elevations.
 - 1. Provide a smooth transition between adjacent existing grades and new grades.
 - 2. Cut out soft spots, fill low spots, and trim high spots to comply with required surface tolerances.
 - 3. In all cases, maintain positive drainage.
- B. Site Grading: Slope grades to direct water away from buildings and to prevent ponding. Finish subgrades to required elevations within the following tolerances:
 - 1. Lawn or Unpaved Areas: Plus or minus 1 inch.
 - 2. Walks: Plus or minus 1 inch.

3. Pavements: Plus or minus 1/2 inch.

- C. Grading inside Building Lines: Finish subgrade to a tolerance of 1/2 inch when tested with a 10 foot straightedge.
- D. Pavement Shoulders: Place shoulders along edges of subbase and base course to prevent lateral movement. Construct shoulders, at least 12 inches wide, of acceptable soil materials and compact simultaneously with each subbase and base layer.
- E. Grade final surface of porous fill below building slabs on grade smooth and even, free of voids, depressions or mounds and compact to required elevation. Final grades within tolerance of 1/2" (1/4" above and 1/4" below required elevation), when tested with a 10 foot straight edge.

3.19 STONE SCREENINGS

- A. Install stone screenings at mow strips, backstops, dugouts, shot put, discus areas, warning tracks, site walks and all other athletic areas detailed on the Drawings.
- B. Mix salvaged and screened stone screenings from Site Clearing operations, with new stone screenings to achieve a homogeneous mixture.
- C. Install stone screenings surface over prepared base, rake smooth and compact.

3.20 SAND JUMPING PITS

- A. Install sand in jumping pits, over geotextile separation fabric. Rake smooth and compact to an even grade, flush with adjacent curbing.
- B. Provide Owner with one half (1/2) cubic yard of additional sand for every jumping pit constructed. Deliver to location, on site, designated by Owner.

3.21 ATHLETIC FIELD CONSTRUCTION

- A. Construct athletic fields where and as detailed, including installation of subsoil as transition between sand drainage layer and topsoil.
- B. Limits of athletic field construction are defined as a minimum of 15' beyond any playing line.

3.22 DRAINAGE FABRIC

- A. Install drainage fabric as shown on Structural, civil and landscape drawings and details. Fabric shall be placed all around the crushed stone that surrounds the foundation drains. The crushed stone surrounding the perforated drain pipe shall be completely wrapped in geotextile drainage fabric. The fabric shall be lapped at all ends, edges, and joints with adjacent sections of fabric. Care shall be exercised to avoid puncturing or tearing the fabric. Any fabric punctured or torn shall be patched with another piece of fabric extending at least two feet beyond the puncture or tear.

- B. Fabric shall be installed vertically between the crushed stone and the structural fill as detailed on the structural drawings.

3.23 FOUNDATION DRAINS

- A. Install pipe to elevations as indicated. Proper fittings shall be provided as required by the configuration. Perforated pipe sections must be installed such that the perforated holes in the pipes are positioned downward to allow water to enter the pipes.
- B. Verify proper pitch and flow, if specified, prior to backfilling.

3.24 FIELD QUALITY CONTROL

- A. Testing Agency: Allow the Owner's testing agency to inspect and test each subgrade and each fill or backfill layer. Do not proceed until test results for previously completed work verify compliance with requirements.
 - 1. Perform field in-place density tests according to ASTM D 1556 (sand cone method), ASTM D 2167 (rubber balloon method), or ASTM D 2937 (drive cylinder method), as applicable.
 - a. Field in-place density tests may also be performed by the nuclear method according to ASTM D 2922, provided that calibration curves are periodically checked and adjusted to correlate to tests performed using ASTM C 1556. With each density calibration check, check the calibration curves furnished with the moisture gages according to ASTM D 3017.
 - b. When field in-place density tests are performed using nuclear methods, make calibration checks of both density and moisture gages at beginning of work, on each different type of material encountered, and at intervals as directed by the Engineer.
 - 2. Trench Backfill: In each compacted initial and final backfill layer, perform at least one field in-place density test for each 150 feet or less of trench, but no fewer than two tests.
 - 3. Field testing of structural fill will consist of grain size analysis of gravel fill, Modified Optimum Density (AASHTO T-180) and field density tests at the rate of one (1) per 200 cubic yards of fill or at the discretion of the inspector.
- B. When testing agency reports that subgrades, fills, or backfills are below specified density, scarify and moisten or aerate, or allow to dry, or remove and replace soil to the depth required, re-compact and retest until required density is obtained. All retesting costs are the responsibility of the Contractor.
- C. Testing Laboratory's presence does not include supervision or direction of the actual work by the Contractor, his employees, subcontractors or agents. Neither the presence of the Testing Laboratory, nor any observations and testing performed by him shall excuse the Contractor from defects discovered in his work.
- D. Testing equipment will be provided by and testing performed by the Testing Laboratory, except as otherwise provided by Contract. Upon request by Architect, the Contractor shall provide such

auxiliary personnel and services as needed to accomplish testing work and to repair damage caused thereby to permanent work.

3.25 PROTECTION

- A. Protecting Graded Areas: Protect newly graded areas from traffic, freezing, and erosion. Keep free of trash and debris.
- B. Repair and reestablish grades to specified tolerances where completed or partially completed surfaces become eroded, rutted, settled, or where they lose compaction due to subsequent construction operations or weather conditions.
 - 1. Scarify or remove and replace soil material to depth as directed by the Architect; reshape and re-compact at optimum moisture content to the required density.
- C. Settling: Where settling occurs during the Project correction period, remove finished surfacing, backfill with additional approved material, compact, and reconstruct surfacing.
 - 1. Restore appearance, quality, and condition of finished surfacing to match adjacent work, and eliminate evidence of restoration to the greatest extent possible.

3.26 DISPOSAL OF SURPLUS AND WASTE MATERIALS

- A. Disposal: Remove surplus satisfactory soil and waste material, including unsatisfactory soil, trash, and debris, and legally dispose of it off Owner's property.
- B. Refer to Division 32 Section "Topsoil" for disposal of topsoil.

END OF SECTION 31 20 00

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SECTION 31 25 00 — EROSION AND SEDIMENTATION CONTROLS

PART 1 – GENERAL

1.00 RELATED DOCUMENTS

- A. The Contractor, Subcontractors, and/or suppliers providing goods and services referenced in or related to this Section shall also be bound by the Related Documents identified in Division 01 Section “Summary.”

1.01 DESCRIPTION

- A. Work Included: Provide labor, materials and equipment necessary to complete the work of this Section, including but not limited to the following:
- B. Control measures to prevent all erosion, siltation and sedimentation of wetlands, waterways, construction areas, adjacent areas and off-site areas.
- C. Control measures shall be accomplished adjacent to or in the following work areas:
- D. Soil stockpiles and on-site storage and staging areas.
- E. Cut and fill slopes and other stripped and graded areas.
- F. Constructed and existing swales and ditches.
- G. Protection of drainage structure inlets.
- H. At edge of wetlands areas, if applicable, as shown on Drawings.
- I. Protection of stockpile areas.
- J. Additional means of protection shall be provided by the Contractor as required for continued or unforeseen erosion problems, at no additional cost to the Owner
- K. Periodic maintenance of all sediment control structures shall be provided to ensure intended purpose is accomplished. Sediment control measures shall be in working condition at the end of each day.

1.03 RELATED SECTIONS:

- A. The Contractor, Subcontractors, and/or suppliers providing goods and services referenced in or related to this Section shall also be bound by the Related Documents identified in Division 01 Section “Summary
- B. Section 31 23 33 – Trenching and Backfilling.

1.02 REFERENCES

- A. Wherever reference is made to the DOT Specifications, it shall mean the Connecticut Department of Transportation Standard Specifications for Roads, Bridges, and Incidental Construction Form 817 (2016) as modified by Supplemental Specifications issued by the Connecticut Department of Transportation.

1.03 QUALITY 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 a sediment and erosion control plan specific to the site, that complies with EPA 832/R-92-005 or requirements of authorities having jurisdiction, whichever is more stringent.
- B. Erosion control measures shall be established at the beginning of construction and maintained during the entire period of construction. On-site areas which are subject to severe erosion, and off-site areas which are especially vulnerable to damage from erosion and/or sedimentation, are to be identified and receive special attention.
- C. All land-disturbing activities are to be planned and conducted to minimize the size of the area to be exposed at any one time, and the length of time of exposure.
- D. Surface water runoff originating upgrade of exposed areas should be controlled to reduce erosion and sediment loss during the period of exposure.
- E. When the increase in the peak rates and velocity of storm water runoff resulting from a land-disturbing activity is sufficient to cause accelerated erosion of the receiving stream bed, provide measures to control both the velocity and rate of release so as to minimize accelerated erosion and increased sedimentation of the stream.
- F. All land-disturbing activities are to be planned and conducted so as to minimize off-site sedimentation damage.
- G. The Contractor is responsible for cleaning out and disposing of all sediment once the storage capacity of the sediment facility is reduced by one-half.
- H. Inspect, repair, and maintain erosion and sedimentation control measures during construction until permanent vegetation has been established.
- I. Remove erosion and sedimentation controls and restore and stabilize areas disturbed during removal.

PART 2 – PRODUCTS

2.01 HAY BALES AND STAKES

- A. Hay Bales: Forty pounds minimum weight and 120 pounds maximum weight.
- B. Wood Stakes:
 - 1. Two (2) per bale for securing bales.
 - 2. Sizes: As shown on the Drawings.

2.02 MATERIALS FOR SILT FENCE

A. Filter Fabric; Filter Cloth:

1. Subarticle M.08.01-26, DOT Specifications.
2. Obtain manufacturer's certification that filter fabric conforms to the requirements of these Specifications.
3. Obtain the filter fabric from a manufacturer who produces the material for use in silt fences and who has a design for that use.
4. Do not use fabric susceptible to deterioration in sunlight.
5. Submit 2-foot square sample and technical data sheet for acceptance by the Owner.
6. Submit manufacturer's installation instructions for acceptance by the Owner.

B. Posts or Other Suitable Mounting:

1. Lengths of wood posts: As shown on the Drawings. Cross-section dimensions: As recommended by filter fabric manufacturer.
2. Other Suitable Mounting: As recommended by the manufacturer.

C. Provide materials as required by the manufacturer for attaching fabric to posts.

2.03 MATERIALS FOR ANTI-TRACKING PAD

- A. Crushed Stone: Sound, tough and durable; free from soft, thin, elongated or laminated pieces and vegetable or other deleterious substances. Grading: Article M.01.01, DOT Specifications No. 4.
- B. Filter Cloth: Subarticle M.08.01-26, DOT Specifications.

2.04 EROSION-CONTROL BLANKETS

- A. Biodegradable wood excelsior, straw, or coconut-fiber mat enclosed in a photodegradable plastic mesh. Include manufacturer's recommended steel wire staples, 6 inches long.

PART 3 – EXECUTION

- A. Place hay bales at slopes, at catch basins and at other locations as shown on the Drawings.
- B. Embed hay bales to a depth of 6 inches.
- C. Drive stakes through hay bales into ground to secure hay bales.
- D. Place and stake hay bales at all locations as necessary to intercept and to filter overland stormwater flows before these flows enter streams or ponds.
- E. Whenever pumping water from excavations, discharge the water such that it passes through hay bales before entering a storm drain or water body.
- F. Remove accumulated sediment and replace bales when system becomes clogged or when directed by the Owner.
- G. Remove hay bales at completion of project unless the Owner directs otherwise.

3.02 CONSTRUCTION AND MAINTENANCE OF SILT FENCES

- A. Construct silt fences as shown on the Drawings.
- B. Construct silt fences in accordance with manufacturer's instructions as accepted by the Owner.
- C. Maintain or replace silt fences until they are no longer necessary or as ordered by the Owner.
- D. Remove silt fences at completion of project unless the Owner directs otherwise.

3.03 CONSTRUCTION AND MAINTENANCE OF ANTI-TRACKING PAD

- A. Construct anti-tracking pad at location shown on the Drawings.
- B. Excavate to length, width and depth dimensions as shown on the Drawings.
- C. Place filter cloth on excavated subgrade.
- D. Place crushed stone on filter cloth to depth as shown on the Drawings.
- E. Maintain the entrance in a condition that will prevent tracking or flowing of sediment onto the public right-of-way. When necessary, increase thickness by adding additional crushed stone; or increase length by excavating to subgrade and placing additional filter cloth and crushed stone; or do both in order to prevent tracking or flowing of sediment. Immediately remove all sediment spilled, dropped, washed or tracked onto the public right-of-way.
- F. Remove anti-tracking pad at completion of project unless the Architect directs otherwise or at a time when permanent access can be constructed.

3.04 CONSTRUCTION OF EROSION CONTROL BLANKETS

- A. Protect seeded areas with slopes exceeding 1V:3H or as indicated on the plans with erosion-control blankets installed and stapled according to manufacturer's written instructions.

3.05 VEGETATIVE STABILIZATION / TEMPORARY SEEDING

- A. Grassing shall be applied according to State of Connecticut DOT form 817 Standard Specifications.

3.05 INLET PROTECTION

- A. Install silt fence or straw bales around inlet as specified herein.

3.06 DUST CONTROL

- A. Throughout the construction period the Contractor shall carry on an active program for the control of fugitive dust within all site construction zones, or areas disturbed as a result of construction. Control methods shall include the following: Apply calcium chloride at a uniform rate of one and one-half (1 ½) pounds per square yard in areas subject to blowing. For emergency control of dust apply water to affected areas. The source of supply and the method of application for water are the responsibility of the contractor.
- B. The frequency and methods of application for fugitive dust control shall be as directed by the Engineer.

3.07 TEMPORARY PROTECTIVE COVERINGS (AFTER GROWING SEASON)

- A. Place temporary covering for erosion and sedimentation control on all areas that have been graded and left exposed after October 30. Contractor shall have the choice to use either or both of the methods described herein.
- B. Hay or straw shall be anchored in-place by one of the following methods and as approved by the Engineer: Mechanical "crimping" with a tractor drawn device specifically devised to cut mulch into top two inches of soil surface or application of non-petroleum based liquid tackifier, applied at a rate and in accordance with manufacturer's instructions for specific mulch material utilized.
- C. Placement of mesh or blanket matting and anchoring in place shall be in accordance with manufacturer's printed instructions.
- D. Inspect protective coverings periodically and reset or replace materials as required.

3.08 TEMPORARY SETTLING BASIN

- A. Shall collect stormwater runoff by use of earthen berm or excavated settling pond. The settling basin shall provide at least 18 inches of depth for runoff to settle out suspended solids prior to discharge. Discharge shall be through a gravel and crushed stone filter and apron.

3.05 COMPLIANCE WITH GUIDELINES AND PERMITS

- A. The Contractor shall review the CTDEEP guidelines (Connecticut Guidelines for Soil Erosion and Sediment Control), and the requirements of the General Permit for the Discharge of Stormwater and Dewatering Wastewaters Associated with Construction Activities prior to any site disturbance.
- B. Inspection shall be performed in accordance with the General Permit as directly cited below:
 - 1. “Qualified personnel (provided by the permittee) shall inspect disturbed areas of the construction activity that have not been finally stabilized, structural control measures, and locations where vehicles enter or exit the site at least once every seven calendar days and within 24 hours of the end of a storm that is 0.1 inches or greater. Where sites have been temporarily or finally stabilized, such inspection shall be conducted at least once every month for three months.”
 - 2. “Disturbed areas used for storage of materials that are exposed to precipitation shall be inspected for evidence of, or the potential for, pollutants entering the drainage system. Erosion and sediment control measures shall be observed to ensure that they are operating correctly. Where discharge locations or points are assessable, they shall be inspected to ascertain whether erosion control measures are effective in preventing significant impacts to receiving waters. Locations where vehicles enter or exit the site shall be inspected for evidence of off-site sediment tracking.”
 - 3. “Based on the results of the inspection, the description of the potential sources and pollution prevention measures identified in the Plan shall be revised as appropriate as soon as practicable after such inspection. Such modification shall provide for timely implementation of any changes to the site within 24 hours and implementation of any changes to the Plan within three calendar days following the inspection. The plan shall be revised and the site controls updated in accordance with the General Permit.”
- C. Stormwater runoff shall be directed away from disturbed areas whenever possible by the use of temporary berms, swales hay bales or silt fence.
- D. In areas where more than 2 acres will be disturbed, sediment traps or other controls will be constructed in accordance with the guidelines.
- E. For discharge points that serve an area with more than 5 disturbed acres at one time, a sediment basin, designed in accordance with the guidelines, shall be installed and shall provide a minimum of 134 cubic yards of water storage per acre drained. The sediment basin shall be maintained until final stabilization of the contributing area. This requirement shall not apply to flows from off-site areas and flows from the site that are either undisturbed or have undergone final stabilization where such flows are diverted around the sediment basin. Outlet structures from sedimentation basins shall not encroach upon a wetland.

- F. The Owner or its representative may require additional controls, as they are deemed necessary due to construction phasing, weather conditions, or other unforeseen conditions that cause excessive soil erosion or sedimentation.

END OF SECTION

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SECTION 32 12 16 — ASPHALT PAVING

PART 1 – GENERAL

1.1 RELATED DOCUMENTS

- A. The Contractor, Subcontractors, and/or suppliers providing goods and services referenced in or related to this Section shall also be bound by the Related Documents identified in Division 01 Section “Summary.”

1.2 DESCRIPTION

- A. Work Included: Bituminous concrete drives, parking, and patching, complete in place, as shown on the Drawings and as specified herein including:
 - 1. Saw cut existing pavement as required.
 - 2. Maintenance and protection of pedestrian traffic as required.
- B. Related Sections:
 - 1. Section 01 23 00 - Alternates
 - 2. Section 31 20 00 – Earth Moving;
 - 3. Section 32 12 16.01 – Asphalt Paving – Running Track
 - 4. Section 32 31 13– Chain link Fences and Gates

1.3 QUALITY ASSURANCE

- A. Qualifications of Workmen
 - 1. Provide at least one person who shall be thoroughly trained and experienced in the skills required, who shall be completely familiar with the design and application of work described for this Section, and who shall be present at all times during progress of the work of this Section and shall direct all work performed under this Section.
 - 2. For actual finishing of bituminous concrete surfaces and operation of the required equipment, use only personnel who are thoroughly trained and experienced in the skills required.

1.4 REFERENCES

- A. Wherever reference is made to the DOT Specifications, it shall mean the Connecticut Department of Transportation Standard Specifications for Roads, Bridges and Incidental Construction Form 817 (2016) as modified by Supplemental Specifications issued by the Connecticut Department of Transportation.

PART 2 - PRODUCTS

2.1 MATERIALS

- A. Subbase crusher-run stone conforming to the requirements of Article M.01.01, for No. 6 stone (3/8" crushed stone), DOT Specifications or to the following:

<u>Sieve Size</u>	<u>Percent Passing</u>
3.5"	100
3/4"	50-100
No. 4	25-75

The fraction, passing the No.4 sieve shall have less than 15% passing the No. 200 sieve.

- B. Base: Processed aggregate for the base shall conform to the requirements of Article M.05.01, DOT Specifications. Coarse Aggregate shall be broken stone conforming to the requirements of Article M.05.01-2 (b).
- C. Pavement Materials:
1. Bituminous concrete mixtures conforming to the requirements of Section M.04 of the DOT Specifications.
 2. In Section M.04, reference is made to the Chief, Materials Testing Section, to the Materials Testing Section, and to the Laboratory; none will be involved in this work. Do the work of the Chief, the Section, and the Laboratory; or arrange for the producer of the bituminous concrete to do this work. Make the determinations, verifications, rejections, approvals, tests, and inspections as specified by Section M.04 and as necessary to produce satisfactory bituminous mixtures.
- D. Tack Coat: Section M.04 of the DOT Specifications.
- E. Joint Sealer: A rubber compound of the hot-poured type conforming to the requirements of Article M.04.02 of the DOT Specifications.
- F. For Running track asphalt additional requirements refer to Section 32 12 16.01 Asphalt Paving – Running Track.

PART 3 - EXECUTION

3.1 INSPECTION

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

3.2 FINAL PREPARATION OF SUBGRADE

- A. After preparation of subgrade as specified in Section 31 20 00 – Earth Moving of these Specifications, thoroughly scarify and sprinkle the entire area to be paved, and then compact by rolling to a smooth, hard, even surface of 95 percent of modified optimum density to receive subbase. Finish to the required grades, with due allowance for the thickness of bituminous concrete courses to be placed thereon.
- B. Equipment: Compact by rolling with a 15-Ton vibratory roller.

3.3 CONSTRUCTION OF SUBBASE AND BASE COURSE

- A. After subgrade has been completed and accepted by the Architect, construct the subbase and base over all areas to be paved.
- B. Construct subbase in accordance with the requirements of Article 2.12.03 of the DOT Specifications, however compact with four passes of a 15-Ton (static weight) roller.
- C. Construct base in accordance with the applicable requirements of Article 3.04.03 of the DOT Specifications. Compact to at least 98 percent of modified optimum density.

3.4 CONSTRUCTION OF BITUMINOUS CONCRETE PAVEMENT

- A. Construct pavement in courses as called for on the Drawings. Use a class of bituminous concrete for each course as indicated on the Drawings. Thickness of each course: As shown on the Drawings.
- B. Construct the bituminous concrete pavement in accordance with Article 4.06.03 of the DOT Specifications, except as modified below:
 - 1. Article 4.06.03-1 Samples: Samples will not be taken by Materials Testing Section. Arrange for the producing plant to take its own samples to ascertain that mixtures are proper. Provide certifications. The Contractor will have the ultimate responsibility.
 - 2. Article 4.06.03-2 Mixing Plant Inspection:
 - a. Inspections, verifications, determinations, and approvals at the mixing plants will not be made by the Chief, Materials Testing Section. The Contractor will be responsible for mixtures and shall take whatever steps are required to ensure production of satisfactory mixtures. He shall certify that mixtures do meet specifications.
 - b. Weights of completed mixtures will not be required.
 - 3. Article 4.06.03-3 Mixing Plant Inspection - Field Laboratory: Delete in its entirety.
 - 4. Article 4.06.03-4: Delete "Assistant Manager of Materials Testing" and substitute "Contractor."

5. Article 4.06.03-5: Delete "Assistant Manager of Materials Testing" wherever it appears and substitute "Contractor."
- C. Certifications: Furnish certified test reports, material certificates, and certificates of compliance in accordance with the requirements of Article 1.06.07 of the DOT Specifications.

3.5 PROTECTION

- A. Protect from traffic during all operations.

3.6 FINISH TOLERANCES

- A. Finish surfaces to the following tolerances.
 1. Subbase and Base: Plus 0.00 feet to minus 0.10 feet from line and grade shown on the Drawings.
 2. Bituminous Concrete Surface Course: Plus or minus 0.05 feet at any point from line and grade shown on the Drawings. No variations in surface more than 1/8 inch in a 10- foot plane.

END OF SECTION

SECTION 32 12 16.01 – ASPHALT PAVING - RUNNING TRACK

PART 1 - GENERAL

1.1 RELATED DOCUMENTS

- A. The Contractor, Subcontractors, and/or suppliers providing goods and services referenced in or related to this Section shall also be bound by the Related Documents identified in Division 01 Section “Summary.”

1.2 SUMMARY

- A. This Section includes the following:
 - 1. Asphalt paving for running track and field events, including patching and overlays.
- B. Related Sections include the following:
 - 1. Division 31 Section “Earth Moving”.
 - 2. Division 32 Section “Asphalt Paving”.
 - 3. Division 32 Section “Polyurethane Running Track Surfacing – Structural Spray”
 - 4. Division 33 Section “Field Subdrainage System”.

1.3 DEFINITIONS

- A. Form 817: "Standard Specifications for Roads, Bridges, and Incidental Construction", State of Connecticut, Department of Transportation, Form 817, 2016 edition, as supplemented.

1.4 SUBMITTALS

- A. Product Data for each product specified. Include technical data and tested physical and performance properties.
- B. Job-Mix Designs for each job mix proposed for the Work.
- C. Shop Drawings: Indicate pavement markings, lane separations, and defined parking spaces. Indicate dedicated handicapped spaces with international graphics symbol.
- D. Qualification data: For firms and persons specified in the “Quality Assurance” Article to demonstrate their capabilities and experience. Include lists of completed projects with project names and addresses, names and addresses of architects and owner, and other information specified.
- E. Material Certificates: Certificates signed by manufacturers certifying that each material complies with requirements.

- F. Two (2) as-built surveys of track and field pavements. Refer to Paragraph "Field Quality Control", below.

1.5 QUALITY ASSURANCE

- A. Installer Qualifications: Engage an experienced installer who has completed asphalt paving for a minimum of three (3) running tracks in the last five (5) years similar in material, design, and extent to that indicated for this Project and with a record of successful in-service performance.
- B. Manufacturer Qualifications: Engage a firm experienced in manufacturing asphalt paving similar to that indicated for this Project and with a record of successful in-service performance.
 - 1. Firm shall be a registered and approved paving mix manufacturer with authorities having jurisdiction or with the DOT of the state in which Project is located.
- C. For general walks, pads and driveways refer to the requirements of Section 32 12 16 – Asphalt Paving.
- D. Asphalt-Paving Publications Requirements: Comply with AI's "The Asphalt Handbook", and ASTM and AASHTO requirements except where more stringent requirements are indicated herein.
- E. Pre-installation Conference: Conduct conference at Project site to comply with requirements of Division 1, Section "Project Coordination" Review methods and procedures related to asphalt paving including, but not limited to the following:
 - 1. Review proposed sources of paving materials, including capabilities and location of manufacturing plant.
 - 2. Review condition of substrate and preparatory work performed by other trades.
 - 3. Review requirements for protecting paving work, including restriction of traffic during installation period and for remainder of construction period.
 - 4. Review and finalize construction schedule for paving and related work. Verify availability for materials, paving Installer's personnel, and equipment required to execute the Work without delays.
 - 5. Review inspection and testing requirements, governing regulations, and proposed installation procedures.
 - 6. Review forecasted weather conditions and procedures for coping with unfavorable conditions.
 - 7. Track surfacing contractor representative shall be present at pre-installation conference.

1.6 DELIVERY, STORAGE, AND HANDLING

- A. Refer to Connecticut DOT form 817 Section 4.06 requirements for Hot Mix Asphalt.

PART 2 - PRODUCTS

2.1 ASPHALT MATERIALS

- A. Asphalt Binder Course (aka Class 1): Hot Mix Asphalt binder course shall be CT DOT Form 817, Article M.04.02, HMA S0.5 Design Level 2 as modified below.
 - 1. **Shall not contain Recycled Asphalt Pavement (RAP) (0% RAP).**
 - 2. **Shall have a minimum PG binder content ranging between a minimum of 5% and 6.5% with zero negative tolerance.**
- B. Asphalt Surface Course (aka Class II): Hot Mix Asphalt surface course shall be CT DOT Form 817, Article M.04.02, HMA S0.375 Design Level 2 as modified below.
 - 1. **Shall not contain Recycled Asphalt Pavement (RAP) (0% RAP)**
 - 2. **Shall have a minimum PG binder content ranging between a minimum of 6% and maximum of 7% with zero negative tolerance.**

2.2 AUXILIARY MATERIALS

- A. Tack Coat: Conforming to Section M.04 of CT DOT specifications.
- B. Joint Sealers: Use of joint sealers is not allowed unless specifically approved in writing by the landscape architect.
- C. Paving Geotextiles (if required): Nonwoven polypropylene, specifically designed for paving application, resistant to chemical attack, rot and mildew.

PART 3 - EXECUTION

3.1 GENERAL

- A. Contractor shall install all pavements as specified in the location and to the grades as shown on the drawings and/or approved by the Landscape Architect. Materials, methods of construction, type and thickness of pavement courses shall be as shown as detailed and specified herein.

3.2 PREPARATION AND CLEANING

- A. Paving contractor shall coordinate with the track surfacing contractor. Paving contractor is responsible for supplying an asphalt surface that meets the requirements of this specification, project schedule and the track surfacing installer. Paving contractor shall make any corrections required to meet the requirements of this specification.
- B. Remove loose material from compacted base material immediately before proof rolling.

- C. Ensure compaction and planarity testing for aggregate base material has been performed and is approved, in writing by the Landscape Architect. Notify Architect in writing of any unsatisfactory conditions. Do not begin paving installation until these conditions have been satisfactorily corrected.
- D. Proof-roll base using heavy, pneumatic-tire rollers to locate areas that are unstable or that require further compaction. Subbase surface to be smooth, free of irregularities, depressions, or unsuitable materials.
- E. Verify that the frames of all structures, improvements and perimeter curbs are installed at the correct elevation in relation to proposed paving. Adjust frames if required. Provide temporary closures over openings until completion of rolling operations. Remove closures at completion of the work. Set covers to grade, flush with the surface of adjoining pavement surface.

3.3 PROJECT CONDITIONS

- A. Environmental Limitations: Do not apply asphalt materials if it is raining, substrate is wet or excessively damp or the following conditions are not met:
 - 1. Prime and Tack Coats: Minimum surface temperature of 60 deg F.
 - 2. Bituminous Concrete Base Course: Minimum surface (earth) temperature of 40 deg F and rising at time of placement.
 - 3. Bituminous Concrete Surface course: Minimum surface (earth/binder) temperature of 60 deg F at time of placement.
- B. Grade Control: Establish and maintain the required lines and grades, including crown, inverted crown, and cross-slopes, for each course during paving operations. Inclination control of pavements at track and field events is extremely critical. Conform to tolerances listed in this specification.
- C. The paving subcontractor MUST have a representative from the track installation subcontractor present during the installation of the surface course of asphalt paving, at the running track. Inspection and written acceptance of the surface course, by the Track Surfacing subcontractor is required before installation of the track surface may proceed.

3.4 HOT-MIX ASPHALT PLACING

- A. Hot-mix Asphalt placement shall conform to Connecticut Form 817, Section M.04 unless specifically revised below.
- B. Whenever possible, all pavement shall be spread by a self-propelled finishing machine. At inaccessible or irregular areas, pavement may be placed by hand methods. The hot mixture shall be spread uniformly to the required depth with hot shovels and rakes. After spreading, the hot mixture shall be carefully smoothed to remove all segregated course aggregate and rake marks. Rakes and lutes used for hand spreading shall be of the type designed for use on asphalt mixtures. Loads shall not be dumped faster than they can be properly spread. Workers shall not stand on the loose mixture while spreading.

- C. Paving Machine Placement: Apply successive lifts of bituminous concrete in transverse directions with the surface course placed in the direction of surface-water flow. Place in typical strips not less than 10'-0" wide.
- D. Joints: Make joints between old and new pavements, or between successive days' work, to ensure continuous bond between adjoining work. Construction joints shall have the same texture, density, and smoothness as other sections of bituminous concrete courses. Clean contact surfaces and apply tack coat.
- E. The mixtures shall be placed and compacted to provide a smooth and dense surface with a uniform texture. When overtaken by sudden storms, the Engineer may permit placement of the bituminous concrete to continue up to the quantity of material that is in transit from the plant.
- F. The mixture shall be placed at a temperature that is within 25°F of the approved job mix formula.
- G. Before rolling is started, the mat shall be checked for defects in material or placement. Such defects shall be corrected to the satisfaction of the Engineer. Where it is impracticable due to physical limitations to operate the paving equipment, the Engineer may permit the use of other methods or equipment. Where hand spreading is permitted, the mixture shall be placed by means of suitable shovels and other tools, and in a uniformly loose layer at a depth that will result in a completed pavement having the designed depth. Any deviation from standard crown or section shall be immediately remedied by placing additional material or removing surplus as directed by the Engineer. The Engineer may direct that other means of spreading be used to ensure a better control of the depths of material and the finished surface.
- H. A thin uniform coating of tack coat shall be applied to the pavement immediately before overlaying and be allowed sufficient time to break (set). All surfaces that have been in place longer than five calendar days shall have an application of tack coat. A tack coat shall be applied to all contact surfaces such as gutters, manholes and concrete barriers. The tack coat shall be applied by a non-gravity pressurized spray system that results in uniform overlapping coverage at an application rate of 0.05 to 0.15 gallons per square yard. Gravity-fed systems are not acceptable for tack coat application. The Engineer must approve the equipment and the method of measurement prior to use. The material for tack coat shall not be heated in excess of 160°F and shall not be further diluted.
- I. Refueling of equipment is prohibited in any location on the paving project where fuel might come in contact with bituminous concrete mixtures already placed or to be placed. Solvents for use in cleaning mechanical equipment or hand tools shall be stored clear of areas paved or to be paved. Before any such equipment and tools are cleaned, they shall be moved off the paved or to-be-paved area; and they shall not be returned for use until after they have been allowed to dry.
- J. Immediately before placing bituminous concrete on a waterproofing membrane, the membrane shall be swept clean. If the membrane is damaged it shall be repaired by patching as directed by the Engineer.
- K. Temporary and permanent transverse joints shall be formed by saw-cutting a sufficient distance back from the previous run, existing bituminous concrete pavement, or bituminous concrete driveways to expose the full depth of the course. On any cold joint, immediately prior to additional bituminous concrete materials being placed, a brush of tack coat shall be used on all contact surfaces.

- L. The longitudinal joint shall be offset at least six inches from the joint in the course immediately below. The joint in the final surface shall be at the centerline or at lane lines.

3.5 ROLLING AND COMPACTION

- A. General: Begin compaction as soon as place hot-mix paving will bear roller weight without excessive displacement. Compact hot-mix paving with hot, hand tampers or vibratory-plate compactors in area inaccessible to rollers.
 - 1. Complete compaction before mix temperature cools to 185 deg F.
- B. Finished surface of track pavement must have one consistent cross-pitch from side to side.
- C. Breakdown Rolling: Accomplish breakdown or initial rolling immediately after rolling joints and outside edge. Examine surface immediately after breakdown rolling for indicated crown, grade, and smoothness. Repair surfaces by loosening displaced material, filling with hot-mix asphalt, and re-rolling to required elevations.
- D. Intermediate Rolling: Begin intermediate rolling immediately after breakdown rolling, while hot-mix is still hot enough to achieve specified density. Continue rolling until hot-mix asphalt course has been uniformly compacted to the following density:
 - 1. Average Density: 96 percent of reference laboratory density according to AASHTO T245 but not less than 94 percent nor greater than 100 percent.
 - 2. Average Density: 92 percent of reference maximum theoretical density according to ASTM D 2041, but not less than 90 percent nor greater than 96 percent.
- E. Finish Rolling: finish roll paved surfaces to remove roller marks while hot-mix asphalt is still warm.
- F. Edge Shaping: While surface is being compacted and finished, trim edges of pavement to proper alignment. Bevel edges while still hot, with back of rake or smooth iron. Compact thoroughly using tamper or other satisfactory method. Raveled or untamped edges will not be accepted.
- G. Repairs: Remove paved areas that are defective or contaminated with foreign materials. Remove paving course over area affected and replace with fresh, hot-mix asphalt. Compact by rolling to specified density and surface smoothness.
- H. Protection: After final rolling, do not permit vehicular traffic on pavement until it has cooled and hardened, and in no case sooner than 8 hours.
- I. Erect barricades to protect paving from traffic until mixture has cooled enough not to become marked.

3.6 INSTALLATION TOLERANCES

- A. Thickness: Compact each course to produce a surface smoothness within the following tolerances:
 - 1. Base Course: Plus ½ inch, no minus.
 - 2. Surface Course: 1/4 inch, no minus.

- B. Surface Smoothness: Compact each course to produce a surface smoothness within the following tolerances as determined by using a 10-foot straightedge applied transversely or longitudinally to paved areas:
 - 1. Base Course: 1/4 inch.
 - 2. Surface Course: 1/16 inch
 - 3. Test with straight edge centered and at right angle to slope. In no case will water be allowed to puddle or stand on any finished pavement.
 - 4. Ribbons/waves in longitudinal runways will not be accepted. Replace as directed.
 - 5. Running track shall have a maximum lateral inclination of 1:100 (1.0% Slope);

3.7 FIELD QUALITY CONTROL

- A. Testing Agency: Contractor will engage a qualified independent testing agency to perform field inspections and tests and to prepare test reports.
 - 1. Owner/Architect has the option to approve or reject the Contractor's choice of testing agency.
 - 2. Testing agency will conduct and interpret tests and state in each report whether tested Work complies with or deviates from specified requirements.
- B. Additional testing, at Contractor's expense, will be performed to determine compliance of corrected Work with specified requirements.
- C. Thickness: In-place compacted thickness of hot-mix asphalt course will be tested for compliance with thickness tolerances.
- D. Surface Smoothness: Finished surface of each hot-mix asphalt course will be tested for compliance with smoothness tolerances.
- E. In-Place Density: Samples of uncompacted paving mixtures and compacted pavement and will be secured by testing agency according to ASTM D 979.
 - 1. Reference laboratory density will be determined by averaging results from 4 samples of hot-mix asphalt-paving mixture delivered daily to site, prepared according to ASTM D 1559, and compacted according to job-mix specifications.
 - 2. In-place density of compacted pavement will be determined by testing core samples according to ASTM D 1188 or ASTM D 2726.
- F. Remove and replace or install additional hot-mix asphalt where test results or measurements indicate that it does not comply with specified requirements.
- G. Track Confirmation Topographic Surveys: Two complete, separate planimetric and topographic surveys must be prepared, sealed and signed by a licensed land surveyor and provided to the Architect in CAD form for review. The first survey shall be performed at completion of the installation of the aggregate base course for asphalt paving, and installation of the perimeter trench drain, if any. (Refer to Section "Perimeter Trench Drain" of this specification). A complete, second survey shall be performed at completion of the installation of the Surface Course of asphalt paving. Both surveys must include the following information:

1. Horizontal limits of pavement, (and trench drain location, if any).
 2. Survey shall provide spot grade Elevations and locations at both sides and center of track pavement, Trench drainage or perimeter curb elevations and location of track radius points. Track elevations at 20 feet on center, maximum.
 3. Horizontal and vertical confirmation of long jump/triple jump and pole vault runways. Record elevations at 6 foot on center intervals, maximum, along both sides of runway. No deviation greater than ½ inch in 10 feet will be permitted. Paving which exceeds this limit will be removed and replaced in its entirety.
 4. Certify general track layout and grading to be in conformance with specification and NCAA standards unless noted otherwise. Track survey shall become the basis for track striping submittal and as-built certification per Division 2, Section “Track Surfacing”.
 5. No deviations greater than those listed in “Installation Tolerances” paragraph, above, will be permitted. Paving which exceeds these limits shall be removed and replaced.
- H. Planarity: The contractor is to perform a flood test and straight bar test of the bituminous pavement top course prior to application of the synthetic track surface. The Architect, as well as a representative from the pavement subcontractor and track installation subcontractor shall be present.
1. The bituminous pavement shall be sufficiently cured and cleaned prior to Work of this section to be performed. The governing guidelines of track construction allow for a maximum longitudinal slope of on tenth of one percent (0.10%) in the running direction. The maximum lateral slope shall not exceed one (1) percent (1.00%).
 2. The entire asphalt base surface shall be checked for planarity, surface tolerance, and flooded and checked for depressions or irregularities in the asphalt. Any puddle area covering a nickel shall or vary +/- 1/16 inch when measured with a 10-foot straightedge in any direction shall be marked and repaired with Patch Binder, according to manufacturer's specifications and approved by the Architect.
 - a. Grade conformance tests shall be performed by a third party approved testing agency (Sports Labs, Labosport, or approved equal) on the top course of the bituminous pavement. The entire surface shall provide positive drainage to the inside edge of the track. The maximum allowable planarity deviation within a pass should be 1/16 inch in 10 feet when measured in any direction utilizing a straight bar. Deficient areas in the leveling course should be corrected as approved by the Architect.
 - b. After patching, the asphalt surface shall not vary allow water to stand greater than 1/16 inch, 40 minutes after a flood test has been performed. Slopes shall meet the guidelines of the ASBA and NFHS.
 3. General Contractor, Asphalt Contractor, Architect, and Track Surfacing Contractor shall be present for testing. Notification shall be sent at least five (5) days prior
- I. Protection of the Work: All sections of the newly finished pavement shall be protected by the Contractor from damage by the Contractor’s equipment and traffic.
- J. Corrective Work Procedures: Any portion of the completed pavement determined by the Engineer to be defective in surface texture, density or composition, or that does not comply with the requirements of the specifications shall be corrected at the expense of the Contractor.

- K. Any corrective courses placed as the final wearing surface shall not be less than one and one-half inches in depth after compaction.

3.8 DEFICIENT PAVEMENT

- A. If pavement placed by the Contractor does not meet these specifications, and the Landscape Architect requires its replacement or correction, the Contractor shall:
- B. Propose a corrective procedure to the Engineer for review and approval prior to any corrective work commencing. The proposal shall include:
 - 1. Limits of pavement to be replaced or corrected, indicating stationing or other landmarks that are readily distinguishable.
 - 2. Schedule.
 - 3. Construction method and sequence of operations.
 - 4. Methods of maintenance and protection of traffic.
 - 5. Material sources.
 - 6. Names and telephone numbers of supervising personnel.
- C. Perform all corrective work in accordance with the Contract and the approved corrective procedure.

3.9 PATCHING AND REPAIRS:

- A. Patching: Saw cut perimeter of patch and excavate existing pavement section to sound base. Re-compact new subgrade. Excavate rectangular patches, parallel and perpendicular to the direction of traffic, extending 12 inches into adjacent sound pavement, unless otherwise indicated. Cut excavation faces vertically. Laminate courses. Feathering of edges and transitions between new and existing pavements is not acceptable.
 - 1. Apply tack coat to faces of excavation and allow to cure before paving.
 - 2. Fill excavation with dense-graded, hot mix asphalt base mix and, while still hot, compact flush with adjacent surface.
 - 3. Partially fill excavation with dense-graded, hot-mix asphalt base mix and compact while still hot. Cover asphalt base course with compacted, hot-mix surface layer finished flush with adjacent surfaces.
- B. Crack and Joint Filling: Remove existing filler material from cracks or joints to a depth of ¼ inch. Refill with asphalt joint-filling material to restore watertight condition. Remove excess filler that has accumulated near cracks or joints. Crack and joint fill prior to any sealcoating. All vegetation shall be removed from cracks in pavements and along curb lines by heat lance (2,800 degree equipment) prior to crack and joint filling.
- C. Tack Coat: Apply uniformly with a powered pressure system to existing surfaces of previously constructed asphalt or Portland cement concrete paving and to surfaces abutting or projecting into new, bituminous concrete pavement. Apply at a uniform rate of 0.05 to 0.15 gal./sq. yd. of surface. Excessive application of tack coat is not permissible and shall be removed.

1. Surface to receive tack coat shall be clean, free from silt, dust, soil, pavement grindings and other foreign matter and dry.
2. Tack coat shall be a constant uniform sprayed application covering a minimum of 98% of the surface to be paved. Swirls or ribbon strips of tack coat are not acceptable. Contractor is responsible for correctly setting pressure, nozzle size and angle, spray bar height and emulsion temperature from applicator.
3. Allow tack coat to cure (a minimum of 24 hours) undisturbed before paving. No one shall drive or walk across the surface while it is curing.
4. Tack coat shall be applied to all asphalt surfaces whose application are five days or older or that have had excessive construction traffic that requires dust and debris removal.
5. Avoid smearing or staining adjoining surfaces, appurtenances, and surroundings. Remove spillages and clean affected surfaces.

3.10 CURING

- A. All new asphalt shall cure for a minimum of 28 days prior to use or installation of any surfacing.

3.11 CLEAN UP

- A. Remove all containers, surplus and debris and dispose of in accordance with local, state and Federal regulation.
- B. Remove all spills and overruns.
- C. Leave site in a clean and orderly condition on a daily basis.
- D. Upon completion of all work, remove all containers, surplus materials, and installation debris. Leave area of work in clean orderly condition.

END OF SECTION 32 12 16

SECTION 32 18 13 – SYNTHETIC GRASS SURFACING SYSTEM

PART 1 - GENERAL

1.1 RELATED DOCUMENTS

- A. The Contractor, Subcontractors, and/or suppliers providing goods and services referenced in or related to this Section shall also be bound by the Related Documents identified in Division 01 Section “Summary.”
- B. Specification Section 32 18 13.10 Synthetic Grass Surfacing Warranty.

1.2 SUMMARY

- A. Section includes: Generally, installation of a synthetic grass carpet over a resilient shock pad with an infill consisting of a mix of a performance infill material and a stabilizing infill material.
 - 1. Procurement and installation of synthetic grass carpet surfacing.
 - 2. Procurement and installation of infill materials.
 - 3. Procurement and installation of a resilient shock pad.
 - 4. Pre and post installation testing of the synthetic grass surfacing system.
 - 5. Warranty and maintenance requirements for the synthetic grass surfacing system.
 - 6. All incidental work items required to complete the work as shown on the Drawings and as called-for in the Specifications.
- B. Contractor shall coordinate work between all Contractors, sections, and trades required for the proper completion of the work. Carefully examine all of the Contract Documents for requirements which affect the work of this Section. The exact scope of work of this section cannot be determined without a thorough review of all Specification Sections and other Contract Documents.
- C. In all cases when conflicts exist between information contained in this Section and in other parts of the Contract Documents, Contractor shall assume that the more stringent and highest-performing solution is required.
- D. Contractor is responsible for all health and safety .
- E. It is the Owner intent to meet the performance, safety, and durability requirements for the synthetic turf system as specified herein for the life of the synthetic turf surfacing system warranty period (8-years).

1.3 REFERENCES

- A. Reference herein to any technical society, organization, group or regulation are made in accordance with the following abbreviations and, unless otherwise noted or specified, all work under this Section shall conform to the latest edition as applicable.
- B. American Society for Testing and Materials (ASTM)

1. ASTM D 789 - Yarn Melting Point
2. ASTM D 1335 - Standard Test Method for Tuft Bind of Pile Yarn Floor Coverings
3. ASTM D 1577 - Standard Test Methods for Linear Density of Textile Fibers (Fiber Denier)
4. ASTM D5034 – Standard Testing Method for Breaking Strength and Elongation of Textile Fabrics (Grab Test)
5. ASTM D5035 – Standard Testing Method for Breaking Force and Elongation of Textile Fabrics (Strip Method)
6. ASTM D 2256 - Standard Test Method for Tensile Properties of Yarns by the Single-Strand Method (Breaking Strength and Elongation)
7. ASTM D 2859 - Standard Test Method for Ignition Characteristics of Finished Textile Floor Covering Materials (Flammability)
8. ASTM D 3218 – Standard Test for Fiber Thickness (Microns)
9. ASTM D422 Particle-Size Analysis
10. ASTM D 4491 - Water Permeability of Geotextiles by Permittivity.
11. ASTM F 355 - Standard Test Method for Impact Attenuation of Playing Surface Systems and Materials.
12. ASTM F 1551 - Comprehensive Characterization of Synthetic Turf Playing Surfaces and Materials (for those not covered above)
13. ASTM F 1632 - Particle Size Analysis and Sand Shape Grading of Golf Course Putting Green and Sports Field Rootzone Mixes
14. ASTM F 1936 - Standard Specification for Impact Attenuation of Turf Playing Systems as Measured in the Field
15. ASTM F2157 - Standard Test Method for Base Material Evenness
16. ASTM F 2765 - Standard Specification for Total Lead Content in Synthetic Grass Fibers.

C. European Standards (EN)

D. National Federation of State High Schools (NFHS)

E. Synthetic Turf Council Guidelines (STC)

F. Connecticut Interscholastic Athletic Conference (CIAC)

G. American Sports Builders Association (ASBA)

1.4 DEFINITIONS

A. Most terms used within the documents are industry standard. Certain words or phrases shall be understood to have specific meanings as follows:

1. Provide: Furnish and install a complete and fully operational system.
2. Furnish: Purchase and deliver to a specific location within the building or site.

3. Install: With respect to equipment furnished by others, install means to receive, unpack, erect or construct, move into position, mount, and connect, including removal of packaging materials.
4. Synthetic Turf Testing Agency (Testing Agency): Agency to perform testing on the synthetic turf system. Testing shall be done by a third-party testing agency. Performance testing and on-site testing shall be performed by an Agency currently holding certification by FIFA, World Rugby, and FIH.

1.5 SUBMITTALS

A. Bid Submittals

1. Non-compliance with the bid submittal requirements as specified herein may result in rejection of the bid.
2. The following letters, on the synthetic grass surfacing manufacturer/vendor's letterhead and signed by an officer of the company, shall be submitted with the bid.
 - a. A letter shall confirm their intent to conform to all requirements set forth in the Bid Documents for the Synthetic Grass Surfacing System and provide a qualified installation crew. Conformance includes, but is not limited to, the Bid Drawings, Specifications, Addendum, and RFI Clarifications.
 - b. Manufacturer's Review of Synthetic Grass Surfacing: A letter confirming that the Bid Documents for the Synthetic Grass Surfacing System have been completely reviewed by qualified representatives of the materials manufacturer and that they are in agreement that the materials and system to be used for the synthetic grass field surfacing are proper and adequate for the applications shown and in no way impact the system warranty.
 - c. Sample manufacturer's warranty and maintenance requirements for the synthetic turf system proposed for this project.
 - d. Synthetic Turf Testing Third-Party Agency: The agencies contact information and current certifications from FIFA, World Rugby, and FIH. Certifications shall be provided from each sports regulatory body, not the testing agency.
3. The following letters, on the resilient shock pad manufacturer/vendor's letterhead and signed by an officer of the company, shall be submitted with the bid.
 - a. A letter shall confirm their intent to conform to all requirements set forth in the Bid Documents for the resilient shock pad and qualified installation crew. Including, but not limited to, the Bid Drawings, Specifications, Addendum, and RFI Clarifications. Letter shall specifically confirm the ability to meet the resilient shock pad performance and warranty requirements set forth in this specification.
 - b. Manufacturer's Review of Synthetic Grass System A letter confirming that the Bid Documents for the synthetic turf system have been completely reviewed by qualified representatives of the materials manufacturer and that they are in agreement that the

materials and system to be used are proper and adequate for the applications shown and in no way impact the pad warranty.

- c. Sample manufacturer's warranty for the resilient pad proposed for this project.
4. The following letters, on the infill manufacturer/vendor's letterhead and signed by an officer of the company, shall be submitted with the bid.
 - a. A letter shall confirm their intent to conform to all requirements set forth in the Bid Documents for the performance infill material, including, but not limited to, the Bid Drawings, Specifications, Addendum, and RFI Clarifications. Letter shall specifically confirm the ability of the performance infill to meet the performance and warranty requirements set forth in this specification.
 - b. Manufacturer's Review of Synthetic Grass System A letter confirming that the Bid Documents for the synthetic turf system have been completely reviewed by qualified representatives of the materials manufacturer and that they are in agreement that the materials and system to be used are proper and adequate for the applications shown and in no way impact the performance infill warranty.
 - c. Sample manufacturer's warranty for the performance infill proposed for this project.

B. Pre-Manufacturing Submittals

1. The intent of the pre-manufacturing submittal is for the synthetic turf manufacturer to provide the required documentation listed below for the ***manufacturers standard system that most closely resembles the system specified*** and has been previously tested for conformance to the requirements below. The intend of this section is for manufactures to provide a system that has been previously tested, ***not to require a manufacturer to manufacture and conduct the required pre-manufacturing submittal testing on a non-standard system. Systems of similar materials that are currently certified by FIFA should meet the requirements of this specification, with the possible exception of the infill material and the resilient shock pad.***
2. Material Testing: Submit for approval test results for all material testing performed under "Quality Control Testing, Pre-Manufacturing" herein. Provide copies of all Testing Agency reports. **Testing shall be no more than 24 months old from date of submittal.**
3. Product Data: Submit manufacturer's general specifications and installation instructions for all products in the Synthetic Grass Surfacing System, including certifications and other data as may be required, to show compliance with the Contract Documents.
 - a. Material Safety Data Sheets (MSDS) sheets for all products and product components, as necessary. This shall include solvents and other products required as part of clean-up.
 - b. Certified Statement of the presences of toxic and or hazardous materials. Any toxic and/or hazardous material exceeding 100 parts per million (ppm) shall be identified in list form. The list shall reference the standard in name and threshold if applicable,

- and the test results. This requirement is above and beyond the requirements for MSDS.
- c. Submit manufacturer's product data for the resilient shock pad demonstrating compliance with this specification. Include manufacturer's written instructions and procedures for each product.
4. Material Samples: Submit two (2) samples for approval for all materials under 2.1 Materials including, but not limited to, the following:
- a. Synthetic Grass Carpet Fiber: Provide samples for each color used for the field, markings, and logos.
 - b. Synthetic Grass Carpet Samples: Twelve-inch (12") square samples of un-filled synthetic grass carpet (rag) for each field and each color used for the field. The samples shall be the manufacturers standard product that most closely resembles the specified system and is to be reviewed as the general product intended for use on the field. Manufacturer shall note any discrepancies between the standard product sample submitted and the product to be manufactured for this project.
 - c. Seaming Materials: Twelve-inch (12") long samples of all materials to be used for seaming of the synthetic grass turf system including, but not limited to, glue and seaming tape.
 - d. Synthetic Grass Surfacing Infill: One-pound samples of each, in separate containers:
 - 1) Performance infill material
 - 2) Stabilizing infill material
 - e. Resilient Shock Pad Sample: Twelve-inch (12") square samples of resilient shock pad.
5. Shop Drawings: Submit for approval the following:
- a. Seaming plan; Seams of the field shall not coincide with the subsurface drain system nor seams of pad.
 - b. Field Marking Layout, including logos. Layouts for all sports shown on the Drawings showing any field lines, markings, boundaries on the appropriate field(s) and all specified colors. All markings shall be tufted in the factory or inlaid. Provide certification that field layouts meet all NFHS and CIAC sport marking requirements as installed in the field.
 - c. Details on field construction, making special note of any details that may deviate from the Drawings or Specifications. Include: edge detail, goal post detail, covers for access to subsurface structures, other inserts, etc.
6. Warranties: Submit a draft copy of the warranties in Owner's name for all products furnished under this section for review and approval.
7. Testing Agency: Submit qualification of testing agency(s) for review and approval.

8. Synthetic grass surfacing manufacturer/vendor and installer qualifications:
- a. Installer Qualifications: Synthetic Grass Installation Sub-Contractor shall certify in writing the designated supervisory personnel on the project are competent in the installation of the synthetic grass surfacing system materials, including gluing or sewing seams and proper installation of the infill mixture. The synthetic grass surfacing installer shall have a full-time representative on-site during installation to oversee and certify the installation and warranty compliance. Provide experience to show that installation crew is competent to complete the level of work outlined in this project. Synthetic Grass Installation Sub-Contractor's superintendent shall demonstrate experience that the superintendent is competent to oversee and complete the level of work outlined in this project.
 - b. At a minimum, provide the following documentation: Fifteen (15) reference projects consisting of Synthetic Grass Multi-Sport Grass Fields of 75,000 square-feet or larger within the past five (5) years completed by the proposed on-site full-time installation superintendent.
 - c. Project Information: At a minimum, provide the following information for each reference project:
 - 1) Project Name
 - 2) Project Location
 - 3) Project scope
 - 4) Construction timeline
 - 5) Construction cost
 - 6) Reference name, title, affiliation, and contact information.
9. Resilient Shock Pad:
- a. Resilient shock pad manufacturer/vendor and installer qualifications:
 - 1) Installer Qualifications: Resilient Shock Pad Installation Sub-Contractor shall certify in writing the designated supervisory personnel on the project are competent in the installation of the Resilient pad material. The Resilient pad installer shall have a representative on-site to certify the installation and warranty compliance. Provide experience to show that installation crew is competent to complete the level of work outlined in this project. Resilient pad Installation Sub-Contractor's superintendent shall experience to demonstrate that the superintendent is competent to oversee and complete the level of work outlined in this project.
 - 2) At a minimum, provide the following documentation: Fifteen (15) reference projects consisting of Resilient pads of 75,000 square-feet or larger within the past five (5) years completed by the proposed on-site full time installation superintendent.
 - 3) Project Information: At a minimum, provide the following information for each reference project:
 - a) Project Name
 - b) Project Location
 - c) Project scope
 - d) Construction timeline

- e) Construction cost
 - f) Reference name, title, affiliation, and contact information.
- 10. Field Maintenance Equipment:
 - a. 2.1 Materials, H. Field Maintenance Equipment
- 11. Field Attic Stock
 - a. 2.1 Materials, G. Attic Stock
- 12. Surveyor: Submit name and qualifications of Professional Land Surveyor who will be responsible for layout and verification of the work of this Section and Section 01 73 00 Execution.

C. Post Manufacturing/Pre-Installation Submittals

- 1. Material Testing: Submit for approval test results for all material testing performed under “1.8 Quality Control Testing, Post-Manufacturing/Pre-Installation” herein. Provide copies of all testing agency reports.
- 2. Material Samples: Submit two (2) samples, with required testing data, for approval for all materials under 2.1 Materials including, but not limited to, the following:
 - a. Synthetic Grass Carpet Sample: Twelve-inch (12") square samples of un-filled synthetic grass for each color manufactured for the project. Samples shall be the same as samples send to the testing agency for conformance of the product declaration.
 - b. Synthetic Grass System Sample: Sample box of synthetic grass system, including infill material.
- 3. Acceptance of Prior Work: Refer to section 3.2 Examination.

D. Post-Installation Submittals

- 1. Material Testing: Submit for approval test results for all material testing performed under “1.8 Quality Control Testing, Post-Installation” herein. Provide copies of all testing agency reports.
- 2. Warranty: Submit for approval final, executed warranty.

E. Warranty Quality Control Submittals

- 1. Material Testing: Submit for approval test results for all material testing performed under “Quality Control Testing, Warranty” herein. Provide copies of all testing agency reports to the Owner and Landscape Architect for review and approval for the entire warranty period.

1.6 QUALITY ASSURANCE

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

- B. The Owner, or Landscape Architect on the Owners behalf, reserves the right to submit any material, either before or after installation, for testing it deems necessary to satisfy the conditions of this contract.
 - 1. Any material tested and found not in compliance with the contract will be rejected and replaced with material conforming to the specifications. This will be done at the sole expense of the Contractor.
 - 2. Any testing performed by the Owner will be at the Owner's expense. The Contractor is responsible for the cost of all testing that fails. Contractor will bear the cost of all retesting as required by the Owner.

1.7 DELIVERY, STORAGE, AND HANDLING

- A. Contractor is required to coordinate material deliveries and storage on-site with Owner. Deliveries and storage of materials on-site shall not impact the function of the adjacent schools and facilities.
- B. Schedule delivery to minimize on-site storage. Segregate differing materials and prevent contamination between materials.
- C. Packing and Shipping: Deliver products in original unopened packaging with legible manufacturers' identification. All materials shall be stored in a dry place out of the direct sunlight.
- D. Areas for loose material delivery and storage shall be adequately cleared, cleaned, and prepared to ensure new material is not contaminated by existing foreign materials and existing materials are not damaged.
- E. Contractor is responsible for the protection, relocation, and other activities related to Owner supplied materials once a Contract is executed.
- F. Resilient shock pad
 - 1. Follow manufacturer's recommendations for packaging, transportation, and delivery to ensure materials are not damaged. Furnish materials in wrapping that protects the material from ultraviolet radiation and from abrasion due to shipping and hauling.
 - 2. Materials shall be stored on a prepared surface. Protect materials from puncture, dirt, grease, water, moisture, mud, mechanical abrasions, excessive heat or cold, or other damaging circumstances.
 - 3. Contractor is responsible for the protection, relocation, and other activities related to Owner supplied materials once a Contract is executed.
- G. Prior to the installation of any materials and immediately upon delivery of the synthetic grass system and components to the project site, the Contractor shall inspect materials as follows:
 - 1. For damaged or defective items.
 - 2. Measure synthetic grass roll lengths, perforations, and uniformity.
 - 3. Adhesives and seaming tape shall arrive in sealed dry containers and be kept in adequate temperature per manufacturer's requirements.

4. Performance infill shall arrive in large sacks or bags without tears and loose material. Material shall be dry and loose within packaging. No performance infill shall be accepted that is bulked or solid.
5. Stabilizing infill may arrive loose or in large sacks, depending on the site conditions. Contractor is responsible for reviewing the site conditions and determining the method for delivery of the stabilizing infill based on the available material storage area provided by the Owner. Material shall arrive dry and shall not be accepted if bulked or solid.
6. Infill materials shall be free of exposed metal particles.
7. Infill shall remain free from contamination of site materials.

H. Bulk Materials: Deliver materials in clean, washed, and covered trucks to eliminate contamination during transportation. On site stockpiling locations to be coordinated with the Owner. Stockpile only in areas free of debris and away from drainage routes. Cover all materials with plastic or geotextile if materials are to be stockpiled more than 48 hours or a rain event is forecasted.

1.8 QUALITY CONTROL TESTING

- A. All sampling/testing shall be the responsibility of Contractor. Contractor shall retain and pay for the services of a Synthetic Turf Testing Third-Party Agency to perform all sampling/testing in accordance with applicable standards.
- B. All testing shall be completed by an independent Synthetic Turf Testing Third-Party Agency as approved by Landscape Architect, unless otherwise noted. Testing must be for current materials with current date from independent testing laboratory as described herein.
- C. Certified copies of laboratory reports shall be submitted for all testing.
- D. Pre-Manufacturing Testing
 1. The intent of the pre-manufacturing testing is for manufacturers to submit the required testing for a previously tested ***standard system and materials*** that most closely resembles the specified system. Manufacturer shall note any discrepancies between the standard materials and systems previously tested and the system proposed for this project, if any.
 - a. *IT IS NOT THE INTENT OF PRE-MANUFACTURING TESTING SECTION TO REQUIRE MANUFACTURERS TO ENGAGE IN TESTING OF MATERIALS OR SYSTEMS NOT PREVIOUSLY TESTED AFTER BIDS HAVE BEEN RECEIVED.*
 - 1) *PREVIOUS TESTING SHALL NOT BE DATED OVER TWO (2) YEARS FROM DATE OF BIDDING.*
 - 2) *MANUFACTURERS WITHOUT A PREVIOUSLY TESTED SYSTEM CLOSELY RESEMBLING THE SPECIFICATION SHALL NOT BE CONSIDERED FOR THIS PROJECT.*
 2. Timing: Contractor shall submit to Landscape Architect a copy of all test results certified by the Synthetic Turf Testing Third-Party Agency prior to manufacturing of the Synthetic Grass Surfacing for the Project. Provide testing data for the following:

TESTING METHOD	CHARACTERISTIC	DECLARATION
SYNTHETIC GRASS YARN (include results for each yarn color separately)		
(provide previous results for testing of product that closely meets specification)		
ASTM D1907/ FIFA Test Method 23	Fiber Denier (Dtex)	< +/- 10%
ASTM D3218/ FIFA Test Method 25	Fiber Microns	< +/- 10%
FIFA Method 22	Pile Yarn Characteristic	Same Polymer
ASTM D 789	Melting Point	> 235 degrees F
ASTM D 5034	Breaking Strength (length)	> 283 lbs./ ft.
ASTM D 5034	Breaking Strength (width)	> 200 lbs./ft
ASTM F 2765-09	Lead Content	< 50 ppm
Artificial Weathering (FIFA 10)		
EN ISO 20105-A02	Artificial Weathering (5,000 hours UVA) Turf Color Change	> Gray Scale 3
EN 13864	Artificial Weathering (5,000 hours UVA) Pile Yarn Tensile Strength	<50% reduction
SYNTHETIC GRASS INFILL MATERIALS		
(include results for each infill material separately)		
(provide previous results for testing of product that closely meets specification)		
EN 71-3	Safety of Toys Part 3	Pass
ASTM F3188	Safety of Synthetic Turf Infill	Pass
EN 933/ FIFA Test Method 20	Particle Size	Max. 1 sieve difference
EN 14955	Particle Shape	Same Shape
EN 1097-3	Bulk Density	± 15% of specification
EN ISO 20105-A02	Artificial Weathering (5,000 hours UVA) Polymetric Infill Color Change	> Grey Scale 3, no change in shape

TESTING METHOD	CHARACTERISTIC	DECLARATION
RESILIENT SHOCK PAD		
(provide results for resilient shock pad tested over concrete only, not full synthetic turf surfacing system)		
EN 1969	Thickness	>17 mm
ASTM F355-A/F1936	Impact Attenuation(g-max)	< 120 G's
EN 1177	Impact Attenuation, Head Injury Criteria (HIC)	<1000 @ 0.6m
ASTM F3189 (EN 14809)	Vertical Deformation	<8.0 mm (<4.0 mm)
ASTM F3189 (EN 14808)	Force Reduction	>55% (>55%)
ASTM F1551/EN 12616 (FIFA Method 24)	Water Infiltration Rate	> 100 in./hr. vertically
ASTM D696-03	Thermal Expansion (per 1°C)	<.0.1mm/M
ASTM D3575	Compression Strength	> 25 psi @ 25% > 40 psi @ 50%
ISO 1856C	Compression Set – Static Load (35psi for 30 min at 23°C after 24 hrs)	< 7%
ASTM G22-76 ASTM G21-96 ASTM F925	Microbiological Analysis Bacteria Resistance, Fungal Resistance Chemical resistance	No growth or detrimental effects
DIN 53428	Water Absorption (after 24 hr immersion)	-<10% after 120 days @ 85C -<5% after 120 days at 85C

SYNTHETIC GRASS SURFACING SYSTEM		
(provide previous results for testing of product that closely meets specification)		
ASTM D5848/ISO 2549	Pile Height (Pile Length Above Backing)	<5%
ASTM D5793	Stitch Gauge	< 3/8"
ISO 1763	Tufts per Unit Area/Knots per Woven Area	
ASTM D5848/ISO 8543	Pile Weight	< +/- 5% of product declaration
ASTM D5848	Total Weight	
ASTM D1335/ISO 4919	Turf Bind (withdrawal)	.30N (unaged)
EN 13744 & ASTM D1335/ISO 4919	Turf Bind (withdrawal)	.30N (after immersion in hot water)
EN 1969/ FIFA Test Method 18	Free Pile Height	< ½" Fiber Reveal
EN 13746	Dimensional Stability	>0.5% After Each Stage
EN 1969/ FIFA Test Method 21	Infill Depth	< ½" Fiber Reveal
EN 12228 Method 1	Joint Strength – unaged	1000N/100mm (bonded)
EN 13744 & EN 12228 Method 1	Joint Strength – after immersion in hot water	1000N/100mm (bonded)
EN 13672	Lisport XL Simulated Wear (can be equivalent yarn on similar system)	> 6,000 passes without splitting
ASTM F1551/EN 12616 (FIFA Method 24)	Water Infiltration Rate	>16 in./hr. (>180mm/h2)
ASTM F355-A/F1936	Impact Attenuation(g-max)	< 100 G's
EN 1177	Impact Attenuation, Head Injury Criteria (HIC)	<900 @ 1.4m
EN 14808/ FIFA 04&09	Force Reduction	55% to 70%
EN 14809/ FIFA 05a&15	Vertical Deformation	4mm to 11mm
EN 15301/ FIFA 06&15	Rotational Resistance	27n to 48n

3. Any system material previously tested and found not in compliance with the contract may be rejected and Contractor shall submit a material found to be acceptable.
4. The Owner, or Architect on the Owner behalf, reserves the right to independently test any material. Any testing performed by the Owner will be at the Owner's expense. The Contractor is responsible for the cost of all testing that fails. Contractor will bear the cost of all retesting as required by the Owner.
5. The approved testing results shall be referred to as the 'manufacturers declaration' for the remainder of this section.

E. Post Manufacturing/Pre-Installation Material Identification Testing

1. Testing for this section may be performed by the synthetic grass surfacing manufacturers in-house laboratory. In-house laboratories shall, at a minimum, hold an ISO-9000 certification and provide documentation that the laboratory has conducted equipment quality control verification within the past twelve (12) months.

2. If the manufacture is unable to meet the requirements for their in-house laboratory or chooses to use a Synthetic Turf Testing Third-Party Agency, samples, as required to perform the testing below, of the materials manufactured for this project shall be submitted to the independent Testing Agency.
3. Timing: Contractor shall submit to Architect a copy of all test results prior to shipping of the Synthetic Grass System materials to the Project. Provide testing data for the following:

PRODUCT IDENTIFICATION - SYNTHETIC GRASS SURFACING CARPET		
ISO 8543	Total Mass Per Unit Area	< 5%
ISO 1763	Tufts per Unit Area/Knots per Woven Area	<10% manufacturers declaration
ISO 4919	Turf Withdrawal Force	>95% of manufacturers declaration
ASTM D5848/ISO 2549	Pile Height (Pile Length Above Backing)	<5%
ASTM D5848/ISO 8543	Pile Weight	> 95%
ASTM D 1335	Tuft Bind (w/out infill)	> 6.8 lbs. or 30N
ASTM D 5848	Primary Backing Weight	± 2 oz./yd ² of manufacturers declaration
ASTM D 5848	Secondary Backing Weight	± 2 oz./yd ² of manufacturers declaration
Visual	Perforations	>3/16" dia. holes, spaced 4" on center
PRODUCT IDENTIFICATION – PILE YARN		
ASTM D 1907/FIFA Test Method 23	Denier (Dtex)	± 5% of manufacturers declaration
ASTM D 3218/FIFA Test Method 25	Microns	± 5% of manufacturers declaration

4. Any material tested and found not in compliance with the contract may be rejected and Contractor shall submit a material found to be acceptable.
5. The Owner, or Architect on the Owner behalf, reserves the right to independently test any material. Any testing performed by the Owner will be at the Owner's expense. The Contractor is responsible for the cost of all testing that fails. Contractor will bear the cost of all re-testing as required by the Owner

F. Post Manufacturing/Pre-Installation Performance Testing

1. The following testing is required if the manufacturer has not performed the testing listed on the synthetic grass surfacing system (resilient shock pad, carpet, and infill) being utilized for this project within the past 24 hours. Test is required if the manufacturing cannot provide such testing and understanding of the installation parameters (i.e. stabilizing and performance infill ratio, fiber reveal) to meet the field performance criteria under this section.

2. Samples, as required to perform the testing below, of the synthetic grass carpet, infill material, and resilient shock pad system shall be submitted to the Synthetic Turf Testing Third-Party Agency.
3. Timing: Contractor shall submit to Landscape Architect a copy of all test results certified by the Independent Testing Agency prior to shipping of the Synthetic Grass System materials to the Project. Provide testing data for the following:

SYNTHETIC GRASS SURFACING SYSTEM (carpet, infill, and resilient pad)		
EN 1969/ FIFA Test Method 18	Free Pile Height	< ½" Fiber Reveal
	Infill Ratio	
ASTM F1551/EN 12616	Water Infiltration Rate	>16 in./hr.
ASTM F 1936	Impact Attenuation(g-max)	< 100 G's
EN 1177	Impact Attenuation, Head Injury Criteria (HIC)	<900 @ 1.4m
EN 14808/ FIFA 04&09	Force Reduction	55% to 70%
EN 14809/ FIFA 05a&15	Vertical Deformation	4mm to 11mm
EN 15301/ FIFA 06&15	Rotational Resistance	27n to 48n
EN 12235/ FIFA 01&15	Vertical Ball Rebound	60cm to 100cm
EN 12234/ FIFA 17 & 15	Reduced Ball Roll	4m to 10m
FIFA 02	Angle Ball Rebound	45% - 70%
FIFA 04a & 15	Shock Absorption	57% - 68%

4. Any material tested and found not in compliance with the contract may be rejected and Contractor shall submit a material found to be acceptable.
5. The Owner, or Landscape Architect on the Owner behalf, reserves the right to independently test any material. Any testing performed by the Owner will be at the Owner's expense. The Contractor is responsible for the cost of all testing that fails. Contractor will bear the cost of all retesting as required by the Owner.

G. Drainage Testing, Pre-Construction

1. Refer to Specification Section 33 46 16 Field Subdrainage System for testing and approval requirements of the synthetic turf field base.
2. Synthetic turf system installer shall submit pre-installation base acceptance letter.

H. Post-Installation Testing

1. Timing: Testing shall be completed on-site once the field is complete and the infill has had adequate time to settle, but no later than forty-five (45) days of the completion of installation.

2. Contractor shall submit to Architect a copy of all test results certified by the Synthetic Turf Testing Third-Party Agency. Provide testing data for the following:

DRAINAGE STONE (installed on-site, prior to installation of resilient pad)		
SEE SPECIFICATION SECTION 33 46 16 'FIELD SUBDRAINAGE SYSTEM'		
SYNTHETIC GRASS SURFACING SYSTEM (installed on-site, after installation of the resilient pad (if applicable), synthetic grass surfacing, inlays, and infill)		
ASTM F1551/EN 12616	Water Infiltration Rate	>16 in./hr. (1 test per 20,000 s.f.)
EN 1969/ FIFA 21	Infill Depth Measurement (minimum 50 locations)	± 10% of specification (1/2" exposed fiber) (individual locations, not average field results)
EN 13036/FIFA 12	Planarity/Surface Regularity	<10 mm
ASTM F 1936	Impact Attenuation(g-max) (minimum 10 locations)	< 95 G's (individual locations, not average field results)
EN 1177	Impact Attenuation, Head Injury Criteria (HIC) (minimum 10 locations)	<900 @ 1.4m (individual locations, not average field results)
EN 14808/ FIFA 04a	Shock Absorption	55% to 70%
EN 14809/ FIFA 05a	Vertical Deformation	4mm to 11mm
EN 15301/ FIFA 06	Rotational Resistance	25n to 50n
EN 12235/ FIFA 01	Vertical Ball Rebound	60cm to 100cm
EN 12234/ FIFA 03	Ball Roll	4m to 10m
EN 71-3	Safety of Toys Part 3	Pass (minimum of 3 samples)
ASTM F3188	Safety of Synthetic Turf Infill	Pass (minimum of 3 samples)

3. Any material tested and found not in compliance with the contract may be rejected and Contractor shall rectify the issue to be acceptable. Any area/item not within conformance shall be retested at the Contractors expense after remedy is implemented until satisfactory results are achieved.
4. The Owner, or Landscape Architect on the Owner behalf, reserves the right to independently test any material. Any testing performed by the Owner will be at the Owner's expense. The Contractor is responsible for the cost of all testing that fails. Contractor will bear the cost of all retesting as required by the Owner.

I. Warranty Testing

1. Timing: Testing shall be completed on-site and annually for the warranty period. Testing shall be scheduled with the Owner and Architect each year prior to start of the fall athletic season.

Contractor shall submit to the Architect and Owner a copy of all test results certified by the independent Synthetic Turf Testing Third-Party Agency. Provide testing data for the following:

SYNTHETIC GRASS SURFACING SYSTEM (annually)		
EN 13036	Planarity/Surface Regularity	<10 mm
EN 1969	Infill Depth Measurement (minimum 50 locations)	± 10% of specification (1/2" exposed fiber) (all locations, not average)
ASTM F 1936	Impact Attenuation(g-max) (minimum 10 locations)	< 100 G's (individual locations, not average field results)
EN 1177	Impact Attenuation, Head Injury Criteria (HIC) (minimum 10 locations)	<900 @ 1.4m (individual locations, not average field results)
EN 71-3	Safety of Toys Part 3	Pass (minimum of 3 samples)
ASTM F3188	Safety of Synthetic Turf Infill	Pass (minimum of 3 samples)

2. Any materials tested and found not in compliance with the warranty requirements shall be rectified at Contractors expense. Contractor shall rectify the issue to be acceptable and pass all warranty testing requirements. Any area/item not within conformance shall be retested at the Contractors expense after remedy is implemented until satisfactory results are achieved.

1.9 PATENT RIGHTS AND INFRINGEMENT

- A. The Drawings and Specifications are not indented to be proprietary or in violation of any current or pending patents. The Contractor and subcontractors are responsible to provide the Owner and Landscape Architect with any violations contained here in prior to bidding. By bidding on the project, the Contractor and subcontractors shall hold the Owner, Construction Manager, and Design Consultants harmless from infringement of any current or future patent issued for the synthetic grass surfacing system.
- B. Contractor and subcontractors shall hold the Owner, Construction Manager, and Design Consultants harmless from infringement of any current or future patent issued for the synthetic grass surfacing system, fibers, backings, including resilient shock pad, installation methods and vertical draining characteristics. The successful bidder will be required to submit a letter for consent from their surety. The Surety shall indemnify the requirements.

- C. There are various established performance criteria throughout this request for products and services. There may exist patent coverage for some means and methods of achieving those performance criteria. Bidders are responsible for ascertaining that means and methods of the products and services which they are providing are not being provided in violation of any such patent rights. Bidder's responsibilities are as follows:
1. To hold harmless, the Owner, Construction Manager, and Design Consultants, as to any violation to include dollar amounts that could be owed as a result of damages for infringement including potential treble damages as provided for under U.S. Patent Law.
 2. All costs that the Owner, Construction Manager, and Design Consultants, would incur in replacing materials and services which are determined to infringe patent rights.
 3. All administrative, legal, and other costs that would be incurred as a result of an infringement.

1.10 WARRANTY

- A. Synthetic Grass Surfacing Warranty – Sports Fields: See Specification Section 32 18 13.10 Synthetic Grass Surfacing Warranty.
- B. Synthetic Grass Infill Warranty
1. Synthetic Turf Surfacing System A & C: The Infill Material Manufacturer shall provide a non-prorated Manufacturer/Installer Warranty/Guarantee (also referred to herein as the Warranty) for the synthetic grass performance infill materials and installation as specified herein, for a minimum period of eight (8) years to the Owner from the date of Certificate of Substantial Completion.
 2. Infill material shall be warrantied against breakdown of material outside of project specifications, deterioration of infill coatings, and failure to adhere to EN 71-3 and ASTM F3188 testing.
- C. Resilient Shock Pad Warranty's
1. The Resilient Pad Manufacturer shall provide a non-prorated resilient shock pad Manufacturer/Installer Warranty/Guarantee (also referred to herein as the Warranty) for the resilient shock pad materials and installation as specified herein, for a minimum period of sixteen (16) years to the Owner from the date of Certificate of Substantial Completion.
 2. Warranty shall include coverage for the following:
 - a. Drainage issues or failure to drain at rate of 50" per hour or greater.
 - b. Undulations or heaving repair for any base or surfacing undulation caused by the resilient shock pad material apparent in the synthetic turf surfacing over 10mm vertical height, whether periodic (due to weather) or persistent.
 - c. Persistent depressions, or deformation of the pad material 10 mm or greater caused by the resilient pad materials.

- d. Any failure in the physical properties of the resilient pad that negatively affect the aesthetics, playability, G-Max rating, HIC rating, or longevity of the synthetic turf surfacing system.
 - e. Costs for repair or replacement of the synthetic turf and infill materials above the resilient pad in affected areas in the event of product failure.
 - f. Resilient shock pad warranty shall guarantee the ability of the synthetic grass surfacing system to meet the warranty criteria under 1.8 Quality Control Testing, I. Warranty Testing for the term of the resilient shock pad warranty.
- D. The Warranties shall cover, in general, the usability of the Synthetic Grass System: accessories, use, characteristics, and suitability, of the installation to the minimums specified in this Section.
- E. All items covered by the warranty are to be replaced or repaired with new materials, including installation at the sole expense of the warranting material manufacturer/supplier over the life of the Warranty.
- F. Sports Field Synthetic Grass System Use: The materials utilized in the sports field synthetic grass system (carpet, infill, resilient pad, seaming, logo's, inlays, etc.) shall be guaranteed for the designated uses as follows:
 - 1. Football, Rugby, Soccer, Baseball, Softball, Field Hockey, Lacrosse
 - 2. Marching Band
 - 3. Graduations and Ceremonies
 - 4. Physical Education and Intramural Sports Programs
 - 5. Physical Education exercises and activities
 - 6. Pedestrian traffic and other similar uses
 - 7. Pneumatic rubber-tired maintenance and service equipment, designed for use on athletic fields and golf courses.
- G. Warranty documents and terms of Warranty shall be in accordance with this Specification.
 - 1. The use of the Manufacturers' standard or modified form of Warranty shall in no circumstance supersede the conditions set forth in this Specification Section, which shall be considered part of the Warranty.
 - 2. This Warranty shall constitute a contract made in the State of where the project is located and shall be governed by the laws of that State.
- H. All Warranties shall include coverage for the following:
 - 1. Drainage issues, or failure to drain at the specified rate.
 - 2. Any failure in the physical properties that negatively affect the aesthetics, playability, G-Max rating, HIC rating, or longevity of the synthetic grass.
- I. Test results, field repairs, and field concerns shall be submitted to the Owner and the Architect in a Field Inspection Report and Testing Results for review.

J. Adhesive Materials

1. The adhesive shall have the same warranty period as the synthetic grass system, eight (8) years. Warranty from the adhesive material manufacturer/supplier shall be submitted with the synthetic grass surfacing warranty for review and approval.

1.11 WARRANTY AND MAINTENANCE OBLIGATIONS

1. The Synthetic Grass Manufacture/Supplier shall be required to provide testing, as described under G. Warranty Testing, and inspection plan for the lifespan of the warranty as part of this Contract and shall submit a schedule of visits at the time of completion.
 - a. Contractor shall make corrections as necessary to meet all testing requirements.
2. The Synthetic Grass Manufacture/Supplier to return to the site once (1) per year for the duration of the warranty, no less than 8 visits.
3. The Synthetic Grass Manufacture/Supplier shall inspect any areas of concern and make repairs as necessary under warranty during each visit including, but not limited to, the following:
 - a. Nailer Board/Concrete Anchor Cub Repairs (general contractor)
 - b. Inlays, Numbers, Logo, and Seam Conditions
 - c. Fiber Conditions
 - d. Fiber Height
 - e. Infill Condition
 - f. Infill Height/ Compaction
 - 1) Sports Fields: Additional infill may be required by the Contractor to maintain the G-Max, HIC levels and required infill depths. Materials shall be provided and installed at no cost to the Owner to achieve acceptable performance and safety requirements under the warranty requirements.
4. Test results, field repairs, and field concerns shall be submitted to the Owner and the Landscape Architect in a Field Inspection Report and Testing Results for review.

PART 2 - PRODUCTS

2.1 MATERIALS

A. Resilient Shock Pad

1. Commercially available panelized/modular resilient pad system designed for multi-sport uses. Resilient shock pad shall consist of prefabricated, interlocking units configured for installation beneath a synthetic turf surfacing system.
 - a. Rolled sheet good shall not be accepted.
2. Compatibility: Resilient shock pad shall be compatible with the submitted synthetic grass surfacing and the infill material. The synthetic grass surfacing and resilient shock pad shall

provide an acceptable system. The resilient shock pad shall be in all ways compatible with the specified synthetic grass surfacing and infill, and shall not affect the synthetic grass surfacing warranty, as well as the synthetic grass surfacing system shall not affect the resilient shock pad warranty.

3. The resilient shock pad shall be intended for installation on a gravel base and suitable for use in New England without the use of adhesives, seaming, or separation fabric.
4. Load Capacity: No permanent deformation under periodic loading (e.g. grooming equipment or ambulance).
5. Connectors, couplers, adhesive, and other fittings shall not be required to connect resilient shock pad panels. Material of construction and configuration shall be in accordance with the resilient pad manufacture's requirements or recommendations, whichever is more stringent.
6. Warranty: Minimum 16-year manufacturer's warranty.
7. Resilient shock pad performance requirements: Refer to Section 1.8 Quality Control Testing, D. Pre-Manufacturing Testing – Resilient Shock Pad
8. Manufacturer shall provide documentations that the resilient shock pad meets the following:
 - a. Product meets human health and total threshold limit concentrations using EPA method 3052
 - b. Product meets human health and total threshold limit concentrations for Title 22 (CAM 17) metals using EPA 6010B/7471A and hexavalent chromium using EPA method 7196A.

B. Synthetic Grass Surfacing Carpet

1. All components and their installation method shall be designed and manufactured for use on outdoor athletic fields. The finished surface shall resist abrasion and cutting from normal use.
2. The materials as hereinafter specified should be able to withstand full climatic exposure in all climates, be resistant to insect infestation, rot, fungus, mildew, ultraviolet light, heat degradation, and be non-allergenic and non-toxic. The entire system shall be constructed to maximize dimensional stability, to resist damage and normal wear and tear from its designated uses, and to minimize the ultra-violet degradation.
3. The system shall have the basic characteristics of flow-through drainage, allowing free movement of surface runoff through the synthetic grass surfacing system where such water may flow to the existing base and into the field drainage system.
4. Pile fibers shall resemble freshly grown natural grass in appearance, texture, and color (except as noted for markings and graphics). Streaks, discoloration, or different dye lots shall not be accepted.
5. Manufacturer is to guarantee that the synthetic grass fiber is adaptable to painted lines.

6. The synthetic grass surfacing systems shall be a proven athletic caliber yarn designed specifically for outdoor use and stabilized to resist the effect of ultraviolet degradation, heat, foot traffic, water, and airborne pollutants.
7. All adhesives used in bonding the system together shall be resistant to moisture, bacterial and fungus attacks, and resistant to ultra-violet rays at any location upon installation.
8. Fabric surface shall be constructed and installed in minimum widths of 15 feet with no longitudinal or transverse seams, except for inlaid lines within a finished roll assembly.
9. The Synthetic Grass System shall always remain free draining before, during, and after the infill materials are installed.
10. The synthetic grass surfacing system shall be made up of the following materials:
 - a. Multi-Sport Field – Tufted combination of monofilament and slit-film fibers with a subsequent shorter pile height layer of fibers.
 - b. The intent of the system is for manufacturers to utilize a standard system that most closely resembles the specified system. Refer to Section 1.8 Quality Control for system performance and safety requirements.
 - c. *IT IS NOT THE INTENT OF THE PRE-MANUFACTURING TESTING SECTION TO REQUIRE MANUFACTURERS TO ENGAGE IN TESTING OF SYSTEM NOT PREVIOUSLY TESTED BETWEEN THE TIME OF BID AND MANUFACTURING.*
 - 1) *MANUFACTURERS WITHOUT A PREVIOUSLY TESTED SYSTEM CLOSELY RESEMBLING THE SPECIFICATION SHALL NOT BE CONSIDERED FOR THIS PROJECT.*

Synthetic Turf Carpet Properties:

Synthetic Turf System over a Resilient Pad

Denier	9,000 (mono & slit-film) 5,000 (thatch/rootzone/spikezone)
Microns	> 300 microns (mono) > 100 microns (slit-film)
Pile Height	2 inches
Pile Weight (Total)	58 oz.
Stitch Gauge	< 3/8"

Synthetic Turf System over a Stone Base

Denier	9,000 (mono & slit-film) 5,000 (thatch/rootzone/spikezone)
Microns	> 300 microns (mono) > 100 microns (slit-film)
Pile Height	2.5 inches
Pile Weight (Total)	65 oz.
Stitch Gauge	< 3/8"

C. Perforations

1. Synthetic grass carpeting shall be perforated to provide vertical drainage as specified herein.

2. Size and spacing of perforations shall be as specified herein. Spacing of perforations shall be uniform in both directions.
3. Perforations shall be complete and full diameter for a minimum of 95% of each roll.
4. Perforations shall be tested by passing a 3/8" drill bit through the holes with no more than 7 lbs. pressure.

D. Markings and Logos

1. All field lining, marking, field boundary system with team area limits, logos, etc. shall be same material (yarn, infill, and backing) as playing field system.
2. Lines, logos, and graphics to be installed in the synthetic grass surface carpet are to be tufted in the factory to the maximum extent practical. Those not tufted in the factory shall be inlaid in the field (**shaving is not permitted**).
3. A complete field lining, marking, and field boundary system with team area limits, etc. shall be provided with the initial installation. Layouts shall be accurately surveyed and marked prior to installation. Layouts shall include all incidental markings required by the NFHS or state athletic organization, whichever is applicable.
4. All markings shall be uniform in color, providing a sharp contrast with the synthetic grass field color and shall have sharp and distinct edging.
5. Logos and lines shall be true and shall not vary more than 1/2" from specified width and location. Lines and logos shall be confirmed on the as-built survey.
6. Turf Graphics (other than field lining)
 - a. Base Bid Field Graphics: (See drawings for detail and location)

E. Adhesive Materials and Seaming Tape

1. Seaming requirements: Refer to Section 1.8 Quality Control Testing, D. Pre-Manufacturing Testing.
2. If a hot melt welding method is used, the glue shall have an application temperature of 325 degrees F. with a melting point of 180 degrees F. Material shall be National Adhesive #34-5372 or equal. Submission of all hot melts shall be 10 calendar days prior to installation.
 - a. **Hot melt shall not be used to adhere synthetic turf carpet to concrete anchor curbing.**
3. Bonding surfaces shall be clean, dry, and free from grease, oil, wax, weak oxide films, mold release agents, and other surface contaminants.
4. The adhesive shall be applied at the rate specified by the manufacturer.

5. The adhesive shall have the same warranty period as the synthetic grass system. Warranty from the adhesive material manufacturer/supplier shall be submitted with the synthetic grass surfacing warranty for review and approval.
6. Seaming tape shall be a 12" wide polypropylene or polyethylene fabric acceptable for use with the synthetic turf carpet system and the adhesive material.
7. Seaming tape shall meet FIFA Joint Strength >25N/100mm

F. Infill

1. Infill materials shall be uniformly filled to a depth which leaves no more than 1/2" of exposed pile after settlement. Infill quantities shall not be determined by weight per unit area.
 - a. Infill materials shall be installed at a ratio as to meet the requirements set forth under Section 1.8 Quality Control Testing, F. Post Manufacturing/Pre-Installation Performance Testing
 - b. Infill materials shall consist of a mixture a performance infill material and a stabilizing infill material.
2. Performance Infill: Acrylic Coated SBR Infill
 - a. Shall be free of all metal and produced of 100% recycled automobile or truck tires. The material shall have a size not to exceed 10 mesh nor smaller than 20 mesh.
 - 1) The fine particles shall not exceed 10% by volume. Rubber shall have no visible evidence of steel particles present in the final synthetic grass surfacing in-fill. The bulk density of the rubber materials shall not be less than 29.75 lbs/cubic feet.
 - a) Coating color: **GREEN**
 - b) Coated SBR infill shall be UV stabile and resistant to heat degradation.
3. Stabilizing Infill: Sand Infill
 - a. Sand shall comprise 100% passing the #16 sieve, no more than 80% passing the #30 sieve and no more than 0.5% passing the #50 sieve per ASTM E-1.
4. A combination of the performance infill and the stabilizing infill materials are to be used as the in-fill system
 - a. System over a resilient pad: The performance infill material shall be between approximately 30-40% by weight and the stabilizing infill material shall be between 60-70% by weight. Manufacturer to provide infill ration based on pre-installation testing.
 - b. System over a stone base: The performance infill material shall be between approximately 40-60% by weight and the stabilizing infill material shall be between 40-60% by weight. Manufacturer to provide infill ration based on pre-installation testing.

G. Additional Field Materials (Attic Stock)

1. Sports Fields:
 - a. The Contractor shall supply and deliver an additional 15 lineal feet of full width (15') material, plus 2 linear feet of full width of each color used. Scraps left from the installation process are not acceptable.
 - b. The Contractor shall furnish additional performance infill material as specified for the sports field synthetic grass surfacing system sufficient to fill two (2) fifty (50) gallon containers. The additional infill materials shall be placed in fifty (50) gallon containers with lockable covers and wheels and clearly labeled "FIELD INFILL".
2. Seaming Repair Kit: Provide a seam repair kit suitable for use by the Owner. Material shall be administered using a caulking gun or similar mechanism. Buckets with a trowel applicator are not acceptable.

H. Field Maintenance Equipment

1. Contractor shall provide the following grooming equipment to the Owner.
 - a. Synthetic Grass Magnet:
 - 1) One (1) new and unused GreensGroomer Sportsfield Magnet® SFM or approved equal for each field. Synthetic grass magnet shall be a towable unit with a 72" draw bar situated on a frame that rides on 2 pneumatic 280/250-4 ribbed 4-ply tires with bearings. Measuring 72" wide x 5" long x 2" in height, the magnet provides 360 sq. inches of surface. Strength of the magnet is 670lbs Pull. The weight of the complete unit is 102lbs.
 - 2) All attachments and adaptors necessary for the connection of the magnet to the Owner's grooming vehicle.
 - b. GreensGroomer Replacement Brushes:
 - 1) One (1) new and unused GreensGroomer set of replacement brushes for each field. Replacement brushes shall be compatible with the Owners existing GreensGroomer field groomers.
 - c. Synthetic Grass Hand Equipment:
 - 1) Rakes: The Contractor shall supply at the end of the Project one (1) new and unused plastic leaf hand rake for each field.
 - 2) Hand Brushes: The Contractor shall supply at the end of the Project one (1) new and unused push broom for each field.
 - 3) Hand Shovel: The Contractor shall supply at the end of the Project one (1) new and unused 27-inch aluminum scoop shovel with fiberglass handle for each field.
 - 4) Two (2) Gallon Bucket: The Contractor shall supply at the end of the Project two (2) new and unused five (5) gallon bucket with handle and lid for each field.
 - 5) Four (4) Single-Prong Infill Depth Gauges: The contractor shall supply at the end of the Project four (4) new and unused single-prong depth gauge supplied by The Synthetic Turf Council www.syntheticurfCouncil.org, contact: Melanie Taylor, melanie@syntheticurfCouncil.org for each field.
 - 6) One (1) Three-Prong Infill Depth Gauge: The contractor shall supply at the end of the Project one (1) new and unused three-prong depth gauge supplied by Sports Laboratories, contact John McLuckie John@sportslabs.co.uk or Kieran O'Donnell kieran@sportslabs.com for each field.

PART 3 - EXECUTION

3.1 GENERAL

- A. Verify site conditions before proceeding with demolition work. Field check the accuracy of the Drawings and inspect structures, utilities, and other site features prior to start of work and notify Engineer in writing, of any hazardous conditions and/or discrepancies.
- B. Weather Permitted Conditions: The Contractor shall not perform any work if the conditions for working are:
 - 1. Ambient air temperatures are below 45 degrees F.
 - 2. Material temperature falls below 45 degrees F.
 - 3. Rain is forecast or falling
 - 4. Conditions exist or are pending that will be unsuitable to the installation of the system.
- C. Drawings / Specifications: The Contractor shall perform all work in strict accordance to the Contract Drawings / Plans, Shop Drawings and manufacturer's specifications and instructions.
- D. Verification: The Contractor shall be responsible for the inspecting, verifying, and completing all installed work of this section.

3.2 EXAMINATION

- A. **Installer is responsible to review the planarity, pitch (slope), drainage capabilities, and conditions of the prepared stone base by means of string lines, testing provided by the General Contractor, and other methods as they deem necessary.**
- B. Acceptance of Prior Work-Field Base Stone: Upon completion of the base and drainage work, the Site General Contractor shall submit a letter, addressed to the Owner, signed by the Site General Contractor, Resilient pad Installer, and the Synthetic Grass Surfacing Installer. The letter shall confirm Field Base Stone has been reviewed, including all testing data, and is acceptable for installation of the synthetic grass surfacing system. Any discrepancies, problems, and/or conflicts shall be addressed prior to issuance of the letter.
 - 1. Continuing with the installation of the resilient shock pad over the field base stone without issuance of such letter shall be considered as an approval of the base by the resilient shock pad and Synthetic Grass Surfacing Installer.

3.3 PREPARATION

- A. The Contractor shall take special care to protect all field structures and utilities. Any damage shall be repair or replaced at the cost of the Contractor
- B. Layout: The Contractor shall be responsible for furnishing, setting and marking all lines, seams and markings for the field. The Contractor shall at all times maintain all necessary benchmarks and control points to locate all events and markings.

- C. Slope: The field shall be installed with a minimum 0.5% and maximum 0.75% slope unless otherwise noted in the Drawings, from the center crown to the sideline.
1. The finish profile of the crown of the field may not exceed grade shown on the Drawings. This will be maintained throughout the length of the crown.
 2. Contractor shall excavate at trench drain/anchor curb at field perimeter so top of resilient pad can be installed flush with top of concrete notch at trench drains. See Detail.
 3. All field base stone shall be touched up and laser graded prior to testing and installation of new turf.

3.4 INSTALLATION

A. Resilient shock pad

1. Prior to pad installation pad installer /manufacturer shall provide written acceptance of the prepared subgrade material and surface. Acceptance shall, at a minimum, include the following:
 - a. Permeability
 - b. Planarity
 - c. Suitability for synthetic turf system.
2. Installer shall minimize disturbance and contact with the accepted field base to the greatest extent possible. Unnecessary storage of materials, foot or vehicular traffic, or other activities on the accepted field base is to be avoided. Installer shall prepare a detailed installation plan that shall include the process by which the pad is to be installed while minimizing disturbance of the base.
 - a. Failure to comply with these requirements will result in removal of the installed material and retesting of the base material for approval.
3. Install pad loose laid on gravel base in accordance with manufacturer's requirements.
4. Protect panels from damage or movement during the installation process. Damaged panels shall be rejected. Install panels and cover with turf promptly. Do not leave panels exposed overnight without ballasting. Contractor is responsible for material stability during construction and shall take all measures necessary to avoid shifting or displacement due to construction, weather, or temperature changes.
5. An interlocking panel design shall be used to hold adjacent panels in place.
6. Pads shall be cut and fit tightly to the edges of the field and all objects within the field. No gaps in the pad over 1/4" are acceptable. Use largest size possible. Filler strips or piecemeal work are not acceptable.
7. Grade and planarity of installed Pad system shall comply Surface Regularity of this specification. Care shall be taken to fix any disturbances of the stone base while installing the resilient pad.

B. Synthetic Grass Surfacing Installation

1. The synthetic grass carpet shall be staged and unrolled as necessary for a daily installation. No material will be allowed to be unrolled 24 hours prior to installation.
2. Installer shall minimize disturbance and contact with the accepted field base to the greatest extent possible. Unnecessary storage of materials, foot or vehicular traffic, or other activities on the accepted field base is to be avoided. Installer shall prepare a detailed installation plan that shall include the process by which the synthetic grass surfacing is to be installed over the resilient shock pad while minimizing disturbance of the base.
 - a. Failure to comply with these requirements will result in removal of the installed material and retesting of the base material for approval.
3. Synthetic grass surfacing shall be installed over the resilient pad. Care shall be taken so as not to damage installed resilient pad.

C. Seams

1. All panel seams spacing is to be held to a minimum of 15 feet unless prior approval of seaming diagram indicates a lesser panel.
2. Fabric surface shall be constructed and installed in minimum widths of 15 feet with no longitudinal or transverse seams, except for inlaid lines with a finished roll assembly. The seams shall be 15'-0" apart. No fitted pieces shall be allowed to true alignment.
3. All panel seams shall be securely sewn or glued and lay flat. Minimum of 5" of seaming tape and glue shall be on either side of the seam.
 - a. Ridges or tenting of seams is not acceptable.
 - b. Gaps greater than 1/8" are not acceptable.
4. Sewn seams shall be sewn with high strength polyester fiber cord. Sewn seams shall be a butt-sewn with double loop lock stitch in such a manner as each loop is wide enough to extend outside of the nearest tufted row. Bagger type seam stitching is not permitted.
5. Seams shall lay flat after infill.
6. All seams shall be brushed thoroughly before infill materials are installed.
7. All seams shall be fully fastened with no loose areas. The Owner reserves the right to submit a seaming sample from the installed field for testing at any time. Failure of a seam to meet the requirements of this document shall be Contractor's responsibility to remove, replace, and re-test to the Owner and Architects satisfaction. Any testing that fails to comply with the project requirements shall become the Contractors responsibility for cost.
8. Installer shall exercise caution to prevent gluing or adhesion of turf to resilient shock pad. Glue shall not be applied directly to pad in any instance.
9. The synthetic grass surfacing system shall always remain free draining before, during, and after the infill materials are installed.

D. Synthetic Grass System Edges and Termination

1. **All edges and ends of the synthetic grass system shall be secured to the anchor curb by 100% adhesive.**
 - a. **Hot melt or nailing is not acceptable.**
 - b. **Final infill level shall be flush with adjacent anchor curb or track surfacing unless noted otherwise on plan.**
2. Edge termination and securing shall take place after all inlays and infill has been installed and the field as been adequately groomed.

E. Lines, Markings, Logos, and In-Lays

1. Lines and markings shall be tufted in the factory to the greatest extent possible during manufacturing.
2. All lines, numbers, and field markings are to be tufted or in-laid with the specific-colored synthetic grass surfacing.
 - a. Shaving of the synthetic turf carpet fibers and adhering of the inlaid carpet to the field backing material shall not be permitted,
3. All lines and markings shall be accurately set and surveyed to within 1/2" tolerance on the as-built survey.
4. All lines and markings shall be installed and verified prior to any installation of in-fill material.
5. All glued inlays shall have a 12" wide seaming tape, fully coated with adhesive. All inlays shall not have any adhesive applied to any exposed fibers.
6. All in-laid areas shall be brushed thoroughly before infill materials are installed.
7. All inlays shall be fully fastened with no loose areas. The Owner reserves the right to submit an inlay sample from the installed field for testing at any time. Failure of inlays to meet the requirements of this document shall be Contractor's responsibility to remove, replace, and re-test to the Owner and Architects satisfaction. Any testing that fails to comply with the project requirements shall become the Contractors responsibility for cost.
8. Installer shall exercise caution to prevent gluing or adhesion of turf to resilient shock pad. Glue shall not be applied directly to pad in any instance.

F. Synthetic Grass Surfacing Infill

1. No in-fill materials shall be installed until the synthetic grass surfacing is fully installed with all lines and markings.
2. The synthetic grass surfacing shall be thoroughly brushed prior to any in-fill materials to remove any wrinkles and defibrillate the slit film.
3. Infill shall not leave more than 1/2" of exposed fiber on sports fields.
4. The in-fill materials shall be installed in layers not to exceed 0.30 lbs per sq ft per layer.

5. Infill material shall be 'worked into' the thatch/rootzone/spikezone layer. Contractor shall allow time and proper machinery to do so.

3.5 PROTECTION

- A. The Contractor shall take special care to protect all field and building structures and utilities. Any damage shall be repair or replaced at the cost of the Contractor.

3.6 TRAINING INSTRUCTION AND OWNERS' MANUALS

- A. Provide a 4 hour, at a minimum, on-site training instructional program for the Owner for each field. Prior to conducting maintenance training the Contractor shall put together and test all maintenance equipment. Equipment shall be fully functional and ready to use at the time of the training. The training shall include review and demonstration generally of the following, but not be limited to:
 1. Daily/Weekly fiber, infill, and seam inspections.
 2. Low infill hand grooming and infill placement.
 3. Seam repair.
 4. Field sweeping, grooming, and decompaction (with tines groomer if applicable). Including demonstration of hock-up, detachment, and use of all equipment with the Owner's equipment.
 5. Field plowing (if applicable).
 6. Protection for events.
 7. Procedure for Warranty claims.
- B. The training instruction will be summarized on a DVD included in the Owner's Manual and close-out documents.
- C. Training shall take place no later than fourteen (14) days after Substantial Completion is executed.

3.7 AS-BUILT FIELD LAYOUT DRAWING

- A. Provide As-Built Field Layout Drawing including verification of all field markings and layout dimensions, by licensed surveyor, to the Architect for review and approval.
 1. Provide as-built survey in AutoCAD and .pdf format as described under Section 01 73 00 Execution.

3.8 CLEAN UP

- A. The site shall be kept clean and free of debris throughout the installation. Empty barrels, sacks, bags, and remnant materials shall be stored or disposed daily in a proper container or legal manner.
- B. After completion of the entire Project, the site shall have a general cleanup removing all debris remaining on the site that is not a part of the final Project.

- C. The equipment supply requirements for this Project shall be part of the total price and shall be the sole expense of the Contractor.
- D. All areas disturbed during this construction shall be restored to the satisfaction of the Owner at no additional cost to the Owner.
- E. All attic stock materials shall be placed in its appropriate location as determined by the Owner.

3.9 Acceptance

- A. Should any imperfections develop in the surface areas prior to the final acceptance of the work, they shall be removed and replaced with new materials. All such repair work shall be done at no additional cost to the Owner.
- B. Acceptance will be issued to the Contractor as described under “Substantial Completion” when all work under this section is found to be completed. The Owner or Architect will not be responsible for any additional acceptance requirements by the Contractor or subcontractors.

END OF SECTION 32 18 13

SECTION 32 18 13.10 – SYNTHETIC GRASS SURFACING WARRANTY

PART 1 - GENERAL

1.1 RELATED DOCUMENTS

- A. The Contractor, Subcontractors, and/or suppliers providing goods and services referenced in or related to this Section shall also be bound by the Related Documents identified in Division 01 Section “Summary.”

1.2 SUMMARY

- A. Section Includes:
 - 1. Synthetic Grass Sports Surfacing Warranty and Guarantee.

1.3 SIGNATORIES TO THE WARRANTY

- A. The Synthetic Grass System Warranty shall be signed by:
 - 1. An officer of the applicable party or agency duly authorized to sign contracts. The term “Contractor” specified herein shall refer to the party or agency that is furnishing the warranty.
 - 2. If the grass Manufacturer and/or Installation Contractor of the Synthetic Grass System (referred to herein as the Sub-contractor) is not the same entity as the Contractor, the warranty shall be co-signed by the Manufacturer and the Sub-contractor.
 - 3. The “Owner” is **TOWN OF RIDGFIELD, CT.**

1.4 GENERAL WARRANTY CONDITIONS

- A. Warranty Period: The Contractor shall provide a **non-prorated** Synthetic Grass Surfacing Manufacturer/Installer Warranty/Guarantee (also referred to herein as the Warranty) for the synthetic grass as specified herein, for a minimum period of eight (8) years, to the Owner from the date of the executed Certificate of Substantial Completion.
 - 1. The Warranty shall cover, in general, the usability of the Synthetic Grass System (and pad if required); accessories, use, characteristics, and suitability, of the installation.
 - 2. All items covered by the warranty are to be replaced or repaired with new materials, including installation at the sole expense of the warranting manufacturer/surface supplier over the life of the Warranty.

3. Field Use: The materials shall be guaranteed for the designated uses as follows:
 - a. Football / Rugby / Soccer
 - b. Baseball / Softball (including metal cleats)
 - c. Field Hockey
 - d. Lacrosse
 - e. Marching Band
 - f. Graduations and Ceremonies
 - g. Physical Education exercises and activities
 - h. Pedestrian traffic and other similar uses
 - i. Plowing of snow
 - j. Pneumatic rubber-tired maintenance and service equipment, designed for use on athletic fields and golf courses.

- B. Warranty documents and terms of Warranty shall be in accordance with this Specification Section.

1. The use of the Manufacturers' standard or modified form of Warranty shall in no circumstance supersede the conditions set forth in this Specification Section, which shall be considered part of the Warranty.
2. This Warranty shall constitute a contract made in the state of Connecticut and shall be governed by the laws of that State.

1.5 BID SUBMITTALS

- A. Contractor shall submit a draft of the standard warranty of the proposed Synthetic Turf System, as required by this specification with the bid.

1.6 PRE-COMPLETION SUBMITTALS

- A. *Provide prior to Substantial Completion, the following documents:*
 1. *Manufacturer's Sample Warranty: shall be a minimum eight (8) year-sports fields non-prorated Synthetic Turf Warranty, as specified herein, for the specific type of synthetic grass that the Contractor intends to install on this Project.*
 2. *Manufacturer's Warranty Certificate, noting compliance with all the conditions of this Specification.*

1.7 CONTRACTOR'S LIABILITY

- A. General: Failure to service the requirements of the Warranty will be charged to the Contractor.
- B. Repair and Replacement: Any defects caused by delaminating, peeling, normal abrasion or raveling that is not in original conformance with the testing specifications shall be repaired or replaced at no cost to the Owner during this Warranty period.

- C. The Contractor will be responsible for all remedies, including replacement if required, required for failed testing, as specified herein, that fail the requirements of the Synthetic Grass System Warranty/Guarantee. All re-testing shall be paid for by the Contractor until such time as the system passes the requirements.
- D. Limited Liability: This warranty does not cover excessive wear of the surface caused by misuse. The Owner will be given instructions and care-taking procedures before final acceptance. The Owner is to follow the maintenance guidelines as specified by the surfacing manufacturer.

1.8 GENERAL FORM OF WARRANTY OF THE SYNTHETIC GRASS SYSTEM

- A. Warranty form: Sample form of warranty herein set forth is a suggested for use for the work under this section. Manufacturers' standard form of warranty may be used or modified provided conditions specified herein are incorporated.
- B. Contractor hereby warrants to the Owner, subject to the limitations and conditions set forth below, that its synthetic grass system consisting of the synthetic grass described as _____, the resilient shock pad (if required in project documents) described as _____, and the adhesives used in the installation, are free from defects in material and workmanship and shall, for a minimum period of eight (8) years from the date of acceptance by the Owner, remain serviceable for the activities as listed above.
- C. Contractor warrants to the Owner that its synthetic grass materials shall not fade, fail, shrink, wrinkle or reflect excessive wear. Contractor shall, at their sole expense and cost, replace such areas of the synthetic grass system not performing to these standards for the life of the warranty.
 - 1. The term "not fade" in the context of this warranty shall mean that the synthetic grass material remain a uniform shade of green or the other colors installed with no significant loss of color as defined by not greater than 20% loss or shade reduction.
 - 2. 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 grass surface shall not have been decreased by more than 6% per year according to ASTM D418, nor exceed 20% during the warranty period.
- D. In the event that the synthetic grass materials do not retain its fiber height or shock absorbency and is consequently no longer serviceable during the warranty period, the Contractor shall, at their sole expense, replace such portions of the system that are no longer serviceable.

1. The term “serviceable” in the context of this warranty shall mean that the synthetic grass material shall meet the following minimal requirements annually:

SYNTHETIC GRASS SURFACING SYSTEM (annually)		
EN 13036	Planarity/Surface Regularity	<10 mm
EN 1969 (Sports Fields)	Infill Depth Measurement (minimum 50 locations)	± 10% of specification (1/2” exposed fiber) (individual locations, not average field results)
ASTM F 1936	Impact Attenuation(g-max) (minimum 10 locations)	< 100 G’s (individual locations, not average field results)
EN 1177	Impact Attenuation, Head Injury Criteria (HIC) (minimum 10 locations)	<900 @ 1.4m (individual locations, not average field results)

2. Prior to any G-Max testing on the field, the testing machine shall be calibrated in the field with a test pad to verify accuracy of the testing unit. Calibration and testing shall be witnessed by the Owner or Owner’s representative. The Contractor is required to perform the necessary testing during a scheduled time at least one time per year during the Warranty period. The results of the testing shall be submitted to the Owner within 30 days of each test. Failure to submit the results shall serve as notice to perform such testing by Owner to determine the extent of the needs under this Warranty.
 3. Any material tested and found not in compliance with the contract may be rejected and Contractor shall rectify the issue to be acceptable. Any area/item not within conformance shall be retested at the Contractors expense after remedy is implemented until satisfactory results are achieved.
- E. Where applicable, the fabric shall adhere firmly and completely to the seaming tape and anchor tape over the entire warranty period.
- F. Contractor warrants to the Owner that the synthetic grass system shall drain vertically a minimum of 16 inches precipitation per hour for a maximum of 24 hours continuously, without visible surface ponding.
- G. Contractor shall replace with new materials, at their sole expense, any damage to the synthetic grass system, which extends more than one meter beyond the location of foreign combustibles, which may ignite, and fire-damage the synthetic grass system. These warranties and the Contractor’s obligations here-under are expressly conditioned upon;
1. The Owner making all minor repairs to the synthetic grass system upon the discovery of the need for such repairs.
 2. The Owner maintaining and properly caring for the synthetic grass system in accordance with the Contractor’s maintenance manual and instructions.

3. The Owner complying with the dynamic and static load specifications established by the Contractor.

- H. The warranty is not to cover any defect, failure, damage or undue wear in or to the synthetic grass system caused by or connected with abuse, neglect, deliberate acts, acts of God, casualty, static or dynamic loads exceeding Contractor's recommendations.

1.9 WARRANTY INSPECTIONS AND TESTING

- A. Scheduled Inspection and Testing: Contractor shall examine the synthetic grass surfacing system and conduct testing and maintenance on the synthetic grass surface as a part of a warranty maintenance plan, see paragraph 1.10 "Warranty" in Specification Section 32 18 13 – Synthetic Grass Surfacing and paragraph 1.11 "Warranty and Maintenance Obligations" in Specification Section 32 18 13 – Synthetic Grass Surfacing.

1. The Testing Results and Field Inspection Report shall be delivered to the Owner and Engineer within thirty (30) days of the testing.

- B. Other Inspections: Contractor shall examine the synthetic grass system in regards to any claim that the Owner makes to be present at any time, to analyze the results of all tests conducted by the Owner or Owner's Authorized Representative(s), and to conduct such tests of his own on the synthetic grass surface.

1. The Owner reserves the right to submit on the synthetic grass surface to the above tests at any time during the length of the Warranty. Consideration will be given to the age and intensity of use of the surface.

- C. Cost of Inspections: The Contractor shall pay for costs of scheduled inspections, testing, and analysis.

1.10 REMEDIAL WORK

- A. Notice: The Owner will notify the Contractor in writing of any issues that require remedial work on the field area.

1. The Contractor shall respond to the notification within forty-eight (48) hours of receipt and schedule any major defect or repair within seventy-two (72) hours or as weather permits.
2. In the event the Contractor does not respond to the Owner's written notice within ten (10) days of receipt of the notice or does not submit, schedule and execute corrective work within sixty (60) days, weather permitting, the Owner has the option of having the work performed at the expense of the Contractor.
3. The Contractor will be given seven (7) days' notice in the form of a certified letter notifying the Contractor of the end of the sixty (60) day period.

- B. Repairs: The Warranty requires that the Contractor shall be required to perform all required repairs in a permanent and suitable manner as deemed necessary to maintain a safe playing condition at all times.
 - 1. Any replacement or repair area shall match (as close as possible) the appearance and requirements of section 32 18 13 of the existing surface.
- C. Schedule of Repairs: The Warranty requires that in case of any major repair or replacement, the Contractor is to schedule such work as to not interfere with the Owner's primary use or schedule.

1.11 CLAIMS

- A. All claims by the Owner under this Warranty must be made in writing to the Contractor's address, within 30 days after the Owner learns of the defect, giving rise to the claim.

END OF SECTION 32 18 13.10

**SECTION 32 18 23.31 – POLYURETHANE RUNNING TRACK SURFACING
–STRUCTURAL SPRAY**

PART 1 GENERAL

1.1 SUMMARY

- A. The work under this section includes the installation of a cast in place, durable, permeable, resilient, all-weather track surface consisting of a polyurethane bound rubber base mat and structural spray top coat on top of a prepared asphalt base.
- B. Work of this specification consists of furnishing all the required labor, materials, equipment, parts and supplies necessary for this installation of the synthetic running track surface.
- C. The installer of all installed materials shall be authorized to do so by the manufacturer.
- D. The work hereunder shall be done and conform to:
 - 1. American Sports Builders Association (ASBA) Track Construction Manual and Track Construction Guidelines

1.2 REFERENCES

- A. Specification Section 32 12 16.01 – “Asphalt Paving-Running Track” for all existing and new pavement repair and preparation.
- B. Reference herein to any technical society, organization, group or regulation are made in accordance with the following abbreviations and, unless otherwise noted or specified, all work under this Section shall conform to the latest edition as applicable.
- C. National Asphalt Pavement Association (NAPA)
- D. USA Track & Field (USATF)
- E. National Federation of State High School Associations (NFHS)
- F. National Interscholastic Athletic Administrators Association (NIAAA)
- G. International Association of Athletics Federation (IAAF)
- H. American Sports Builders Association (ASBA)

1.3 JOB CONDITIONS

- A. Weather Limitations
 - 1. The urethane mixture shall not be placed whenever the surface is wet, frozen, or when the temperature is outside the limitations stated by the manufacturer’s recommendations for installation. Contractor shall be responsible for submitting the procedure at least one week in advance of any surfacing operations that may result in placement of the all-weather running track urethane surfacing outside of the temperature limitations.

- A. Only one each of the following bid submittals are required to the bidding entities at the time of bid:
 - 1. A letter on the Contractor / Sub-contractor's letterhead (whomever shall be supplying and installing the all-weather track surfacing system) shall be submitted, with the bid, confirming their intent to conform to all information presented during the bidding process for the All-Weather Track Surfacing System. Including, but not limited to, the bid Drawings, Specifications, Addendum, and RFI Clarifications.
 - 2. Non-compliance with the bid submittal requirements as specified herein will result in rejection of the bid.

1.5 SUBMITTALS

- A. Manufacturer's product data sheets including installation guidelines for components and system.
- B. Manufacturer's color options for review and selection by the Engineer/Owner.
- C. Three (3) representative samples of the system to be installed with appropriate labeling for identification and color as selected by Engineer/ Owner.
- D. Current material safety data sheets (MSDS) for the liquid components.
- E. Test reports that verify the manufacturer's specifications (data) for the product to be installed.
- F. Documentation that verifies that the synthetic surfacing material does not contain any toxic or hazardous substance, which exceeds limits set forth by the EPA.
- G. The synthetic surfacing material manufacturer shall submit a letter stating that the surfacing contractor is qualified to install its synthetic surface system.
- H. A certificate from the manufacturer of the binders and coatings stating that the materials have been produced specifically for the use in sports surfacing construction.
- I. A complete list of materials, including quantities, intended to be used in the construction of the running track system. All liquid quantities will be prior to dilution.
- J. Provide a letter stating that the surfacing contractor has reviewed the asphalt specification and accepts the specification as correct.
- K. *Provide a letter after checking the prepared asphalt surface in the field & accepting it for synthetic surface installation. Should areas be found that do not meet specifications, they shall be repaired or replaced by the asphalt contractor prior to the synthetic surfacing contractor issuing its letter of acceptance.*
- L. A test report that the ½" (13 mm) system has been tested to IAAF standards for force reduction and modified vertical deformation. Force reduction shall be 35-50%. Modified vertical deformation shall be 0.6-1.8 mm.
- M. Submit evidence that the synthetic surfacing contractor holds the necessary contractor's license to install synthetic surfacing.

- N. Submit evidence that the material manufacturer is ISO 9001 certified.
- O. Contractor shall provide written maintenance information on the installed product to be presented to the owner upon completion of the surface. This shall include repair methods and availability of repair materials including cost. Submit 3 copies of the approved Surfacing Care and Maintenance Guide.

1.6 COORDINATION

- A. Contractor shall coordinate with all other trades, especially Site Contractors to ensure approval of asphalt base prior to surfacing application. Any rework shall be done at no cost to the Owner.

1.7 RELATED WORK

- A. When surfacing on new bituminous pavement, the bituminous pavement must meet the specifications and standards set forth by the Architect. The contractor shall be responsible of performing an elevation survey of the bituminous pavement prior to application of the synthetic track surface. The contractor is to perform a flood test of the bituminous pavement top course prior to application of the synthetic track surface.
- B. The bituminous pavement and associated repairs shall be sufficiently cured and cleaned prior to Work of this section to be performed. The governing guidelines of track construction allow for a maximum longitudinal slope of on tenth of one percent (0.10%) in the running direction. The maximum lateral slope shall not exceed one (1) percent (1.00%)
- C. Grade conformance tests may be required to be performed by the Contractor on both the leveling course and the top course of the bituminous pavement at the Architect's discretion. The entire surface shall provide positive drainage to the inside edge of the track. The maximum allowable planarity deviation within a pass should be 1/4 inch in 10 feet when measured in any direction. Deficient areas in the leveling course should be corrected as approved by the Engineer. After any corrections, the surface shall not allow water to stand greater than 1/16 inch deep, one (1) hour after rain has ended.
- D. The Contractor shall be responsible to have adjacent grass edged and removed from all areas receiving the synthetic surface. It may be necessary to apply a liquid herbicide such as Roundup to any adjacent edges of track and event areas.

1.8 MATERIAL HANDLING AND STORAGE

- A. Materials should be delivered in manufacturer's container to maintain clean and dry conditions. See manufacturer's guidelines for temperature requirements for the locale of installation.
- B. Store material in accordance with manufacturer's specifications and MSDS.
- C. The contractor shall provide a secure, clean, dry location for storage of materials at temperature as above. Under no circumstances should materials be stored outside unless fully protected from moisture with 10 mil polyethylene barrier and tarpaulin. All materials stored outside shall be inspected by dealer for moisture contamination before application.
- D. Deliver products to the site in original, unopened containers with labels attached.

- E. All surfacing materials shall be non-flammable.

1.9 QUALITY ASSURANCE

- A. Provide a certificate of accuracy from a registered engineer, land surveyor or certified track builder by ASBA that the track measures 400 meters in all lanes from start to finish.
- B. The contractor shall record the batch number of each product used on the site and maintain it throughout the warranty period.
- C. The contractor shall provide the Architect, an estimate of the volume of each liquid product and the weight of the rubber granule to be used on site.
- D. The manufacturer's representative will be available to help resolve material issues.
- E. Provide, as a part of the Warranty, documents stating that the materials applied conform to the manufacturer's specifications and that the material will not separate from the asphalt or concrete base, blister, bubble, fade, crack or wear excessively during the life of the warranty.
- F. The materials will not foam, thus causing air bubbles and reduce the life expectancy of the surface.
- G. The synthetic surfacing contractor and owner will annually walk and inspect the synthetic surface during the life of the warranty. Issues will be documented in writing to the Owner. The Owner will review items with the Engineer. Warranty issues will be repaired and for non-warranty items a method for correction will be presented.
- H. Track system shall subject to successfully tested independently an accredited IAAF testing house to the requirements of the IAAF Performance Specifications for Synthetic Surface Athletics Tracks (Outdoor) dated January 1990.
- I. The synthetic surfacing contractor shall maintain a clean and orderly job site. All excess materials shall be removed from the construction area and properly disposed of. Scrap shall be removed in the same manner.

1.10 GUARANTEE

- A. The Contractor shall be required to guarantee all labor, materials, workmanship and services for the Synthetic Surface and Track Markings.
- B. This guarantee shall remain in force for a period of not less than FIVE (5) YEARS from the date of written acceptance of the work.
- C. Any defects caused by delaminating, peeling, normal abrasion or raveling that is not in original conformance with the testing specifications shall be repaired or replaced at no cost to the Owner during this guarantee period.
- D. This Contractor shall be required to submit the following documents in regard to the guarantee:
 - 1. Letter from the manufacturer(s) of all materials attesting to the guarantee length and limits. This must be signed by an officer of the organization.
 - 2. Maintenance Instruction Guide for the Contract Surfaces, signed by an officer of the surface company and notarized.

3. Letter of Guarantee from the Installation Contractor for the above time period, signed by an officer of the Company and notarized.
4. These documents shall be submitted to the Owner prior to final payment. The installer and the materials manufacturer shall supply a warranty covering labor and materials respectively. The warranty period shall be for five (5) years.

1.11 INSTALLER QUALIFICATIONS

- A. Installers shall be regularly engaged in the construction and surfacing of running tracks.
- B. Installer shall be an authorized applicator of the specified system.
 1. Installers of this product are to provide a list of at least 5 installations that are a minimum of 5 years old that contain the same products, and use the same method of installation. Include:
 - a. Project Name
 - b. Address
 - c. Owners Representatives Name
 - d. Owners Representatives Email
 - e. Owners Representatives Phone
 2. Completed projects are to have been installed under the same company name and ownership that is presently bidding.
- C. Installer shall be a builder member of the ASBA.
- D. The installer's installing foreman must have at least 8 years experience installing the specified type of synthetic track surface system.

1.12 MANUFACTURER QUALIFICATION

- A. System manufacturer shall certify that the materials provided are manufactured specifically for construction and surfacing of running tracks.
- B. System manufacturer shall be continuously engaged in the business of track surfacing materials for at least 10 years.
- C. System manufacturer of this product are to provide a list of at least 5 installations that are minimum of 5 years old that contain the same products, and use the same method of installation.

1. Include:
 - a. Project Name
 - b. Address
 - c. Owners Representatives Name
 - d. Owners Representatives Email
 - e. Owners Representatives Phone
 2. Completed projects are to have been installed under the same company name and ownership that is presently bidding.
- D. System manufacturer shall have a designated representative available for site inspection.

PART 2 PRODUCTS

2.1 GENERAL

- A. The synthetic surfacing shall be a 13 mm thick, permeable, structural spray system, with a paved in place rubber granule and polyurethane binder base layer. Two coats of a mixture of colored polyurethane and EPDM rubber granules are structurally sprayed onto the base to form a textured finish.
 1. BSS 100 track system as supplied by Beynon Sports (A Tarkett Sports Company)
 2. Action-Track 200 track system as supplied by Copeland Coating Company
 3. BS track system as supplied by Spurtan (An APT Company)
- B. The synthetic track surface system shall have a smooth finish and may be applied for outdoor use.
- C. The structural spray applied polyurethane and rubber blended coating shall be resilient and allow moisture to pass through the surface. It shall have a textured finish for outdoor applications.
- D. The product shall meet the following minimum physical properties:
 1. **Top Color: Red (Final color to be approved by Architects based on manufacture's standard palette)**

E. Performance Standards

	<u>Test Results</u>	<u>DIN Standard</u>
Thickness (DIN):		min. 13 mm
Force Reduction (IAAF):		35-50%
Modified Vertical Deformation (IAAF):		0.6 mm – 2.5 mm
Permeability:		min 0.01 cm/s
Friction (wet) (IAAF):		> 0.5
Friction (dry) (DIN):		<1.1
Tensile Strength (IAAF):		≥ 0.4 MPa
Elongation (IAAF):		>40%
Spike Resistance (DIN)		Class 1

- F. Product substitution: If other than the product specified, the contractor shall submit at least 7 days prior to the bid date a complete type written list of proposed substitutions with sufficient data, drawings, samples and literature to demonstrate that the proposed substitution is of equal quality and utility to that originally specified. Information must include a QUV test of at least 1,000 hours and IAAF test information for the system to be installed
- G. Any materials used must be an emulsion/water based product. Any products which require solvents such as MEK, Butyl Cellusolve or Acetone for clean up or mixing are not acceptable.
- H. Materials must have a VOC less than 150g/lit. for binder products. Top coats shall have a VOC of less than 100g/lit. measured by EPA method 24.
- I. Materials may not have a flash point of less than 200°F.
- J. All Materials shall have documented independent test results by an accredited IAAF testing house to the requirements of the IAAF Performance Specifications for Synthetic Surface Athletics Tracks (Outdoor) dated January 1990.

2.2 MATERIALS

A. Rubber – Polyurethane Track Basemat (SBR)

1. The polyurethane track base mat rubber shall be specifically graded rubber granules with a controlled gradation between 1.0mm to 3.00mm.
 - a. Dust and rubber particulate smaller than a No. 200 sieve size shall not exceed 1 percent of the total rubber.
 - b. The rubber shall be black SBR

B. Rubber – Structural Spray Top Coat (EPDM)

1. EPDM colored virgin rubber granules that are processed and graded to 0.5 – 1.5 mm in size unless otherwise specified. The rubber shall contain a minimum of 20% EPDM and be approved by the resin manufacturer. The specific density shall be 1.60 +/- 0.08 and Shore A hardness of 60. Color coat shall be **RED** in color

C. Primer

1. The synthetic track surface primer shall be polyurethane based and compatible with asphalt and synthetic track surfacing materials.
2. When installing over a concrete pavement special developed concrete primer, manufactured by the same manufacturer of the other materials, shall be applied.

D. Binder

1. The synthetic track surface binding agent shall be a single component; MDI based moisture cure polyurethane binder. The binder shall not have a free TDI monomer level above 0.2% and must be solvent free.
 - a. The polyurethane binder shall be 100 percent solids.
 - b. The polyurethane binder shall be compatible with SBR and EPDM rubber granules.
2. All polyurethane binder shall be manufactured by the installation company and to be delivered in new unopened containers, clearly labeled by the manufacturer.

E. Structural Spray Coating

1. The spray coating shall be a MDI-based single-component, moisture cured, 100% solids, and pigmented polyurethane, specifically formulated for compatibility with EPDM granules.
 - a. The coating shall be RED.
 - b. Pigment intergraded in the field shall not be allowed.

PART 3 EXECUTION

3.1 GENERAL

- A. The bituminous pavement should be sufficiently cured and cleaned in order for work to progress
- B. The entire surface shall be swept, power blown, or high pressure washed to remove all dirt, oil, grease, or any other foreign matter. The surface shall be free from any loose material.
- C. All work shall be performed by manufacturer's technicians and comply with the manufacturer's guidelines for the complete placement and installation of the base layer, the sealing and surface layers.
- D. During surface installation and striping all sprinkler systems shall be shut off, or controlled so that no water falls on the track or event surfaces.
- E. All materials shall be installed in strict compliance with the manufacturer's specifications and instructions.
- F. The Contractor shall be responsible to have the entire track area, and other pertinent areas such as football field, concessions, etc., closed and secured of all activities 24 hours per day through the curing and completion of the synthetic track surface.

3.2 WEATHER LIMITATIONS

- A. Ambient and surface temperatures must be 50°F and rising.
- B. Installation should not be conducted during rainfall or when rainfall is imminent.
- C. Do not apply when surface temperature is in excess of 140°F.
- D. Apply the synthetic surfacing material only during favorable weather conditions. Work is to proceed only when adequate curing can be guaranteed by the manufacturer and installer.

3.3 SURFACE PREPARATION

- A. *Asphalt shall be cleaned of all oils, spills & staining. Repairs to existing asphalt as asphalt shall be allowed to cure for a minimum of 21 days prior to the application of any surfacing materials. Surfacing installer shall provide written acceptance of surface, and confirmation of warranty for any application prior to 21 days.*
- B. All concrete work is to cure for a minimum of 45 days. *Surfacing installer shall provide written acceptance of surface, and confirmation of warranty for any application over concrete prior to 45 days.* No curing agents are to be used. Any concrete flat work such as run ups etc. will be checked as in 3.3D.
- C. The surface must be thoroughly cleaned of all loose dirt and debris. Any oil spills (hydraulic, diesel, motor oil, etc.) must be completely removed, either by chipping out or removing and replacing with new, keyed in asphalt.
- D. The asphalt substrate track surface shall not vary from planned cross slope by more than + .2%, with a maximum lateral slope outside to inside of 1% for NCAA or IAAF facilities (1% to 2% for NFHS), and a maximum slope of 0.1% in any running direction. The finished asphalt shall not vary under a 10' straight edge more than 1/8".
- E. Prior to the application of resilient surface materials, the entire asphalt base surface shall be checked for planarity, surface tolerance, and flooded and checked for depressions or irregularities in the asphalt. Any puddle area covering a nickel shall or vary +/- ¼ inch when measured with a 10-foot straightedge in any direction shall be marked and repaired with Patch Binder, according to manufacturer's specifications and approved by the Engineer. After patching, the asphalt surface shall not vary allow water to stand greater than 1/16 inch, one (1) hour after a flood test has been pre-formed. Slopes shall meet the guidelines of the ASBA and NFHS.
- F. It shall be the responsibility of the general contractor to flood the surface.
 - 1. If, after 40 minutes of drying time, there are birdbaths evident, it shall be the responsibility of the landscape architect, in conjunction with the surfacing contractor, to determine the method of correction. No cold tar patching, skin patching or sand mix patching will be acceptable.
 - 2. Any oil spills (hydraulic, diesel, motor oil, etc.) must be completely removed and replaced with either polyurethane or new, keyed in asphalt. The minimum curing time for the asphalt base repair is 21 days. It shall be the responsibility of the surfacing contractor to determine if the asphalt substrate has cured sufficiently prior to the application of the polyurethane surfacing system.

3. It shall be the responsibility of the general contractor to determine if the asphalt substrate meets all design specifications, i.e. cross slopes, planarity and specific project criteria. After all the above conditions are met, the synthetic surfacing contractor must, in writing, accept the planarity of the asphalt receiving base, before work can commence.
- G. All-Weather running track surfacing installer representative shall be present for all testing on the asphalt base. Installer shall submit, in writing, acceptance of the asphalt base.

3.4 RESILIENT SURFACE INSTALLATION

A. Primer

1. The entire area to be surfaced shall receive an application of polyurethane primer applied uniformly at a rate between 0.20-0.30 lb. per sq. yd. A minimum cure time of 30 minutes is required before application of the base mat materials.
2. Only the area to be covered within the working day should be primed to ensure a good bond to the base. Concrete base may require additional coating based on absorption rate of applied primer.

B. Polyurethane Track Basemat

1. The mixing ratio of rubber to binder shall not be less than 100 parts rubber to 20 part binder as determined by the weight of the products. The materials shall be prepared in a mechanical mixer until a homogenous mix is obtained.
2. The mixed materials making up the synthetic track surface shall be applied by a mechanically operated finishing machine, which shall have an electrically heated screed, to an approximate depth of 11 - 12 mm using approximately 17.33 lbs/sy of mixed material.
3. The cured edge of each joint shall be primed with the synthetic track surface binding agent prior to the laying of the adjacent base mat. All joint work shall be troweled flush with the adjacent mat.
4. Trowel work: All seams shall be troweled smooth within the pot life of the material. All edges shall be straight and rounded by turning the trowel. All cold dry seams shall be cut straight at an inward angle and primed prior to commencing with subsequent work.

C. Structural Spray Top Coat (two applications)

1. The polyurethane track base mat shall be cleaned and prepared prior to the installation of the structural spray top coat in accordance with the manufacturer's specifications and instructions.
2. According to the manufacturer's specifications, the specified quantity of colored EPDM granules shall be mixed thoroughly with the specified quantity of the one component polyurethane of the structural spray material.
3. Structural Spray Coat (two applications) – is spray applied with air and volume-controlled spray equipment. Care is to be taken so as to provide an even surface without streaking.

4. A second coat of material over the first is applied in the opposite direction. The total rate of each coat of spray shall range from 3.5 to 4.0 lbs. per square yard.

3.5 MARKING AND MEASUREMENTS

- A. Wait 48 hours after surface completion before applying line marking.
- B. Experienced personal specializing in all-weather running track striping shall accomplish all striping.
- C. See Track Markings Section

3.6 PROTECTION

- A. During construction the installer is responsible for limiting access of non-construction personnel to the site.
- B. The installation contractor shall coordinate any irrigation of fields with the owner.
- C. The installer shall protect curbs, fences and all other structures from overspray.

3.7 QUALITY ASSURANCE

- A. Track system shall subject to successfully tested independently an accredited IAAF testing house to the requirements of the IAAF Performance Specifications for Synthetic Surface Athletics Tracks (Outdoor) dated January 1990

3.8 CLEAN UP

- A. Remove all containers, surplus and debris and dispose of in accordance with local, state and Federal regulation.
- B. Remove all spills and overruns.
- C. Leave site in a clean and orderly condition on a daily basis.
- D. Upon completion of all work, remove all containers, surplus materials, and installation debris. Leave area of work in clean orderly condition.

END OF SECTION

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**SECTION 32 18 23.33 – POLYURETHANE RUNNING TRACK SURFACING
–EMBEDDED SANDWICH SYSTEM (BASE BID)**

PART 1 GENERAL

1.1 SUMMARY

- A. Work of this specification includes the installation and application of an IAAF approved, impermeable polyurethane synthetic track system consisting of SBR Rubber and single-component polyurethane binder and a poured-in-place, two-component U.V. stabilized elastomeric polyurethane wearing layer with an embedded textured finish.
- B. Work of this specification consists of furnishing all the required labor, materials, equipment, parts, and supplies necessary for this installation of the synthetic running track surface.
- C. The work hereunder shall be done and conform to:
 - 1. American Sports Builders Association Track Construction Manual and Track Construction Guidelines.
 - 2. Codes and standards follow the current guidelines set forth by the National Federation of State High School Associations (NFHS), Connecticut Interscholastic Athletic Conference (CIAC), the National Collegiate Athletic Association (NCAA), and the International Association of Athletics Federations (IAAF).

1.2 REFERENCES

- A. Reference herein to any technical society, organization, group or regulation are made in accordance with the following abbreviations and, unless otherwise noted or specified, all work under this Section shall conform to the latest edition as applicable.
- B. National Asphalt Pavement Association (NAPA).
- C. USA Track & Field (USATF).
- D. Connecticut Interscholastic Athletic Conference (CIAC).
- E. National Federation of State High School Associations (NFHS).
- F. National Collegiate Athletic Association (NCAA).
- G. National Interscholastic Athletic Administrators Association (NIAAA).
- H. International Association of Athletics Federation (IAAF).

1.3 JOB CONDITIONS

- A. Weather Limitations
 - 1. The texturizing mixture shall not be placed whenever the surface is wet, frozen or when the temperature is outside the limitations stated by the manufacturer's recommendations for installation. Contractor shall be responsible for submitting the procedure at least one week in advance of any surfacing operations that may result in placement of the all-weather running track texturizing surfacing outside of the temperature limitations.

1.4 BID-SUBMITTALS

- A. Only one each of the following bid submittals are required to the bidding entities at the time of bid:
 - 1. A letter on the Contractor / Sub-contractor's letterhead (whomever shall be supplying and installing the all-weather track surfacing system) shall be submitted, with the bid, confirming their intent to conform to all information presented during the bidding process for the All-Weather Track Surfacing System. Including, but not limited to, the bid Drawings, Specifications, Addendum, and RFI Clarifications.
 - 2. Non-compliance with the bid submittal requirements as specified herein will result in rejection of the bid.

1.5 SUBMITTALS

- A. Manufacturer's product data sheets including installation guidelines for components and system.
- B. Manufacturer's color options for review and selection by the Engineer/Owner.
- C. Three (3) representative samples of the system to be installed with appropriate labeling for identification and color as selected by Engineer/ Owner.
- D. Current material safety data sheets (MSDS) for the liquid components.
- E. Test reports that verify the manufacturer's specifications (data) for the product to be installed.
- F. Documentation that verifies that the synthetic surfacing material does not contain any toxic or hazardous substance, which exceeds limits set forth by the EPA.
- G. The synthetic surfacing material manufacturer shall submit a letter stating that the surfacing contractor is qualified to install its synthetic surface system.
- H. A certificate from the manufacturer of the binders and coatings stating that the materials have been produced specifically for the use in sports surfacing construction.
- I. A complete list of materials intended to be used in the construction of the running track system. All liquid quantities will be prior to dilution.
- J. Provide a letter stating that the surfacing contractor has reviewed the asphalt specification and accepts the specification as correct.
- K. Provide a letter after checking the asphalt accepting it for synthetic surface installation. Should areas be found that do not meet specifications, they shall be repaired or replaced by the asphalt contractor prior to the synthetic surfacing contractor issuing its letter of acceptance.
- L. Submit evidence that the synthetic surfacing contractor holds the necessary contractor's license to install synthetic surfacing.
- M. Submit evidence that the material manufacturer is ISO 9001 certified.
- N. Contractor to shall provide written maintenance information on the installed product to be presented to the owner upon completion of the surface. This shall include repair methods and

availability of repair materials including cost. Submit 3 copies of the approved Surfacing Care and Maintenance Guide.

1.6 COORDINATION

- A. Contractor shall coordinate with all other trades, especially Site Contractors to ensure approval of asphalt base prior to surfacing application. Any rework shall be done at no cost to the Owner.

1.7 RELATED WORK

- A. When surfacing on new bituminous pavement, the bituminous pavement must meet the specifications and standards set forth by the Engineer. The contractor shall be responsible of performing an elevation survey of the bituminous pavement prior to application of the synthetic track surface. The contractor is to perform a flood test of the bituminous pavement top course prior to application of the synthetic track surface.
- B. The bituminous pavement shall be sufficiently cured and cleaned prior to Work of this section to be performed. The governing guidelines of track construction allow for a maximum longitudinal slope of on tenth of one percent (0.10%) in the running direction. The maximum lateral slope shall not exceed one (1) percent (1.00%)
- C. Grade conformance tests may be required to be performed by the Contractor on both the leveling course and the top course of the bituminous pavement at the Engineer's discretion. The entire surface shall provide positive drainage to the inside edge of the track. The maximum allowable planarity deviation within a pass should be 1/4 inch in 10 feet when measured in any direction. Deficient areas in the leveling course should be corrected as approved by the Engineer. After any corrections, the surface shall not allow water to stand greater than 1/16 inch deep, one (1) hour after rain has ended.
- D. The Contractor shall be responsible to have adjacent grass edged and removed from all areas receiving the synthetic surface. It may be necessary to apply a liquid herbicide such as Roundup to any adjacent edges of track and event areas.

1.8 MATERIAL HANDLING AND STORAGE

- A. Materials should be delivered in manufacturer's container to maintain clean and dry conditions. See manufacturer's guidelines for temperature requirements for the locale of installation.
- B. Store material in accordance with manufacturer's specifications and MSDS.
- C. The contractor shall provide a secure, clean, dry location for storage of materials at temperature as above. Under no circumstances should materials be stored outside unless fully protected from moisture with 10 mil polyethylene barrier and tarpaulin. All materials stored outside shall be inspected by dealer for moisture contamination before application.
- D. Deliver products to the site in original, unopened containers with labels attached.
- E. All surfacing materials shall be non-flammable.

1.9 QUALITY ASSURANCE

- A. Provide a certificate of accuracy from a registered engineer, land surveyor or certified track builder by ASBA that the track measures 400 meters in all lanes from start to finish.

- B. The contractor shall record the batch number of each product used on the site and maintain it throughout the warranty period.
- C. The contractor shall provide the Engineer, an estimate of the volume of each liquid product and the weight of the rubber granule to be used on site.
- D. The manufacturer's representative will be available to help resolve material issues.
- E. Provide, as a part of the Warranty, documents stating that the materials applied conform to the manufacturer's specifications and that the material will not separate from the asphalt or concrete base, blister, bubble, fade, crack or wear excessively during the life of the warranty.
- F. The materials will not foam, thus causing air bubbles and reduce the life expectancy of the surface.
- G. The synthetic surfacing contractor and owner will annually walk and inspect the synthetic surface during the life of the warranty. Issues will be documented in writing to the Owner. The Owner will review items with the Engineer. Warranty issues will be repaired and for non-warranty items a method for correction will be presented.
- H. Track system shall subject to successfully tested independently an accredited IAAF testing house to the requirements of the IAAF Performance Specifications for Synthetic Surface Athletics Tracks (Outdoor) dated January 1990.
- I. The synthetic surfacing contractor shall maintain a clean and orderly job site. All excess materials shall be removed from the construction area and properly disposed of. Scrap shall be removed in the same manner.

1.10 GUARANTEE

- A. The Contractor shall be required to guarantee all labor, materials, workmanship and services for the Synthetic Surface and Track Markings.
- B. This guarantee shall remain in force for a period of not less than FIVE (5) YEARS from the date of Substantial Completion of the work.
- C. Any defects caused by delaminating, peeling, normal abrasion or raveling that is not in original conformance with the testing specifications shall be repaired or replaced at no cost to the Owner during this guarantee period.

- D. This Contractor shall be required to submit the following documents regarding the guarantee:
1. Letter from the manufacturer(s) of all materials attesting to the guarantee length and limits. This must be signed by an officer of the organization.
 2. Maintenance Instruction Guide for the Contract Surfaces, signed by an officer of the surface company and notarized.
 3. Letter of Guarantee from the Installation Contractor for the above time period, signed by an officer of the Company and notarized.
 4. These documents shall be submitted to the Owner prior to final payment.

1.11 INSTALLER QUALIFICATIONS

- A. Installers shall be regularly engaged in the construction and surfacing of running tracks.
- B. Installer shall be an authorized applicator of the specified system.
1. Installers of this product are to provide a list of at least ten (10) installations that are a maximum of five (5) years old that contain the same products and use the same method of installation. Include:
 - a. Project Name
 - b. Address
 - c. Owners Representatives Name
 - d. Owners Representatives Email
 - e. Owners Representatives Phone
 2. Completed projects are to have been installed under the same company name and ownership that is presently bidding.
- C. The installer's installing foreman must have at least 8 years' experience installing the specified type of synthetic track surface system.

1.12 MANUFACTURER QUALIFICATION

- A. System manufacturer shall certify that the materials provided are manufactured specifically for construction and surfacing of running tracks.
- B. System manufacturer shall be operational within the US that has been continuously engaged in the business of track surfacing materials for at least ten (10) years.
- C. System manufacturer of this product are to provide a list of at least twenty (20) installations that are maximum of five (5) years old that contain the same products and use the same method of installation.

1. Include:
 - a. Project Name
 - b. Address
 - c. Owners Representatives Name
 - d. Owners Representatives Email
 - e. Owners Representatives Phone
 2. Completed projects are to have been installed under the same company name and ownership that is presently bidding.
- D. System manufacturer shall have a designated representative available for site inspection.

PART 2 PRODUCTS

2.1 GENERAL

- A. The synthetic surfacing shall be a 13 mm thick, impermeable, sandwich system, with a paved in place rubber granule and polyurethane binder base layer sealed to render it impermeable. The surface finish is embedded granular EPDM.
- B. Materials must have a VOC less than 150g/lit. for binder products. Topcoats shall have a VOC of less than 100g/lit. measured by EPA method 24.
- C. Materials may not have a flash point of less than 200°F.
- D. All Materials shall have documented independent test results by an accredited IAAF testing house to the requirements of the IAAF Performance Specifications for Synthetic Surface Athletics Tracks (Outdoor) dated January 1990.

2.2 PROPERTIES

- A. The product shall meet the following minimum physical properties:

1. Top Color:
 - a. **Base Bid: Gray with Orange Transition Zones**
 - b. **Alternate #11: Red**
2. Final color to be approved by Architect

B. Performance Standards	<u>Test Results</u>	<u>DIN Standard</u>
Thickness (DIN):	min. 13 mm	
Force Reduction (IAAF):	35-50%	
Modified Vertical Deformation (IAAF):	0.6 mm – 2.5 mm	
Friction (wet) (IAAF):	> 0.5	
Friction (dry) (DIN):	<1.1	

Tensile Strength (IAAF):	≥ 0.5 MPa
Elongation (IAAF):	>40%
Spike Resistance (DIN)	Class 1

2.3 MATERIALS

A. Rubber – Polyurethane Track Basemat (SBR)

1. The polyurethane track base mat rubber shall be specifically graded rubber granules with a controlled gradation between 1.0mm to 3.00mm.
 - a. Dust and rubber particulate smaller than a No. 200 sieve size shall not exceed 1 percent of the total rubber.
 - b. The rubber shall be black SBR

B. Rubber – Structural Spray Top Coat (EPDM)

1. EPDM colored virgin rubber granules that are processed and graded to 0.5 – 1.5 mm in size unless otherwise specified. The rubber shall contain a minimum of 20% EPDM and be approved by the resin manufacturer. The specific density shall be 1.60 +/- 0.08 and Shore A hardness of 60.

C. Primer

1. The entire area to be surfaced shall receive an application of polyurethane primer applied uniformly at a rate between 0.20-0.30 lb. per sq. yd. A minimum cure time of 30 minutes is required before application of the base mat materials.
2. Only the area to be covered within the working day should be primed to ensure a good bond to the base. Concrete base may require additional coating based on absorption rate of applied primer.

D. Binder

1. The synthetic track surface binding agent shall be a single component; MDI based moisture cure polyurethane binder. The binder shall not have a free TDI monomer level above 0.2% and must be solvent free.
 - a. The polyurethane binder shall be 100 percent solids.
 - b. The polyurethane binder shall be compatible with SBR and EPDM rubber granules.
2. All polyurethane binder shall be manufactured by the installation company and to be delivered in new unopened containers, clearly labeled by the manufacturer.

E. Polyurethane Track Basemat

1. The mixing ratio of rubber to binder shall not be less than 100 parts rubber to 20 part binder as determined by the weight of the products. The materials shall be prepared in a mechanical mixer until a homogenous mix is obtained.

2. The mixed materials making up the synthetic track surface shall be applied by a mechanically operated finishing machine, which shall have an electrically heated screed, to an approximate depth of 11 - 12 mm using approximately 17.33 lbs/sy of mixed material.
 3. The cured edge of each joint shall be primed with the synthetic track surface binding agent prior to the laying of the adjacent base mat. All joint work shall be troweled flush with the adjacent mat.
 4. Trowel work: All seams shall be troweled smooth within the pot life of the material. All edges shall be straight and rounded by turning the trowel. All cold dry seams shall be cut straight at an inward angle and primed prior to commencing with subsequent work.
- F. Seal Coat: This seal coat shall be a two-component polyurethane pore sealer use with paved rubber granule mats. The granular SBR and binder layer shall be sealed with the seal coat. The application of EPDM dust is not allowed.
- G. Aliphatic Spray Coat
1. Shall be a two-component varnish with high quality UV resistance.
- H. Line Paint: Shall comply with Specification Section 32 1823.35 Markings
- I. The installer will furnish the Owner/Engineer with a proof of delivery that the correct volume of product has been provided. The installer will also verify that the same manufacturer has supplied all binders and coatings.

PART 3 EXECUTION

3.1 GENERAL

- A. The bituminous pavement should be sufficiently cured and cleaned in order for work to progress
- B. The entire surface shall be swept, power blown, or high pressure washed to remove all dirt, oil, grease, or any other foreign matter. The surface shall be free from any loose material.
- C. All work shall be performed by manufacturer's technicians and comply with the manufacturer's guidelines for the complete placement and installation of the base layer, the sealing and surface layers.
- D. During surface installation and striping all sprinkler systems shall be shut off, or controlled so that no water falls on the track or event surfaces.
- E. All materials shall be installed in strict compliance with the manufacturer's specifications and instructions.
- F. The Contractor shall be responsible to have the entire track area, and other pertinent areas such as football field, concessions, etc., closed and secured of all activities 24 hours per day through the curing and completion of the synthetic track surface.

3.2 WEATHER LIMITATIONS

- A. Apply Synthetic Track Surfacing in dry weather when pavement and atmospheric temperatures are fifty (50) degrees Fahrenheit, or above, and are anticipated to remain above fifty (50) degrees Fahrenheit for twenty-four (24) hours after completing application.

- B. Installation should not be conducted during rainfall or when rainfall is imminent. Rain cannot be falling. If there is a threat of rain, work shall cease until dry conditions can be re-established on the track pavement. Work is to proceed only when adequate curing can be guaranteed by the manufacturer.
- C. The maximum temperature cannot exceed 105 degrees at any point during a 24 - hour period.
- D. Do not apply when surface temperature is more than 140°F.
- E. Apply the synthetic surfacing material only during favorable weather conditions. Work is to proceed only when adequate curing can be guaranteed by the manufacturer and installer.

3.3 SURFACE PREPARATION

- A. New asphalt shall be allowed to cure for a minimum of 28 days prior to the application of any surfacing materials.
- B. All concrete work is to cure for a minimum of 45 days. No curing agents are to be used. Any concrete flat work such as run ups etc. will be checked as in 3.3D.
- C. The surface must be thoroughly cleaned of all loose dirt and debris. Any oil spills (hydraulic, diesel, motor oil, etc.) must be completely removed, either by chipping out or removing and replacing with new, keyed in asphalt.
- D. The asphalt substrate track surface shall not vary from planned cross slope by more than + .2%, with a maximum lateral slope outside to inside of 1% for NCAA or IAAF facilities (1% to 2% for NFHS), and a maximum slope of 0.1% in any running direction. The finished asphalt shall not vary under a 10' straight edge more than 1/8".
- E. It should be the responsibility of the contractor to flood the surface.
 - 1. If, after 20 minutes of drying time, there are birdbaths evident, it shall be the responsibility of the Contractor, in conjunction with the surfacing contractor, to determine the method of correction and submit to the Engineer. No cold tar patching, skin patching or sand mix patching will be acceptable.
 - 2. Any oil spills (hydraulic, diesel, motor oil, etc.) must be completely removed and replaced with either polyurethane or new, keyed in asphalt. The minimum curing time for the asphalt base repair is 28 days. It shall be the responsibility of the surfacing contractor to determine if the asphalt substrate has cured sufficiently prior to the application of the polyurethane surfacing system.
 - 3. It shall be the responsibility of the general contractor to determine if the asphalt substrate meets all design specifications, i.e. cross slopes, planarity and specific project criteria. After all the above conditions are met, the synthetic surfacing contractor must, in writing, accept the planarity of the asphalt receiving base, before work can commence.

3.4 RESILIENT SURFACE INSTALLATION

- A. Primer
 - 1. The entire area to be surfaced shall receive an application of polyurethane primer applied uniformly at a rate between 0.20-0.30 lb. per sq. yd. A minimum cure time of 30 minutes is required before application of the base mat materials.

2. Only the area to be covered within the working day should be primed to ensure a good bond to the base. Concrete base may require additional coating based on absorption rate of applied primer.

B. Polyurethane Track Basemat

1. The mixing ratio of rubber to binder shall not be less than 100-part rubber to 20-part binder as determined by the weight of the products. The materials shall be prepared in a mechanical mixer until a homogenous mix is obtained.
2. The mixed materials making up the synthetic track surface shall be applied by a mechanically operated finishing machine, which shall have an electrically heated screed, to an approximate depth of 11 - 12 mm using approximately 17.33 lbs/sy of mixed material.
3. The cured edge of each joint shall be primed with the synthetic track surface binding agent prior to the laying of the adjacent base mat. All joint work shall be troweled flush with the adjacent mat.
4. Trowel work: All seams shall be troweled smooth within the pot life of the material. All edges shall be straight and rounded by turning the trowel. All cold dry seams shall be cut straight at an inward angle and primed prior to commencing with subsequent work.

C. Seal Coat

1. The two components are mixed at the prescribed ratio homogeneously with a suitable mixing device. The coating is squeegee applied to the base mat, making it impermeable. The sealed surface must be checked for pin holes prior to further application. The seal coat consumption is approximately 2.00-3.00 lbs/sy of seal coating.

D. Top Layer

1. One application of double mixed polyurethane coating at approximately 3.87 lbs/sy is applied on top of the base layer with a notched squeegee. After the material has self-leveled and is still liquid, colored 1.0-3.5 mm EPDM rubber granules are broadcast into the surface to excess. After curing (hardening) the excess colored EPDM granules are removed. Then approximately 4.98 lbs/sy of EPDM will remain in the colored polyurethane. The resilient embedded textured finish shall be a dense matrix of exposed EPDM granules to a depth of 5 mm.

3.5 MARKING AND MEASUREMENTS

- A. Wait 48 hours after surface completion before applying line marking.
- B. Experienced personnel specializing in all-weather running track striping shall accomplish all striping.
- C. See Section 32 1823.35 - Running Track Surfacing - Markings.

3.6 PROTECTION

- A. During construction the installer is responsible for limiting access of non-construction personnel to the site.
- B. The installation contractor shall coordinate any irrigation of fields with the owner.

- C. The installer shall protect curbs, fences and other structures from overspray.

3.7 QUALITY ASSURANCE

- A. Track system shall subject to successfully tested independently an accredited IAAF testing house to the requirements of the IAAF Performance Specifications for Synthetic Surface Athletics Tracks (Outdoor) dated January 1990

3.8 CLEAN UP

- A. Remove all containers, surplus and debris and dispose of in accordance with local, state and Federal regulation.
- B. Remove all spills and overruns.
- C. Leave site in a clean and orderly condition on a daily basis.
- D. Upon completion of all work, remove all containers, surplus materials, and installation debris. Leave area of work in clean orderly condition.

END OF SECTION

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SECTION 32 18 23.35 RUNNING TRACK SURFACING - MARKINGS

PART 1 GENERAL

1.1 SUMMARY

- A. The Contractor, Subcontractors, and/or suppliers providing goods and services referenced in or related to this Section shall also be bound by the Related Documents identified in Division 01 Section "Summary."

1.2 SUMMARY

- A. Work of this specification consists of furnishing all the required labor, materials, equipment, parts and supplies necessary for this installation of the synthetic running track striping, and markings.
- B. The work hereunder shall be done and conform to:
 - 1. American Sports Builders Association Track Construction Manual and Track Construction Guidelines
 - 2. Connecticut Interscholastic Athletic Conference (CIAC) and the National Federation of State High School Associations (NFHS) for track and field event layout.

1.3 REFERENCES

- A. Reference herein to any technical society, organization, group or regulation are made in accordance with the following abbreviations and, unless otherwise noted or specified, all work under this Section shall conform to the latest edition as applicable.
- B. National Asphalt Pavement Association (NAPA)
- C. USA Track & Field (USATF)
- D. National Federation of State High School Associations (NFHS)
- E. National Interscholastic Athletic Administrators Association (NIAAA)
- F. International Association of Athletics Federation (IAAF)
- G. American Sports Builders Association (ASBA)

1.4 JOB CONDITIONS

- A. Weather Limitations
 - 1. The striping mixture shall not be placed whenever the surface is wet, frozen or when the temperature is outside the limitations stated by the manufacturer's recommendations for installation. Contractor shall be responsible for submitting the procedure at least one week in advance of any surfacing operations that may result in placement of the all-weather running track striping material outside of the temperature limitations.

1.5 SUBMITTALS

- A. Manufacturer's specifications for components and system.
- B. Current material safety data sheets (MSDS) for the liquid components.
- C. Current Authorized Applicator certificate from the surface system manufacturer.
- D. A certificate from the manufacturer of the striping material stating that the materials have been produced specifically for the use in all-weather track surfacing striping.
- E. A complete list of materials intended to be used in the striping of the running track system. All liquid quantities will be prior to dilution.
- F. Contractor to shall provide written maintenance information on the installed product to be presented to the owner upon completion of the surface. This shall include repair methods and availability of repair materials including cost. Submit 3 copies of recommended Surfacing Care and Maintenance Guide.
- G. Upon completion, supply the Owner with all necessary as-built drawings showing markings color coding of each event.
- H. Upon completion, a letter of certification attesting to the accuracy of the markings shall be submitted by the Professional Engineer or Land Surveyor in charge of the layout. The letter shall be signed and sealed by the person or persons in charge of the layout indicating the state of registration, number and name.

1.6 COORDINATION

- A. Contractor shall coordinate with all other trades, especially all-weather track surfacing installer to ensure approval of track surfacing prior to striping application. Any rework shall be done at no cost to the Owner.

1.7 RELATED WORK

- A. The all-weather track surfacing shall be sufficiently cured and cleaned prior to work of this section to be performed.

1.8 MATERIAL HANDLING AND STORAGE

- A. Materials should be delivered in manufacturer's container to maintain clean and dry conditions. See manufacturer's guidelines for temperature requirements for the locale of installation.
- B. Store material in accordance with manufacturer's specifications and MSDS.
- C. The owner shall provide a secure, clean, dry location for storage of materials at temperature as above. Under no circumstances should materials be stored outside unless fully protected from moisture with 10 mil polyethylene barrier and tarpaulin. All materials stored outside shall be inspected by dealer for moisture contamination before application.
- D. Deliver products to the site in original, unopened containers with labels attached.
- E. All surfacing materials shall be non-flammable.

1.9 QUALITY ASSURANCE

- A. Track system shall be subject to testing by an independent accredited IAAF testing house. The track system must adhere to the requirements of the IAAF Performance Specifications for Synthetic Surface Athletics Tracks (Outdoor) dated January 1990.

1.10 GUARANTEE

- A. See the warranty section
- B. The installer and the materials manufacturer shall supply a warranty covering labor and materials respectively. The warranty period shall be for five (5) years.

1.11 INSTALLER QUALIFICATIONS

- A. Installers shall be regularly engaged in the striping of running tracks.
- B. Installer shall be an authorized applicator of the specified system.
 - 1. Installers of this product are to provide a list of at least 10 installations that are a minimum of 5 years old that contain the same products, and use the same method of installation. Include:
 - a. Project Name
 - b. Address
 - c. Owners Representatives Name
 - d. Owners Representatives Email
 - e. Owners Representatives Phone
 - 2. Completed projects are to have been installed under the same company name and ownership that is presently bidding.
- C. Installer shall be a builder member of the ASBA.
- D. The installer's installing foreman must have at least 8 years' experience installing the specified type of synthetic track surface system.

1.12 MANUFACTURER QUALIFICATION

- A. System manufacturer shall certify that the materials provided are manufactured specifically for construction and surfacing of running tracks.
- B. System manufacturer shall be a US owned company that has been continuously engaged in the business of track surfacing materials for at least 10 years.
- C. System manufacturer of this product are to provide a list of at least 20 installations that are minimum of 3 years old that contain the same products, and use the same method of installation.

1. Include:

- a. Project Name
- b. Address
- c. Owners Representatives Name
- d. Owners Representatives Email
- e. Owners Representatives Phone

2. Completed projects are to have been installed under the same company name and ownership that is presently bidding.

D. Striping paint manufacturer shall have a designated representative available for site inspection.

PART 2 PRODUCTS

2.1 GENERAL

- A. Paint shall be that material as recommended by the manufacturer of the track surface.
- B. All markings shall receive two (2) coats of paint to achieve the full opaque results.

2.2 MATERIALS

- A. Paint shall be polyurethane based for all system except for rubberized asphalt and the latex systems.
- B. No thinners shall be used.
- C. No painting shall be performed when the velocity of the wind exceeds twelve (12) MPH, unless the spray equipment is equipped with the proper air curtains.

PART 3 EXECUTION

3.1 GENERAL

- A. Ambient and surface temperatures must be as recommended by the manufacturer, but not less than 50°F and rising.
- B. Installation should not be conducted during rainfall or when rainfall is imminent.
- C. Do not apply when surface temperature is in excess of 140°F.
- D. The all-weather track surfacing should be sufficiently cured and cleaned in order for work to progress.
- E. The entire surface shall be swept, power blown, or high pressure washed to remove all dirt, oil, grease, or any other foreign matter. The surface shall be free from any loose material.
- F. All work shall be performed by manufacturer's technicians and comply with the manufacturer's guidelines for the complete placement and installation of the base layer, the sealing and surface layers.

3.2 WEATHER LIMITATIONS

- A. Ambient and surface temperatures must be 50°F and rising.
- B. Installation should not be conducted during rainfall or when rainfall is imminent.
- C. Do not apply when surface temperature is in excess of 140°F.
- D. Apply the synthetic surfacing material only during favorable weather conditions. Work is to proceed only when adequate curing can be guaranteed by the manufacturer and installer.
- E. During surface installation and striping all sprinkler systems shall be shut off, or controlled so that no water falls on the track or event surfaces.
- F. All materials shall be installed in strict compliance with the manufacturer's specifications and instructions.
- G. The Contractor shall be responsible to have the entire track area, and other pertinent areas such as football field, concessions, etc., closed and secured of all activities 24 hours per day through the curing and completion of the synthetic track surface.

3.3 SURFACE PREPARATION

- A. New running track surfacing shall be allowed to adequately cure prior to painting.
- B. The surface must be thoroughly cleaned of all loose dirt and debris.

3.4 RUNNING TRACK MARKINGS

- A. Markings
 - 1. Shall be marked for (6) – 3'-6" lanes and include all event markings as recommended by NFHS requirements. Also included shall be those additional events as indicated in the specifications.
- B. Computations
 - 1. Verify the locations of purposed events with the Owner.
 - 2. Calculations shall be made to the nearest 1/10,000th of a foot.
 - 3. Calculations of the angle shall be made to the nearest one second.
 - 4. Calculations shall be submitted to the Landscape Architect prior to the painting.
 - 5. Calculations shall be made by or certified by the certified track builder or surveyor completing the work.

C. Layout

1. Lines and markings shall be made by a competent, experienced and fully qualified Track Marking Professional.
2. Locate and confirm both new radius points.
3. Establish and set all necessary control points.
4. Measurements shall be made on the track to the nearest 1/100th of a foot.
5. Angles shall be set by using a transit or theodolite capable of reading direct to 20 seconds.
6. The markings on the curve may also be set by using the chord length method.
7. Measurements shall be made with an engineering steel tape in engineering scale.
8. All markings shall be clearly identified and color coded for the painter to identify.

D. Symbols

1. All lanes and lines shall be white 2" wide markings
2. All starts and finishes shall be 2" wide lines
3. Starting Lines:
 - a. 100 Meters (on all straights) _____ White
 - b. 110 HH (on all straights) _____ White
 - c. 200 Meters _____ White
 - d. 300 Meters _____ White
 - e. 400 Meters _____ White
 - f. 800 Meters _____ Green
 - g. 1600/3200 Meters _____ White
 - h. 4x200 Meter Relay _____ Red
 - i. 4x400 Meter Relay _____ Blue
4. Finish Line _____ White
5. Break Line _____ Green

6. Relay Exchange Zones:

- a. 400 Meters _____ Yellow
- b. 800 Meters (Lane 1 only split color – Red/Yellow) _____ Red
1-2 and 2-3 Red: 3-4 Yellow (same mark as 400 meter, 2-3)
- c. 1600 Meters _____ Blue
- d. 3200 Meters _____ Black

7. Hurdle Locations

- a. 100 Meter HH (girls) _____ Yellow
- b. 110 Meter HH (boys) _____ Blue
- c. 300 Meter LH/IH (girls/boys) _____ Red

8. Acceleration marks shall be a 9" wide by 9" long triangles marked clearly in the center of the lane.

9. Hurdle marks shall be 1" X 6" tic marks on the lane line on both sides of the lane.

10. Lane numbers shall be not less than 22" high and 38" wide and located as directed by the Owner in five (5) locations. Numbers shall be in two (2) colors (as selected by the Landscape Architect from the manufactures standard color line). All stencil bracing shall be filled in to achieve a solid graphic. Numbers shall be offset from starting lines and triangles to allow adequate room for starting blocks or transition areas for athletes.

11. Triangles shall be not less than 40" wide x 24" high stencil to be provided by track surfacing installer.

12. Event Identification shall be 4" letters stenciled below and to the right of lane no. 2 and mark.

13. Scratch lines for the jumping events shall be 12" wide. Include markings for both men's and women's distances under NFHS regulations.

14. All starts and finishes shall be clearly marked with the start of the said events.

15. One (1) mile mark and two (2) mile mark.

16. All symbols shall have the proper color code for the event.

3.5 PROTECTION

- A. During construction the installer is responsible for limiting access of non-construction personnel to the site.
- B. The installation contractor shall coordinate any irrigation of fields with the owner.
- C. The installer shall protect curbs, fences and other structures from overspray.

3.6 QUALITY ASSURANCE

- A. Upon completion, a letter of certification attesting to the accuracy of the markings shall be submitted by the Professional Engineer or Land Surveyor in charge of the layout. The letter shall be signed and sealed by the person or persons in charge of the layout indicating the state of registration, number and name.
- B. All measurements and tolerances shall conform to those recommended by the American Sports Builders Association (ASBA) and the National Federation of State High School Associations (NFHS) for track and field event layout.

3.7 CLEAN UP

- A. Remove all containers, surplus and debris and dispose of in accordance with local, state and Federal regulation.
- B. Remove all spills and overruns.
- C. Leave site in a clean and orderly condition on a daily basis.
- D. Upon completion of all work, remove all containers, surplus materials, and installation debris. Leave area of work in clean orderly condition.

END OF SECTION 32 18 23.35

SECTION 32 31 13 – CHAIN LINK FENCES AND GATES

PART 1 GENERAL

1.1 SUMMARY

A. Section includes

1. Furnishing and installing woven wire fencing systems of the type and height specified and supported by metal posts erected where indicated on the Drawings and as specified herein, including fence and gates.
2. Replacing woven chain link fence fabric on existing framework.

B. Contractor shall coordinate work between all Subcontractors, sections, and trades required for the proper completion of the work.

C. Contractor is responsible for all health and safety.

1.2 REFERENCES

A. Reference herein to any technical society, organization, group or regulation are made in accordance with the following abbreviations and, unless otherwise noted or specified, all work under this Section shall conform to the latest edition as applicable.

B. Code of Federal Regulations (CFR).

1. 29 CFR 1926, Safety and Health Regulations for Construction.

C. American Society for Testing and Materials (ASTM).

1. ASTM A53 - Standard Specification for Pipe, Steel, Black and Hot-Dipped, Zinc-Coated, Welded and Seamless.
2. ASTM A90- Standard Test Method for Weight (Mass) of Coating on Iron or Steel Articles with Zinc or Zinc Alloy.
3. ASTM A123- Zinc (Hot Dip Galvanized) Coatings on Iron and Steel Products.
4. ASTM A153- Standard Specification for Zinc Coating (Hot Dip) on Iron and Steel Hardware.
5. ASTM A392- Standard Specification for Zinc-Coated Steel Chain-Link Fence Fabric.
6. ASTM A428- Standard Test Method for Weight (Mass) of Coating on Aluminum-Coated Iron or Steel Articles.
7. ASTM A491- Standard Specification for Aluminum Coated Steel Chain Link Fence Fabric.
8. ASTM A780 – Standard Specification for Repair of Damaged and Uncoated Areas of Hot-Dip Galvanized Coatings.
9. ASTM A817- Standard Specification for Metallic-Coated Steel Wire for Chain Link Fence Fabric and Marcellled Tension Wire.

10. ASTM A824 - Standard Specification Metallic-Coated Steel Marcellled Tension Wire for Use with Chain Link Fence.
11. ASTM B211- Standard Specification for Aluminum and Aluminum-Alloy Bar, Rod and Wire.
12. ASTM C94 - Standard Specification for Ready-Mixed Concrete.
13. ASTM F552 - Standard Terminology Relating to Chain Link Fencing.
14. ASTM F567- Standard Practice for Installation of Chain Link Fence.
15. ASTM F626 - Standard Specification for Fence Fittings.
16. ASTM F668 - Specification for Polymer Coated Chain Link Fence Fabric.
17. ASTM F900 - Standard Specification for Industrial and Commercial Swing Gates.
18. ASTM F934 - Specification for Standard Colors for Polymer-Coated Chain Link.
19. ASTM F1043 - Strength and Protective Coatings on Metal Industrial Chain Link Fence Framework.
20. ASTM F1083 - Standard Specification for Pipe, Steel, Hot-Dipped Zinc-Coated (Galvanized) Welded, for Fence Structures.
21. ASTM F1183 - Standard Specification for Aluminum Alloy Chain Link Fence Fabric.

D. Chain Link Fence Manufacturer's Institute

1. Chain Link Fence Manufacturer's Institute Product Manual, latest revision.

1.3 SYSTEM DESCRIPTION

A. Temporary Construction Fence shall meet the following basic parameters:

1. Fence Height: 8 feet.
2. Mesh Size: 2 inches.
3. Mesh Gage: 12
4. Gates: Height of gates shall match that of fence. Width of gates shall be as shown on the Drawings.
5. Anchored post or driven posts where indicated. No top or bottom rails required.
6. Panelized/modular units where indicated. Two stabilizers per panel.

B. Permanent Fence shall meet the following basic parameters:

1. Fence Height: Varies, refer to the Drawings.
2. Type:
 - a. At Running Track: 9 gauge vinyl coated black mesh and accessories

- b. Alternate Perimeter fence: 9 gauge galvanized mesh and accessories
- 3. Mesh Size:
 - a. Field and boundary fencing: 2"
 - b. All mesh to have knuckled both selvages.
- 4. Mesh Gage:
 - a. Field Fencing: Wire with a diameter of 9 gauge galvanized core fused. Measured prior to application of coating.
- 5. Gates: Height of gates shall match that of fence. Type and size of gates shall be as shown on the Drawings.
- 6. Anchored post where indicated; top and bottom rails between posts unless otherwise indicated.

1.4 SUBMITTALS

- A. Shop drawings showing the plan layout, spacing of components, post foundation dimensions, hardware anchorage, gates and a schedule of components.
- B. Product Data: For each type of product indicated. Include construction details, material descriptions, dimensions of individual components and profiles, and finishes for chain-link fences and gates.
 - 1. Fence and gate posts, rails, and fittings.
 - 2. Chain-link fabric, reinforcements, and attachments.
 - 3. Accessories: Privacy slats.
 - 4. Gates, locking mechanisms and hardware.
- C. Shop Drawings: Include plans, elevations, sections, details, and attachments to other work. Show accessories, hardware, gate operation, and operational clearances.
- D. Samples for Initial Selection: For components with factory-applied color finishes.
- E. Samples for Verification: Prepared on Samples of size indicated below:
 - 1. Polymer-Coated Components: In 6-inch lengths for components and on full-sized units for accessories.
- F. Delegated-Design Submittal: For chain-link fences and gate framework indicated to comply with performance requirements and design criteria, including analysis data signed and sealed by the qualified professional engineer responsible for their preparation.

1.5 INFORMATIONAL SUBMITTALS

- A. Qualification Data: For qualified factory-authorized service representative.
- B. Product Certificates: For each type of chain-link fence, and gate, from manufacturer.

- C. Product Test Reports: For framing strength according to ASTM F 1043.
- D. Field quality-control reports.
- E. Warranty: Sample of special warranty.

1.6 CLOSEOUT SUBMITTALS

- A. Operation and Maintenance Data: For the following to include in emergency, operation, and maintenance manuals:
 - 1. Polymer finishes.
 - 2. Gate hardware.

1.7 QUALITY ASSURANCE

- A. Use adequate numbers of skilled workmen who are thoroughly trained and experienced in the necessary crafts and who are completely familiar with the specified requirements and the methods needed for proper performance of the work of this Section.
- B. Supply material in accordance with Chain Link Fence Manufacturer's Institute Product Manual and this Specification.
- C. Perform installation in accordance with ASTM F567.
- D. Maintain all facilities installed under this Section in proper and safe condition throughout the progress of the work.
- E. Testing Agency Qualifications: For testing fence grounding. Member company of NETA or an NRTL.
 - 1. Testing Agency's Field Supervisor: Currently certified by NETA to supervise on-site testing.
- F. Electrical Components, Devices, and Accessories: Listed and labeled as defined in NFPA 70, by a qualified testing agency, and marked for intended location and application.
- G. Emergency Access Requirements: Comply with requirements of authorities having jurisdiction for gates with automatic gate operators serving as a required means of access.
- H. Mockups: Build mockups to set quality standards for fabrication and installation.
 - 1. Include 10-foot length of fence and gate.
- I. Preinstallation Conference: Conduct conference at Project site.
 - 1. Inspect and discuss electrical roughing-in, equipment bases, and other preparatory work specified elsewhere.
 - 2. Review sequence of operation for each type of gate operator.
 - 3. Review coordination of interlocked equipment specified in this Section and elsewhere.
 - 4. Review required testing, inspecting, and certifying procedures.

1.8 PROJECT CONDITIONS

- A. Field Measurements: Verify layout information for chain-link fences and gates shown on Drawings in relation to property survey and existing structures. Verify dimensions by field measurements.
- B. Fence gates be mechanically restricted from swinging over Synthetic turf or Synthetic track surfacing materials.

1.9 DELIVERY, STORAGE AND HANDLING

- A. Deliver fence fabric and accessories in packed cartons or firmly tied rolls.
- B. Packages shall be labeled with the manufacturer's name.
- C. Store fence fabric and accessories in a secure and dry place.

1.10 WARRANTY

- A. Special Warranty: Manufacturer's standard form in which Installer agrees to repair or replace components of chain-link fences and gates that fail in materials or workmanship within specified warranty period.
 - 1. Failures include, but are not limited to, the following:
 - a. Faulty operation of gate accessories and mechanisms.
 - b. Deterioration of metals, metal finishes, and other materials beyond normal weathering.
- B. Warranty Period: Five years from date of Substantial Completion.

PART 2 PRODUCTS

2.1 GENERAL

- A. Material furnished shall be in good condition and shall not have been painted.
- B. All posts and rails shall be straight, true to section and of sufficient length for proper installation.
- C. Unless otherwise specified, hardware and accessories shall conform to the requirements of ASTM F626 and ASTM A123 or ASTM A153 as applicable for zinc-coating.

2.2 LINE POSTS

A. See Drawings for size and type depending on height of fence.

1. Vinyl Coated Color: Black Class 2b fused and adhered

2.3 CORNER, END, AND PULL POSTS

A. See Drawings for size depending on height of fence.

1. Vinyl Coated Color: Black Class 2b fused and adhered

2.4 BRACE ASSEMBLY

A. Rails

1. 1.25-inch nominal (1.660 O.D.) steel pipe, steel pipe.

- a. Vinyl Coated Color: Black Class 2b fused and adhered

B. Truss rod shall be 3/8-inch with adjustable turnbuckles or truss tightener to match fabric type.

2.5 CHAIN-LINK FENCE FABRIC

A. General: Provide fabric in one-piece heights measured between top and bottom of outer edge of selvage knuckle or twist. Comply with CLFMI Product Manual and with requirements indicated below:

1. Fabric Height: As indicated on Drawings.

2. Steel Wire Fabric:

- a. Field Fencing: Wire with a diameter of 9 gauge galvanized core fused. Measured prior to application of coating.

- b. Mesh Size:

- 1) 2 inches. Measured prior to application of coating.

- c. Polymer-Coated Fabric: ASTM F 668, Class 2b.

- 1) Color: Black, ASTM F 934.

- d. Coat selvage ends of fabric that is metallic coated before the weaving process with manufacturer's standard clear protective coating.

3. Selvage: Knuckled at both selvages.

2.6 FENCE FRAMING

A. Posts and Rails: Comply with ASTM F 1043 for framing, including rails, braces, and line; terminal; and corner posts. Provide members with minimum dimensions and wall thickness according to ASTM F 1043 based on the following:

1. Fence Height: As indicated on Drawings.

2. Light Industrial Strength: Material Group IC-L, round steel pipe, electric-resistance-welded pipe.
 - a. Line Post: Refer to Drawings for post sizes based on fence height.
 - b. End, Corner and Pull Post: Refer to Drawings for post sizes based on fence height.
3. Horizontal Framework Members: Intermediate top and bottom rails complying with ASTM F 1043.
 - a. Top, Bottom and Mid Rail for all fencing systems and all heights: Refer to Drawings for post sizes based on fence height.
 - b. Brace Rails: Comply with ASTM F 1043.

B. Polymer coating over metallic coating.

1. Color: Black, ASTM F 934.

2.7 STRETCHER BARS

- A. Bars shall be one piece lengths of zinc-coated steel, not less than 2-inches shorter than the full height of the fencing fabric with a minimum cross section of 3/16-inch by 3/4-inch, ASTM F626.
- B. Polymer coating over metallic coating.
- C. Color: Black, ASTM F 934.

2.8 TENSION WIRE

- A. Polymer-Coated Steel Wire: Marcellled (spiraled or crimped) No. 7 gage, (0.177-inches) diameter, ASTM A824, ASTM F 1664,
- B. Polymer coating Class 2b over-coated steel wire. Color Black, ASTM F 934.

2.9 HARDWARE AND TIES

- A. Hardware & tie finish shall match that of fence fabric used.
- B. Miscellaneous hardware, including but not limited to nuts, bolts, washers, clips, bands, rail ends, brackets, and straps shall be provided as required, hot-dip galvanized steel or aluminum alloy, ASTM F626.
- C. Tension bands shall be formed from flat or beveled steel and shall have a minimum thickness after galvanizing of 0.078-inches and a minimum width of 3/4-inch.
- D. Brace bands shall be formed from flat or beveled steel and shall have a minimum thickness after galvanizing of 0.108-inches and a minimum width of 3/4-inch.
- E. Wire ties shall be minimum 16-gage galvanized steel wire or minimum 9-gage aluminum alloy wire.
- F. All fasteners shall be hot-dip galvanized, ASTM F2329.

- G. Bolts: Steel, ASTM A307.
- H. Washers: Steel, round, ASTM F844.
- I. Bolts: Steel, ASTM A563 Grade A, hex head.

2.10 FITTINGS

- A. General: Comply with ASTM F 626.
- B. Post Caps: Provide for each post.
 - 1. Provide line post caps with loop to receive tension wire or top rail.
 - 2. Post caps shall be mechanically fastened to posts to prevent removal.
- C. Rail and Brace Ends: For each gate, corner, pull, and end post.
- D. Rail Fittings: Provide the following:
 - 1. Top Rail Sleeves: Pressed-steel or round-steel tubing not less than 6 inches long.
 - 2. Rail Clamps: Line and corner boulevard clamps for connecting intermediate and bottom rails in the fence line-to-line posts.
- E. Tension and Brace Bands: Pressed steel.
- F. Tension Bars: Steel, length not less than 2 inches (50 mm) shorter than full height of chain-link fabric. Provide one bar for each gate and end post, and two for each corner and pull post, unless fabric is integrally woven into post.
- G. Truss Rod Assemblies: Steel, hot-dip galvanized after threading rod and turnbuckle or other means of adjustment.
- H. Tie Wires, Clips, and Fasteners: ASTM F 626.
 - 1. Standard Round Wire Ties: For attaching chain-link fabric to posts, rails, and frames, complying with the following:
 - a. Hot-Dip Galvanized Steel: 0.148-inch- (3.76-mm-) diameter wire; galvanized coating thickness matching coating thickness of chain-link fence fabric.
- I. Finish:
 - 1. Metallic Coating for Pressed Steel or Cast Iron: Not less than 1.2 oz. /sq. ft. (366 g /sq. m) zinc.
 - a. Polymer coating over metallic coating.

2.11 GATES

- A. Gate Construction: ASTM F900. Corners welded or assembled with special malleable or pressed-steel fittings and rivets or bolts to provide rigid connections.
- B. Pipe and Tubing:

1. Zinc-Coated Steel: Comply with ASTM F 1043 and ASTM F 1083; protective coating and finish to match fence framing.
- C. Posts: Round tubular steel.
 1. Size: Refer to Drawings for post sizes based on fence height.
- D. Gate Frames and Bracing: Round tubular steel.
 1. Framing:
 - a. Size: Refer to Drawings for post sizes based on fence height.
 - b. Assemble gate frames by welded connections. When width of gate leaf exceeds 10 feet, install mid-distance vertical tubing of the same size and weight as frame members. When either horizontal or vertical bracing is not required, provide truss rods as cross bracing to prevent sag or twist.
 - c. Horizontal bracing shall be used on all gates.
- E. Wire Fencing Fabric: Fabric shall match that of fence, attached securely to frame at intervals not exceeding 15-inches.
- F. Hardware:
 1. Hinges: 180-degree **outward swing only**.
 - a. **Hinge brackets shall be tack welded after install and coated.**
 - b. **Gates shall not allow swing over track surfacing or synthetic turf.**
 - c. Open gate position shall lie parallel to adjacent fenceline
 2. Latches permitting operation from both sides of gate with provision for padlocking accessible from both sides of gate.
 3. All gates shall be equipped with hot-dipped galvanized steel hinges and latch with provisions for padlocking.
 4. Double gates and single gates with leaf width 4 feet and greater shall be equipped with a minimum ½” drop bar, locable latch receivers and gate hold backs, one each leaf.
 5. Hinges shall be cast steel hinges capable of 180 degree opening. Tack weld hinge brackets to the steel post after installation to lock each hinge to the gate post and prevent sagging. No-lift-off type hinges. Box type hinges are not acceptable.
 6. Gate Leaves: Configured with intermediate members and diagonal truss rods or tubular members as necessary to provide rigid construction, free from sag or twist.
 7. Latches, hinges, stops, keepers and other hardware items shall be furnished as required for proper operation.

2.12 CONCRETE

- A. Concrete shall conform to ASTM C94; or pre-packaged concrete mix, ASTM C387. Minimum 28-day compressive strength of 3,000 psi. No air entrainment.

2.13 GROUT AND ANCHORING CEMENT

- A. Nonshrink, Nonmetallic Grout: Premixed, factory-packaged, non-staining, noncorrosive, nongaseous grout complying with ASTM C 1107. Provide grout, recommended in writing by manufacturer, for exterior applications.
- B. Erosion-Resistant Anchoring Cement: Factory-packaged, non-shrink, non-staining, hydraulic-controlled expansion cement formulation for mixing with potable water at Project site to create pourable anchoring, patching, and grouting compound. Provide formulation that is resistant to erosion from water exposure without needing protection by a sealer or waterproof coating and that is recommended in writing by manufacturer, for exterior applications.

PART 3 EXECUTION

3.1 GENERAL

- A. Install fence with properly trained crew as shown on the drawings in accordance with ASTM F567.
- B. Install all nuts for tension bands and hardware bolts on the side of the fence opposite the fabric.
- C. The temporary chain link fence shall be removed at the conclusion of the work.

3.2 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 otherwise permitted by Architect.
- B. Proceed with installation only after unsatisfactory conditions have been corrected.

3.3 PREPARATION

- A. 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.

3.4 INSTALLATION, GENERAL

- A. Install chain-link fencing to comply with ASTM F 567 and more stringent requirements indicated.
 - 1. Install fencing on established boundary lines inside property line.

3.5 CHAIN-LINK FENCE INSTALLATION

- A. Post Excavation: Drill or hand-excavate holes for posts to diameters and spacings indicated, in firm, undisturbed soil.
- B. 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 in position during setting with concrete or mechanical devices.
 - 2. Concrete post footings shall have a plan diameter 12-inches greater than the post diameter. Holes shall be clean and free of loose soil and debris. Concrete shall be placed continuously in one operation and tamped or vibrated for consolidation. Tops of the concrete footings shall be crowned to shed water.
 - 3. Gate post/footings shall be installed a minimum of 42-inches below grade.
 - 4. All corner, end posts, and gate posts shall be braced.
 - a. Brace each gate and corner post to adjacent line post with horizontal center brace rail and diagonal truss rods. Install brace rail one bay from end and gate posts.
 - b. Corner and terminal posts are to be braced horizontally and diagonally. The braces are to extend over one adjacent panel. Changes in line of 30 degrees or more shall be considered as corners.
 - c. Braces and truss rods shall be securely fastened to posts with appropriate hardware.
 - d. Pull posts with two braces shall be provided for all heights where changes in horizontal or vertical alignment of ten (10) degrees or more occur.
 - 5. Concrete Fill: Place concrete around posts to dimensions indicated and vibrate or tamp for consolidation. Protect aboveground portion of posts from concrete splatter.
 - a. Concealed Concrete: Top 3 inches below grade as indicated on Drawings to allow covering with surface material.
 - b. Posts Set into Concrete in Sleeves: Use steel pipe sleeves preset and anchored into concrete for installing posts. After posts have been inserted into sleeves, fill annular space between post and sleeve with non-shrink, nonmetallic grout, mixed and placed to comply with anchoring material manufacturer's written instructions, and finished sloped to drain water away from post.
 - c. Posts Set into Voids in Concrete: Form or core drill holes not less than 5 inches deep and 3/4 inch larger than OD of post. Clean holes of loose material, insert posts, and fill annular space between post and concrete with non-shrink, nonmetallic grout, mixed and placed to comply with anchoring material manufacturer's written instructions, and finished sloped to drain water away from post.
- C. Terminal Posts: Locate terminal end, corner, and gate posts per ASTM F 567 and terminal pull posts at changes in horizontal or vertical alignment of 15 degrees or more.

- D. Line Posts: Space line posts uniformly as indicated on the Drawings. Unless indicated otherwise, spacing shall be 8 feet on-center.
- E. Post Bracing and Intermediate Rails: Install according to ASTM F 567, maintaining plumb position and alignment of fencing. Diagonally brace terminal posts to adjacent line posts with truss rods and turnbuckles. Install braces at end and gate posts and at both sides of corner and pull posts.
 - 1. horizontal braces at midheight of fabric 72 inches or higher, on fences with top rail and at two-third fabric height on fences without top rail. Install so posts are plumb when diagonal rod is under proper tension.
- F. Tension Wire: Install according to ASTM F567, maintaining plumb position and alignment of fencing. Pull wire taut, without sags. Fasten fabric to tension wire with 0.120-inch-diameter hog rings of same material and finish as fabric wire, spaced a maximum of 24 inches on-center. Install tension wire in locations indicated before stretching fabric. Provide horizontal tension wire at the following locations:
 - 1. Extended along top and bottom of fence fabric. Install top tension wire through post cap loops. Install bottom tension wire within 6 inches (152 mm) of bottom of fabric and tie to each post with not less than same diameter and type of wire.
- G. Top Rail: Install according to ASTM F567, maintaining plumb position and alignment of fencing. Run rail continuously through line post caps, bending to radius for curved runs and terminating into rail end attached to posts or post caps fabricated to receive rail at terminal posts. Provide expansion couplings as recommended in writing by fencing manufacturer.
- H. Intermediate and Bottom Rails: Install and secure to posts with fittings.
- I. Chain-Link Fabric: Apply fabric to outside of enclosing framework. Leave 1 inch between finish grade or surface and bottom selvage unless otherwise indicated. Pull fabric taut and tie to posts, rails, and tension wires. Anchor to framework so fabric remains under tension after pulling force is released.
- J. Tension or Stretcher Bars: Thread through fabric and secure to end, corner, pull, and gate posts with tension bands spaced not more than 15 inches on-center.
- K. Tie Wires: Use wire of proper length to firmly secure fabric to line posts and rails. Attach wire at one end to chain-link fabric, wrap wire around post a minimum of 180 degrees, and attach other end to chain-link fabric per ASTM F626. Bend ends of wire to minimize hazard to individuals and clothing.
 - 1. Maximum Spacing: Tie fabric to line posts at 12 inches on-center and to braces at 24 inches on-center.
- L. Fasteners: Install nuts for tension bands and carriage bolts on the side of the fence opposite the fabric side.
- M. Fabric:
 - 1. Do not install fabric until concrete post footings have cured seven (7) days. Provide fabric of the height specified. Install fabric on the public side of the fence, with bottom no greater than 2-inches above the ground surface. Fabric shall be pulled taut to prevent sagging and

provide a uniform smooth appearance. Fasten fabric to line posts at intervals not exceeding 15-inches with ties as specified.

2. Install tension wire in one continuous length between pull posts, weaved through fence fabric at top. Tension wire shall be applied to provide a wire without visible sag between posts. Fasten fabric to tension wire at intervals not exceeding 24-inches with ties or hog rings as specified.
3. Where it is not practicable to conform the fence to general contour of the ground, as at ditches, channels, etc., the opening beneath the fence shall be enclosed with chain link fabric and sufficiently braced to preclude access, but not to restrict the flow of water.

3.6 GATE INSTALLATION

- A. Install gates according to manufacturer's written instructions, level, plumb, and secure for full opening without interference. Attach fabric as for fencing. Attach hardware using tamper-resistant or concealed means. Install ground-set items in concrete for anchorage. Adjust hardware for smooth operation and lubricate where necessary.
- B. Provide swing gates at the locations and dimensions shown on the Drawings. Do not install gates until concrete post footings have cured seven (7) days.
- C. Gates shall be installed plumb, level, and secure, with full opening without interference. Hardware shall be installed and adjusted for smooth operation and lubricated where necessary.
- D. Provide concrete center drop to footing depth and suitable drop rod sleeve at each leaf at center of double gate openings.
- E. Gates shall not be able to swing over adjacent track surfacing. Gates shall open 180 degrees, fully so that gate leaf lies parallel to adjacent fence.

3.7 GROUNDING AND BONDING

- A. Fence Grounding: Install at maximum intervals of 1,500 feet except as follows:
- B. Fences within 100 feet of buildings, structures, walkways, and roadways: Ground at maximum intervals of 750 feet.
 1. Gates and Other Fence Openings: Ground fence on each side of opening.
 2. Bond metal gates to gate posts.
 3. Coordinate subparagraph below with Drawings in projects where intentional discontinuities are provided in metal fencing conductivity to localize lightning effects to the vicinity of strikes. See Evaluations.
 4. Bond across openings, with and without gates, except openings indicated as intentional fence discontinuities. Use No. 2 AWG wire and bury it at least 18 inches below finished grade.
- C. Protection at Crossings of Overhead Electrical Power Lines: Ground fence at location of crossing and at a maximum distance of 150 feet on each side of crossing.

- D. Plans and details on Electrical Drawings and requirements in Division 26 Sections may revise or illustrate application of requirement below or may require grounding that exceeds minimum requirements in IEEE C2. Fences enclosing electrical substations are often bonded to a station grounding mat.
- E. Fences Enclosing Electrical Power Distribution Equipment: Ground as required by IEEE C2 unless otherwise indicated.
- F. Grounding Method: At each grounding location, drive a grounding rod vertically until the top is 6-inches below finished grade. Connect rod to fence with No. 6 AWG conductor. Connect conductor to each fence component at the grounding location, including the following:
 - 1. Make grounding connections to each barbed wire strand with wire-to-wire connectors designed for this purpose.
 - 2. Make grounding connections to each barbed tape coil with connectors designed for this purpose.
- G. Bonding Method for Gates: Connect bonding jumper between gate post and gate frame.
- H. Connections: Make connections to minimize possibility of galvanic action or electrolysis. Select connectors, connection hardware, conductors, and connection methods so metals in direct contact will be galvanically compatible.
 - 1. Use electroplated or hot-tin-coated materials to ensure high conductivity and to make contact points closer in order of galvanic series.
 - 2. Make connections with clean, bare metal at points of contact.
 - 3. Make aluminum-to-steel connections with stainless-steel separators and mechanical clamps.
 - 4. Make aluminum-to-galvanized-steel connections with tin-plated copper jumpers and mechanical clamps.
 - 5. Coat and seal connections having dissimilar metals with inert material to prevent future penetration of moisture to contact surfaces.
- I. Bonding to Lightning Protection System: If fence terminates at lightning-protected building or structure, ground the fence and bond the fence grounding conductor to lightning protection down conductor or lightning protection grounding conductor complying with NFPA 780.

3.8 FIELD QUALITY CONTROL

- A. Grounding-Resistance Testing: Engage a qualified testing agency to perform tests and inspections.
 - 1. Grounding-Resistance Tests: Subject completed grounding system to a megger test at each grounding location. Measure grounding resistance no fewer than two full days after last trace of precipitation, without soil having been moistened by any means other than natural drainage or seepage and without chemical treatment or other artificial means of reducing natural grounding resistance. Perform tests by two-point method according to IEEE 81.

2. Excessive Grounding Resistance: If resistance to grounding exceeds specified value, notify Architect promptly. Include recommendations for reducing grounding resistance and a proposal to accomplish recommended work.
3. Report: Prepare test reports certified by a testing agency of grounding resistance at each test location. Include observations of weather and other phenomena that may affect test results.

3.9 ADJUSTING

- A. Gates: Adjust gates to operate smoothly, easily, and quietly, free of binding, warp, excessive deflection, distortion, nonalignment, misplacement, disruption, or malfunction, throughout entire operational range. Confirm that latches and locks engage accurately and securely without forcing or binding.
- B. Lubricate hardware and other moving parts.

3.10 DEMONSTRATION

- A. Engage a factory-authorized service representative to train Owner's personnel to adjust, operate, and maintain chain-link fences and gates.

END OF SECTION

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SECTION 32 86 00 – ATHLETIC FIELD EQUIPMENT

PART 1 GENERAL

1.1 RELATED DOCUMENTS

- A. The Contractor, Subcontractors, and/or suppliers providing goods and services referenced in or related to this Section shall also be bound by the Related Documents identified in Division 01 Section "Summary."

1.2 SUMMARY

- A. Section includes:
 - 1. Purchase and installation of all fixed play field equipment and components.
 - 2. Purchase and delivery of all non-fixed play field equipment and components.
- B. The work of this Section is affected by Alternates contained in Section 01 2300 – Alternates.

1.3 REFERENCES

- A. Reference herein to any technical society, organization, group or regulation are made in accordance with the following abbreviations and, unless otherwise noted or specified, all work under this Section shall conform to the latest edition as applicable.
- B. Code of Federal Regulations (CFR).
 - 1. 29 CFR 1926, Safety and Health Regulations for Construction.
- C. American Society of Testing and Material (ASTM).
- D. Connecticut Interscholastic Athletic Conference (CIAC).
- E. National Federation of State High Schools (NFHS)

1.4 SUBMITTALS

- A. Manufacturers Product Data
 - 1. Provide manufacturers product data prior to actual field installation work, for Architect's and Owner's representative's review.
 - 2. Product Data: drawings including standard printed specifications and diagrams.
 - 3. Colors: Provide manufacturer's standard colors for selection by the Architect and Owner.
- B. Shop Drawings
 - 1. Provide drawings of the manufacturers recommended installation and foundation requirements prior to actual field installation work, for Landscape Architect's review.
 - 2. Shop drawings including drawings depicting installation directions and dimensions for all sports equipment.
 - 3. Material safety data sheets on all products, as necessary.

1.5 QUALITY ASSURANCE/ WARRANTY

- A. Manufacturers warranties shall pass to the Owner and certification made that the product materials meet all applicable grade trademarks or conform to industry standards and inspection requirements.
- B. All materials, products, and installation shall be warrantied for no less than one (1) year from the date of executed Substantial Completion.

1.6 PRODUCT DELIVERY AND STORAGE

- A. Materials delivered to the site shall be examined for damage or defects in shipping. Any defects shall be noted and reported to the Owners representative. Replacements, if necessary, shall be immediately re-ordered, so as to minimize any conflict with the construction schedule. Sound materials shall be stored above ground under protective cover or indoors so as to provide proper protection.

PART 2 PRODUCTS

2.1 SPORTS FIELD EQUIPMENT

- A. Furnish all sports field components as specified by these specifications and shown on the project drawings.
- B. Color: As selected by Architect based on all options available from manufacturer.
- C. Sports field equipment shall be provided with all necessary components and attachments to fully install systems. Attachment systems shall be in a color approved by the Owner and Architect. The products must meet the NFHS AND CIAC regulations.
- D. Provide and install the following per manufacturer's instructions and as shown on drawings products shall be as manufactured by Sportsfield Specialties, inc. Delhi, NY. or approved equal. Provide all accessories, hardware and equipment for proper installation and operation.
- E. GOAL POST PADDING: Provide one (1) complete set for each football goal.
 - 1. Model GPPRDG. Pads shall be a 6' in height, 6" thick split cylindrical urethane foam core fully encapsulated in a vinyl laminated polyester fabric to repel water, rot, mildew, UV light and shall further resist tears and abrasions that has a minimum weight of 18 oz per square yard. It shall have continuous hook and loop closure strips and top and bottom tie cords to keep pads in place. Cover material shall be flame retardant.
 - 2. Color Orange with black lettering to be selected by Architect and Owner from manufacturer's standard colors. Provide imprinted logo on pad panels spelling "RIDGEFIELD".
- F. FOOTBALL/SOCCER GOALS: Provide one (1) complete set of Football Goal Uprights and Soccer Goals for the Tiger Hollow Stadium Field.
 - 1. Football/Soccer Goal System shall be base plate mounted, rotating GoalPak Football / Round Soccer Goal System, Model: GP820HSR and shall contain the following components:

- a. Football goal posts shall be “Ultimate” AdjustRight, rotating all aluminum single support post, base plate mounted, 8-foot offset, 20’ uprights, goose-neck type posts with integral soccer goal lock-down kit and all mounting and installation hardware.

Football Uprights:

- a. Single Gooseneck Support: Fabricated of 6" Schedule 40 Aluminum Pipe (6.625" O.D.), 5' Radius, 8' Offset,
- b. Rotating Base Plate Mounting Kit
- c. Crossbar: Fabricated of 6" Schedule 40 Aluminum Pipe (6.625" O.D.)
- d. Width: 23'-4" inside dimension between uprights – High School
 - 1) Allowing for the adjustment of both the gooseneck/crossbar and upright/crossbar connections throughout the life of the football goal post ensuring proper alignment of all components.
 - 2) No exposed hardware on the face of the goal.
 - 3) Anti-vibration enhancements such as serrated washers and nyloc coated bolt ends.
- e. Uprights: Fabricated of Extruded 6061-T6 Aluminum Tube (4"O.D.) with Rigid Wire Loop Welded to Upper End
 - 1) Length: 20'
 - 2) Powder Coated Finish: Yellow
- f. Installation Package Consisting of the Following Components for each End Zone:
 - 1) Rotating Base Plate Mounting Kit
 - 2) Access Frame Kit + : 1/8" (0.125") for synthetic turf installation
 - 3) Aluminum Construction with Gasket Seal
 - 4) 1" PVC Drain Stub,
 - 5) Dimensions: 1'-2-1/2" H X 3'-4" Square
 - 6) Two (2) Half Moon Filler Plugs
 - 7) One (1) Full Size Blank Filler Plug
 - 8) Provide minimum 6 Oz. container of touch up paint to match goal.
 - 9) Provide all required mounting and installation hardware.
- g. Goal posts shall be supplied with wind directional flags.
 - 1) Each post shall include a package of ten (10) additional shear-pins and two (2) directional flags.
- h. Goal post foundations shall be reinforced concrete formed using CMP. Footing concrete and reinforcement shall meet manufactures recommendations.
- i. Contractor to provide shop drawing, signed and sealed by State of CT PE, for goal post foundation for approval prior to installation.

Soccer Goals:

- a. Provide one (1) set, of two (2) goals Model: SG824S regulation size round faced soccer goal, with mobility/integrated wheel kit, and integral lockdown safety system.
- b. Soccer goals shall be synthetic turf type (without ground sleeves) precision-crafted, official size (24' wide, 8' high, 3' top and 8' bottom depths) soccer goals are engineered from hi-tech aluminum alloys for maximum durability. The main

frame is fabricated of 4" stock slotted heavy-wall aluminum extrusion. The goal mouth features a white powder-coated finish for minimal maintenance. Goal shall include integrated wheel kit and rear cross bar anchoring system.

- c. Goals shall include large loop stays and a ground bar made of 2" sq. slotted heavy-wall aluminum extrusion with rounded safety corners. The crossbar and ground bar each incorporate a one-piece design (no horizontal joints) for added stability. Goals shall be equipped with Rollaway Wheels. Side mounted wheels are not acceptable.
- d. Nets shall be suitable for synthetic turf applications and operate safely without ground sleeves.
- e. Provide one (1) complete set containing two nets each. Color as selected by Architect based on all options available from manufacturer.

G. INTERNATIONAL CORNER FLAGS (ALTERNATE #9)

- 1. Provide four, 60" tall x 1 1/2" O.D. PVC uprights, Steel spring base with weighted bases for synthetic turf. KwikGoal Universal Weighted Soccer Corner Flags Model: SCG6B1104.

H. BALL SAFETY NETTING SYSTEM (removable)

- 1. Provide complete ball safety netting system including, but not limited to, footings, sleeves, sleeve covers, posts, netting, and hardware, Model: BSS210 (TFBSS210P)

a. Components for Net and Post:

- 1) 10' Straight Removable Pole Ball Safety Netting System.
- 2) 2" Schedule 80 Aluminum Pipe (2.38" O.D.) for Heights 10' and Below.
- 3) Height Above Ground equal to system height plus 8" (for net stretching and hardware).

b. Powder Coated Finish

- 1) Color: Black

c. Netting: Overall Dimensions: Refer to Project Drawings

- 1) 1-3/4" Square Mesh
- 2) Ultra Cross Knotless Dyneema® Netting
- 3) Provide opening/flap for use of rotating goals
- 4) Space post layout to allow for rotating football goals.

d. Accessories:

- 1) Stainless Steel and/or Galvanized Steel Assembly Hardware
- 2) Secure Snap Clips for Net Attachment
- 3) Net Guide Rings

- 4) Black Vinyl Coated Wire Rope, Stainless Steel Wire Rope or Galvanized Steel Wire Rope
- 5) Black Plastic Friction Lock or Aluminum Ground Sleeve Caps
- 6) Model Specific Hardware Kit and Installation Instructions

e. Post Footings and Ground Sleeves:

- 1) 2' (24") Ground Sleeve Aluminum or Steel Tube
- 2) 4,000 psi concrete footing sized per manufacturers recommendations
- 3) Provide shop drawing for sleeve footing. Stamped and Sealed Foundation Drawings and Calculations by a Licensed Professional Engineer of Record in the State of Project Location

I. Electrical/communication box

1. Provide electrical/communication boxes are shown on drawings within synthetic turf in track/field.
 - a. ComBox Model: CBTS1830 (for application in running track surfacing and Model: CBIT1830 (for applications in infilled synthetic turf) or approved equal. Box covers to be appropriate for application in Synthetic Turf or Track surfacing.

2.2 BALL NETTING (30'HT.) (SCOTTS RIDGE ALTERNATE #3)

- A. Contractor shall provide complete ball safety netting system including, but not limited to, footings, sleeves, sleeve covers, posts, netting, and hardware.
1. 30' high 6" diam. straight pole break-away netting system and accessories. 1-3/4" square mesh. Net with sewn rope binding at perimeter edges. Sportsfield Specialties BSS630 or approved equal.
 - a. Height: 30'
 - b. Include break-away accessories, rope cleats, ground sleeves and footings.
 - c. Include 12 extra 'Storm guard' pins in sealed container.
 - d. Include black break-away zip ties for attaching bottom of net to top of adjacent fence. 36" O.C. maximum.
 - e. Color: Black
 2. Contractor shall provide signed and stamped shop drawing by Structural Engineer licensed by the State of Connecticut for the backstop pole foundations based on local codes and soil conditions.

2.3 FACILITY USE SIGNAGE

- A. Facility Use Signage shall be 24" x 36" or larger .063 Aluminum sign. Message shall be applied with durable 7-year vinyl graphics. Sign shall be three color signs. Sign shall be supplied with radius corners and 4 (3/16") mounting holes, Provide and install four (4) signs and mounting

hardware for mounting on existing fence at Tiger Hollow Stadium and two (2) signs and mounting hardware for mounting on existing fence at Scotts Ridge Field.

- B. Sign shall include the facility name and generally the following:

RIDGEFIELD HIGH SCHOOL
HOME OF THE TIGERS

FIELD REGULATIONS

Any group wishing to use the field must obtain a permit by contacting the ATHLETICS office at (xxx) xxx-xxxx

No alcohol, smoking/ tobacco products on premise
No food or drinks (including sports drinks)
DRINKING WATER ONLY
No sunflower seeds, chewing gum
No pets
No golf
No bikes, rollerblades, or strollers
No motorized vehicles on the field or track
No fireworks or flammable liquids
No metal cleats, spikes, or shoes with cleats/spikes removed.
No High Heels
No chairs, tents, or stages on track or field
No glass or sharp objects
All materials are to be carried (NOT DRAGGED) across the field
No driving of stakes or anchors
No spectators on the track or field

Please remove all trash and debris after use of the complex

Please contact the RIDGEFIELD POLICE at (XXX) XXX-XXXX to report inappropriate use or vandalism

- C. Sign text shall be reviewed by Architect and Owner prior to manufacturing.
- D. Signs shall be mounted with nylon threaded nuts and bolts shall be cut flush to ensure safety of players and spectators.

PART 3 EXECUTION

3.1 INSTALLATION OF SPORTS FIELD COMPONENTS

- A. Provide all materials and necessary labor for the complete installation of the equipment and padding.
- B. Install goal posts level, plumb and in proper alignment with the sports field marking.
- C. Install all bases, plates and rubbers as per manufacturer's instructions.
- D. Mount signs at locations determined by Landscape Architect and Owner.

- E. All athletic equipment shall be installed as recommended with manufacturer's written directions, and as indicated on the drawings.
- F. Hold top of concrete footings 6" below finished grade. Slope all tops of footings to drain.
- G. All equipment shall be installed and in working condition for the Owner prior to Substantial Completion.

3.2 WARRANTY

- A. All products shall be warrantied from material and installation defects for a minimum of one (1) year from the date of execution of the Substantial Completion.

END OF SECTION 32 86 00

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SECTION 32 86 10 TRACK AND FIELD EQUIPMENT

PART 1 - GENERAL

1.1 RELATED DOCUMENTS

- A. The Contractor, Subcontractors, and/or suppliers providing goods and services referenced in or related to this Section shall also be bound by the Related Documents identified in Division 01 Section "Summary."

1.2 SUMMARY

- A. This Section includes the following:
 - 1. Long jump/ triple jump take-off board system
 - 2. Pole vault box and standard anchor forms
 - 3. Lockable Rotating Track Lane Gate
 - 4. High jump landing pad and standards
 - 5. Long jump/ triple jump pit covers
 - 6. Track crossing matts
 - 7. Runways matts
- B. Related Sections include the following:
 - 1. Division 01 section "Alternates"
 - 2. Division 32 Section "Concrete Pavement and Curbs".
 - 3. Division 32 Section "Track Surfacing".
 - 4. Division 32 Section "Athletic Equipment".
 - 5. Division 03 Section "Cast-in-Place Concrete".

1.3 SUBMITTALS

- A. Manufacturers Product Data: Provide manufacturers product data prior to actual field installation work, for Architects or Owners representative's review.
- B. Shop Drawings: Provide drawings of the manufacturers recommended installation and foundation requirements prior to actual field installation work, for Architects or Owners representative's review. Contractor shall provide fully dimensioned manufacturer's shop Drawings detailing specified product and confirming anchoring system.
- C. Manufacturer shall certify that all equipment meets current National Federation of High School Assoc. (NFHS) regulations and standards.

1.4 DEFINITIONS

- A. National Federation of State High School Associations (NFHS)

1.5 QUALITY ASSURANCE/ WARRANTY

- A. Manufacturers warranties shall pass to the Owner and certification made that the product materials meet all applicable grade trademarks or conform to industry standards and inspection requirements. All materials, products, and installation shall be warrantied for no less than one (1) year from the date of executed Substantial Completion.

1.6 PRODUCT DELIVERY AND STORAGE

- A. Materials delivered to the site shall be examined for damage or defects in shipping. Any defects shall be noted and reported to the Owners representative. Replacements, if necessary, shall be immediately reordered, so as to minimize any conflict with the construction schedule. Sound materials shall be stored above ground under protective cover or indoors so as to provide proper protection.

1.7 JOB CONDITIONS

- A. Coordinate/schedule of equipment installation with adjacent site and athletic improvements.

PART 2 - PRODUCTS

2.1 SPORTS FIELD EQUIPMENT

- A. Furnish all sports field components as specified by these specifications and shown on the project drawings.
- B. Color: As selected by Architect based on all options available from manufacturer.
- C. Sports field equipment shall be provided with all necessary components and attachments to fully install systems. Attachment systems shall be in a color approved by the Owner and Engineer. The products must meet the NFHS AND CIAA regulations.

2.2 FIXED TRACK AND FIELD EQUIPMENT

- A. Provide and install the following per manufacturer's instructions and as shown on drawings products shall be as manufactured by Sportsfield Specialties, inc. Delhi, NY. or approved equal. Provide all accessories, hardware and equipment for proper installation and operation.
 - 1. TAKE-OFF BOARDS: Shall be Model#LTJT0B8BL 8" Synthetic take off board with stainless steel tray and leveling bolts. Provide Aluminum blanking lid with track surfacing for off season use. Provide (2) two take off boards per LTJ runway. See details for locations.
 - 2. POLE VAULT BOX: Cast Aluminum Pole vault box Model #PVBCAW powder coated white. Contractor to provide two ¼' drill holes in bottom corners for drainage per detail. Provide aluminum grommets for drill holes. Provide Model #PVBCPCA cast aluminum cover/plug – fill cover with track and field surfacing per instructions.

3. POLE VAULT STANDARDS FORM SYSTEM: Provide and assemble complete pole vault system. Model PVS517 and PVSFS.
4. LOCKABLE ROTATING TRACK LANE GATE (ALTERNATE #9)
 - a. Model: LGRTL - Lockable Rotating Track Lane Gate:
 - 1) Upright Post Fabricated of 3.5" Schedule 40 Aluminum Pipe (4" O.D.) with 2" x 5" x 1/8" (0.125") Aluminum Horizontal and Diagonal Support, Fully Welded Construction
 - a) Hold Points: Upright Notched Every 90°
 - b) White Super Durable Powder Coated Finish
 - c) Black Vinyl Decal: "PLEASE JOG IN OUTSIDE LANES"
 - d) Welded Padlock Tab (Padlock Furnished by Owner)
 - 2) Ground Sleeve:
 - a) Aluminum Construction
 - b) 4.3" OD x 4.1" ID x 30"L
 - c) Stop Bolt
 - d) Welded Collar and Padlock Tabs (Padlock Furnished by Others)
 - e) Welded Leveling Plate
 - 3) Lightweight Lift and Rotate Design

2.3 NON-FIXED TRACK AND FIELD EQUIPMENT

- A. Provide, assemble, and install the following per manufacturer's instructions and as shown on drawings products shall be as manufactured by Sportsfield Specialties, inc. Delhi, NY. or approved equal. Provide all accessories, hardware and equipment for proper installation and operation.
 1. TRACK CROSSING MATS:
 - a. Model: TCM, non-woven polypropylene geotextile material with 19 oz. reinforced vinyl rapped galvanized steel chain perimeter.
 - b. Provide two (2) at 30' long x 7'-6" wide (track crossing covers)
 - c. Color: Black with Orange border and logo
 2. HIGH JUMP LANDING PAD SYSTEM: (ALTERNATE #9) shall be
 - a. Model: JumpZone Challenger High Jump Pad System Model HJ168.
 - b. Include all weather cover Z(HJ168AWC) with digital graphics and logo (HJDG).
 - c. Color to be Orange with black trim from standard selection. Provide custom lettering "TIGERS".
 3. HURDLES AND CARTS (ALTERNATE #9): Provide and assemble 30 hurdles. Hurdles shall be Model #HRHSA 41" advanced High School Aluminum rocker hurdle with adjustable height and weighted ground bars. Hurdle height shall be able to be adjusted without the use of special tools or equipment. Gateboards shall be polycarbonate with 2 color graphics to match existing hurdles and "RIDGEFIELD" printed on the front face. Colors shall be from manufacturer's standard color palette.
 - a. Provide 3 all aluminum universal hurdle carts with 5" dia. Hard rubber casters for rocker type hurdles model number HLRCRT. Provide an all weather vinyl cover for each hurdle cart.

4. LONG TRIPLE JUMP VINYL PIT COVERS: Provide one (1) pit cover for each pit.
 - a. Model: SPCVRMDDG double layer mesh weighted cover.
 - b. Size: 11'-9" x 25'-6" with digital graphics.
 - c. Color: Black with orange trim.
5. RUNWAY MATS: Provide one (1) runway mat for each run track event runway (i.e. long/triple jump, pole vault)
 - a. Model: RR1248 Roll-out rubber track protector
 - b. Size: 12mm x 48"W x full length of runway (see Drawings)
 - c. Color: Black

2.4 CONCRETE

- A. Refer to Sections "Concrete Pavement and Curbs" and "Cast-In-Place Concrete".

PART 3 - EXECUTION

3.1 GENERAL

- A. Install track and field equipment where and as indicated and in conformance with manufacturer recommendations.
- B. Certify locations and dimensions of athletic improvements to be in conformance with current **NFHS** standards.
- C. All equipment shall be installed and in working condition for the Owner prior to Substantial Completion.
- D. Installer should have experience with a minimum of five (5) installations or similar experience in the previous three (3) years for each piece of equipment.

3.2 LONG TRIPLE JUMP TAKE OFF BOARD SYSTEM

- A. Install take off board in concrete base as per manufacturer recommendations and as per project details.
- B. Insure that finished surfacing is maintained flush with takeoff board as per **NFHS** standards and manufacturer recommendations.
- C. Install stone drainage sumps under each take-off board. Drill 3/8" diameter weep holes through concrete base to drain vault boxes per manufacturers recommendations.

3.3 POLE VAULT PLANTING BOX and STANDARD ANCHOR SYSTEM

- A. Install box in concrete base as per manufacturer recommendations and as per project details.
- B. Insure that finished surfacing is maintained flush with box 'plug' board as per manufacturer recommendations.

- C. Install stone drainage sumps under each planting box. Drill 3/8" diameter weep holes through box corners and concrete base to drain vault boxes.

3.4 LOCKABLE ROTATING TRACK LANE GATE

- A. All Lane Gates shall be installed as recommended per manufacturer's written instructions and as indicated on the drawings. Concrete anchoring foundations to be determined by others based on local soil conditions and building codes. Installer should have a minimum of five (5) Lane Gate installations or similar experience in the previous three (3) years.

3.5 PROTECTION/CLEAN UP

- A. Protect: until acceptance of the project. Replace or refinish the surfaces if damaged prior to acceptance.
- B. Clean up all debris from equipment installation procedures.

END OF SECTION 32 86 10

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SECTION 32 91 01 – TOPSOIL

PART 1 - GENERAL

1.1 RELATED DOCUMENTS

- A. The Contractor, Subcontractors, and/or suppliers providing goods and services referenced in or related to this Section shall also be bound by the Related Documents identified in Division 01 Section “Summary.”

1.2 SUMMARY

- A. This Section includes the following:
 - 1. Testing, amending, screening, placing and finish grading all stockpiled and borrow topsoil.
 - 2. Provide all borrow topsoil necessary to properly complete all lawn and planting operations.
- B. Related Sections include the following:
 - 1. Division 31 Section “Site Clearing”.
 - 2. Division 31 Section “Earth Moving”.
 - 3. Division 32 Section “Turf and Grasses”.

1.3 QUALITY ASSURANCE

- A. All work shall comply with all codes, rules, regulations, laws and ordinances for the Town, State of Connecticut, and all other authorities having jurisdiction.
- B. Topsoil:
 - 1. Testing: Representative samples of all stockpiled and borrow topsoil shall be completely analyzed/tested to determine:
 - a. Nutrient analysis using the Modified Morgan extractant for soil available P, K, Ca, and Mg.
 - b. Soil pH.
 - c. Organic content-determined by loss of weight on ignition.
 - d. Particle size analysis-sand, silt, and clay-analysis shall be determined using the hydrometer method of particle size analysis with size fractions based upon sized limits established by USDA.
 - e. Laboratory recommendations required for topsoil to achieve optimum nutrient levels for the establishment of lawn, trees and shrubs or special plantings (i.e. wetlands replication).
 - 2. Testing shall conform to “Recommended Soil Testing Procedures for the Northeastern United States”, Bulletin #493
 - 3. Before delivery of any borrow topsoil, furnish the Architect with a 5 gallon sample of material.
 - 4. Topsoil testing costs shall be borne by the Contractor.

5. Testing laboratory shall be:
Soil Nutrient Analysis Laboratory
Department of Plant Science
University of Connecticut
2019 Hillside Road, U-102
Storrs, Ct 06269-1102
6. Contractor may submit a written request to utilize an alternate testing laboratory, to the Owner and Architect for approval. This request must include the qualifications of the proposed alternate laboratory. This laboratory may not be retained by the Contractor until written permission is received from the owner and Architect.

1.4 SUBMITTALS

- A. Submit topsoil test results to the Architect for review. The Architect will be the sole judge of acceptability.
- B. 5-lb sample to the Architect for visual conformance confirmation.

1.5 PRODUCT HANDLING

- A. Coordinate delivery of borrow topsoil such that it is placed as delivered and no stockpiling is required.

PART 2 - PRODUCTS

2.1 BORROW TOPSOIL

- A. Shall be a sandy loam, or fine loamy sand (per USDA Soil Classification index), with a minimum 50% sand content by weight not to contain materials harmful to plant life, to be clean, fertile, friable, and well draining. All topsoil to be free of any subsoil earth clods, sod, stones over 3/4" in any dimension, sticks, roots, weeds, litter and other deleterious material. Topsoil shall be uniform in quality and texture and contain organic matter and mineral elements necessary for sustaining healthy plant growth.
- B. Topsoil shall have the following optimum ranges unless otherwise approved by the Architect.
 1. Organic Matter Content: 3 – 7%
 2. Acidity range: pH 6.0 to pH 7.4
- C. Nutrient levels shall be achieved by the Contractor's addition of amendments to the topsoil to meet the optimum nutrient levels specified in the testing laboratory report.

2.2 STOCKPILED TOPSOIL

- A. Stockpiled topsoil shall conform to all requirements of paragraph 2.1.
- B. Provide amendments to stockpiled topsoil (organic material, sand, etc.) to produce topsoil in conformance with the Soil Nutrient Analysis Recommendations and project requirements.

- C. Waste products from screening operations are the property of the Contractor and shall be removed from the site at the Contractor's expense.

PART 3 - EXECUTION

3.1 SHAPING AT ALL NEW LAWN AREAS

- A. After rough grading has been completed, shape and grade lawn subgrade areas to lines and levels as noted on the drawings and as required based on total amounts of approved topsoil to allow placement of uniform depth of topsoil. Adjustments may be necessary due to field conditions. Provide all shaping adjustments at no additional cost to the Owner.
- B. Cultivate and loosen the subgrade soil to min. 18" depth with a subsoiler or other approved machinery to correct over-compaction.
- C. After shaping of lawn subgrades remove all sticks, stones, or foreign material one (1) inch or greater in dimension. Remove debris and stone off-site.

3.2 TOPSOIL SPREADING

- A. **Do not apply topsoil to the prepared subgrade without approval by the Architect.** Once approved, no vehicular traffic will be allowed on finish subgrade. Topsoil will not be permitted to be spread until topsoil test reports have been submitted and approved. Topsoil shall not be delivered or worked in a frozen or muddy condition.
- B. Uniformly distribute and spread topsoil over all graded lawn areas to conform smoothly to the lines, grades, and elevations shown or otherwise required. If directed conduct field density tests to demonstrate friable subgrade conditions. All general lawn areas to have a minimum of 6" of topsoil after compaction. All approved stockpiled topsoil is to be spread unless otherwise directed by the Owner. Maintain consistent depths of material throughout the project area.
 - 1. Manually supply topsoil around all trees to remain. Avoid damage to root systems.
- C. Topsoil shall be spread in (2) equal lifts. Bottom lift shall be thoroughly mixed with the loosened subgrade by disking, harrowing, or other approved means, to a depth of 4 inches into the subgrade, to create a transition layer.
- D. Place topsoil only when it can be immediately followed by lawn development operations.
- E. Supply and replace topsoil to eroded, settled or damaged areas until all lawn areas are stabilized. Care shall be taken not to damage grass or pavement areas in the replacement to topsoil.

3.3 PROTECTION

- A. Remove weeds prior to lawn development operations. No weeds shall be allowed to go to seed.
- B. Keep heavy equipment, trucks, etc. off areas that have received topsoil, at all times.

- C. If compaction occurs, scarify to the full depth of the topsoil and regrade topsoil.

3.4 EXCESS TOPSOIL

- A. Excess Topsoil and topsoil not approved for reuse shall become the property of the Contractor and shall be removed from the site and disposed of in a legal manner.

END OF SECTION 32 91 01

SECTION 32 92 00 – TURF AND GRASSES

PART 1 - GENERAL

1.1 RELATED DOCUMENTS

- A. The Contractor, Subcontractors, and/or suppliers providing goods and services referenced in or related to this Section shall also be bound by the Related Documents identified in Division 01 Section “Summary.”

1.2 SUMMARY

- A. The work of this Section includes the following:
 - 1. Fine grading and preparing lawn areas.
 - 2. Furnishing and applying soil amendments.
 - 3. Furnishing and applying fertilizers.
 - 4. Seeding new lawns.
 - 5. Furnishing and applying slope seed mixtures.
 - 6. Replanting unsatisfactory or damaged lawns.
 - 7. Maintenance of all lawns until acceptance.
- B. Related Sections include the following:
 - 1. Division 31 Section “Site Clearing”.
 - 2. Division 31 Section “Earth Moving”.
 - 3. Division 32 Section “Topsoil”.
 - 4. Division 32 Section “Plants”.
- C. The intent of this specification is to provide athletic fields that are high-performance, competition grade.

1.3 DEFINITIONS

- A. Form 817: “Standard Specifications for Roads, Bridges and Incidental Construction”, State of Connecticut, Department of Transportation, Form 817, 2016 edition, with all supplement.

1.4 SUBMITTALS

- A. General: Submit each item in this Article according to the Conditions of the Contract and Division 1 Specification Sections.
- B. Product data for the following:
 - 1. Fertilizers.
 - 2. Limestone.
 - 3. Chemical preservatives and controls – also confirm that each of the materials proposed to be applied are permitted for use by the State of Connecticut.

- C. Certification of grass seed from seed vendor for each grass-seed mixture and sod grown stating the botanical and common name and percentage by weight of each species and variety, and percentage of purity, germination, and weed seed. Include the year of production and date of packaging. Submit topsoil test of sod source to determine compatibility of sod material with project topsoil (borrow & stockpiled).
- D. Seed labels from actual bags/containers of the seed mix at the time of seeding.
- E. Qualification data for firms and persons specified in the "Quality Assurance" Article to demonstrate their capabilities and experience. Include lists of completed projects with project names and addresses, names and address of Architects and Owner, and other information specified.
- F. Material test reports from qualified independent testing agency indicating and interpreting test results relative to compliance of the following materials with requirements indicated.
 - 1. Analysis of existing surface soil.
 - 2. Analysis of imported topsoil.
- G. Planting schedule indicating anticipated dates and locations for each type of seeding or sodding.
- H. Maintenance instructions recommending procedures to be established by Owner for maintenance of lawns during an entire year. Submit before expiration of required maintenance periods.
- I. The Contractor must include, in the Schedule of Values, a separate line item for "Maintenance of Lawns". This item will include all costs assigned by the Contractor, for the expenditure of labor and materials anticipated from the time of lawn establishment, until acceptance.

1.5 QUALITY ASSURANCE

- A. Installer Qualifications: Engage an experienced Installer who has completed lawn development work similar in material, design, and extent to that indicated for this Project and with a record of successful grass establishment.
 - 1. Installer's Field Supervision: Require Installer to maintain an experienced full-time supervisor on the Project site during times that grass planting is in progress.
 - 2. Athletic field contractors must have completed 5 athletic fields in the past three (3) years, similar to the design and materials specified herein.
- B. Examine work to receive lawn development and notify the Architect of any defects. Specifically review the topsoil placement (depths, grades, and condition). Commencement of this work implies acceptance by Contractor of preparatory work by others.
- C. Pre-installation Conference: Conduct conference at Project site to comply with requirements of Division 01 Section "Project Meetings".

1.6 DELIVERY, STORAGE, AND HANDLING

- A. Seed, Fertilizer and Lime: Deliver in original sealed, labeled, and undamaged containers, showing weight, analysis, and name of manufacturer.

- B. Sod: Harvest, deliver, store, and handle sod according to the requirements of the American Sod Producers Association's (ASPA) "Specifications for Turfgrass Sod Materials and Transplanting/Installing."
- C. Protect materials from deterioration during delivery and while stored at site.

1.7 GUARANTEE

- A. Duration of guarantee shall be until the completion of the specified maintenance period and until Owner's final acceptance of all lawn areas.

1.8 CHEMICAL CONFORMANCE

- A. All chemical applications shall conform to the State of Connecticut statutes and City Integrated Pest Management (IPM) plans.
- B. Contractor shall provide all necessary data and information to the Owner for amending or filing an IPM plan, including, but not limited to proposed chemicals and EPA number, applicator name and license number, and proposed application dates.
- C. All fertilizer, pesticide and herbicide applications must conform to the City IPM, or in the absence thereof, must conform to the regulations of the State of Connecticut, in addition to any and all conditions listed in Division 1, Section "Project Environmental Permits" of this Specification.

PART 2 - PRODUCTS

2.1 SEED

- A. Grass Seed: Fresh, clean, dry, new-crop seed complying with the Association of Official Seed Analysts' "Rules for Testing Seeds" for purity and germination tolerances.
 - 1. Seed Mixture: Provide seed of grass species and varieties, proportions by weight, and minimum percentages of purity, germination, and maximum percentage of weed seed as indicated on Schedules at the end of this Section.

2.2 SOD (if required)

- A. Sod: Certified turfgrass sod minimum two years' old, complying with ASPA specifications for machine-cut thickness, size, strength, moisture content, and mowed height, and free of weeds and undesirable native grasses. Provide viable sod of uniform density, color, and texture of the following turfgrass species, strongly rooted, and capable of vigorous growth and development when planted. Pad thickness 3/4" (+1/4"), excluding thatch and top growth. Minimum size: 9 SF/piece.

1. Species: Provide sod of grass species and varieties, proportions by weight, and minimum percentages of purity, germination, and maximum percentage of weed seed as indicated on Schedules at the end of this Section.
2. Sod to be harvested from field, which is comprised of a “sandy loam” or “loamy sand” classification of soil.

2.3 LIME

- A. ASTM C 602, class T, agricultural ground limestone containing a minimum 50 percent total oxides (calcium oxide plus magnesium oxide), with a minimum 50 percent passing a 100 mesh sieve, and 98% passing a 20-mesh sieve, for powder form of lime.
 1. Provide lime in the form of dolomitic limestone.

2.4 FERTILIZER

- A. Phosphorus: Commercial, soluble; guaranteed analysis of 0-46-0.
- B. Starter Fertilizer: Commercial-grade complete fertilizer of neutral character, consisting of fast release water soluble nitrogen, derived from natural organic sources of urea ammonium phosphate, or similar material.
 1. Composition: Nitrogen, phosphorous, and potassium in amounts recommended in soil reports from a qualified soil-testing agency, 14.28.14 guaranteed analysis.
- C. Secondary-Fertilizer: Granular fertilizer consisting of 50 percent water-insoluble nitrogen, phosphorus, and potassium with guaranteed analysis of 15.15.15.
- D. Tertiary Fertilizer: guaranteed analysis of 46-0-0.

2.5 MULCHES

- A. Straw Mulch: Provide air-dry, clean, mildew-and seed-free, salt hay or threshed straw of wheat, rye, oats, or barley.
- B. Peat Mulch: Provide peat moss in natural, shredded, or granulated form, of fine texture, with a pH range of 4 to 6 and a water-absorbing capacity of 1100 to 2000 percent.
- C. Fiber Mulch: Biodegradable dyed-wood cellulose-fiber mulch, nontoxic, free of plant growth or germination inhibitors, with maximum moisture content of 15 percent and a pH range of 4.5 to 6.5.
- D. Nonasphaltic Tackifier: Colloidal tackifier recommended by fiber-mulch manufacturer for slurry application, nontoxic and free of plant growth or germination inhibitors.

2.6 EROSION CONTROL MATERIALS

- A. Material shall be a lightweight, nonwoven erosion control/revegetation blanket comprised primarily of virgin wood fiber. The blanket shall be manufactured by blending thermal mechanically – defibrated wood fiber with a small percentage of recycled synthetic fibers and forming them into a drapeable blanket. An accelerated photodegradable polypropylene netting shall be laminated to the surfaces of the blanket.
- B. Material shall be similar to “Futerra”, as manufactured by Conwed Fibers of Statesville, North Carolina, or approved equal.

2.7 SALT MARSH HAY

- A. Naturally harvested salt marsh hay, certified weed free.

2.8 CHEMICAL PREVENTATIVE AND CONTROLS

- A. Commercial materials labeled for turf maintenance, State of Connecticut and EPA registered and approved for turf application.

2.9 WATER

- A. Potable: The Contractor is responsible for furnishing all water necessary to complete the establishment and maintenance of lawns until acceptance by Owner. This requirement includes providing all water for irrigated lawn areas, if any, until the irrigation system is activated.

PART 3 - EXECUTION

3.1 EXAMINATION

- A. Examine areas to receive lawns and grass for compliance with requirements and for conditions affecting performance of work of this Section. Do not proceed with installation until unsatisfactory conditions have been corrected.

3.2 COORDINATION AND SCHEDULING

- A. Planting Season: Sow lawn seed and install sod during normal planting seasons for type of lawn work required. Correlate planting with specified maintenance periods to provide required maintenance from date of Substantial Completion.
- B. Weather Limitations: Proceed with planting only when existing and forecast weather conditions are suitable for work.
- C. Construct lawns between August 15 and October 1, unless otherwise approved.

- D. Examine areas to receive seeding or sod and notify Architect of any problems prior to commencing work. Specifically review the topsoil placement (depths, grades and conditions). Commencement of this work implies acceptance by Contractor of preparatory work of others.

3.3 PREPARATION

- A. Protect structures, utilities, sidewalks, pavement, and other facilities, trees, shrubs, and plantings from damage caused by lawn and athletic field development operations.
 - 1. Protect adjacent and adjoining areas from hydroseed overspraying.
- B. Provide erosion control measures to prevent erosion or displacement of soils and discharge of soil bearing water runoff or airborne dust to adjacent properties and walkways.

3.4 TOPSOIL PREPARATION - GENERAL

- A. Apply lime, and phosphorus at the rates recommended by the topsoil tests in all areas where topsoil has been installed. Cultivate topsoil to its full depth by scarifying or other disking methods to thoroughly incorporate amendments into the topsoil. Maintain a loose friable seed bed. At no time will rubber tired loaders or graders having greater compaction than a small farm tractor be allowed on topsoil. Keep all heavy equipment and trucks off prepared topsoil. Do not prepare while ground is wet or frozen.
- B. Provide additional topsoil where and as required to properly meet all proposed finish grades.
- C. Remove any weeds, debris, foreign matter and stones having any dimension greater than 3/4 inch. Remove from property.
- D. Fine grade to a smooth uniform surface. The entire area shall present an even grade with no depressions where water will stand. Any protective fencing around existing trees shall be removed and disposed of by the Contractor at this time. Topsoil shall be smoothly blended to existing finish grades around erosion control devices and adjacent existing conditions, maintain existing surface drainage patterns. Round-off all top and toe of slopes. Reinstall erosion control devices and protective fencing as required.
- E. **Approval of surface by Architect shall be obtained before seeding or sodding operations begin.** Where directed, perform bulk density and nuclear compaction readings to monitor degree of soil compaction/seed bed friability.

3.5 LAWN DEVELOPMENT

- A. General: All disturbed areas not developed otherwise shall be developed as lawn as indicated on the Drawings and as specified.

3.6 SEEDING GENERAL LAWN AREAS

- A. Ensure that the soil has been prepared in accordance with Topsoil Paragraph of this Section. All disturbed areas not developed otherwise shall be developed as lawn.

- B. Seeding shall be done when wind does not interfere with uniform distribution of hydroseeding mixture.
- C. Sow seed at following rates:
 - 1. Seeding Rate: 5 lb per 1000 sq. ft.
- D. Hydroseeding of general lawn areas, only, is permitted. Mix specified seed, fertilizer, and maximum 10% of fiber mulch in water, using equipment specifically designed for hydroseed application. Continue mixing until uniformly blended into homogenous slurry suitable for hydraulic application.
 - 1. Mix slurry with non-asphaltic tackifier.
 - 2. Apply slurry uniformly to all areas to be seeded in a 2-step process. Apply first slurry application at the minimum rate required to obtain specified seed-sowing rate.
 - 3. Apply second slurry cover coat of fiber mulch at a rate of 1000 pounds per acre.

3.7 SODDING NEW LAWNS

- A. Lay sod within 24 hours of stripping. Do not lay sod if dormant or if ground is frozen. The prepared soil shall be watered within 12-24 hours prior to laying the sod. Sod should not be laid on soil that is dry and powdery.
- B. Lay sod in straight lines to form a solid mass with tight joints. Butt ends and sides of sod; do not stretch or overlap. Stagger sod strips or pads to offset joints in adjacent courses. Avoid damage to subgrade or sod during installation. Tamp and roll lightly to ensure contact with subgrade, eliminate air pockets, and form a smooth surface. Work sifted soil of fine sand into minor cracks between pieces of sod; remove excess to avoid smothering sod and adjacent grass. Provide full pieces on all perimeter edges.
 - 1. Lay sod across angle of slopes exceeding 1:3.
 - 2. Anchor sod on slopes exceeding 1:5 with wood pegs spaced as recommended by sod manufacturer but not less than 2 anchors per sod strip to prevent slippage.
- C. Saturate sod with fine water spray within 2 hours of planting. During first week, water daily or more frequently as necessary to maintain moist soil to a minimum depth of 1-1/2 inches below the sod.

3.8 EROSION PREVENTATIVES

- A. Install erosion control material on all seeded slopes one foot (1') vertical to three (3) feet horizontal or steeper, or any seeded areas which receive concentrated run-off water, and areas as required by the Architect or Owner. Joints in these materials shall overlap no less than one foot (1') and the material shall be secured as recommended by the manufacturer.

3.9 WATERING LAWN AREAS

- A. Maintain a moist seed and sod bed at all times. Water seedbed daily with 1/4" water/day using three sets, keeping the surface moist. Apply complete coverage to insure proper germination/root

growth conditions. Maintain soil moisture at or near field capacity during the period of germination and seeding development.

- B. Protect all lawn areas with barricades, if necessary, to keep all traffic off the area. Repair all damage to lawn areas including topsoil replacement, at no additional cost to Owner.
- C. Adjust watering requirement as required at request of Owner and after a full ground cover has been achieved.

3.10 MAINTENANCE

- A. Begin maintenance of lawns immediately after each area is planted and continue until lawn is accepted, but for not less than the following periods.
 - 1. Seeded Lawns: 60 days after date of first mowing, and after a minimum of 5 mowings;
 - 2. Sodded Lawns: 45 days after date of first mowing, and a minimum of 3 mowings;
 - 3. When full maintenance period has not elapsed before end of growing season, or if lawn is not fully established at that time, continue maintenance during the next growing season.
- B. Maintain and establish all lawns by watering, fertilizing, weeding, mowing, trimming, replanting bare or eroded areas and redress to produce a uniformly smooth lawn.
- C. Replant bare areas with same materials specified for lawns.
- D. Add new mulch in areas where mulch has been disturbed sufficiently to nullify its purpose. Anchor as required to prevent displacement.
- E. Crabgrass and broadleaf weed control.
 - 1. General: Treat all lawn areas with crabgrass or broadleaf weed control in conformance with manufacturer's recommendations as required (after diagnosis of weed/crabgrass presence) and in conformance with all State and Local regulations.
 - 2. Time: Conform to the manufacturer's recommendations.
 - 3. Rate: Conform to the manufacturer's recommendations.
- F. Disease Control
 - 1. General: Treat any diseased lawn areas with disease control in conformance with the manufacturer's recommendations as required (after diagnosis of disease organisms) and in conformance with all State and Local regulations.
 - 2. Time: Conform to the manufacturer's recommendations.
 - 3. Rate: Conform to the manufacturer's recommendations.
- G. Mow lawns as soon as there is enough top growth to cut with reel mower set at mowing height of 1-1/2" (bench height). Repeat mowing as required to maintain specified height without cutting more than 30 percent of the grass height on maximum 5 day interval. Remove no more than 30 percent of grass-leaf growth in initial or subsequent mowings. Do not mow when grass is wet. Schedule mowing when grass attains a 2" height. Subsequent mowing to maintain following grass height. Subsequent mowings to maintain following grass height.

1. Mow grass from 1-1/2 to 2 inches high.
 2. Maintain reel blade and bed knife in sharp condition and evenly matched to provide a clean cut.
- H. Secondary Fertilization: Apply secondary fertilization to entire lawn and athletic field areas two (2) weeks after seeding.
- I. Tertiary Fertilizations: Apply three (3) tertiary fertilizations at two week intervals (4, 6, and 8 weeks after seeding) to entire lawn and athletic field areas.

3.11 EXISTING LAWN RENOVATION

- A. Renovate existing lawn damaged by Contractor's operations, such as storage of materials or equipment and movement of vehicles.
1. Reestablish lawn where settlement or washouts occur or where regrading is required.
- B. Remove sod and vegetation from diseased or unsatisfactory lawn areas; do not bury in soil.
- C. Remove topsoil containing foreign materials resulting from Contractor's operations, including oil drippings, fuel spills, stone, gravel, and other construction materials, and replace with new topsoil.
- D. Mow, dethatch, core aerate, and rake existing lawn.
- E. Remove weeds before seeding. Where weeds are extensive, apply selective herbicides as required, Do not use pre-emergence herbicides.
- F. Remove waste and foreign materials, including weeds, soil cores, grass, vegetation, and turf, and legally dispose of them off Owner's property.
- G. Till stripped, bare and compacted areas thoroughly to a soil depth of 12 inches.
- H. Apply soil amendments and initial fertilizers required for establishing new lawns and mix thoroughly into top 6 inches of existing soil. Provide new planting soil to fill low spots and meet finish grades.
- I. Apply seed and protect with straw mulch as required for new lawns.
- J. Water newly planted areas and keep moist until new lawn is established.

3.12 ACCEPTABLE LAWNS

- A. The Architect shall inspect all work for acceptance of lawns upon written request of the Contractor. The request shall be received at least 10 days before the anticipated date of inspection.
1. Lawn areas will not be accepted in "pieces", unless specifically agreed to by the Owner.
 2. If the lawn is in acceptable condition, the Contractor's maintenance responsibility will end. If, in the opinion of the Architect, the grass stand is unacceptable, the Contractor's

complete maintenance responsibilities shall continue until an acceptable stand of grass is achieved.

- B. All lawns will be considered eligible for inspection and acceptance provided all requirements, including maintenance, have been met and a healthy, uniform, dense stand of grass is established, free of weeds, bare spots and surface irregularities, with coverage exceeding 90 percent over any 5 square feet selected by the Architect. The Architect will be the sole judge of acceptability. Lawns must be free of weeds, crabgrass, and other undesirable plants, with no disease present. Sodded lawns shall be free of open joints and uneven surfaces. Acceptance will not be made until all damaged areas, including areas outside the property limits, have been restored to original conditions.
- C. Prior to acceptance of athletic fields, the Contractor shall perform a 6 inch deep core aeration. Allow the cores to dry, drag the cores, and topdress with a one-quarter inch depth of sand to all athletic field areas. Contractor must request a meeting with the Architect to establish specific timing of this operation.
- D. In no case will any lawns be accepted prior to Substantial Completion of the overall project.
- E. Replant lawns that do not meet requirements and continue maintenance until lawns are satisfactory. Upon stabilization of lawn areas, remove erosion control devices and protective fencing. Reseed bare areas as required.

3.13 WINTERIZATION

- A. At the end of the growing season, prior to the on-set of Winter, all newly-seeded areas, open earthen areas, or stockpiled earth materials, must be protected from erosion. This protection must form a continuous blanket over these areas. Protection may be:
 - 1. a hydro-seed mulch with a non-asphaltic tackifier, or;
 - 2. straw mulch spread uniformly at a rate of 2 tons per acre to form a continuous blanket 1-1/2 inches in loose depth over the areas with a slope not exceeding 1:6.

3.14 CLEANUP AND PROTECTION

- A. Promptly remove soil and debris created by lawn work from paved areas. Clean wheels of vehicles before leaving site to avoid tracking soil onto surface of roads, walks, or other paved areas. Broom clean all walks and pavements.
- B. Erect barricades and warning signs as required to protect newly planted areas from traffic, vandalism, and unauthorized use. Maintain barricades throughout maintenance period until lawn is established and accepted by the Owner.

3.15 LAWN MATERIAL INSTALLATION

- A. Lawns: Provide materials in not less than the following quantities:
 - 1. Weight of lime per 1000 sq. ft: as per topsoil test report.

2. Weight of phosphorous per 1000 sq. ft.: as per topsoil test report.
3. Weight of commercial fertilizer per 1000 sq. ft.: as per topsoil test report.
4. Cellulose Pulp 'Fiber: 32# /1,000 SF.
5. Grass Seed: 130 lbs/acre.
6. Starter Fertilizer: 310 lbs./acre.
7. Secondary Fertilizer: 300#/acre.
8. Tertiary Fertilizer 50#/acre, providing 22# of nitrogen/acre.

3.16 SEED

- A. Provide fresh, clean, new –crop seed; blue tag certified complying with the tolerance for purity and germination established by the Office of Seed Analysis of North America. Provide seed of the grass species, proportions and maximum percentages of weed seed.
- B. Provide seed in cleaned, sealed, properly labeled containers. Seed that is wet, moldy, or otherwise damaged will not be accepted. Handle seed to manufacturer recommendations for exposure to extremes of heat, cold, or moisture.

C. Lawn Seed Quality:

1. Weed Seed: maximum of 0.50%, no noxious weed seed.
2. Purity: minimum of 97% pure.
3. Crop: maximum 0.50%
4. Germination Rate: minimum 85%.

D. Mixture for General Lawn Areas:

TYPE OF SEED	PERCENT BY WEIGHT
Perennial Ryegrass	30%
50% Manhattan	
50% Saturn	
Fine leaf or Creeping Fescue	25%
50% Pennlawn	
50% Jamestown II	
Kentucky Bluegrass	45%
50% Glade	
50% Cobart	

3.17 TURFGRASS SOD

- A. Provide strongly rooted sod, not less than two (2) years old and free of weeds and undesirable native grasses and machine cut to pad thickness of weeds and undesirable native grasses and machine cut to pad thickness of 3/4" (+1/4"), excluding top growth and thatch. Provide only sod capable of vigorous growth and development when planted (viable, not dormant).
1. General Lawn Areas

RIDGEFIELD HIGH SCHOOL
RIDGEFIELD, CT
KBA #21001.00

TIGER HOLLOW AND SCOTTS RIDGE
FIELD AND TRACK REPLACEMENTS

America Kentucky Bluegrass	20%
Apollo Kentucky Bluegrass	20%
Limousine Kentucky Bluegrass	20%
Award Kentucky Bluegrass	20%
Total Eclipse Kentucky Bluegrass	20%

3.18 SLOPE SEED MIX

Refer to Form 816, Section M.13.04.

END OF SECTION 32 92 00

SECTION 33 46 16 FIELD SUBDRAINAGE SYSTEM

PART 1 GENERAL

1.1 SUMMARY

A. Section includes:

1. This section outlines steps required for touch-up, testing of the existing stone field base and drainage. Specification also outlines installation of a full multi-component synthetic field drainage system on top of a prepared subgrade and perimeter collector drains, if required for patching/repair.
2. Testing, Inspections, monitoring, and reporting.

B. Contractor shall coordinate work between all Contractors, sections, and trades required for the proper completion of the work.

C. Contractor is responsible for all health and safety.

1.2 REFERENCES

A. Reference herein to any technical society, organization, group or regulation are made in accordance with the following abbreviations and, unless otherwise noted or specified, all work under this Section shall conform to the latest edition as applicable.

B. Code of Federal Regulations (CFR).

1. 29 CFR 1926, Safety and Health Regulations for Construction.

C. Commonwealth of Massachusetts

1. Standard Specifications for Highways and Bridges, Massachusetts Highway Department

D. American Association of State High and Transportation Officials (AASHTO).

1. AASHTO M252 - Standard Specification for Corrugated Polyethylene Drainage Pipe

E. American Society for Testing and Materials (ASTM)

1. ASTM C88 - Test Method for Soundness of Aggregates by Use of Sodium Sulfate or Magnesium Sulfate.
2. ASTM C131 - Standard Test Method for Resistance to Degradation of Small-Size Coarse Aggregate by Abrasion and Impact in the Los Angeles Machine.
3. ASTM D422 - Standard Test Method for Particle Analysis of Soils.
4. ASTM D1557 - Standard Test Methods for Laboratory Compaction Characteristics of Soil Using Modified Effort (56,000 ft-lbf/ft³(2,700 kN-m/m³)).
5. ASTM D2434 - Standard Test Method for Permeability of Granular Soils (Constant Head).
6. ASTM D2922 - Standard Test Methods for Density of Soil and Soil-Aggregate in Place by Nuclear Methods (Shallow Depth).
7. ASTM D3212 - Standard Specification for Joints for Drain and Sewer Plastic Pipes Using Flexible Elastomeric Seals.
8. ASTM F1551/EN 12616 - Standard Test Method for Comprehensive Characterization of Synthetic Turf Playing Surfaces and Materials

9. ASTM D3786 - Standard Test Method for Bursting Strength of Textile Fabrics-Diaphragm Bursting Strength Tester Method.
 10. ASTM D4355 - Standard Test Method for Deterioration of Geotextiles by Exposure to Light, Moisture and Heat in a Xenon Arc Type Apparatus.
 11. ASTM D4491 - Standard Test Methods for Water Permeability of Geotextiles by Permittivity.
 12. ASTM D4533 - Standard Test Method for Trapezoid Tearing Strength of Geotextiles.
 13. ASTM D4632 - Standard Test Method for Grab Breaking Load and Elongation of Geotextiles.
 14. ASTM D4833 - Standard Test Method for Index Puncture Resistance of Geotextiles, Geomembranes, and Related Products.
 15. ASTM D4751 - Standard Test Method for Determining Apparent Opening Size of a Geotextile.
 16. ASTM D7001 - Standard Specification for Geocomposites for Pavement Edge Drains and Other High-Flow Applications.
- F. Fédération Internationale de Football Association (FIFA)
1. EN 13036 – Surface Planarity/Surface Regularity

1.3 SUBMITTALS

- A. Sampling and Testing Laboratory: Submit name and qualifications of commercial sampling and testing laboratory for Architect's approval.
- B. Testing Agency: Submit name and qualifications of third-party in-field quality control Testing Agency for Architect's approval.
- C. Surveyor: Submit name and qualifications of Professional Land Surveyor who will be responsible for layout and verification of the work of this Section.
- D. Product Data: Submit manufacturer's product data demonstrating compliance with this specification. Include manufacturer's written instructions for each product.
 1. Flat Panel Drain
- E. Confirmation of Acceptance, Design: Submit a signed written statement signed by the manufacturer of the all-weather grass surfacing materials confirming that:
 1. The field subdrainage system design meets the requirements of the all-weather grass surfacing manufacturer and the that if the system is constructed as designed there will be no conflicts with the conditions of the warranty.
- F. Material Testing Data: Submit for approval test results for all material testing performed under the Article "Testing, Pre-Construction" herein. Failure to submit testing results shall in no way relive Contractor from his obligation to meet the performance requirements of the field subdrainage system in all regards.
 1. Material testing data shall be no older than three (3) months from proposed material placement date. Testing data older than three (3) months will be rejected.
- G. Pre-Construction drainage testing: Submit for approval test results for all drainage testing performed under the Article "Testing, Pre-Construction" herein. Failure to submit testing results

shall in no way relive Contractor from his obligation to meet the performance requirements of the field subdrainage system in all regards.

H. Samples

1. Submit for approval samples of proposed materials. Failure to submit samples shall in no way relieve Contractor from his obligation to meet the performance requirements of the field subdrainage system in all regards. Submit the following (as necessary):
 - a. Flat Panel Drains: Submit 12-inch long product sample.
 - b. Field Base, Bottom Stone: Deliver to the Project Site one 5 gallon bucket of material in an air-tight container. Provide sample within 10 days of contract award. Sample shall be accompanied by adequate labelling indicating project name, source of supply, and identified as "Field Base, Bottom Stone".
 - c. Field Base, Top Stone: Deliver to the Project Site one 5 gallon bucket of material in an air-tight container. Provide sample within 10 days of contract award. Sample shall be accompanied by adequate labelling indicating project name, source of supply, and identified as "Field Base, Top Stone".
 - d. Collector Pipe Stone, Bottom Stone: Deliver to the Project Site one 5 gallon bucket of material in an air-tight container. Provide sample within 10 days of contract award. Sample shall be accompanied by adequate labelling indicating project name, source of supply, and identified as "Collector Pipe Stone, Bottom Stone".
- I. Material Certificates: Submit certificates for Bottom Stone, Top Stone, and Collector Pipe Stone materials signed by material producer and Contractor, certifying that each material delivered to the project complies with, or exceeds the requirements specified herein.
- J. Quality Control Testing Results
 1. Submit results of all test results performed under Article 1.5 and 1.6 "Testing, Quality Control During Construction" herein. Provide copies of all Testing Agency reports.
 2. Failure to submit quality control testing results shall in no way relive Contractor from his obligation to meet the performance requirements of the field subdrainage system in all regards.
- K. Confirmation of Acceptance, Completed Base: Submit a signed written statement signed by the manufacturer of the all-weather grass surfacing materials and countersigned by the all-weather grass surfacing and resilient pad materials installers (if different), confirming that:
 1. Based on the Progress Survey and visual inspections, all applicable areas and surfaces are satisfactory for the installation of the all-weather grass surfacing material.
 2. No conditions exist that are in conflict with the all-weather grass surfacing material warranty requirements.

1.4 DELIVERY, STORAGE AND HANDLING

- A. All deliveries are to be scheduled so as to avoid school drop-off and pick-up activities. No deliveries shall be allowed to enter the site during these times.

B. Drainage Stone

1. Schedule delivery to minimize on-site storage. Segregate differing stone materials and prevent from contamination with other materials.
2. Coordinate procurement of stone with the sampling and in-field testing required herein.

C. Geotextiles

1. Follow geotextile manufacturer's recommendations for packaging, transportation, and delivery to ensure materials are not damaged. Furnish the geotextile fabric in a wrapping that protects the fabric from ultraviolet radiation and from abrasion due to shipping and hauling.
2. Geotextile shall be stored on a prepared surface (not wooden pallets) and should not be stacked more than two rolls high. Storage shall be such that the geotextile is protected from puncture, dirt, grease, water, moisture, mud, mechanical abrasions, excessive heat or cold, or other damaging circumstances. Temporary storage at the Project Site shall be away from standing water such that crushing or flattening of roll goods does not occur.

D. Piping and Drains

1. Manufacturer shall package the pipe and other drainage materials in a manner designed to deliver the pipe to the Project Site neatly, intact, and without physical damage. Transportation carrier shall use an appropriate method to ensure the pipe is properly supported, stacked, and restrained during transport. Inspect materials delivered to site for damage; store with minimum of handling.
2. Unloading of the pipe and other drainage materials should be controlled so as not to collide with the other pipe sections or fittings, and care should be taken to avoid chipping or spalling, especially to the spigots and bells. For manhole sections, cone sections, bases, fittings and other precast appurtenances, utilize lifting holes or lifting eyes provided.
3. In cold weather conditions, use caution to prevent impact damage. Handling methods considered acceptable for warm weather may be unacceptable during cold weather.
4. Storage: Store materials on site in enclosures or under protective coverings. Do not store materials directly on the ground. Keep inside of pipes and fittings free of dirt and debris.

1.5 QUALITY ASSURANCE

- A. Use adequate numbers of skilled workmen who are thoroughly trained and experienced in the necessary crafts and who are completely familiar with the specified requirements and the methods needed for proper performance of the work of this Section.
- B. Landscape Architect reserves the right to perform all in-field testing specified in this Section and reserves the right to determine the suitability of all materials to be used for in the work, and to reject any material not meeting these specifications.
- C. Sampling and Testing Laboratory: The Sampling and Testing Laboratory shall be a qualified commercial entity with a documented track-record of conducting sampling and laboratory testing in support of construction projects. Once approved, the Sampling and Testing Laboratory shall not be changed without Architect's approval.

- D. Testing Agency: The Testing Agency shall be a qualified commercial entity with a documented track-record of performing in-field testing and inspection services. The Sampling and Testing Laboratory may provide the services of the Testing Agency provided it meets the qualifications to do so. Once approved, the Testing Agency shall not be changed without Landscape Architect's approval.
- E. Surveyor: Engage a Land Surveyor licensed as a Professional Land Surveyor (PLS) in the state where the project is located to perform layout and verification of the work of this Section.
- F. Material Certificates: Materials Certificates certify that the materials furnished conform to all applicable requirements of the Contract Documents. Materials Certificates shall be signed by a duly authorized and responsible agent for the organization supplying the material. Contractor shall be responsible for any testing, Materials Certificates, and inspections required. Materials Certificates shall also include the following information:
 - 1. Project for which the material has been consigned.
 - 2. Name of Contractor to which material is supplied.
 - 3. Item number and description of material.
 - 4. Quantity of material represented by the certificate.
 - 5. Means of identifying the consignment, such as label, marking, lot numbers, etc.
 - 6. Date and method of shipment

1.6 TESTING, PRE-CONSTRUCTION

- A. All pre-construction sampling/testing shall be the responsibility of Contractor. Contractor shall retain and pay for the services of a third-party Sampling and Testing Laboratory and/or Testing Agency to perform all sampling/testing services in accordance with applicable standards and these specifications.
- B. Existing Conditions Drainage inspection: Prior to construction contractor shall expose existing stormwater manholes where necessary for access and camera inspect existing stormwater perimeter collector drainage piping under the field and outlet pipes under the track to the nearest stormwater manhole outside of the track and field. Provide the Architect with an electronic copy of camera footage, and a list of any noted deficiencies/ needs for repair.
- C. Material Testing. (only submit on products proposed to be used)
 - 1. Provide testing data for the following:
 - a. Field Base, Bottom Stone
 - b. Field Base, Top Stone
 - c. Collector Pipe Stone, Bottom Stone
 - 2. Testing parameters:
 - a. Moisture-Dry Density Curve (Proctor Test-Modified): ASTM D1557
 - b. Gradation: ASTM D422
 - c. Resistance to Abrasion: ASTM C131
 - d. Soundness: ASTM C88
 - e. Chemical Testing: Contractor shall conduct chemical testing to demonstrate that such material is free of oils, hazardous materials, or other organic and non-organic constituents which may be considered contaminants. For each

type/classification and source of earth material proposed, submit a letter signed by an authorized representative of the material supplier stating that such proposed earth material is free of oils, hazardous materials, or other organic and non-organic constituents which may be considered contaminants.

3. Testing Frequency: One test for each type of material per source of supply.
4. All required testing (sample and analysis) shall be submitted as part of one submittal or it will be rejected. Failure to include any of the above requirements will result in rejection.

1.7 TESTING, QUALITY CONTROL DURING CONSTRUCTION

A. All quality control sampling/testing during construction shall be the responsibility of Contractor. Contractor shall retain and pay for the services of a third-party Sampling and Testing Laboratory and/or Testing Agency to perform all sampling/testing/inspection services in accordance with applicable standards and these specifications.

B. Existing Field Stone Base

1. Upon removal of the existing synthetic turf surfacing system and preparation of the existing field stone base for the new synthetic turf system the field stone base shall be reviewed and tested for the following:

a. Infiltration tests, double-ring infiltrometer, ASTM F1551/EN 12616 - Standard Test Method for Comprehensive Characterization of Synthetic Turf Playing Surfaces and Materials, as the prepared field base Stone layer of the field subdrainage system/base is completed. Alternative infiltration testing will not be considered valid.

1) Testing Frequency: Perform eight (8) tests for each field. At least two (2) shall be conducted in the area of the field perimeter collector trench.

2) Testing criteria: Each test will be considered acceptable when an infiltration rate of no less than 16 inches per hour (16 in/hr) is demonstrated. Do not proceed with turf installation until all tests are considered acceptable.

2. Surface Regularity/Planarity

a. The planarity of the finished, prepared Field Base, Top Stone grade of the field shall conform to EN 13036 Surface Planarity as performed by an independent Certified Testing Agency.

b. Contractor shall conduct a field survey of the field stone base at 25 feet O.C. grid. Grades shall be checked using a dual plane laser operation survey instrument and shall be within 1/4 inch of required elevation. Correct irregularities in elevation beyond this tolerance.

3. Shall the existing field stone base fail to meet the requirements herein, the Architect or Owner may utilize the field base alternates included in the project bid. The following testing shall be completed on all new materials utilized for either alternate.

C. Material Testing

1. During construction, prior to the delivery of material to the Project Site, provide representative testing for the following materials (only if material proposed to be used on site):
 - a. Field Base, Bottom Stone
 - b. Field Base, Top Stone
 - c. Collector Pipe Stone, Bottom Stone
2. Intent: The purpose of such testing is to monitor consistency in material characteristics during construction to ensure materials delivered to the Project Site demonstrate the same characteristics as those represented by Architect-approved pre-construction material testing submittals.
 - a. If testing indicates that materials demonstrate differing characteristics as indicated in Landscape Architect-approved pre-construction material testing submittals, materials shall not be employed in the work. Any material represented by such sampling result which has been placed shall be removed from the Project Site and replaced with acceptable material at no expense to Owner.
 - b. Contractor is solely responsible for coordinating the timing of sampling, testing, reporting, and Landscape Architect's review. Allow Landscape Architect 24 hours to review test results.
3. Testing parameters:
 - a. Moisture-Dry Density Curve (Proctor Test-Modified): ASTM D1557
 - b. Gradation: ASTM D422
 - c. Resistance to Abrasion: ASTM C131
 - d. Soundness: ASTM C88
4. Testing Frequency: One test representing 10,000 square feet (1 test/10,000 sf) of in-place material.

D. Compaction Testing

1. Compaction Testing: ASTM D2922. (where applicable)
 - a. Collector Pipe Stone, Bottom Stone: One test per 2,500 square feet of Bottom Stone installed (1 test/2,500 sf).
 - b. Field Base Bottom Stone: One test per 5,000 square feet of Bottom Stone installed (1 test/5,000 sf).
 - c. Prepared Field Base Top Stone: One test per 5,000 square feet of Top Stone installed (1 test/5,000 sf).
2. Additional compaction testing may be required when there is evidence of a change in the quality of moisture control or the effectiveness of compaction.

3. If testing indicates that compacted subgrade, backfill, or fill are below specified density, additional compaction and/or replacement of material shall be provided at no expense to Owner.

E. Drainage Testing

1. Collector Pipe, Bottom Stone

- a. Perform infiltration tests, double-ring infiltrometer, ASTM F1551/EN 12616 - Standard Test Method for Comprehensive Characterization of Synthetic Turf Playing Surfaces and Materials, on the completed Collector Drain. Alternative infiltration testing will not be considered valid.
- b. Testing Frequency: Perform six tests
- c. Testing criteria: Each test will be considered acceptable when an infiltration rate of no less than 30 inches per hour (30 in/hr) is demonstrated. Do not proceed with turf installation until all tests are considered acceptable.

2. Field Base, Bottom Stone

- a. Perform infiltration tests, double-ring infiltrometer, ASTM F1551/EN 12616 - Standard Test Method for Comprehensive Characterization of Synthetic Turf Playing Surfaces and Materials, as the Bottom Stone layer of the field subdrainage system/base is completed. Alternative infiltration testing will not be considered valid.
 - 1) Testing Frequency: Perform one test for each 20,000 square feet (20,000 sf) of completed area.
 - 2) Testing criteria: Each test will be considered acceptable when an infiltration rate of no less than 30 inches per hour (30 in/hr) is demonstrated. Do not proceed with installation of subsequent layers until all tests are considered acceptable.

3. 2. Field Base, Top Stone (completed field base)

- a. Perform infiltration tests, double-ring infiltrometer, ASTM F1551/EN 12616 - Standard Test Method for Comprehensive Characterization of Synthetic Turf Playing Surfaces and Materials, as the prepared field base Stone layer of the field subdrainage system/base is completed. Alternative infiltration testing will not be considered valid.
- b. Testing Frequency: Perform one test for each 20,000 square feet (20,000 sf) of completed field area.
- c. Testing criteria: Each test will be considered acceptable when an infiltration rate of no less than 20 inches per hour (20 in/hr) is demonstrated. Do not proceed with turf installation until all tests are considered acceptable.

1.8 SURFACE REGULARITY TESTING

A. Subgrade

1. The planarity of the finished subgrade of the field shall conform to EN 13036 Surface Planarity as performed by an independent Certified Testing Agency. Planarity shall not be greater than 15 mm.

2. Contractor shall also conduct a field survey at 25 feet o.c. grid. Grades shall be checked using a dual plane laser operation survey instrument and shall be within 1/4 inch of required elevation. Correct irregularities in elevation beyond this tolerance.

B. Field Base, Bottom Stone

1. The planarity of the finished Field Base, Bottom Stone grade of the field shall conform to EN 13036 Surface Planarity as performed by an independent Certified Testing Agency.
2. Contractor shall also conduct a field survey of all renovated athletic areas at 25 feet o.c. grid. Grades shall be checked using a dual plane laser operation survey instrument and shall be within 1/4 inch of required elevation. Correct irregularities in elevation beyond this tolerance.

C. Prepared Field Base, Top Stone

1. The planarity of the finished, prepared Field Base, Top Stone grade of the field shall conform to EN 13036 Surface Planarity as performed by an independent Certified Testing Agency.
2. Contractor shall also conduct a field survey of all renovated athletic areas at 25 feet o.c. grid. Grades shall be checked using a dual plane laser operation survey instrument and shall be within 1/4 inch of required elevation. Correct irregularities in elevation beyond this tolerance.

PART 2 PRODUCTS

2.1 FIELD DRAIN (FLAT PANEL)

- A. Composite, pre-fabricated high density polyethylene (HDPE), 3-dimensional high-flow, drainage core with internal support pillars, wrapped with a filtration geotextile filter fabric, 1.5-inches by 13-inches. HDPE minimum cell classification: 424420C, ASTM D3350.
- B. Couplers, tees, caps, and other fittings: As required to complete the system. Material of construction and configuration shall be in accordance with the drain manufacture's requirements or recommendations, whichever is more stringent. HDPE minimum cell classification: 424420C, ASTM D3350.
- C. Geotextile Filter Fabric
 1. Grab Tensile Strength (weakest principle direction), ASTM D4632: 120 pounds
 2. Grab Elongation (weakest principle direction), ASTM D4633: 60%
 3. Trapezoidal Tear (weakest principle direction) ASTM D4533: 40 pounds
 4. Puncture, ASTM D3786: 30 pounds
 5. Permittivity, ASTM D4491: 0.7
 6. AOS (U.S. Sieve Size), ASTM D4751: 60
 7. U.V. Resistance, ASTM D4355: 70

2.2 COLLECTOR PIPE (IF PROPOSED)

- A. Perforated Corrugated Polyethylene Pipe: AASHTO M252 Type SP (Double Wall) as indicated on the Drawings.

1. Perforations: Class 2 slotted perforations per AASHTO M252. Perforations shall be uniformly spaced along the length and circumference of the pipe.
2. Joints: Joint: Silt-tight, ASTM D3212.

2.3 FIELD BASE, BOTTOM STONE

- A. Product resulting from the artificial crushing of rocks, boulders or large cobblestones, substantially all faces of which have resulted from the crushing operation. Material shall consist of sound, tough, durable, angular stones, free from soft, thin, elongated, laminated, friable, micaceous or disintegrated pieces, feldspar, limestone, marble, mud, dirt, organic matter, or other deleterious material. The presence of soft, thin, elongated, laminated, friable, micaceous or disintegrated pieces, feldspar, limestone, marble, mud, dirt, organic matter, or other deleterious material will be cause for rejection at Landscape Architect's discretion.
1. Testing and evaluation of material by the testing laboratory shall evaluate material composition for the presents of feldspar or micaceous materials and note same on testing report. Material may be rejected due to the presence of feldspar or micaceous materials.
- B. **Test for Resistance to Abrasion, ASTM C131. Materials shall show a loss on abrasion of not more than 25%.**
- C. Soundness, ASTM C88. Coarse aggregate shall not have a loss of more than 15% at the end of five cycles.
- D. Gradation:

Gradation of Bottom Stone (#67)

Sieve	Percent Passing by Weight
1"	100
3/4"	90-100
3/8"	20-55
No. 4	0-10
No. 8	0-5

OR APPROVED EQUAL

2.4 FIELD BASE, TOP STONE

- A. Product resulting from the artificial crushing of rocks, boulders or large cobblestones, substantially all faces of which have resulted from the crushing operation. Material shall consist of sound, tough, durable, angular stones, free from soft, thin, elongated, laminated, friable, micaceous or disintegrated pieces, limestone, marble, mud, dirt, organic matter, or other deleterious material. The presence of soft, thin, elongated, laminated, friable, micaceous or disintegrated pieces, feldspar, limestone, marble, mud, dirt, organic matter, or other deleterious material will be cause for rejection at Landscape Architect's discretion.
1. Testing and evaluation of material by the testing laboratory shall evaluate material composition for the presents of feldspar or micaceous materials and note same on

testing report. Material may be rejected due to the presence of feldspar or micaceous materials.

- B. **Test for Resistance to Abrasion, ASTM C131. Materials shall show a loss on abrasion of not more than 25%.**
- C. Soundness, ASTM C88. Coarse aggregate shall not have a loss of more than 15% at the end of five cycles.
- D. Gradation:
 - 1. Gradation of Top Stone (#8)

Sieve	Percent Passing by Weight
1/2"	100
3/8"	85-100
1/4"	75-90
No. 4	10-40
No. 8	0-10
No. 16	0-5
No. 200	0-2

2.5 COLLECTOR PIPE STONE, BOTTOM STONE

- A. Product resulting from the artificial crushing of rocks, boulders or large cobblestones, substantially all faces of which have resulted from the crushing operation. Material shall consist of sound, tough, durable, angular stones, free from soft, thin, elongated, laminated, friable, micaceous or disintegrated pieces, limestone, marble, mud, dirt, organic matter, or other deleterious material.
 - 1. Testing and evaluation of material by the testing laboratory shall evaluate material composition for the presents of feldspar or micaceous materials and note same on testing report. Material maybe rejected due to the presence of feldspar or micaceous materials.
- B. **Test for Resistance to Abrasion, ASTM C131. Materials shall show a loss on abrasion of not more than 25%.**
- C. Soundness, ASTM C88. Coarse aggregate shall not have a loss of more than 15% at the end of five cycles.
- D. Size: 3/4-inch, clean, washed stone.

2.6 GEOTEXTILE

- A. Composition: Nonwoven, polypropylene fibers.
- B. Physical properties:

Mechanical Properties	Test Method	Unit	Minimum Average Roll Value
Grab Tensile Strength, Ultimate	ASTM D 4632	Pounds	120
Grab Tensile Strength, Elongation at Ultimate	ASTM D 4632	Percent (%)	50
Trapezoid Tear Strength	ASTM D 4533	Pounds	50
Mullen Burst Strength	ASTM D 3786	psi	225
Puncture Strength	ASTM D 4833	Pounds	60
Apparent Opening Size (AOS)	ASTM D 4751	U.S. Sieve	70
Permittivity	ASTM D 4491	sec ⁻¹	1.8
Flow Rate	ASTM D 4491	gal/min/ft ²	135
UV Resistance (at 500 hours)	ASTM D 4355	% strength retained	70
Physical Properties	Test Method	Unit	Average Roll Value
Weight	ASTM D 5261	oz/yd ²	4.5
Thickness	ASTM D 5199	Mils (mm)	44 (1.12)

PART 3 EXECUTION

3.1 GENERAL

- A. Notify “Dig Safe” to request a utility mark-out for the Project Site prior to any earth disturbance. Provide written confirmation to Landscape Architect that such mark-out has been completed.
- B. Verify site conditions before proceeding with demolition work. Field check the accuracy of the Drawings and inspect structures, utilities, and other site features prior to start of work and notify Landscape Architect in writing, of any discrepancies or hazardous conditions.
- C. Take precautions for preventing injuries to persons or damage to property in or about the work. Protect structures, utilities, adjacent athletic facilities, walks, pavements and other improvements from damage caused by settlement, lateral movement, undermining, washout and other hazards created by earthwork operations.
- D. Protect sub-grades and foundation soils against freezing temperatures or frost. Provide protective insulating materials as necessary.
- E. Provide erosion-control measures to prevent erosion or displacement of soils and discharge of soil-bearing water runoff or airborne dust to adjacent properties and walkways.

3.2 PROGRESS SURVEY

- A. Retain and pay for the services of a Professional Land Surveyor licensed in the State of Connecticut who will be responsible for the verification of the work of this Section. Complete Progress Surveys for each of the following stages:

1. Completed top stone elevations.
 2. Completed field subdrainage system elevations and drain locations, including collector pipe and flat panel piping for all new materials installed.
- B. Complete surveys to verify that the specified lines, grades, and cross sections of the project elements and/or systems as indicated on the Drawings have been achieved, or that the lines, grades, and cross sections of the system required to achieve final field elevations indicated on the Drawings have been achieved.
- C. Prepare Progress Survey depicting the area and elevations of each finished system for review by Architect and turf installer. Drawing shall be prepared based on a 20 foot grid with spot grades to the nearest 0.01 foot. In addition to spot grades and surface regularity testing, Contractor shall pull string lines at each inlaid line location and at 15 foot intervals to identify high and low spots. This includes all lines. Depict locations of string lines on Progress Survey.
- D. Survey shall be provided to Landscape Architect and Owner in paper and AutoCAD format for review.

3.3 DEWATERING

- A. Prevent surface water and ground water from entering excavations, from ponding on prepared subgrade and from flooding Project site and surrounding area.
- B. Protect subgrade from softening, undermining, washout and damage by rain or water accumulation.

3.4 SUBGRADE

- A. Formation: Form and shape subgrade to the specified lines, grades, and cross-sections indicated on the Drawings, or to the lines, grades, and cross-sections required to achieve final field elevations indicated on the Drawings. Refer to Section 31 2310 - Earthwork.
1. All soft and yielding material and other portions of the subgrade which will not compact readily shall be removed and replaced with suitable material. Utilize Granular Fill, Processed Aggregate, or other Landscape Architect-approved material as required.
 2. Reconstruct sub-grades damaged by freezing temperatures, frost, rain, accumulated water or construction activities, as directed by Landscape Architect.
- B. Compaction: The entire area of the subgrade shall be uniformly and thoroughly compacted by use of compaction equipment consisting of rollers, compactors or a combination thereof.
1. Earth-moving and other equipment not specifically manufactured for compaction purposes will not be considered as compaction equipment.
- C. Approval of Subgrade: Examine the subgrade of the field for horizontal and vertical conformance, compaction, and general suitability.
1. Evidence of inadequate subgrade shall be brought to the immediate attention of Landscape Architect.
 2. Areas of potential ponding shall be corrected.
 3. Confirm planarity requirements of subgrade based on a 20 foot grid. Grid shall be laid-out and a level-set laser system used to determine elevation compliance.

- a. Construction Tolerance: Re-grade areas that are not within 1/2-inch of required elevations.

3.5 FLAT PANEL DRAIN

- A. Install flat panel drains as indicated on the Drawings.
- B. Install all drain components in accordance with the manufacturer's instructions.

3.6 DRAINAGE STONE, BOTTOM STONE AND TOP STONE

- A. Confirm placement of flat panel drains prior to initiating installation of Bottom Stone.
- B. Conduct and submit material testing in accordance with Article 1.7
- C. Installation
 - 1. Install each layer of stone as indicated on the Drawings.
 - 2. Bottom Stone: Install in two lifts, compacted to required density.
 - 3. Top Stone: Install in a single lift and compact to required density
 - 4. Maintain dozer, grader, or loader push distances below 75 feet to minimize segregation of course-graded fractions from fine-graded fractions, as well as not overwork the material.
 - 5. Installed layers shall be kept clean and uncontaminated. Less select materials shall not be permitted to become mixed with drainage stone. Materials spilled outside specified lines shall be removed and areas repaired.
 - 6. Portions of drainage layer which become contaminated, softened, or dislodged by passing of equipment, or otherwise damaged, shall be cleaned, replaced, and otherwise repaired to conform to the requirements of this specification.
- D. Compaction
 - 1. Compact lifts using a 6 ton steel wheel roller or vibratory roller equivalent to a 6-ton static roller, or approved equivalent.
 - 2. Rolling shall begin at sides and progress to center of crowned areas, and shall begin on low side and progress toward high side of sloped areas. Rolling shall continue until material does not creep or wave ahead of roller wheels.
 - 3. Compaction Density: Compaction density shall be expressed as a percentage of maximum dry density at optimum moisture content according to ASTM D 1557 Method C.
 - a. Bottom Stone: Between 90% and 92%
 - b. Top Stone: Between 90% and 92%
- E. Final Grading
 - 1. Utilize a laser-guided grader to complete fine grading of the finish surface of the field subdrainage system. Laser control system shall control each side of the blade independently. Single post control systems are not acceptable.

2. Minimize movement of machinery or equipment over completed work. Repair any ruts or other deviations.
3. Surface Regularity: The planarity of the finished grade of the field subdrainage system shall conform to EN 13036 Surface Planarity as performed by an independent Certified Testing Agency.
 - a. Deviations shall be measures below a straightedge using a graduated wedge (slip gauge). No deviation shall exceed 10mm.
4. Protection
 - a. Where the activities of Contractor have been determined by the Landscape Architect to have caused damage or contamination of the dynamic stone material the Contractor shall remove and replace all affected areas to the satisfaction of Landscape Architect.
 - b. Where weather conditions have created erosion of topping stone material or migration of fine material such that it concentrates in areas on the drainage stone surface (such as runoff causing migration of fines), these areas shall be cleaned of all fine material and replaced with new material.

3.7 PERIMETER COLLECTOR DRAIN

- A. Install drainpipe and bedding system as indicated on the Drawings.
- B. Installed drains shall be kept clean and uncontaminated. Less select materials shall not be permitted to become mixed with drainage stone.

3.8 DRAINAGE TESTING

- A. Complete post-installation drainage testing of the installed field subdrainage system/base in accordance with Article 1.7.

3.9 CLEAN UP

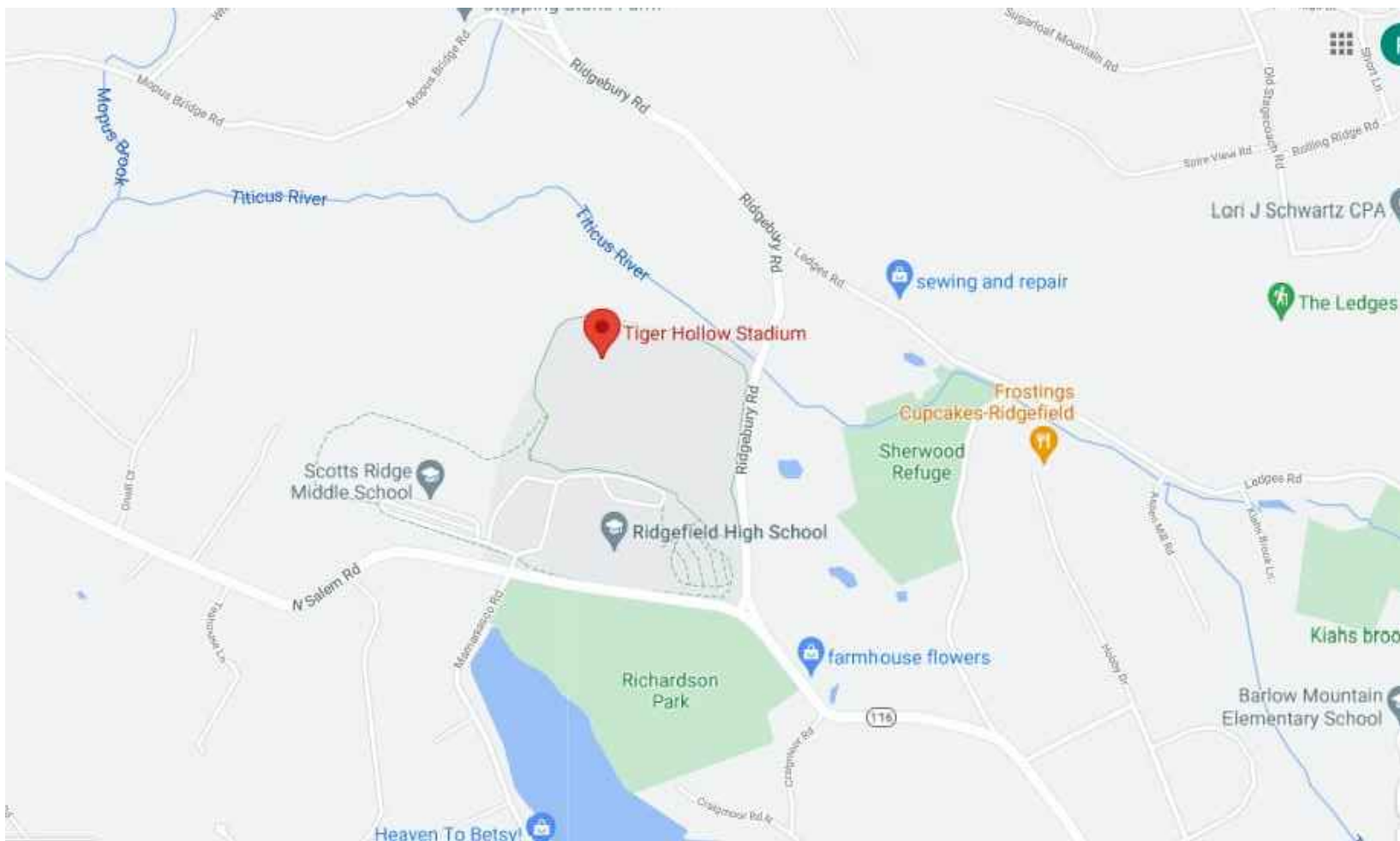
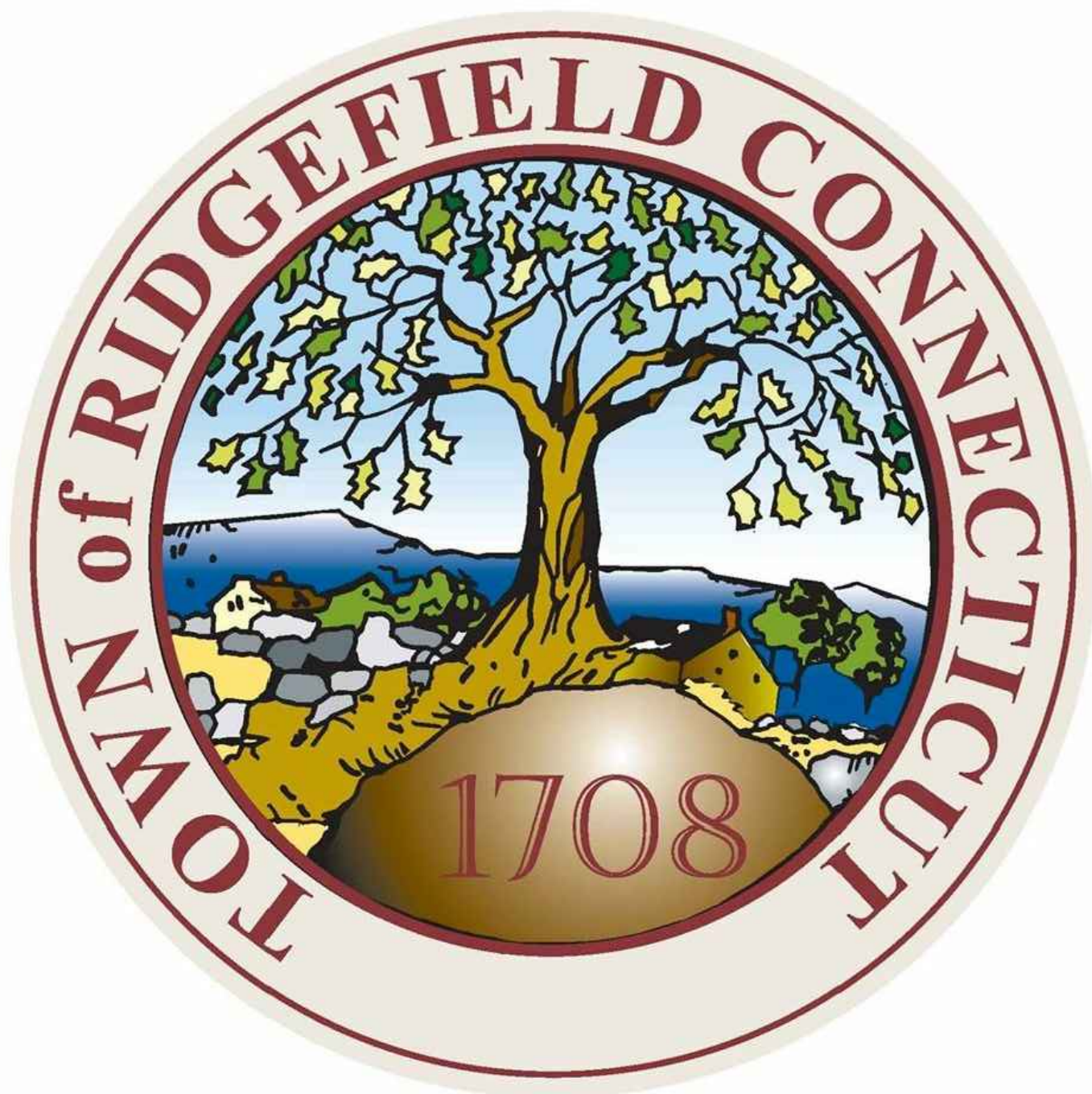
- A. Contractor shall remove all debris, residuals, and materials at the conclusion of the work.

END OF SECTION

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RIDGEFIELD HIGH SCHOOL TIGER HOLLOW & SCOTTS RIDGE SYNTHETIC TURF & TRACK REPLACEMENTS

RIDGEFIELD HIGH SCHOOL 700 N SALEM RD
SCOTTS RIDGE MIDDLE SCHOOL 750 N SALEM RD
RIDGEFIELD, CT



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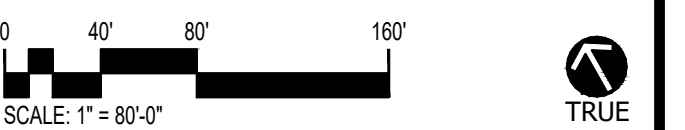
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KAESTLE BOOS
associates, inc

DRAWING LIST:

L0.00	OVERALL SITE PLAN
L0.01	SCOTTS RIDGE - EXISTING CONDITIONS PLAN
L0.02	TIGER HOLLOW STADIUM- EXISTING CONDITIONS PLAN
L1.01	SCOTS RIDGE - PREPARATION & DEMO PLAN
L1.02	TIGER HOLLOW STADIUM - PREPARATION & DEMO PLAN
L2.01	SCOTTS RIDGE - LAYOUT, MATERIALS & GRADING PLAN
L2.02	TIGER HOLLOW STADIUM - LAYOUT & MATERIALS PLAN
L3.01	TIGER HOLLOW STADIUM - GRADING & UTILITIES PLAN
L4.01	SITE DETAILS
L4.02	SITE DETAILS
L4.03	SITE DETAILS
L4.04	SITE DETAILS
L4.05	SITE DETAILS
L4.06	SITE DETAILS

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DATE	REFERENCE



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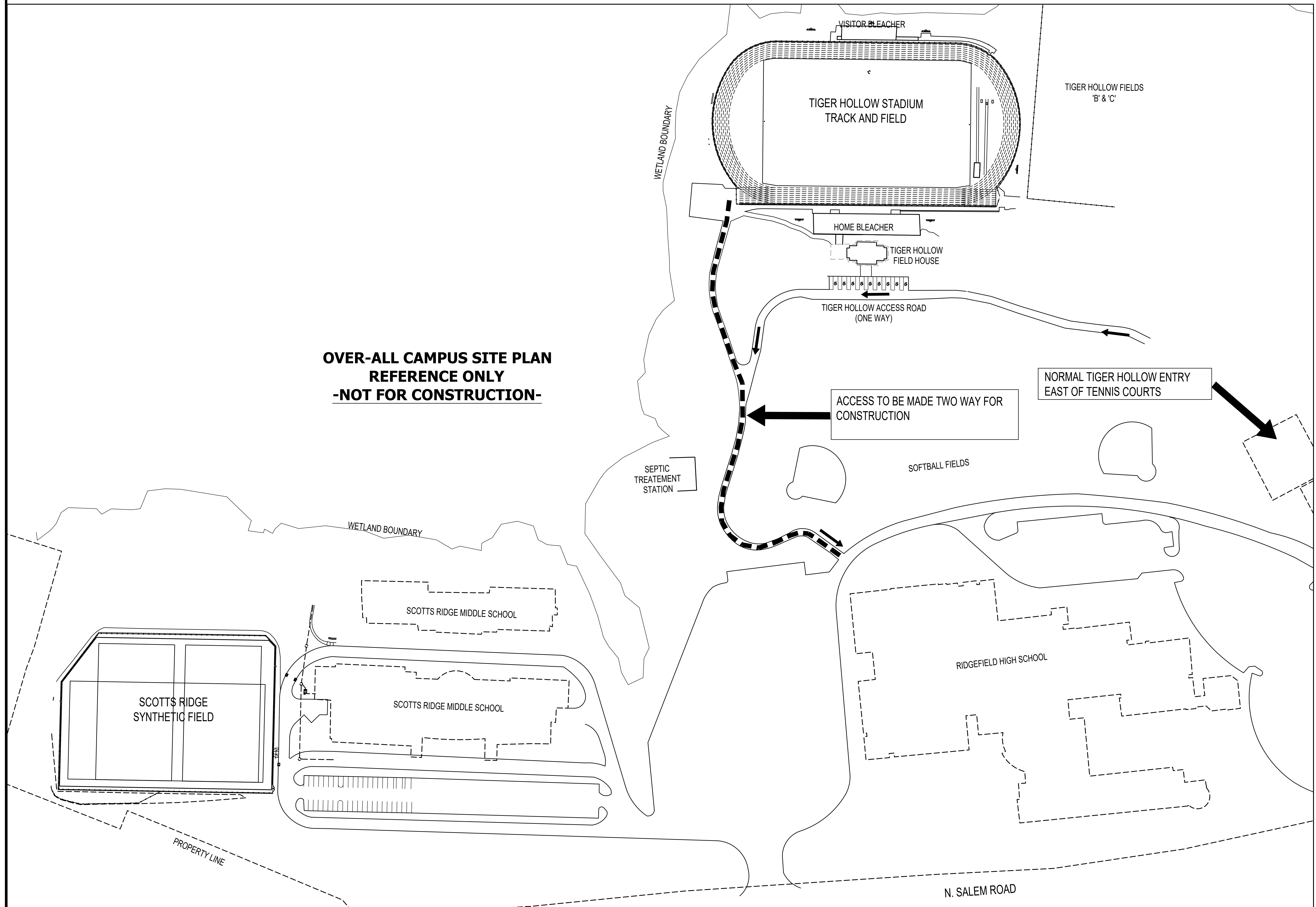
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OVERALL SITE PLAN


DRAWING NO.:

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 PROPERTY LINE

 SETBACK LINE

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325 Foxborough Boulevard, Suite 100, Foxborough, MA 02035
Phone: 508-549-9906 Fax: 508-549-9907

Email: kba@kba-architects.com  Web: www.kba-architects.com

1. EXISTING CONDITIONS INFORMATION FOR SCOTTS RIDGE MIDDLE SCHOOL FIELDS WAS OBTAINED FROM PAPER COPIES OF PREVIOUS CONSTRUCTION PLANS ENTITLED "THE SCOTTS RIDGE MIDDLE SCHOOL SYNTHETIC TURF LAYOUT PLAN" BY HARRY J. SHEPARD & ASSOCIATES, LLC DATED 5-28-2003 UPDATED 10-2-2003.
2. ALL EXISTING LOCATIONS AND DIMENSIONS SHOWN ON THESE PLANS SHOULD BE CONSIDERED APPROXIMATE. CONTRACTOR SHALL MAKE ALL SITE VISITS NECESSARY TO CONFIRM EXISTING CONDITIONS EXTENTS AND AREAS NECESSARY TO BID THIS PROJECT. SEE BID DOCUMENTS FOR COORDINATING SITE VISITS.
3. EXISTING UTILITIES AND LOCATIONS INFORMATION IS BASED ON AVAILABLE INFORMATION AND RECORDS. LOCATIONS SHOWN ARE APPROXIMATE AND ALL UTILITIES MAY NOT BE SHOWN. PRIOR TO THE START OF ANY CONSTRUCTION ACTIVITY, THE CONTRACTOR SHALL HAVE ALL UTILITIES IN THE AREA OF CONSTRUCTION MARKED ON THE GROUND. SEE SPECIFICATION FOR REQUIREMENTS.
4. PRIOR TO ANY CONSTRUCTION OR DEMOLITION CONTRACTOR SHALL CONTACT (CALL BEFORE YOU DIG) (CBYD) AT 1800-922-4455(CT) A MINIMUM OF 72 HOURS IN ADVANCE. CONTRACTOR IS RESPONSIBLE FOR ANY ADDITIONAL ON-SITE UTILITIES LOCATION SERVICES.
5. PRIOR TO ANY CONSTRUCTION CONTRACTOR SHALL INSTALL ALL NECESSARY EROSION CONTROL MEASURES SHOWN ON PLAN, OR AS REQUIRED. ALL EROSION CONTROL MEASURES SHALL BE IN ACCORDANCE WITH THE STANDARDS OF THE 2002 CONNECTICUT GUIDELINES FOR SOIL EROSION AND SEDIMENT CONTROL AS AMENDED, AND OR LOCAL MUNICIPALITY REQUIREMENTS, WHICHEVER IS MORE STRINGENT.
6. PRIOR TO ANY CONSTRUCTION ACTIVITY THE CONTRACTOR IS RESPONSIBLE FOR ESTABLISHING PROJECT BENCHMARKS OUTSIDE THE LIMITS OF WORK TO ESTABLISH EXISTING CONDITIONS LAYOUT AND ELEVATION TO ASSIST WITH PROPOSED CONSTRUCTION. CONTRACTOR IS RESPONSIBLE FOR MAINTAINING AND RE-ESTABLISHING THESE BENCHMARKS AS NEEDED DURING THE CONSTRUCTION PROJECT.

[illegible]

**TIGER HOLLOW &
SCOTTS RIDGE
SYNTHETIC TURF AND
TRACK REPLACEMENTS**

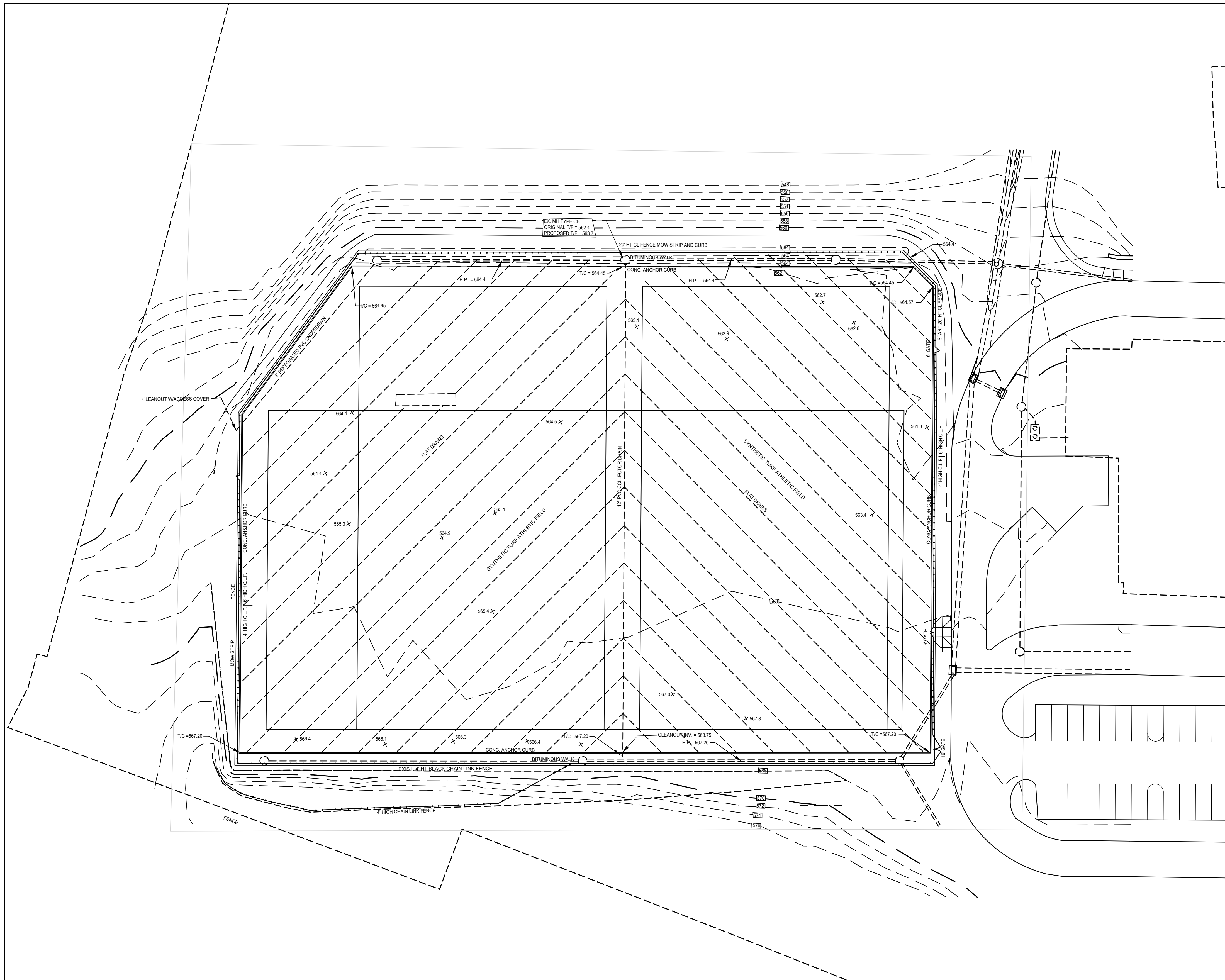
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750 N Salem Rd.
Ridgefield, CT 06877**

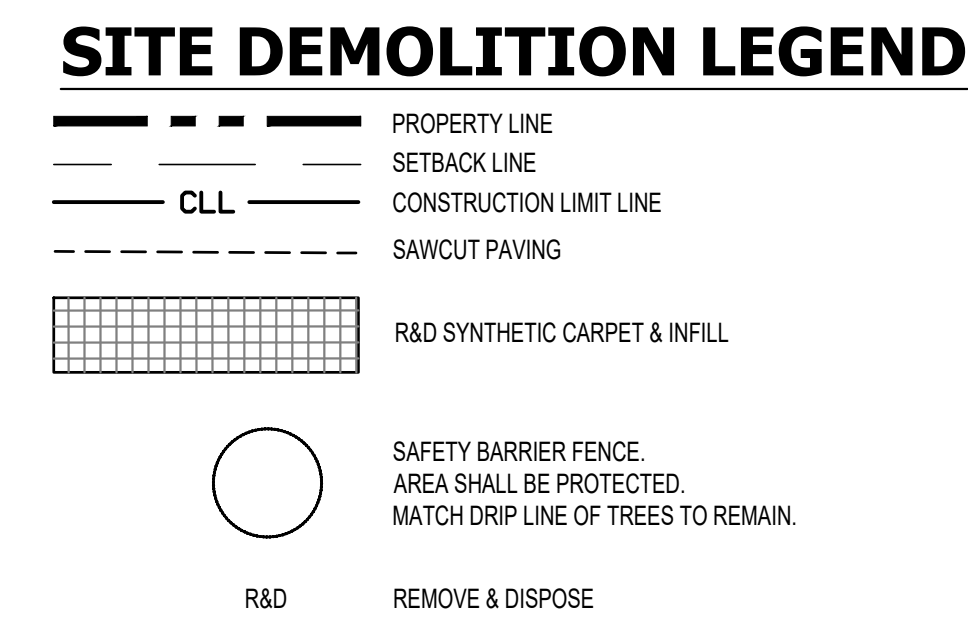
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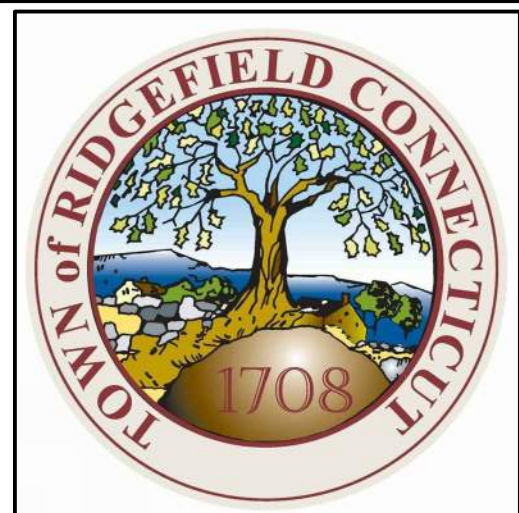


1. EXISTING SITE LOCATIONS, GRADING, UTILITIES AND LOCATIONS INFORMATION IS BASED ON PREVIOUS CONSTRUCTION DRAWINGS. LOCATIONS SHOWN ARE APPROXIMATE AND ALL UTILITIES MAY NOT BE SHOWN. PRIOR TO THE START OF ANY CONSTRUCTION ACTIVITY, THE CONTRACTOR SHALL HAVE ALL UTILITIES MARKED ON THE GROUND. SEE SPECIFICATION FOR REQUIREMENTS.
2. PRIOR TO ANY CONSTRUCTION OR DEMOLITION CONTRACTOR SHALL CONTACT (CALL BEFORE YOU DIG (CBYD)) AT 1800-822-4455(CITY) A MINIMUM OF 72 HOURS IN ADVANCE. CONTRACTOR IS RESPONSIBLE FOR ANY ADDITIONAL ON-SITE UTILITIES LOCATION SERVICES.
3. PRIOR TO ANY CONSTRUCTION CONTRACTOR SHALL INSTALL ALL NECESSARY EROSION CONTROL MEASURES SHOWN ON PLAN, OR AS REQUIRED. ALL EROSION CONTROL MEASURES SHALL BE IN ACCORDANCE WITH THE STANDARDS OF THE 2002 CONNECTICUT GUIDELINES FOR SOIL EROSION AND SEDIMENT CONTROL AS AMENDED, AND OR LOCAL MUNICIPALITY REQUIREMENTS. WHICHEVER IS MORE STRINGENT.
4. CONTRACTOR IS RESPONSIBLE FOR ALL SITE SAFETY AND SECURITY. CONTRACTOR SHALL INSTALL AND MAINTAIN AND REMOVE TEMPORARY CONSTRUCTION FENCE TO ENCLOSE AND SECURE THE SITE DURING CONSTRUCTION OPERATIONS. CONTRACTOR SHALL ADJUST THE LOCATION, GATES AND ACCESS, AS NEEDED TO ACCOMMODATE CONSTRUCTION OPERATIONS, FOR THE DURATION OF THE PROJECT. EXISTING FENCE MAY BE USED WHERE POSSIBLE.
5. ALL DEBRIS AND EXCESS MATERIALS SHALL BE PROMPTLY REMOVED FROM THE SITE AND DISPOSED OF IN A LEGAL MANNER.
6. ANY IMPROVEMENTS DAMAGED BY CONSTRUCTION ACTIVITIES SHALL BE THE RESPONSIBILITY OF THE CONTRACTOR AND SHALL BE RESTORED TO ORIGINAL CONDITION.
7. **SYNTHETIC TURF REMOVAL:** CONTRACTOR SHALL REMOVE AND DISPOSE OF EXISTING SYNTHETIC TURF CARPET AND INFILL IN THE AREA SHOWN. EXISTING GRAVEL BASE TO REMAIN AND BE PROTECTED. EXISTING CONCRETE ANCHOR CURB TO REMAIN AND BE PROTECTED. ASSUME EXISTING 2.5" KRAP TURF CARPET AND INFILL. (SEE MATERIALS PLAN FOR BASE PREPARATION REQUIREMENTS)
8. **CONCRETE ANCHOR CURB:** UPON TURF REMOVAL CONTRACTOR SHALL CLEAN AND INSPECT CONDITIONS OF EXPOSED PORTIONS OF EXISTING ANCHOR CURB AND REPORT ALL AREAS IN NEED OF REPAIR TO THE ARCHITECT FOR REVIEW.
9. **CHAIN LINK PERIMETER FENCE:** CONTRACTOR SHALL REMOVE CHAIN LINK FENCE FROM 4 & 6 FOOT HEIGHT PERIMETER FENCING. EXISTING POLES & RAILS TO REMAIN IN PLACE (AND BE PAINTED PRIOR TO INSTALLATION OF NEW FENCE FABRIC.). PERIMETER FENCING OVER 6 FT. SHALL REMAIN AS-IS AND BE PROTECTED.

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TIGER HOLLOW & SCOTTS RIDGE SYNTHETIC TURF AND TRACK REPLACEMENTS

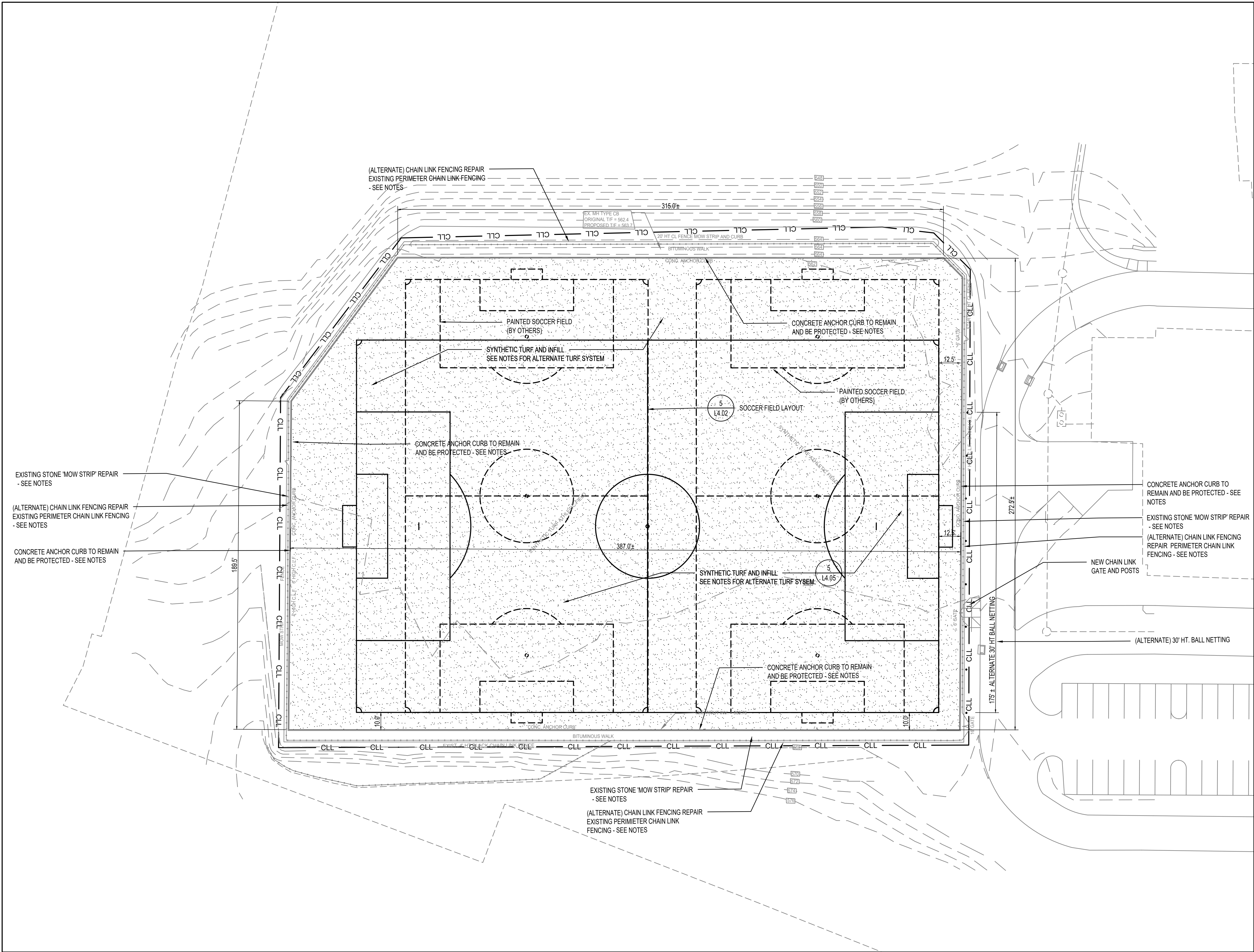
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Ridgefield, CT 06877**

PROJECT NO.: 21001.01

DRAWN BY: KM

SCOTTS RIDGE PREPARATION & DEMOLITION PLAN

DRAWING NO.



LAYOUT LEGEND

PROPERTY LINE

SETBACK LINE

CONSTRUCTION LIMIT LINE

CLL

CURB

CHAIN LINK FENCING

GATES (TYP.)

R5'

RADIAL DIMENSION

10.0'

LINEAR DIMENSION

5°

ANGULAR DIMENSION

SCOTTS RIDGE LAYOUT & CONSTRUCTION NOTES

- CONTRACTOR IS RESPONSIBLE TO VERIFY ALL EXISTING CONDITIONS LAYOUT INFORMATION. BRING ANY DISCREPANCIES TO THE ARCHITECT'S ATTENTION FOR REVIEW AND CLARIFICATION. REFER TO SITE PREPARATION & DEMOLITION PLAN FOR ESTABLISHMENT OF EXISTING LAYOUT BASELINE AND BENCHMARK REQUIREMENTS.
- DO NOT SCALE DRAWINGS. USE DIMENSIONS GIVEN. ALL DIMENSIONS AND EXISTING CONDITIONS SHALL BE VERIFIED BY THE CONTRACTOR IN THE FIELD PRIOR BIDDING.
- ALL DIMENSIONS ARE 90° AND TO THE NEAREST FOOT UNLESS OTHER WISE NOTED. ALL DIMENSIONS ARE TO THE FACE OF CURB, FACE OF BUILDING, EDGE OF PAVEMENT, CENTERLINE OF FENCE OR THE BOTTOM FACE OF WALL UNLESS OTHERWISE NOTED.
- CONTRACTOR SHALL ENGAGE A SURVEYOR LICENSED IN THE STATE OF PROJECT TO PERFORM LAYOUT AND SURVEYING SERVICES INCLUDING, BUT NOT LIMITED TO VERIFICATION AND LAYOUT OF BASELINES, PROPOSED IMPROVEMENTS, DIMENSIONS AND ELEVATIONS. REPORT ALL DISCREPANCIES TO THE ARCHITECT.
- SCOTT'S RIDGE NEW SYNTHETIC TURF SYSTEMS:

BASE BID TURF SYSTEM: SHALL BE SYNTHETIC TURF ON EXISTING STONE BASE (WITH OUT RESILIENT UNDERLAYMENT. SHIM AT CURB NOT REQUIRED.)

ALTERNATE TURF SYSTEM: SHALL BE NEW SYNTHETIC TURF WITH RESILIENT UNDERLAYMENT. PROVIDE SHIM AT EXISTING CURB. SEE DETAIL. SEE DETAILS AND SPECIFICATION FOR DETAILED TURF ALTERNATES.
- ALTERNATE: CHAIN LINK FENCING REPAIRS: CONTRACTOR SHALL REMOVE EXISTING FENCE FABRIC ALL FIELD PERIMETER FENCE AND DISPOSE OFF SITE. EXISTING FENCE POSTS & RAILS TO REMAIN AND BE PROTECTED. STRAIGHTEN AND PAINT EXISTING POSTS AND RAILS TO REMAIN. REPLACE BENT OR BROKEN RAILS AND ACCESSORIES. PAINT EXISTING RAILS AND POSTS (SATIN BLACK). INSTALL NEW BLACK VINYL COATED FENCE FABRIC, RAILS AND ACCESSORIES ON EXISTING POLES. MATCH EXISTING HEIGHTS.
- STONE 'MOW STRIP': PRIOR TO INSTALLATION OF NEW TURF AND FENCE CONTRACTOR SHALL RE-GRADE AND SUPPLEMENT EXISTING MOW STRIP WITH STONE SCREENINGS TO PROVIDE A FLUSH CONDITION. PROVIDE ADDITIONAL STONE SCREENINGS AS REQUIRED TO BRING STRIP FLUSH WITH TOP OF TURF CURB.

SCOTTS RIDGE GRADING NOTES

- PRIOR TO TURF INSTALLATION OF THE NEW SYNTHETIC TURF SYSTEM THE EXISTING FIELD STONE BASE SHALL BE LASER GRADE AND TESTED TO CONFORM TO THE REQUIREMENTS OF SPECIFICAION SECTION 33 46 16 FIELD SUBDRAINAGE SYSTEM. GRADE TO BE 0.5% IN EXISTING ORIENTATION.
- FINISHED GRADE SHALL REFER TO THE THE TOP OF EXISTING CONCRETE ANCHOR CURB AND TOP OF FINISHED TURF INFILL.
- THE CONTRACTOR SHALL BE RESPONSIBLE FOR REPAIR OR REPLACEMENT OF ALL UTILITIES OR IMPROVEMENT DAMAGED BY THE CONTRACTOR'S ACTIVITIES.

SCOTTS RIDGE BID ALTERNATES:

SEE SPECIFICATION AND DETAILS FOR DETAILED SCOPE OF BID ALTERNATES.

ALTERNATE #1: (ADD) SYNTHETIC TURF WITH RESILIENT PAD

ALTERNATE #2: CHAIN LINK FENCING REPAIRS

ALTERNATE #3: 30' HT. BALL NETTING SYSTEM

ALTERNATE #4: FIELD TOP STONE REPAIRS

ALTERNATE #5: FIELD COLLECTOR DRAIN REPAIRS

KAESTLE BOOS
associates, inc

416 Slater Road, P.O. Box 2590, New Britain, CT 06050-2590
Phone: 860-229-0361 Fax: 860-229-5303

325 Foxborough Boulevard, Suite 100, Foxborough, MA 02035
Phone: 508-549-9906 Fax: 508-549-9907

Email: kba@kba-architects.com Web: www.kba-architects.com

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0 15' 30' 60'

SCALE: 1" = 30'-0"

TRUE

TOWN of RIDGEFIELD CONNECTICUT
1708

RIDGEFIELD HIGH SCHOOL

TIGER HOLLOW &
SCOTTS RIDGE
SYNTHETIC TURF AND
TRACK REPLACEMENTS

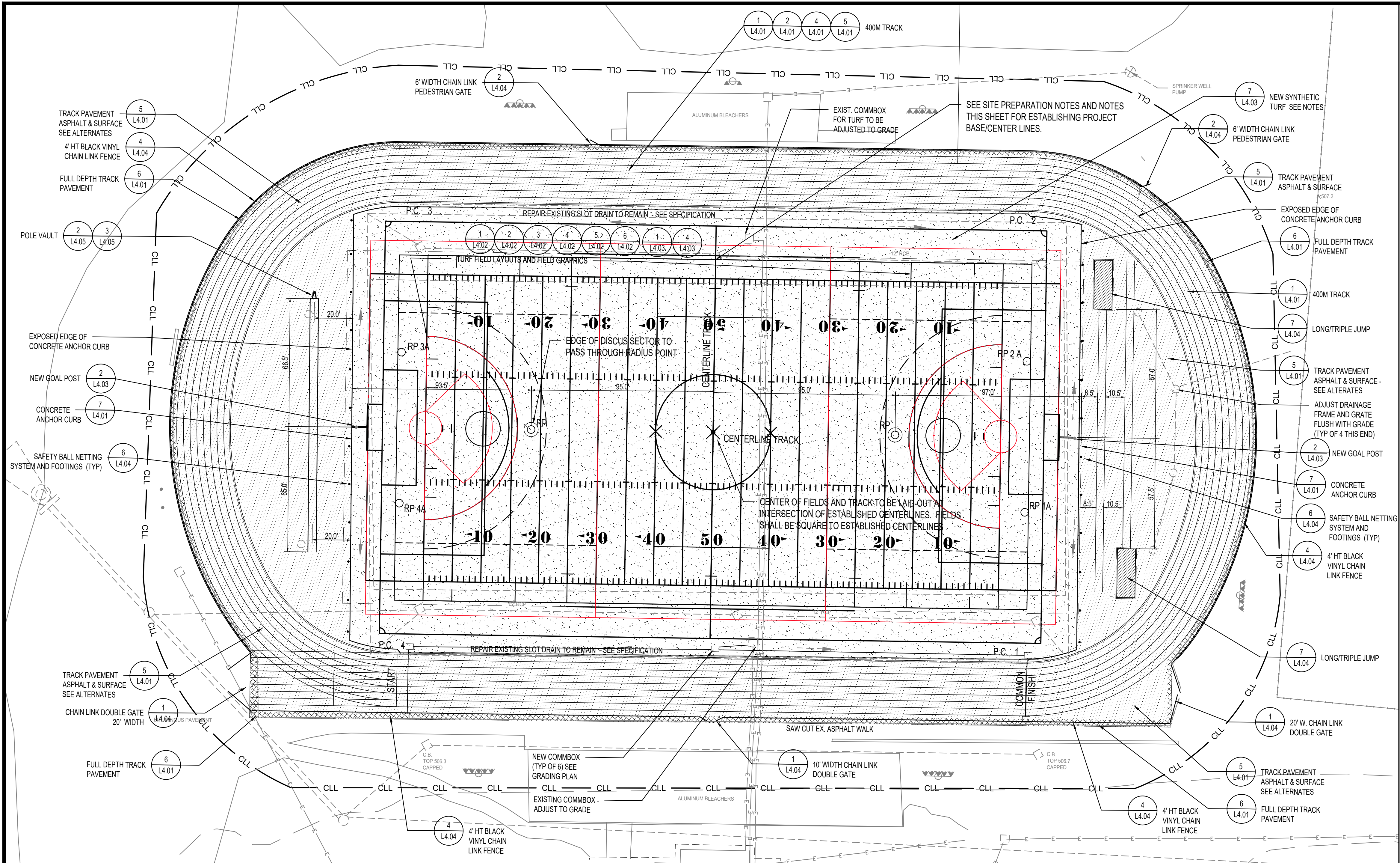
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PROJECT NO.: 21001.01 DRAWN BY: KM

SCOTTS RIDGE
LAYOUT, MATERIALS
& GRADING
PLAN

DRAWING NO.:
L2.01

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LAYOUT LEGEND

--- PROPERTY LINE
--- SETBACK LINE
--- CLL --- CONSTRUCTION LIMIT LINE

--- CURB
--- CHAIN LINK FENCING
--- GATES (TYP.)

R5' --- RADIAL DIMENSION
+ 10.0' --- LINEAR DIMENSION
45° --- ANGULAR DIMENSION

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RIDGEFIELD HIGH SCHOOL

**TIGER HOLLOW &
SCOTTS RIDGE
SYNTHETIC TURF AND
TRACK REPLACEMENTS**

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750 N Salem Rd.
Ridgefield, CT 06877

PROJECT NO.: 21001.01 DRAWN BY: KM

**TIGER HOLLOW
STADIUM
LAYOUT & MATERIALS
PLAN**

DRAWING NO.:

L2.02

TIGER HOLLOW BID ALTERNATES:

SEE SPECIFICATION AND DETAILS FOR DETAILED SCOPE OF BID ALTERNATES.

ALTERNATE #6: (DEDUCT) SYNTHETIC TURF OVER STONE BASE (WITHOUT RESILIENT PAD)

ALTERNATE #7: FIELD BASE TOPSTONE REPAIR

ALTERNATE #8: FIELD PERIMETER COLLECTOR DRAIN REPAIR

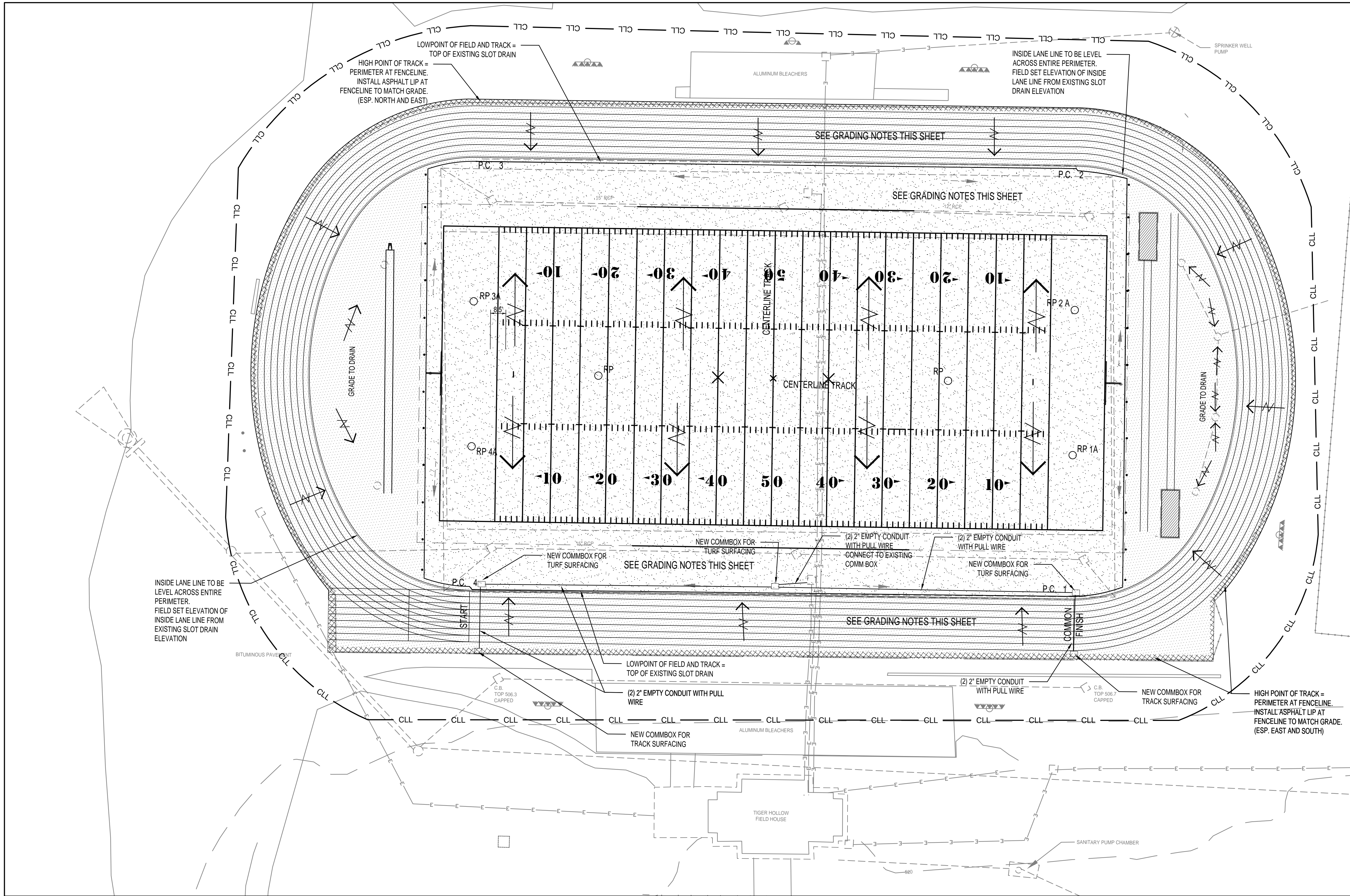
ALTERNATE #9: NON-FIXED TRACK AND FIELD EQUIPMENT

ALTERNATE #10: (DEDUCT) URETHANE STRUCTURAL SPRAY TRACK SURFACE IN LIEU OF SANDWICH SYSTEM

ALTERNATE #11: (DEDUCT): RED RUNNING TRACK SURFACE IN LIEU OF ORANGE/GREY SURFACE

TIGER HOLLOW LAYOUT & CONSTRUCTION NOTES

1. CONTRACTOR IS RESPONSIBLE TO VERIFY ALL EXISTING CONDITIONS LAYOUT INFORMATION. BRING ANY DISCREPANCIES TO THE ARCHITECT'S ATTENTION FOR REVIEW AND CLARIFICATION. REFER TO LAYOUT AND CENTERLINE ESTABLISHMENT NOTES ON SITE PREPARATION DRAWINGS.
2. DO NOT SCALE DRAWINGS. USE DIMENSIONS GIVEN. ALL DIMENSIONS AND EXISTING CONDITIONS SHALL BE VERIFIED BY THE CONTRACTOR IN THE FIELD PRIOR TO BIDDING AND THE CONTRACTOR SHALL BE HELD RESPONSIBLE FOR THE SAME.
3. ALL DIMENSIONS ARE 90° AND TO THE NEAREST FOOT UNLESS OTHER WISE NOTED. ALL DIMENSIONS ARE TO THE FACE OF CURB, FACE OF BUILDING, EDGE OF PAVEMENT, CENTERLINE OF FENCE OR THE BOTTOM FACE OF WALL UNLESS OTHERWISE NOTED.
4. CONTRACTOR SHALL ENGAGE A SURVEYOR LICENSED IN THE STATE OF PROJECT TO PERFORM LAYOUT AND SURVEYING SERVICES INCLUDING, BUT NOT LIMITED TO VERIFICATION AND LAYOUT OF BASELINES, SPOTGRADES, PROPOSED IMPROVEMENTS, DIMENSIONS, ELEVATIONS AND AS-BUILT CONDITIONS. REPORT ALL DISCREPANCIES TO THE ARCHITECT. SEE SITE PREPARATION SHEET FOR LAYOUT CENTERLINE ESTABLISHMENT NOTES.
5. NEW PERIMETER CHAIN LINK FENCE: LOCATE NEW FENCE A MINIMUM OF 39" FROM NEW OUTSIDE LANE LINE OF RUNNING TRACK. NEW FENCE & GATES TO BE 4' HT. BLACK VINYL CHAIN LINK FENCE AND POSTS. ALL GATES SHALL OPEN OUTWARD AND SHALL BE MECHANICALLY PREVENTED FROM SWINGING OVER TRACK SURFACING. RAISE GATES AS REQUIRED TO ALLOW OUTWARD OPEN.
6. SEE GRADING SHEET FOR TRACK AND FIELD BASE PREPARATION AND GRADING NOTES.



GRADING LEGEND

	PROPERTY LINE
	SETBACK LINE
	BASE BID CONSTRUCTION LIMIT LINE
	AREA ENLARGEMENT
	HANDICAP ACCESSIBLE ROUTE (SLOPE NOT TO EXCEED 5% IN DIRECTION OF TRAVEL & SHALL BE MAX. 2% CROSS SLOPE. TYP.)
	EXISTING CONTOUR
	PROP. INTERMEDIATE CONTOUR
	PROP. INTERVAL CONTOUR
	3'x4' ACCESSIBLE SPECTATOR AREA (2% SLOPE MAX. ANY DIRECTION)
	SPOT ELEVATION
	FLUSH CONDITION
	CATCH BASIN
	AREA/YARD DRAIN
	DRAINAGE ARROW
	F.F.E. FINISH FLOOR ELEVATION
	B.W. BOTTOM OF WALL
	T.W. TOP OF WALL
	B.S. BOTTOM OF STAIRS
	T.S. TOP OF STAIRS
	B.C. BOTTOM OF CURB
	T.C. TOP OF CURB
	T.F. TOP OF FRAME
	H.P. HIGH POINT
	L.P. LOW POINT
	CST. CONSISTENT
	EXIST. EXISTING
	ACCESSIBLE ENTRANCE

TIGER HOLLOW GRADING NOTES

- THIS IS A GENERAL GRADING PLAN. EXISTING ELEVATIONS AND TOPOGRAPHIC SURVEY WAS NOT PERFORMED TO CONFIRM GRADES. CONTRACTOR TO PROVIDE PRE-CONSTRUCTION SURVEY CONFIRMATIONS. REFER TO SITE PREPARATION AND DEMOLITION PLANS FOR REQUIREMENTS.
- TURF FIELD GRADING: PRIOR TO THE INSTALLATION OF THE NEW SYNTHETIC TURF SYSTEM, THE EXISTING FIELD STONE BASE SHALL BE LASER GRADED AND TESTED TO CONFORM TO THE REQUIREMENTS OF SPECIFICATION SECTION 33 46 16 FIELD SUBDRAINAGE SYSTEM. FINISH GRADE SHALL REFER TO THE FOLLOWING:
RUNNING TRACK: TOP OF FINISHED ASPHALT
ANCHOR CURB & SLOT DRAINAGE: TOP OF CONCRETE OR DRAIN.
SYNTHETIC FIELD: TOP OF FINISHED INFILL.
** URETHANE TRACK SURFACING SHALL EXTEND OVER ANCHOR CURBING AND SLOT DRAINAGE.
- TURF FIELD GRADING: SYNTHETIC FIELD STONE BASE SHALL BE GRADED AT 0.5% BETWEEN EXISTING SLOT DRAINS AND CENTERLINE OF FIELD. NEW 'D' AREA ANCHOR CURBS TO FOLLOW THIS GRADE. PROPOSED ACCESS BOXES SHALL BE ADJUSTED AS REQUIRED TO BE FLUSH WITH GRADE. EXISTING BURIED DRAINAGE STRUCTURES, IF ENCOUNTERED, SHALL REMAIN BURIED.
- RUNNING TRACK CROSS PITCH: EXISTING TRACK CROSS-PITCH IS INCONSISTENT AND GREATER THAN THE MAXIMUM 2% IN SOME AREAS. BASE OF DESIGN ELEVATION SHALL BE GRADE OF TOP OF EXISTING POLY-CRETE SLOT DRAINS. (ASSUMED TO BE LEVEL - CONTRACTOR TO CONFIRM). FINISH GRADE OF ASPHALT SHALL BE FLUSH WITH TOP OF POLY-CRETE DRAIN.
CONTRACTOR SHALL SET TRACK ELEVATIONS BY CREATING SLOPE NOT TO EXCEED 2% SLOPE BETWEEN POLY-CRETE BASE ELEVATION AND INSIDE LANE LINE TO SET INSIDE EDGE OF TRACK ELEVATION. REMAINING TRACK LANES SHALL BE GRADED AT A CONSISTENT CROSS SLOPE NOT TO EXCEED 2% TO PERIMETER FENCE LINE. PERPENDICULAR TO PROPOSED TRACK LANES. BREAK IN GRADE ACROSS TRACK WIDTH SHALL NOT BE ACCEPTABLE.
- CONTRACTOR SHALL INCLUDE IN HIS BID ALL RE-GRADING NECESSARY TO LOWER GRADES BY UP TO 3" AT OUTER EDGE OF TRACK FOR CORRECTING GRADE DISCREPANCIES NOTED ABOVE. RE-GRADING SHALL INCLUDE ALL COSTS FOR LOADING, HAULING AND DISPOSING OF EXCESS MATERIAL OFF SITE. ASSUME GRAVEL BASE IS PRESENT AND DEEP ENOUGH TO BE RE-GRADED IN PLACE. CONTRACTOR SHALL ALSO INCLUDE IN HIS BID A 3" ASPHALT 'LIP' AT INSIDE OF THE PROPOSED FENCE LINE TO TAKE UP GRADE DIFFERENCES TO ADJACENT EXISTING GRADE. SEE DETAILS.
- 'D' AREAS SHALL BE GRADED TO DRAIN TO EXISTING DRAINAGE GRATES. GRADES SHALL BE CONSISTENT BETWEEN LANE LINE OR CURBS AND EXISTING DRAIN ELEVATIONS.
- INSTALL NEW COMMBOX'S AND COMMUNICATION CONDUIT AS SHOWN. CONDUIT TO BE INSTALLED WITH PULL WIRE ONLY. STUB CONDUITS INTO COMBOXES. ADJUST LOCATION/ELEVATION OF CONDUIT TO AVOID ADJACENT DRAINAGE.

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associates, inc

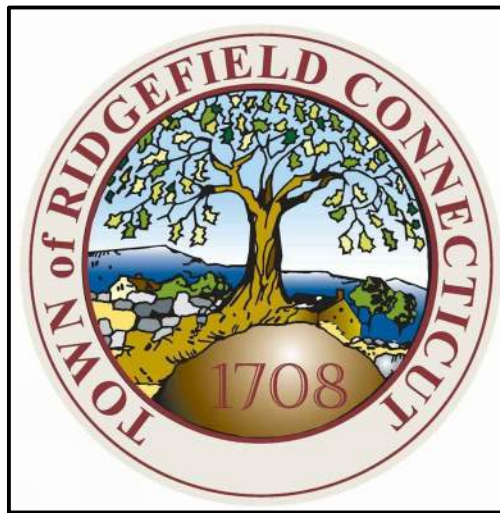
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Phone: 860-229-0361 ▲ Fax: 860-229-5303

325 Foxborough Boulevard, Suite 100, Foxborough, MA 02035
Phone: 508-549-9906 ▲ Fax: 508-549-9907

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RIDGEFIELD HIGH SCHOOL

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SYNTHETIC TURF AND
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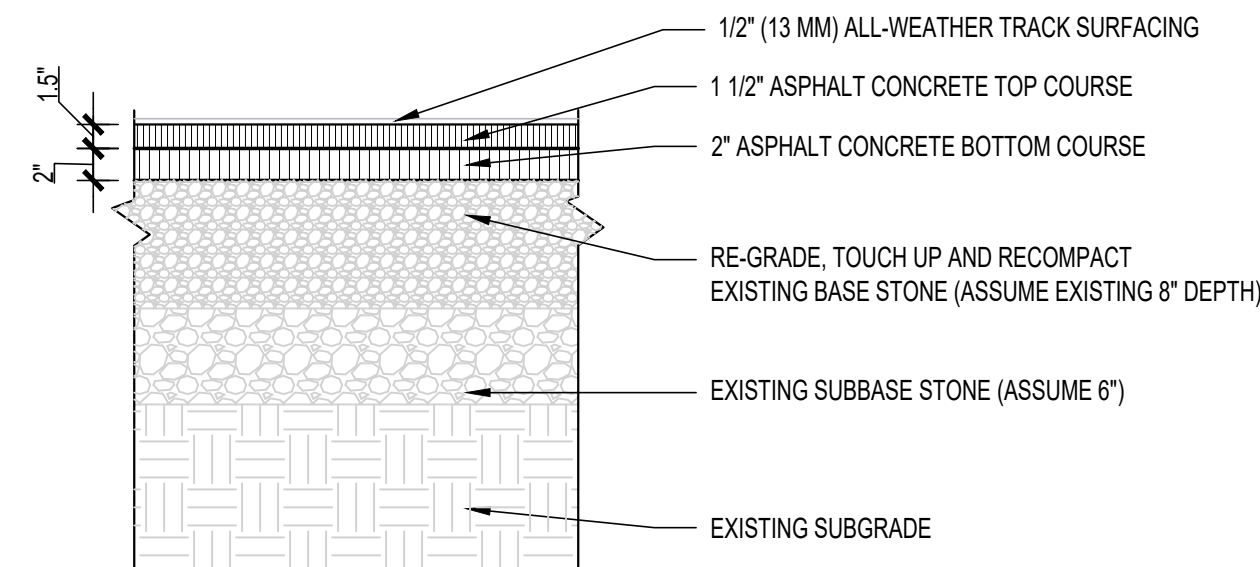
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TIGER HOLLOW
STADIUM
GRADING & UTILITIES
PLAN

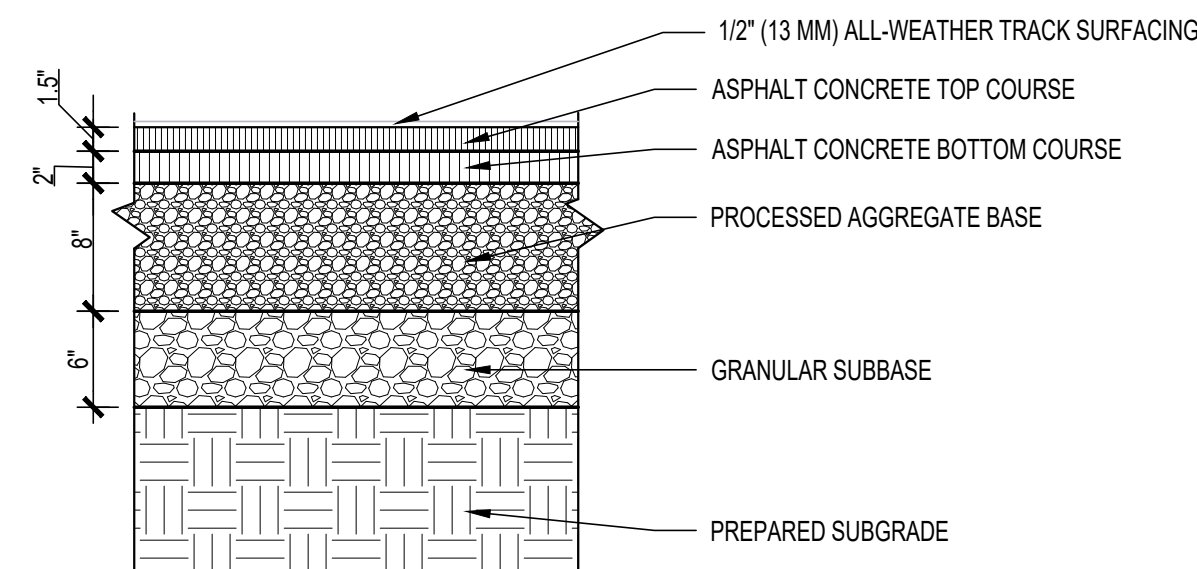
DRAWING NO.:

L3.00



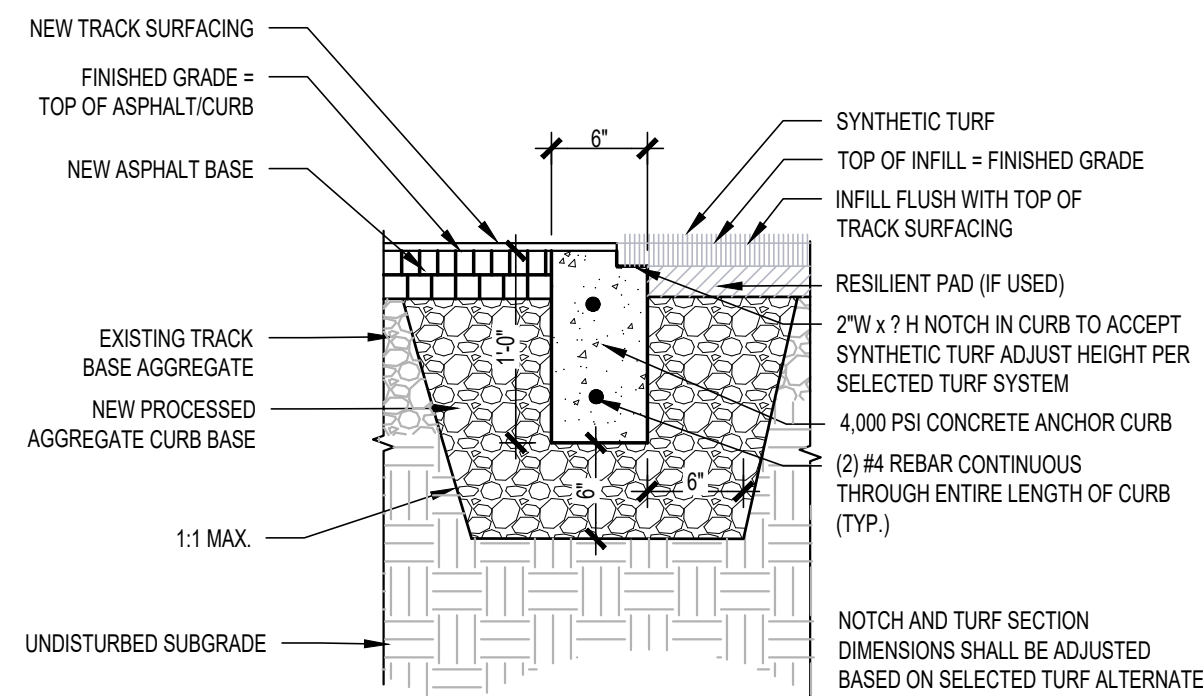
5 TRACK PAVEMENT

NOT TO SCALE



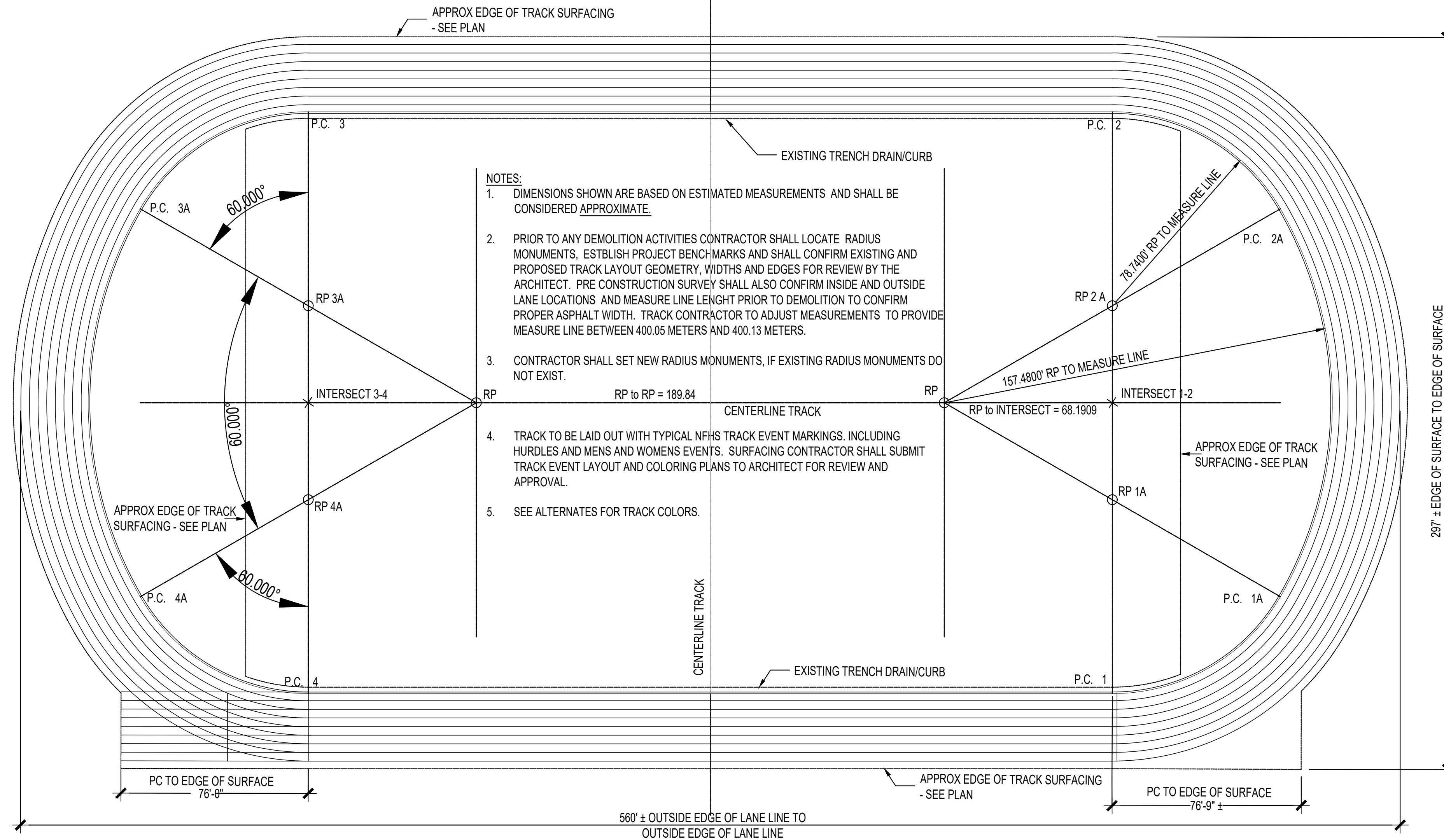
6 TRACK PAVEMENT (FULL DEPTH)

NOT TO SCALE



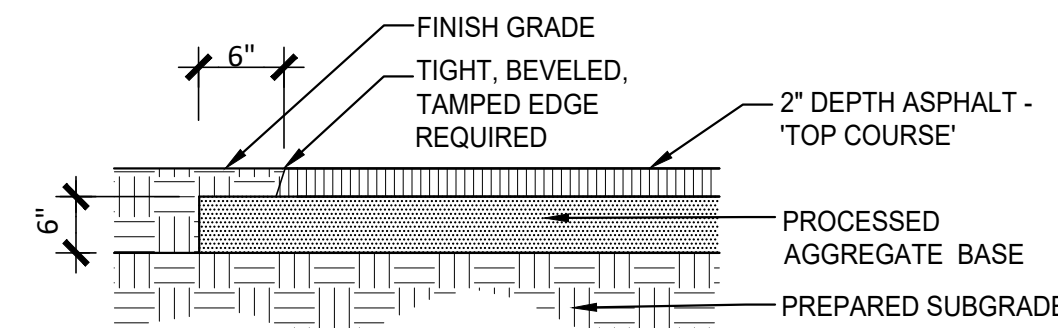
7 CONCRETE ANCHOR CURB

NOT TO SCALE



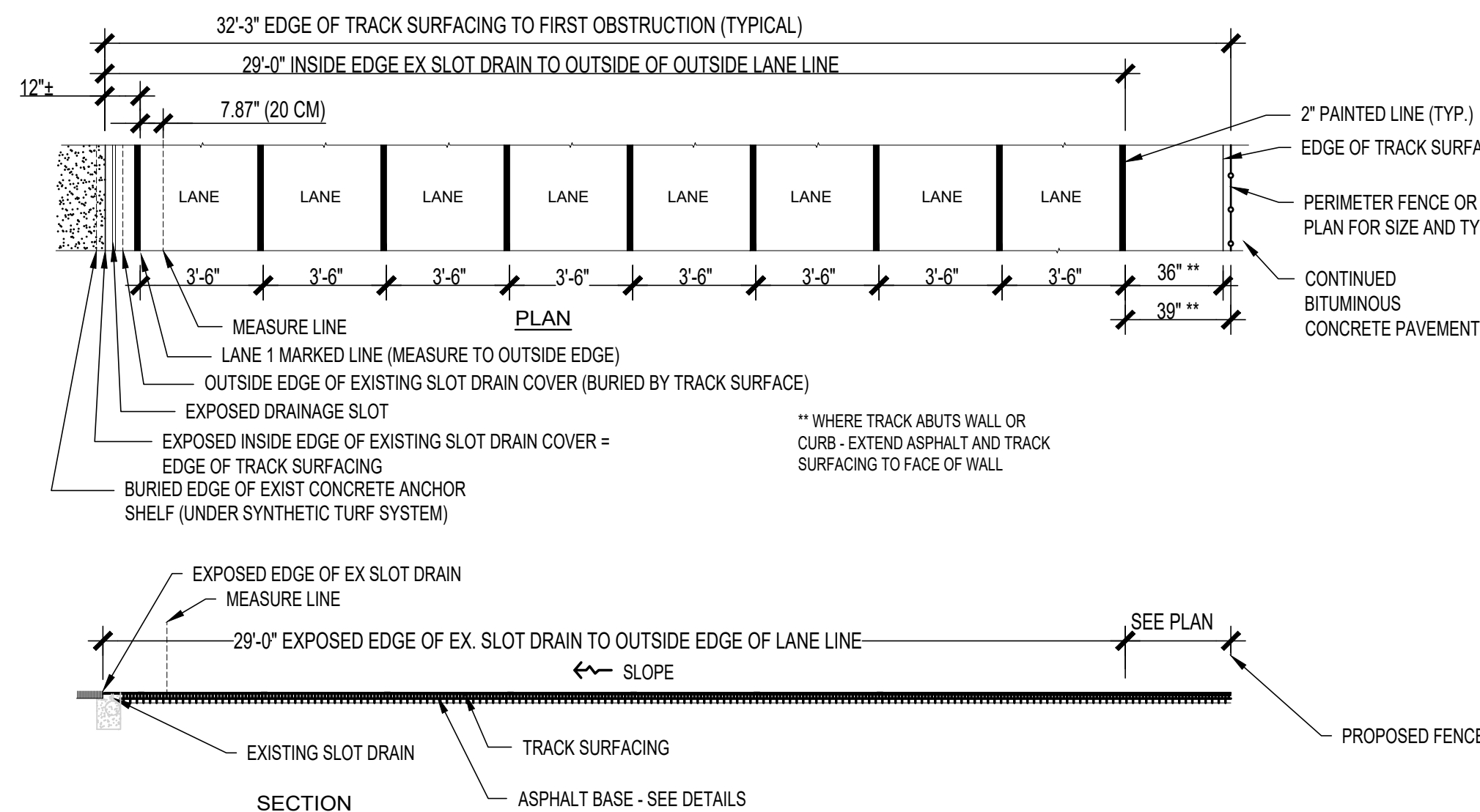
1 ESTIMATED 400 M TRACK LAYOUT - TIGER HOLLOW STADIUM - RIDGEFIELD

NOT TO SCALE



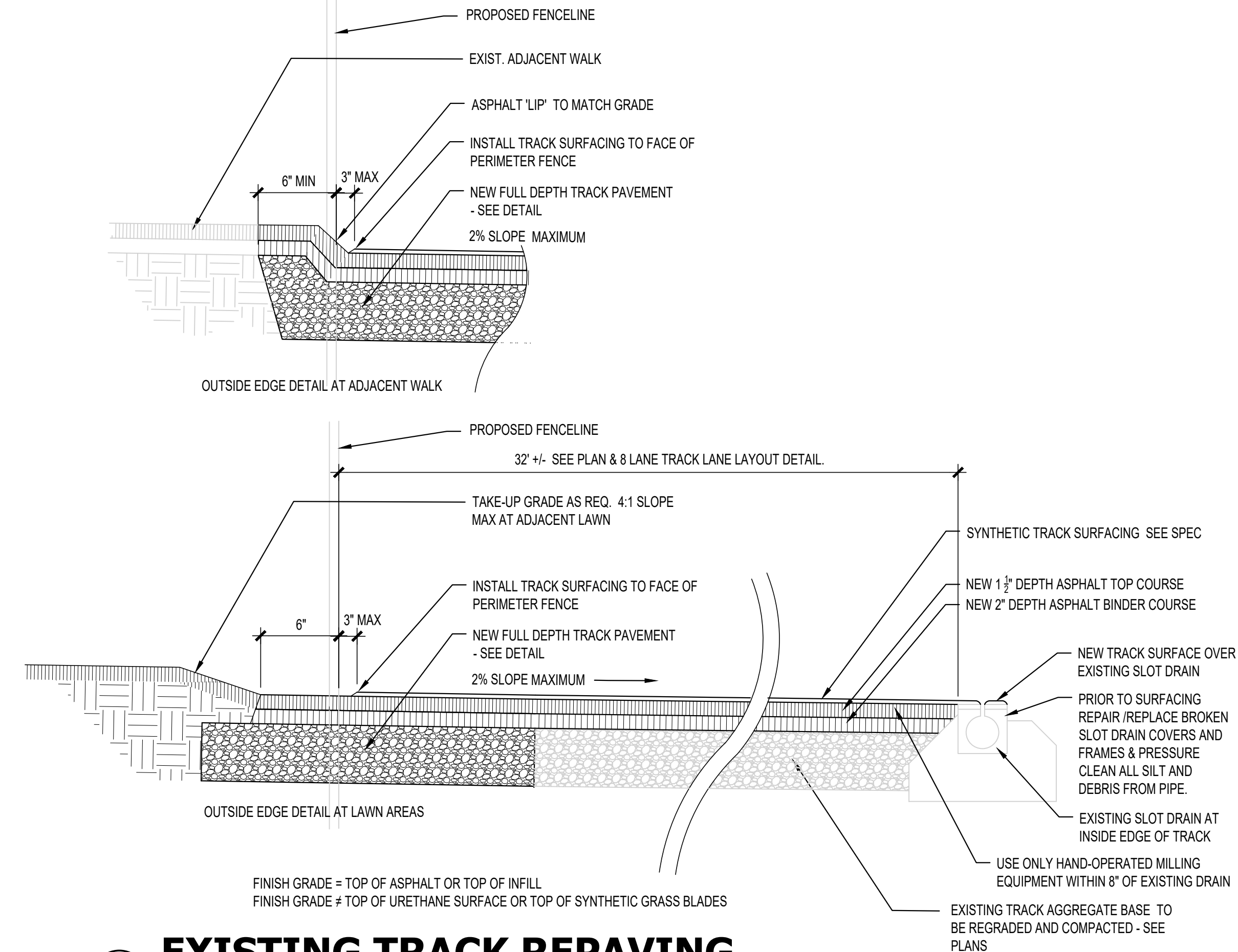
3 ASPHALT WALK - SINGLE COURSE

NOT TO SCALE



4 TRACK LAYOUT SECTION - 8 LANE

NOT TO SCALE



2 EXISTING TRACK REPAVING

NOT TO SCALE

DATE	DESCRIPTION
MAY 5, 2021	ISSUED FOR BID

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RIDGEFIELD HIGH SCHOOL

TIGER HOLLOW & SCOTTS RIDGE SYNTHETIC TURF AND TRACK REPLACEMENTS

700 N Salem Rd.
750 N Salem Rd.
Ridgefield, CT 06877

PROJECT NO.: 21001.01

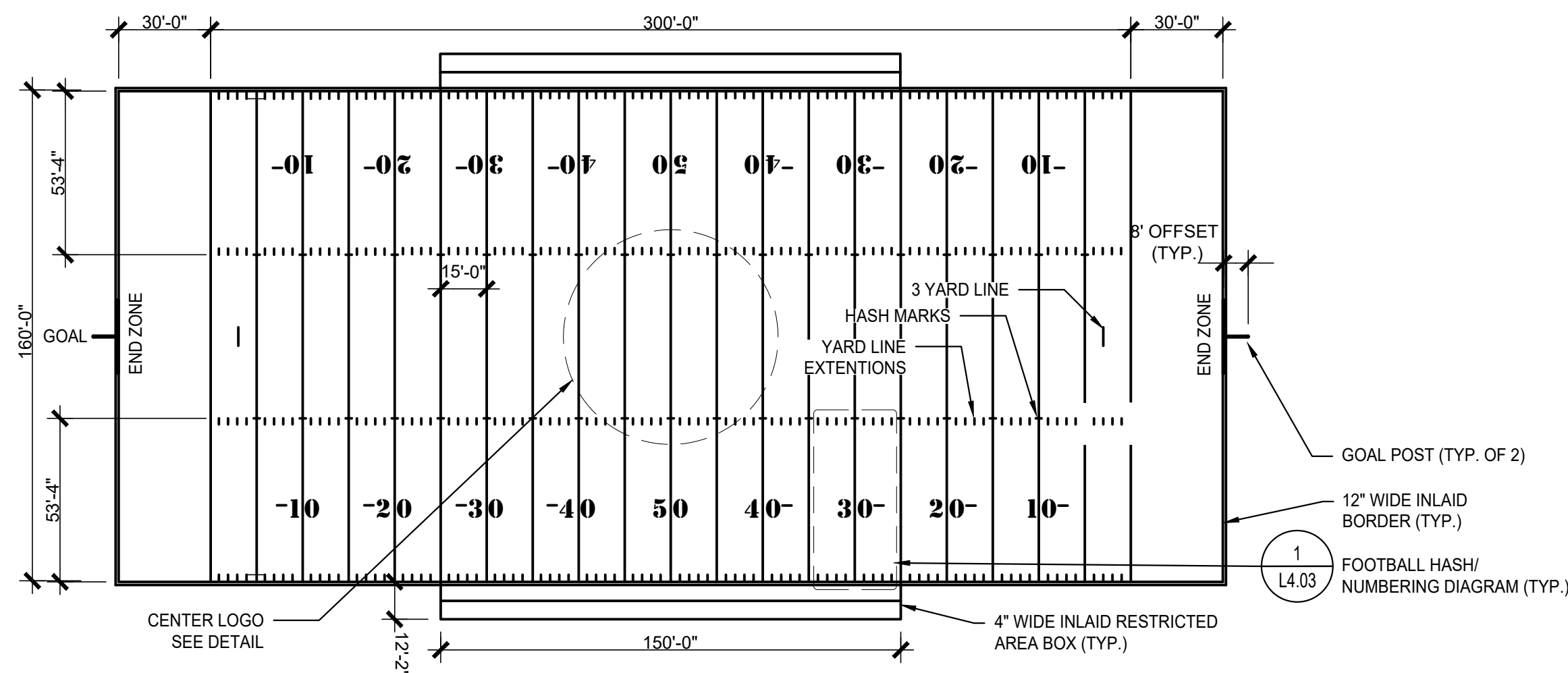
DRAWN BY: KM

SITE DETAILS

DRAWING NO.:

L4.01

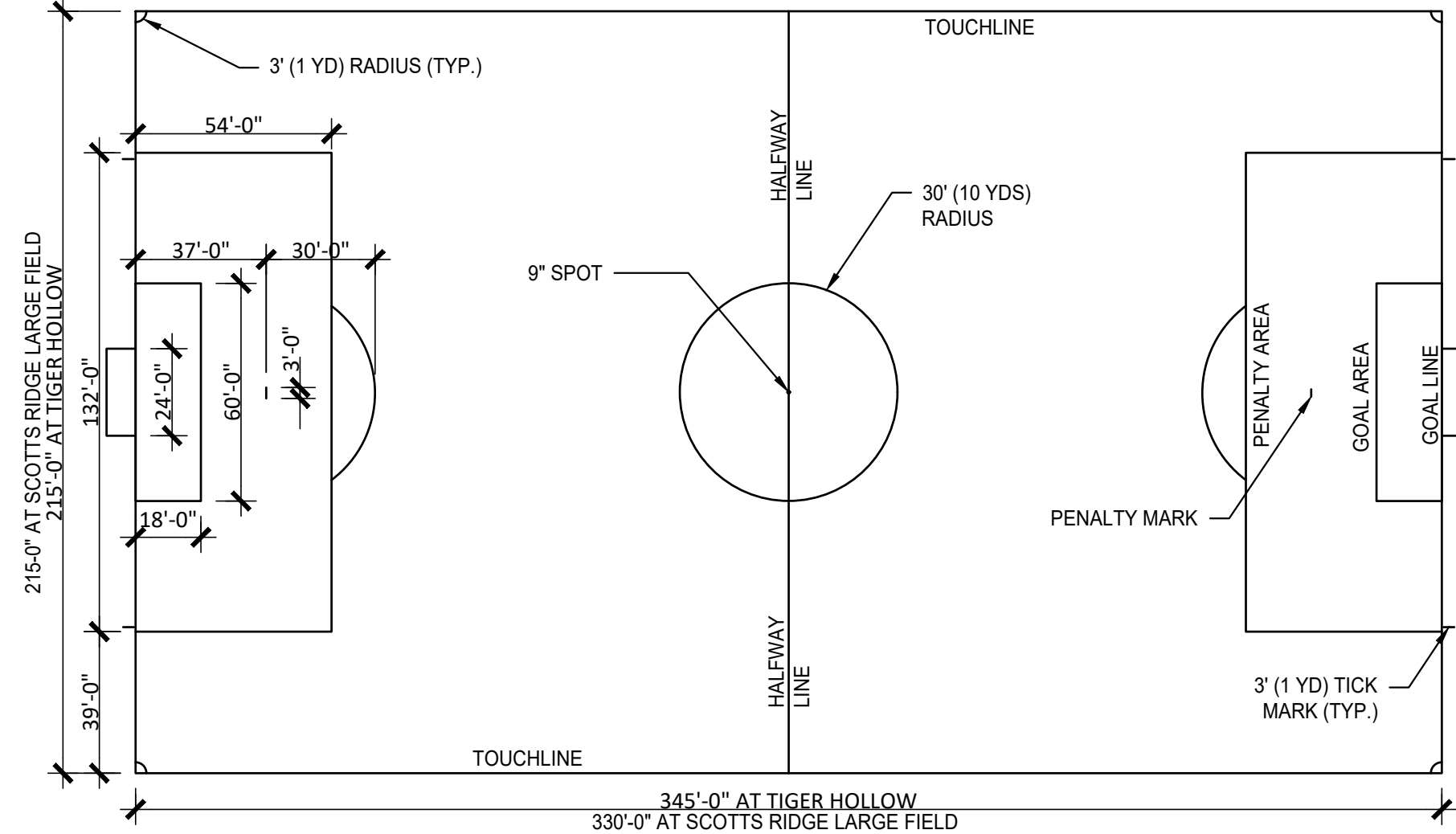
- NOTES:
1. ALL FOOTBALL DIMENSIONS ARE MEASURED FROM INSIDE EDGE OF LINE TO INSIDE EDGE OF LINE.
 2. WHERE FOOTBALL LINES OVERLAP OTHER SPORT FIELD LINES, FOOTBALL SHALL TAKE PRIORITY.
 3. EXISTING GOAL POSTS TO REMAIN - ALIGN END LINES AND FIELD LAYOUT WITH EXISTING POST LOCATIONS.



4 FOOTBALL FIELD LAYOUT (WHITE INLAID MARKINGS) (NFHS)

NOT TO SCALE

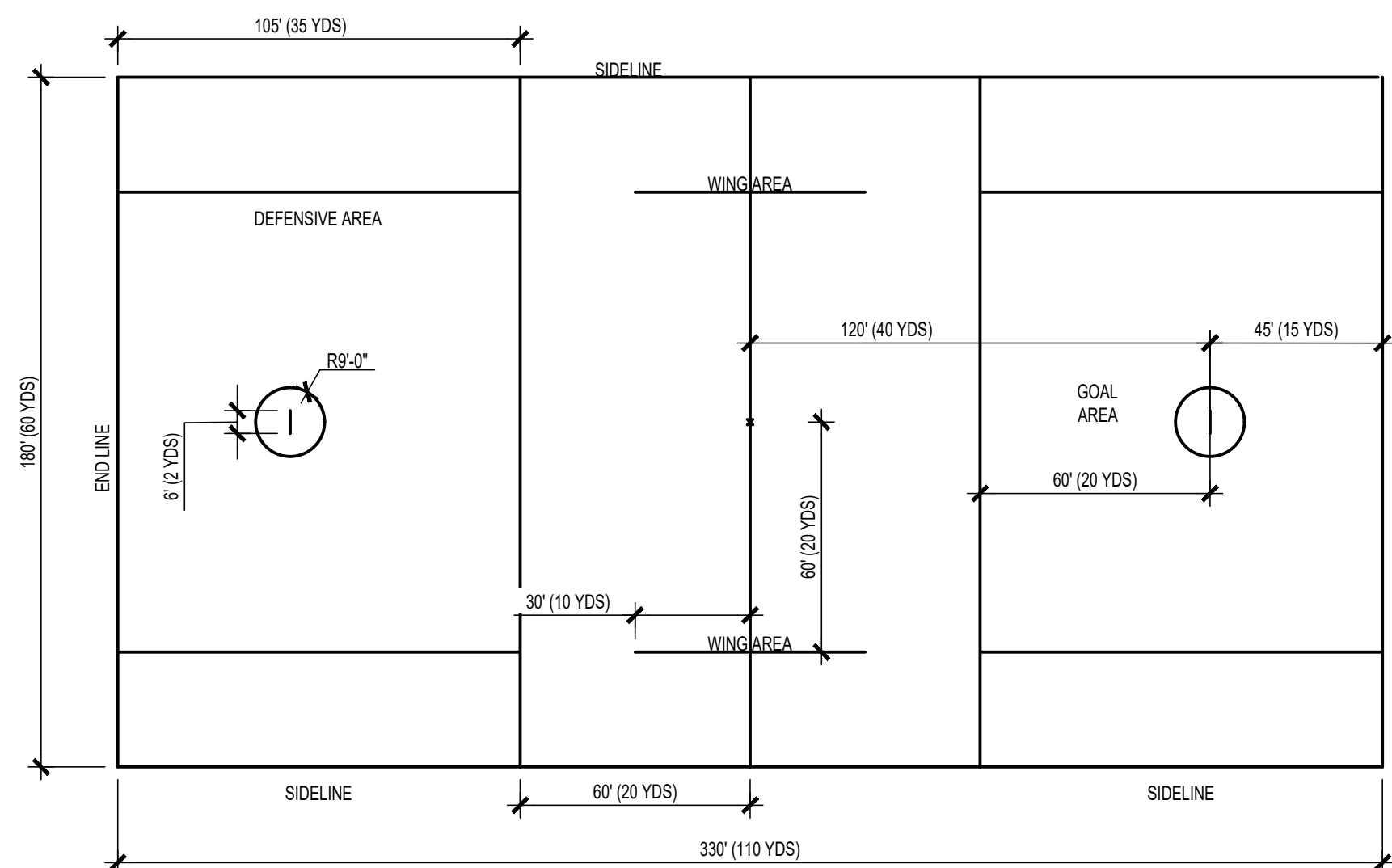
- NOTES:
1. ALL SOCCER DIMENSIONS ARE MEASURED FROM OUTSIDE EDGE OF LINE TO OUTSIDE EDGE OF LINE, UNLESS OTHERWISE NOTED.
 2. TEAM AREAS TO BE PAINTED BY OTHERS (N.I.C.)
 3. INLAID YELLOW LINES AT TIGER HOLLOW. INLAID WHITE LINES AT SCOTTS RIDGE FIELDS



5 SOCCER FIELD LAYOUT

NOT TO SCALE

- NOTES:
1. TEAM AREAS TO BE PAINTED BY OTHERS (N.I.C.)
 2. ALL DIMENSIONS FROM INSIDE EDGE TO INSIDE EDGE OF LINES.



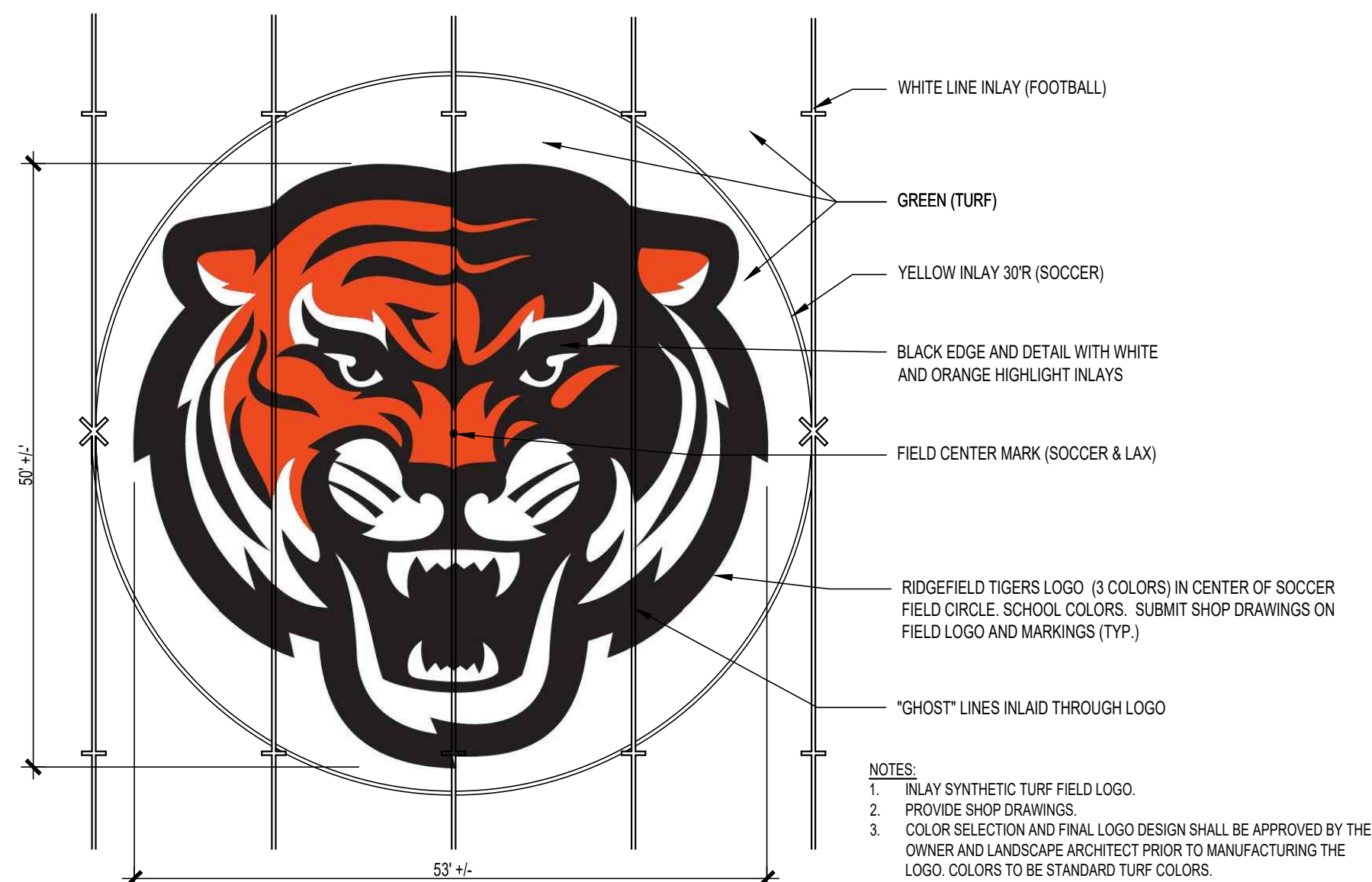
6 BOY'S LACROSSE FIELD LAYOUT (BLUE INLAID MARKINGS)

NOT TO SCALE



1 SYNTHETIC TURF GRAPHICS

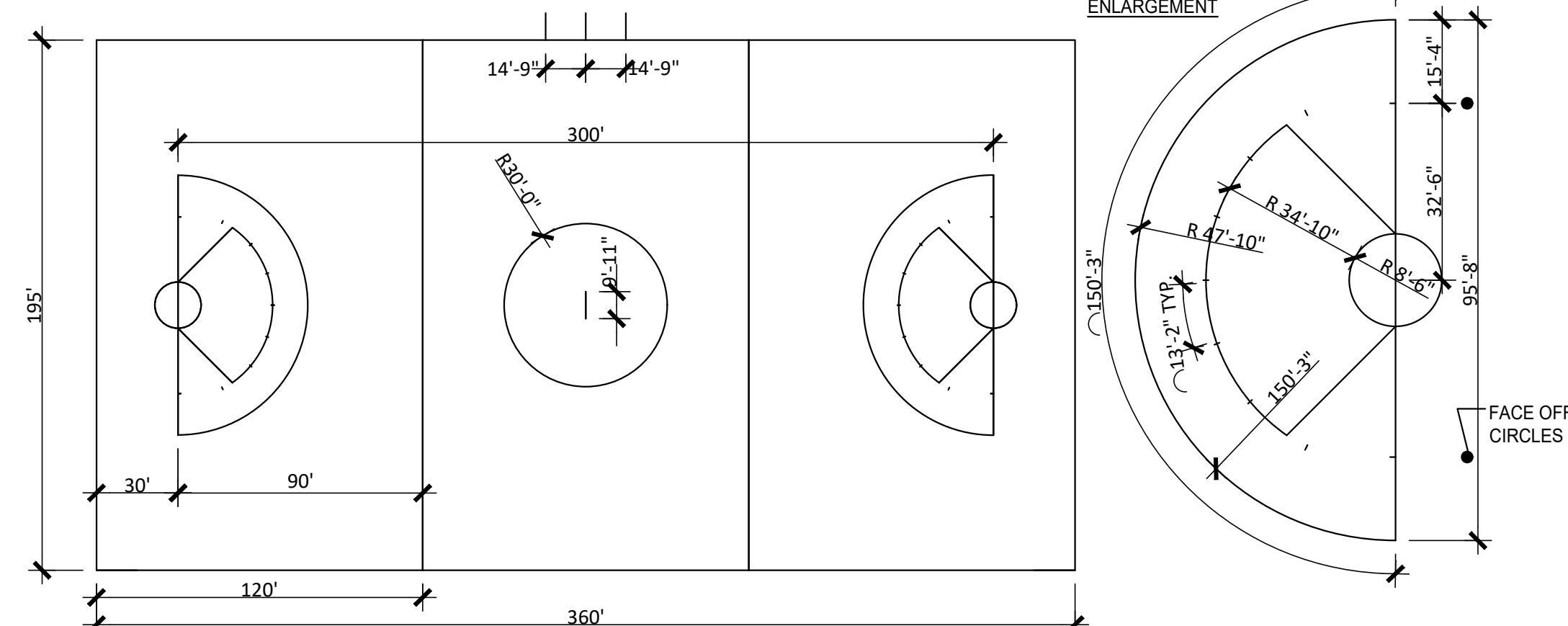
NOT TO SCALE



2 SYNTHETIC TURF FIELD CENTER LOGO

NOT TO SCALE

- NOTES:
1. TEAM AREAS TO BE PAINTED BY OTHERS (N.I.C.)
 2. ALL DIMENSIONS FROM INSIDE EDGE TO INSIDE EDGE OF LINES.



3 GIRL'S LACROSSE (ORANGE INLAID MARKINGS)

NOT TO SCALE

KAESTLE BOOS
associates, inc

416 Slater Road, P.O. Box 2590, New Britain, CT 06050-2590
Phone: 860-229-0361 ▲ Fax: 860-229-5303

325 Foxborough Boulevard, Suite 100, Foxborough, MA 02035
Phone: 508-549-9906 ▲ Fax: 508-549-9907

Email: kba@kba-architects.com ▲ Web: www.kba-architects.com

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RIDGEFIELD HIGH SCHOOL

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TRACK REPLACEMENTS**

**700 N Salem Rd.
750 N Salem Rd.
Ridgefield, CT 06877**

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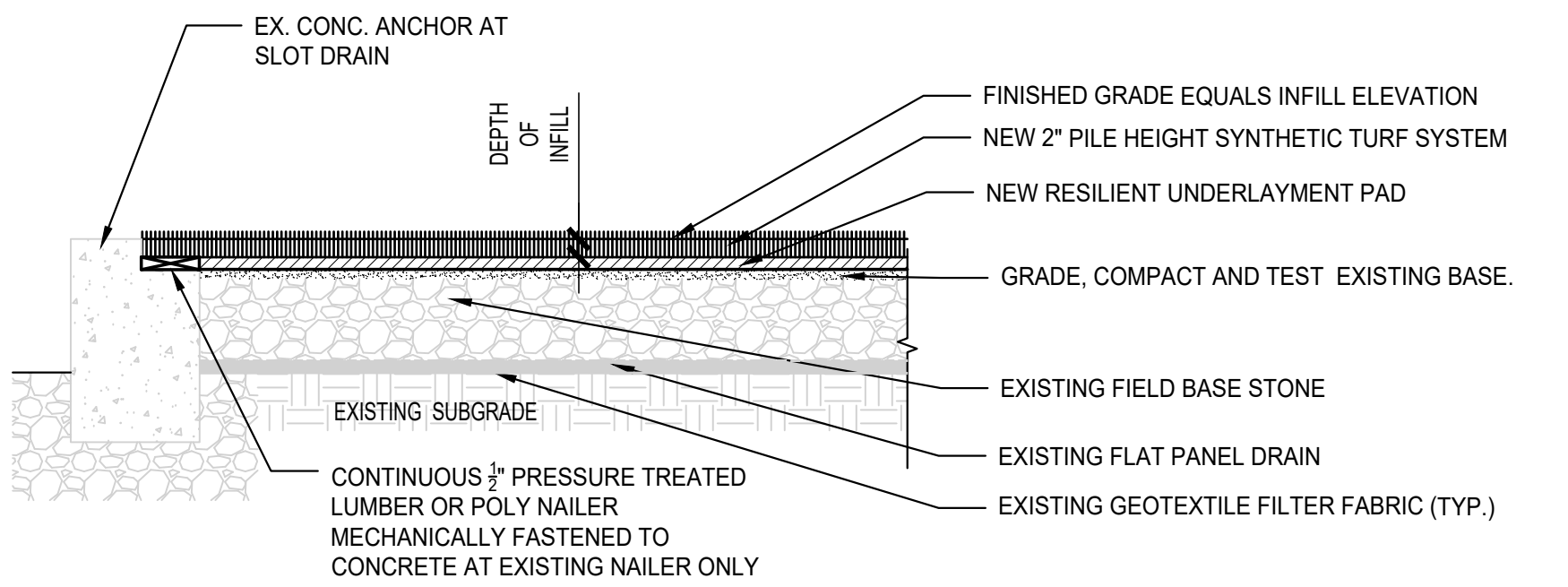
DRAWN BY: KM

**SITE
DETAILS**

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L4.02

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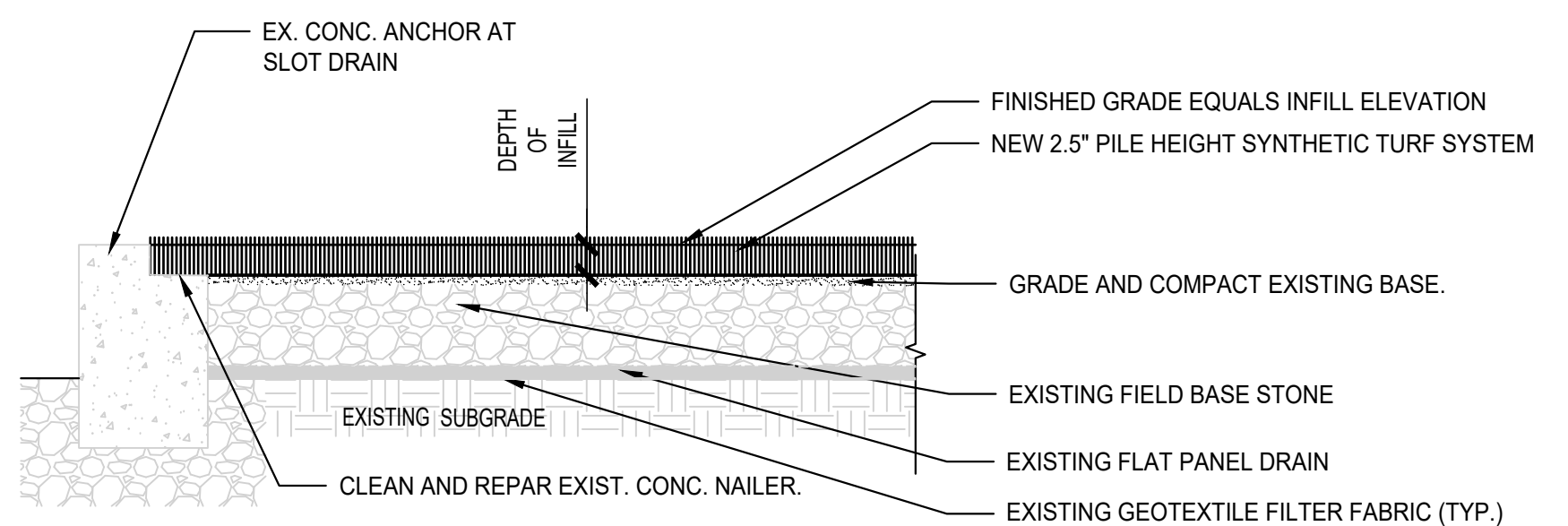


- NOTES:
- EXISTING FIELD BASE STONE TO BE GRADED AND TESTED TO CONFORM TO SPECIFICATION SECTION 33 46 16 FIELD SUBDRAINAGE SYSTEM PRIOR TO PLACEMENT OF NEW TURF SYSTEM.

SCOTTS RIDGE FIELD: ALTERNATE TURF SYSTEM
TIGER HOLLOW STADIUM: BASE BID TURF SYSTEM

7 SYNTHETIC TURF REPLACEMENT (W/ PAD)

NOT TO SCALE

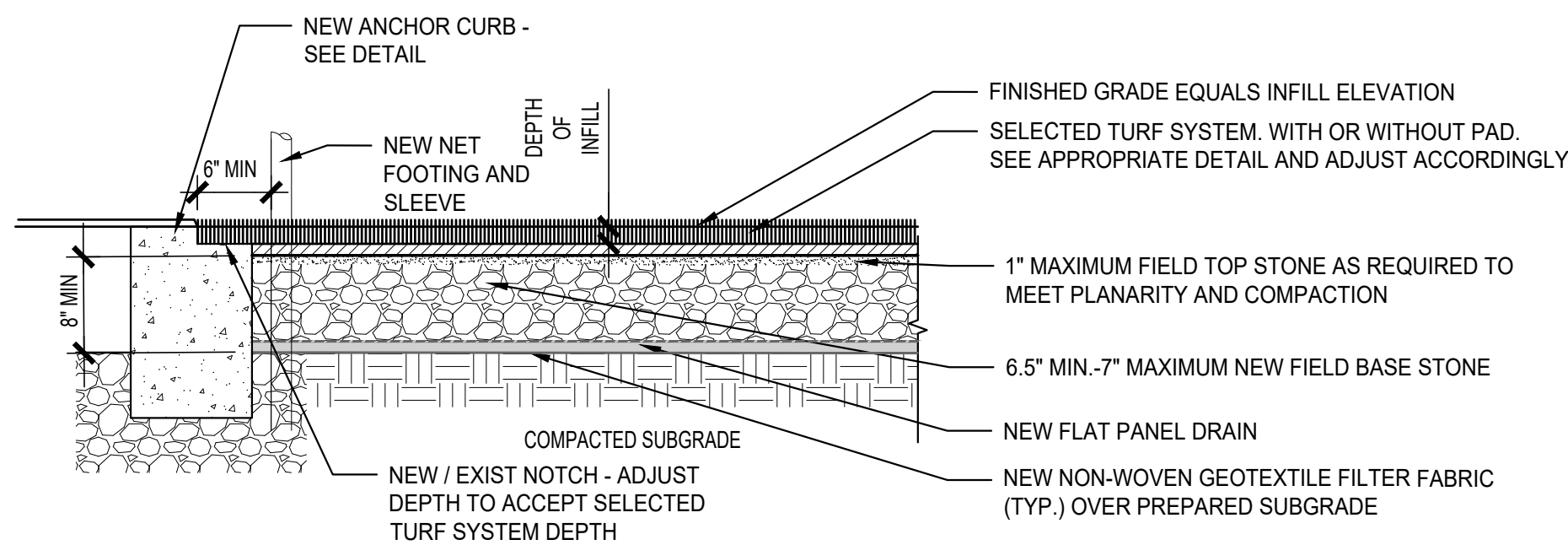


- NOTES:
- EXISTING FIELD BASE STONE TO BE GRADED AND TESTED TO CONFORM TO SPECIFICATION SECTION 33 46 16 FIELD SUBDRAINAGE SYSTEM PRIOR TO PLACEMENT OF NEW TURF SYSTEM.

SCOTTS RIDGE FIELD: BASE BID TURF SYSTEM
TIGER HOLLOW STADIUM: ALTERNATE TURF SYSTEM

8 SYNTHETIC TURF REPLACEMENT (NO PAD)

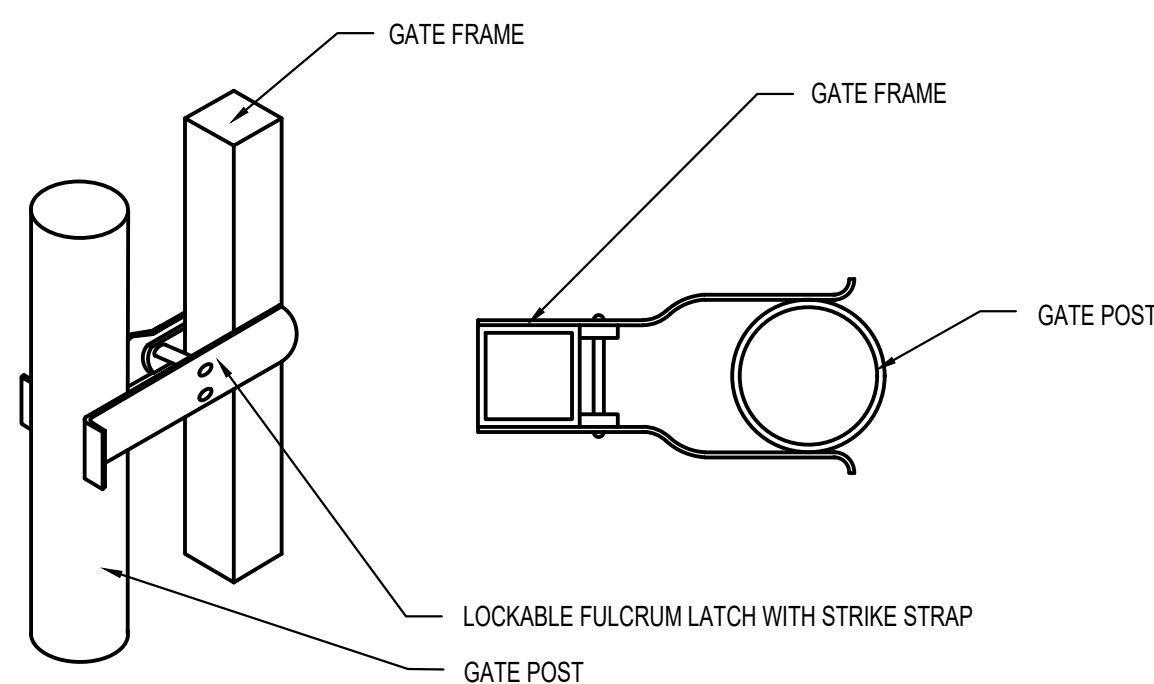
NOT TO SCALE



- NOTES:
- CONTRACTOR SHALL DETERMINE AMOUNT OF FIELD BASE TOP STONE AND FIELD BASE BOTTOM STONE REQUIRED WITH RESPECT TO METHOD OF PLACEMENT OF STONE AND ACHIEVING REQUIRED PLANARITY AND FINAL COMPACTION. FIELD TOP STONE SHALL NOT EXCEED A 1\"/>

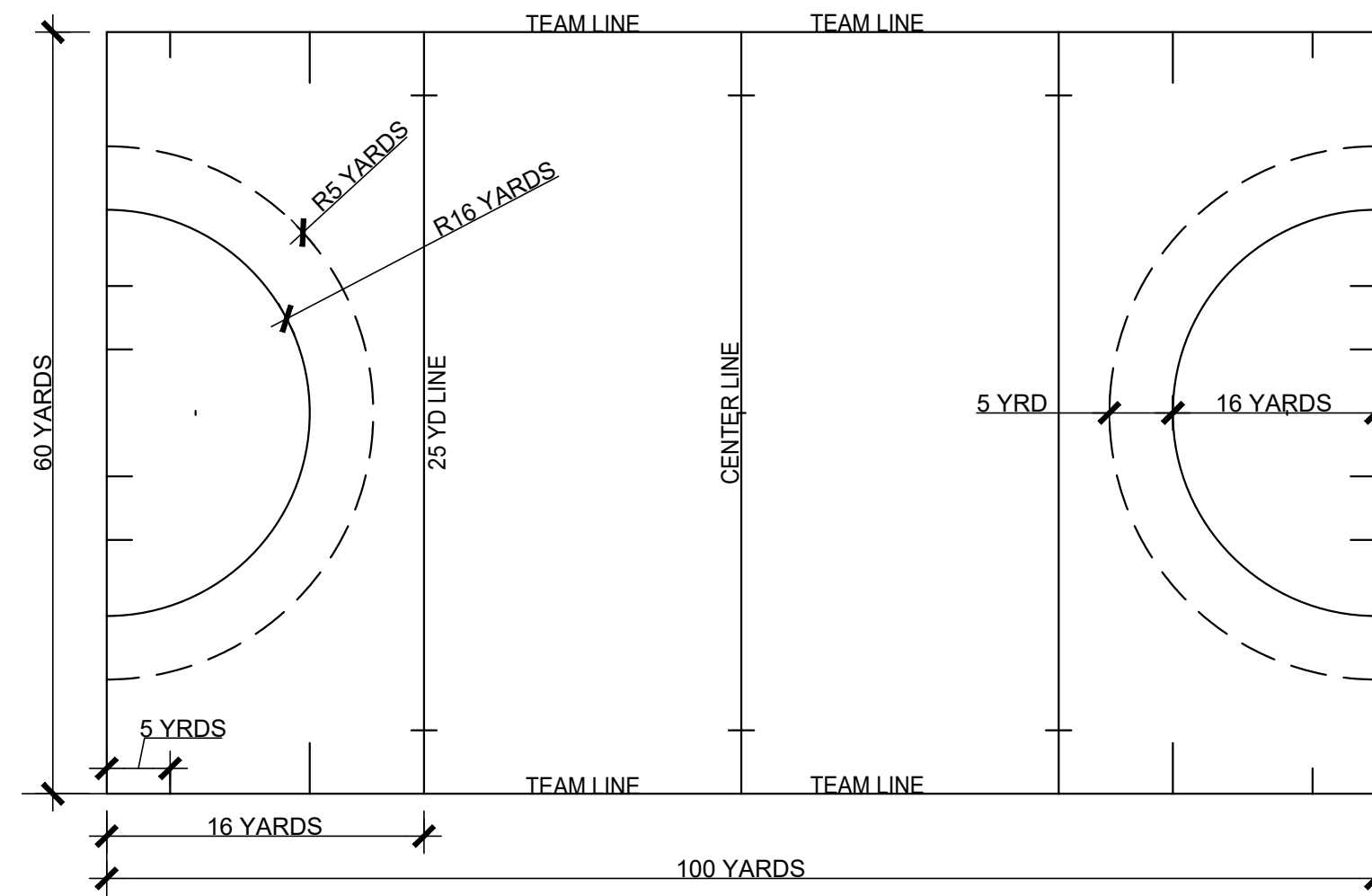
9 SYNTHETIC TURF (FULL DEPTH)

NOT TO SCALE



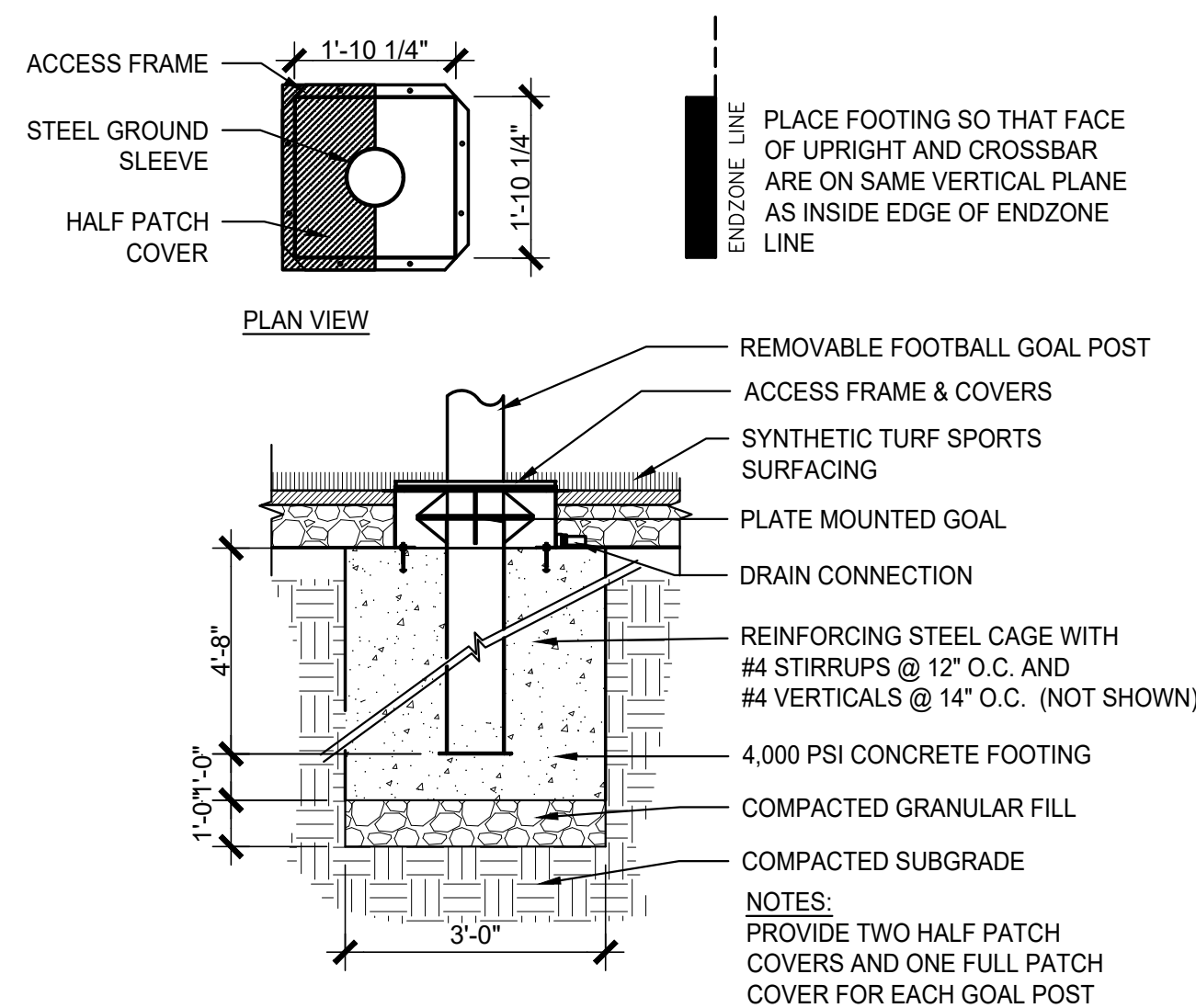
10 FULCRUM LATCH FOR FENCE

NOT TO SCALE



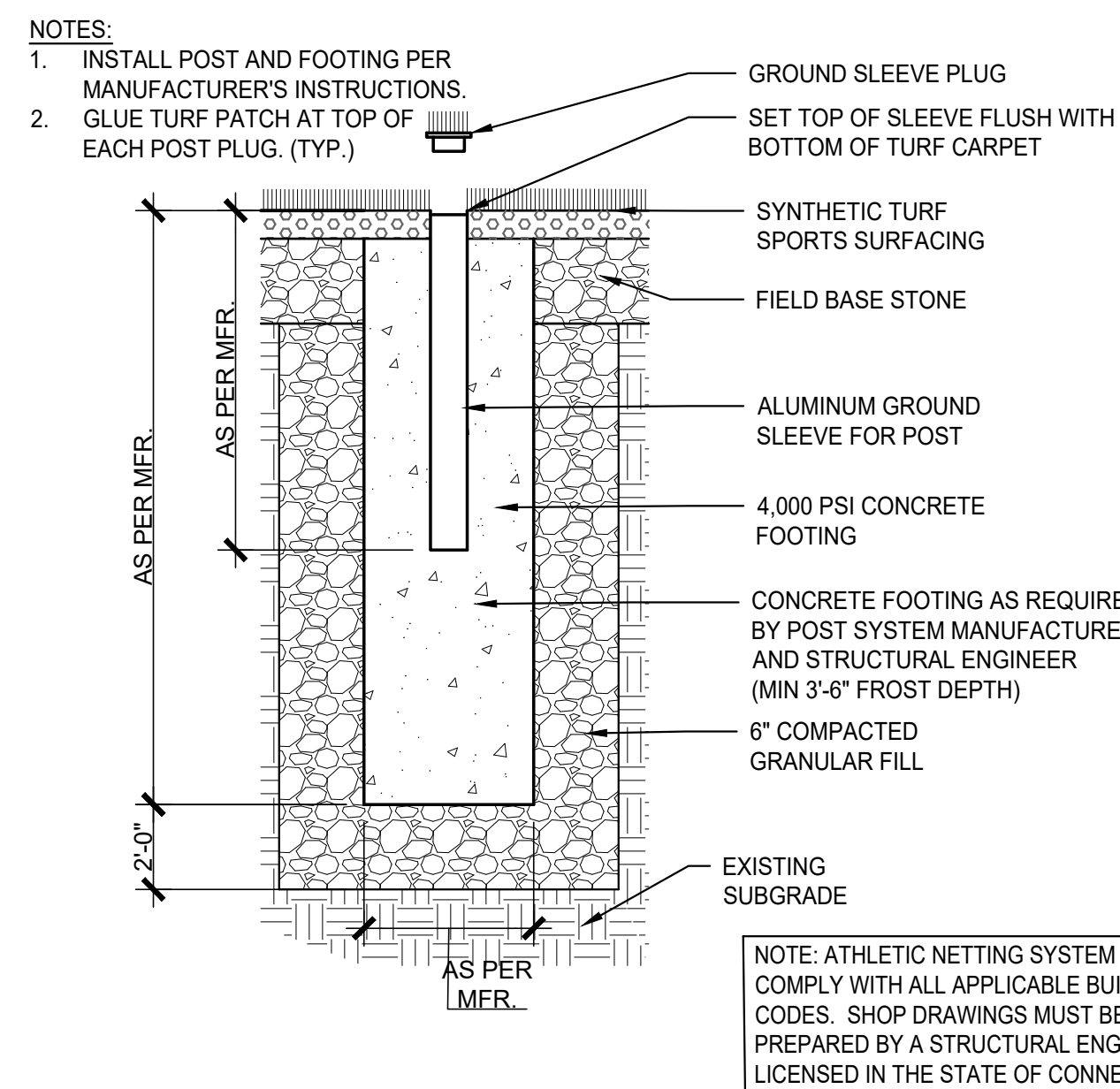
4 FIELD HOCKEY LAYOUT (BLACK INLAID MARKINGS)

NOT TO SCALE



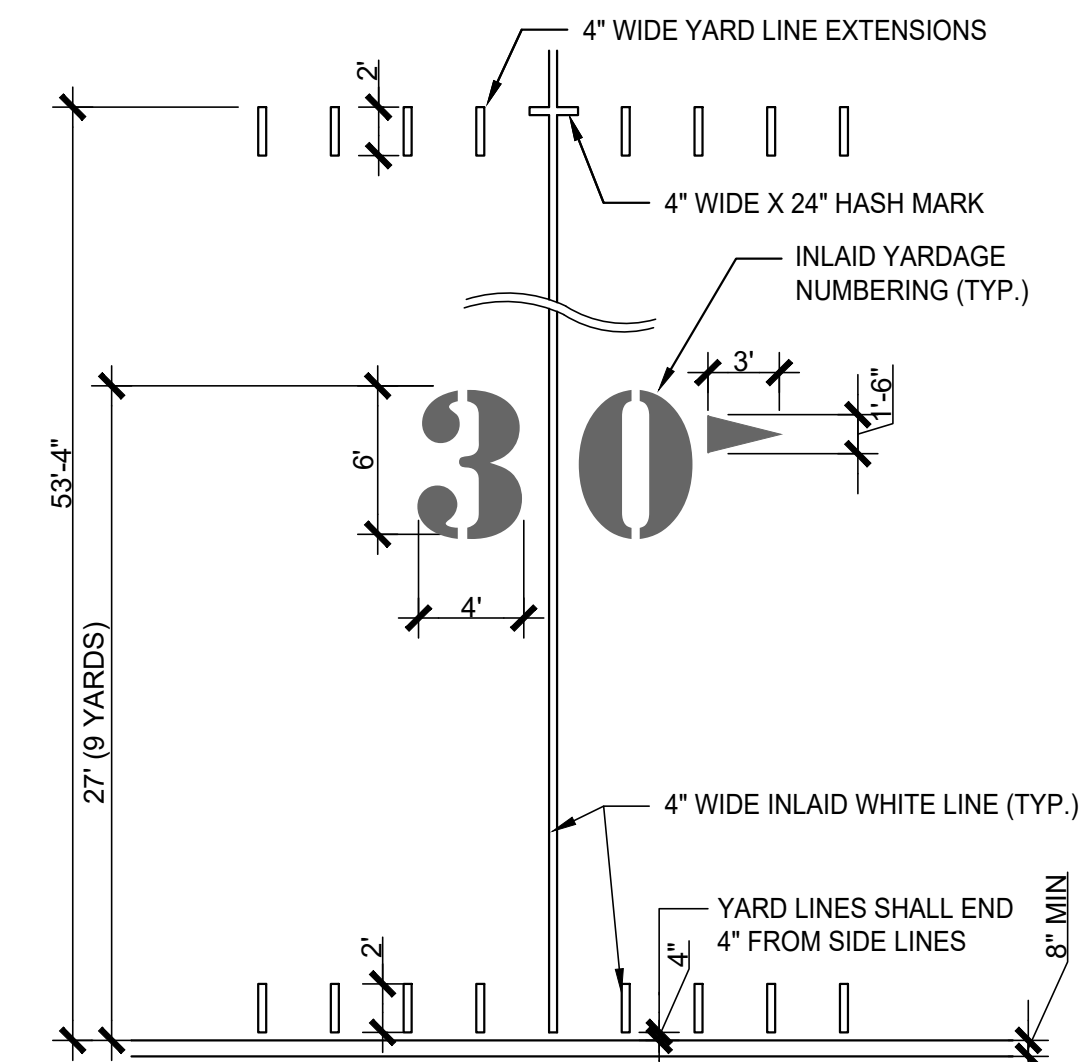
5 FOOTBALL GOAL POST FOOTING

NOT TO SCALE



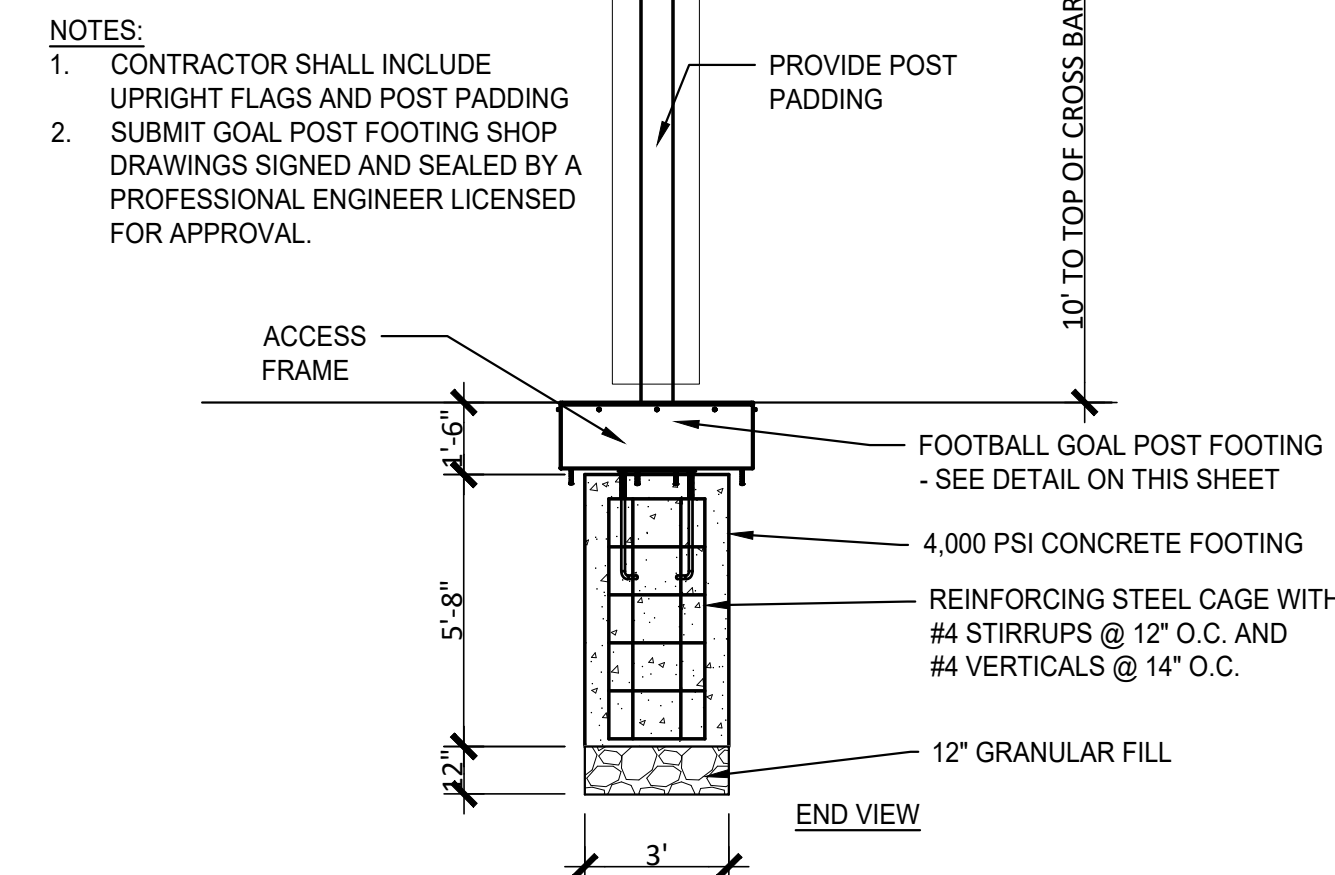
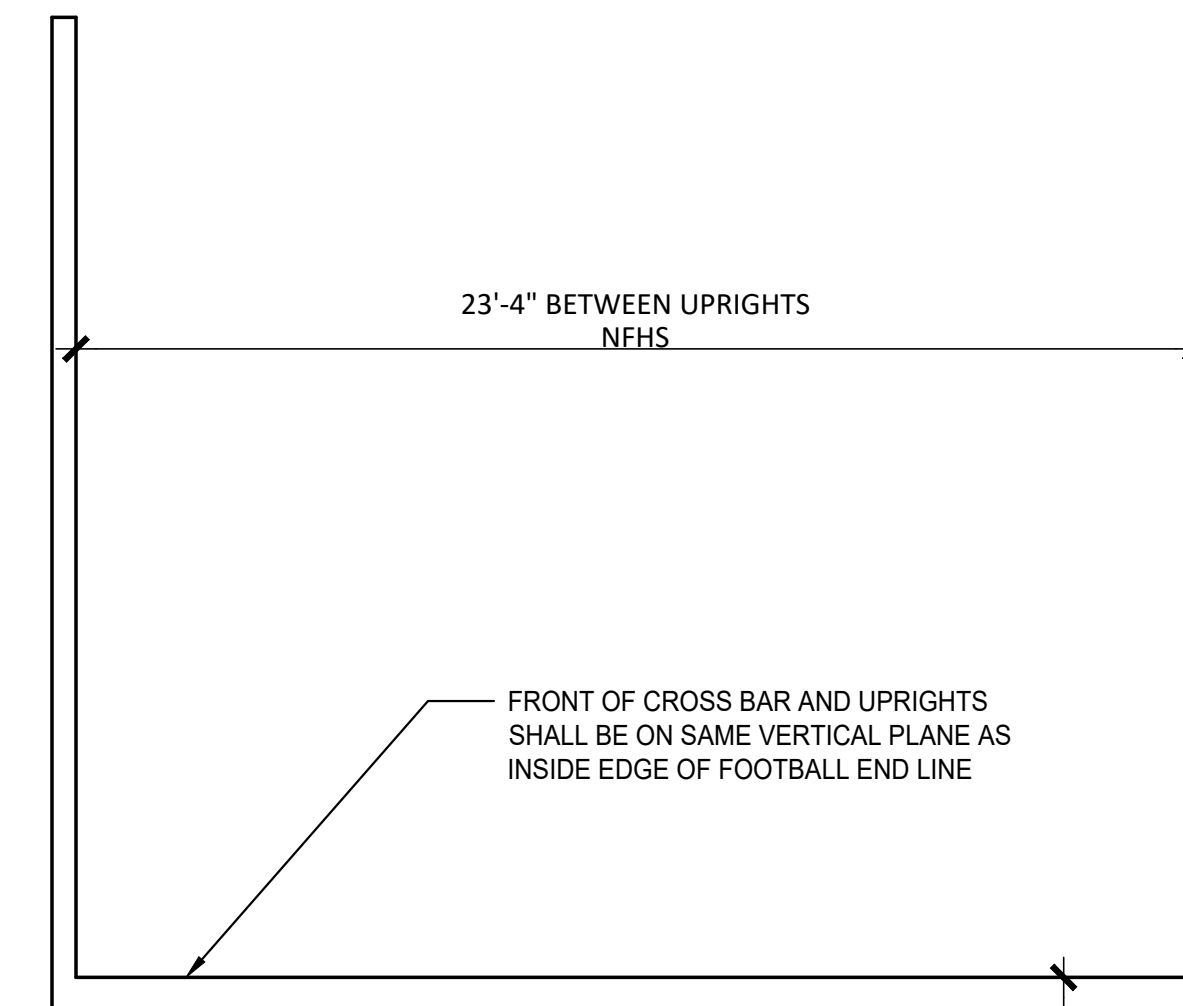
6 GROUND SLEEVE FOR BALL SAFETY NETTING

NOT TO SCALE



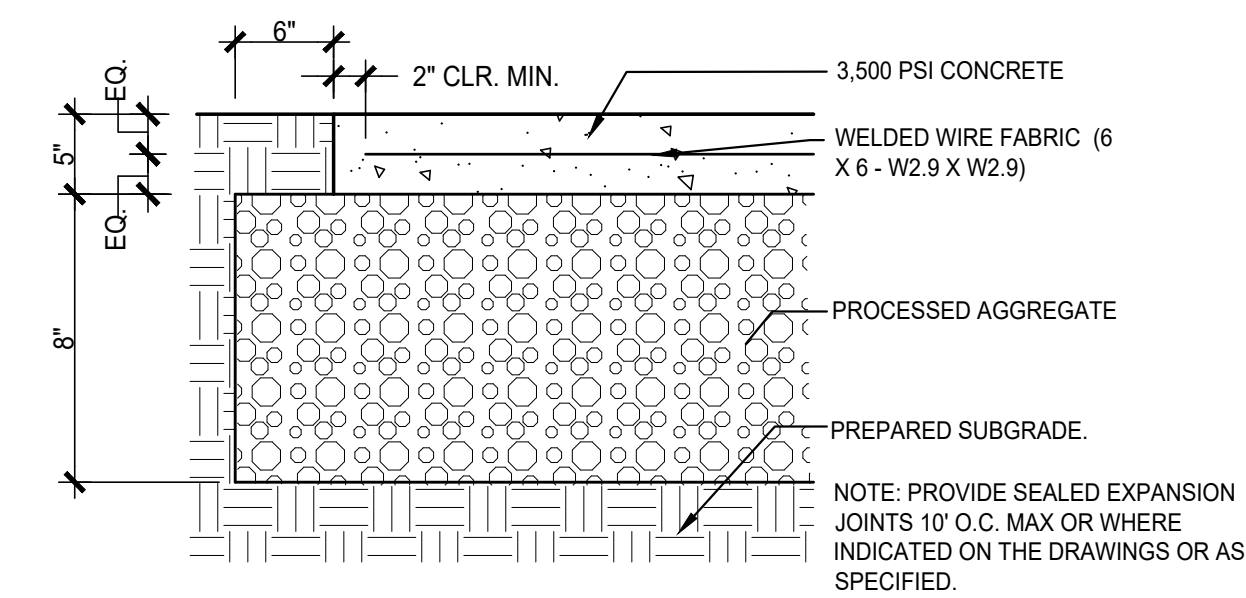
1 FOOTBALL FIELD NUMBERS

NOT TO SCALE



2 FOOTBALL GOAL POST

NOT TO SCALE



3 CONCRETE PAD

NOT TO SCALE

KAESTLE BOOS
associates, inc

416 Slater Road, P.O. Box 2590, New Britain, CT 06050-2590
Phone: 860-229-0361 ▲ Fax: 860-229-5303

325 Foxborough Boulevard, Suite 100, Foxborough, MA 02035
Phone: 508-549-9900 ▲ Fax: 508-549-9907

Email: kba@kba-architects.com ▲ Web: www.kba-architects.com

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RIDGEFIELD HIGH SCHOOL

**TIGER HOLLOW &
SCOTTS RIDGE
SYNTHETIC TURF AND
TRACK REPLACEMENTS**

**700 N Salem Rd.
750 N Salem Rd.
Ridgefield, CT 06877**

PROJECT NO.: 21001.01

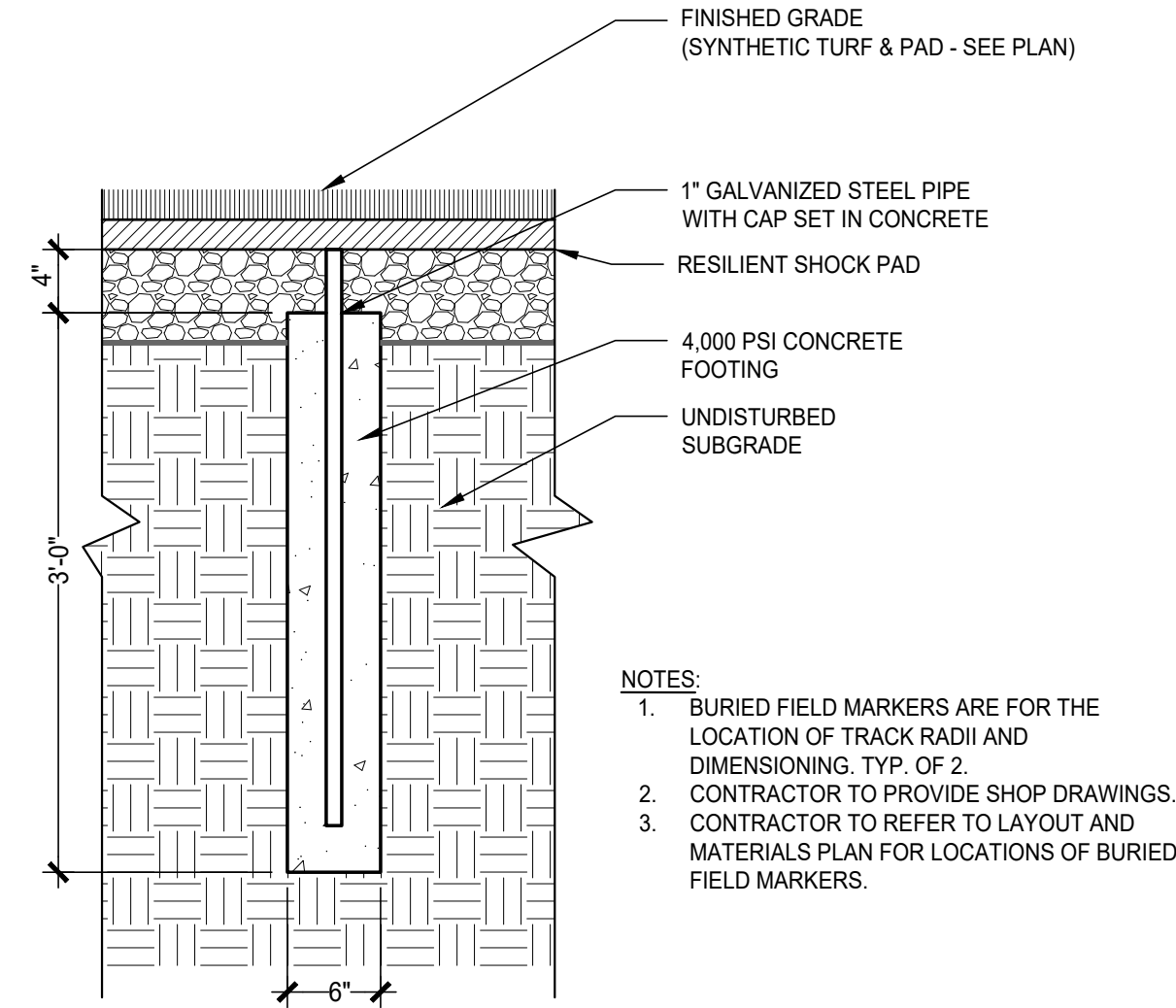
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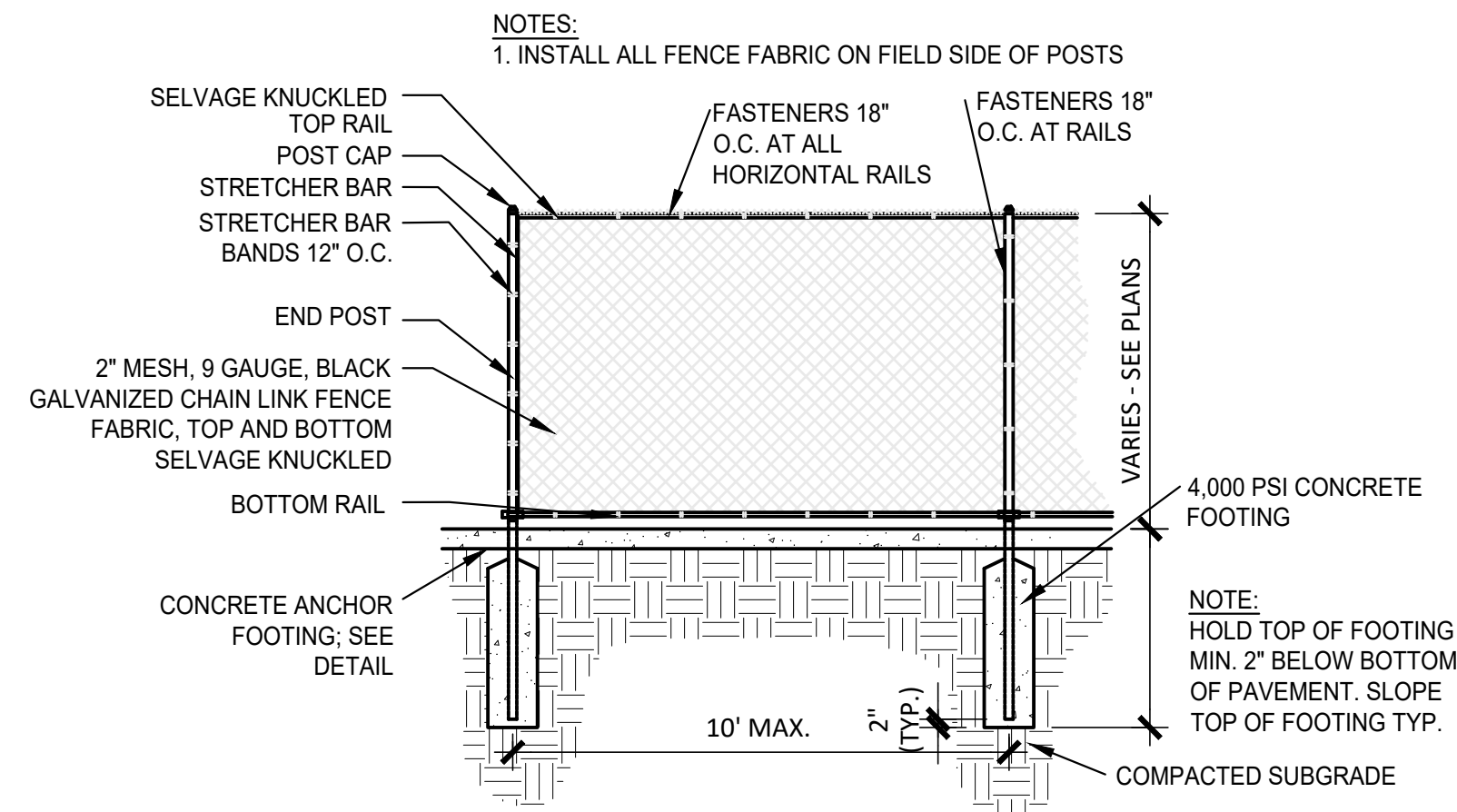
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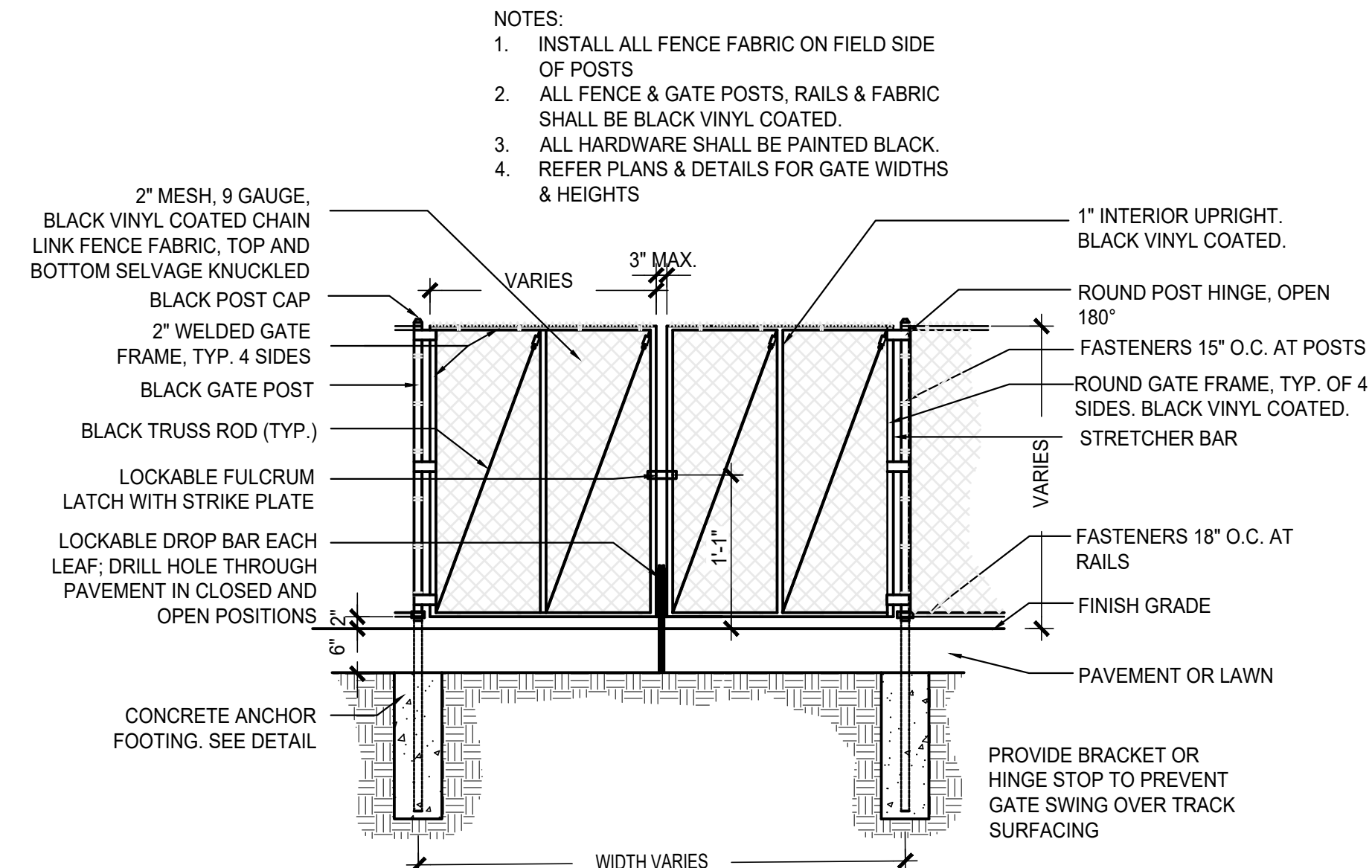
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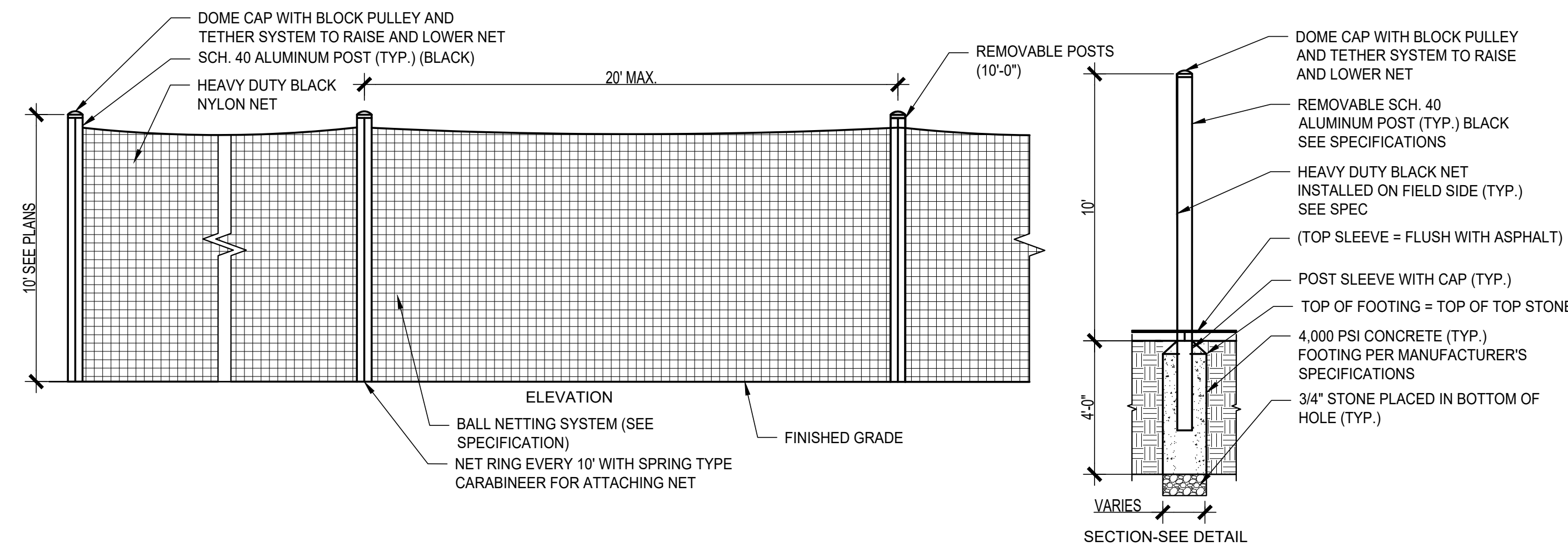
5 TRACK RADIUS MONUMENT
NOT TO SCALE



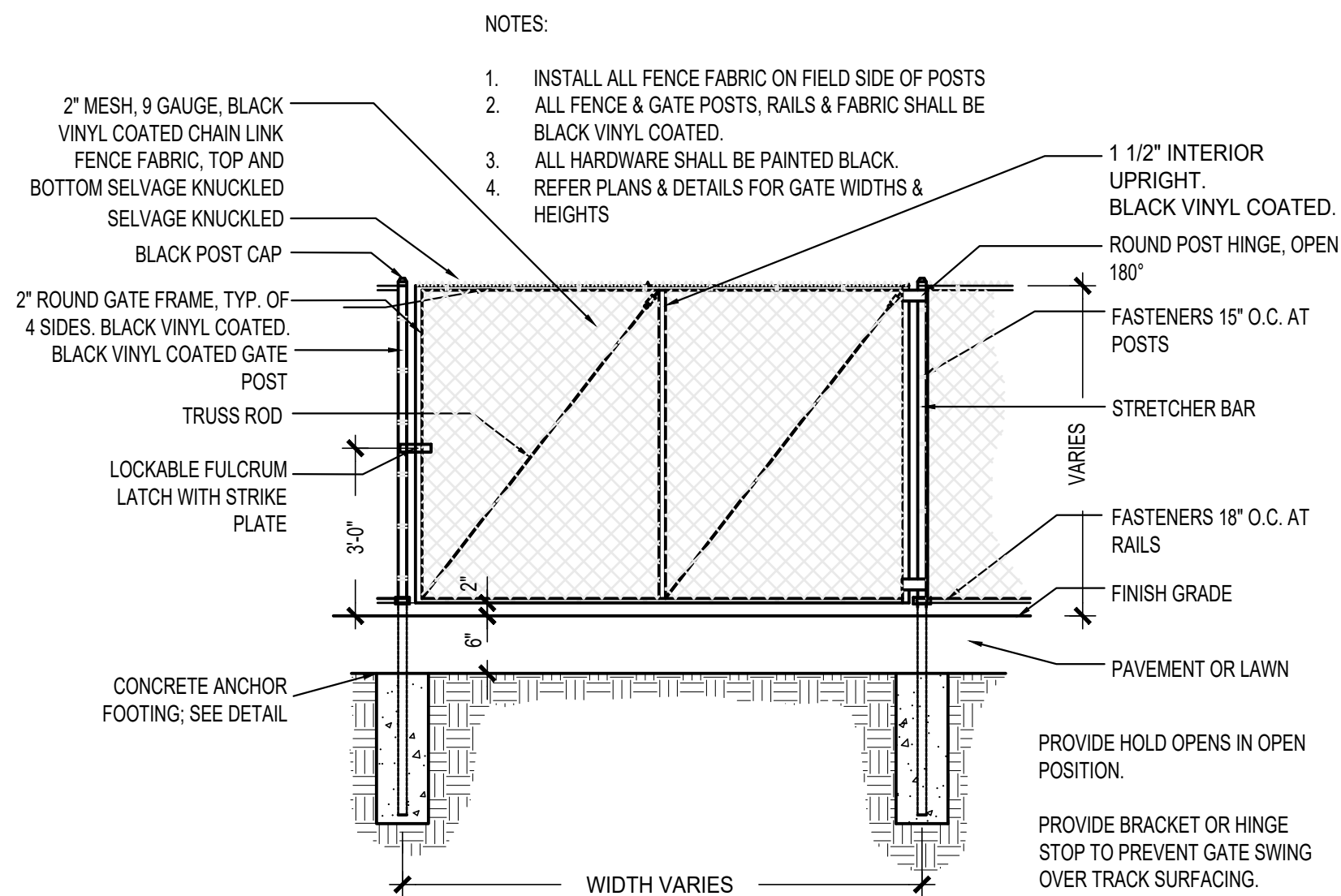
4 CHAIN LINK FENCE
NOT TO SCALE



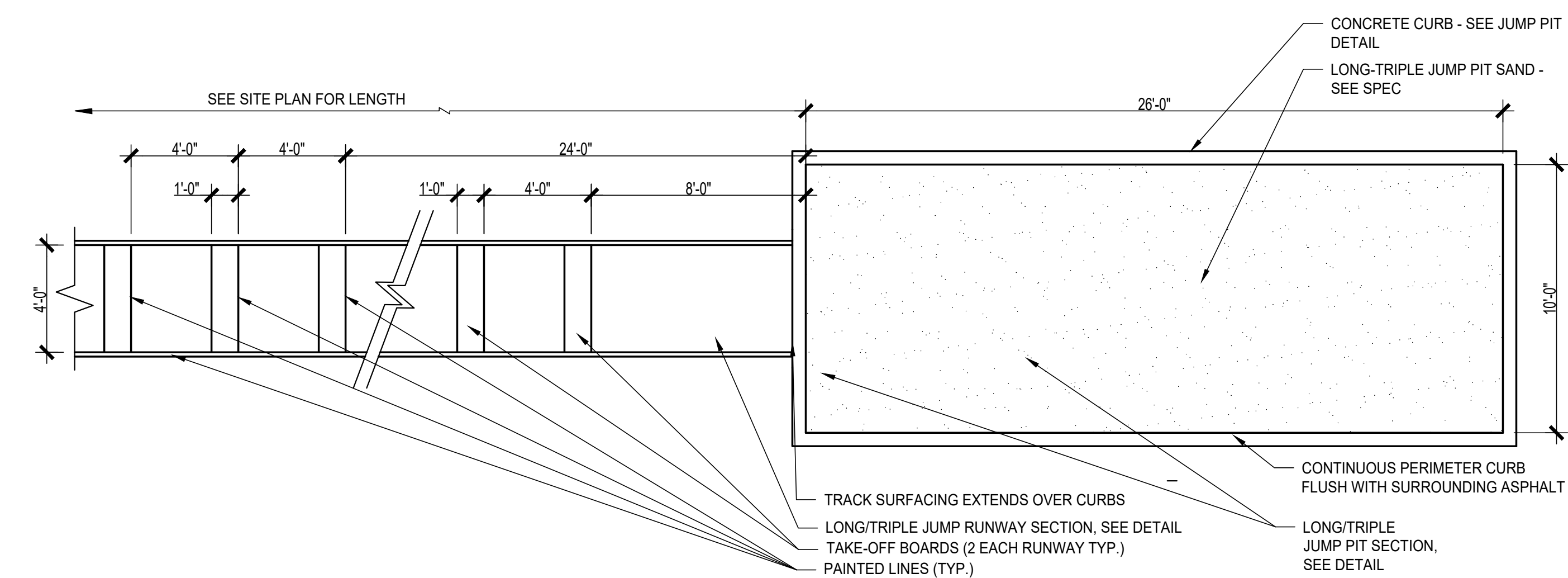
1 CHAIN LINK FENCE GATE - DOUBLE
NOT TO SCALE



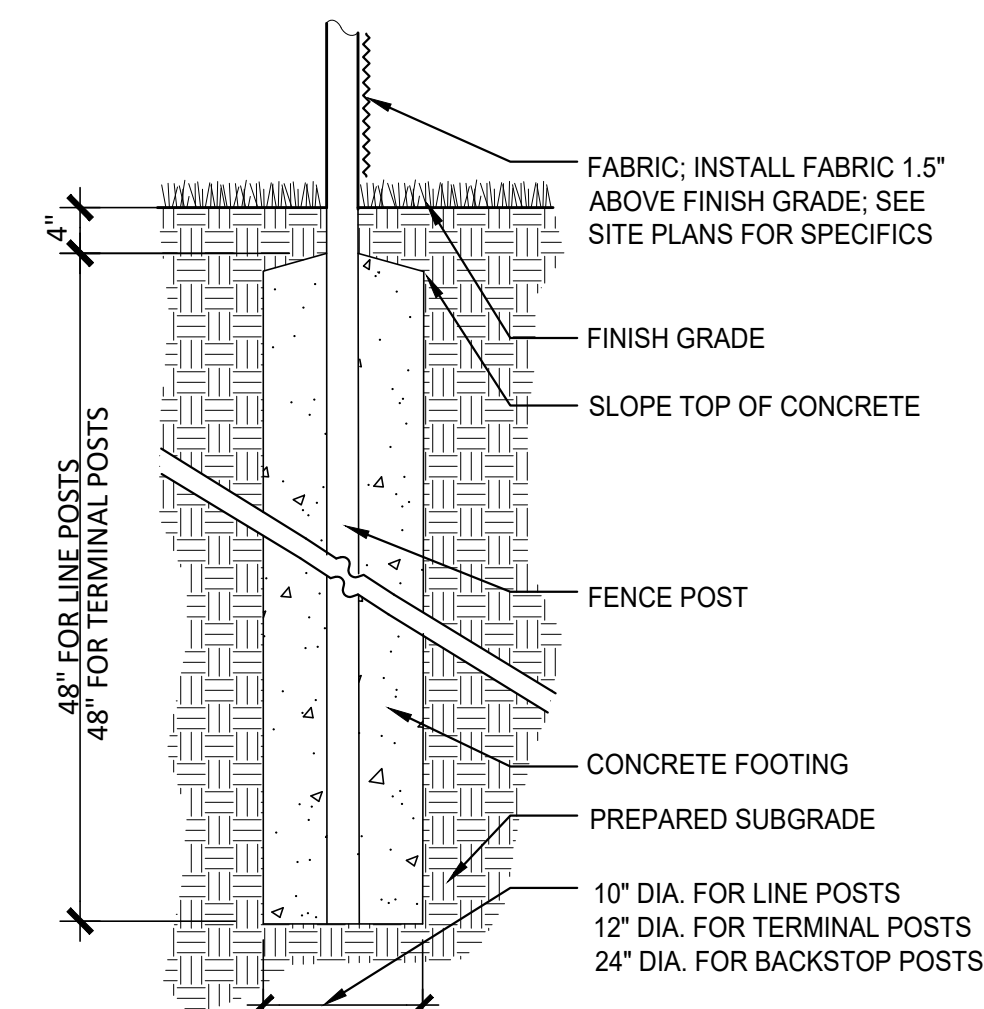
6 BALL SAFETY NETTING SYSTEM (10' REMOVABLE POSTS)
NOT TO SCALE



2 CHAIN LINK FENCE GATE - SINGLE LEAF
NOT TO SCALE



7 LONG/TRIPLE JUMP RUNWAY STRIPING PLAN
NOT TO SCALE



3 CHAIN LINK FENCE POST FOOTING
NOT TO SCALE

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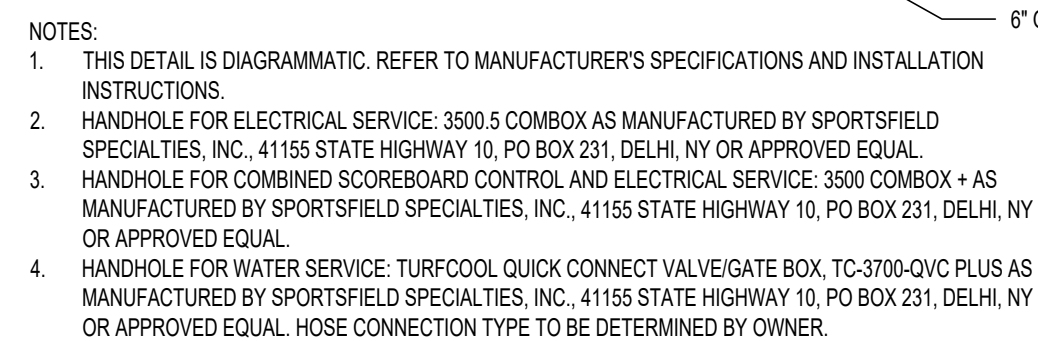
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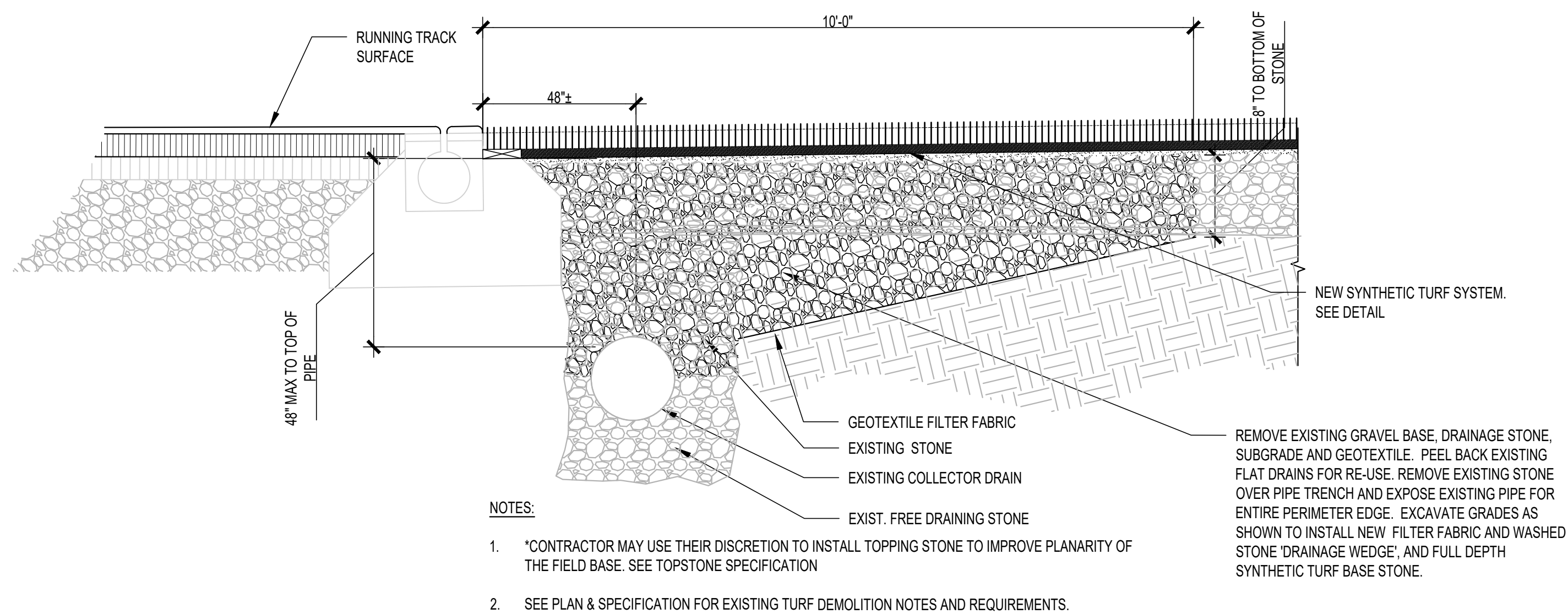
**SITE
DETAILS**

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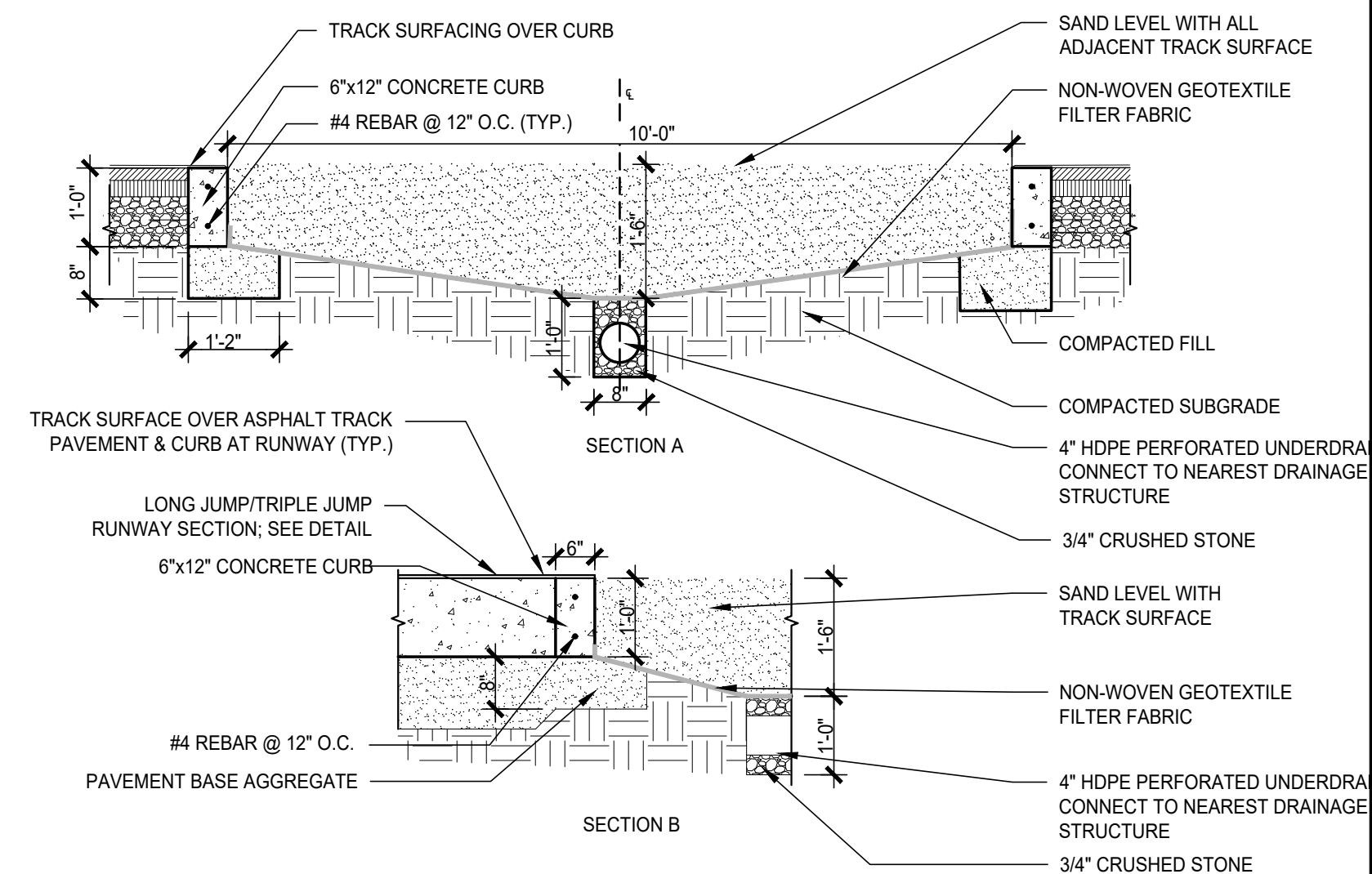
L4.04



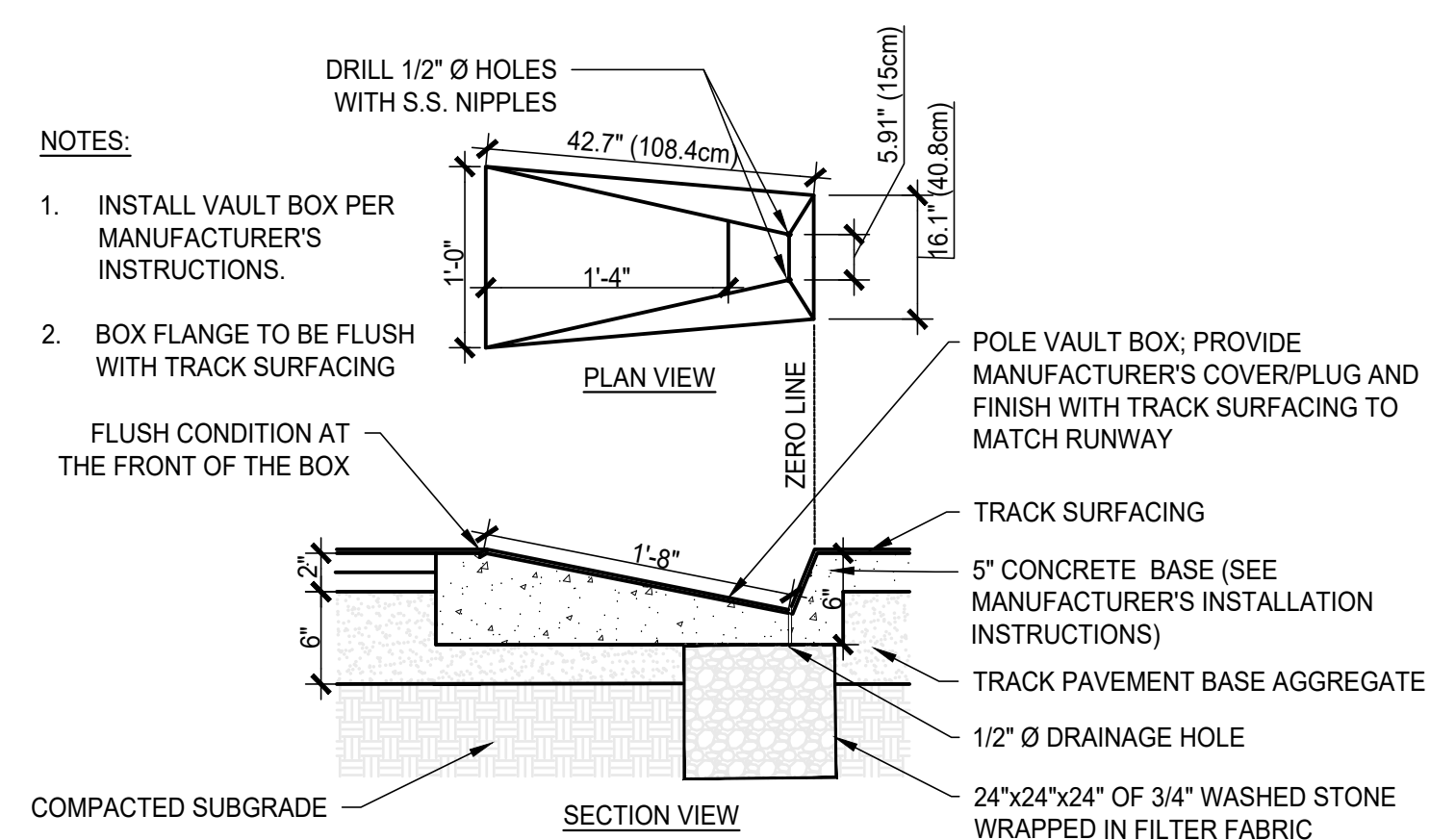
5 COMBOX IN SYNTHETIC GRASS



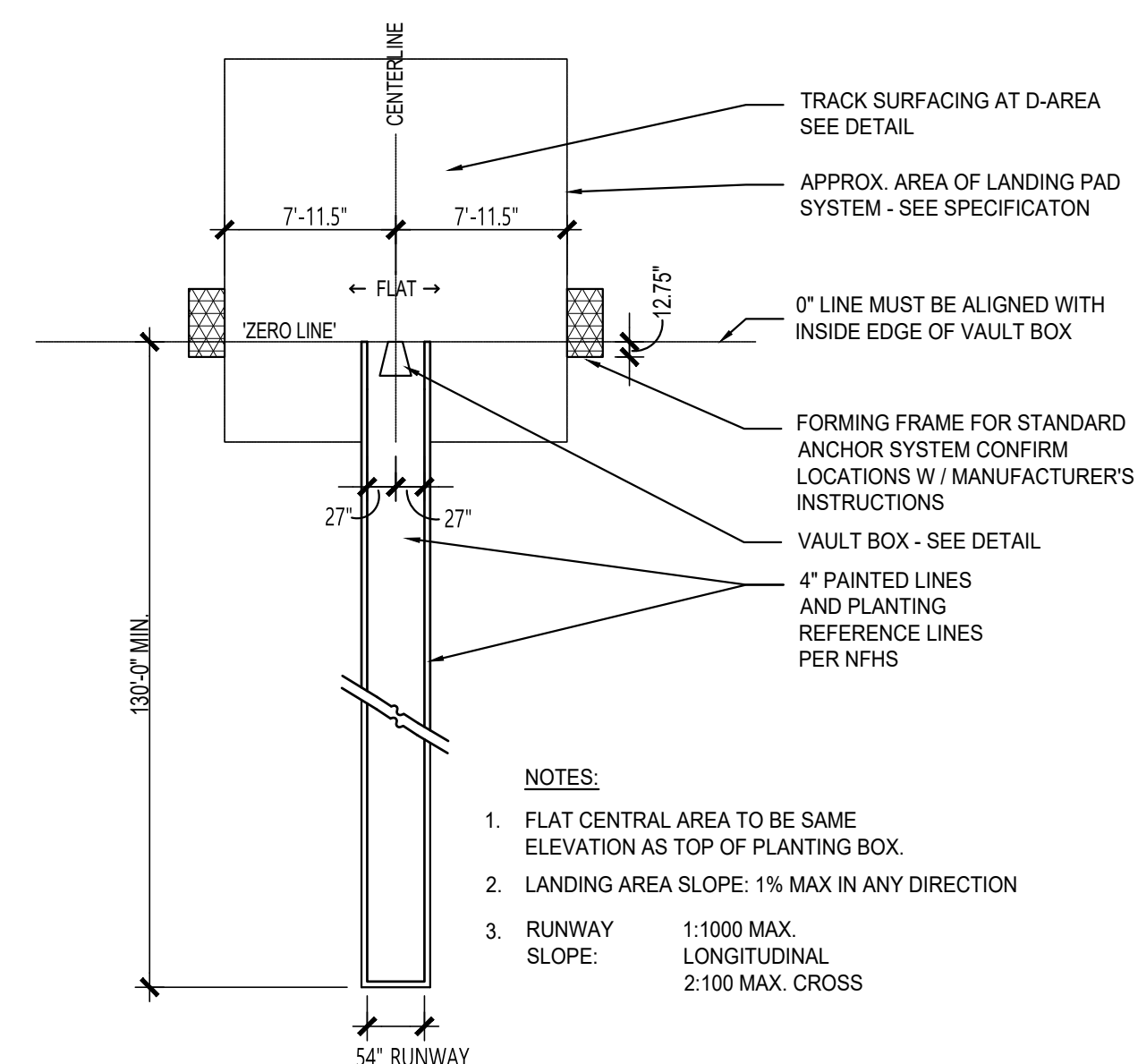
SYNTHETIC TURF COLLECTOR DRAIN REMEDATION (ALTERNATE)



1 LONG/TRIPLE JUMP PIT SECTION AT TRACK SURFACING



2 POLEVAULT VAULT BOX



3 POLE VAULT



1

30' BALL NETTING SYSTEM @ FENCE (ALTERNATE)

NOT TO SCALE



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L4.06