



City of Meriden, Connecticut

Purchasing Department

Invitation to Bid

For

North End Field – Ballfield Reconstruction

210 Britannia Street, Meriden CT 06450

Meriden, CT

B023-16

Proposals Due: November 2, 2022 @ 1:00 P.M.

Purchasing Department

142 East Main Street, Room 210

Meriden, CT 06450

(203) 630-4115

**B023-16 - NORTH END FIELD
BALLFIELD RECONSTRUCTION
MERIDEN, CONNECTICUT**

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LEGAL NOTICE

INVITATION TO BID

The City of Meriden is accepting sealed bids for:

**B023-16 - North End Field - Ballfield Reconstruction
210 Britannia Street, Meriden, CT**

The City of Meriden seeks the services of a contractor to reconstruct the existing ballfield complex to include, but is not limited to, construct (1) synthetic turf little league baseball field, construct (1) synthetic turf softball field, construct a new parking lot and walkways around the site.

Bids shall be submitted on forms and in the manner specified. Forms and specifications may be obtained from the Purchasing Department, on the City of Meriden website (www.meridenct.gov/business/bids-rfps/), and on the State of Connecticut Department of Administrative Services website (<https://portal.ct.gov/DAS/CTSource>). Bids will be accepted at the Purchasing Department, 142 East Main Street, Room 210, Meriden, Connecticut 06450 until **1:00 P.M. Local, Eastern Standard Time on November 2, 2022** at which time they will be publicly opened and read. Any bid received after the time and date specified shall not be considered.

A NON-MANDATORY Pre-Bid Conference will be held on the project site. Please meet at **North End Fields on Wednesday, October 12, 2022, at 10:00 A.M.** at 210 Britannia Street, Meriden, CT 06450.

The right is reserved to reject any or all bids, in whole or in part, to award any item, group of items, or total bid, and to waive informality or technical defects, if it is deemed to be in the best interest of the City of Meriden. No bidder may withdraw its bid within sixty (60) days of the date of the bid opening.

Each bid shall be accompanied by a Certified Check or Bid Bond in the amount of Ten (10%) percent of the amount bid.

Labor and Material Payment Bond and a Performance bond for One Hundred Percent (100%) of the contract price, with a corporate surety approved by the City of Meriden, will be required of the lowest responsible bidder.

The attention of bidders is call to the requirement for minimum wage rates to be paid under this contract.

The City of Meriden is an Affirmative Action/Equal Opportunity Employer. Disadvantaged, minority, small, and women business enterprises are encouraged to respond.

Adam B. Tulin
Purchasing Officer
City of Meriden, CT 06450-8022
Dated: October 3, 2022

CITY OF MERIDEN, CONNECTICUT

B023-16 NORTH END FIELD - BALLFIELD RECONSTRUCTION

INFORMATION TO BIDDERS

1. BIDDING PROCEDURES

Sealed Bids shall be submitted on the forms designated by the attached proposal bid forms. Bids will be received by the City of Meriden's Purchasing Department, Room 210, City Hall, 142 East Main Street, Meriden, Connecticut, 06450-8022 until 1:00 P.M. on November 2, 2022 and thereafter immediately read in public (the "bid opening").

2. BIDS

Bids are to be submitted on the attached proposal forms. Please submit two copies of the proposal forms and Bidder's Qualification Statement. One shall be an original and one can be a copy. **Please submit one complete copy of your bid on a flash drive.**

BID WILL BE AUTOMATICALLY REJECTED FOR ANYONE SUBMITTING A SURETY OTHER THAN THOSE SPECIFIED.

- a. Bids must be made out and signed in the corporate, or other, name of Bidder, and must be fully and properly executed by an authorized person.
- b. The sealed envelope must denote the Bidder's name and address in the upper left hand corner and the words "**BID DOCUMENT – B023-16 - North End Field Ballfield Reconstruction to be opened at 1:00 P.M.**" in the lower left hand corner.
- c. Bids received later than the time and date specified will not be considered.
- d. Amendments to or withdrawal of bids received later than the date and time set forth in the bid opening will not be considered.
- e. All prices must be in ink or typewritten. In the event of a bidder's mathematical error in tabulating any bid prices, *the written unit prices shall govern.*

3. BIDDER QUALIFICATIONS

Bidders will be required to fill out, and include as part of its bid, any attached Bidder's Qualification Statement.

In determining the qualifications of a bidder, the City of Meriden will consider the bidder's record of performance in any prior contracts for construction work. The City of Meriden expressly reserves the right to reject a bid if the bidder's historical performance, in the sole opinion of the City of Meriden, has been unsatisfactory in any manner or if the bidder has habitually and without just cause neglected the payment of bills or has otherwise disregarded its obligations to subcontractors, suppliers, or employees.

4. EXAMINATION OF BIDDING DOCUMENTS

Bidders are to examine all documents and visit the site in order to make a thorough examination of the conditions so that the bidder may familiarize itself with all of the existing requirements, conditions, and difficulties that will affect the execution of the work in order to determine the amount of work necessary to carry out the true intent of the specifications and work shown on the drawings.

The City of Meriden and its agents do not have any responsibility for the accuracy, completeness, or sufficiency of any bid document obtained from any other source other than from the City of Meriden. Obtaining documents from any other source(s) may result in obtaining incomplete and inaccurate information. Obtaining documents from any other source may also result in failure to receive any addenda, corrections, or other revisions to the documents that may be issued.

No request shall be honored if such request is made less than seven (7) calendar days prior to the date fixed for the opening of bids. Any and all such interpretations, and any supplementary instructions, will be in the form of a written addenda to the specifications which, if issued, will be made available on the City of Meriden website (www.meridenct.gov) unless it is to change the date fixed for the opening of bids, not later than three (3) days prior to the date fixed for the opening of bids. Bidders are encouraged to check the website regularly for addenda. Failure of any bidder to receive any such addenda shall not relieve any bidder from any obligations under its bid as submitted.

Any questions about the bid document must be submitted in writing via email to meridenpurchasing@meridenct.gov. Any other format of question will not be answered.

5. BIDS TO REMAIN OPEN

No bidder may withdraw its bid within sixty (60) days of the date of the bid opening. Should there be reason why the contract cannot be awarded within the specified period, the time may be extended by mutual agreement between the City of Meriden and the successful bidder.

6. AWARD OF CONTRACT

The Purchasing Officer reserves the right to make an award on the bid which, by the Purchasing Officer's judgment and recommendation from the project design consultant following bid evaluations, best meets the specifications and is deemed to be in the best interest of the City of Meriden.

The contract will not be awarded to any corporation, firm, or individual which/who is in arrears to the City of Meriden by debt or contract, or who is in default as security or otherwise by any obligation to the City of Meriden.

The right is reserved to reject any or all bids, in whole or in part, to award any item, group of items, or total bid, and to waive informality or technical defects, if it is deemed to be in the best interest of the City of Meriden.

7. BID PROTEST PROCEDURE

In the event that any bidder wishes to protest the potential award of a bid, or any procedure of act in the advertising or soliciting of the bids, said bidder must make said protest in writing, which shall state the reason therefore and request a conference with respect thereto. Said protest must be received in the City Purchasing Office within **FIVE (5)** business days after the delivery of bid results or decisions. A conference with respect to said protest shall be scheduled by the Purchasing Officer forthwith and shall be attended by him or his designee and such other persons as the Purchasing Officer and the City Manager shall require to attend. The subject matter of said conference shall be limited to the reasons for the protest specified in the written request for said conference. Said conference shall also include a discussion of all possibilities for a resolution of dispute. The City shall make a decision in writing within three (3) business days after said conference and forward the same to the protesting bidder forthwith. In the event that any protesting bidder wishes to take legal action against the City, they must fully comply with all of these instructions to bidders.

8. CITY OF MERIDEN, LOCAL PREFERENCE – N/A

9. EXTENSION OF AGREEMENT – N/A

10. TIME

Inasmuch as the contract concerns a public improvement, the provisions of the contract relating to the time of performance and completion of the work are of the essence of the contract. Accordingly, the successful bidder/contractor (“Contractor”) shall begin work on the day specified in paragraph 2.04 of the General Conditions and shall perform the work diligently so as to permit full use not later than the first day following the construction period established in the Contract. See paragraph 10 entitled “Liquidated Damages” of the Agreement between City of Meriden, as owner, and the Contractor.

11. SCHEDULE OF WORK

The Contractor shall schedule all work in a manner that will not disrupt City of Meriden operations. Once the work has begun, the Contractor shall work full-time until completion of the Contract.

12. TAXES

The City of Meriden is exempt under Connecticut General Statutes from the payment of the excise taxes imposed by the federal government and the Sales and Use Tax of the State of Connecticut; such taxes should not be included in the bid price. Upon request, exemption certificates will be furnished to the successful bidder.

13. FAIR EMPLOYMENT PRACTICES

The Contractor shall agree that neither it or its subcontractors, except in the case of a bona fide occupational qualification or need, to refuse to hire or employ or to bar or to discharge from employment any individual or to discriminate against such individual in compensation or in terms, conditions or privileges of employment because of the individual's race, color, religious creed, age, sex, gender identity or expression, marital status, national origin, ancestry, present or past history of mental disability, intellectual disability, learning disability, physical disability, including, but not limited to, blindness or status as a veteran. The aforementioned terms are obtained from Connecticut General Statutes Section 46a-60, *et seq.*, entitled "Discriminatory employment practices prohibited," as amended.

14. FORM OF AGREEMENT BETWEEN CITY OF MERIDEN AND CONTRACTOR

The Agreement for the work will be written on the Agreement between City of Meriden and Contractor, wherein the basis of payment is a stipulated sum.

15. LOCAL SUBCONTRACTORS, SUPPLIERS, etc.

Local subcontractors, material suppliers, and labor in the City of Meriden should be considered and sought out insofar as it is practical in the performance of this project.

16. CITY OF MERIDEN CODE OF ETHICS

The City of Meriden has adopted a Code of Ethics located in Chapter 21 of the Code of the City of Meriden, sections 21-1 through 21-15, inclusive, which are expressly incorporated herein by reference. The terms of the Code of Ethics shall constitute a part of any contract or agreement entered into by the City of Meriden as a result of this bid as if those terms were fully set forth in such contract or agreement.

Bidders are specifically advised that the Code of Ethics prohibits public officers and employees, as well as their immediate families and businesses, with which they are associated from participating in any transaction which is incompatible with the proper discharge of official duties or responsibilities. Bidders are also advised that the Code of Ethics contain provisions with respect to paid contractors and former employees and officials.

BIDDERS SHOULD NOTE THAT BIDS, CONTRACTS, AND AGREEMENTS ENTERED INTO OR AWARDED IN VIOLATION OF THE CODE OF ETHICS ARE VOIDABLE BY RESOLUTION OF THE CITY COUNCIL OF THE CITY OF MERIDEN.

Copies of the Code of Ethics may be obtained from the office of the City Clerk or may be found online on the City of Meriden's website.

17. NON-COLLUSION BID STATEMENT

Each bidder submitting a bid to the City of Meriden for any portion of the work contemplated by the documents on which bidding is based shall execute and attach thereto the sworn Non-Collusive Bid Statement, to the effect that the bidder has not colluded with any other person, firm, or corporation in the submission of the bid.

18. SOIL CONDITIONS

The City of Meriden does not guarantee the accuracy of any information which it may have obtained as to the kind or condition of the soil that may be encountered in the performance of the proposed work; neither does the City of Meriden represent that the plans and specifications drawn are based upon any soil data so obtained. The City of Meriden does not make any representations as to the soil data so obtained. The City of Meriden does not make any representations as to the soil conditions to be encountered or as to foundation materials.

19. AWARD IN CASE OF A TIE

In the event there are two or more responsive bidders, the decision to award will be based by the following criteria and in the following order:

- a. The incumbent will be awarded the bid over that of another bidder.
- b. In the case of a multi-item bid, if one bidder has been awarded other items from the same bid and the other bidder has not, the bidder with the multiple awards will be awarded the bid over that of another bidder.
- c. The bidder located in the State of Connecticut will be awarded the bid over that of another bidder.
- d. The winner of a coin toss will be awarded the bid over that of another bidder.

The above-referenced provisions do not apply to those situations in which more than one City-based business responsible bidder has submitted bids not more than ten (10) percent higher than the lowest bid and has agreed to accept the award of the bid at the amount of the lowest bid. Under such circumstances, the provisions of the Code of the City of Meriden, section 3-14, are controlling, as set forth under Section 8 of this 'Information to Bidders.'

20. ASSIGNMENT OF CONTRACT

No contract may be assigned without the written consent of the Purchasing Officer or designee.

21. PERMITS

The Contractor shall be responsible for obtaining any and all necessary permits required by the City of Meriden prior to the commencement of work. The Contractor may contact the

City of Meriden Building Department for permit information at (203) 630-4091. For all other required permits, contact the City of Meriden Engineering Department at (203) 630-4018.

22. BID PRICE AND PAYMENT

The City of Meriden is exempt from the payment of the excise taxes imposed by the Federal government and the Sales and Use Tax of the State of Connecticut under Connecticut General Statutes; accordingly, such taxes shall not be included in the bid price.

The City of Meriden, unless stated otherwise in the bidding documents or Contract, will make payment to the Contractor not less than thirty (30) days following completion of services.

23. QUALITY

All materials, equipment, supplies, and services shall be subject to rigid inspection. If defective material, equipment, supplies, or services are discovered, the Contractor shall remove or make good such material, equipment, or supplies without extra compensation. It is expressly understood and agreed that any inspection by the City of Meriden will in no way lessen the responsibility of the Contractor or release Contractor from the obligation to perform and deliver to the City sound and satisfactory materials, equipment, supplies, or allow the cost to be deducted from any monies due it from the City of Meriden. All services will be performed in a workmanlike manner.

24. INSURANCE

The successful bidder shall be required to provide a Certificate of Insurance denoting general liability, automobile liability, workers compensation liability, and other coverage required by the City's Risk Manager.

25. CITY HALL CLOSING

If Meriden City Hall is closed due to inclement weather, or any other unforeseen event, bids will be due at the same time on the next business day that City Hall is open.

26. PAYMENT REQUISITIONS & CERTIFIED PAYROLL

Progress payment requisitions are due monthly on last day of the month for work completed during the contract period. Requisitions are to be sent to the Architect/Engineer and/or City of Meriden Department responsible for management/administration of the contracted work.

Certified Payroll for construction contracts that require State of Connecticut Prevailing Wage Determinations are required for each week of work by the Contractor and any or all the Contractor's Subcontractors and are due monthly with each requisition. One hard copy and one electronic copy shall be sent to the Architect/Engineer and the City of Meriden

Purchasing Department. No progress payments will be issued to the Contractor without accompanying Certified Payroll.

For federally funded construction contracts with Davis Bacon Wage Determinations, Certified Payroll for all employees of the Contractor and any or all of the Contractor's Subcontractors are required to be submitted weekly to the Architect/Engineer and to the City of Meriden Purchasing Department. One hard copy and one electronic copy shall be sent to the Architect/Engineer and the City of Meriden Purchasing Department. Employees on the construction site will be interviewed by City of Meriden Staff and/or City of Meriden subcontracted Project Management/Clerk-of-the-Works/Owner's Representatives for Davis Bacon compliance. No progress payments will be issued to the Contractor without accompanying Certified Payroll.

1. Minority owned business? _____ yes _____ no
2. Years organized. _____
3. Is your company a corporation _____ yes _____ no
If yes where incorporated? _____
4. How many years have you been engaged in business under your present firm name? _____
5. Former Firm Name (if any) _____
6. List total number of Personnel _____
7. Is any principal of your firm an employee or public official of the City of Meriden, or an immediate family member of an employee or public official of the City of Meriden? (Definition of immediate family includes: an individual's spouse, fiancé or fiancée; the parent, brother or sister of such individual or spouse; and the child of such individual or the spouse of such child.)
_____ yes _____ no
8. List Vehicles and Equipment that you will use to perform this work: (show age of vehicles and equipment, sizes, capacities, etc.)

9. List the work to be performed by Subcontractors and summarize the dollar value of each subcontract.

10. List the name and address of the more important contracts recently completed by you, starting the approximate gross cost for each, and the month and year completed:

11. General character of work performed by you _____

12. Have you ever failed to complete any contract awarded to you? If so, where and why?

13. Have you ever defaulted on a contract? If so where and why?

14. Have you ever filed bankruptcy: _____ Please explain: _____

15. Will you, upon request, furnish any information that may be required by the City of Meriden? _____
16. The undersigned hereby authorizes and request any person, firm or cooperation to furnish any information requested by the City of Meriden, in verification of the recitals comprising this Statement of Bidder's Qualifications.

Dated this _____ day of _____, 20____ year

 Name of Bidder

 Title

State of _____
 County of _____

_____ being duly sworn deposes and says that they are
 Name _____ of _____
 title _____ name of organization
 and that the answers to the forgoing question and all statement therein contained are true and correct

Subscribed and sworn to before me
 this _____ day of _____ 20____
 day month year

 Notary Public signature

My commission expires _____

FORM OF SURETY GUARANTY

(Shall accompany proposal)

KNOW ALL MEN BY THESE PRESENTS, that for and in consideration of the sum of \$1.00, lawful money of the United States, the receipt whereof is hereby acknowledged, paid the undersaid corporation, and for other valuable consideration the

(Name of Surety Company) .

a corporation organized and existing under the laws of the State of _____

and licensed to do business in the State of _____ certifies and agrees

that if Contract _____

is awarded to - _____
(Name of Bidder)

Corporation will execute the bond or bonds as required by the Contract Documents and will become surety in the full amount of the Contract price for the faithful performance of the Contract and for payment of all persons supplying labor or furnishing or furnishing materials in connection thencewith.

(Surety)

The language of this form shall generally be given on the official form normally provided by the Surety Company complete with the usual proof of Authority of Officers of the Surety Company to execute said official form.

Should a bid be offered with a check as surety without said official form, such bid shall be rejected.

BID BOND

KNOW ALL MEN BY THESE PRESENTS, that we, the undersigned _____,
(Name of Principal)

As Principal, and _____,
(Name of Surety), as Surety are firmly bound

Unto the CITY OF MERIDEN, CONNECTICUT hereinafter called the "OWNER", in the penal sum of

_____ DOLLARS, (\$ _____) lawful money of the
United States, for the payment of which sum well and truly to be made, we bind ourselves, our heirs, executors,
administrators, successors and assigns, jointly and severally, firmly by these presents:

THE CONDITION OF THIS OBLIGATION IS SUCH THAT, WHEREAS, the said Principal has submitted the Accompanying bid
dated _____, 20 _____

For _____

NOW, THEREFORE, if the Principal shall not withdraw said Bid within the Period specified therein after the opening of
the same, or if no period be specified, within thirty (30) days after the said opening and shall within the period
specified therefore, or if no period be specified, within ten (10) days after the prescribed forms are presented to him
for signature, enter into a written Contract with the Owner in accordance with the Bid, as accepted, and give bond
with good and sufficient surety or sureties, as may be required for the faithful performance and proper fulfillment of
such Contract; or in the event of the withdrawal of said Bid within the period specified, or the failure to enter into such
Contract and give such bond within the time specified, if the Principal shall pay the Owner the difference between the
amount specified in said Bid and the Amount for which the Owner may procure the required work or supplies or both,
if the latter be in excess of the former, then the above obligation shall be void and of no effect, otherwise to remain in
full force and effect.

IN WITNESS WHEREOF, the Principal and the Surety have hereunto set their hands and seals, this _____ day of
_____, 20 _____.

(Principal)

(Address) (Affix seal)

By: _____

Witness Signature

(Surety)

(Address) (Affix seal)

By: _____

Witness Signature

SECTION II – BASE BID BREAKDOWN

Give the total lump sum for each line item listed below, consisting of all work as described in the specifications and as shown on the Drawings, and as necessary to complete the total work related to each line item. Identify subcontractor and an alternate subcontractor as indicated. If work is to be self-performed, it is not necessary to identify an alternate.

- 1. General Requirements (Max. 10% of Total Lump Sum)
 _____ (\$ _____)
 Written Figure Dollars & Cents

- 2. Play Field Equipment
 _____ (\$ _____)
 Written Figure Dollars & Cents

- 3. Site Electrical (Parking Lot Lighting, Electrical Infrastructure)
 _____ (\$ _____)
 Written Figure Dollars & Cents

- 4. Site Clearing
 _____ (\$ _____)
 Written Figure Dollars & Cents

- 5. Earth Moving
 _____ (\$ _____)
 Written Figure Dollars & Cents

- 6. Concrete Curbing & Walks
 _____ (\$ _____)
 Written Figure Dollars & Cents

NAME OF BIDDER:

7. Synthetic Turf Surfacing

Written Figure (\$ _____)
Dollars & Cents

8. Chain Link Fences & Gates

Written Figure (\$ _____)
Dollars & Cents

9. Turf and Grasses

Written Figure (\$ _____)
Dollars & Cents

10. Storm Utility Drainage Piping

Written Figure (\$ _____)
Dollars & Cents

11. Synthetic Field Subsurface Drainage

Written Figure (\$ _____)
Dollars & Cents

TOTAL

Written Figure (\$ _____) **Dollars & Cents**

(The total above shall be the same figure entered for Lump Sum Bid in Section I of this Bid Form).

NAME OF BIDDER:

SECTION III – ALTERNATES:

Alternate No. 1: Post-Tensioned Concrete Basketball Court, Sidewalks, and Parking Along Locust St.

_____ (\$ _____)
Written Figure Dollars & Cents

Alternate No. 2: Scoreboards and Associated Electrical Supply

_____ (\$ _____)
Written Figure Dollars & Cents

Alternate No. 3: 10' x 12' Storage Shed on Processed Aggregate Base

_____ (\$ _____)
Written Figure Dollars & Cents

Alternate No. 4: Dugout Shelters

_____ (\$ _____)
Written Figure Dollars & Cents

Alternate No. 5: Parking Lot Trees

_____ (\$ _____)
Written Figure Dollars & Cents

Alternate No. 6: Bituminous Concrete Parking Lot and Pavement Markings

_____ (\$ _____)
Written Figure Dollars & Cents

NAME OF BIDDER:

SECTION IV – UNIT PRICES

**Unit Price 1: Removal, Disposal and Replacement of Unstable Materials
(Assume 200 Cubic Yards)**

_____ (\$ _____)
Written Figure (Per Cubic Yard) Dollars & Cents (Per Cubic Yard)

SECTION V – TIME OF COMPLETION

If awarded this Contract, the Undersigned guarantees Substantial Completion of Contract by August 31, 2023; and guarantees Final Completion (including all punch list items) within 15 calendar days thereafter.

SECTION VI – ADDENDUM RECEIPT

Receipt of the following Addenda to the Contract Documents is acknowledged:

Addendum Number: _____

Dated: _____

Addendum Number: _____

Dated: _____

Addendum Number: _____

Dated: _____

SECTION VII – BID ACCEPTANCE

1. In submitting this bid, it is understood that the right is reserved by the City to reject any and all bids and to waive any informalities or irregularities in the bid received and to accept the bid deemed to be in its best interest. If written notice of the acceptance of this bid is mailed, faxed, or delivered to the undersigned within sixty (60) days after the opening thereof, the undersigned agrees to execute and deliver a contract in the prescribed form and furnish the required bonds within ten (10) days after the contract is presented to him/her for signature.

2. A Bid Bond is required.

NAME OF BIDDER:

- 3. Attached hereto is an affidavit in proof that the undersigned has not entered into any collusion with any person in respect to this proposal or any other proposal or the submitting of proposals for the contract for which this proposal is submitted.

- 4. The Owner further reserves the right to reject any bid or all bids, to waive any informalities or irregularities in the bid received and to accept the bid, which in his/her judgment will be in the best interest of the City

OFFICIAL ADDRESS:

Date: _____

By: _____

Title: _____

END OF SECTION

BID FORM

B023-16

North End Field – Ballfield Reconstruction

Date of Opening: November 2, 2022
At 1:00 P.M.

To: Adam B Tulin, MPA
Purchasing Officer
142 East Main Street, Room 210
Meriden, CT 06450

The undersigned _____, doing business in the City/Town of _____, in the State of _____, herewith, after reading thoroughly the Specifications and other Bid documents (including if any addendum or addenda) submit the following proposal:

Lump sum price:

_____ Dollars & Cents
Written Amount

Receipt of Addenda is acknowledged:

No: _____ Dated: _____

No: _____ Dated: _____

NAME OF BIDDER _____

ADDRESS _____

BY: _____
Print or type name Title

SIGNATURE _____ DATE _____

TELEPHONE _____ E-Mail _____

PLEASE NOTE: All spaces must be filled in with figures or words or your bid may be automatically rejected.



Opportunity * Guidance * Support



THIS IS A PUBLIC WORKS PROJECT

Covered by the

PREVAILING WAGE LAW

CT General Statutes Section 31-53

**If you have QUESTIONS regarding your wages
CALL (860) 263-6790**

Section 31-55 of the CT State Statutes requires every contractor or subcontractor performing work for the state to post in a prominent place the prevailing wages as determined by the Labor Commissioner.

Sec. 31-53b. Construction safety and health course. New miner training program. Proof of completion required for mechanics, laborers and workers on public works projects. Enforcement. Regulations. Exceptions. (a) Each contract for a public works project entered into on or after July 1, 2009, by the state or any of its agents, or by any political subdivision of the state or any of its agents, described in subsection (g) of section 31-53, shall contain a provision requiring that each contractor furnish proof with the weekly certified payroll form for the first week each employee begins work on such project that any person performing the work of a mechanic, laborer or worker pursuant to the classifications of labor under section 31-53 on such public works project, pursuant to such contract, has completed a course of at least ten hours in duration in construction safety and health approved by the federal Occupational Safety and Health Administration or, has completed a new miner training program approved by the Federal Mine Safety and Health Administration in accordance with 30 CFR 48 or, in the case of telecommunications employees, has completed at least ten hours of training in accordance with 29 CFR 1910.268.

(b) Any person required to complete a course or program under subsection (a) of this section who has not completed the course or program shall be subject to removal from the worksite if the person does not provide documentation of having completed such course or program by the fifteenth day after the date the person is found to be in noncompliance. The Labor Commissioner or said commissioner's designee shall enforce this section.

(c) Not later than January 1, 2009, the Labor Commissioner shall adopt regulations, in accordance with the provisions of chapter 54, to implement the provisions of subsections (a) and (b) of this section. Such regulations shall require that the ten-hour construction safety and health courses required under subsection (a) of this section be conducted in accordance with federal Occupational Safety and Health Administration Training Institute standards, or in accordance with Federal Mine Safety and Health Administration Standards or in accordance with 29 CFR 1910.268, as appropriate. The Labor Commissioner shall accept as sufficient proof of compliance with the provisions of subsection (a) or (b) of this section a student course completion card issued by the federal Occupational Safety and Health Administration Training Institute, or such other proof of compliance said commissioner deems appropriate, dated no earlier than five years before the commencement date of such public works project.

(d) This section shall not apply to employees of public service companies, as defined in section 16-1, or drivers of commercial motor vehicles driving the vehicle on the public works project and delivering or picking up cargo from public works projects provided they perform no labor relating to the project other than the loading and unloading of their cargo.

(P.A. 06-175, S. 1; P.A. 08-83, S. 1.)

History: P.A. 08-83 amended Subsec. (a) by making provisions applicable to public works project contracts entered into on or after July 1, 2009, replacing provision re total cost of work with reference to Sec. 31-53(g), requiring proof in certified payroll form that new mechanic, laborer or worker has completed a 10-hour or more construction safety course and adding provision re new miner training program, amended Subsec. (b) by substituting "person" for "employee" and adding "or program", amended Subsec. (c) by adding "or in accordance with Federal Mine Safety and Health Administration Standards" and setting new deadline of January 1, 2009, deleted former Subsec. (d) re "public building", added new Subsec. (d) re exemptions for public service company employees and delivery drivers who perform no labor other than delivery and made conforming and technical changes, effective January 1, 2009.

STATUTE 31-55a

- SPECIAL NOTICE -

To: All State and Political Subdivisions, Their Agents, and Contractors

Connecticut General Statute 31-55a - Annual adjustments to wage rates by contractors doing state work.

Each contractor that is awarded a contract on or after October 1, 2002, for (1) the construction of a state highway or bridge that falls under the provisions of section 31-54 of the general statutes, or (2) the construction, remodeling, refinishing, refurbishing, rehabilitation, alteration or repair of any public works project that falls under the provisions of section 31-53 of the general statutes shall contact the Labor Commissioner on or before July first of each year, for the duration of such contract, to ascertain the prevailing rate of wages on an hourly basis and the amount of payment or contributions paid or payable on behalf of each mechanic, laborer or worker employed upon the work contracted to be done, and shall make any necessary adjustments to such prevailing rate of wages and such payment or contributions paid or payable on behalf of each such employee, effective each July first.

- The prevailing wage rates applicable to any contract or subcontract awarded on or after October 1, 2002 are subject to annual adjustments each July 1st for the duration of any project which was originally advertised for bids on or after October 1, 2002.
- Each contractor affected by the above requirement shall pay the annual adjusted prevailing wage rate that is in effect each July 1st, as posted by the Department of Labor.
- It is the **contractor's** responsibility to obtain the annual adjusted prevailing wage rate increases directly from the Department of Labor's Web Site. The annual adjustments will be posted on the Department of Labor Web page: www.ctdol.state.ct.us. For those without internet access, please contact the division listed below.
- The Department of Labor will continue to issue the initial prevailing wage rate schedule to the Contracting Agency for the project. All subsequent annual adjustments will be posted on our Web Site for contractor access.


Any questions should be directed to the Contract Compliance Unit, Wage and Workplace Standards Division, Connecticut Department of Labor, 200 Folly Brook Blvd., Wethersfield, CT 06109 at (860)263-6790.

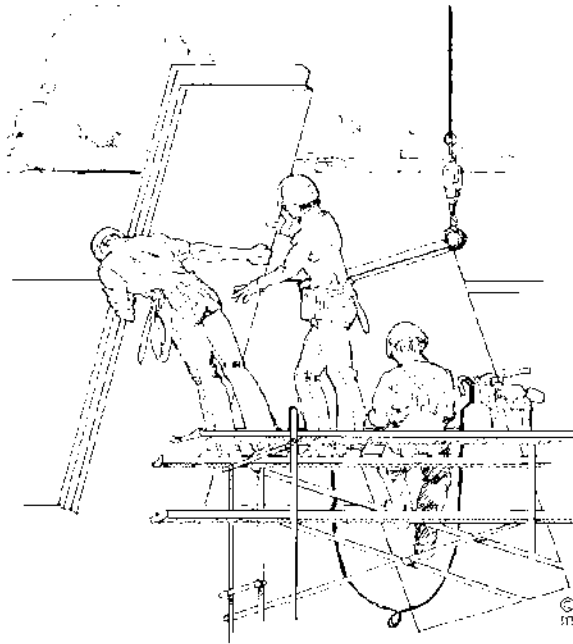
~NOTICE~

TO ALL CONTRACTING AGENCIES

Please be advised that Connecticut General Statutes Section 31-53, requires the contracting agency to certify to the Department of Labor, the total dollar amount of work to be done in connection with such public works project, regardless of whether such project consists of one or more contracts.

Please find the attached “Contracting Agency Certification Form” to be completed and returned to the Department of Labor, Wage and Workplace Standards Division, Public Contract Compliance Unit.

 Inquiries can be directed to (860)263-6543.



CONNECTICUT DEPARTMENT OF LABOR
WAGE AND WORKPLACE STANDARDS DIVISION
CONTRACT COMPLIANCE UNIT

CONTRACTING AGENCY CERTIFICATION FORM

I, _____, acting in my official capacity as _____,
authorized representative title

for _____, located at _____,
contracting agency address

do hereby certify that the total dollar amount of work to be done in connection with
_____, located at _____,
project name and number address

shall be \$_____, which includes all work, regardless of whether such project
consists of one or more contracts.

CONTRACTOR INFORMATION

Name: _____

Address: _____

Authorized Representative: _____

Approximate Starting Date: _____

Approximate Completion Date: _____

Signature

Date

Return To: Connecticut Department of Labor
Wage & Workplace Standards Division
Contract Compliance Unit
200 Folly Brook Blvd.
Wethersfield, CT 06109

Date Issued: _____

CONNECTICUT DEPARTMENT OF LABOR
WAGE AND WORKPLACE STANDARDS DIVISION

CONTRACTORS WAGE CERTIFICATION FORM
Construction Manager at Risk/General Contractor/Prime Contractor

I, _____ of _____
Officer, Owner, Authorized Rep. Company Name

do hereby certify that the _____
Company Name

Street

City

and all of its subcontractors will pay all workers on the

Project Name and Number

Street and City

the wages as listed in the schedule of prevailing rates required for such project (a copy of which is attached hereto).

Signed

Subscribed and sworn to before me this _____ day of _____, _____.

Notary Public

Return to:
Connecticut Department of Labor
Wage & Workplace Standards Division
200 Folly Brook Blvd.
Wethersfield, CT 06109

Rate Schedule Issued (Date): _____

Informational Bulletin

THE 10-HOUR OSHA CONSTRUCTION SAFETY AND HEALTH COURSE

(applicable to public building contracts entered into *on or after July 1, 2007*, where the total cost of all work to be performed is at least \$100,000)

- (1) This requirement was created by Public Act No. 06-175, which is codified in Section 31-53b of the Connecticut General Statutes (pertaining to the prevailing wage statutes);
- (2) The course is required for public building construction contracts (projects funded in whole or in part by the state or any political subdivision of the state) entered into on or after July 1, 2007;
- (3) It is required of private employees (not state or municipal employees) and apprentices who perform manual labor for a general contractor or subcontractor on a public building project where the total cost of all work to be performed is at least \$100,000;
- (4) The ten-hour construction course pertains to the ten-hour Outreach Course conducted in accordance with federal OSHA Training Institute standards, and, for telecommunications workers, a ten-hour training course conducted in accordance with federal OSHA standard, 29 CFR 1910.268;
- (5) The internet website for the federal OSHA Training Institute is http://www.osha.gov/fso/ote/training/edcenters/fact_sheet.html;
- (6) The statutory language leaves it to the contractor and its employees to determine who pays for the cost of the ten-hour Outreach Course;
- (7) Within 30 days of receiving a contract award, a general contractor must furnish proof to the Labor Commissioner that all employees and apprentices performing manual labor on the project will have completed such a course;
- (8) Proof of completion may be demonstrated through either: (a) the presentation of a *bona fide* student course completion card issued by the federal OSHA Training Institute; *or* (2) the presentation of documentation provided to an employee by a trainer certified by the Institute pending the actual issuance of the completion card;
- (9) Any card with an issuance date more than 5 years prior to the commencement date of the construction project shall not constitute proof of compliance;

- (10) Each employer shall affix a copy of the construction safety course completion card to the certified payroll submitted to the contracting agency in accordance with Conn. Gen. Stat. § 31-53(f) on which such employee's name first appears;
- (11) Any employee found to be in non-compliance shall be subject to removal from the worksite if such employee does not provide satisfactory proof of course completion to the Labor Commissioner by the fifteenth day after the date the employee is determined to be in noncompliance;
- (12) Any such employee who is determined to be in noncompliance may continue to work on a public building construction project for a maximum of fourteen consecutive calendar days while bringing his or her status into compliance;
- (13) The Labor Commissioner may make complaint to the prosecuting authorities regarding any employer or agent of the employer, or officer or agent of the corporation who files a false certified payroll with respect to the status of an employee who is performing manual labor on a public building construction project;
- (14) The statute provides the minimum standards required for the completion of a safety course by manual laborers on public construction contracts; any contractor can exceed these minimum requirements; and
- (15) Regulations clarifying the statute are currently in the regulatory process, and shall be posted on the CTDOL website as soon as they are adopted in final form.
- (16) Any questions regarding this statute may be directed to the Wage and Workplace Standards Division of the Connecticut Labor Department via the internet website of <http://www.ctdol.state.ct.us/wgwkstnd/wgemenu.htm>; or by telephone at (860)263-6790.

THE ABOVE INFORMATION IS PROVIDED EXCLUSIVELY AS AN EDUCATIONAL RESOURCE, AND IS NOT INTENDED AS A SUBSTITUTE FOR LEGAL INTERPRETATIONS WHICH MAY ULTIMATELY ARISE CONCERNING THE CONSTRUCTION OF THE STATUTE OR THE REGULATIONS.

November 29, 2006

Notice
To All Mason Contractors and Interested Parties
Regarding Construction Pursuant to Section 31-53 of the
Connecticut General Statutes (Prevailing Wage)

The Connecticut Labor Department Wage and Workplace Standards Division is empowered to enforce the prevailing wage rates on projects covered by the above referenced statute.

Over the past few years the Division has withheld enforcement of the rate in effect for workers who operate a forklift on a prevailing wage rate project due to a potential jurisdictional dispute.

The rate listed in the schedules and in our Occupational Bulletin (see enclosed) has been as follows:

Forklift Operator:

- **Laborers (Group 4) Mason Tenders** - operates forklift solely to assist a mason to a maximum height of nine feet only.
- **Power Equipment Operator (Group 9)** - operates forklift to assist any trade and to assist a mason to a height over nine feet.

The U.S. Labor Department conducted a survey of rates in Connecticut but it has not been published and the rate in effect remains as outlined in the above Occupational Bulletin.

Since this is a classification matter and not one of jurisdiction, effective January 1, 2007 the Connecticut Labor Department will enforce the rate on each schedule in accordance with our statutory authority.

Your cooperation in filing appropriate and accurate certified payrolls is appreciated.

Information Bulletin ***Occupational Classifications***

The Connecticut Department of Labor has the responsibility to properly determine "job classification" on prevailing wage projects covered under C.G.S. Section 31-53(d).

Note: This information is intended to provide a sample of some occupational classifications for guidance purposes only. It is not an all-inclusive list of each occupation's duties. This list is being provided only to highlight some areas where a contractor may be unclear regarding the proper classification. If unsure, the employer should seek guidelines for CTDOL.

Below are additional clarifications of specific job duties performed for certain classifications:

- **ASBESTOS WORKERS**

Applies all insulating materials, protective coverings, coatings and finishes to all types of mechanical systems.

- **ASBESTOS INSULATOR**

Handle, install apply, fabricate, distribute, prepare, alter, repair, dismantle, heat and frost insulation, including penetration and fire stopping work on all penetration fire stop systems.

- **BOILERMAKERS**

Erects hydro plants, incomplete vessels, steel stacks, storage tanks for water, fuel, etc. Builds incomplete boilers, repairs heat exchanges and steam generators.

- **BRICKLAYERS, CEMENT MASONS, CEMENT FINISHERS, MARBLE MASONS, PLASTERERS, STONE MASONS, PLASTERERS. STONE MASONS, TERRAZZO WORKERS, TILE SETTERS**

Lays building materials such as brick, structural tile and concrete cinder, glass, gypsum, terra cotta block. Cuts, tools and sets marble, sets stone, finishes concrete, applies decorative steel, aluminum and plastic tile, applies cements, sand, pigment and marble chips to floors, stairways, etc.

- **CARPENTERS, MILLWRIGHTS. PILEDIVERMEN. LATHERS. RESILEINT FLOOR LAYERS, DOCK BUILDERS, DIKERS, DIVER TENDERS**

Constructs, erects, installs and repairs structures and fixtures of wood, plywood and wallboard. Installs, assembles, dismantles, moves industrial machinery. Drives piling into ground to provide foundations for structures such as buildings and bridges, retaining walls for earth embankments, such as cofferdams. Fastens wooden, metal or rockboard lath to walls, ceilings and partitions of buildings, acoustical tile layer, concrete form builder. Applies firestopping materials on fire resistive joint systems only. Installation of curtain/window walls only where attached to wood or metal studs. Installation of insulated material of all types whether blown, nailed or attached in other ways to walls, ceilings and floors of buildings. Assembly and installation of modular furniture/furniture systems. Free-standing furniture is not covered. This includes free standing: student chairs, study top desks, book box desks, computer furniture, dictionary stand, atlas stand, wood shelving, two-position information access station, file cabinets, storage cabinets, tables, etc.

- **LABORER, CLEANING**

- The clean up of any construction debris and the general (heavy/light) cleaning, including sweeping, wash down, mopping, wiping of the construction facility and its furniture, washing, polishing, and dusting.

- **DELIVERY PERSONNEL**

- If delivery of supplies/building materials is to one common point and stockpiled there, prevailing wages are not required. If the delivery personnel are involved in the distribution of the material to multiple locations within the construction site then they would have to be paid prevailing wages for the type of work performed: laborer, equipment operator, electrician, ironworker, plumber, etc.

- An example of this would be where delivery of drywall is made to a building and the delivery personnel distribute the drywall from one "stockpile" location to further sub-locations on each floor. Distribution of material around a construction site is the job of a laborer or tradesman, and not a delivery personnel.

- **ELECTRICIANS**

Install, erect, maintenance, alteration or repair of any wire, cable, conduit, etc., which generates, transforms, transmits or uses electrical energy for light, heat, power or other purposes, including the Installation or maintenance of telecommunication, LAN wiring or computer equipment, and low voltage wiring. ***License required per Connecticut General Statutes: E-1,2 L-5,6 C-5,6 T-1,2 L-1,2 V-1,2,7,8,9.**

- **ELEVATOR CONSTRUCTORS**

Install, erect, maintenance and repair of all types of elevators, escalators, dumb waiters and moving walks. **License required by Connecticut General Statutes: R-1,2,5,6.*

- **FORK LIFT OPERATOR**

Laborers Group 4) Mason Tenders - operates forklift solely to assist a mason to a maximum height of nine (9) feet only.

Power Equipment Operator Group 9 - operates forklift to assist any trade, and to assist a mason to a height over nine (9) feet.

- **GLAZIERS**

Glazing wood and metal sash, doors, partitions, and 2 story aluminum storefronts. Installs glass windows, skylights, store fronts and display cases or surfaces such as building fronts, interior walls, ceilings and table tops and metal store fronts. Installation of aluminum window walls and curtain walls is the "joint" work of glaziers and ironworkers, which require equal composite workforce.

- **IRONWORKERS**

Erection, installation and placement of structural steel, precast concrete, miscellaneous iron, ornamental iron, metal curtain wall, rigging and reinforcing steel. Handling, sorting, and installation of reinforcing steel (rebar). Metal bridge rail (traffic), metal bridge handrail, and decorative security fence installation. Installation of aluminum window walls and curtain walls is the "joint" work of glaziers and ironworkers which require equal composite workforce.

- **INSULATOR**

- Installing fire stopping systems/materials for "Penetration Firestop Systems": transit to cables, electrical conduits, insulated pipes, sprinkler pipe penetrations, ductwork behind radiation, electrical cable trays, fire rated pipe penetrations, natural polypropylene, HVAC ducts, plumbing bare metal, telephone and communication wires, and boiler room ceilings.

- **LABORERS**

Acetylene burners, asphalt rakers, chain saw operators, concrete and power buggy operator, concrete saw operator, fence and guard rail erector (except metal bridge rail (traffic), decorative security fence (non-metal).

installation.), hand operated concrete vibrator operator, mason tenders, pipelayers (installation of storm drainage or sewage lines on the street only), pneumatic drill operator, pneumatic gas and electric drill operator, powermen and wagon drill operator, air track operator, block paver, curb setters, blasters, concrete spreaders.

- **PAINTERS**

Maintenance, preparation, cleaning, blasting (water and sand, etc.), painting or application of any protective coatings of every description on all bridges and appurtenances of highways, roadways, and railroads. Painting, decorating, hardwood finishing, paper hanging, sign writing, scenic art work and drywall hhg for any and all types of building and residential work.

- **LEAD PAINT REMOVAL**

- Painter's Rate

1. Removal of lead paint from bridges.
2. Removal of lead paint as preparation of any surface to be repainted.
3. Where removal is on a Demolition project prior to reconstruction.

- Laborer's Rate

1. Removal of lead paint from any surface NOT to be repainted.
2. Where removal is on a *TOTAL* Demolition project only.

- **PLUMBERS AND PIPEFITTERS**

Installation, repair, replacement, alteration or maintenance of all plumbing, heating, cooling and piping. ****License required per Connecticut General Statutes: P-1,2,6,7,8,9 J-1,2,3,4 SP-1,2 S-1,2,3,4,5,6,7,8 B-1,2,3,4 D-1,2,3,4.***

- **POWER EQUIPMENT OPERATORS**

Operates several types of power construction equipment such as compressors, pumps, hoists, derricks, cranes, shovels, tractors, scrapers or motor graders, etc. Repairs and maintains equipment. ****License required, crane operators only, per Connecticut General Statutes.***

- **ROOFERS**

Covers roofs with composition shingles or sheets, wood shingles, slate or asphalt and gravel to waterproof roofs, including preparation of surface. (demolition or removal of any type of roofing and or clean-up of any and all areas where a roof is to be relaid.)

- **SHEETMETAL WORKERS**

Fabricate, assembles, installs and repairs sheetmetal products and equipment in such areas as ventilation, air-conditioning, warm air heating, restaurant equipment, architectural sheet metal work, sheetmetal roofing, and aluminum gutters. Fabrication, handling, assembling, erecting, altering, repairing, etc. of coated metal material panels and composite metal material panels when used on building exteriors and interiors as soffits, fascia, louvers, partitions, canopies, cornice, column covers, awnings, beam covers, cladding, sun shades, lighting troughs, spires, ornamental roofing, metal ceilings, mansards, copings, ornamental and ventilation hoods, vertical and horizontal siding panels, trim, etc. The sheet metal classification also applies to the vast variety of coated metal material panels and composite metal material panels that have evolved over the years as an alternative to conventional ferrous and non-ferrous metals like steel, iron, tin, copper, brass, bronze, aluminum, etc. Fabrication, handling, assembling, erecting, altering, repairing, etc. of architectural metal roof, standing seam roof, composite metal roof, metal and composite bathroom/toilet partitions, aluminum gutters, metal and composite lockers and shelving, kitchen equipment, and walk-in coolers. To include testing and air –balancing ancillary to installation and construction.

- **SPRINKLER FITTERS**

Installation, alteration, maintenance and repair of fire protection sprinkler systems.

****License required per Connecticut General Statutes: F-1,2,3,4.***

- **TILE MARBLE AND TERRAZZO FINISHERS**

Assists and tends the tile setter, marble mason and terrazzo worker in the performance of their duties.

- **TRUCK DRIVERS**

~How to pay truck drivers delivering asphalt is under REVISION~

Truck Drivers are requires to be paid prevailing wage for time spent "working" directly on the site. These drivers remain covered by the prevailing wage for any time spent transporting between the actual construction location and facilities (such as fabrication, plants, mobile factories, batch plant, borrow pits, job headquarters, tool yards, etc.) dedicated exclusively, or nearly so, to performance of the contract or project, which are so located in proximity to the actual construction location that it is reasonable to include them. ****License required, drivers only, per Connecticut General Statutes.***

For example:

- Material men and deliverymen are not covered under prevailing wage as long as they are not directly involved in the construction process. If, they unload the material, they would then be covered by prevailing wage for the classification they are performing work in: laborer, equipment operator, etc.
- Hauling material off site is not covered provided they are not dumping it at a location outlined above.
- Driving a truck on site and moving equipment or materials on site would be considered covered work, as this is part of the construction process.

➤ *Any questions regarding the proper classification should be directed to:*
Public Contract Compliance Unit
Wage and Workplace Standards Division
Connecticut Department of Labor
200 Folly Brook Blvd, Wethersfield, CT 06109
(860) 263-6543.

**Connecticut Department of Labor
Wage and Workplace Standards Division
FOOTNOTES**

⇒ Please Note: If the “Benefits” listed on the schedule for the following occupations includes a letter(s) (+ a or + a+b for instance), refer to the information below.

Benefits to be paid at the appropriate prevailing wage rate for the listed occupation.

If the “Benefits” section for the occupation lists only a dollar amount, disregard the information below.

**Bricklayers, Cement Masons, Cement Finishers, Concrete Finishers, Stone Masons
(Building Construction) and
(Residential- Hartford, Middlesex, New Haven, New London and Tolland Counties)**

- a. Paid Holiday: Employees shall receive 4 hours for Christmas Eve holiday provided the employee works the regularly scheduled day before and after the holiday. Employers may schedule work on Christmas Eve and employees shall receive pay for actual hours worked in addition to holiday pay.

Elevator Constructors: Mechanics

- a. Paid Holidays: New Year’s Day, Memorial Day, Independence Day, Labor Day, Veterans’ Day, Thanksgiving Day, Christmas Day, plus the Friday after Thanksgiving.
- b. Vacation: Employer contributes 8% of basic hourly rate for 5 years or more of service or 6% of basic hourly rate for 6 months to 5 years of service as vacation pay credit.

Glaziers

- a. Paid Holidays: Labor Day and Christmas Day.

**Power Equipment Operators
(Heavy and Highway Construction & Building Construction)**

- a. Paid Holidays: New Year’s Day, Good Friday, Memorial day, Independence Day, Labor Day, Thanksgiving Day and Christmas Day, provided the employee works 3 days during the week in which the holiday falls, if scheduled, and if scheduled, the working day before and the working day after the holiday. Holidays falling on Saturday may be observed on Saturday, or if the employer so elects, on the preceding Friday.

Ironworkers

- a. Paid Holiday: Labor Day provided employee has been on the payroll for the 5 consecutive work days prior to Labor Day.

Laborers (Tunnel Construction)

- a. Paid Holidays: New Year's Day, Memorial Day, Independence Day, Labor Day, Thanksgiving Day and Christmas Day. No employee shall be eligible for holiday pay when he fails, without cause, to work the regular work day preceding the holiday or the regular work day following the holiday.

Roofers

- a. Paid Holidays: July 4th, Labor Day, and Christmas Day provided the employee is employed 15 days prior to the holiday.

Sprinkler Fitters

- a. Paid Holidays: Memorial Day, July 4th, Labor Day, Thanksgiving Day and Christmas Day, provided the employee has been in the employment of a contractor 20 working days prior to any such paid holiday.

Truck Drivers

(Heavy and Highway Construction & Building Construction)

- a. Paid Holidays: New Year's Day, Memorial Day, Independence Day, Labor Day, Thanksgiving Day, Christmas day, and Good Friday, provided the employee has at least 31 calendar days of service and works the last scheduled day before and the first scheduled day after the holiday, unless excused.

Minimum Rates and Classifications for Heavy/Highway Construction

ID#: 22-39320

**Connecticut Department of Labor
Wage and Workplace Standards**

By virtue of the authority vested in the Labor Commissioner under provisions of Section 31-53 of the General Statutes of Connecticut, as amended, the following are declared to be the prevailing rates and welfare payments and will apply only where the contract is advertised for bid within 20 days of the date on which the rates are established. Any contractor or subcontractor not obligated by agreement to pay to the welfare and pension fund shall pay this amount to each employee as part of his/her hourly wages.

Project Number: B023-16

Project Town: Meriden

State#:

FAP#:

Project: North End Field Ballfield Reconstruction

| CLASSIFICATION | Hourly Rate | Benefits |
|---|--------------------|-----------------|
| 1) Boilermaker | 44.46 | 28.51 |
| 1a) Bricklayer, Cement Masons, Cement Finishers, Plasterers, Stone Masons | 38.27 | 34.47 |
| 2) Carpenters, Piledrivermen | 36.07 | 26.15 |
| 2a) Diver Tenders | 36.07 | 26.15 |
| 3) Divers | 44.53 | 26.15 |
| 03a) Millwrights | 36.32 | 26.81 |
| 4) Painters: (Bridge Construction) Brush, Roller, Blasting (Sand, Water, etc.), Spray | 55.0 | 23.75 |
| 4a) Painters: Brush and Roller | 37.22 | 23.40 |
| 4b) Painters: Spray Only | 40.22 | 23.40 |
| 4c) Painters: Steel Only | 39.22 | 23.40 |

| | | |
|--|-------|------------------------|
| 4d) Painters: Blast and Spray | 40.22 | 23.40 |
| 4e) Painters: Tanks, Tower and Swing | 39.22 | 23.40 |
| 4f) Elevated Tanks (60 feet and above) | 46.22 | 23.40 |
| 5) Electrician (Trade License required: E-1,2 L-5,6 C-5,6 T-1,2 L-1,2 V-1,2,7,8,9) | 40.6 | 32.21+3% of gross wage |
| 6) Ironworkers: Ornamental, Reinforcing, Structural, and Precast Concrete Erection | 39.7 | 38.77 + a |
| 7) Plumbers (Trade License required: (P-1,2,6,7,8,9 J-1,2,3,4 SP-1,2) and Pipefitters (Including HVAC Work) (Trade License required: S-1,2,3,4,5,6,7,8 B-1,2,3,4 D-1,2,3,4 G-1, G-2, G-8, G-9) | 47.03 | 34.05 |
| ----LABORERS----- | | |
| 8) Group 1: Laborer (Unskilled), Common or General, acetylene burner, concrete specialist | 32.0 | 24.40 |
| 9) Group 2: Chain saw operators, fence and guard rail erectors, pneumatic tool operators, powdermen | 32.25 | 24.40 |
| 10) Group 3: Pipelayers | 32.5 | 24.40 |
| 11) Group 4: Jackhammer/Pavement breaker (handheld); mason tenders (cement/concrete), catch basin builders, asphalt rakers, air track operators, block paver, curb setter and forklift operators | 32.5 | 24.40 |
| 12) Group 5: Toxic waste removal (non-mechanical systems) | 34.0 | 24.40 |
| 13) Group 6: Blasters | 33.75 | 24.40 |

| | | |
|---|-------|-----------|
| Group 7: Asbestos/lead removal, non-mechanical systems (does not include leaded joint pipe) | 33.0 | 24.40 |
| Group 8: Traffic control signalmen | 18.0 | 24.40 |
| Group 9: Hydraulic Drills | 32.75 | 24.40 |
| ----LABORERS (TUNNEL CONSTRUCTION, FREE AIR). Shield Drive and Liner Plate Tunnels in Free Air.---- | | |
| 13a) Miners, Motormen, Mucking Machine Operators, Nozzle Men, Grout Men, Shaft & Tunnel Steel & Rodmen, Shield & Erector, Arm Operator, Cable Tenders | 34.23 | 24.40 + a |
| 13b) Brakemen, Trackmen, Miners' Helpers and all other men | 33.26 | 24.40 + a |
| ----CLEANING, CONCRETE AND CAULKING TUNNEL---- | | |
| 14) Concrete Workers, Form Movers, and Strippers | 33.26 | 24.40 + a |
| 15) Form Erectors | 33.59 | 24.40 + a |
| ----ROCK SHAFT LINING, CONCRETE, LINING OF SAME AND TUNNEL IN FREE AIR:---- | | |
| 16) Brakemen, Trackmen, Tunnel Laborers, Shaft Laborers, Miners Helpers | 33.26 | 24.40 + a |
| 17) Laborers Topside, Cage Tenders, Bellman | 33.15 | 24.40 + a |
| 18) Miners | 34.23 | 24.40 + a |
| ----TUNNELS, CAISSON AND CYLINDER WORK IN COMPRESSED AIR: ---- | | |

| | | |
|---|-------|-----------|
| 18a) Blaster | 40.72 | 24.40 + a |
| 19) Brakemen, Trackmen, Groutman, Laborers, Outside Lock Tender, Gauge Tenders | 40.52 | 24.40 + a |
| 20) Change House Attendants, Powder Watchmen, Top on Iron Bolts | 38.54 | 24.40 + a |
| 21) Mucking Machine Operator, Grout Boss, Track Boss | 41.31 | 24.40 + a |
| ----TRUCK DRIVERS----(*see note below) | | |
| Two Axle Trucks, Helpers | 31.16 | 28.78 + a |
| Three Axle Trucks; Two Axle Ready Mix | 31.27 | 28.78 + a |
| Three Axle Ready Mix | 31.33 | 28.78 + a |
| Four Axle Trucks | 31.39 | 28.78 + a |
| Four Axle Ready-Mix | 31.44 | 28.78 + a |
| Heavy Duty Trailer (40 tons and over) | 33.66 | 28.78 + a |
| Specialized earth moving equipment other than conventional type on-the road trucks and semi-trailer (including Euclids) | 31.44 | 28.78 + a |
| Heavy Duty Trailer (up to 40 tons) | 32.39 | 28.78 + a |
| Snorkle Truck | 31.54 | 28.78 + a |
| ----POWER EQUIPMENT OPERATORS---- | | |

| | | |
|--|-------|-----------|
| Group 1: Crane Handling or Erecting Structural Steel or Stone, Hoisting Engineer (2 drums or over). (Trade License Required) | 50.27 | 26.80 + a |
| Group 1a: Front End Loader (7 cubic yards or over); Work Boat 26 ft. and over. | 46.07 | 26.80 + a |
| Group 2: Cranes (100 ton rate capacity and over); Bauer Drill/Caisson. (Trade License Required) | 49.91 | 26.80 + a |
| Group 2a: Cranes (under 100 ton rated capacity). | 49.06 | 26.80 + a |
| Group 2b: Excavator over 2 cubic yards; Pile Driver (\$3.00 premium when operator controls hammer). | 45.71 | 26.80 + a |
| Group 3: Excavator; Gradall; Master Mechanic; Hoisting Engineer (all types of equipment where a drum and cable are used to hoist or drag material regardless of motive power of operation), Rubber Tire Excavator (Drott-1085 or similar); Grader Operator; Bulldozer Fine Grade (slopes, shaping, laser or GPS, etc.). (Trade License Required) | 44.86 | 26.80 + a |
| Group 4: Trenching Machines; Lighter Derrick; CMI Machine or Similar; Koehring Loader (Skooper). | 44.42 | 26.80 + a |
| Group 5: Specialty Railroad Equipment; Asphalt Paver; Asphalt Spreader; Asphalt Reclaiming Machine; Line Grinder; Concrete Pumps; Drills with Self Contained Power Units; Boring Machine; Post Hole Digger; Auger; Pounder; Well Digger; Milling Machine (over 24" mandrel) | 43.73 | 26.80 + a |
| Group 5 continued: Side Boom; Combination Hoe and Loader; Directional Driller. | 43.73 | 26.80 + a |
| Group 6: Front End Loader (3 up to 7 cubic yards); Bulldozer (rough grade dozer). | 43.38 | 26.80 + a |
| Group 7: Asphalt Roller; Concrete Saws and Cutters (ride on types); Vermeer Concrete Cutter; Stump Grinder; Scraper; Snooper; Skidder; Milling Machine (24" and under Mandrel) | 42.99 | 26.80 + a |

| | | |
|---|-------|-----------|
| Group 8: Mechanic, Grease Truck Operator, Hydroblaster, Barrier Mover, Power Stone Spreader; Welder; Work Boat under 26 ft.; Transfer Machine. | 42.54 | 26.80 + a |
| Group 9: Front End Loader (under 3 cubic yards), Skid Steer Loader regardless of attachments (Bobcat or Similar); Fork Lift, Power Chipper; Landscape Equipment (including hydroseeder), Vacuum Excavation Truck and Hydrovac Excavation Truck (27 HG pressure or greater). | 42.04 | 26.80 + a |
| Group 10: Vibratory Hammer, Ice Machine, Diesel and Air Hammer, etc. | 39.7 | 26.80 + a |
| Group 11: Conveyor, Earth Roller; Power Pavement Breaker (whiphammer), Robot Demolition Equipment. | 39.7 | 26.80 + a |
| Group 12: Wellpoint Operator. | 39.63 | 26.80 + a |
| Group 13: Compressor Battery Operator. | 38.97 | 26.80 + a |
| Group 14: Elevator Operator; Tow Motor Operator (Solid Tire No Rough Terrain). | 37.66 | 26.80 + a |
| Group 15: Generator Operator; Compressor Operator; Pump Operator; Welding Machine Operator; Heater Operator. | 37.2 | 26.80 + a |
| Group 16: Maintenance Engineer. | 36.46 | 26.80 + a |
| Group 17: Portable Asphalt Plant Operator; Portable Crusher Plant Operator; Portable Concrete Plant Operator., Portable Grout Plant Operator, Portable Water Filtration Plant Operator. | 41.39 | 26.80 + a |
| Group 18: Power Safety Boat; Vacuum Truck; Zim Mixer; Sweeper; (minimum for any job requiring CDL license). | 38.61 | 26.80 + a |

**NOTE: SEE BELOW

----LINE CONSTRUCTION----(Railroad Construction and Maintenance)----

| | | |
|--|-------|--------------|
| 20) Lineman, Cable Splicer, Technician | 48.19 | 6.5% + 22.00 |
| 21) Heavy Equipment Operator | 42.26 | 6.5% + 19.88 |
| 22) Equipment Operator, Tractor Trailer Driver, Material Men | 40.96 | 6.5% + 19.21 |
| 23) Driver Groundmen | 26.5 | 6.5% + 9.00 |
| 23a) Truck Driver | 40.96 | 6.5% + 17.76 |

----LINE CONSTRUCTION----

| | | |
|--|-------|--------------|
| 24) Driver Groundmen | 30.92 | 6.5% + 9.70 |
| 25) Groundmen | 22.67 | 6.5% + 6.20 |
| 26) Heavy Equipment Operators | 37.1 | 6.5% + 10.70 |
| 27) Linemen, Cable Splicers, Dynamite Men | 41.22 | 6.5% + 12.20 |
| 28) Material Men, Tractor Trailer Drivers, Equipment Operators | 35.04 | 6.5% + 10.45 |

Welders: Rate for craft to which welding is incidental.

**Note: Hazardous waste removal work receives additional \$1.25 per hour for truck drivers.*

***Note: Hazardous waste premium \$3.00 per hour over classified rate*

- Crane with 150 ft. boom (including jib) - \$1.50 extra
- Crane with 200 ft. boom (including jib) - \$2.50 extra
- Crane with 250 ft. boom (including jib) - \$5.00 extra
- Crane with 300 ft. boom (including jib) - \$7.00 extra
- Crane with 400 ft. boom (including jib) - \$10.00 extra

All classifications that indicate a percentage of the fringe benefits must be calculated at the percentage rate times the "base hourly rate".

Apprentices duly registered under the Commissioner of Labor's regulations on "Work Training Standards for Apprenticeship and Training Programs" Section 31-51-d-1 to 12, are allowed to be paid the appropriate percentage of the prevailing journeymen hourly base and the full fringe benefit rate, providing the work site ratio shall not be less than one full-time journeyman instructing and supervising the work of each apprentice in a specific trade.

--Connecticut General Statute Section 31-55a: Annual Adjustments to wage rates by contractors doing state work
--

The Prevailing wage rates applicable to this project are subject to annual adjustments each July 1st for the duration of the project.

Each contractor shall pay the annual adjusted prevailing wage rate that is in effect each July 1st, as posted by the Department of Labor.

It is the contractor's responsibility to obtain the annual adjusted prevailing wage rate increases directly from the Department of Labor's website.

The annual adjustments will be posted on the Department of Labor's Web page:

www.ct.gov/dol. For those without internet access, please contact the division listed below.

The Department of Labor will continue to issue the initial prevailing wage rate schedule to the Contracting Agency for the project.

All subsequent annual adjustments will be posted on our Web Site for contractor access.

Contracting Agencies are under no obligation pursuant to State labor law to pay any increase due to the annual adjustment provision.

Effective October 1, 2005 - Public Act 05-50: any person performing the work of any mechanic, laborer, or worker shall be paid prevailing wage

All Person who perform work ON SITE must be paid prevailing wage for the appropriate mechanic, laborer, or worker classification.

All certified payrolls must list the hours worked and wages paid to All Persons who perform work ON SITE regardless of their ownership i.e.: (Owners, Corporate Officers, LLC Members, Independent Contractors, et. al)

Reporting and payment of wages is required regardless of any contractual relationship alleged to exist between the contractor and such person.

~~Unlisted classifications needed for work not included within the scope of the classifications listed may be added after award only as provided in the labor standards contract clause (29 CFR 5.5 (a) (1) (ii)).

Please direct any questions which you may have pertaining to classification of work and payment of prevailing wages to the Wage and Workplace Standards Division, telephone (860)263-6790.

As of: September 13, 2022

STANDARD FORM OF AGREEMENT
BETWEEN OWNER AND CONTRACTOR
ON THE BASIS OF A STIPULATED PRICE
B023-16 – NORTH END FIELD – BALLFIELD RECONSTRUCTION

THIS AGREEMENT is dated as of the _____ day of _____ 2022 by and between the City of Meriden, 142 East Main Street Meriden, CT 06450 hereinafter called OWNER and _____ hereinafter called CONTRACTOR.

OWNER and CONTRACTOR, in consideration of the mutual covenants hereinafter set forth, agree as follows:

Article 1. WORK.

CONTRACTOR shall complete all Work as specified or indicated in the Contract Documents. The Work is generally described as follows:

The Project for which the Work under the Contract Documents may be the whole or only a part is generally described as follows:

Article 2. ENGINEER.

The Project has been designed by SLR International Corporation who is hereinafter called ENGINEER and who is to act as Owner's representative, assume all duties and responsibilities and has the rights and authority assigned to ENGINEER in the Contract Documents in connection with completion of the Work in accordance with the contract documents.

Article 3. CONTRACT TIMES.

3.1 The Work will be substantially completed by _____, after the date when the Contract Times commence to run as provided in paragraph 2.03 of the General Conditions, and completed and ready for final payment in accordance with paragraph 14.07B of the General Conditions by **15 days** after the date when the Contract Times commence to run.

3.2 Liquidated Damages. OWNER and CONTRACTOR recognize that time is of the essence of this Agreement and that OWNER will suffer financial loss if the Work is not completed within the times specified in paragraph 3.1 above, plus any extensions thereof allowed in accordance with Article 12 of the General Conditions. They also recognize the delays, expense and difficulties involved in proving the actual loss suffered by OWNER if the Work is not completed on time. Accordingly, instead of requiring any such proof, OWNER and CONTRACTOR agree that as liquidated damages for delay (but not as a penalty) CONTRACTOR shall pay OWNER Two Hundred Fifty Dollars (**\$250.00**) for each day that expires after the time specified in paragraph 3.1 for Substantial Completion until the Work is substantially complete. After Substantial Completion, if CONTRACTOR shall neglect, refuse or fail to complete the remaining Work within the time specified in paragraph 3.1 for completion and readiness for final payment or any proper extension thereof granted by OWNER, CONTRACTOR shall pay OWNER Two Hundred Fifty Dollars (**\$250.00**) for each day that expires after the time specified in paragraph 3.1 for completion and readiness for final payment.

Article 4. CONTRACT PRICE.

OWNER shall pay CONTRACTOR for completion of the Work in accordance with the Contract Documents an amount in current funds equal to the sum of the amounts determined pursuant to paragraphs 4.1 and 4.2 below:

4.1. For all Work, other than Unit Price Work, a Lump Sum of:

Figures

Written

All specific cash allowances are included in the above price and have been computed in accordance with 11.02 of the General Conditions;

Plus
4.2. For all Unit Price Work, an amount equal to the sum of the established unit price for each separately identified item of Unit Price Work times the estimated quantity of that item as indicated in this paragraph 4.2:

UNIT PRICE WORK

| NO. | ITEM | UNIT | ESTIMATED QUANTITY | UNIT PRICE | TOTAL ESTIMATED |
|-----|------|------|--------------------|------------|-----------------|
|-----|------|------|--------------------|------------|-----------------|

TOTAL OF ALL UNIT PRICES:

_____ \$ _____
Written Figures

As provided in paragraph 11.03 of the General Conditions estimated quantities are not guaranteed, and determinations of actual quantities and classification are to be made by ENGINEER as provided in paragraph 9.07 of the General Conditions. Unit prices have been computed as provided in paragraph 11.03C of the General Conditions.

(The Bid may be attached. Any attachments and/or exhibits attached should be listed in Article 8).

If adjustment prices for variations from stipulated Base Bid quantities have been agreed to, insert appropriate provisions.

Article 5. PROGRESS PAYMENTS.

- 5.1 Based upon applications for Payment submitted to the Engineer by the Contractor and Certificates for Payment issued by the Engineer, the Owner shall make progress payments on account to the Contractor as provided below and elsewhere in the Contract Documents.
- 5.2 The period covered by each Application for Payment shall be one calendar month ending on the last day of the month.

- 5.3 Each Application for Payment shall be based upon the Schedule of Values submitted by the Contractor in accordance with the Contract Documents. The Schedule of Values shall allocate the entire Contract Sum among the various portions of the Work and be prepared in such form and supported by such data to substantiate its accuracy as the Engineer may require. This Schedule, unless objected to by the Engineer, shall be used as a basis for reviewing the Contractor's Applications for Payment.
- 5.4 Applications for Payment shall indicate the percentage of completion of each portion of the Work as of the end of the period covered by the Application for Payment.
- 5.5 Subject to the provisions of the Contract Documents, the amount of each progress payment shall be computed as follows:

5.6.1 Take that portion of the Contract sum properly allocable to completed work as determined by multiplying the percentage completion of each portion of the Work by the share of the total Contract Sum allocated to that portion of the work in the Schedule of Values, less retainage of five percent (5 percent). Pending final determination of cost to the Owner of changes in the Work, amounts not in dispute may be included as provided in appropriate sections of the General Conditions even though the Contract Sum has not yet been adjusted by Change Order.

5.6.2 Add that portion of the Contract Sum properly allocable to materials and equipment delivered and suitably stored at the site for subsequent incorporation in the completed construction (or, if approved in advance by the Owner, suitably stored off the site at a location agreed upon in writing) less retainage of five percent (5 percent).

5.6.3 Subtract the aggregate of previous payments made by the Owner; and

5.6.4 Subtract amounts, if any, for which the Engineer has withheld or nullified a Certificate for Payment as provided in Paragraph 14.02.B.5 of the General Conditions.

5.7 The progress payment amount determined in accordance with Paragraph 5.6 shall be further modified under the following circumstances;

(Not applicable)

5.7.1 Add, upon Substantial Completion of the Work, a sum sufficient to increase the total payments to ninety-five percent (95) of the Contract Sum, less such amounts as the Engineer shall determine for incomplete Work and unsettled claims; and

5.7.2 Add, if final completion of the Work is thereafter materially delayed, through no fault of the Contractor, additional amounts payable in accordance with Paragraph 14.08 of the General Conditions.

5.8 Reduction or limitation of retainage, if any shall be as follows:

(Not applicable)

5.9 Progress payment requisitions are due monthly on last day of the month for work completed during the contract period. Requisitions are to be sent to the Architect/Engineer and/or City of Meriden Department responsible for management/administration of the contracted work.

Certified Payroll for construction contracts that require State of Connecticut Prevailing Wage Determinations are required for each week of work by the Contractor and any or all the Contractor's Subcontractors and are due monthly with each requisition. One hard copy and one electronic copy shall be sent to the Architect/Engineer and the City of Meriden Purchasing Department. No progress payments will be issued to the Contractor without accompanying Certified Payroll.

For federally funded construction contracts with Davis Bacon Wage Determinations, Certified Payroll for all employees of the Contractor and any or all of the Contractor's Subcontractors are required to be submitted weekly to the Architect/Engineer and to the City of Meriden Purchasing Department. One hard copy and one electronic copy shall be sent to the Architect/Engineer and the City of Meriden Purchasing Department. Employees on the construction site will be interviewed by City of Meriden Staff and/or City of Meriden subcontracted Project Management/Clerk-of-the-Works/Owner's Representatives for Davis Bacon compliance. No progress payments will be issued to the Contractor without accompanying Certified Payroll.

Article 6. INTEREST.

No interest shall be due or paid on any monies not paid when due.

Article 7. CONTRACTOR'S REPRESENTATIONS.

In order to induce OWNER to enter into this Agreement CONTRACTOR makes the following representations:

7.1. CONTRACTOR has examined and carefully studied the Contract Documents including the Addenda listed in paragraph 8 and the other related data identified in the Bidding Documents including "technical data."

7.2. CONTRACTOR has visited the site and become familiar with and is satisfied as to the general, local and site conditions that may affect cost, progress, performance or furnishing of the Work.

7.3. CONTRACTOR is familiar with and is satisfied as to all federal, state and local Laws and Regulations that may affect cost, progress, performance and furnishing of the Work.

7.4. CONTRACTOR has carefully studied all reports of explorations and tests of subsurface conditions at or contiguous to the site and all drawings of physical conditions in or relating to existing surface or subsurface structures at or contiguous to the site (except Underground Facilities) which have been identified in the Supplementary Conditions as provided in paragraph 4.02 of the General Conditions. CONTRACTOR accepts the determination of the extent of the "technical data" contained in such reports and drawings upon which CONTRACTOR is entitled to rely. CONTRACTOR acknowledges that such reports and drawings are not Contract Documents and may not be complete for Contractor's purposes. CONTRACTOR acknowledges that OWNER and ENGINEER do not assume responsibility for the accuracy or completeness of information and

data shown or indicated in the Contract Documents with respect to Underground Facilities at or contiguous to the site. CONTRACTOR has obtained and carefully studied assumes responsibility for having done so) all such additional supplementary examinations, investigations, explorations, tests, studies and data concerning conditions (surface, subsurface and Underground Facilities) at or contiguous to the site or otherwise which may affect cost, progress, performance or furnishing of the Work or which relate to any aspect of the means, methods, techniques, sequences and procedures of construction to be employed by CONTRACTOR and safety precautions and programs incident thereto. CONTRACTOR does not consider that any additional examinations, investigations, explorations, tests, studies or data are necessary for the performance and furnishing of the Work at the Contract Price, within the Contract Times and in accordance with the other terms and conditions of the contract Documents.

7.5. CONTRACTOR is aware of the general nature of work to be performed by OWNER and others at the site that relates to the Work as indicated in the Contract Documents.

7.6. CONTRACTOR has correlated the information known to CONTRACTOR, information and observation obtained from visits to the site, reports and drawings identified in the Contract Documents and all additional examinations, investigations, explorations, tests, studies and data with the Contract Documents.

7.7. CONTRACTOR has given ENGINEER written notice of all conflicts, errors, ambiguities or discrepancies that CONTRACTOR has discovered in the Contract Documents and the written resolution thereof by ENGINEER is acceptable to CONTRACTOR, and the Contract Documents are generally sufficient to indicate and convey understanding of all terms and conditions for performance and furnishing of the Work.

Article 8. CONTRACT DOCUMENTS.

The Contract Documents, which comprise the entire agreement between OWNER and CONTRACTOR concerning the Work, consist of the following:

8.1. This Agreement.

8.2. General Conditions and Supplemental General Conditions.

8.3. Notice of Award – **Attachment A**

8.4. Performance, Payment, and other Bonds – **Attachment B.**

8.5. Insurance certificate – **Attachment C**

8.6. Contractor's Bid Proposal, Non-Collusive Bid Statement, Bidder's Qualification Statement, St of CT Forms that are applicable - **Attachment D**

8.7. Connecticut Department of Labor – Wage and Workplace Standards Division.

8.8. **“By Reference”**: The complete Specifications as included in the bidding documents bearing the title.

8.9. **“By Reference”**: List of Drawings: Sheet No's. ___ through ___ included in the bidding documents.

The above documents are on file in the City of Meriden's Purchasing Department.

Standard Form of Agreement: Page 6

8.10. Addenda numbers _____.

(Those addenda which pertain exclusively to the bidding process need not be listed.)

8.11. The following which may be delivered or issued after the Effective Date of the Agreement and are not attached hereto: All-Written Amendments and other documents amending, modifying or supplementing the Contract Documents pursuant to paragraphs 3.04 and 3.05 of the General Conditions.

There are no Contract Documents other than those listed above. The Contract Documents may only be amended, modified or supplemented as provided in paragraphs 3.04 and 3.05 of the General Conditions.

Article 9. MISCELLANEOUS.

9.1. Terms used in this Agreement which are defined in Article I of the General Conditions will have the meanings indicated in the General Conditions.

9.2. No assignment by a party hereto of any rights under or interests in the Contract Documents will be binding on another party hereto without the written consent of the party sought to be bound; and, specifically but without limitation, moneys that may become due and moneys that are due may not be assigned without such consent (except to the extent that the effect of this restriction may be limited by law), and unless specifically stated to the contrary in any written consent to an assignment no assignment will release or discharge the assignor from any duty or responsibility under the Contract Documents.

9.3. OWNER and CONTRACTOR each binds itself, its partners, successors, assigns and legal representatives to the other party hereto, its partners, successors, assigns and legal representatives in respect to all covenants, agreements and obligations contained in the Contract Documents.

9.4. Any provision or part of the Contract Documents held to be void or unenforceable under any Law or Regulation shall be deemed stricken, and all remaining provisions shall continue to be valid and binding upon OWNER and CONTRACTOR, who agree that the Contract Documents shall be reformed to replace such stricken provision or part thereof with a valid and enforceable provision that comes as close as possible to expressing the intention of the stricken provision.

9.5 OTHER PROVISIONS.

WITNESS WHEREOF, the parties hereto have affixed their names and seals.

THE CITY OF MERIDEN

CONTRACTOR:

Timothy P. Coon, City Manager
Duly Authorized

Duly Authorized

Date: _____

Date: _____

STANDARD GENERAL CONDITIONS OF THE CONSTRUCTION CONTRACT

Prepared by

ENGINEERS JOINT CONTRACT DOCUMENTS COMMITTEE

and

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ARTICLE 1 – DEFINITIONS AND TERMINOLOGY

1.01 *Defined Terms*

- A. Wherever used in the Bidding Requirements or Contract Documents and printed with initial capital letters, the terms listed below will have the meanings indicated which are applicable to both the singular and plural thereof. In addition to terms specifically defined, terms with initial capital letters in the Contract Documents include references to identified articles and paragraphs, and the titles of other documents or forms.
1. *Addenda*—Written or graphic instruments issued prior to the opening of Bids which clarify, correct, or change the Bidding Requirements or the proposed Contract Documents.
 2. *Agreement*—The written instrument which is evidence of the agreement between Owner and Contractor covering the Work.
 3. *Application for Payment*—The form acceptable to Engineer which is to be used by Contractor during the course of the Work in requesting progress or final payments and which is to be accompanied by such supporting documentation as is required by the Contract Documents.
 4. *Asbestos*—Any material that contains more than one percent asbestos and is friable or is releasing asbestos fibers into the air above current action levels established by the United States Occupational Safety and Health Administration.
 5. *Bid*—The offer or proposal of a Bidder submitted on the prescribed form setting forth the prices for the Work to be performed.
 6. *Bidder*—The individual or entity who submits a Bid directly to Owner.
 7. *Bidding Documents*—The Bidding Requirements and the proposed Contract Documents (including all Addenda).
 8. *Bidding Requirements*—The advertisement or invitation to bid, Instructions to Bidders, Bid security of acceptable form, if any, and the Bid Form with any supplements.
 9. *Change Order*—A document recommended by Engineer which is signed by Contractor and Owner and authorizes an addition, deletion, or revision in the Work or an adjustment in the Contract Price or the Contract Times, issued on or after the Effective Date of the Agreement.
 10. *Claim*—A demand or assertion by Owner or Contractor seeking an adjustment of Contract Price or Contract Times, or both, or other relief with respect to the terms of the Contract. A demand for money or services by a third party is not a Claim.
 11. *Contract*—The entire and integrated written agreement between the Owner and Contractor concerning the Work. The Contract supersedes prior negotiations, representations, or agreements, whether written or oral.

12. *Contract Documents*—Those items so designated in the Agreement. Only printed or hard copies of the items listed in the Agreement are Contract Documents. Approved Shop Drawings, other Contractor submittals, and the reports and drawings of subsurface and physical conditions are not Contract Documents.
13. *Contract Price*—The moneys payable by Owner to Contractor for completion of the Work in accordance with the Contract Documents as stated in the Agreement (subject to the provisions of Paragraph 11.03 in the case of Unit Price Work).
14. *Contract Times*—The number of days or the dates stated in the Agreement to: (i) achieve Milestones, if any; (ii) achieve Substantial Completion; and (iii) complete the Work so that it is ready for final payment as evidenced by Engineer’s written recommendation of final payment.
15. *Contractor*—The individual or entity with whom Owner has entered into the Agreement.
16. *Cost of the Work*—See Paragraph 11.01 for definition.
17. *Drawings*—That part of the Contract Documents prepared or approved by Engineer which graphically shows the scope, extent, and character of the Work to be performed by Contractor. Shop Drawings and other Contractor submittals are not Drawings as so defined.
18. *Effective Date of the Agreement*—The date indicated in the Agreement on which it becomes effective, but if no such date is indicated, it means the date on which the Agreement is signed and delivered by the last of the two parties to sign and deliver.
19. *Engineer*—The individual or entity named as such in the Agreement.
20. *Field Order*—A written order issued by Engineer which requires minor changes in the Work but which does not involve a change in the Contract Price or the Contract Times.
21. *General Requirements*—Sections of Division 1 of the Specifications.
22. *Hazardous Environmental Condition*—The presence at the Site of Asbestos, PCBs, Petroleum, Hazardous Waste, or Radioactive Material in such quantities or circumstances that may present a substantial danger to persons or property exposed thereto.
23. *Hazardous Waste*—The term Hazardous Waste shall have the meaning provided in Section 1004 of the Solid Waste Disposal Act (42 USC Section 6903) as amended from time to time.
24. *Laws and Regulations; Laws or Regulations*—Any and all applicable laws, rules, regulations, ordinances, codes, and orders of any and all governmental bodies, agencies, authorities, and courts having jurisdiction.
25. *Liens*—Charges, security interests, or encumbrances upon Project funds, real property, or personal property.
26. *Milestone*—A principal event specified in the Contract Documents relating to an intermediate completion date or time prior to Substantial Completion of all the Work.

27. *Notice of Award*—The written notice by Owner to the Successful Bidder stating that upon timely compliance by the Successful Bidder with the conditions precedent listed therein, Owner will sign and deliver the Agreement.
28. *Notice to Proceed*—A written notice given by Owner to Contractor fixing the date on which the Contract Times will commence to run and on which Contractor shall start to perform the Work under the Contract Documents.
29. *Owner*—The individual or entity with whom Contractor has entered into the Agreement and for whom the Work is to be performed.
30. *PCBs*—Polychlorinated biphenyls.
31. *Petroleum*—Petroleum, including crude oil or any fraction thereof which is liquid at standard conditions of temperature and pressure (60 degrees Fahrenheit and 14.7 pounds per square inch absolute), such as oil, petroleum, fuel oil, oil sludge, oil refuse, gasoline, kerosene, and oil mixed with other non-Hazardous Waste and crude oils.
32. *Progress Schedule*—A schedule, prepared and maintained by Contractor, describing the sequence and duration of the activities comprising the Contractor's plan to accomplish the Work within the Contract Times.
33. *Project*—The total construction of which the Work to be performed under the Contract Documents may be the whole, or a part.
34. *Project Manual*—The bound documentary information prepared for bidding and constructing the Work. A listing of the contents of the Project Manual, which may be bound in one or more volumes, is contained in the table(s) of contents.
35. *Radioactive Material*—Source, special nuclear, or byproduct material as defined by the Atomic Energy Act of 1954 (42 USC Section 2011 et seq.) as amended from time to time.
36. *Resident Project Representative*—The authorized representative of Engineer who may be assigned to the Site or any part thereof.
37. *Samples*—Physical examples of materials, equipment, or workmanship that are representative of some portion of the Work and which establish the standards by which such portion of the Work will be judged.
38. *Schedule of Submittals*—A schedule, prepared and maintained by Contractor, of required submittals and the time requirements to support scheduled performance of related construction activities.
39. *Schedule of Values*—A schedule, prepared and maintained by Contractor, allocating portions of the Contract Price to various portions of the Work and used as the basis for reviewing Contractor's Applications for Payment.

40. *Shop Drawings*—All drawings, diagrams, illustrations, schedules, and other data or information which are specifically prepared or assembled by or for Contractor and submitted by Contractor to illustrate some portion of the Work.
41. *Site*—Lands or areas indicated in the Contract Documents as being furnished by Owner upon which the Work is to be performed, including rights-of-way and easements for access thereto, and such other lands furnished by Owner which are designated for the use of Contractor.
42. *Specifications*—That part of the Contract Documents consisting of written requirements for materials, equipment, systems, standards and workmanship as applied to the Work, and certain administrative requirements and procedural matters applicable thereto.
43. *Subcontractor*—An individual or entity having a direct contract with Contractor or with any other Subcontractor for the performance of a part of the Work at the Site.
44. *Substantial Completion*—The time at which the Work (or a specified part thereof) has progressed to the point where, in the opinion of Engineer, the Work (or a specified part thereof) is sufficiently complete, in accordance with the Contract Documents, so that the Work (or a specified part thereof) can be utilized for the purposes for which it is intended. The terms “substantially complete” and “substantially completed” as applied to all or part of the Work refer to Substantial Completion thereof.
45. *Successful Bidder*—The Bidder submitting a responsive Bid to whom Owner makes an award.
46. *Supplementary Conditions*—That part of the Contract Documents which amends or supplements these General Conditions.
47. *Supplier*—A manufacturer, fabricator, supplier, distributor, materialman, or vendor having a direct contract with Contractor or with any Subcontractor to furnish materials or equipment to be incorporated in the Work by Contractor or Subcontractor.
48. *Underground Facilities*—All underground pipelines, conduits, ducts, cables, wires, manholes, vaults, tanks, tunnels, or other such facilities or attachments, and any encasements containing such facilities, including those that convey electricity, gases, steam, liquid petroleum products, telephone or other communications, cable television, water, wastewater, storm water, other liquids or chemicals, or traffic or other control systems.
49. *Unit Price Work*—Work to be paid for on the basis of unit prices.
50. *Work*—The entire construction or the various separately identifiable parts thereof required to be provided under the Contract Documents. Work includes and is the result of performing or providing all labor, services, and documentation necessary to produce such construction, and furnishing, installing, and incorporating all materials and equipment into such construction, all as required by the Contract Documents.
51. *Work Change Directive*—A written statement to Contractor issued on or after the Effective Date of the Agreement and signed by Owner and recommended by Engineer ordering an

addition, deletion, or revision in the Work, or responding to differing or unforeseen subsurface or physical conditions under which the Work is to be performed or to emergencies. A Work Change Directive will not change the Contract Price or the Contract Times but is evidence that the parties expect that the change ordered or documented by a Work Change Directive will be incorporated in a subsequently issued Change Order following negotiations by the parties as to its effect, if any, on the Contract Price or Contract Times.

1.02 Terminology

A. The words and terms discussed in Paragraph 1.02.B through F are not defined but, when used in the Bidding Requirements or Contract Documents, have the indicated meaning.

B. *Intent of Certain Terms or Adjectives:*

1. The Contract Documents include the terms “as allowed,” “as approved,” “as ordered,” “as directed” or terms of like effect or import to authorize an exercise of professional judgment by Engineer. In addition, the adjectives “reasonable,” “suitable,” “acceptable,” “proper,” “satisfactory,” or adjectives of like effect or import are used to describe an action or determination of Engineer as to the Work. It is intended that such exercise of professional judgment, action, or determination will be solely to evaluate, in general, the Work for compliance with the information in the Contract Documents and with the design concept of the Project as a functioning whole as shown or indicated in the Contract Documents (unless there is a specific statement indicating otherwise). The use of any such term or adjective is not intended to and shall not be effective to assign to Engineer any duty or authority to supervise or direct the performance of the Work, or any duty or authority to undertake responsibility contrary to the provisions of Paragraph 9.09 or any other provision of the Contract Documents.

C. *Day:*

1. The word “day” means a calendar day of 24 hours measured from midnight to the next midnight.

D. *Defective:*

1. The word “defective,” when modifying the word “Work,” refers to Work that is unsatisfactory, faulty, or deficient in that it:
 - a. does not conform to the Contract Documents; or
 - b. does not meet the requirements of any applicable inspection, reference standard, test, or approval referred to in the Contract Documents; or
 - c. has been damaged prior to Engineer’s recommendation of final payment (unless responsibility for the protection thereof has been assumed by Owner at Substantial Completion in accordance with Paragraph 14.04 or 14.05).

E. *Furnish, Install, Perform, Provide:*

1. The word “furnish,” when used in connection with services, materials, or equipment, shall mean to supply and deliver said services, materials, or equipment to the Site (or some other specified location) ready for use or installation and in usable or operable condition.
2. The word “install,” when used in connection with services, materials, or equipment, shall mean to put into use or place in final position said services, materials, or equipment complete and ready for intended use.
3. The words “perform” or “provide,” when used in connection with services, materials, or equipment, shall mean to furnish and install said services, materials, or equipment complete and ready for intended use.
4. When “furnish,” “install,” “perform,” or “provide” is not used in connection with services, materials, or equipment in a context clearly requiring an obligation of Contractor, “provide” is implied.

F. Unless stated otherwise in the Contract Documents, words or phrases that have a well-known technical or construction industry or trade meaning are used in the Contract Documents in accordance with such recognized meaning.

ARTICLE 2 – PRELIMINARY MATTERS

2.01 Delivery of Bonds and Evidence of Insurance

- A. When Contractor delivers the executed counterparts of the Agreement to Owner, Contractor shall also deliver to Owner such bonds as Contractor may be required to furnish.
- B. *Evidence of Insurance:* Before any Work at the Site is started, Contractor and Owner shall each deliver to the other, with copies to each additional insured identified in the Supplementary Conditions, certificates of insurance (and other evidence of insurance which either of them or any additional insured may reasonably request) which Contractor and Owner respectively are required to purchase and maintain in accordance with Article 5.

2.02 Copies of Documents

- A. Owner shall furnish to Contractor up to ten printed or hard copies of the Drawings and Project Manual. Additional copies will be furnished upon request at the cost of reproduction.

2.03 Commencement of Contract Times; Notice to Proceed

- A. The Contract Times will commence to run on the thirtieth day after the Effective Date of the Agreement or, if a Notice to Proceed is given, on the day indicated in the Notice to Proceed. A Notice to Proceed may be given at any time within 30 days after the Effective Date of the Agreement. In no event will the Contract Times commence to run later than the sixtieth day after the day of Bid opening or the thirtieth day after the Effective Date of the Agreement, whichever date is earlier.

2.04 *Starting the Work*

- A. Contractor shall start to perform the Work on the date when the Contract Times commence to run. No Work shall be done at the Site prior to the date on which the Contract Times commence to run.

2.05 *Before Starting Construction*

- A. *Preliminary Schedules:* Within 10 days after the Effective Date of the Agreement (unless otherwise specified in the General Requirements), Contractor shall submit to Engineer for timely review:
 - 1. a preliminary Progress Schedule indicating the times (numbers of days or dates) for starting and completing the various stages of the Work, including any Milestones specified in the Contract Documents;
 - 2. a preliminary Schedule of Submittals; and
 - 3. a preliminary Schedule of Values for all of the Work which includes quantities and prices of items which when added together equal the Contract Price and subdivides the Work into component parts in sufficient detail to serve as the basis for progress payments during performance of the Work. Such prices will include an appropriate amount of overhead and profit applicable to each item of Work.

2.06 *Preconstruction Conference; Designation of Authorized Representatives*

- A. Before any Work at the Site is started, a conference attended by Owner, Contractor, Engineer, and others as appropriate will be held to establish a working understanding among the parties as to the Work and to discuss the schedules referred to in Paragraph 2.05.A, procedures for handling Shop Drawings and other submittals, processing Applications for Payment, and maintaining required records.
- B. At this conference Owner and Contractor each shall designate, in writing, a specific individual to act as its authorized representative with respect to the services and responsibilities under the Contract. Such individuals shall have the authority to transmit instructions, receive information, render decisions relative to the Contract, and otherwise act on behalf of each respective party.

2.07 *Initial Acceptance of Schedules*

- A. At least 10 days before submission of the first Application for Payment a conference attended by Contractor, Engineer, and others as appropriate will be held to review for acceptability to Engineer as provided below the schedules submitted in accordance with Paragraph 2.05.A. Contractor shall have an additional 10 days to make corrections and adjustments and to complete and resubmit the schedules. No progress payment shall be made to Contractor until acceptable schedules are submitted to Engineer.
 - 1. The Progress Schedule will be acceptable to Engineer if it provides an orderly progression of the Work to completion within the Contract Times. Such acceptance will not impose on

Engineer responsibility for the Progress Schedule, for sequencing, scheduling, or progress of the Work, nor interfere with or relieve Contractor from Contractor's full responsibility therefor.

2. Contractor's Schedule of Submittals will be acceptable to Engineer if it provides a workable arrangement for reviewing and processing the required submittals.
3. Contractor's Schedule of Values will be acceptable to Engineer as to form and substance if it provides a reasonable allocation of the Contract Price to component parts of the Work.

ARTICLE 3 – CONTRACT DOCUMENTS: INTENT, AMENDING, REUSE

3.01 *Intent*

- A. The Contract Documents are complementary; what is required by one is as binding as if required by all.
- B. It is the intent of the Contract Documents to describe a functionally complete project (or part thereof) to be constructed in accordance with the Contract Documents. Any labor, documentation, services, materials, or equipment that reasonably may be inferred from the Contract Documents or from prevailing custom or trade usage as being required to produce the indicated result will be provided whether or not specifically called for, at no additional cost to Owner.
- C. Clarifications and interpretations of the Contract Documents shall be issued by Engineer as provided in Article 9.

3.02 *Reference Standards*

- A. Standards, Specifications, Codes, Laws, and Regulations
 1. Reference to standards, specifications, manuals, or codes of any technical society, organization, or association, or to Laws or Regulations, whether such reference be specific or by implication, shall mean the standard, specification, manual, code, or Laws or Regulations in effect at the time of opening of Bids (or on the Effective Date of the Agreement if there were no Bids), except as may be otherwise specifically stated in the Contract Documents.
 2. No provision of any such standard, specification, manual, or code, or any instruction of a Supplier, shall be effective to change the duties or responsibilities of Owner, Contractor, or Engineer, or any of their subcontractors, consultants, agents, or employees, from those set forth in the Contract Documents. No such provision or instruction shall be effective to assign to Owner, Engineer, or any of their officers, directors, members, partners, employees, agents, consultants, or subcontractors, any duty or authority to supervise or direct the performance of the Work or any duty or authority to undertake responsibility inconsistent with the provisions of the Contract Documents.

3.03 *Reporting and Resolving Discrepancies*

A. *Reporting Discrepancies:*

1. *Contractor's Review of Contract Documents Before Starting Work:* Before undertaking each part of the Work, Contractor shall carefully study and compare the Contract Documents and check and verify pertinent figures therein and all applicable field measurements. Contractor shall promptly report in writing to Engineer any conflict, error, ambiguity, or discrepancy which Contractor discovers, or has actual knowledge of, and shall obtain a written interpretation or clarification from Engineer before proceeding with any Work affected thereby.
2. *Contractor's Review of Contract Documents During Performance of Work:* If, during the performance of the Work, Contractor discovers any conflict, error, ambiguity, or discrepancy within the Contract Documents, or between the Contract Documents and (a) any applicable Law or Regulation, (b) any standard, specification, manual, or code, or (c) any instruction of any Supplier, then Contractor shall promptly report it to Engineer in writing. Contractor shall not proceed with the Work affected thereby (except in an emergency as required by Paragraph 6.16.A) until an amendment or supplement to the Contract Documents has been issued by one of the methods indicated in Paragraph 3.04.
3. Contractor shall not be liable to Owner or Engineer for failure to report any conflict, error, ambiguity, or discrepancy in the Contract Documents unless Contractor had actual knowledge thereof.

B. *Resolving Discrepancies:*

1. Except as may be otherwise specifically stated in the Contract Documents, the provisions of the Contract Documents shall take precedence in resolving any conflict, error, ambiguity, or discrepancy between the provisions of the Contract Documents and:
 - a. the provisions of any standard, specification, manual, or code, or the instruction of any Supplier (whether or not specifically incorporated by reference in the Contract Documents); or
 - b. the provisions of any Laws or Regulations applicable to the performance of the Work (unless such an interpretation of the provisions of the Contract Documents would result in violation of such Law or Regulation).

3.04 *Amending and Supplementing Contract Documents*

- A. The Contract Documents may be amended to provide for additions, deletions, and revisions in the Work or to modify the terms and conditions thereof by either a Change Order or a Work Change Directive.
- B. The requirements of the Contract Documents may be supplemented, and minor variations and deviations in the Work may be authorized, by one or more of the following ways:

1. A Field Order;
2. Engineer's approval of a Shop Drawing or Sample (subject to the provisions of Paragraph 6.17.D.3); or
3. Engineer's written interpretation or clarification.

3.05 *Reuse of Documents*

A. Contractor and any Subcontractor or Supplier shall not:

1. have or acquire any title to or ownership rights in any of the Drawings, Specifications, or other documents (or copies of any thereof) prepared by or bearing the seal of Engineer or its consultants, including electronic media editions; or
2. reuse any such Drawings, Specifications, other documents, or copies thereof on extensions of the Project or any other project without written consent of Owner and Engineer and specific written verification or adaptation by Engineer.

B. The prohibitions of this Paragraph 3.05 will survive final payment, or termination of the Contract. Nothing herein shall preclude Contractor from retaining copies of the Contract Documents for record purposes.

3.06 *Electronic Data*

A. Unless otherwise stated in the Supplementary Conditions, the data furnished by Owner or Engineer to Contractor, or by Contractor to Owner or Engineer, that may be relied upon are limited to the printed copies (also known as hard copies). Files in electronic media format of text, data, graphics, or other types are furnished only for the convenience of the receiving party. Any conclusion or information obtained or derived from such electronic files will be at the user's sole risk. If there is a discrepancy between the electronic files and the hard copies, the hard copies govern.

B. Because data stored in electronic media format can deteriorate or be modified inadvertently or otherwise without authorization of the data's creator, the party receiving electronic files agrees that it will perform acceptance tests or procedures within 60 days, after which the receiving party shall be deemed to have accepted the data thus transferred. Any errors detected within the 60-day acceptance period will be corrected by the transferring party.

C. When transferring documents in electronic media format, the transferring party makes no representations as to long term compatibility, usability, or readability of documents resulting from the use of software application packages, operating systems, or computer hardware differing from those used by the data's creator.

**ARTICLE 4 – AVAILABILITY OF LANDS; SUBSURFACE AND PHYSICAL CONDITIONS;
HAZARDOUS ENVIRONMENTAL CONDITIONS; REFERENCE POINTS**

4.01 *Availability of Lands*

- A. Owner shall furnish the Site. Owner shall notify Contractor of any encumbrances or restrictions not of general application but specifically related to use of the Site with which Contractor must comply in performing the Work. Owner will obtain in a timely manner and pay for easements for permanent structures or permanent changes in existing facilities. If Contractor and Owner are unable to agree on entitlement to or on the amount or extent, if any, of any adjustment in the Contract Price or Contract Times, or both, as a result of any delay in Owner’s furnishing the Site or a part thereof, Contractor may make a Claim therefor as provided in Paragraph 10.05.
- B. Upon reasonable written request, Owner shall furnish Contractor with a current statement of record legal title and legal description of the lands upon which the Work is to be performed and Owner’s interest therein as necessary for giving notice of or filing a mechanic’s or construction lien against such lands in accordance with applicable Laws and Regulations.
- C. Contractor shall provide for all additional lands and access thereto that may be required for temporary construction facilities or storage of materials and equipment.

4.02 *Subsurface and Physical Conditions*

- A. *Reports and Drawings:* The Supplementary Conditions identify:
 - 1. those reports known to Owner of explorations and tests of subsurface conditions at or contiguous to the Site; and
 - 2. those drawings known to Owner of physical conditions relating to existing surface or subsurface structures at the Site (except Underground Facilities).
- B. *Limited Reliance by Contractor on Technical Data Authorized:* Contractor may rely upon the accuracy of the “technical data” contained in such reports and drawings, but such reports and drawings are not Contract Documents. Such “technical data” is identified in the Supplementary Conditions. Except for such reliance on such “technical data,” Contractor may not rely upon or make any claim against Owner or Engineer, or any of their officers, directors, members, partners, employees, agents, consultants, or subcontractors with respect to:
 - 1. the completeness of such reports and drawings for Contractor’s purposes, including, but not limited to, any aspects of the means, methods, techniques, sequences, and procedures of construction to be employed by Contractor, and safety precautions and programs incident thereto; or
 - 2. other data, interpretations, opinions, and information contained in such reports or shown or indicated in such drawings; or
 - 3. any Contractor interpretation of or conclusion drawn from any “technical data” or any such other data, interpretations, opinions, or information.

4.03 *Differing Subsurface or Physical Conditions*

A. *Notice:* If Contractor believes that any subsurface or physical condition that is uncovered or revealed either:

1. is of such a nature as to establish that any “technical data” on which Contractor is entitled to rely as provided in Paragraph 4.02 is materially inaccurate; or
2. is of such a nature as to require a change in the Contract Documents; or
3. differs materially from that shown or indicated in the Contract Documents; or
4. is of an unusual nature, and differs materially from conditions ordinarily encountered and generally recognized as inherent in work of the character provided for in the Contract Documents;

then Contractor shall, promptly after becoming aware thereof and before further disturbing the subsurface or physical conditions or performing any Work in connection therewith (except in an emergency as required by Paragraph 6.16.A), notify Owner and Engineer in writing about such condition. Contractor shall not further disturb such condition or perform any Work in connection therewith (except as aforesaid) until receipt of written order to do so.

B. *Engineer’s Review:* After receipt of written notice as required by Paragraph 4.03.A, Engineer will promptly review the pertinent condition, determine the necessity of Owner’s obtaining additional exploration or tests with respect thereto, and advise Owner in writing (with a copy to Contractor) of Engineer’s findings and conclusions.

C. *Possible Price and Times Adjustments:*

1. The Contract Price or the Contract Times, or both, will be equitably adjusted to the extent that the existence of such differing subsurface or physical condition causes an increase or decrease in Contractor’s cost of, or time required for, performance of the Work; subject, however, to the following:
 - a. such condition must meet any one or more of the categories described in Paragraph 4.03.A; and
 - b. with respect to Work that is paid for on a unit price basis, any adjustment in Contract Price will be subject to the provisions of Paragraphs 9.07 and 11.03.
2. Contractor shall not be entitled to any adjustment in the Contract Price or Contract Times if:
 - a. Contractor knew of the existence of such conditions at the time Contractor made a final commitment to Owner with respect to Contract Price and Contract Times by the submission of a Bid or becoming bound under a negotiated contract; or
 - b. the existence of such condition could reasonably have been discovered or revealed as a result of any examination, investigation, exploration, test, or study of the Site and

contiguous areas required by the Bidding Requirements or Contract Documents to be conducted by or for Contractor prior to Contractor's making such final commitment; or

c. Contractor failed to give the written notice as required by Paragraph 4.03.A.

3. If Owner and Contractor are unable to agree on entitlement to or on the amount or extent, if any, of any adjustment in the Contract Price or Contract Times, or both, a Claim may be made therefor as provided in Paragraph 10.05. However, neither Owner or Engineer, or any of their officers, directors, members, partners, employees, agents, consultants, or subcontractors shall be liable to Contractor for any claims, costs, losses, or damages (including but not limited to all fees and charges of engineers, architects, attorneys, and other professionals and all court or arbitration or other dispute resolution costs) sustained by Contractor on or in connection with any other project or anticipated project.

4.04 *Underground Facilities*

A. *Shown or Indicated:* The information and data shown or indicated in the Contract Documents with respect to existing Underground Facilities at or contiguous to the Site is based on information and data furnished to Owner or Engineer by the owners of such Underground Facilities, including Owner, or by others. Unless it is otherwise expressly provided in the Supplementary Conditions:

1. Owner and Engineer shall not be responsible for the accuracy or completeness of any such information or data provided by others; and
2. the cost of all of the following will be included in the Contract Price, and Contractor shall have full responsibility for:
 - a. reviewing and checking all such information and data;
 - b. locating all Underground Facilities shown or indicated in the Contract Documents;
 - c. coordination of the Work with the owners of such Underground Facilities, including Owner, during construction; and
 - d. the safety and protection of all such Underground Facilities and repairing any damage thereto resulting from the Work.

B. *Not Shown or Indicated:*

1. If an Underground Facility is uncovered or revealed at or contiguous to the Site which was not shown or indicated, or not shown or indicated with reasonable accuracy in the Contract Documents, Contractor shall, promptly after becoming aware thereof and before further disturbing conditions affected thereby or performing any Work in connection therewith (except in an emergency as required by Paragraph 6.16.A), identify the owner of such Underground Facility and give written notice to that owner and to Owner and Engineer. Engineer will promptly review the Underground Facility and determine the extent, if any, to which a change is required in the Contract Documents to reflect and document the

consequences of the existence or location of the Underground Facility. During such time, Contractor shall be responsible for the safety and protection of such Underground Facility.

2. If Engineer concludes that a change in the Contract Documents is required, a Work Change Directive or a Change Order will be issued to reflect and document such consequences. An equitable adjustment shall be made in the Contract Price or Contract Times, or both, to the extent that they are attributable to the existence or location of any Underground Facility that was not shown or indicated or not shown or indicated with reasonable accuracy in the Contract Documents and that Contractor did not know of and could not reasonably have been expected to be aware of or to have anticipated. If Owner and Contractor are unable to agree on entitlement to or on the amount or extent, if any, of any such adjustment in Contract Price or Contract Times, Owner or Contractor may make a Claim therefor as provided in Paragraph 10.05.

4.05 *Reference Points*

- A. Owner shall provide engineering surveys to establish reference points for construction which in Engineer's judgment are necessary to enable Contractor to proceed with the Work. Contractor shall be responsible for laying out the Work, shall protect and preserve the established reference points and property monuments, and shall make no changes or relocations without the prior written approval of Owner. Contractor shall report to Engineer whenever any reference point or property monument is lost or destroyed or requires relocation because of necessary changes in grades or locations, and shall be responsible for the accurate replacement or relocation of such reference points or property monuments by professionally qualified personnel.

4.06 *Hazardous Environmental Condition at Site*

- A. *Reports and Drawings:* The Supplementary Conditions identify those reports and drawings known to Owner relating to Hazardous Environmental Conditions that have been identified at the Site.
- B. *Limited Reliance by Contractor on Technical Data Authorized:* Contractor may rely upon the accuracy of the "technical data" contained in such reports and drawings, but such reports and drawings are not Contract Documents. Such "technical data" is identified in the Supplementary Conditions. Except for such reliance on such "technical data," Contractor may not rely upon or make any claim against Owner or Engineer, or any of their officers, directors, members, partners, employees, agents, consultants, or subcontractors with respect to:
 1. the completeness of such reports and drawings for Contractor's purposes, including, but not limited to, any aspects of the means, methods, techniques, sequences and procedures of construction to be employed by Contractor and safety precautions and programs incident thereto; or
 2. other data, interpretations, opinions and information contained in such reports or shown or indicated in such drawings; or
 3. any Contractor interpretation of or conclusion drawn from any "technical data" or any such other data, interpretations, opinions or information.

- C. Contractor shall not be responsible for any Hazardous Environmental Condition uncovered or revealed at the Site which was not shown or indicated in Drawings or Specifications or identified in the Contract Documents to be within the scope of the Work. Contractor shall be responsible for a Hazardous Environmental Condition created with any materials brought to the Site by Contractor, Subcontractors, Suppliers, or anyone else for whom Contractor is responsible.
- D. If Contractor encounters a Hazardous Environmental Condition or if Contractor or anyone for whom Contractor is responsible creates a Hazardous Environmental Condition, Contractor shall immediately: (i) secure or otherwise isolate such condition; (ii) stop all Work in connection with such condition and in any area affected thereby (except in an emergency as required by Paragraph 6.16.A); and (iii) notify Owner and Engineer (and promptly thereafter confirm such notice in writing). Owner shall promptly consult with Engineer concerning the necessity for Owner to retain a qualified expert to evaluate such condition or take corrective action, if any. Promptly after consulting with Engineer, Owner shall take such actions as are necessary to permit Owner to timely obtain required permits and provide Contractor the written notice required by Paragraph 4.06.E.
- E. Contractor shall not be required to resume Work in connection with such condition or in any affected area until after Owner has obtained any required permits related thereto and delivered written notice to Contractor: (i) specifying that such condition and any affected area is or has been rendered safe for the resumption of Work; or (ii) specifying any special conditions under which such Work may be resumed safely. If Owner and Contractor cannot agree as to entitlement to or on the amount or extent, if any, of any adjustment in Contract Price or Contract Times, or both, as a result of such Work stoppage or such special conditions under which Work is agreed to be resumed by Contractor, either party may make a Claim therefor as provided in Paragraph 10.05.
- F. If after receipt of such written notice Contractor does not agree to resume such Work based on a reasonable belief it is unsafe, or does not agree to resume such Work under such special conditions, then Owner may order the portion of the Work that is in the area affected by such condition to be deleted from the Work. If Owner and Contractor cannot agree as to entitlement to or on the amount or extent, if any, of an adjustment in Contract Price or Contract Times as a result of deleting such portion of the Work, then either party may make a Claim therefor as provided in Paragraph 10.05. Owner may have such deleted portion of the Work performed by Owner's own forces or others in accordance with Article 7.
- G. To the fullest extent permitted by Laws and Regulations, Owner shall indemnify and hold harmless Contractor, Subcontractors, and Engineer, and the officers, directors, members, partners, employees, agents, consultants, and subcontractors of each and any of them from and against all claims, costs, losses, and damages (including but not limited to all fees and charges of engineers, architects, attorneys, and other professionals and all court or arbitration or other dispute resolution costs) arising out of or relating to a Hazardous Environmental Condition, provided that such Hazardous Environmental Condition: (i) was not shown or indicated in the Drawings or Specifications or identified in the Contract Documents to be included within the scope of the Work, and (ii) was not created by Contractor or by anyone for whom Contractor is responsible. Nothing in this Paragraph 4.06.G shall obligate Owner to indemnify any individual or entity from and against the consequences of that individual's or entity's own negligence.

- H. To the fullest extent permitted by Laws and Regulations, Contractor shall indemnify and hold harmless Owner and Engineer, and the officers, directors, members, partners, employees, agents, consultants, and subcontractors of each and any of them from and against all claims, costs, losses, and damages (including but not limited to all fees and charges of engineers, architects, attorneys, and other professionals and all court or arbitration or other dispute resolution costs) arising out of or relating to a Hazardous Environmental Condition created by Contractor or by anyone for whom Contractor is responsible. Nothing in this Paragraph 4.06.H shall obligate Contractor to indemnify any individual or entity from and against the consequences of that individual's or entity's own negligence.
- I. The provisions of Paragraphs 4.02, 4.03, and 4.04 do not apply to a Hazardous Environmental Condition uncovered or revealed at the Site.

ARTICLE 5 – BONDS AND INSURANCE

5.01 *Performance, Payment, and Other Bonds*

- A. Contractor shall furnish performance and payment bonds, each in an amount at least equal to the Contract Price as security for the faithful performance and payment of all of Contractor's obligations under the Contract Documents. These bonds shall remain in effect until one year after the date when final payment becomes due or until completion of the correction period specified in Paragraph 13.07, whichever is later, except as provided otherwise by Laws or Regulations or by the Contract Documents. Contractor shall also furnish such other bonds as are required by the Contract Documents.
- B. All bonds shall be in the form prescribed by the Contract Documents except as provided otherwise by Laws or Regulations, and shall be executed by such sureties as are named in the list of "Companies Holding Certificates of Authority as Acceptable Sureties on Federal Bonds and as Acceptable Reinsuring Companies" as published in Circular 570 (amended) by the Financial Management Service, Surety Bond Branch, U.S. Department of the Treasury. All bonds signed by an agent or attorney-in-fact must be accompanied by a certified copy of that individual's authority to bind the surety. The evidence of authority shall show that it is effective on the date the agent or attorney-in-fact signed each bond.
- C. If the surety on any bond furnished by Contractor is declared bankrupt or becomes insolvent or its right to do business is terminated in any state where any part of the Project is located or it ceases to meet the requirements of Paragraph 5.01.B, Contractor shall promptly notify Owner and Engineer and shall, within 20 days after the event giving rise to such notification, provide another bond and surety, both of which shall comply with the requirements of Paragraphs 5.01.B and 5.02.

5.02 *Licensed Sureties and Insurers*

- A. All bonds and insurance required by the Contract Documents to be purchased and maintained by Owner or Contractor shall be obtained from surety or insurance companies that are duly licensed or authorized in the jurisdiction in which the Project is located to issue bonds or insurance policies for the limits and coverages so required. Such surety and insurance companies shall also

meet such additional requirements and qualifications as may be provided in the Supplementary Conditions.

5.03 *Certificates of Insurance*

- A. Contractor shall deliver to Owner, with copies to each additional insured and loss payee identified in the Supplementary Conditions, certificates of insurance (and other evidence of insurance requested by Owner or any other additional insured) which Contractor is required to purchase and maintain.
- B. Owner shall deliver to Contractor, with copies to each additional insured and loss payee identified in the Supplementary Conditions, certificates of insurance (and other evidence of insurance requested by Contractor or any other additional insured) which Owner is required to purchase and maintain.
- C. Failure of Owner to demand such certificates or other evidence of Contractor's full compliance with these insurance requirements or failure of Owner to identify a deficiency in compliance from the evidence provided shall not be construed as a waiver of Contractor's obligation to maintain such insurance.
- D. Owner does not represent that insurance coverage and limits established in this Contract necessarily will be adequate to protect Contractor.
- E. The insurance and insurance limits required herein shall not be deemed as a limitation on Contractor's liability under the indemnities granted to Owner in the Contract Documents.

5.04 *Contractor's Insurance*

- A. Contractor shall purchase and maintain such insurance as is appropriate for the Work being performed and as will provide protection from claims set forth below which may arise out of or result from Contractor's performance of the Work and Contractor's other obligations under the Contract Documents, whether it is to be performed by Contractor, any Subcontractor or Supplier, or by anyone directly or indirectly employed by any of them to perform any of the Work, or by anyone for whose acts any of them may be liable:
 - 1. claims under workers' compensation, disability benefits, and other similar employee benefit acts;
 - 2. claims for damages because of bodily injury, occupational sickness or disease, or death of Contractor's employees;
 - 3. claims for damages because of bodily injury, sickness or disease, or death of any person other than Contractor's employees;
 - 4. claims for damages insured by reasonably available personal injury liability coverage which are sustained:

- a. by any person as a result of an offense directly or indirectly related to the employment of such person by Contractor, or
 - b. by any other person for any other reason;
5. claims for damages, other than to the Work itself, because of injury to or destruction of tangible property wherever located, including loss of use resulting therefrom; and
 6. claims for damages because of bodily injury or death of any person or property damage arising out of the ownership, maintenance or use of any motor vehicle.
- B. The policies of insurance required by this Paragraph 5.04 shall:
1. with respect to insurance required by Paragraphs 5.04.A.3 through 5.04.A.6 inclusive, be written on an occurrence basis, include as additional insureds (subject to any customary exclusion regarding professional liability) Owner and Engineer, and any other individuals or entities identified in the Supplementary Conditions, all of whom shall be listed as additional insureds, and include coverage for the respective officers, directors, members, partners, employees, agents, consultants, and subcontractors of each and any of all such additional insureds, and the insurance afforded to these additional insureds shall provide primary coverage for all claims covered thereby;
 2. include at least the specific coverages and be written for not less than the limits of liability provided in the Supplementary Conditions or required by Laws or Regulations, whichever is greater;
 3. include contractual liability insurance covering Contractor's indemnity obligations under Paragraphs 6.11 and 6.20;
 4. contain a provision or endorsement that the coverage afforded will not be canceled, materially changed or renewal refused until at least 30 days prior written notice has been given to Owner and Contractor and to each other additional insured identified in the Supplementary Conditions to whom a certificate of insurance has been issued (and the certificates of insurance furnished by the Contractor pursuant to Paragraph 5.03 will so provide);
 5. remain in effect at least until final payment and at all times thereafter when Contractor may be correcting, removing, or replacing defective Work in accordance with Paragraph 13.07; and
 6. include completed operations coverage:
 - a. Such insurance shall remain in effect for two years after final payment.
 - b. Contractor shall furnish Owner and each other additional insured identified in the Supplementary Conditions, to whom a certificate of insurance has been issued, evidence satisfactory to Owner and any such additional insured of continuation of such insurance at final payment and one year thereafter.

5.05 *Owner's Liability Insurance*

- A. In addition to the insurance required to be provided by Contractor under Paragraph 5.04, Owner, at Owner's option, may purchase and maintain at Owner's expense Owner's own liability insurance as will protect Owner against claims which may arise from operations under the Contract Documents.

5.06 *Property Insurance*

- A. Unless otherwise provided in the Supplementary Conditions, Owner shall purchase and maintain property insurance upon the Work at the Site in the amount of the full replacement cost thereof (subject to such deductible amounts as may be provided in the Supplementary Conditions or required by Laws and Regulations). This insurance shall:
1. include the interests of Owner, Contractor, Subcontractors, and Engineer, and any other individuals or entities identified in the Supplementary Conditions, and the officers, directors, members, partners, employees, agents, consultants, and subcontractors of each and any of them, each of whom is deemed to have an insurable interest and shall be listed as a loss payee;
 2. be written on a Builder's Risk "all-risk" policy form that shall at least include insurance for physical loss or damage to the Work, temporary buildings, falsework, and materials and equipment in transit, and shall insure against at least the following perils or causes of loss: fire, lightning, extended coverage, theft, vandalism and malicious mischief, earthquake, collapse, debris removal, demolition occasioned by enforcement of Laws and Regulations, water damage (other than that caused by flood), and such other perils or causes of loss as may be specifically required by the Supplementary Conditions.
 3. include expenses incurred in the repair or replacement of any insured property (including but not limited to fees and charges of engineers and architects);
 4. cover materials and equipment stored at the Site or at another location that was agreed to in writing by Owner prior to being incorporated in the Work, provided that such materials and equipment have been included in an Application for Payment recommended by Engineer;
 5. allow for partial utilization of the Work by Owner;
 6. include testing and startup; and
 7. be maintained in effect until final payment is made unless otherwise agreed to in writing by Owner, Contractor, and Engineer with 30 days written notice to each other loss payee to whom a certificate of insurance has been issued.
- B. Owner shall purchase and maintain such equipment breakdown insurance or additional property insurance as may be required by the Supplementary Conditions or Laws and Regulations which will include the interests of Owner, Contractor, Subcontractors, and Engineer, and any other individuals or entities identified in the Supplementary Conditions, and the officers, directors,

members, partners, employees, agents, consultants and subcontractors of each and any of them, each of whom is deemed to have an insurable interest and shall be listed as a loss payee.

- C. All the policies of insurance (and the certificates or other evidence thereof) required to be purchased and maintained in accordance with this Paragraph 5.06 will contain a provision or endorsement that the coverage afforded will not be canceled or materially changed or renewal refused until at least 30 days prior written notice has been given to Owner and Contractor and to each other loss payee to whom a certificate of insurance has been issued and will contain waiver provisions in accordance with Paragraph 5.07.
- D. Owner shall not be responsible for purchasing and maintaining any property insurance specified in this Paragraph 5.06 to protect the interests of Contractor, Subcontractors, or others in the Work to the extent of any deductible amounts that are identified in the Supplementary Conditions. The risk of loss within such identified deductible amount will be borne by Contractor, Subcontractors, or others suffering any such loss, and if any of them wishes property insurance coverage within the limits of such amounts, each may purchase and maintain it at the purchaser's own expense.
- E. If Contractor requests in writing that other special insurance be included in the property insurance policies provided under this Paragraph 5.06, Owner shall, if possible, include such insurance, and the cost thereof will be charged to Contractor by appropriate Change Order. Prior to commencement of the Work at the Site, Owner shall in writing advise Contractor whether or not such other insurance has been procured by Owner.

5.07 *Waiver of Rights*

- A. Owner and Contractor intend that all policies purchased in accordance with Paragraph 5.06 will protect Owner, Contractor, Subcontractors, and Engineer, and all other individuals or entities identified in the Supplementary Conditions as loss payees (and the officers, directors, members, partners, employees, agents, consultants, and subcontractors of each and any of them) in such policies and will provide primary coverage for all losses and damages caused by the perils or causes of loss covered thereby. All such policies shall contain provisions to the effect that in the event of payment of any loss or damage the insurers will have no rights of recovery against any of the insureds or loss payees thereunder. Owner and Contractor waive all rights against each other and their respective officers, directors, members, partners, employees, agents, consultants and subcontractors of each and any of them for all losses and damages caused by, arising out of or resulting from any of the perils or causes of loss covered by such policies and any other property insurance applicable to the Work; and, in addition, waive all such rights against Subcontractors and Engineer, and all other individuals or entities identified in the Supplementary Conditions as loss payees (and the officers, directors, members, partners, employees, agents, consultants, and subcontractors of each and any of them) under such policies for losses and damages so caused. None of the above waivers shall extend to the rights that any party making such waiver may have to the proceeds of insurance held by Owner as trustee or otherwise payable under any policy so issued.
- B. Owner waives all rights against Contractor, Subcontractors, and Engineer, and the officers, directors, members, partners, employees, agents, consultants and subcontractors of each and any of them for:

1. loss due to business interruption, loss of use, or other consequential loss extending beyond direct physical loss or damage to Owner's property or the Work caused by, arising out of, or resulting from fire or other perils whether or not insured by Owner; and
 2. loss or damage to the completed Project or part thereof caused by, arising out of, or resulting from fire or other insured peril or cause of loss covered by any property insurance maintained on the completed Project or part thereof by Owner during partial utilization pursuant to Paragraph 14.05, after Substantial Completion pursuant to Paragraph 14.04, or after final payment pursuant to Paragraph 14.07.
- C. Any insurance policy maintained by Owner covering any loss, damage or consequential loss referred to in Paragraph 5.07.B shall contain provisions to the effect that in the event of payment of any such loss, damage, or consequential loss, the insurers will have no rights of recovery against Contractor, Subcontractors, or Engineer, and the officers, directors, members, partners, employees, agents, consultants and subcontractors of each and any of them.

5.08 *Receipt and Application of Insurance Proceeds*

- A. Any insured loss under the policies of insurance required by Paragraph 5.06 will be adjusted with Owner and made payable to Owner as fiduciary for the loss payees, as their interests may appear, subject to the requirements of any applicable mortgage clause and of Paragraph 5.08.B. Owner shall deposit in a separate account any money so received and shall distribute it in accordance with such agreement as the parties in interest may reach. If no other special agreement is reached, the damaged Work shall be repaired or replaced, the moneys so received applied on account thereof, and the Work and the cost thereof covered by an appropriate Change Order.
- B. Owner as fiduciary shall have power to adjust and settle any loss with the insurers unless one of the parties in interest shall object in writing within 15 days after the occurrence of loss to Owner's exercise of this power. If such objection be made, Owner as fiduciary shall make settlement with the insurers in accordance with such agreement as the parties in interest may reach. If no such agreement among the parties in interest is reached, Owner as fiduciary shall adjust and settle the loss with the insurers and, if required in writing by any party in interest, Owner as fiduciary shall give bond for the proper performance of such duties.

5.09 *Acceptance of Bonds and Insurance; Option to Replace*

- A. If either Owner or Contractor has any objection to the coverage afforded by or other provisions of the bonds or insurance required to be purchased and maintained by the other party in accordance with Article 5 on the basis of non-conformance with the Contract Documents, the objecting party shall so notify the other party in writing within 10 days after receipt of the certificates (or other evidence requested) required by Paragraph 2.01.B. Owner and Contractor shall each provide to the other such additional information in respect of insurance provided as the other may reasonably request. If either party does not purchase or maintain all of the bonds and insurance required of such party by the Contract Documents, such party shall notify the other party in writing of such failure to purchase prior to the start of the Work, or of such failure to maintain prior to any change in the required coverage. Without prejudice to any other right or remedy, the other party may elect to obtain equivalent bonds or insurance to protect such other party's

interests at the expense of the party who was required to provide such coverage, and a Change Order shall be issued to adjust the Contract Price accordingly.

5.10 *Partial Utilization, Acknowledgment of Property Insurer*

- A. If Owner finds it necessary to occupy or use a portion or portions of the Work prior to Substantial Completion of all the Work as provided in Paragraph 14.05, no such use or occupancy shall commence before the insurers providing the property insurance pursuant to Paragraph 5.06 have acknowledged notice thereof and in writing effected any changes in coverage necessitated thereby. The insurers providing the property insurance shall consent by endorsement on the policy or policies, but the property insurance shall not be canceled or permitted to lapse on account of any such partial use or occupancy.

ARTICLE 6 – CONTRACTOR’S RESPONSIBILITIES

6.01 *Supervision and Superintendence*

- A. Contractor shall supervise, inspect, and direct the Work competently and efficiently, devoting such attention thereto and applying such skills and expertise as may be necessary to perform the Work in accordance with the Contract Documents. Contractor shall be solely responsible for the means, methods, techniques, sequences, and procedures of construction. Contractor shall not be responsible for the negligence of Owner or Engineer in the design or specification of a specific means, method, technique, sequence, or procedure of construction which is shown or indicated in and expressly required by the Contract Documents.
- B. At all times during the progress of the Work, Contractor shall assign a competent resident superintendent who shall not be replaced without written notice to Owner and Engineer except under extraordinary circumstances.

6.02 *Labor; Working Hours*

- A. Contractor shall provide competent, suitably qualified personnel to survey and lay out the Work and perform construction as required by the Contract Documents. Contractor shall at all times maintain good discipline and order at the Site.
- B. Except as otherwise required for the safety or protection of persons or the Work or property at the Site or adjacent thereto, and except as otherwise stated in the Contract Documents, all Work at the Site shall be performed during regular working hours. Contractor will not permit the performance of Work on a Saturday, Sunday, or any legal holiday without Owner’s written consent (which will not be unreasonably withheld) given after prior written notice to Engineer.

6.03 *Services, Materials, and Equipment*

- A. Unless otherwise specified in the Contract Documents, Contractor shall provide and assume full responsibility for all services, materials, equipment, labor, transportation, construction equipment and machinery, tools, appliances, fuel, power, light, heat, telephone, water, sanitary facilities, temporary facilities, and all other facilities and incidentals necessary for the performance, testing, start-up, and completion of the Work.

- B. All materials and equipment incorporated into the Work shall be as specified or, if not specified, shall be of good quality and new, except as otherwise provided in the Contract Documents. All special warranties and guarantees required by the Specifications shall expressly run to the benefit of Owner. If required by Engineer, Contractor shall furnish satisfactory evidence (including reports of required tests) as to the source, kind, and quality of materials and equipment.
- C. All materials and equipment shall be stored, applied, installed, connected, erected, protected, used, cleaned, and conditioned in accordance with instructions of the applicable Supplier, except as otherwise may be provided in the Contract Documents.

6.04 *Progress Schedule*

- A. Contractor shall adhere to the Progress Schedule established in accordance with Paragraph 2.07 as it may be adjusted from time to time as provided below.
 - 1. Contractor shall submit to Engineer for acceptance (to the extent indicated in Paragraph 2.07) proposed adjustments in the Progress Schedule that will not result in changing the Contract Times. Such adjustments will comply with any provisions of the General Requirements applicable thereto.
 - 2. Proposed adjustments in the Progress Schedule that will change the Contract Times shall be submitted in accordance with the requirements of Article 12. Adjustments in Contract Times may only be made by a Change Order.

6.05 *Substitutes and "Or-Equals"*

- A. Whenever an item of material or equipment is specified or described in the Contract Documents by using the name of a proprietary item or the name of a particular Supplier, the specification or description is intended to establish the type, function, appearance, and quality required. Unless the specification or description contains or is followed by words reading that no like, equivalent, or "or-equal" item or no substitution is permitted, other items of material or equipment or material or equipment of other Suppliers may be submitted to Engineer for review under the circumstances described below.
 - 1. "*Or-Equal*" Items: If in Engineer's sole discretion an item of material or equipment proposed by Contractor is functionally equal to that named and sufficiently similar so that no change in related Work will be required, it may be considered by Engineer as an "or-equal" item, in which case review and approval of the proposed item may, in Engineer's sole discretion, be accomplished without compliance with some or all of the requirements for approval of proposed substitute items. For the purposes of this Paragraph 6.05.A.1, a proposed item of material or equipment will be considered functionally equal to an item so named if:
 - a. in the exercise of reasonable judgment Engineer determines that:
 - 1) it is at least equal in materials of construction, quality, durability, appearance, strength, and design characteristics;

- 2) it will reliably perform at least equally well the function and achieve the results imposed by the design concept of the completed Project as a functioning whole; and
 - 3) it has a proven record of performance and availability of responsive service.
- b. Contractor certifies that, if approved and incorporated into the Work:
- 1) there will be no increase in cost to the Owner or increase in Contract Times; and
 - 2) it will conform substantially to the detailed requirements of the item named in the Contract Documents.

2. *Substitute Items:*

- a. If in Engineer's sole discretion an item of material or equipment proposed by Contractor does not qualify as an "or-equal" item under Paragraph 6.05.A.1, it will be considered a proposed substitute item.
- b. Contractor shall submit sufficient information as provided below to allow Engineer to determine if the item of material or equipment proposed is essentially equivalent to that named and an acceptable substitute therefor. Requests for review of proposed substitute items of material or equipment will not be accepted by Engineer from anyone other than Contractor.
- c. The requirements for review by Engineer will be as set forth in Paragraph 6.05.A.2.d, as supplemented by the General Requirements, and as Engineer may decide is appropriate under the circumstances.
- d. Contractor shall make written application to Engineer for review of a proposed substitute item of material or equipment that Contractor seeks to furnish or use. The application:
 - 1) shall certify that the proposed substitute item will:
 - a) perform adequately the functions and achieve the results called for by the general design,
 - b) be similar in substance to that specified, and
 - c) be suited to the same use as that specified;
 - 2) will state:
 - a) the extent, if any, to which the use of the proposed substitute item will prejudice Contractor's achievement of Substantial Completion on time,
 - b) whether use of the proposed substitute item in the Work will require a change in any of the Contract Documents (or in the provisions of any other direct contract with Owner for other work on the Project) to adapt the design to the proposed substitute item, and

- c) whether incorporation or use of the proposed substitute item in connection with the Work is subject to payment of any license fee or royalty;
 - 3) will identify:
 - a) all variations of the proposed substitute item from that specified, and
 - b) available engineering, sales, maintenance, repair, and replacement services; and
 - 4) shall contain an itemized estimate of all costs or credits that will result directly or indirectly from use of such substitute item, including costs of redesign and claims of other contractors affected by any resulting change.
- B. *Substitute Construction Methods or Procedures:* If a specific means, method, technique, sequence, or procedure of construction is expressly required by the Contract Documents, Contractor may furnish or utilize a substitute means, method, technique, sequence, or procedure of construction approved by Engineer. Contractor shall submit sufficient information to allow Engineer, in Engineer's sole discretion, to determine that the substitute proposed is equivalent to that expressly called for by the Contract Documents. The requirements for review by Engineer will be similar to those provided in Paragraph 6.05.A.2.
- C. *Engineer's Evaluation:* Engineer will be allowed a reasonable time within which to evaluate each proposal or submittal made pursuant to Paragraphs 6.05.A and 6.05.B. Engineer may require Contractor to furnish additional data about the proposed substitute item. Engineer will be the sole judge of acceptability. No "or equal" or substitute will be ordered, installed or utilized until Engineer's review is complete, which will be evidenced by a Change Order in the case of a substitute and an approved Shop Drawing for an "or equal." Engineer will advise Contractor in writing of any negative determination.
- D. *Special Guarantee:* Owner may require Contractor to furnish at Contractor's expense a special performance guarantee or other surety with respect to any substitute.
- E. *Engineer's Cost Reimbursement:* Engineer will record Engineer's costs in evaluating a substitute proposed or submitted by Contractor pursuant to Paragraphs 6.05.A.2 and 6.05.B. Whether or not Engineer approves a substitute so proposed or submitted by Contractor, Contractor shall reimburse Owner for the reasonable charges of Engineer for evaluating each such proposed substitute. Contractor shall also reimburse Owner for the reasonable charges of Engineer for making changes in the Contract Documents (or in the provisions of any other direct contract with Owner) resulting from the acceptance of each proposed substitute.
- F. *Contractor's Expense:* Contractor shall provide all data in support of any proposed substitute or "or-equal" at Contractor's expense.

6.06 *Concerning Subcontractors, Suppliers, and Others*

- A. Contractor shall not employ any Subcontractor, Supplier, or other individual or entity (including those acceptable to Owner as indicated in Paragraph 6.06.B), whether initially or as a replacement, against whom Owner may have reasonable objection. Contractor shall not be

required to employ any Subcontractor, Supplier, or other individual or entity to furnish or perform any of the Work against whom Contractor has reasonable objection.

- B. If the Supplementary Conditions require the identity of certain Subcontractors, Suppliers, or other individuals or entities to be submitted to Owner in advance for acceptance by Owner by a specified date prior to the Effective Date of the Agreement, and if Contractor has submitted a list thereof in accordance with the Supplementary Conditions, Owner's acceptance (either in writing or by failing to make written objection thereto by the date indicated for acceptance or objection in the Bidding Documents or the Contract Documents) of any such Subcontractor, Supplier, or other individual or entity so identified may be revoked on the basis of reasonable objection after due investigation. Contractor shall submit an acceptable replacement for the rejected Subcontractor, Supplier, or other individual or entity, and the Contract Price will be adjusted by the difference in the cost occasioned by such replacement, and an appropriate Change Order will be issued. No acceptance by Owner of any such Subcontractor, Supplier, or other individual or entity, whether initially or as a replacement, shall constitute a waiver of any right of Owner or Engineer to reject defective Work.
- C. Contractor shall be fully responsible to Owner and Engineer for all acts and omissions of the Subcontractors, Suppliers, and other individuals or entities performing or furnishing any of the Work just as Contractor is responsible for Contractor's own acts and omissions. Nothing in the Contract Documents:
1. shall create for the benefit of any such Subcontractor, Supplier, or other individual or entity any contractual relationship between Owner or Engineer and any such Subcontractor, Supplier or other individual or entity; nor
 2. shall create any obligation on the part of Owner or Engineer to pay or to see to the payment of any moneys due any such Subcontractor, Supplier, or other individual or entity except as may otherwise be required by Laws and Regulations.
- D. Contractor shall be solely responsible for scheduling and coordinating the Work of Subcontractors, Suppliers, and other individuals or entities performing or furnishing any of the Work under a direct or indirect contract with Contractor.
- E. Contractor shall require all Subcontractors, Suppliers, and such other individuals or entities performing or furnishing any of the Work to communicate with Engineer through Contractor.
- F. The divisions and sections of the Specifications and the identifications of any Drawings shall not control Contractor in dividing the Work among Subcontractors or Suppliers or delineating the Work to be performed by any specific trade.
- G. All Work performed for Contractor by a Subcontractor or Supplier will be pursuant to an appropriate agreement between Contractor and the Subcontractor or Supplier which specifically binds the Subcontractor or Supplier to the applicable terms and conditions of the Contract Documents for the benefit of Owner and Engineer. Whenever any such agreement is with a Subcontractor or Supplier who is listed as a loss payee on the property insurance provided in Paragraph 5.06, the agreement between the Contractor and the Subcontractor or Supplier will contain provisions whereby the Subcontractor or Supplier waives all rights against Owner,

Contractor, Engineer, and all other individuals or entities identified in the Supplementary Conditions to be listed as insureds or loss payees (and the officers, directors, members, partners, employees, agents, consultants, and subcontractors of each and any of them) for all losses and damages caused by, arising out of, relating to, or resulting from any of the perils or causes of loss covered by such policies and any other property insurance applicable to the Work. If the insurers on any such policies require separate waiver forms to be signed by any Subcontractor or Supplier, Contractor will obtain the same.

6.07 *Patent Fees and Royalties*

- A. Contractor shall pay all license fees and royalties and assume all costs incident to the use in the performance of the Work or the incorporation in the Work of any invention, design, process, product, or device which is the subject of patent rights or copyrights held by others. If a particular invention, design, process, product, or device is specified in the Contract Documents for use in the performance of the Work and if, to the actual knowledge of Owner or Engineer, its use is subject to patent rights or copyrights calling for the payment of any license fee or royalty to others, the existence of such rights shall be disclosed by Owner in the Contract Documents.
- B. To the fullest extent permitted by Laws and Regulations, Owner shall indemnify and hold harmless Contractor, and its officers, directors, members, partners, employees, agents, consultants, and subcontractors from and against all claims, costs, losses, and damages (including but not limited to all fees and charges of engineers, architects, attorneys, and other professionals, and all court or arbitration or other dispute resolution costs) arising out of or relating to any infringement of patent rights or copyrights incident to the use in the performance of the Work or resulting from the incorporation in the Work of any invention, design, process, product, or device specified in the Contract Documents, but not identified as being subject to payment of any license fee or royalty to others required by patent rights or copyrights.
- C. To the fullest extent permitted by Laws and Regulations, Contractor shall indemnify and hold harmless Owner and Engineer, and the officers, directors, members, partners, employees, agents, consultants and subcontractors of each and any of them from and against all claims, costs, losses, and damages (including but not limited to all fees and charges of engineers, architects, attorneys, and other professionals and all court or arbitration or other dispute resolution costs) arising out of or relating to any infringement of patent rights or copyrights incident to the use in the performance of the Work or resulting from the incorporation in the Work of any invention, design, process, product, or device not specified in the Contract Documents.

6.08 *Permits*

- A. Unless otherwise provided in the Supplementary Conditions, Contractor shall obtain and pay for all construction permits and licenses. Owner shall assist Contractor, when necessary, in obtaining such permits and licenses. Contractor shall pay all governmental charges and inspection fees necessary for the prosecution of the Work which are applicable at the time of opening of Bids, or, if there are no Bids, on the Effective Date of the Agreement. Owner shall pay all charges of utility owners for connections for providing permanent service to the Work.

6.09 *Laws and Regulations*

- A. Contractor shall give all notices required by and shall comply with all Laws and Regulations applicable to the performance of the Work. Except where otherwise expressly required by applicable Laws and Regulations, neither Owner nor Engineer shall be responsible for monitoring Contractor's compliance with any Laws or Regulations.
- B. If Contractor performs any Work knowing or having reason to know that it is contrary to Laws or Regulations, Contractor shall bear all claims, costs, losses, and damages (including but not limited to all fees and charges of engineers, architects, attorneys, and other professionals and all court or arbitration or other dispute resolution costs) arising out of or relating to such Work. However, it shall not be Contractor's responsibility to make certain that the Specifications and Drawings are in accordance with Laws and Regulations, but this shall not relieve Contractor of Contractor's obligations under Paragraph 3.03.
- C. Changes in Laws or Regulations not known at the time of opening of Bids (or, on the Effective Date of the Agreement if there were no Bids) having an effect on the cost or time of performance of the Work shall be the subject of an adjustment in Contract Price or Contract Times. If Owner and Contractor are unable to agree on entitlement to or on the amount or extent, if any, of any such adjustment, a Claim may be made therefor as provided in Paragraph 10.05.

6.10 *Taxes*

- A. Contractor shall pay all sales, consumer, use, and other similar taxes required to be paid by Contractor in accordance with the Laws and Regulations of the place of the Project which are applicable during the performance of the Work.

6.11 *Use of Site and Other Areas*

A. *Limitation on Use of Site and Other Areas:*

1. Contractor shall confine construction equipment, the storage of materials and equipment, and the operations of workers to the Site and other areas permitted by Laws and Regulations, and shall not unreasonably encumber the Site and other areas with construction equipment or other materials or equipment. Contractor shall assume full responsibility for any damage to any such land or area, or to the owner or occupant thereof, or of any adjacent land or areas resulting from the performance of the Work.
2. Should any claim be made by any such owner or occupant because of the performance of the Work, Contractor shall promptly settle with such other party by negotiation or otherwise resolve the claim by arbitration or other dispute resolution proceeding or at law.
3. To the fullest extent permitted by Laws and Regulations, Contractor shall indemnify and hold harmless Owner and Engineer, and the officers, directors, members, partners, employees, agents, consultants and subcontractors of each and any of them from and against all claims, costs, losses, and damages (including but not limited to all fees and charges of engineers, architects, attorneys, and other professionals and all court or arbitration or other dispute resolution costs) arising out of or relating to any claim or action, legal or equitable, brought

by any such owner or occupant against Owner, Engineer, or any other party indemnified hereunder to the extent caused by or based upon Contractor's performance of the Work.

- B. *Removal of Debris During Performance of the Work:* During the progress of the Work Contractor shall keep the Site and other areas free from accumulations of waste materials, rubbish, and other debris. Removal and disposal of such waste materials, rubbish, and other debris shall conform to applicable Laws and Regulations.
- C. *Cleaning:* Prior to Substantial Completion of the Work Contractor shall clean the Site and the Work and make it ready for utilization by Owner. At the completion of the Work Contractor shall remove from the Site all tools, appliances, construction equipment and machinery, and surplus materials and shall restore to original condition all property not designated for alteration by the Contract Documents.
- D. *Loading Structures:* Contractor shall not load nor permit any part of any structure to be loaded in any manner that will endanger the structure, nor shall Contractor subject any part of the Work or adjacent property to stresses or pressures that will endanger it.

6.12 *Record Documents*

- A. Contractor shall maintain in a safe place at the Site one record copy of all Drawings, Specifications, Addenda, Change Orders, Work Change Directives, Field Orders, and written interpretations and clarifications in good order and annotated to show changes made during construction. These record documents together with all approved Samples and a counterpart of all approved Shop Drawings will be available to Engineer for reference. Upon completion of the Work, these record documents, Samples, and Shop Drawings will be delivered to Engineer for Owner.

6.13 *Safety and Protection*

- A. Contractor shall be solely responsible for initiating, maintaining and supervising all safety precautions and programs in connection with the Work. Such responsibility does not relieve Subcontractors of their responsibility for the safety of persons or property in the performance of their work, nor for compliance with applicable safety Laws and Regulations. Contractor shall take all necessary precautions for the safety of, and shall provide the necessary protection to prevent damage, injury or loss to:
 - 1. all persons on the Site or who may be affected by the Work;
 - 2. all the Work and materials and equipment to be incorporated therein, whether in storage on or off the Site; and
 - 3. other property at the Site or adjacent thereto, including trees, shrubs, lawns, walks, pavements, roadways, structures, utilities, and Underground Facilities not designated for removal, relocation, or replacement in the course of construction.
- B. Contractor shall comply with all applicable Laws and Regulations relating to the safety of persons or property, or to the protection of persons or property from damage, injury, or loss; and

shall erect and maintain all necessary safeguards for such safety and protection. Contractor shall notify owners of adjacent property and of Underground Facilities and other utility owners when prosecution of the Work may affect them, and shall cooperate with them in the protection, removal, relocation, and replacement of their property.

- C. Contractor shall comply with the applicable requirements of Owner's safety programs, if any. The Supplementary Conditions identify any Owner's safety programs that are applicable to the Work.
- D. Contractor shall inform Owner and Engineer of the specific requirements of Contractor's safety program with which Owner's and Engineer's employees and representatives must comply while at the Site.
- E. All damage, injury, or loss to any property referred to in Paragraph 6.13.A.2 or 6.13.A.3 caused, directly or indirectly, in whole or in part, by Contractor, any Subcontractor, Supplier, or any other individual or entity directly or indirectly employed by any of them to perform any of the Work, or anyone for whose acts any of them may be liable, shall be remedied by Contractor (except damage or loss attributable to the fault of Drawings or Specifications or to the acts or omissions of Owner or Engineer or anyone employed by any of them, or anyone for whose acts any of them may be liable, and not attributable, directly or indirectly, in whole or in part, to the fault or negligence of Contractor or any Subcontractor, Supplier, or other individual or entity directly or indirectly employed by any of them).
- F. Contractor's duties and responsibilities for safety and for protection of the Work shall continue until such time as all the Work is completed and Engineer has issued a notice to Owner and Contractor in accordance with Paragraph 14.07.B that the Work is acceptable (except as otherwise expressly provided in connection with Substantial Completion).

6.14 *Safety Representative*

- A. Contractor shall designate a qualified and experienced safety representative at the Site whose duties and responsibilities shall be the prevention of accidents and the maintaining and supervising of safety precautions and programs.

6.15 *Hazard Communication Programs*

- A. Contractor shall be responsible for coordinating any exchange of material safety data sheets or other hazard communication information required to be made available to or exchanged between or among employers at the Site in accordance with Laws or Regulations.

6.16 *Emergencies*

- A. In emergencies affecting the safety or protection of persons or the Work or property at the Site or adjacent thereto, Contractor is obligated to act to prevent threatened damage, injury, or loss. Contractor shall give Engineer prompt written notice if Contractor believes that any significant changes in the Work or variations from the Contract Documents have been caused thereby or are required as a result thereof. If Engineer determines that a change in the Contract Documents is

required because of the action taken by Contractor in response to such an emergency, a Work Change Directive or Change Order will be issued.

6.17 *Shop Drawings and Samples*

A. Contractor shall submit Shop Drawings and Samples to Engineer for review and approval in accordance with the accepted Schedule of Submittals (as required by Paragraph 2.07). Each submittal will be identified as Engineer may require.

1. *Shop Drawings:*

- a. Submit number of copies specified in the General Requirements.
- b. Data shown on the Shop Drawings will be complete with respect to quantities, dimensions, specified performance and design criteria, materials, and similar data to show Engineer the services, materials, and equipment Contractor proposes to provide and to enable Engineer to review the information for the limited purposes required by Paragraph 6.17.D.

2. *Samples:*

- a. Submit number of Samples specified in the Specifications.
- b. Clearly identify each Sample as to material, Supplier, pertinent data such as catalog numbers, the use for which intended and other data as Engineer may require to enable Engineer to review the submittal for the limited purposes required by Paragraph 6.17.D.

B. Where a Shop Drawing or Sample is required by the Contract Documents or the Schedule of Submittals, any related Work performed prior to Engineer's review and approval of the pertinent submittal will be at the sole expense and responsibility of Contractor.

C. *Submittal Procedures:*

1. Before submitting each Shop Drawing or Sample, Contractor shall have:

- a. reviewed and coordinated each Shop Drawing or Sample with other Shop Drawings and Samples and with the requirements of the Work and the Contract Documents;
- b. determined and verified all field measurements, quantities, dimensions, specified performance and design criteria, installation requirements, materials, catalog numbers, and similar information with respect thereto;
- c. determined and verified the suitability of all materials offered with respect to the indicated application, fabrication, shipping, handling, storage, assembly, and installation pertaining to the performance of the Work; and
- d. determined and verified all information relative to Contractor's responsibilities for means, methods, techniques, sequences, and procedures of construction, and safety precautions and programs incident thereto.

2. Each submittal shall bear a stamp or specific written certification that Contractor has satisfied Contractor's obligations under the Contract Documents with respect to Contractor's review and approval of that submittal.
3. With each submittal, Contractor shall give Engineer specific written notice of any variations that the Shop Drawing or Sample may have from the requirements of the Contract Documents. This notice shall be both a written communication separate from the Shop Drawings or Sample submittal; and, in addition, by a specific notation made on each Shop Drawing or Sample submitted to Engineer for review and approval of each such variation.

D. *Engineer's Review:*

1. Engineer will provide timely review of Shop Drawings and Samples in accordance with the Schedule of Submittals acceptable to Engineer. Engineer's review and approval will be only to determine if the items covered by the submittals will, after installation or incorporation in the Work, conform to the information given in the Contract Documents and be compatible with the design concept of the completed Project as a functioning whole as indicated by the Contract Documents.
2. Engineer's review and approval will not extend to means, methods, techniques, sequences, or procedures of construction (except where a particular means, method, technique, sequence, or procedure of construction is specifically and expressly called for by the Contract Documents) or to safety precautions or programs incident thereto. The review and approval of a separate item as such will not indicate approval of the assembly in which the item functions.
3. Engineer's review and approval shall not relieve Contractor from responsibility for any variation from the requirements of the Contract Documents unless Contractor has complied with the requirements of Paragraph 6.17.C.3 and Engineer has given written approval of each such variation by specific written notation thereof incorporated in or accompanying the Shop Drawing or Sample. Engineer's review and approval shall not relieve Contractor from responsibility for complying with the requirements of Paragraph 6.17.C.1.

E. *Resubmittal Procedures:*

1. Contractor shall make corrections required by Engineer and shall return the required number of corrected copies of Shop Drawings and submit, as required, new Samples for review and approval. Contractor shall direct specific attention in writing to revisions other than the corrections called for by Engineer on previous submittals.

6.18 *Continuing the Work*

- A. Contractor shall carry on the Work and adhere to the Progress Schedule during all disputes or disagreements with Owner. No Work shall be delayed or postponed pending resolution of any disputes or disagreements, except as permitted by Paragraph 15.04 or as Owner and Contractor may otherwise agree in writing.

6.19 *Contractor's General Warranty and Guarantee*

- A. Contractor warrants and guarantees to Owner that all Work will be in accordance with the Contract Documents and will not be defective. Engineer and its officers, directors, members, partners, employees, agents, consultants, and subcontractors shall be entitled to rely on representation of Contractor's warranty and guarantee.
- B. Contractor's warranty and guarantee hereunder excludes defects or damage caused by:
 - 1. abuse, modification, or improper maintenance or operation by persons other than Contractor, Subcontractors, Suppliers, or any other individual or entity for whom Contractor is responsible; or
 - 2. normal wear and tear under normal usage.
- C. Contractor's obligation to perform and complete the Work in accordance with the Contract Documents shall be absolute. None of the following will constitute an acceptance of Work that is not in accordance with the Contract Documents or a release of Contractor's obligation to perform the Work in accordance with the Contract Documents:
 - 1. observations by Engineer;
 - 2. recommendation by Engineer or payment by Owner of any progress or final payment;
 - 3. the issuance of a certificate of Substantial Completion by Engineer or any payment related thereto by Owner;
 - 4. use or occupancy of the Work or any part thereof by Owner;
 - 5. any review and approval of a Shop Drawing or Sample submittal or the issuance of a notice of acceptability by Engineer;
 - 6. any inspection, test, or approval by others; or
 - 7. any correction of defective Work by Owner.

6.20 *Indemnification*

- A. To the fullest extent permitted by Laws and Regulations, Contractor shall indemnify and hold harmless Owner and Engineer, and the officers, directors, members, partners, employees, agents, consultants and subcontractors of each and any of them from and against all claims, costs, losses, and damages (including but not limited to all fees and charges of engineers, architects, attorneys, and other professionals and all court or arbitration or other dispute resolution costs) arising out of or relating to the performance of the Work, provided that any such claim, cost, loss, or damage is attributable to bodily injury, sickness, disease, or death, or to injury to or destruction of tangible property (other than the Work itself), including the loss of use resulting therefrom but only to the extent caused by any negligent act or omission of Contractor, any Subcontractor, any Supplier, or any individual or entity directly or indirectly employed by any of them to perform any of the Work or anyone for whose acts any of them may be liable .

- B. In any and all claims against Owner or Engineer or any of their officers, directors, members, partners, employees, agents, consultants, or subcontractors by any employee (or the survivor or personal representative of such employee) of Contractor, any Subcontractor, any Supplier, or any individual or entity directly or indirectly employed by any of them to perform any of the Work, or anyone for whose acts any of them may be liable, the indemnification obligation under Paragraph 6.20.A shall not be limited in any way by any limitation on the amount or type of damages, compensation, or benefits payable by or for Contractor or any such Subcontractor, Supplier, or other individual or entity under workers' compensation acts, disability benefit acts, or other employee benefit acts.
- C. The indemnification obligations of Contractor under Paragraph 6.20.A shall not extend to the liability of Engineer and Engineer's officers, directors, members, partners, employees, agents, consultants and subcontractors arising out of:
 - 1. the preparation or approval of, or the failure to prepare or approve maps, Drawings, opinions, reports, surveys, Change Orders, designs, or Specifications; or
 - 2. giving directions or instructions, or failing to give them, if that is the primary cause of the injury or damage.

6.21 *Delegation of Professional Design Services*

- A. Contractor will not be required to provide professional design services unless such services are specifically required by the Contract Documents for a portion of the Work or unless such services are required to carry out Contractor's responsibilities for construction means, methods, techniques, sequences and procedures. Contractor shall not be required to provide professional services in violation of applicable law.
- B. If professional design services or certifications by a design professional related to systems, materials or equipment are specifically required of Contractor by the Contract Documents, Owner and Engineer will specify all performance and design criteria that such services must satisfy. Contractor shall cause such services or certifications to be provided by a properly licensed professional, whose signature and seal shall appear on all drawings, calculations, specifications, certifications, Shop Drawings and other submittals prepared by such professional. Shop Drawings and other submittals related to the Work designed or certified by such professional, if prepared by others, shall bear such professional's written approval when submitted to Engineer.
- C. Owner and Engineer shall be entitled to rely upon the adequacy, accuracy and completeness of the services, certifications or approvals performed by such design professionals, provided Owner and Engineer have specified to Contractor all performance and design criteria that such services must satisfy.
- D. Pursuant to this Paragraph 6.21, Engineer's review and approval of design calculations and design drawings will be only for the limited purpose of checking for conformance with performance and design criteria given and the design concept expressed in the Contract Documents. Engineer's review and approval of Shop Drawings and other submittals (except design calculations and design drawings) will be only for the purpose stated in Paragraph 6.17.D.1.

- E. Contractor shall not be responsible for the adequacy of the performance or design criteria required by the Contract Documents.

ARTICLE 7 – OTHER WORK AT THE SITE

7.01 Related Work at Site

- A. Owner may perform other work related to the Project at the Site with Owner’s employees, or through other direct contracts therefor, or have other work performed by utility owners. If such other work is not noted in the Contract Documents, then:
 - 1. written notice thereof will be given to Contractor prior to starting any such other work; and
 - 2. if Owner and Contractor are unable to agree on entitlement to or on the amount or extent, if any, of any adjustment in the Contract Price or Contract Times that should be allowed as a result of such other work, a Claim may be made therefor as provided in Paragraph 10.05.
- B. Contractor shall afford each other contractor who is a party to such a direct contract, each utility owner, and Owner, if Owner is performing other work with Owner’s employees, proper and safe access to the Site, provide a reasonable opportunity for the introduction and storage of materials and equipment and the execution of such other work, and properly coordinate the Work with theirs. Contractor shall do all cutting, fitting, and patching of the Work that may be required to properly connect or otherwise make its several parts come together and properly integrate with such other work. Contractor shall not endanger any work of others by cutting, excavating, or otherwise altering such work; provided, however, that Contractor may cut or alter others' work with the written consent of Engineer and the others whose work will be affected. The duties and responsibilities of Contractor under this Paragraph are for the benefit of such utility owners and other contractors to the extent that there are comparable provisions for the benefit of Contractor in said direct contracts between Owner and such utility owners and other contractors.
- C. If the proper execution or results of any part of Contractor’s Work depends upon work performed by others under this Article 7, Contractor shall inspect such other work and promptly report to Engineer in writing any delays, defects, or deficiencies in such other work that render it unavailable or unsuitable for the proper execution and results of Contractor’s Work. Contractor’s failure to so report will constitute an acceptance of such other work as fit and proper for integration with Contractor’s Work except for latent defects and deficiencies in such other work.

7.02 Coordination

- A. If Owner intends to contract with others for the performance of other work on the Project at the Site, the following will be set forth in Supplementary Conditions:
 - 1. the individual or entity who will have authority and responsibility for coordination of the activities among the various contractors will be identified;
 - 2. the specific matters to be covered by such authority and responsibility will be itemized; and
 - 3. the extent of such authority and responsibilities will be provided.

- B. Unless otherwise provided in the Supplementary Conditions, Owner shall have sole authority and responsibility for such coordination.

7.03 *Legal Relationships*

- A. Paragraphs 7.01.A and 7.02 are not applicable for utilities not under the control of Owner.
- B. Each other direct contract of Owner under Paragraph 7.01.A shall provide that the other contractor is liable to Owner and Contractor for the reasonable direct delay and disruption costs incurred by Contractor as a result of the other contractor's wrongful actions or inactions.
- C. Contractor shall be liable to Owner and any other contractor under direct contract to Owner for the reasonable direct delay and disruption costs incurred by such other contractor as a result of Contractor's wrongful action or inactions.

ARTICLE 8 – OWNER'S RESPONSIBILITIES

8.01 *Communications to Contractor*

- A. Except as otherwise provided in these General Conditions, Owner shall issue all communications to Contractor through Engineer.

8.02 *Replacement of Engineer*

- A. In case of termination of the employment of Engineer, Owner shall appoint an engineer to whom Contractor makes no reasonable objection, whose status under the Contract Documents shall be that of the former Engineer.

8.03 *Furnish Data*

- A. Owner shall promptly furnish the data required of Owner under the Contract Documents.

8.04 *Pay When Due*

- A. Owner shall make payments to Contractor when they are due as provided in Paragraphs 14.02.C and 14.07.C.

8.05 *Lands and Easements; Reports and Tests*

- A. Owner's duties with respect to providing lands and easements and providing engineering surveys to establish reference points are set forth in Paragraphs 4.01 and 4.05. Paragraph 4.02 refers to Owner's identifying and making available to Contractor copies of reports of explorations and tests of subsurface conditions and drawings of physical conditions relating to existing surface or subsurface structures at the Site.

8.06 *Insurance*

- A. Owner's responsibilities, if any, with respect to purchasing and maintaining liability and property insurance are set forth in Article 5.

8.07 *Change Orders*

A. Owner is obligated to execute Change Orders as indicated in Paragraph 10.03.

8.08 *Inspections, Tests, and Approvals*

A. Owner's responsibility with respect to certain inspections, tests, and approvals is set forth in Paragraph 13.03.B.

8.09 *Limitations on Owner's Responsibilities*

A. The Owner shall not supervise, direct, or have control or authority over, nor be responsible for, Contractor's means, methods, techniques, sequences, or procedures of construction, or the safety precautions and programs incident thereto, or for any failure of Contractor to comply with Laws and Regulations applicable to the performance of the Work. Owner will not be responsible for Contractor's failure to perform the Work in accordance with the Contract Documents.

8.10 *Undisclosed Hazardous Environmental Condition*

A. Owner's responsibility in respect to an undisclosed Hazardous Environmental Condition is set forth in Paragraph 4.06.

8.11 *Evidence of Financial Arrangements*

A. Upon request of Contractor, Owner shall furnish Contractor reasonable evidence that financial arrangements have been made to satisfy Owner's obligations under the Contract Documents.

8.12 *Compliance with Safety Program*

A. While at the Site, Owner's employees and representatives shall comply with the specific applicable requirements of Contractor's safety programs of which Owner has been informed pursuant to Paragraph 6.13.D.

ARTICLE 9 – ENGINEER'S STATUS DURING CONSTRUCTION

9.01 *Owner's Representative*

A. Engineer will be Owner's representative during the construction period. The duties and responsibilities and the limitations of authority of Engineer as Owner's representative during construction are set forth in the Contract Documents.

9.02 *Visits to Site*

A. Engineer will make visits to the Site at intervals appropriate to the various stages of construction as Engineer deems necessary in order to observe as an experienced and qualified design professional the progress that has been made and the quality of the various aspects of Contractor's executed Work. Based on information obtained during such visits and observations, Engineer, for the benefit of Owner, will determine, in general, if the Work is proceeding in accordance with the Contract Documents. Engineer will not be required to make exhaustive or

continuous inspections on the Site to check the quality or quantity of the Work. Engineer's efforts will be directed toward providing for Owner a greater degree of confidence that the completed Work will conform generally to the Contract Documents. On the basis of such visits and observations, Engineer will keep Owner informed of the progress of the Work and will endeavor to guard Owner against defective Work.

- B. Engineer's visits and observations are subject to all the limitations on Engineer's authority and responsibility set forth in Paragraph 9.09. Particularly, but without limitation, during or as a result of Engineer's visits or observations of Contractor's Work, Engineer will not supervise, direct, control, or have authority over or be responsible for Contractor's means, methods, techniques, sequences, or procedures of construction, or the safety precautions and programs incident thereto, or for any failure of Contractor to comply with Laws and Regulations applicable to the performance of the Work.

9.03 *Project Representative*

- A. If Owner and Engineer agree, Engineer will furnish a Resident Project Representative to assist Engineer in providing more extensive observation of the Work. The authority and responsibilities of any such Resident Project Representative and assistants will be as provided in the Supplementary Conditions, and limitations on the responsibilities thereof will be as provided in Paragraph 9.09. If Owner designates another representative or agent to represent Owner at the Site who is not Engineer's consultant, agent or employee, the responsibilities and authority and limitations thereon of such other individual or entity will be as provided in the Supplementary Conditions.

9.04 *Authorized Variations in Work*

- A. Engineer may authorize minor variations in the Work from the requirements of the Contract Documents which do not involve an adjustment in the Contract Price or the Contract Times and are compatible with the design concept of the completed Project as a functioning whole as indicated by the Contract Documents. These may be accomplished by a Field Order and will be binding on Owner and also on Contractor, who shall perform the Work involved promptly. If Owner or Contractor believes that a Field Order justifies an adjustment in the Contract Price or Contract Times, or both, and the parties are unable to agree on entitlement to or on the amount or extent, if any, of any such adjustment, a Claim may be made therefor as provided in Paragraph 10.05.

9.05 *Rejecting Defective Work*

- A. Engineer will have authority to reject Work which Engineer believes to be defective, or that Engineer believes will not produce a completed Project that conforms to the Contract Documents or that will prejudice the integrity of the design concept of the completed Project as a functioning whole as indicated by the Contract Documents. Engineer will also have authority to require special inspection or testing of the Work as provided in Paragraph 13.04, whether or not the Work is fabricated, installed, or completed.

9.06 *Shop Drawings, Change Orders and Payments*

- A. In connection with Engineer's authority, and limitations thereof, as to Shop Drawings and Samples, see Paragraph 6.17.
- B. In connection with Engineer's authority, and limitations thereof, as to design calculations and design drawings submitted in response to a delegation of professional design services, if any, see Paragraph 6.21.
- C. In connection with Engineer's authority as to Change Orders, see Articles 10, 11, and 12.
- D. In connection with Engineer's authority as to Applications for Payment, see Article 14.

9.07 *Determinations for Unit Price Work*

- A. Engineer will determine the actual quantities and classifications of Unit Price Work performed by Contractor. Engineer will review with Contractor the Engineer's preliminary determinations on such matters before rendering a written decision thereon (by recommendation of an Application for Payment or otherwise). Engineer's written decision thereon will be final and binding (except as modified by Engineer to reflect changed factual conditions or more accurate data) upon Owner and Contractor, subject to the provisions of Paragraph 10.05.

9.08 *Decisions on Requirements of Contract Documents and Acceptability of Work*

- A. Engineer will be the initial interpreter of the requirements of the Contract Documents and judge of the acceptability of the Work thereunder. All matters in question and other matters between Owner and Contractor arising prior to the date final payment is due relating to the acceptability of the Work, and the interpretation of the requirements of the Contract Documents pertaining to the performance of the Work, will be referred initially to Engineer in writing within 30 days of the event giving rise to the question.
- B. Engineer will, with reasonable promptness, render a written decision on the issue referred. If Owner or Contractor believes that any such decision entitles them to an adjustment in the Contract Price or Contract Times or both, a Claim may be made under Paragraph 10.05. The date of Engineer's decision shall be the date of the event giving rise to the issues referenced for the purposes of Paragraph 10.05.B.
- C. Engineer's written decision on the issue referred will be final and binding on Owner and Contractor, subject to the provisions of Paragraph 10.05.
- D. When functioning as interpreter and judge under this Paragraph 9.08, Engineer will not show partiality to Owner or Contractor and will not be liable in connection with any interpretation or decision rendered in good faith in such capacity.

9.09 *Limitations on Engineer's Authority and Responsibilities*

- A. Neither Engineer's authority or responsibility under this Article 9 or under any other provision of the Contract Documents nor any decision made by Engineer in good faith either to exercise or not

exercise such authority or responsibility or the undertaking, exercise, or performance of any authority or responsibility by Engineer shall create, impose, or give rise to any duty in contract, tort, or otherwise owed by Engineer to Contractor, any Subcontractor, any Supplier, any other individual or entity, or to any surety for or employee or agent of any of them.

- B. Engineer will not supervise, direct, control, or have authority over or be responsible for Contractor's means, methods, techniques, sequences, or procedures of construction, or the safety precautions and programs incident thereto, or for any failure of Contractor to comply with Laws and Regulations applicable to the performance of the Work. Engineer will not be responsible for Contractor's failure to perform the Work in accordance with the Contract Documents.
- C. Engineer will not be responsible for the acts or omissions of Contractor or of any Subcontractor, any Supplier, or of any other individual or entity performing any of the Work.
- D. Engineer's review of the final Application for Payment and accompanying documentation and all maintenance and operating instructions, schedules, guarantees, bonds, certificates of inspection, tests and approvals, and other documentation required to be delivered by Paragraph 14.07.A will only be to determine generally that their content complies with the requirements of, and in the case of certificates of inspections, tests, and approvals that the results certified indicate compliance with, the Contract Documents.
- E. The limitations upon authority and responsibility set forth in this Paragraph 9.09 shall also apply to the Resident Project Representative, if any, and assistants, if any.

9.10 *Compliance with Safety Program*

- A. While at the Site, Engineer's employees and representatives shall comply with the specific applicable requirements of Contractor's safety programs of which Engineer has been informed pursuant to Paragraph 6.13.D.

ARTICLE 10 – CHANGES IN THE WORK; CLAIMS

10.01 *Authorized Changes in the Work*

- A. Without invalidating the Contract and without notice to any surety, Owner may, at any time or from time to time, order additions, deletions, or revisions in the Work by a Change Order, or a Work Change Directive. Upon receipt of any such document, Contractor shall promptly proceed with the Work involved which will be performed under the applicable conditions of the Contract Documents (except as otherwise specifically provided).
- B. If Owner and Contractor are unable to agree on entitlement to, or on the amount or extent, if any, of an adjustment in the Contract Price or Contract Times, or both, that should be allowed as a result of a Work Change Directive, a Claim may be made therefor as provided in Paragraph 10.05.

10.02 *Unauthorized Changes in the Work*

- A. Contractor shall not be entitled to an increase in the Contract Price or an extension of the Contract Times with respect to any work performed that is not required by the Contract Documents as amended, modified, or supplemented as provided in Paragraph 3.04, except in the case of an emergency as provided in Paragraph 6.16 or in the case of uncovering Work as provided in Paragraph 13.04.D.

10.03 *Execution of Change Orders*

- A. Owner and Contractor shall execute appropriate Change Orders recommended by Engineer covering:
 - 1. changes in the Work which are: (i) ordered by Owner pursuant to Paragraph 10.01.A, (ii) required because of acceptance of defective Work under Paragraph 13.08.A or Owner's correction of defective Work under Paragraph 13.09, or (iii) agreed to by the parties;
 - 2. changes in the Contract Price or Contract Times which are agreed to by the parties, including any undisputed sum or amount of time for Work actually performed in accordance with a Work Change Directive; and
 - 3. changes in the Contract Price or Contract Times which embody the substance of any written decision rendered by Engineer pursuant to Paragraph 10.05; provided that, in lieu of executing any such Change Order, an appeal may be taken from any such decision in accordance with the provisions of the Contract Documents and applicable Laws and Regulations, but during any such appeal, Contractor shall carry on the Work and adhere to the Progress Schedule as provided in Paragraph 6.18.A.

10.04 *Notification to Surety*

- A. If the provisions of any bond require notice to be given to a surety of any change affecting the general scope of the Work or the provisions of the Contract Documents (including, but not limited to, Contract Price or Contract Times), the giving of any such notice will be Contractor's responsibility. The amount of each applicable bond will be adjusted to reflect the effect of any such change.

10.05 *Claims*

- A. *Engineer's Decision Required:* All Claims, except those waived pursuant to Paragraph 14.09, shall be referred to the Engineer for decision. A decision by Engineer shall be required as a condition precedent to any exercise by Owner or Contractor of any rights or remedies either may otherwise have under the Contract Documents or by Laws and Regulations in respect of such Claims.
- B. *Notice:* Written notice stating the general nature of each Claim shall be delivered by the claimant to Engineer and the other party to the Contract promptly (but in no event later than 30 days) after the start of the event giving rise thereto. The responsibility to substantiate a Claim shall rest with the party making the Claim. Notice of the amount or extent of the Claim, with supporting data

shall be delivered to the Engineer and the other party to the Contract within 60 days after the start of such event (unless Engineer allows additional time for claimant to submit additional or more accurate data in support of such Claim). A Claim for an adjustment in Contract Price shall be prepared in accordance with the provisions of Paragraph 12.01.B. A Claim for an adjustment in Contract Times shall be prepared in accordance with the provisions of Paragraph 12.02.B. Each Claim shall be accompanied by claimant's written statement that the adjustment claimed is the entire adjustment to which the claimant believes it is entitled as a result of said event. The opposing party shall submit any response to Engineer and the claimant within 30 days after receipt of the claimant's last submittal (unless Engineer allows additional time).

- C. *Engineer's Action:* Engineer will review each Claim and, within 30 days after receipt of the last submittal of the claimant or the last submittal of the opposing party, if any, take one of the following actions in writing:
1. deny the Claim in whole or in part;
 2. approve the Claim; or
 3. notify the parties that the Engineer is unable to resolve the Claim if, in the Engineer's sole discretion, it would be inappropriate for the Engineer to do so. For purposes of further resolution of the Claim, such notice shall be deemed a denial.
- D. In the event that Engineer does not take action on a Claim within said 30 days, the Claim shall be deemed denied.
- E. Engineer's written action under Paragraph 10.05.C or denial pursuant to Paragraphs 10.05.C.3 or 10.05.D will be final and binding upon Owner and Contractor, unless Owner or Contractor invoke the dispute resolution procedure set forth in Article 16 within 30 days of such action or denial.
- F. No Claim for an adjustment in Contract Price or Contract Times will be valid if not submitted in accordance with this Paragraph 10.05.

ARTICLE 11 – COST OF THE WORK; ALLOWANCES; UNIT PRICE WORK

11.01 *Cost of the Work*

- A. *Costs Included:* The term Cost of the Work means the sum of all costs, except those excluded in Paragraph 11.01.B, necessarily incurred and paid by Contractor in the proper performance of the Work. When the value of any Work covered by a Change Order or when a Claim for an adjustment in Contract Price is determined on the basis of Cost of the Work, the costs to be reimbursed to Contractor will be only those additional or incremental costs required because of the change in the Work or because of the event giving rise to the Claim. Except as otherwise may be agreed to in writing by Owner, such costs shall be in amounts no higher than those prevailing in the locality of the Project, shall not include any of the costs itemized in Paragraph 11.01.B, and shall include only the following items:

1. Payroll costs for employees in the direct employ of Contractor in the performance of the Work under schedules of job classifications agreed upon by Owner and Contractor. Such employees shall include, without limitation, superintendents, foremen, and other personnel employed full time on the Work. Payroll costs for employees not employed full time on the Work shall be apportioned on the basis of their time spent on the Work. Payroll costs shall include, but not be limited to, salaries and wages plus the cost of fringe benefits, which shall include social security contributions, unemployment, excise, and payroll taxes, workers' compensation, health and retirement benefits, bonuses, sick leave, vacation and holiday pay applicable thereto. The expenses of performing Work outside of regular working hours, on Saturday, Sunday, or legal holidays, shall be included in the above to the extent authorized by Owner.
2. Cost of all materials and equipment furnished and incorporated in the Work, including costs of transportation and storage thereof, and Suppliers' field services required in connection therewith. All cash discounts shall accrue to Contractor unless Owner deposits funds with Contractor with which to make payments, in which case the cash discounts shall accrue to Owner. All trade discounts, rebates and refunds and returns from sale of surplus materials and equipment shall accrue to Owner, and Contractor shall make provisions so that they may be obtained.
3. Payments made by Contractor to Subcontractors for Work performed by Subcontractors. If required by Owner, Contractor shall obtain competitive bids from subcontractors acceptable to Owner and Contractor and shall deliver such bids to Owner, who will then determine, with the advice of Engineer, which bids, if any, will be acceptable. If any subcontract provides that the Subcontractor is to be paid on the basis of Cost of the Work plus a fee, the Subcontractor's Cost of the Work and fee shall be determined in the same manner as Contractor's Cost of the Work and fee as provided in this Paragraph 11.01.
4. Costs of special consultants (including but not limited to engineers, architects, testing laboratories, surveyors, attorneys, and accountants) employed for services specifically related to the Work.
5. Supplemental costs including the following:
 - a. The proportion of necessary transportation, travel, and subsistence expenses of Contractor's employees incurred in discharge of duties connected with the Work.
 - b. Cost, including transportation and maintenance, of all materials, supplies, equipment, machinery, appliances, office, and temporary facilities at the Site, and hand tools not owned by the workers, which are consumed in the performance of the Work, and cost, less market value, of such items used but not consumed which remain the property of Contractor.
 - c. Rentals of all construction equipment and machinery, and the parts thereof whether rented from Contractor or others in accordance with rental agreements approved by Owner with the advice of Engineer, and the costs of transportation, loading, unloading, assembly, dismantling, and removal thereof. All such costs shall be in accordance with the terms of

said rental agreements. The rental of any such equipment, machinery, or parts shall cease when the use thereof is no longer necessary for the Work.

- d. Sales, consumer, use, and other similar taxes related to the Work, and for which Contractor is liable, as imposed by Laws and Regulations.
- e. Deposits lost for causes other than negligence of Contractor, any Subcontractor, or anyone directly or indirectly employed by any of them or for whose acts any of them may be liable, and royalty payments and fees for permits and licenses.
- f. Losses and damages (and related expenses) caused by damage to the Work, not compensated by insurance or otherwise, sustained by Contractor in connection with the performance of the Work (except losses and damages within the deductible amounts of property insurance established in accordance with Paragraph 5.06.D), provided such losses and damages have resulted from causes other than the negligence of Contractor, any Subcontractor, or anyone directly or indirectly employed by any of them or for whose acts any of them may be liable. Such losses shall include settlements made with the written consent and approval of Owner. No such losses, damages, and expenses shall be included in the Cost of the Work for the purpose of determining Contractor's fee.
- g. The cost of utilities, fuel, and sanitary facilities at the Site.
- h. Minor expenses such as telegrams, long distance telephone calls, telephone service at the Site, express and courier services, and similar petty cash items in connection with the Work.
- i. The costs of premiums for all bonds and insurance Contractor is required by the Contract Documents to purchase and maintain.

B. *Costs Excluded:* The term Cost of the Work shall not include any of the following items:

1. Payroll costs and other compensation of Contractor's officers, executives, principals (of partnerships and sole proprietorships), general managers, safety managers, engineers, architects, estimators, attorneys, auditors, accountants, purchasing and contracting agents, expeditors, timekeepers, clerks, and other personnel employed by Contractor, whether at the Site or in Contractor's principal or branch office for general administration of the Work and not specifically included in the agreed upon schedule of job classifications referred to in Paragraph 11.01.A.1 or specifically covered by Paragraph 11.01.A.4, all of which are to be considered administrative costs covered by the Contractor's fee.
2. Expenses of Contractor's principal and branch offices other than Contractor's office at the Site.
3. Any part of Contractor's capital expenses, including interest on Contractor's capital employed for the Work and charges against Contractor for delinquent payments.
4. Costs due to the negligence of Contractor, any Subcontractor, or anyone directly or indirectly employed by any of them or for whose acts any of them may be liable, including but not

limited to, the correction of defective Work, disposal of materials or equipment wrongly supplied, and making good any damage to property.

5. Other overhead or general expense costs of any kind and the costs of any item not specifically and expressly included in Paragraphs 11.01.A.
- C. *Contractor's Fee:* When all the Work is performed on the basis of cost-plus, Contractor's fee shall be determined as set forth in the Agreement. When the value of any Work covered by a Change Order or when a Claim for an adjustment in Contract Price is determined on the basis of Cost of the Work, Contractor's fee shall be determined as set forth in Paragraph 12.01.C.
- D. *Documentation:* Whenever the Cost of the Work for any purpose is to be determined pursuant to Paragraphs 11.01.A and 11.01.B, Contractor will establish and maintain records thereof in accordance with generally accepted accounting practices and submit in a form acceptable to Engineer an itemized cost breakdown together with supporting data.

11.02 Allowances

- A. It is understood that Contractor has included in the Contract Price all allowances so named in the Contract Documents and shall cause the Work so covered to be performed for such sums and by such persons or entities as may be acceptable to Owner and Engineer.
- B. *Cash Allowances:*
 1. Contractor agrees that:
 - a. the cash allowances include the cost to Contractor (less any applicable trade discounts) of materials and equipment required by the allowances to be delivered at the Site, and all applicable taxes; and
 - b. Contractor's costs for unloading and handling on the Site, labor, installation, overhead, profit, and other expenses contemplated for the cash allowances have been included in the Contract Price and not in the allowances, and no demand for additional payment on account of any of the foregoing will be valid.
- C. *Contingency Allowance:*
 1. Contractor agrees that a contingency allowance, if any, is for the sole use of Owner to cover unanticipated costs.
- D. Prior to final payment, an appropriate Change Order will be issued as recommended by Engineer to reflect actual amounts due Contractor on account of Work covered by allowances, and the Contract Price shall be correspondingly adjusted.

11.03 Unit Price Work

- A. Where the Contract Documents provide that all or part of the Work is to be Unit Price Work, initially the Contract Price will be deemed to include for all Unit Price Work an amount equal to

the sum of the unit price for each separately identified item of Unit Price Work times the estimated quantity of each item as indicated in the Agreement.

- B. The estimated quantities of items of Unit Price Work are not guaranteed and are solely for the purpose of comparison of Bids and determining an initial Contract Price. Determinations of the actual quantities and classifications of Unit Price Work performed by Contractor will be made by Engineer subject to the provisions of Paragraph 9.07.
- C. Each unit price will be deemed to include an amount considered by Contractor to be adequate to cover Contractor's overhead and profit for each separately identified item.
- D. Owner or Contractor may make a Claim for an adjustment in the Contract Price in accordance with Paragraph 10.05 if:
 - 1. the quantity of any item of Unit Price Work performed by Contractor differs materially and significantly from the estimated quantity of such item indicated in the Agreement; and
 - 2. there is no corresponding adjustment with respect to any other item of Work; and
 - 3. Contractor believes that Contractor is entitled to an increase in Contract Price as a result of having incurred additional expense or Owner believes that Owner is entitled to a decrease in Contract Price and the parties are unable to agree as to the amount of any such increase or decrease.

ARTICLE 12 – CHANGE OF CONTRACT PRICE; CHANGE OF CONTRACT TIMES

12.01 Change of Contract Price

- A. The Contract Price may only be changed by a Change Order. Any Claim for an adjustment in the Contract Price shall be based on written notice submitted by the party making the Claim to the Engineer and the other party to the Contract in accordance with the provisions of Paragraph 10.05.
- B. The value of any Work covered by a Change Order or of any Claim for an adjustment in the Contract Price will be determined as follows:
 - 1. where the Work involved is covered by unit prices contained in the Contract Documents, by application of such unit prices to the quantities of the items involved (subject to the provisions of Paragraph 11.03); or
 - 2. where the Work involved is not covered by unit prices contained in the Contract Documents, by a mutually agreed lump sum (which may include an allowance for overhead and profit not necessarily in accordance with Paragraph 12.01.C.2); or
 - 3. where the Work involved is not covered by unit prices contained in the Contract Documents and agreement to a lump sum is not reached under Paragraph 12.01.B.2, on the basis of the Cost of the Work (determined as provided in Paragraph 11.01) plus a Contractor's fee for overhead and profit (determined as provided in Paragraph 12.01.C).

C. *Contractor's Fee*: The Contractor's fee for overhead and profit shall be determined as follows:

1. a mutually acceptable fixed fee; or
2. if a fixed fee is not agreed upon, then a fee based on the following percentages of the various portions of the Cost of the Work:
 - a. for costs incurred under Paragraphs 11.01.A.1 and 11.01.A.2, the Contractor's fee shall be 15 percent;
 - b. for costs incurred under Paragraph 11.01.A.3, the Contractor's fee shall be five percent;
 - c. where one or more tiers of subcontracts are on the basis of Cost of the Work plus a fee and no fixed fee is agreed upon, the intent of Paragraphs 12.01.C.2.a and 12.01.C.2.b is that the Subcontractor who actually performs the Work, at whatever tier, will be paid a fee of 15 percent of the costs incurred by such Subcontractor under Paragraphs 11.01.A.1 and 11.01.A.2 and that any higher tier Subcontractor and Contractor will each be paid a fee of five percent of the amount paid to the next lower tier Subcontractor;
 - d. no fee shall be payable on the basis of costs itemized under Paragraphs 11.01.A.4, 11.01.A.5, and 11.01.B;
 - e. the amount of credit to be allowed by Contractor to Owner for any change which results in a net decrease in cost will be the amount of the actual net decrease in cost plus a deduction in Contractor's fee by an amount equal to five percent of such net decrease; and
 - f. when both additions and credits are involved in any one change, the adjustment in Contractor's fee shall be computed on the basis of the net change in accordance with Paragraphs 12.01.C.2.a through 12.01.C.2.e, inclusive.

12.02 *Change of Contract Times*

- A. The Contract Times may only be changed by a Change Order. Any Claim for an adjustment in the Contract Times shall be based on written notice submitted by the party making the Claim to the Engineer and the other party to the Contract in accordance with the provisions of Paragraph 10.05.
- B. Any adjustment of the Contract Times covered by a Change Order or any Claim for an adjustment in the Contract Times will be determined in accordance with the provisions of this Article 12.

12.03 *Delays*

- A. Where Contractor is prevented from completing any part of the Work within the Contract Times due to delay beyond the control of Contractor, the Contract Times will be extended in an amount equal to the time lost due to such delay if a Claim is made therefor as provided in Paragraph 12.02.A. Delays beyond the control of Contractor shall include, but not be limited to, acts or

neglect by Owner, acts or neglect of utility owners or other contractors performing other work as contemplated by Article 7, fires, floods, epidemics, abnormal weather conditions, or acts of God.

- B. If Owner, Engineer, or other contractors or utility owners performing other work for Owner as contemplated by Article 7, or anyone for whom Owner is responsible, delays, disrupts, or interferes with the performance or progress of the Work, then Contractor shall be entitled to an equitable adjustment in the Contract Price or the Contract Times, or both. Contractor's entitlement to an adjustment of the Contract Times is conditioned on such adjustment being essential to Contractor's ability to complete the Work within the Contract Times.
- C. If Contractor is delayed in the performance or progress of the Work by fire, flood, epidemic, abnormal weather conditions, acts of God, acts or failures to act of utility owners not under the control of Owner, or other causes not the fault of and beyond control of Owner and Contractor, then Contractor shall be entitled to an equitable adjustment in Contract Times, if such adjustment is essential to Contractor's ability to complete the Work within the Contract Times. Such an adjustment shall be Contractor's sole and exclusive remedy for the delays described in this Paragraph 12.03.C.
- D. Owner, Engineer, and their officers, directors, members, partners, employees, agents, consultants, or subcontractors shall not be liable to Contractor for any claims, costs, losses, or damages (including but not limited to all fees and charges of engineers, architects, attorneys, and other professionals and all court or arbitration or other dispute resolution costs) sustained by Contractor on or in connection with any other project or anticipated project.
- E. Contractor shall not be entitled to an adjustment in Contract Price or Contract Times for delays within the control of Contractor. Delays attributable to and within the control of a Subcontractor or Supplier shall be deemed to be delays within the control of Contractor.

ARTICLE 13 – TESTS AND INSPECTIONS; CORRECTION, REMOVAL OR ACCEPTANCE OF DEFECTIVE WORK

13.01 Notice of Defects

- A. Prompt notice of all defective Work of which Owner or Engineer has actual knowledge will be given to Contractor. Defective Work may be rejected, corrected, or accepted as provided in this Article 13.

13.02 Access to Work

- A. Owner, Engineer, their consultants and other representatives and personnel of Owner, independent testing laboratories, and governmental agencies with jurisdictional interests will have access to the Site and the Work at reasonable times for their observation, inspection, and testing. Contractor shall provide them proper and safe conditions for such access and advise them of Contractor's safety procedures and programs so that they may comply therewith as applicable.

13.03 *Tests and Inspections*

- A. Contractor shall give Engineer timely notice of readiness of the Work for all required inspections, tests, or approvals and shall cooperate with inspection and testing personnel to facilitate required inspections or tests.
- B. Owner shall employ and pay for the services of an independent testing laboratory to perform all inspections, tests, or approvals required by the Contract Documents except:
 - 1. for inspections, tests, or approvals covered by Paragraphs 13.03.C and 13.03.D below;
 - 2. that costs incurred in connection with tests or inspections conducted pursuant to Paragraph 13.04.B shall be paid as provided in Paragraph 13.04.C; and
 - 3. as otherwise specifically provided in the Contract Documents.
- C. If Laws or Regulations of any public body having jurisdiction require any Work (or part thereof) specifically to be inspected, tested, or approved by an employee or other representative of such public body, Contractor shall assume full responsibility for arranging and obtaining such inspections, tests, or approvals, pay all costs in connection therewith, and furnish Engineer the required certificates of inspection or approval.
- D. Contractor shall be responsible for arranging and obtaining and shall pay all costs in connection with any inspections, tests, or approvals required for Owner's and Engineer's acceptance of materials or equipment to be incorporated in the Work; or acceptance of materials, mix designs, or equipment submitted for approval prior to Contractor's purchase thereof for incorporation in the Work. Such inspections, tests, or approvals shall be performed by organizations acceptable to Owner and Engineer.
- E. If any Work (or the work of others) that is to be inspected, tested, or approved is covered by Contractor without written concurrence of Engineer, Contractor shall, if requested by Engineer, uncover such Work for observation.
- F. Uncovering Work as provided in Paragraph 13.03.E shall be at Contractor's expense unless Contractor has given Engineer timely notice of Contractor's intention to cover the same and Engineer has not acted with reasonable promptness in response to such notice.

13.04 *Uncovering Work*

- A. If any Work is covered contrary to the written request of Engineer, it must, if requested by Engineer, be uncovered for Engineer's observation and replaced at Contractor's expense.
- B. If Engineer considers it necessary or advisable that covered Work be observed by Engineer or inspected or tested by others, Contractor, at Engineer's request, shall uncover, expose, or otherwise make available for observation, inspection, or testing as Engineer may require, that portion of the Work in question, furnishing all necessary labor, material, and equipment.

- C. If it is found that the uncovered Work is defective, Contractor shall pay all claims, costs, losses, and damages (including but not limited to all fees and charges of engineers, architects, attorneys, and other professionals and all court or arbitration or other dispute resolution costs) arising out of or relating to such uncovering, exposure, observation, inspection, and testing, and of satisfactory replacement or reconstruction (including but not limited to all costs of repair or replacement of work of others); and Owner shall be entitled to an appropriate decrease in the Contract Price. If the parties are unable to agree as to the amount thereof, Owner may make a Claim therefor as provided in Paragraph 10.05.
- D. If the uncovered Work is not found to be defective, Contractor shall be allowed an increase in the Contract Price or an extension of the Contract Times, or both, directly attributable to such uncovering, exposure, observation, inspection, testing, replacement, and reconstruction. If the parties are unable to agree as to the amount or extent thereof, Contractor may make a Claim therefor as provided in Paragraph 10.05.

13.05 *Owner May Stop the Work*

- A. If the Work is defective, or Contractor fails to supply sufficient skilled workers or suitable materials or equipment, or fails to perform the Work in such a way that the completed Work will conform to the Contract Documents, Owner may order Contractor to stop the Work, or any portion thereof, until the cause for such order has been eliminated; however, this right of Owner to stop the Work shall not give rise to any duty on the part of Owner to exercise this right for the benefit of Contractor, any Subcontractor, any Supplier, any other individual or entity, or any surety for, or employee or agent of any of them.

13.06 *Correction or Removal of Defective Work*

- A. Promptly after receipt of written notice, Contractor shall correct all defective Work, whether or not fabricated, installed, or completed, or, if the Work has been rejected by Engineer, remove it from the Project and replace it with Work that is not defective. Contractor shall pay all claims, costs, losses, and damages (including but not limited to all fees and charges of engineers, architects, attorneys, and other professionals and all court or arbitration or other dispute resolution costs) arising out of or relating to such correction or removal (including but not limited to all costs of repair or replacement of work of others).
- B. When correcting defective Work under the terms of this Paragraph 13.06 or Paragraph 13.07, Contractor shall take no action that would void or otherwise impair Owner's special warranty and guarantee, if any, on said Work.

13.07 *Correction Period*

- A. If within one year after the date of Substantial Completion (or such longer period of time as may be prescribed by the terms of any applicable special guarantee required by the Contract Documents) or by any specific provision of the Contract Documents, any Work is found to be defective, or if the repair of any damages to the land or areas made available for Contractor's use by Owner or permitted by Laws and Regulations as contemplated in Paragraph 6.11.A is found to be defective, Contractor shall promptly, without cost to Owner and in accordance with Owner's written instructions:

1. repair such defective land or areas; or
 2. correct such defective Work; or
 3. if the defective Work has been rejected by Owner, remove it from the Project and replace it with Work that is not defective, and
 4. satisfactorily correct or repair or remove and replace any damage to other Work, to the work of others or other land or areas resulting therefrom.
- B. If Contractor does not promptly comply with the terms of Owner's written instructions, or in an emergency where delay would cause serious risk of loss or damage, Owner may have the defective Work corrected or repaired or may have the rejected Work removed and replaced. All claims, costs, losses, and damages (including but not limited to all fees and charges of engineers, architects, attorneys, and other professionals and all court or arbitration or other dispute resolution costs) arising out of or relating to such correction or repair or such removal and replacement (including but not limited to all costs of repair or replacement of work of others) will be paid by Contractor.
- C. In special circumstances where a particular item of equipment is placed in continuous service before Substantial Completion of all the Work, the correction period for that item may start to run from an earlier date if so provided in the Specifications.
- D. Where defective Work (and damage to other Work resulting therefrom) has been corrected or removed and replaced under this Paragraph 13.07, the correction period hereunder with respect to such Work will be extended for an additional period of one year after such correction or removal and replacement has been satisfactorily completed.
- E. Contractor's obligations under this Paragraph 13.07 are in addition to any other obligation or warranty. The provisions of this Paragraph 13.07 shall not be construed as a substitute for, or a waiver of, the provisions of any applicable statute of limitation or repose.

13.08 *Acceptance of Defective Work*

- A. If, instead of requiring correction or removal and replacement of defective Work, Owner (and, prior to Engineer's recommendation of final payment, Engineer) prefers to accept it, Owner may do so. Contractor shall pay all claims, costs, losses, and damages (including but not limited to all fees and charges of engineers, architects, attorneys, and other professionals and all court or arbitration or other dispute resolution costs) attributable to Owner's evaluation of and determination to accept such defective Work (such costs to be approved by Engineer as to reasonableness) and for the diminished value of the Work to the extent not otherwise paid by Contractor pursuant to this sentence. If any such acceptance occurs prior to Engineer's recommendation of final payment, a Change Order will be issued incorporating the necessary revisions in the Contract Documents with respect to the Work, and Owner shall be entitled to an appropriate decrease in the Contract Price, reflecting the diminished value of Work so accepted. If the parties are unable to agree as to the amount thereof, Owner may make a Claim therefor as provided in Paragraph 10.05. If the acceptance occurs after such recommendation, an appropriate amount will be paid by Contractor to Owner.

13.09 *Owner May Correct Defective Work*

- A. If Contractor fails within a reasonable time after written notice from Engineer to correct defective Work, or to remove and replace rejected Work as required by Engineer in accordance with Paragraph 13.06.A, or if Contractor fails to perform the Work in accordance with the Contract Documents, or if Contractor fails to comply with any other provision of the Contract Documents, Owner may, after seven days written notice to Contractor, correct, or remedy any such deficiency.
- B. In exercising the rights and remedies under this Paragraph 13.09, Owner shall proceed expeditiously. In connection with such corrective or remedial action, Owner may exclude Contractor from all or part of the Site, take possession of all or part of the Work and suspend Contractor's services related thereto, take possession of Contractor's tools, appliances, construction equipment and machinery at the Site, and incorporate in the Work all materials and equipment stored at the Site or for which Owner has paid Contractor but which are stored elsewhere. Contractor shall allow Owner, Owner's representatives, agents and employees, Owner's other contractors, and Engineer and Engineer's consultants access to the Site to enable Owner to exercise the rights and remedies under this Paragraph.
- C. All claims, costs, losses, and damages (including but not limited to all fees and charges of engineers, architects, attorneys, and other professionals and all court or arbitration or other dispute resolution costs) incurred or sustained by Owner in exercising the rights and remedies under this Paragraph 13.09 will be charged against Contractor, and a Change Order will be issued incorporating the necessary revisions in the Contract Documents with respect to the Work; and Owner shall be entitled to an appropriate decrease in the Contract Price. If the parties are unable to agree as to the amount of the adjustment, Owner may make a Claim therefor as provided in Paragraph 10.05. Such claims, costs, losses and damages will include but not be limited to all costs of repair, or replacement of work of others destroyed or damaged by correction, removal, or replacement of Contractor's defective Work.
- D. Contractor shall not be allowed an extension of the Contract Times because of any delay in the performance of the Work attributable to the exercise by Owner of Owner's rights and remedies under this Paragraph 13.09.

ARTICLE 14 – PAYMENTS TO CONTRACTOR AND COMPLETION

14.01 *Schedule of Values*

- A. The Schedule of Values established as provided in Paragraph 2.07.A will serve as the basis for progress payments and will be incorporated into a form of Application for Payment acceptable to Engineer. Progress payments on account of Unit Price Work will be based on the number of units completed.

14.02 *Progress Payments*

A. *Applications for Payments:*

- 1. At least 20 days before the date established in the Agreement for each progress payment (but not more often than once a month), Contractor shall submit to Engineer for review an

Application for Payment filled out and signed by Contractor covering the Work completed as of the date of the Application and accompanied by such supporting documentation as is required by the Contract Documents. If payment is requested on the basis of materials and equipment not incorporated in the Work but delivered and suitably stored at the Site or at another location agreed to in writing, the Application for Payment shall also be accompanied by a bill of sale, invoice, or other documentation warranting that Owner has received the materials and equipment free and clear of all Liens and evidence that the materials and equipment are covered by appropriate property insurance or other arrangements to protect Owner's interest therein, all of which must be satisfactory to Owner.

2. Beginning with the second Application for Payment, each Application shall include an affidavit of Contractor stating that all previous progress payments received on account of the Work have been applied on account to discharge Contractor's legitimate obligations associated with prior Applications for Payment.
3. The amount of retainage with respect to progress payments will be as stipulated in the Agreement.

B. Review of Applications:

1. Engineer will, within 10 days after receipt of each Application for Payment, either indicate in writing a recommendation of payment and present the Application to Owner or return the Application to Contractor indicating in writing Engineer's reasons for refusing to recommend payment. In the latter case, Contractor may make the necessary corrections and resubmit the Application.
2. Engineer's recommendation of any payment requested in an Application for Payment will constitute a representation by Engineer to Owner, based on Engineer's observations of the executed Work as an experienced and qualified design professional, and on Engineer's review of the Application for Payment and the accompanying data and schedules, that to the best of Engineer's knowledge, information and belief:
 - a. the Work has progressed to the point indicated;
 - b. the quality of the Work is generally in accordance with the Contract Documents (subject to an evaluation of the Work as a functioning whole prior to or upon Substantial Completion, the results of any subsequent tests called for in the Contract Documents, a final determination of quantities and classifications for Unit Price Work under Paragraph 9.07, and any other qualifications stated in the recommendation); and
 - c. the conditions precedent to Contractor's being entitled to such payment appear to have been fulfilled in so far as it is Engineer's responsibility to observe the Work.
3. By recommending any such payment Engineer will not thereby be deemed to have represented that:
 - a. inspections made to check the quality or the quantity of the Work as it has been performed have been exhaustive, extended to every aspect of the Work in progress, or

- involved detailed inspections of the Work beyond the responsibilities specifically assigned to Engineer in the Contract Documents; or
- b. there may not be other matters or issues between the parties that might entitle Contractor to be paid additionally by Owner or entitle Owner to withhold payment to Contractor.
4. Neither Engineer's review of Contractor's Work for the purposes of recommending payments nor Engineer's recommendation of any payment, including final payment, will impose responsibility on Engineer:
 - a. to supervise, direct, or control the Work, or
 - b. for the means, methods, techniques, sequences, or procedures of construction, or the safety precautions and programs incident thereto, or
 - c. for Contractor's failure to comply with Laws and Regulations applicable to Contractor's performance of the Work, or
 - d. to make any examination to ascertain how or for what purposes Contractor has used the moneys paid on account of the Contract Price, or
 - e. to determine that title to any of the Work, materials, or equipment has passed to Owner free and clear of any Liens.
 5. Engineer may refuse to recommend the whole or any part of any payment if, in Engineer's opinion, it would be incorrect to make the representations to Owner stated in Paragraph 14.02.B.2. Engineer may also refuse to recommend any such payment or, because of subsequently discovered evidence or the results of subsequent inspections or tests, revise or revoke any such payment recommendation previously made, to such extent as may be necessary in Engineer's opinion to protect Owner from loss because:
 - a. the Work is defective, or completed Work has been damaged, requiring correction or replacement;
 - b. the Contract Price has been reduced by Change Orders;
 - c. Owner has been required to correct defective Work or complete Work in accordance with Paragraph 13.09; or
 - d. Engineer has actual knowledge of the occurrence of any of the events enumerated in Paragraph 15.02.A.

C. Payment Becomes Due:

1. Ten days after presentation of the Application for Payment to Owner with Engineer's recommendation, the amount recommended will (subject to the provisions of Paragraph 14.02.D) become due, and when due will be paid by Owner to Contractor.

D. *Reduction in Payment:*

1. Owner may refuse to make payment of the full amount recommended by Engineer because:
 - a. claims have been made against Owner on account of Contractor's performance or furnishing of the Work;
 - b. Liens have been filed in connection with the Work, except where Contractor has delivered a specific bond satisfactory to Owner to secure the satisfaction and discharge of such Liens;
 - c. there are other items entitling Owner to a set-off against the amount recommended; or
 - d. Owner has actual knowledge of the occurrence of any of the events enumerated in Paragraphs 14.02.B.5.a through 14.02.B.5.c or Paragraph 15.02.A.
2. If Owner refuses to make payment of the full amount recommended by Engineer, Owner will give Contractor immediate written notice (with a copy to Engineer) stating the reasons for such action and promptly pay Contractor any amount remaining after deduction of the amount so withheld. Owner shall promptly pay Contractor the amount so withheld, or any adjustment thereto agreed to by Owner and Contractor, when Contractor remedies the reasons for such action.
3. Upon a subsequent determination that Owner's refusal of payment was not justified, the amount wrongfully withheld shall be treated as an amount due as determined by Paragraph 14.02.C.1 and subject to interest as provided in the Agreement.

14.03 *Contractor's Warranty of Title*

- A. Contractor warrants and guarantees that title to all Work, materials, and equipment covered by any Application for Payment, whether incorporated in the Project or not, will pass to Owner no later than the time of payment free and clear of all Liens.

14.04 *Substantial Completion*

- A. When Contractor considers the entire Work ready for its intended use Contractor shall notify Owner and Engineer in writing that the entire Work is substantially complete (except for items specifically listed by Contractor as incomplete) and request that Engineer issue a certificate of Substantial Completion.
- B. Promptly after Contractor's notification, Owner, Contractor, and Engineer shall make an inspection of the Work to determine the status of completion. If Engineer does not consider the Work substantially complete, Engineer will notify Contractor in writing giving the reasons therefor.
- C. If Engineer considers the Work substantially complete, Engineer will deliver to Owner a tentative certificate of Substantial Completion which shall fix the date of Substantial Completion. There shall be attached to the certificate a tentative list of items to be completed or corrected before

final payment. Owner shall have seven days after receipt of the tentative certificate during which to make written objection to Engineer as to any provisions of the certificate or attached list. If, after considering such objections, Engineer concludes that the Work is not substantially complete, Engineer will, within 14 days after submission of the tentative certificate to Owner, notify Contractor in writing, stating the reasons therefor. If, after consideration of Owner's objections, Engineer considers the Work substantially complete, Engineer will, within said 14 days, execute and deliver to Owner and Contractor a definitive certificate of Substantial Completion (with a revised tentative list of items to be completed or corrected) reflecting such changes from the tentative certificate as Engineer believes justified after consideration of any objections from Owner.

- D. At the time of delivery of the tentative certificate of Substantial Completion, Engineer will deliver to Owner and Contractor a written recommendation as to division of responsibilities pending final payment between Owner and Contractor with respect to security, operation, safety, and protection of the Work, maintenance, heat, utilities, insurance, and warranties and guarantees. Unless Owner and Contractor agree otherwise in writing and so inform Engineer in writing prior to Engineer's issuing the definitive certificate of Substantial Completion, Engineer's aforesaid recommendation will be binding on Owner and Contractor until final payment.
- E. Owner shall have the right to exclude Contractor from the Site after the date of Substantial Completion subject to allowing Contractor reasonable access to remove its property and complete or correct items on the tentative list.

14.05 *Partial Utilization*

- A. Prior to Substantial Completion of all the Work, Owner may use or occupy any substantially completed part of the Work which has specifically been identified in the Contract Documents, or which Owner, Engineer, and Contractor agree constitutes a separately functioning and usable part of the Work that can be used by Owner for its intended purpose without significant interference with Contractor's performance of the remainder of the Work, subject to the following conditions:
 - 1. Owner at any time may request Contractor in writing to permit Owner to use or occupy any such part of the Work which Owner believes to be ready for its intended use and substantially complete. If and when Contractor agrees that such part of the Work is substantially complete, Contractor, Owner, and Engineer will follow the procedures of Paragraph 14.04.A through D for that part of the Work.
 - 2. Contractor at any time may notify Owner and Engineer in writing that Contractor considers any such part of the Work ready for its intended use and substantially complete and request Engineer to issue a certificate of Substantial Completion for that part of the Work.
 - 3. Within a reasonable time after either such request, Owner, Contractor, and Engineer shall make an inspection of that part of the Work to determine its status of completion. If Engineer does not consider that part of the Work to be substantially complete, Engineer will notify Owner and Contractor in writing giving the reasons therefor. If Engineer considers that part of the Work to be substantially complete, the provisions of Paragraph 14.04 will apply with respect to certification of Substantial Completion of that part of the Work and the division of responsibility in respect thereof and access thereto.

4. No use or occupancy or separate operation of part of the Work may occur prior to compliance with the requirements of Paragraph 5.10 regarding property insurance.

14.06 *Final Inspection*

- A. Upon written notice from Contractor that the entire Work or an agreed portion thereof is complete, Engineer will promptly make a final inspection with Owner and Contractor and will notify Contractor in writing of all particulars in which this inspection reveals that the Work is incomplete or defective. Contractor shall immediately take such measures as are necessary to complete such Work or remedy such deficiencies.

14.07 *Final Payment*

A. *Application for Payment:*

1. After Contractor has, in the opinion of Engineer, satisfactorily completed all corrections identified during the final inspection and has delivered, in accordance with the Contract Documents, all maintenance and operating instructions, schedules, guarantees, bonds, certificates or other evidence of insurance, certificates of inspection, marked-up record documents (as provided in Paragraph 6.12), and other documents, Contractor may make application for final payment following the procedure for progress payments.
2. The final Application for Payment shall be accompanied (except as previously delivered) by:
 - a. all documentation called for in the Contract Documents, including but not limited to the evidence of insurance required by Paragraph 5.04.B.6;
 - b. consent of the surety, if any, to final payment;
 - c. a list of all Claims against Owner that Contractor believes are unsettled; and
 - d. complete and legally effective releases or waivers (satisfactory to Owner) of all Lien rights arising out of or Liens filed in connection with the Work.
3. In lieu of the releases or waivers of Liens specified in Paragraph 14.07.A.2 and as approved by Owner, Contractor may furnish receipts or releases in full and an affidavit of Contractor that: (i) the releases and receipts include all labor, services, material, and equipment for which a Lien could be filed; and (ii) all payrolls, material and equipment bills, and other indebtedness connected with the Work for which Owner might in any way be responsible, or which might in any way result in liens or other burdens on Owner's property, have been paid or otherwise satisfied. If any Subcontractor or Supplier fails to furnish such a release or receipt in full, Contractor may furnish a bond or other collateral satisfactory to Owner to indemnify Owner against any Lien.

B. *Engineer's Review of Application and Acceptance:*

1. If, on the basis of Engineer's observation of the Work during construction and final inspection, and Engineer's review of the final Application for Payment and accompanying

documentation as required by the Contract Documents, Engineer is satisfied that the Work has been completed and Contractor's other obligations under the Contract Documents have been fulfilled, Engineer will, within ten days after receipt of the final Application for Payment, indicate in writing Engineer's recommendation of payment and present the Application for Payment to Owner for payment. At the same time Engineer will also give written notice to Owner and Contractor that the Work is acceptable subject to the provisions of Paragraph 14.09. Otherwise, Engineer will return the Application for Payment to Contractor, indicating in writing the reasons for refusing to recommend final payment, in which case Contractor shall make the necessary corrections and resubmit the Application for Payment.

C. Payment Becomes Due:

1. Thirty days after the presentation to Owner of the Application for Payment and accompanying documentation, the amount recommended by Engineer, less any sum Owner is entitled to set off against Engineer's recommendation, including but not limited to liquidated damages, will become due and will be paid by Owner to Contractor.

14.08 *Final Completion Delayed*

- A. If, through no fault of Contractor, final completion of the Work is significantly delayed, and if Engineer so confirms, Owner shall, upon receipt of Contractor's final Application for Payment (for Work fully completed and accepted) and recommendation of Engineer, and without terminating the Contract, make payment of the balance due for that portion of the Work fully completed and accepted. If the remaining balance to be held by Owner for Work not fully completed or corrected is less than the retainage stipulated in the Agreement, and if bonds have been furnished as required in Paragraph 5.01, the written consent of the surety to the payment of the balance due for that portion of the Work fully completed and accepted shall be submitted by Contractor to Engineer with the Application for such payment. Such payment shall be made under the terms and conditions governing final payment, except that it shall not constitute a waiver of Claims.

14.09 *Waiver of Claims*

- A. The making and acceptance of final payment will constitute:
 1. a waiver of all Claims by Owner against Contractor, except Claims arising from unsettled Liens, from defective Work appearing after final inspection pursuant to Paragraph 14.06, from failure to comply with the Contract Documents or the terms of any special guarantees specified therein, or from Contractor's continuing obligations under the Contract Documents; and
 2. a waiver of all Claims by Contractor against Owner other than those previously made in accordance with the requirements herein and expressly acknowledged by Owner in writing as still unsettled.

ARTICLE 15 – SUSPENSION OF WORK AND TERMINATION

15.01 *Owner May Suspend Work*

- A. At any time and without cause, Owner may suspend the Work or any portion thereof for a period of not more than 90 consecutive days by notice in writing to Contractor and Engineer which will fix the date on which Work will be resumed. Contractor shall resume the Work on the date so fixed. Contractor shall be granted an adjustment in the Contract Price or an extension of the Contract Times, or both, directly attributable to any such suspension if Contractor makes a Claim therefor as provided in Paragraph 10.05.

15.02 *Owner May Terminate for Cause*

- A. The occurrence of any one or more of the following events will justify termination for cause:
1. Contractor's persistent failure to perform the Work in accordance with the Contract Documents (including, but not limited to, failure to supply sufficient skilled workers or suitable materials or equipment or failure to adhere to the Progress Schedule established under Paragraph 2.07 as adjusted from time to time pursuant to Paragraph 6.04);
 2. Contractor's disregard of Laws or Regulations of any public body having jurisdiction;
 3. Contractor's repeated disregard of the authority of Engineer; or
 4. Contractor's violation in any substantial way of any provisions of the Contract Documents.
- B. If one or more of the events identified in Paragraph 15.02.A occur, Owner may, after giving Contractor (and surety) seven days written notice of its intent to terminate the services of Contractor:
1. exclude Contractor from the Site, and take possession of the Work and of all Contractor's tools, appliances, construction equipment, and machinery at the Site, and use the same to the full extent they could be used by Contractor (without liability to Contractor for trespass or conversion);
 2. incorporate in the Work all materials and equipment stored at the Site or for which Owner has paid Contractor but which are stored elsewhere; and
 3. complete the Work as Owner may deem expedient.
- C. If Owner proceeds as provided in Paragraph 15.02.B, Contractor shall not be entitled to receive any further payment until the Work is completed. If the unpaid balance of the Contract Price exceeds all claims, costs, losses, and damages (including but not limited to all fees and charges of engineers, architects, attorneys, and other professionals and all court or arbitration or other dispute resolution costs) sustained by Owner arising out of or relating to completing the Work, such excess will be paid to Contractor. If such claims, costs, losses, and damages exceed such unpaid balance, Contractor shall pay the difference to Owner. Such claims, costs, losses, and damages incurred by Owner will be reviewed by Engineer as to their reasonableness and, when

so approved by Engineer, incorporated in a Change Order. When exercising any rights or remedies under this Paragraph, Owner shall not be required to obtain the lowest price for the Work performed.

- D. Notwithstanding Paragraphs 15.02.B and 15.02.C, Contractor's services will not be terminated if Contractor begins within seven days of receipt of notice of intent to terminate to correct its failure to perform and proceeds diligently to cure such failure within no more than 30 days of receipt of said notice.
- E. Where Contractor's services have been so terminated by Owner, the termination will not affect any rights or remedies of Owner against Contractor then existing or which may thereafter accrue. Any retention or payment of moneys due Contractor by Owner will not release Contractor from liability.
- F. If and to the extent that Contractor has provided a performance bond under the provisions of Paragraph 5.01.A, the termination procedures of that bond shall supersede the provisions of Paragraphs 15.02.B and 15.02.C.

15.03 *Owner May Terminate For Convenience*

- A. Upon seven days written notice to Contractor and Engineer, Owner may, without cause and without prejudice to any other right or remedy of Owner, terminate the Contract. In such case, Contractor shall be paid for (without duplication of any items):
 - 1. completed and acceptable Work executed in accordance with the Contract Documents prior to the effective date of termination, including fair and reasonable sums for overhead and profit on such Work;
 - 2. expenses sustained prior to the effective date of termination in performing services and furnishing labor, materials, or equipment as required by the Contract Documents in connection with uncompleted Work, plus fair and reasonable sums for overhead and profit on such expenses;
 - 3. all claims, costs, losses, and damages (including but not limited to all fees and charges of engineers, architects, attorneys, and other professionals and all court or arbitration or other dispute resolution costs) incurred in settlement of terminated contracts with Subcontractors, Suppliers, and others; and
 - 4. reasonable expenses directly attributable to termination.
- B. Contractor shall not be paid on account of loss of anticipated profits or revenue or other economic loss arising out of or resulting from such termination.

15.04 *Contractor May Stop Work or Terminate*

- A. If, through no act or fault of Contractor, (i) the Work is suspended for more than 90 consecutive days by Owner or under an order of court or other public authority, or (ii) Engineer fails to act on any Application for Payment within 30 days after it is submitted, or (iii) Owner fails for 30 days

to pay Contractor any sum finally determined to be due, then Contractor may, upon seven days written notice to Owner and Engineer, and provided Owner or Engineer do not remedy such suspension or failure within that time, terminate the Contract and recover from Owner payment on the same terms as provided in Paragraph 15.03.

- B. In lieu of terminating the Contract and without prejudice to any other right or remedy, if Engineer has failed to act on an Application for Payment within 30 days after it is submitted, or Owner has failed for 30 days to pay Contractor any sum finally determined to be due, Contractor may, seven days after written notice to Owner and Engineer, stop the Work until payment is made of all such amounts due Contractor, including interest thereon. The provisions of this Paragraph 15.04 are not intended to preclude Contractor from making a Claim under Paragraph 10.05 for an adjustment in Contract Price or Contract Times or otherwise for expenses or damage directly attributable to Contractor's stopping the Work as permitted by this Paragraph.

ARTICLE 16 – DISPUTE RESOLUTION

16.01 Methods and Procedures

- A. Either Owner or Contractor may request mediation of any Claim submitted to Engineer for a decision under Paragraph 10.05 before such decision becomes final and binding. The mediation will be governed by the Construction Industry Mediation Rules of the American Arbitration Association in effect as of the Effective Date of the Agreement. The request for mediation shall be submitted in writing to the American Arbitration Association and the other party to the Contract. Timely submission of the request shall stay the effect of Paragraph 10.05.E.
- B. Owner and Contractor shall participate in the mediation process in good faith. The process shall be concluded within 60 days of filing of the request. The date of termination of the mediation shall be determined by application of the mediation rules referenced above.
- C. If the Claim is not resolved by mediation, Engineer's action under Paragraph 10.05.C or a denial pursuant to Paragraphs 10.05.C.3 or 10.05.D shall become final and binding 30 days after termination of the mediation unless, within that time period, Owner or Contractor:
 - 1. elects in writing to invoke any dispute resolution process provided for in the Supplementary Conditions; or
 - 2. agrees with the other party to submit the Claim to another dispute resolution process; or
 - 3. gives written notice to the other party of the intent to submit the Claim to a court of competent jurisdiction.

ARTICLE 17 – MISCELLANEOUS

17.01 Giving Notice

- A. Whenever any provision of the Contract Documents requires the giving of written notice, it will be deemed to have been validly given if:

1. delivered in person to the individual or to a member of the firm or to an officer of the corporation for whom it is intended; or
2. delivered at or sent by registered or certified mail, postage prepaid, to the last business address known to the giver of the notice.

17.02 *Computation of Times*

- A. When any period of time is referred to in the Contract Documents by days, it will be computed to exclude the first and include the last day of such period. If the last day of any such period falls on a Saturday or Sunday or on a day made a legal holiday by the law of the applicable jurisdiction, such day will be omitted from the computation.

17.03 *Cumulative Remedies*

- A. The duties and obligations imposed by these General Conditions and the rights and remedies available hereunder to the parties hereto are in addition to, and are not to be construed in any way as a limitation of, any rights and remedies available to any or all of them which are otherwise imposed or available by Laws or Regulations, by special warranty or guarantee, or by other provisions of the Contract Documents. The provisions of this Paragraph will be as effective as if repeated specifically in the Contract Documents in connection with each particular duty, obligation, right, and remedy to which they apply.

17.04 *Survival of Obligations*

- A. All representations, indemnifications, warranties, and guarantees made in, required by, or given in accordance with the Contract Documents, as well as all continuing obligations indicated in the Contract Documents, will survive final payment, completion, and acceptance of the Work or termination or completion of the Contract or termination of the services of Contractor.

17.05 *Controlling Law*

- A. This Contract is to be governed by the law of the state in which the Project is located.

17.06 *Headings*

- A. Article and paragraph headings are inserted for convenience only and do not constitute parts of these General Conditions.

SUPPLEMENTAL GENERAL CONDITIONS

GENERAL CONDITIONS

The General Conditions of the Contract for Construction, EJCDC Document C-700, 2007 Edition, as bound herewith, shall be the General conditions of the Contract, except as amended by these Supplemental General Conditions

CHANGES AND ADDITIONS TO VARIOUS ARTICLES OF THE GENERAL CONDITIONS

Article 1 Definitions

Article 1 is hereby modified as follows:

Delete the definition "Notice to Proceed"

Article 2 Preliminary Matters

Article 2.02 is modified as follows:

DELETE Article 2.02 in its entirety

Article 2.03 is modified as follows:

30th day is changed to 10th day, and delete "A Notice to Proceed...earlier"

Article 3 Reporting and Resolving Discrepancies

Article 3.03A.# - change "unless" to "that" and add knowledge thereof, or should have had knowledge of....

Article 4 Availability of lands

Article 4.01B – delete "as necessary for giving notice of or filing a mechanics or construction lien against such lands in accordance with applicable Laws & Regulations."

Article 4.06G – Hazardous Environmental Conditions at Site - Delete in its entirety

Article 5 Bonds and Insurance

Delete Article 5 in its entirety and substitute the following:

PERFORMANCE BOND AND LABOR AND MATERIAL PAYMENT BOND

The Contractor shall, within ten (10) days from the date of the Notice of Award, furnish the City of Meriden with a PERFORMANCE BOND and a LABOR AND MATERIAL PAYMENT BOND, both in the amount of 100% of the amount bid, conditioned upon the performance of the Contractor on all undertaking, covenants, terms, and conditions and agreements of the contract. The bond shall be in the form of the specimen bonds annexed hereto, such bonds shall be executed by the contractor and a corporate bonding company licensed, authorized, and admitted to transact such business in the State of Connecticut and named on the current list of "Surety Companies acceptable on Federal Bonds", as published in the "Treasury Department" listed for an amount equal to the amount of the reinsurance. Written evidence of how any excess suretyship has been placed by the surety signing the bonds shall accompany the bonds. The expense of the bonds shall be borne by the Contractor. If at anytime a surety on any such bond is declared bankrupt or loses its right to do business in the State of Connecticut, or is removed from the list of Surety Companies acceptable on Federal Bonds, or for any other justifiable cause, the Contractor shall, within ten (10) days after notice from the City of Meriden to do so. substitute an acceptable bond(s) in such form and sum and signed by such other surety or sureties as may be

paid by the Contractor. No payments shall be deemed due nor shall be made until the new surety or sureties have furnished an acceptable bond to the City.

If the Contractor is a partnership, the bonds shall be signed by each of the individuals who are partners; if a corporation, the bonds shall be signed in the correct corporation name by a duly authorized officer, agent, or attorney-in-fact. There should be executed an appropriate number of counterparts of the bond corresponding to the number of counterparts of the contract. Each executed bond shall be accompanied by 1) appropriate acknowledgements of the respective parties; 2) appropriate duly certified copy of Power of Attorney or other certificate of authority where bond is executed by agent, officer, or other representative of Contractor or surety; 3) a duly certified extract from by-laws or resolutions or surety under which Power of Attorney or other certificates of authority of its agent, officer, or representative was issued.

The Contractor hereby agrees and understands that a Notice of Award is expressly conditional upon the receipt of these bonds and a Certificate of Insurance naming the City of Meriden (and others as appropriate) as ADDITIONAL INSURED. If said documents are not received by the City of Meriden within ten (10) days from the date of Notice of Award, the City of Meriden reserves the right to withdraw its conditional acceptance of the bid and cancel the Notice of Award.

PERFORMANCE BOND

KNOW ALL MEN BY THESE PRESENTS, that

(here insert full name and address or legal title of Contractor)

as Principal hereinafter called contractor and

(here insert full name and address or legal title of Surety)

As Surety, hereinafter called Surety, are held and firmly bound unto

(here insert full name and address or legal title of Owner)

As Obligee, hereinafter called Owner, in the amount of

Dollars \$ _____

for the payment whereof Contractor and Surety bind themselves, their heirs, executors, administrators, successors and assigns, jointly and severally, firmly by these presents.

WHEREAS,

Contractor has by written agreement dated

20 , entered into a contract with Owner for

(here insert full name, address and description of project)

In accordance with Drawings and Specifications prepared by (here insert full name and address or legal title of Engineer/Architect)

Which contract is by reference made a part hereof, and is hereinafter referred to as the Contract.

PERFORMANCE BOND

NOW, THEREFORE, THE CONDITION OF THIS OBLIGATION is such that, if Contractor, shall promptly and faithfully perform said Contract, then this obligation shall be null and void; otherwise it shall remain in full force and effect.

The Surety hereby waives, notice of any alteration or extension of time made by the Owner.

Whenever Contractor shall be, and declared by Owner to be in default under the Contract, the Owner having performed Owner’s obligations thereunder, the surety may promptly remedy the default, or shall promptly

- 1) Complete the Contract in accordance with its terms and conditions, or
- 2) Obtain a bid or bids for completing the Contract in accordance with its terms and conditions, and upon determination by Surety of the lowest responsible bidder, or, if the Owner elects, upon determination by the Owner and the Surety jointly of the lowest responsible bidder, arrange for a contract between such bidder and Owner, and make available as Work progresses (even though there should be a default of a succession of

defaults, under the contract or contracts of completion arranged under this paragraph sufficient funds to pay the cost of completion less the balance of the contract price; but not exceeding, including other costs and damages for which the Surety may be liable hereunder, the amount set forth in the first paragraph hereof. The term “balance of the contract price,” as used in this paragraph, shall mean the total amount payable by Owner to Contractor under the Contract and any amendments thereto, less the amount properly paid by Owner to Contractor.

Any suit under this bond must be instituted before the expiration of two (2) years from the date on which final payment under the Contract falls due.

No right of action shall accrue on this bond to or for the use of any person or corporation other than the Owner named herein or the heirs, executors, administrators or successors of the Owner.

Signed and sealed this

day of

20

(Witness)

(Principal)

(Title)

(Surety)

(Witness)

(Title)

LABOR AND MATERIAL PAYMENT BOND

KNOW ALL MEN BY THESE PRESENTS, that

(here insert full name and address or legal title of Contractor)

as Principal, hereinafter called Principal, and

(here insert full name and address or legal title of Surety)

As Surety, hereinafter called Surety, are held and firmly bound unto

(here insert full name and address or legal title of Owner)

As Obligee, hereinafter called Owner, for the use and benefit of claimants as hereinbelow defined, in the amount of _____ **Dollars \$** _____

For the payment whereof Principal and Surety bind themselves, their heirs, executors, administrators, successors and assigns, jointly and severally, firmly by these presents.

WHEREAS,

Principal has by written agreement dated _____

(here insert full name, address and description of project)

20____, entered into a contract with Owner for

In accordance with Drawings and Specifications prepared by

(here insert full name and address or legal title of Engineer/Architect)

which contract is by reference made a part hereof, and is hereinafter referred to as the Contract.

LABOR AND MATERIAL PAYMENT BOND

NOW, THEREFORE, THE CONDITION OF THIS OBLIGATION is such that, if Principal shall promptly make payment to all claimants as hereinafter defined, for all labor and material used or reasonably required for use in the performance of the Contract, then this obligation shall be void; otherwise it shall remain in full force and effect, subject, however, to the following conditions:

1. A claimant is defined as one having a direct contract with the Principal or with a Subcontractor of the Principal for labor, material, or both, used or reasonably required for use in the performance of the Contract, labor and material being construed to include that part of water, gas, power, light, heat, oil, gasoline, telephone service or rental of equipment directly applicable to the Contract.

2. The above named Principal and Surety hereby jointly and severally agree with the Owner that every claimant as herein defined, who has not been paid in full before the expiration of a period of ninety (90) days after the date on which the last of such claimant's work or labor was done or performed or materials were furnished by such claimant, may sue on this bond for the use of such claimant, prosecute the suit to final judgment for such sum or sums as may be justly due claimant, and have execution thereon. The Owner shall not be liable for the payment of any costs or expenses of any such suit.

3. No suit or action shall be commenced hereunder by any claimant:

a) Unless claimant, other than one having a direct contact with the Principal, shall have given written notice to any two of the following: the Principal, the Owner, or the Surety above named, within ninety (90) days after such claimant did or performed the last of the work or labor, or furnished the last of the materials for which said claim is made, stating with substantial

accuracy the amount claimed and the name of the party to whom the materials were furnished, or for whom the work or labor was done or performed. Such notice shall be served by mailing the same by registered mail or certified mail, postage prepaid, in an envelop addressed to the Principal Owner or Surety, at any place where an office is regularly maintained for the transaction of business, or served in any manner in which legal process may be served in the state in which the aforesaid project is located, save that such service need not be made by a public officer.

b) After the expiration of one (1) year following the date on which Principal ceased Work on said Contract, it being understood, however, that if any limitation embodied in this bond is prohibited by any law controlling the construction hereof such limitation shall be deemed to be amended so as to be equal to the minimum period of limitation permitted by such law.

c) Other than in a state court of competent jurisdiction in and for the county or other political subdivision of the state in which the Project or any part thereof, is situated, or in the United States District Court for the district in which the Project, or any part thereof is situated, and not elsewhere.

4. The amount of this bond shall be reduced by and to the extent of any payment or payments made in good faith hereunder, inclusive of the payment by Surety of mechanics' liens which may be filed of record against said improvement, whether or not claim for the amount of such lien be presented under and against this bond.

Signed and sealed this

day of

20

(Principal)

(Title)

(Surety)

(Title)

(Witness)

(Witness)

INSURANCE REQUIREMENTS

*

All insurance coverage shall be provided by the Contractor and by or for any of their Subcontractors at no additional expense to the City. The scope and limits of insurance coverages specified are the minimum requirements and shall in no way limit or exclude the City from requesting additional limits and coverage provided under the Contractor's policies and/or their Subcontractors' policies. The Contractor shall either require each of their Subcontractors to produce identical insurance coverage requirements as detailed hereinafter or the Contractor shall secure the coverage for all Subcontractors under the Contractor's own policies.

The Contractor and/or Subcontractors shall be responsible for maintaining the stated insurance coverage in force for the life of the Contract with insurance carriers licensed and authorized to underwrite such insurance in the State of Connecticut. (Insurance carriers shall be rated A or higher by AM Best Co.)

The type and limits of insurance coverage shall not be less than the type and limits designated herein, and the Contractor and/or Subcontractors agree that the coverage or the acceptance by the City of Certificates of Insurance indicating the type and limits of insurance shall in no way limit the liability of the Contractor and/or subcontractor to any such type and limits of insurance coverage.

The insurance coverage hereinafter afforded by the Contractor and/or subcontractor shall be primary insurance, except when stated to apply in excess of or contingent upon the absence of other insurance. The amount and type of insurance shall not be reduced by the existence of other insurance's held by the City.

The Contractor and/or Subcontractor shall provide coverage's that are not impaired or the aggregate is not to be impaired by any other risk, past or present, and the limits required, shall be fully available to the City of Meriden or restored if depleted below the required levels during the course of the contract and/or any extensions thereto.

The Contractor and/or Subcontractor shall not commence work under the terms of this contract until they have obtained the liability insurance coverage required by this article and has filed Certificates of Insurance on same with the City, and the City has approved the Certificates of Insurance and the represented coverage.

Each Certificate of Insurance shall include the following pertinent information:

- Name of Insurance Carrier writing policy
- Name Insured
- Address of Named Insured
- Description of coverage (Workers' Compensation certificates should evidence the state(s) of operation including Connecticut)
- Policy Periods (effective and expiration dates)
- Limits of liability and terms
- Brief description of operations performed and property covered
- Name and address of certificate holder
- Authorized agent's name and address
- Date and signature of the issuing agent (original only)
- All additional named insured endorsement
- All cross liability endorsements
- All indemnification and hold harmless agreements (must be supported by Contractual Liability Insurance)

Each insurance policy (with the exception of OCP shall contain an endorsement naming the City as an Additional Insured, evidence of a Cross Liability endorsement so that each insureds interests are considered and treated separately in the case of claims between the insureds. The Contractor shall provide 60 Day advance Notification** to the City in the event of any material change, modification, cancellation, or non-renewal of insurance coverage.**

**Amended 01/13/14

The Contractor and/or Subcontractors shall include a waiver of subrogation rights, on all insurance policies, so that the City of Meriden cannot be sued by the Contractor's insurer to recover any payments made on behalf of the Contractor and/or Subcontractor.

All insurance policies provided by the Contractor and/or Subcontractors shall include an endorsement indicating that any breach of warranty, by the named insured, will not be imputed to another insured.

During the course of execution of the work, whenever there is a lapse in the insurance requirements as stated herein, through cancellation, expiration, failure to renew , or any other cause, the City shall order the cessation of all activities** until such time as the insurance requirements are complied with. The Contractor shall have no claim or claims whatever against the City, or other parties to the contract.

**Amended 01/13/14

The Contractor and their Subcontractors shall indemnify and save harmless the City of Meriden, and all additional named insured and all appointed or elected officers, officials, directors, committee members, employees, volunteer workers, commissioners, and any affiliated, associated, or allied entities and/or bodies of, or as may be participated in by the City of Meriden, or as may now or hereinafter be constituted or established from and against all claims, damages, and losses and expenses including attorney's fees arising out of or resulting from the performance of the work under this contract, provided that any such claims, damage, loss or expense is attributable to bodily injury, sickness, disease or death, or to injury to, or destruction of tangible property, including the loss of use resulting therefrom; and is caused in whole or in part by any negligent or willful act or omission of the Contractor, and their Subcontractors, anyone directly or indirectly employed by any of them or anyone for whose acts any of them may be liable.

The Contractor and their Subcontractors shall, during the execution of the work, take necessary precautions and place proper guards for the prevention of accidents; shall set up all night suitable and sufficient lights and barricades; shall fully comply with the latest revisions of the Occupational Safety and Health Act of 1970 and all other Federal, State and Local Regulations, including any all amendments, revisions, and additions thereto, and shall indemnify and save harmless the City of Meriden and their additional named insured and their employees, officers, agents from any and all claims, suits, actions, fines, fees, damages, and costs to which they may incur by reason of death or injury to all persons and/or for all property damage of another resulting from non-compliance, unskillfulness, willfulness, negligence, or carelessness in the execution of the work, or in guarding or protecting the same, or from any improper methods, materials, implements or appliances used in execution of the work, or by or on account of any direct or indirect act or omission of the Contractor of their Subcontractors or their employees or agents.

The Contractor shall be responsible for initiating, maintaining, and supervising all safety precautions and programs in connection with the execution of the contract.

The Contractor shall take all reasonable precautions for the safety of, and shall provide all reasonable protection to prevent damage, injury, or loss to; 1) all employees on the work and all other persons who may be affected thereby; 2) all the work and all the materials and equipment to be incorporated therein, whether in storage in or on the site, under the care, custody, or control of the Contractor or any of their Subcontractors; and 3) other property at the site or adjacent thereto, including trees, shrubs, lawns, walks, pavements, roadways, structures, and utilities not designed for removal, relocation, or replacement in the course of construction.

The Contractor shall erect and maintain, as required by existing conditions and progress of the work, all reasonable safeguards for safety and protection, including posting danger signs and other warnings against hazards promulgating safety regulations and notifying owners and users of adjacent utilities.

The Contractor and/or subcontractor shall give all notices and comply with all applicable laws, ordinances, rules, regulations, and lawful orders for any public authority bearing on the safety of persons or property or their protection from damage, injury, or loss.

When The use or storage of explosives or other hazardous materials or equipment is necessary for the execution of work, the Contractor and/or their Subcontractors shall exercise the utmost care and shall carry on such activities under the supervision of properly qualified personnel.

The contractor shall designate a responsible member of their organization at the site whose duty shall be the prevention of accidents. This person shall be the Contractor's superintendent unless otherwise designated by the Contractor in writing to the City.

In any emergency affecting the safety of persons or property, the Contractor shall act to prevent threatened damage, injury, or loss.

The Contractor, Subcontractor, and their insurer(s) shall waive governmental immunity as a defense and shall not use the defense of governmental immunity in the adjustment of claims or in the defense of any suit, action or claim brought against the City. Nothing shall limit the City of Meriden from utilizing the defense of governmental immunity.

Contractor shall agree to maintain in force at all times during the contract the following minimum coverages and shall name the City Meriden as an Additional Insured on a primary and non-contributory basis to all policies except Workers Compensation. All policies should also include a Waiver of Subrogation. Umbrella/Excess shall state that it follows form over General Liability, Auto Liability and Workers Compensation. Insurance shall be written with Carriers approved in the State of Connecticut and with a minimum AM Best’s Rating of “A-“ VIII. In addition, all Carriers are subject to approval by the City of Meriden.

| | | (Minimum Limits) |
|---|---|------------------|
| General Liability | Each Occurrence | \$1,000,000 |
| | General Aggregate | \$2,000,000 |
| | Products/Completed Operations Aggregate | \$2,000,000 |
| Auto Liability | Combined Single Limit | |
| | Each Accident | \$1,000,000 |
| Umbrella (Excess Liability) | Each Occurrence | \$1,000,000 |
| | Aggregate | \$1,000,000 |
| Workers’ Compensation and Employers’ Liability | WC Statutory Limits | |
| | EL Each Accident | \$1,000,000 |
| | EL Disease Each Employee | \$1,000,000 |
| | EL Disease Policy Limit | \$1,000,000 |

Original, completed Certificates of Insurance must be presented to the City of Meriden prior to contract issuance. Contractor agrees to provide replacement/renewal certificates at least 60 days prior to the expiration date of the policies.

Article 6 Substitutes and “or equals”

Article 6.05.2.A – After Contractor add “or Owner”

Article 6.05.2.2E – Substitute Items - Add the words “If, in the owner’s opinion, the number of substitutions is excessive” after “reimburse Owner for the reasonable charges of Engineer for evaluating each such proposed substitutes”.

Add the following paragraph 6.09D:

The requirements of subparagraph 6.09 do not waive the Contractor’s responsibility of complying with the requirement of the Contract Documents when such regulations and requirements exceed those of any laws, ordinances, rules, regulations and orders of any public authority bearing the work.

Delete Article 6.10 in its entirety and substitute the following:

Under the terms of Regulation 16, referring to Contractors and Subcontractors issued by the State Tax Commission in administration of the State Sales and Use Tax, the Contractor may purchase materials or supplies to be consumed in the performance of this Contract without payment of Tax and shall not include in his Bid nor charge any Sales or Use Tax on any materials or labor provided.

Amend Article 6.12 to read:

“Contractor shall maintain in a safe place at the Site two (2) record copies...”

Add the following to article 6.13:

6.13.A.4 Protection in general shall consist of the following:

6.13.A.5 The Contractor shall furnish approved hard hats, other personal, protective equipment as required, approved first aid supplies, name of first aid attendant, and a posted list of emergency facilities.

6.13.A.6 The Contractor shall take prompt action to correct any hazardous conditions reported.

6.13.A.7 The Contractor shall be responsible for the adequate strength and safety of all scaffolding, staging and hoisting equipment, and for temporary shoring, bracing and tying.

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.

The Contractor shall be directly responsible for compliance therewith on the part of its 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 its agents, employees, material men or Subcontractors, to so comply.

The Contractor shall indemnify the Owner and the Engineer and save them harmless from any and all losses, costs and expenses, including fines and reasonable attorney’s fees incurred by the Owner and the Engineer 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.

6.16 Emergencies

Add 6.16.B – The Contractor shall provide the Owner with at least two (2) phone numbers in case of emergency.

Article 8 – Replacement of Engineer

Delete 8.02 in its entirety

8.06 – Insurance

8.06A – Delete Article 5, Add Supplemental General Conditions

Article 9 - Engineer's Status During Construction

Revise 9.03.B to read:

In addition to the Engineer, The Owner may employ a Clerk-of- the Works shall be authorized to observe all material, workmanship and equipment for compliance with the Contract Documents' requirements of tests and safety provisions, and report any variance to the Engineer. He shall have no authority to interpret, vary or suspend the requirements of the Contract.

The Clerk-of-the-Works will keep records of material deliveries, weather conditions and manpower; he will monitor compliance with the approved Construction Schedule and the Equal Employment Provisions.

The Contractor shall cooperate with the Clerk-of-the-Works in the performance of his duties, and shall provide access to all portions of the work and information required for his records. Any requests for modification of the Contract provisions or working procedures shall be reviewed with the project representative prior to making submittal(s) to the Engineer.

Cost of Work, Allowances; Unit Price Work

Article 11 is hereby modified as follows:

Add the following Articles:

11.03D Delete the entire paragraph and substitute the following:

It is understood and agreed that the prices bid for the various units of construction shall control in any Contract awarded hereafter. The City of Meriden reserves the right to revise the estimated quantities with no fixed limits set nor extra compensation allowed other than the above stated unit prices.

Article 12 – Change of Contract Price and Change of Contract Time

Add the following:

12.01.B.4 - The Contractor, when performing work under article 11.3.3 shall, upon request, promptly furnish in a form satisfactory to the Owner, itemized statements of the cost of the work so ordered, including, but not limited to, certified payrolls, and copies of accounts, bills and vouchers to substantiate the above estimates.

Add 12.04.1 -The Contractor guarantees that he can and will complete the work within the time specified or within the time as extended as provided elsewhere in the Contract Documents. Inasmuch as the damage and loss to the City of Meriden which will result from the failure of the Contractor to complete the work within the stipulated time will be most difficult or impossible of accurate assessment, the damages to the City for such delay and failure on the part of the Contractor shall be liquidated in the sum of \$250.00 each calendar day (Sundays and Holidays included) by which the Contractor shall fail to complete the work or any part thereof in accordance with the provisions hereof and such liquidated damages shall not be considered as a penalty. The City will deduct and retain out of any money due to become due hereunder, the amount of liquidated damages, and in case those amounts are less than the amount of liquidated damages, the Contractor shall be liable to pay the difference upon demand by the City.

Article 13 - Warranty and Guarantee; Tests and Inspections; Correction, Removal or Acceptance of Defective Work

Article 13.02 is modified to include the following:

The Contractor shall make every effort to minimize damage to all access routes, and he shall acquire all necessary permits for working in, on or from public streets or rights of way and for securing access rights of their own.

All costs of the removal and restoration to original condition of walls, fences and structures, utility lines, poles, guy wires or anchors, and other improvements required for passage of the Contractor's equipment shall be borne by the Contractor. The Contractor shall notify the proper authorities of the City and all utilities of any intended modifications or disruption to their property prior to the start of construction, and shall cooperate with them in the scheduling and performance of this operation.

Article 14 Payments to Contractor and Completion

Modify 14.02.D.4 to read:

Payments may be withheld to Contractors who are in default through debt or contract to the City.

14.07C – Change “thirty days” to “forty five (45) days”

Delete 14.09A in its entirety.

Article 15 Suspension of work and termination

Delete 15.03.3 in its entirety.

15.04B – Change 30 to 45 and change “30 days to pay” to 60.

SECTION 00 01 15 LIST OF DRAWING SHEETS

1.1 LIST OF DRAWING SHEETS

A. List of Drawings: Drawing consist of the following Contract Drawings:

SITE PLANS

| | | |
|----|------|--|
| 01 | -- | TITLE SHEET |
| 02 | IN | INDEX PLAN |
| 03 | EX-1 | EXISTING CONDITIONS |
| 04 | EX-2 | EXISTING CONDITIONS |
| 05 | RM-1 | SITE PLAN – REMOVALS |
| 06 | RM-2 | SITE PLAN – REMOVALS |
| 07 | LA-1 | SITE PLAN – LAYOUT |
| 08 | LA-2 | SITE PLAN – LAYOUT |
| 09 | GR-1 | SITE PLAN – GRADING |
| 10 | GR-2 | SITE PLAN – GRADING |
| 11 | UT-1 | SITE PLAN – UTILITIES |
| 12 | UT-2 | SITE PLAN – UTILITIES |
| 13 | SE-1 | SITE PLAN – SEDIMENT & EROSION CONTROLS |
| 14 | SE-2 | SITE PLAN – SEDIMENT & EROSION CONTROLS |
| 15 | SE-3 | SEDIMENT & EROSION CONTROL NOTES AND DETAILS |
| 16 | SD-1 | SITE DETAILS |
| 17 | SD-2 | SITE DETAILS |
| 18 | SD-3 | SITE DETAILS |
| 19 | SD-4 | SITE DETAILS |
| 20 | SD-5 | SITE DETAILS |
| 21 | SD-6 | CITY OF MERIDEN STANDARD DETAILS |
| 22 | ES-0 | ELECTRICAL SPECIFICATIONS, NOTES & ABBREVIATIONS |
| 23 | ES-1 | SITE ELECTRICAL DETAILS & SCHEDULES |
| 24 | ES-1 | SITE ELECTRICAL DETAILS |
| 25 | ES-2 | SITE ELECTRICAL PLAN |

END OF SECTION 00 01 15

SECTION 00 22 05 NOTICE TO CONTRACTOR – EXISTING SOILS

It is the intent of the project to keep all existing soils onsite. Shall it be determined that existing soils be removed from the site and disposed of in a legal manner, the Contractor shall in writing notify the owner a project engineer prior to removing soils from the property.

END OF SECTION 00 22 05

SECTION 00 22 10 NOTICE TO CONTRACTOR – SUBMITTALS FOR IMPORTED AGGREGATES

In accordance with the requirements in these special provisions the Contractor is hereby notified of the requirement to provide submittals that include tests on the gradation, abrasion, soundness and any other parameters specified for the various aggregate materials proposed for use on this project. The cost for such testing shall be the sole responsibility of the Contractor. The tests must be current and based on a specific source location/pile. No material shall be imported until the Engineer issues a written approval. The Contractor shall also provide testing and documentation of the imported and stockpiled material to confirm consistency with the approved submittals and compliance with these Special Provisions.

In addition to the above requirements, the contractor is notified of the following additional testing that is applicable to the dynamic stone to be used on the multipurpose field.

1. A sample of the stone, approximately one cubic foot, shall be delivered to the engineer along with submittals identified above.
2. Prior to the placement of the dynamic stone beneath the field, the contractor shall deliver the material and construct a 20' x 20' sample plot. The contractor will be responsible for providing a permeability test of the test plot in accordance with the specifications. The test plot shall remain in place during the placement of the stone.
3. The owner will arrange for a test of the material from the test plot for conformance with the approved submittal. The contractor should allow sufficient time to receive the test results prior to placement under the field.

END OF SECTION

SECTION 00 22 15 NOTICE TO CONTRACTOR – ANTICIPATED SOURCE OF MATERIAL – DYNAMIC STONE

Prior to the award of the Contract, the bidders may be requested to submit their proposed source of dynamic stone material, samples and testing results for the dynamic stone material, including but not limited to sieve analysis, resistance to abrasion, and soundness in conformance with the Special Provisions.

END OF SECTION

SECTION 00 45 13 - BIDDERS QUALIFICATIONS

In order to be considered for the project, the successful Bidder must demonstrate that they or their Subcontractor meets the following requirements:

- Successfully completed a minimum of five synthetic field installations of 75,000 square feet or greater since 2017.

The Contractor or Subcontractor with the above qualifications shall perform all the work required in Special Provisions, Section 32 18 13 Synthetic Turf Surfacing, and Section 33 46 00 Synthetic Turf Field Subsurface Drainage.

The Owner may make such investigations as it deems necessary to determine the ability of the bidder to perform the work, and the bidder shall furnish to the Owner all such information and data for this purpose as the Owner may request. The Owner reserves the right to reject any bid if the evidence submitted by, or investigation of, such bidder fails to satisfy the Owner that such bidder is properly qualified to carry out the obligations of the Contract and to complete the work contemplated therein.

END OF SECTION

01 11 00 - SUMMARY OF WORK

PART 1 - GENERAL

1.1 PROJECT/WORK IDENTIFICATION

- A. The name of the project is "**North End Field Ballfield Reconstruction**" and is located at **210 Britannia Street, Meriden, CT 06450**
- B. The Work of this Contract has been identified in this Project Manual and Project Drawings as prepared by **SLR International Corporation** dated: August 2022.

1.2 WORK COVERED BY CONTRACT DOCUMENTS

- A. The general intent of the Work is:
 - 1. Removals of existing site features including fencing, pavements, curbing, dugouts, buildings shall be performed by the Owner.
 - 2. Remove and retain the existing turf, clay infield materials, topsoil, subsoils as needed.
 - 3. Remove and replace existing subsurface storm drainage systems.
 - 4. Install concrete anchor curb with integral fencing and backstops, around the perimeter of the new field.
 - 5. Construct free-draining dynamic stone base(s).
 - 6. Furnish and install new synthetic turf and infill material(s)
 - 7. Install conduit and pull boxes for future site electrical items.
 - 8. **Alternate No. 1** – Furnish and install a post-tension concrete ½ basketball court, with concrete walks, and parking spaces along Locust Street.
 - 9. **Alternate No. 2** - Install scoreboards and electrical supply. Empty conduit and pull boxes shall be included in Base Bid.
 - 10. **Alternate No. 3** – Furnish and install 10'x12' prefabricated storage shed on gravel base in a location on site as directed by Owner.
 - 11. **Alternate No. 4** – Furnish and install (4) dugout shelters. Concrete pads and chain link fencing included in the project base bid.
 - 12. **Alternate No. 5** – Furnish and install parking lot shade trees and mulch.
 - 13. **Alternate No. 6** – Furnish and install bituminous concrete parking lot surfacing (processed aggregate base material included in project base bid.). Furnish and install all parking lot pavement markings.
- B. The following outline generally describes the proposed Scope of Work:
 - 1. **Demolition/site clearing:** Provide temporary erosion and sedimentation control measures. Remove and dispose of turf grass and stockpile all topsoil material for reuse of site. Remove and dispose of subsurface storm drainpipes.
 - 2. **Electrical:** Furnish and install conduit to vaults. Provide pull strings in all empty electrical conduit.

3. **Earthwork:** Shape and compact subgrade. Furnish and install geotextile fabric on subgrade beneath synthetic turf field. Place, shape and compact dynamic stone base(s) beneath synthetic turf field. Place, shape and compact stone base beneath surrounding pavements.
4. **Storm Drainage:** Furnish and install collector pipe in stone trench and tie into existing storm drainage systems. Furnish and install composite flat drains and connect into collector pipe. Replaced damaged pipes in existing perimeter drainage system as noted on the plans.
5. **Turf Improvements:** Furnish and install concrete turf anchor curb around the perimeter of each field. Furnish and install a geotextile fabric, synthetic turf grass surfacing, inlaid line work, and infill material(s). Supply field maintenance equipment and attic stock materials.
6. **Perimeter Improvements:** Furnish and install new perimeter chain link fencing and gates. Install new concrete curbing, walks and processed aggregate parking lot.
7. **Alternate No. 1** – Furnish and install a post-tension concrete ½ basketball court, with concrete walks, and parking spaces along Locust Street.
8. **Alternate No. 2** – Furnish and Install scoreboards and electrical supply.
9. **Alternate No. 3** – Furnish and install 10'x12' prefabricated timber storage shed on gravel base.
10. **Alternate No. 4** – Furnish and install (4) dugout shelters. Concrete pads and chain link fencing included in the project base bid.
11. **Alternate No. 5** – Furnish and install parking lot shade trees and mulch.
12. **Alternate No. 6** – Furnish and install bituminous concrete parking lot surfacing (processed aggregate base material included in project base bid.). Furnish and install all parking lot pavement markings.

C. Construct Work under a fixed price contract.

1.3 COORDINATION

- A. General Contractor shall coordinate Work of the various Sections of Specifications to assure efficient and orderly sequence of installation of construction elements, with provisions for accommodating items installed later.
- B. Verify characteristics of elements of interrelated operating equipment are compatible; coordinate Work of various Sections having interdependent responsibilities for installing, connecting to, and placing in service, such equipment.

1.4 OWNER OCCUPANCY

- A. Owner will occupy areas outside of the project site.

PART 2 – PRODUCTS - (Not Used)

PART 3 – EXECUTION -(Not Used)

END OF SECTION 01 11 00

01 23 00 - ALTERNATES

PART 1 - GENERAL

1.1 REQUIREMENTS INCLUDED

- A. Identification and description of Alternate Work.

1.2 DESCRIPTION OF REQUIREMENTS

- A. "Alternates" are defined as alternate products, materials, equipment, systems, methods, units of work or major elements of the construction, which may, at Owner's option, and under terms established by Instructions to Bidders and in the Contract or Agreement, be selected for the Work in lieu of corresponding requirements of Contract Documents. Alternates may or may not change the scope and general character of the Work substantially. Requirements of this section may be related to "allowances," "unit prices," "change orders," "substitutions," and similar provisions.
- B. Refer to the Contract or "Owner-Contractor Agreement," and subsequent modifications thereof, if any, for determination of which of the several scheduled "Alternates" herein have been accepted, and therefore are in full force and effect as though included originally in the contract documents of the base bid.
- C. Coordinate related work and modify surrounding work as required to complete the Work, including changes under each alternate, when acceptance is designated in the Owner-Contractor Agreement.
- D. Immediately following award of Contract, prepare and distribute to each entity to be involved in performance of the Work, a notification of status of each alternate. Indicate which Alternates have been:
 - 1. Accepted
 - 2. Rejected
 - 3. Deferred for consideration at a later date as indicated. Include full description of modifications to alternates, if any.

PART 2 - PRODUCTS

2.1 GENERAL REQUIREMENTS OF ALTERNATES

- A. Description for each Alternate is recognized to be abbreviated and incomplete. Each change in execution must be complete for the scope of Work affected. Refer to the Specification Sections and Drawings, for specific requirements of the Work, regardless of whether references are so noted in description of each alternate. Coordinate related work and modify surrounding work as required to properly integrate with the Work of each alternate. It is recognized that descriptions of alternates are primarily scope

definitions, and do not necessarily detail full range of materials and processes needed to complete the work as required.

2.2 DESCRIPTION OF ALTERNATES

- A. **Alternate No. 1:**
Furnish and install a post-tensioned concrete basketball court, with hoop, concrete walks, concrete curbing, and bituminous concrete parking spaces along Locust Street and shown on the drawings and details.
- B. **Alternate No. 2:**
Furnish and install scoreboards, steel supports, concrete foundations and electrical supply as shown on the drawings and details.
- C. **Alternate No. 3:**
Furnish and install 10'x12' prefabricated storage shed on 10" processed aggregate base in a location to be determined by owner and landscape architect. Basis of design: Klotter Farms 10' x 12' Vinyl Cape #6791 or approved equal. Color: t.b.d. by Owner.
- D. **Alternate No. 4:**
Furnish and install (4) dugout shelters. Concrete pads and chain link fencing included in the project base bid.
- E. **Alternate No. 5:**
Furnish and install parking lot shade trees and mulch.
- F. **Alternate No. 6:**
Furnish and install bituminous concrete parking lot surfacing (processed aggregate base material included in project base bid.). Furnish and install all parking lot pavement markings.

PART 3 - EXECUTION

(Not Used)

END OF SECTION 01 23 00

01 30 00 - PROJECT ADMINISTRATION

PART 1 - GENERAL

1.1 PRECONSTRUCTION CONFERENCE

- A. Prior to commencing the Work, a pre-construction conference will be held at the site. The Owner's Representative, General Contractor, and major sub-contractors shall attend this meeting.
- B. The Owner's Representative shall prepare the agenda, which shall include:
 - 1. Submittals - those received prior to the conference and those due at the conference. Any necessary discussion covering future submittals will be covered at this time, including the requirement for maintaining and submitting record drawings. At a minimum, the following submittals will be discussed:
 - a. Certificate of Insurance
 - b. Labor and Material Payment Bond
 - c. Construction Schedule
 - d. Submittal Schedule
 - e. Schedule of Values
 - f. Approved Applicator Certificates
 - g. Record Drawings
- C. Review the General Contractors Proposed Construction Schedule and proposed workforce size.
- D. Review final list of subcontractors and material suppliers.
- E. Review the Contract Documents to resolve errors, omissions, or inconsistencies discovered.
- F. Review job conditions, including:
 - 1. Work by other contractors
 - 2. Owner/Public occupancy during construction
 - 3. Hours of work
 - 4. Maintenance of exits and building security
 - 5. Contractor access and use area; Material Storage and refuse areas
 - 6. Protection of existing surfaces, finishes, displays
 - 7. Protection of building environment (dust)
 - 8. Weather protection procedures
 - 9. Landscape protection
- G. Review planned use of Owner's facilities, such as parking lots and driveways. Confirm Owner's requirements for scheduling such use and protecting the facilities from damage.

- H. Review Owner's project requirements
- I. Security procedures
- J. Confirm communications network
 - 1. General Contractor shall provide contact numbers for all key personnel.
 - 2. General Contractor shall note hierarchy of personnel contacts, should there be an emergency.
- K. Personnel identification
- L. Parking assignments
- M. Review material handling procedures such as:
 - 1. Methods of transport and disposal of demolished materials
 - 2. Locations of refuse receptacles
 - 3. Delivery dates of materials
 - 4. Storage and protection of materials delivered to the site
- N. Discuss project administration procedures
- O. Provisions for Owner's access to the work
- P. Frequency, time, and location of project meetings.
- Q. Definition of "project completion" AND "substantial completion" which determines when the contractor is eligible to make closeout submittals.
- R. Minutes of this meeting will be taken by the Owner's Representative, who will reproduce and distribute them to parties in attendance.

1.2 PRE-CONSTRUCTION DOCUMENTATION

- A. Submit photographs or videos for Owner's record of any existing condition the General Contractor feels necessary to document prior to the start of construction activities. Damages not documented will be assumed to be the result of construction activities.

1.3 PROGRESS MEETINGS

- A. Meetings will be held regularly to review the Work in progress. Mandatory attendance will be required by the General Contractor, and the Owner's representative. Attendance by installing subcontractors, or product representatives, may be requested based on the phase of the Work.
- B. The General Contractor will prepare the agenda for the meeting, preside over it, record, reproduce and distribute the minutes.

- C. The Agenda may include:
1. Review and approval of preceding minutes
 2. Review of work progress since last meeting
 3. Compliance of the work with the Contract Documents
 4. Problems that may impede progress and procedures to maintain schedule.
 5. Discussion of Work planned to be done before next meeting
 6. Schedule pre-installation conferences.
 7. Discuss findings or action items identified in previous pre-installation conferences.
 8. Review delivery schedules.
 9. Review proposed changes
 - a. review submittal status
 - b. Review applications and payments
 10. Other business

1.4 JOB SITE ADMINISTRATION

- A. The Owner may have a Project Representative present at the site while the Work is in progress. The duties of such representative shall be as assigned by the Owner, and identified in the Documents portion of the Project Manual.
- B. The Contractor shall provide ready and easy access for the Representative, and the Owner to all parts of the Work, whenever and wherever it is in progress, including the provision of safety equipment of first quality and in excellent condition.
- C. Failure to provide access may result in rejection of that portion of the Work to which access has been denied.

PART 2 - PRODUCTS

(Not Used)

PART 3 - EXECUTION

(Not Used)

END OF SECTION 01 30 00

01 50 00 - TEMPORARY FACILITIES AND CONTROLS

PART 1 - GENERAL

1.1 TEMPORARY UTILITIES

- A. Electricity: The Owner's existing 110-volt convenience outlets are available for the Contractors' use. Cooperate with the Project Manager to identify circuits for construction activities. Verify grounding requirements. Verify that the capacity of the circuit will sustain the anticipated tool loads. Do not overload single outlets with multiple outlet taps. Use multiple circuits or local over current devices.
- B. Provide artificial lighting for construction operations when natural or ambient light is not adequate for work. Light values shall be adequate for the task in progress. Maintain required illumination levels during critical procedures and installations. Provide supplemental light at hazards.
- C. Existing and permanent lighting may be used during construction. Maintain lighting and make routine repairs. Prior to Substantial completion, replace lamps with those of specified configuration, voltage and color characteristics.
- D. Do not use devices which produce open flame or smoke. Do not store fuels indoors or adjacent to occupied buildings. Maintain limited quantities of fuel. Store in listed, approved containers.
- E. Do not operate permanent equipment or facilities for temporary purposes without prior approval. Verify that installation is approved for operation, and that filters are in place. Provide and pay for operation, maintenance, and fuel consumed. The warranty date shall reflect the date of final acceptance rather than the "in service" date.

1.2 WATER

- A. Water will be made available by the Owner, at no expense to the Contractor, from existing outlets at the pressure available. Make connections to existing facilities using back-flow protection. Extend branch piping with outlets located so that water is available by use of hoses. Take measures to conserve water.

1.3 PROTECTION OF EXISTING FACILITIES

- A. Note pre-existing damage to areas adjacent to Project Area, and areas which must be traversed to access the Work. Review existing conditions as well as proposed methods of temporary protection at pre-construction conference.
- B. Provide barriers required to prevent public access to construction areas, to provide for Owner's use of site and extensive public access, and to protect existing facilities and adjacent properties from damage from construction operations. Where barriers or enclosures face Owner occupied areas, paint as directed by the Project Manager.

- C. Maintain egress routes from Owner's operations.
- D. Protect existing surfaces and finishes designated to remain. Provide covers, pads, and draping to resist Work related abuse. Restore finishes which have been damaged or made unsightly.
- E. Identify and protect existing utilities. Confer with respective utility company when exposed connections are within potential contact area of construction activities. Take necessary protective action as work of this Contract.
- F. When excavation is required, request review and clearance from School's facilities department.
- G. Provide protection for landscape and grounds within and adjacent to Project Area.
- H. Protect walkways and curbs where vehicles are expected to cross or park. Use planking or sheet materials to evenly distribute loads from wheels and stabilizers. Take measures to prevent staining or chipping. Restore paving where damaged or made unsightly by construction activities.
- I. Control water and site drainage. When altering discharge or drainage patterns, provide positive means of directing water to prevent nuisance as well as hazardous conditions.
- J. Do not permit effluent produced as a result of construction activities to drain onto plantings, landscape features or into storm drains.
- K. Protect trees, shrubs and plantings according to the likely hazard.
- L. Proposed protection techniques shall be submitted for review. Proceed only according to approved methods. If protection requirements are not clear, confer with the Project Manager and proceed as directed.
- M. Do not use trees as construction aids. Do not restrain temporary braces or guy against trees. Pile material well beyond drip lines.
- N. Avoid using lawns for parking, material storage, stockpiling debris, or discharging waste liquids. Restore lawn areas damaged by construction activities:
 - 1. Replace contaminated soils.
 - 2. Regrade to original contour.
 - 3. Seed or sod to match adjacent undamaged area.
- O. Heal in plantings removed during construction as soon as feasible.
- P. Protect installed Work from damage caused by construction operations. Limit traffic on finished surfaces.
- Q. Comply with the Owner' basic security requirements:

1. Contractors' forces shall remain within the limits of the designated Project Area. Unauthorized exploration outside of the limits of the Project Area may be interpreted as trespass by the School.
2. The Superintendent or other specifically designated individual shall be responsible for distributing and collecting keys to limited access areas each day. Maintain a log of key distribution.
3. Advise contractors' forces on-site of appropriate standards of conduct. Persistent use of profanity or comments directed at individuals outside the work force may be interpreted as harassment or disorderly conduct by the School.
4. At pre-construction conference, the Project Manager will cooperate in identifying areas available for material and tool storage. These areas will be incorporated into the Project Area, and secured by the Contractor.
5. Disable or remove material handling equipment.
6. Maintain perimeter security. When it becomes necessary to prop open gates or doors which are normally locked, co-ordinate with School's security to provide continuous supervision of area until doors or gates can be closed, and normal security is re-established.

1.4 CONSTRUCTION AIDS

- A. Provide lifting devices and qualified operators necessary for the efficient movement of materials.
- B. Provide construction aids and equipment required by personnel and to facilitate execution of the Work.

1.5 CLEANING DURING CONSTRUCTION

- A. The General Conditions require that the Project Area be kept clean. Control accumulation of waste materials and rubbish. Remove combustible debris and food waste daily. Provide carting service to regularly dispose of construction refuse in a lawful manner. Where hazardous materials are removed, submit copies of landfill receipts. Do not use School dumpsters.
- B. Clean interior areas prior to start of each phase of work. Maintain areas free of dust and other contaminants during finishing operations.
- C. Make provisions to keep streets and drives in the area of construction free of accumulation of mud, clay, gravel, and any other materials which vehicles or equipment may track or scatter onto these surfaces.
- D. No burning, burying or disposal of rubbish or debris at the job site will be permitted.

1.6 PROJECT IDENTIFICATION

- A. Not applicable.

1.7 ROADS AND DUMPSTERS

- A. At the pre-construction conference discuss vehicular access requirements and curbside dumpster location. Repair damage caused by contractors' equipment. Post signs or other warning devices where hazards may be created by poor visibility or new traffic patterns.

1.8 PARKING

- A. Parking is available on site. Cooperate with Owner in identifying and maintaining location for contractor parking.

PART 2 - PRODUCTS

(Not used)

PART 3 - EXECUTION

(Not used)

PART 4 - SCHEDULES AND FORMS

(Not used)

END OF SECTION 01 50 00

01 73 00 -EXECUTION

PART 1 - GENERAL

1.1 SUMMARY

- A. Section includes general administrative and procedural requirements governing execution of the Work including, but not limited to, the following:
 - 1. Construction layout.
 - 2. Field engineering and surveying.
 - 3. Installation of the Work.
 - 4. Progress cleaning.
 - 5. Protection of installed construction.
 - 6. Correction of the Work.

- B. Related Sections:

(Not Used)

PART 2 - PRODUCTS

2.1 MATERIALS

- A. General: Comply with requirements specified in other Sections.

- B. In-Place Materials: Use materials for patching identical to in-place materials.

PART 3 - EXECUTION

3.1 EXAMINATION

- A. Existing Conditions: The existence and location of underground utilities and construction indicated as existing are not guaranteed.

- B. Examination and Acceptance of Conditions: Before proceeding with each component of the Work, examine substrates, areas, and conditions, with Installer present where indicated, for compliance with requirements for installation tolerances and other conditions affecting performance. Record observations.
 - 1. Verify compatibility with and suitability of substrates, including compatibility with existing finishes.
 - 2. Examine baser suitable conditions where products and systems are to be installed.

3. Proceed with installation only after unsatisfactory conditions have been corrected. Proceeding with the Work indicates acceptance of surfaces and conditions.

3.2 PREPARATION

- A. Field Measurements: Take field measurements as required to fit the Work properly. Recheck measurements before installing each product.
- B. Space Requirements: Verify space requirements and dimensions of items shown diagrammatically on Drawings.
- C. Review of Contract Documents and Field Conditions: Immediately on discovery of the need for clarification of the Contract Documents caused by differing field conditions outside the control of the Contractor, submit a request for information to Owner.

3.3 INSTALLATION

- A. General: Locate the Work and components of the Work accurately, in correct alignment and elevation, as indicated.
- 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. 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.
- F. Attachment: Provide solid blocking and attachment plates and anchors and fasteners of adequate size and number to securely anchor each component in place, accurately located and aligned with other portions of the Work.
- G. Hazardous Materials: Use products, and installation materials that are not considered hazardous.

3.4 PROGRESS CLEANING

- A. General: Clean Project site and work areas daily, including common areas. Enforce requirements strictly. Dispose of materials lawfully.
- 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. Exposed Surfaces in Finished Areas: Clean exposed surfaces and protect as necessary to ensure freedom from damage and deterioration at time of Substantial Completion.
- F. Waste Disposal: Do not bury or burn waste materials on-site. Do not wash waste materials down sewers or into waterways.
- G. 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.
- H. 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.
- I. Limiting Exposures: Supervise construction operations to assure that no part of the construction, completed or in progress, is subject to harmful, dangerous, damaging, or otherwise deleterious exposure during the construction period.

3.5 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.

3.6 CORRECTION OF THE WORK

- A. Repair or remove and replace defective construction. Restore damaged substrates and finishes.
 - 1. Repairing includes replacing defective parts, refinishing damaged surfaces, touching up with matching materials, and properly adjusting operating equipment.
- B. Remove and replace damaged surfaces that are exposed to view if surfaces cannot be repaired without visible evidence of repair.

END OF SECTION 01 73 00

01 74 19 - CONSTRUCTION WASTE MANAGEMENT AND DISPOSAL

PART 1 - GENERAL

1.1 RELATED DOCUMENTS

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

1.2 SUMMARY

- A. Section includes administrative and procedural requirements for the following:
 - 1. Recycling nonhazardous demolition and construction waste.
 - 2. Disposing of nonhazardous demolition and construction waste.
- B. Related Sections:
 - 1. Division 31 Section "Site Clearing" for disposition of waste resulting from site clearing and removal of above- and below-grade improvements.

1.3 DEFINITIONS

- A. Construction Waste: Building and site improvement materials and other solid waste resulting from construction, remodeling, renovation, or repair operations. Construction waste includes packaging.
- B. Demolition Waste: Building and site improvement materials resulting from demolition or selective demolition operations.
- C. Disposal: Removal off-site of demolition and construction waste and subsequent sale, recycling, reuse, or deposit in landfill or incinerator acceptable to authorities having jurisdiction.
- D. Recycle: Recovery of demolition or construction waste for subsequent processing in preparation for reuse.
- E. Salvage: Recovery of demolition or construction waste and subsequent sale or reuse in another facility.
- F. Salvage and Reuse: Recovery of demolition or construction waste and subsequent incorporation into the Work.

1.4 PERFORMANCE REQUIREMENTS

- A. General: Use all reasonable means to divert construction and demolition waste from landfills and incinerators. Facilitate recycling and salvage of materials, including the following:

1. Demolition Waste:
 - a. Bituminous concrete pavement
 - b. Concrete
 - c. Chain link fencing
 - d. Skinned infield mix
 - e. Turf grass

2. Construction Waste:
 - a. Site-clearing waste.
 - b. Packaging: Regardless of salvage/recycle goal indicated in paragraph above, salvage or recycle 100 percent of the following uncontaminated packaging materials:
 - 1) Paper.
 - 2) Cardboard.
 - 3) Boxes.
 - 4) Plastic sheet and film.
 - 5) Polystyrene packaging.
 - 6) Wood crates.
 - 7) Plastic pails.

PART 2 - PRODUCTS

(Not Used)

PART 3 - EXECUTION

3.1 IMPLEMENTATION

- A. General: Implement waste management plan. Provide handling, containers, storage, signage, transportation, and other items as required to implement waste management plan during the entire duration of the Contract.
 1. Comply with Division 01 Section "Temporary Facilities and Controls" for operation, termination, and removal requirements.

- B. Site Access and Temporary Controls: Conduct waste management operations to ensure minimum interference with roads, streets, walks, walkways, and other adjacent occupied and used facilities.

3.2 RECYCLING DEMOLITION AND CONSTRUCTION WASTE, GENERAL

- A. General: Recycle paper and beverage containers used by on-site workers.

- B. Preparation of Waste: Prepare and maintain recyclable waste materials according to recycling or reuse facility requirements. Maintain materials free of dirt, adhesives, solvents, petroleum contamination, and other substances deleterious to the recycling process.
- C. Procedures: Separate recyclable waste from other waste materials, trash, and debris. Separate recyclable waste by type at Project site to the maximum extent practical.

3.3 RECYCLING CONSTRUCTION WASTE

- A. Packaging:
 - 1. Cardboard and Boxes: Break down packaging into flat sheets. Bundle and store in a dry location.
 - 2. Polystyrene Packaging: Separate and bag materials.
 - 3. Pallets: As much as possible, require deliveries using pallets to remove pallets from Project site. For pallets that remain on-site, break down pallets into component wood pieces and comply with requirements for recycling wood.
 - 4. Crates: Break down crates into component wood pieces and comply with requirements for recycling wood.
- B. Wood Materials:
 - 1. Clean Cut-Offs of Lumber: Grind or chip into small pieces.

3.4 DISPOSAL OF WASTE

- A. General: Except for items or materials to be salvaged, recycled, or otherwise reused, remove waste materials from Project site and legally dispose of them in a landfill or incinerator acceptable to authorities having jurisdiction.
 - 1. Except as otherwise specified, do not allow waste materials that are to be disposed of accumulate on-site.
 - 2. Remove and transport debris in a manner that will prevent spillage on adjacent surfaces and areas.
- B. Burning: Do not burn waste materials.
- C. Disposal: Transport waste materials off Owner's property and legally dispose of them.

END OF SECTION 01 74 19

01 77 00 - CLOSEOUT PROCEDURES

PART 1 - GENERAL

1.1 REQUIREMENTS

- A. Administrative Procedures.
- B. Project Record Documents.
- C. Operation and Maintenance Data.
- D. Warranties and Bonds.
- E. Spare Parts and Maintenance Materials.
- F. Post Construction Inspection.
- G. Final Cleaning.

1.2 DEFINITION

- A. Closeout is defined to include general requirements near the end of Contract Time, in preparation for final acceptance, final payment, normal termination of contract, occupancy by Owner and similar actions evidencing completion of the work. Specific requirements for individual units of work are specified in sections of Division 2 through 32. Time of closeout is directly related to "Substantial Completion", and therefore may be either a single time period for the entire Work, or a series of time periods for individual parts of the Work which have been certified as substantially complete at different dates. That time variation (if any) shall be applicable to other provisions of this section.

1.3 PREREQUISITES TO SUBSTANTIAL COMPLETION

- A. In addition to the requirements of the General Conditions for certification of Substantial Completion, (for either the entire Work or for agreed portions of the Work), complete the following, and list known exceptions in request:
 - 1. Cooperate with Project Manager and coordinate access for Owner, such as:
 - a. Complete personnel training for equipment or systems that require such training as a condition of warranty.
 - b. Submit Manuals or maintenance data for Work under warranty at Substantial Completion.

1.4 SUBSTANTIAL COMPLETION

- A. Within ten (10) days following receipt of Contractor's request for substantial completion inspection, the Owner will either proceed with inspection or advise Contractor of prerequisites not fulfilled.
- B. Following initial inspection, the Owner will either authorize Certificate of Substantial Completion, or advise Contractor of Work which must be performed prior to issuance of certificate; and repeat inspection when requested and assured that work has been substantially complete. Results of completed inspection will form initial "punch list" for final acceptance.
- C. Should the Owner consider that Work is substantially complete, the Contractor shall prepare, and submit to Owner a list of items to be completed or corrected, as determined by the inspection.
- D. Complete work listed for completion or correction, within designated time.
- E. Should the Owner consider that work list is not substantially complete, he shall notify Contractor in writing stating reasons.
- F. Complete work, and send second written notice to Owner certifying that Project, or designated portion of Project, is substantially complete.
- G. Landscape Architect will re-inspect work.

1.5 PREREQUISITES TO FINAL ACCEPTANCE

- A. In addition to the requirements of the General Conditions, submit Prior to requesting Owner's final inspection for certification of final acceptance and final payment, as required by General Conditions, complete the following and list known exceptions (if any) in request:
- B. Submit certified copy of Owner's final punch list of itemized work to be completed or corrected, stating that each item has been completed or otherwise resolved for acceptance.
- C. Submit record drawings, maintenance manuals, final project photographs, specific warranties, workmanship/maintenance bonds, maintenance agreements, final certifications and similar record documents as specified herein. Record drawings to be submitted within 15 days after Substantial Completion.
- D. Complete final clean up requirements as specified herein, including touch up of marred surfaces.
- E. Deliver extra stocks of materials, and similar physical items to Owner.
- F. Make final changeover of locks and transmit keys to Owner, and advise Owner's personnel to change over in security provisions.

1.6 FINAL ACCEPTANCE

- A. Within ten (10) days following receipt of contractor's notice that the work has been completed, including "punch list" items from earlier inspections, Owner will re-inspect the work. Upon completion of re-inspection Owner will either notify Contractor in writing of work not completed or obligations not fulfilled as required for final acceptance of request Contractor submit evidence of payments, release of liens and final application for payment as an indication of final acceptance.
- B. Contractor shall take immediate steps to remedy the stated deficiencies, and send second written notice to Owner certifying that work is complete and Owner will re-inspect work.
- C. A maximum of two final inspections shall be permitted.

1.7 FINAL APPLICATION FOR PAYMENT

- A. Contractor shall submit final application in accordance with requirements of General and Supplementary Conditions and as herein before specified.

1.8 FINAL CLEANING

- A. General Cleaning during progress of work is specified in the General Conditions.
- B. Execute final cleaning prior to final inspection.

PART 2 - PROJECT RECORD DOCUMENTS

2.1 RECORD COPIES

- A. Record copies are defined to include those documents or copies relating directly to performance of the work, which Contractor is required to prepare or maintain for Owner's records, recording the work as actually performed. In particular, record copies show changes in the work in relation to the way in which specified by original contract documents; and show additional information of value to Owner's records, but not indicated by original contract documents. Record documents include: prepared drawings (if any are specified), marked up copies of shop drawings, marked up copies of specifications, addenda and change orders, marked up product data submittals, record samples, field test reports, Inspection Certificates, Manufacturer's Certificates, and miscellaneous record information on work which is otherwise recorded only schematically or not at all. Label each record document "PROJECT RECORD" in one (1) inch high printed letters.
- B. Maintain documents in clean, dry, legible condition and do not use record documents for construction purposes.
- C. Record documents shall be available at all times for inspection by Owner.

- D. Keep documents current; do not permanently conceal any work until required information has been recorded on the documents.
- E. At Contract closeout, submit documents with transmittal letter containing date, Project title, Contractor's name and address, list of documents, and signature of Contractor.
- F. Provide both electronic and paper copies of all required documents.

2.2 RECORD DRAWINGS

- A. During progress of work maintain two (2) sets of contract drawings, shop drawings, and any special drawings with mark up of actual installation that vary substantially from the work as originally shown.
- B. Mark whatever drawing is most capable of showing actual physical condition, fully and accurately.
- C. Submit Record Drawings to Landscape Architect not more than 2 weeks after Substantial Completion.

2.3 RECORD SPECIFICATION

- A. During progress of the work, maintain two (2) copies of specifications, including addenda, change orders and similar modifications issued in printed form during construction, and mark up variations (of substance) in actual work in comparison with text of specifications and modifications as issued. Give particular attention to substitutions, selection of options, and similar information on work where it is concealed or cannot otherwise be readily discerned at a later date by direct observation. Note related record drawing information and product data, where applicable.

2.4 RECORD MANUFACTURER'S PRODUCT DATA

- A. During progress of the work, maintain one copy of each product data submittal, and mark up significant variations in the actual work comparison with submitted information. Include both variations in product as delivered to site, and variations from manufacturer's instructions and recommendations for installation. Give particular attention to concealed products and portions of the work that cannot otherwise be readily discerned at a later date by direct observations.
- B. Note related change orders and mark up of record drawings and specifications.

2.5 OPERATION AND MAINTENANCE DATA

- A. Provide data for:
 - 1. Products specified in individual Specification Sections.
- B. Submit two sets prior to final inspection, bound in 8 1/2 x 11 inch three ring side binders with durable plastic covers.

- C. Provide a separate volume for each system, with a table of contents and index tabs for each volume.
 - 1. Part 1: Directory, listing names, addresses, and telephone numbers of: Contractor.
 - 2. Part 2: Operation and maintenance instructions, arranged by Specification Division. For each Specification Division, give names, addresses, and telephone numbers of Subcontractors and suppliers. List:
 - 3. Appropriate design criteria.
 - 4. List of equipment.
 - 5. Parts list.
 - 6. Operating instructions.
 - 7. Maintenance instructions, equipment.
 - 8. Maintenance instructions, finishes.
 - 9. Shop drawings and product data.
 - 10. Warranties.

- D. Arrange for each installer of work requiring continuing maintenance or operation, to meet with Owner's personnel, at project site, to provide basic instructions needed for proper operation and maintenance of entire work. Include instructions by manufacturer's representatives where installer is not an expert in the required procedures. Review maintenance manuals, record documentation, tools, spare parts and materials, hazards, cleaning and similar procedures and facilities. Review maintenance and operations in relations with applicable warranties, agreements to maintain bonds, and similar continuing commitments.

2.6 WARRANTIES AND BONDS

- A. Provide duplicate, notarized copies. Execute Contractor's submittals and assemble documents executed by Subcontractors, suppliers, and manufacturers. Provide table of contents and assemble in binder with durable plastic cover.

- B. Submit material prior to final application for payment. For equipment put into use with Owner's permission during construction, submit within ten (10) days after first operation. For items of Work delayed materially beyond date of Substantial Completion, provide updated submittal within ten days after acceptance, listing date of acceptance as start of warranty period.

2.7 SPARE PARTS AND MAINTENANCE MATERIALS

- A. Provide products, spare parts, and maintenance materials in quantities specified in each Section, in addition to that used for construction of Work. Coordinate with Owner, deliver to Project site and obtain receipt prior to final payment.

2.8 POST CONSTRUCTION INSPECTION

- A. Prior to expiration of one year from Date of Substantial completion, Landscape Architect/engineer will make visual inspection of Project in company with Owner and

Contractor to determine whether correction of work is required, in accordance with provisions of General Conditions.

- B. Owner will promptly notify Contractor, in writing, of any observed deficiencies.

PART 3 - PRODUCTS

(Not Used)

END OF SECTION 01 77 00

01 78 10 - PROJECT RECORD DOCUMENTS

PART 1 - GENERAL

1.1 SUMMARY

- A. This Section includes administrative and procedural requirements for Project Record Documents, including the following:
 - 1. Record Drawings.
 - 2. Record Specifications.
 - 3. Record Product Data.
- B. See Divisions 2 through 33 Sections for specific requirements for Project Record Documents of the Work in those Sections.

1.2 SUBMITTALS

- A. Record Drawings: Comply with the following:
 - 1. Number of Copies: Submit (1) set of marked-up Record Prints.
- B. Record Specifications: Submit (1) copy of Project's Specifications, including addenda and contract modifications.
- C. Record Product Data: Submit (1) copy of each Product Data submittal.

PART 2 - PRODUCTS

2.1 RECORD DRAWINGS

- A. Record Prints: Maintain one set of blue- or black-line white prints of the Shop Drawings.
 - 1. Preparation: Mark Record Prints to show the actual installation where installation varies from that shown originally. Require individual or entity who obtained record data, whether individual or entity is Installer, subcontractor, or similar entity, to prepare the marked-up Record Prints.
 - a. Give particular attention to information on concealed elements that would be difficult to identify or measure and record later.
 - b. Record data as soon as possible after obtaining it. Record and check the markup before enclosing concealed installations.
 - 2. Note Construction Change Directive numbers, alternate numbers, Change Order numbers, and similar identification, where applicable.

2.2 RECORD SPECIFICATIONS

- A. Preparation: Mark Specifications to indicate the actual product installation where installation varies from that indicated in Specifications, addenda, and contract modifications.
 - 1. Give particular attention to information on concealed products and installations that cannot be readily identified and recorded later.
 - 2. Mark copy with the proprietary name and model number of products, materials, and equipment furnished, including substitutions and product options selected.
 - 3. Record the name of manufacturer, supplier, Installer, and other information necessary to provide a record of selections made.
 - 4. Note related Change Orders, and Record Drawings where applicable.

2.3 RECORD PRODUCT DATA

- A. Preparation: Mark Product Data to indicate the actual product installation where installation varies substantially from that indicated in Product Data submittal.
 - 1. Give particular attention to information on concealed products and installations that cannot be readily identified and recorded later.
 - 2. Include significant changes in the product delivered to Project site and changes in manufacturer's written instructions for installation.
 - 3. Note related Change Orders, and Record Drawings where applicable.

2.4 MISCELLANEOUS RECORD SUBMITTALS

- A. Assemble miscellaneous records required by other Specification Sections for miscellaneous record keeping and submittal in connection with actual performance of the Work. Bind or file miscellaneous records and identify each, ready for continued use and reference.

PART 3 - EXECUTION

3.1 RECORDING AND MAINTENANCE

- A. Recording: Maintain one copy of each submittal during the construction period for Project Record Document purposes. Post changes and modifications to Project Record Documents as they occur; do not wait until the end of Project.
- B. Maintenance of Record Documents and Samples: Do not use Project Record Documents for construction purposes. Maintain Record Documents in good order and in a clean, dry, legible condition, protected from deterioration and loss. Provide access to Project Record Documents for Owner's reference during normal working hours.

END OF SECTION 01 78 10

01 78 23 - OPERATION AND MAINTENANCE DATA

PART 1 - GENERAL

1.1 SUMMARY

- A. This Section includes administrative and procedural requirements for preparing operation and maintenance manuals, including the following:
 - 1. Operation manuals for systems and equipment.
 - 2. Maintenance manuals for the care and maintenance of products, materials, systems and equipment.
- B. See Divisions 2 through 33 Sections for specific operation and maintenance manual requirements for the Work in those Sections.

1.2 SUBMITTALS

- A. Manual: Submit (3) copies of each manual in final form at least (7) seven days before final inspection. O & M documentation is required before occupation of the building by the Owner.

PART 2 - PRODUCTS

2.1 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 a title page, table of contents, and manual contents.
- B. Coordination: 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 the manuals.
- C. Title Page: 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. Cross-reference to related systems in other operation and maintenance manuals.
- D. Provide an operation and maintenance documentation directory that includes the following elements:

1. Organization: Include a section in the directory for each of the following:
 - a. List of documents
 - b. List of systems
 - c. List of Equipment
 - d. Table of Contents

2. List of Systems and Subsystems
 - a. List systems alphabetically, include references to O&M manuals that contain information about each system.

3. List of Equipment
 - a. List equipment for each system, organized alphabetically by system. List pieces of equipment not part of a system alphabetically on a separate list.

- E. 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.

- F. 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.

2.2 OPERATION MANUALS

- A. Content: In addition to requirements in this Section, include operation data required in individual Specification Sections and equipment descriptions, operating standards, operating procedures, operating logs, wiring and control diagrams, and license requirements.

- 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. Complete nomenclature and number of replacement parts.

- C. Operating Procedures: Include start-up, break-in, and control procedures; stopping and normal shutdown instructions; routine, normal, seasonal, and weekend operating instructions; and required sequences for electric or electronic systems.

2.3 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 inspection procedures, types of cleaning agents, methods of cleaning, schedule for cleaning and maintenance, and 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.

2.4 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 maintenance instructions, drawings and diagrams for

maintenance, nomenclature of parts and components, and recommended spare parts for each component part or piece of equipment:

- D. Maintenance Procedures: Include test and inspection instructions, troubleshooting guide, disassembly instructions, and adjusting instructions, that detail essential maintenance procedures:
- 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.
- 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.

PART 3 - EXECUTION

3.1 MANUAL PREPARATION

- A. Product Maintenance Manual: Assemble a complete set of maintenance data indicating care and maintenance of each product, material, and finish incorporated into the Work.
- B. 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.
- C. 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.
- D. 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.
 - 1. Do not use original Project Record Documents as part of operation and maintenance manuals.

- E. Comply with Division 1 Section "Project Closeout Procedures" for schedule for submitting operation and maintenance documentation.

END OF SECTION 01 78 23

SECTION 03 38 00 – POST-TENSIONED CONCRETE COURT SYSTEM – BID ALTERNATE NO.1

PART 1 - GENERAL

1.1 GENERAL DESCRIPTION

- A. Post tensioned concrete slab sport courts.

1.2 RELATED SECTIONS

- A. Related Work
 - 1. Section 116823 – Playfield Equipment and Structures
 - 2. Section 312000 – Earth Moving
 - 3. Section 321316 – Cast-in-Place Concrete

1.3 QUALITY ASSURANCE

- A. Post tensioned Concrete Court Slab shall conform to the guidelines of the Post-Tensioning Institute (PTI) and the American Sports Builders Association (ASBA)
- B. Contractor performing work shall have a minimum Level 1 Certification from the Post-Tensioning Institute and be a Certified Court Builder from the ASBA with a minimum of five (5) years' experience installing post-tension concrete courts. Bidders must provide at least five (5) references that are satisfactory to the City and will serve to illustrate the Contractor's ability to act as the primary conveyor to accomplish the construction of the tennis courts in accordance with the specifications. References shall be for projects of similar scale and scope to the proposed contract.
- C. All post-tensioning materials shall be supplied by a Post-tensioning Institute (PTI) certified plant.
- D. The contractor shall provide an estimate of the quantity of materials to be used on site upon request.

1.4 SUBMITTALS

- A. Shop drawings: For tendon layout of court.
- B. Product Data: For slab tensioning materials.
- C. Design Mixtures: For each concrete mix.

1.5 GUARANTEE

- A. All work stated above will include a 20-year warranty from the following:
 - 1. Any cracking of the post-tensioned slab.

- B. NOTE: Depending on the usage of the courts they may need to be recoated with acrylic color coating after seven years. The re-coating is not included in the warranty.

PART 2 - PRODUCTS

2.1 MATERIALS

- A. The materials, including but not limited to concrete, stone and sand base courses, tensioning cables, and filter fabric for this work shall conform to the requirements of the Standard Specifications Form 818, and the Post-Tensioning Institute.

PART 3 - EXECUTION

3.1 CONSTRUCTION METHODS

A. SUBGRADE AND PREPARATION

1. Excavate existing soil to slope subgrade at 2% in the direction of the court surface slope. Install base layer of 3/8" crushed stone. Subgrade layer, base layer, and sub-base layer shall each be compacted to 95% standard proctor density.
2. Basketball hoop post shall be installed prior to post-tensioned slab concrete and set in independent concrete footings, any object protruding through slab will be isolated from the slab using foam sleeves to allow slab to shorten as tension forces are applied.
3. A 2" layer of fine sand will be installed over the entire area and fine graded to a .0833% slope as shown on plans.
4. Polyethylene sheeting. Two (2) layers of 6 mil polyethylene sheeting placed in opposite directions to cover entire court area under slab. Overlap polyethylene sheets at least 6 inches and tape joints. All joints of proceeding layers should run perpendicular to previous. Care is to be taken not to puncture sheeting, any tears in the sheeting is to be repaired by taping.

B. CONCRETE SLAB

1. Forms shall be installed around perimeter of court and secured to the ground with stakes to prevent movement during placement of concrete. Top of form shall be finish grade. Forms shall be straight and carry a consistent slope as indicated on the contract drawings.
2. Concrete forms shall be set and post tensioning strands shall be installed in both directions as shown on approved shop drawings. All strands are to be supported on chairs and tied at all intersections to prevent vertical and horizontal movement during concrete placement. Strands to be set per Post-Tensioning Institute (PTI) specifications. A minimum of 3" clearance between strands and openings shall be maintained at fence and net post footings.
3. Concrete shall be 3,500 psi with a maximum aggregate size of ¾ inch as specified in ASTM C-150. Place concrete by pumping method. Calcium chloride or other materials containing chlorides are not permitted as admixtures. Concrete must be well consolidated, especially in the vicinity of strand anchorages. Concrete shall be spread, consolidated, screeded, bull-floated and finished in accordance with Section 7.2 of ACI (American Concrete Institute) Standard 302, Recommended Practice for Concrete Floor

and Slab Construction. Immediately after finishing, the concrete should be kept continuously moist for seven days by covering with polyethylene film or waterproof curing paper, or by sprinkling or ponding or other acceptable coverings. When concrete is sufficiently set to withstand foot pressure with only about 1/4" indentation and the water sheen has left the surface, the slab shall be uniformly finished by power floating and troweling. The final finish texture shall be a medium broom finish unless otherwise specified by the surface manufacturer. No curing compounds shall be used at any time.

4. Strip forms and stress the post tensioning strands according to their specifications. The cables shall be pre-stressed to 16,000 lbs/strand between 24 and 48 hours after the concrete is placed to avoid any shrinkage cracks from occurring. After seven days, or when concrete has reached a minimum of 2,400 psi, final stressing procedure may be applied according to PTI specifications. Jacking force for the final stressing of each tendon shall be to 33,000 lbs/strand. Strands shall be anchored at 29 kips.
5. After final stressing of tendons, ends shall be cut off to provide 1/8" of cover and a cap filled with corrosion inhibiting material placed over cable end. Pocket holes shall be filled flush with edge of slab with non-shrink, non-metallic grout. Exposed anchors shall be waterproofed prior to grouting.
6. Surface tolerance shall be a single plane with a pitch over 10 feet. Surface shall be flat to within 1/8 inch under a 10-foot-long straight edge in all directions. Any variance shall be corrected by contractor at his expense using 5,000 psi epoxy grout. Finish surface shall not have a water-holding area greater than 1/8 inch deep. This is to be determined by flooding the court with water, allowing it to drain for one hour on a seventy (70) degree or warmer day. After the required patch grout mix has attained an initial set, trowel or broom the patch so that it is even and feathers into the adjacent surface. Allow the patch grout to dry overnight prior to application of coatings. Allow patches to cure completely before coatings are applied. Re-flooding and patching may be necessary until "birdbaths" are properly minimized.
7. Joints: Courts shall be poured monolithic with keyed expansion joints as detailed.

PART 4 - MATERIALS AND QUALITY ASSURANCE

- 4.1 Post-tensioning material shall consist of seven wire low relaxation strands, conforming to ASTM A416/A 416M, with an ultimate strength of 270 ksi. Strands should be coated with a permanent rust preventative lubricant and wrapped with plastic sheathing. If strand sheathing is damaged or removed, it is to be repaired by taping. A maximum of 6" exposed strand is permitted at the anchor. End anchorage devices will conform to Post-Tensioning Institute (PTI) specifications. All dead end anchorages must be power seated.
- 4.2 Concrete shall be 3,500 psi with 3/4 inch maximum size coarse aggregate - as specified in Standard Specifications for Portland Cement or ASTM C-150. Aggregate shall conform to Standard Specifications for Concrete Aggregates ASTM C 33. Fly ash or other additives are not acceptable. Air entrainment by total volume of concrete shall be within the range of 5 to 7 percent. Calcium chloride or other materials containing chlorides are not permitted as admixtures.

END OF SECTION 32 12 18

SECTION 11 68 23 – PLAYFIELD EQUIPMENT AND STRUCTURES

PART 1 - GENERAL

1.1 SUMMARY

- A. Provide all equipment and materials and do all work necessary to furnish and install the playfield equipment, as indicated on the drawings and as specified herein. Playfield equipment shall include, but not be limited to:
1. Ball Safety Netting
 2. Basketball System (**Bid Alternate No. 1**)
 3. Aluminum Player Benches
 4. Baseball/Softball Bases, Home Plate
 5. Foul Poles
 6. Dugout Shelter (**Bid Alternate No. 4**)
 7. Outfield Fence Topper
 8. Portable Pitcher's Mound
 9. Flag Pole

1.2 RELATED WORK

- A. Examine contract documents for requirements that affect work of this section. Other specification divisions and sections that directly relate to the work of this section include, but are not limited to:
1. Section 31 20 00 – Earth Moving
 2. Section 03 30 04 – Cast-in-Place Concrete

1.3 REFERENCES

- A. Comply with applicable requirements of the following standards. Where these standards conflict with other specified requirements, the most restrictive requirements shall govern.
1. National Federation of State High School Associations (NFHS)
 2. American Sports Builders Association (ASBA)
 3. Manufacturers Data and Recommended Installation Requirements

1.4 SUBMITTALS

- A. Provide Shop Drawings: Contractor shall provide fully dimensioned manufacturer's shop drawings detailing specific product and conforming installation requirements.
- B. Manufacturer shall certify that all equipment meets current NFHS regulations and standards.

1.5 QUALITY ASSURANCE

- 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.

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 BALL SAFETY NETTING (20' Ht.)

A. Model & Manufacturer:

1. BSS420 - Ball Safety Netting System as manufactured by:

Sportsfield Specialties Inc.
P.O. Box 231
41155 State Highway 10
Delhi, NY 13753
p. 888-975-3343
f. 607-746-8481
www.sportsfieldspecialties.com

2. #907390-20 - Ball Safety Netting System as manufactured by:

Litania Sports Group, Inc. (Gill Athletics)
601 Mercury Drive
Champaign, IL 61822
1-800-637-3090
www.gillathletics.com

3. #590-3210 - Ball Safety Netting System as manufactured by:

UCS Inc.
511 Hoffman Road
Lincolnton, NC 28092
1-800-526-4856
www.ucsspirit.com

Or Approved Equal

B. Components:

1. Professionally Pre-Engineered Break-Away Ball Safety Netting System Straight Poles:
 - a. 3 1/2" Schedule 40 aluminum pipe (4.0" O.D.), 23'-6"L
 - b. Standard powder coated black finish
2. Professionally pre-engineered break-away ball safety netting system,
3. Upright Post Ground Sleeves
 - a. Per manufacturer
 - b. Steel Tube with Alignment Bolt
 - c. Ground Sleeve Cap
4. Net with Perimeter Rope Binding:
 - a. 1-3/4" square mesh
 - b. #36 black nylon
 - c. Sewn 1/4" diameter braided rope binding on perimeter edges
 - d. Color: black
5. Accessories:
 - a. Black Plastic Friction Fit Ground Sleeve Caps
 - b. Model Specific Hardware Kit and Installation Instructions
6. Concrete Foundation
 - a. Stamped and sealed drawings and calculations by a licensed professional engineer of record in the state of Connecticut

2.2 BASKETBALL SYSTEM – BID ALTERNATE NO.1

A. Manufacturer:

1. Jaypro Sports LLC
 976 Hartford Turnpike
 Waterford, CT 06385
 p. 800-243-0533
 f. 800-988-3363
www.jayprosports.com
2. Bison
 603L Street
 Lincoln, NE 68508
 1-800-247-7668
www.bisoninc.com

3. First Team
902 Corey Road
Hutchinson, KS 67501
1-800-649-3688
www.firstteaminc.com

Or Approved Equal

B. Components:

1. 5-9/16" Gooseneck System
 - a. 5-9/16" O.D., hot dip galvanized steel pipe with 72" safe play area,
 - b. Heavy, 1-5/8" backboard braces,
 - c. 48" in-ground bury (Lifetime limited warranty);
 - d. Official size 42" x 72" perforated style backboard
12 ga. steel skin with heavy steel rear framework, safety rolled edges, and white powder coated finish (10-year limited warranty);
 - e. Playground goal with double 5/8" steel rim,
Netlocks to add strength and eliminate netlock breakage,
3/16" thick steel box-style backplate and rim supports,
 - f. Nylon net
2. Concrete Foundation
 - a. Stamped and sealed drawings and calculations by a licensed professional engineer of record in the state of Connecticut

2.3 ALUMINUM PLAYER BENCHES

- A. 21' – In-ground – Player bench w/ back
 1. Aluminum bench
 - a. Seats: 15
 - b. Width: 10" non-skid seat planks
 - c. Height: 18" seat, 33" with back
 2. Support
 - a. 4 – 2" heavy-duty rust-resistant galvanized steel legs
 - b. Planks are supported by galvanized steel understructure
 - c. Footings to be set in concrete foundations
 - 1) 4,000 psi concrete mix
 - 2) Min. dimension: 42"D x 12" DIA.
 3. Warranty
 - a. 3-year limited warranty

2.4 BASEBALL/SOFTBALL BASES, HOME PLATE

- A. For each new little league field provide:
 1. Baseball Base Set – Flex Style

- a. Set of three bases (per field)
 - b. 15" L x 15" W x 3" H
 - c. Color: White
 - d. Impact bases are shock absorbing and compress on impact
 - e. Provide 3 anchors and (3) 1-1/2" solid rubber plugs
 - 1) Anchors to be set in concrete footing.
 - 2) 4,000 psi concrete
 - 3) Min. dimensions 6"x6"x6"
2. Home Plate – Bury-All (Rubber)
 - a. 20" L x 20" W x 4" H
 - b. Non-skid surface
 3. Warranty
 - a. 1-year limited warranty

2.5 FOUL POLE

- A. Baseball foul poles with a zinc undercoating and powder coat finish
 1. 20' Ht. Foul Poles – Semi-Permanent
 - a. 4" heavy-duty steel tube pole (1 piece)
 - b. Color: Yellow
 - c. With Wing
 - d. Ground sleeve installation
 2. Concrete footing
 - a. 4,000 psi
 - b. 42" D x 24" DIA. reinforced with 6-34" L rebar
 - c. 6" crushed stone base
 3. Warranty
 - a. 3-year limited warranty

2.6 DUGOUT SHELTER – BID ALTERNATE NO.4

- A. 8' x 30' Dugout Roof Structure
 1. Design Criteria
 - a. Building Code: ASCE 7-10
 - b. Maximum Wind Speed Rating: 140mph, Exposure Category C
 - c. Maximum Ground Snow Load: 60psf
 - d. Seismic Design: Category E, Ss=1.5g, S1=0.75g
 - e. Roof Pitch: 2" Rise Back-to-Front
 2. Components
 - a. Overall Dimensions: 8'W x 30'L
 - b. Structural Columns Fabricated of:
 - 1) 3-1/2" x 3-1/2" x 3/16" (0.1875") Structural Steel Tube with Factory Pre-Drilled 9" x 9" x 5/8" (0.625") A36 Steel Base Mounting Plates and 9" x 9" x 5/8" (0.625") A36 Steel Roof and Column Cap Plates
 - 2) Fully Welded Construction

- 3) Maximum Allowable Spacing Between Structural Steel Columns is Fifteen (15') On-Center
- c. Roof Frame Fabricated of:
 - 1) 5" x 2" x 3/16" (0.1875") Structural Steel Rectangular Perimeter, Transverse, and Longitudinal Roof Tubes
 - 2) Fully Welded Construction
- d. Structural Steel Columns and Roof Frame Receive a Powder Coated Primer and Coated Finish, Color: Black
- e. Roofing Material is 29 Gauge, Classic Rib® Style Corrugated Metal with J-Channel Drip Cap Installed on Front and Sides, Color: t.b.d. by Owner from standard color palate
- f. Structural Columns Attached to Roof Structure with Galvanized Hardware
- g. Includes Carbon Steel Anchoring Hardware, Epoxy and Lifting Eye Bolts
- h. Model Specific Hardware Kit and Installation Instructions
- i. Stamped and sealed drawings and calculations by a licensed professional engineer of record in the state of Connecticut

2.7 OUTFIELD FENCE TOPPER

- A. Corrugated polyethylene fence topper
 - 1. Components
 - a. 4/1/2" dia. pre-slit corrugated polyethene tubing
 - b. Color: Yellow
 - c. Secure with tie wraps every 2' o.c.
 - 2. Warranty
 - a. 2-year limited warranty

2.8 PORTABLE PITCHERS MOUND

A. Manufacturer:

- 1. True Pitch, Inc.
 P.O. Box 111
 Altoona, IA 50009
 p. 800-647-3539
 f. 515-967-7619
www.truepitchmounds.com

or Approved Equal

- 2. 60/90 Mound shall be a full regulation 18' diameter fiberglass (or approved equal) portable pitching mound. The mound shall be covered in synthetic turf matching the turf used over the entirety of the playing surface. The synthetic turf color shall match the "clay" color selected for the field turf system. The mound shall have an integral pitching rubber which shall be 10" above the elevation of home plate.

3. 50/70 Mound shall be a regulation fiberglass (or approved equal) portable pitching mound. The mound shall be covered in synthetic turf matching the turf used over the entirety of the playing surface. The synthetic turf color shall match the “clay” color selected for the field turf system. The mound shall have an integral pitching rubber which shall be 8” above the elevation of home plate.

2.9 FLAG POLE

- A. Flagpole – Height: 30’

As Manufactured By: Atlantic Fiberglass Products, Inc.
P.O. Box 3394, Amity Station
New Haven, CT 06525 – 3934
Tel. (888) 560-7653
Fax (203) 469-3490
WEBSITE: www.atlanticfiberglass.com
Or Approved Equivalent

Provide shop drawings for review and approval.

PART 3 - EXECUTION

3.1 INSTALLATION – GENERAL

- A. All work shall be constructed as shown on the plans and as recommended per the manufacturers' specifications.
- B. All vault drains shall be hard piped into adjacent collector pipe trench.

3.2 CLEANING

- A. Clean up debris and unused material, and remove from the site.

END OF SECTION 11 68 23

11 68 43 - BALLFIELD SCOREBOARD – BID ALTERNATE NO.2

PART 1 - GENERAL

1.01 SECTION INCLUDES

- A. Single-sided LED baseball/softball scoreboard

1.02 REFERENCES

- A. Standard for Electric Signs, UL 48
- B. Standard for CSA C22.2 #207
- C. Federal Communications Commission Regulation Part 15
- D. National Electric Code

1.03 SUBMITTALS

- A. Product data: Submit manufacturer's product illustrations, data and literature that fully describe the scoreboards and accessories proposed for installation.
- B. Shop drawings: Submit mechanical and electrical drawings.
- C. Maintenance data: Submit manufacturer's installation, operation, and maintenance manuals.

1.04 DELIVERY, STORAGE, AND HANDLING

- A. Product delivered on site
- B. Scoreboard and equipment to be housed in a clean, dry environment

1.05 PROJECT CONDITIONS

- A. Environmental limitations: Do not install scoreboard equipment until mounting structure is secure and concrete has ample time to cure.
- B. Field measurements: Verify position and elevation of structure and its layout for scoreboard equipment. Verify dimensions by field measurements.
- C. Verify mounting structure is capable of supporting the scoreboard's weight and windload in addition to the auxiliary equipment.
- D. Installation may proceed within acceptable weather conditions.

1.06 QUALITY ASSURANCE

- A. For outdoor use
- B. Source Limitations: Obtain each type of scoring or related equipment through one source from a single manufacturer.
- C. ETL listed to UL 48
- D. NEC compliant
- E. FCC compliant
- F. ETL listed to CSA 22.2 #207

1.07 WARRANTY

- A. Provide 5 years of no cost parts exchange including standard shipping on electronics parts and radios due to manufacturing defects
- B. Provide toll-free service coordination
- C. Provide technical phone support during Daktronics business hours

Part 2 PRODUCTS

2.01 MANUFACTURER

- A. Daktronics, Inc., 201 Daktronics Drive, P.O. Box 5128, Brookings, SD 57006-5128
- B. Nevco Sports, LLC, One Horticultural Lane, Edwardsville, IL 62025
- C. OES Scoreboards, 4056 Blakie Road, London, Ontario, Canada, N6L1P7

2.02 PRODUCT

- A. Daktronics BA-2518 single-sided baseball scoreboard displays HOME and GUEST scores to 99, INNING to nine and indicates BALL, STRIKE and OUT.

2.03 SCOREBOARD

- A. General information
 - 1. Dimensions: 4'-0" (1.22 m) high, 9'-0" (2.74 m) wide, 0'-8" (203 mm) deep
 - 2. Weight: 96 lb (44 kg)
 - 3. Power requirement: 75 W (red/amber digits), 155 W (white digits)
 - 4. Color: t.b.d. by Owner.
- B. Construction
 - 1. Alcoa aluminum alloy 5052 for excellent corrosion resistance
 - 2. Scoreboard back, face, and perimeter: 0.063" (1.60 mm) thick
- C. Digits & Indicators
 - 1. LED color: White
 - 2. HOME, GUEST and INNING digits: 18" (457 mm) high
 - 3. BALL, STRIKE and OUT indicators: 2" (51 mm) diameter
 - 4. Seven bar segments per digit
 - 5. PanaView® LED digit technology
 - 6. All digits and indicators are sealed front and back with weather-tight silicone gel
- D. Captions
 - 1. Vinyl applied directly to scoreboard face
 - 2. HOME, GUEST, and INNING captions: 8" (203 mm) high
 - 3. BALL, STRIKE and OUT captions: 6" (152 mm) high
 - 4. Color: standard white or others available upon request
 - 5. Accessory Equipment
n/a

2.04 SCORING CONSOLE

- A. Console is an All Sport® 1600 controller
- B. Scores multiple sports using changeable keyboard inserts
- C. Controls multiple scoreboards and displays, including other All Sport 1600 controlled displays currently owned by customer
- D. Recalls clock, score, and period information if power is lost
- E. Runs Time of Day and Segment Timer modes
- F. Console includes:
 - 1. Rugged aluminum enclosure to house electronics
 - 2. Sealed membrane water-resistant keyboard
 - 3. 32-character LCD to verify entries and recall information currently displayed
 - 4. Power cord that plugs into a standard grounded outlet; 3 watts max
 - 5. Control cable to connect to the control receptacle junction box (wired system only)

- 6. Soft-sided carrying case
- G. Accessory Equipment
n/a

Part 3 EXECUTION

3.01 EXAMINATION

- A. Verify that mounting structure is ready to receive scoreboard. Verify that placement of conduit and junction boxes are as specified and indicated in plans and shop drawings. Verify concrete has cured adequately according to specifications.

3.02 INSTALLATION

- A. All power and control cables to scoreboards and displays will be routed in conduit. Power to the scoreboards/displays as well as raceways shown on electrical plans by the Electrical Contractor. Scoreboard control wiring including conduit will be the responsibility of the contractor assigned the scoreboard equipment.
- B. Install scoreboards and exterior displays to beams in location detailed and in accordance with manufacturer's instructions. Verify unit is plumb and level.

3.03 INSTALLATION—CONTROL CENTER

- A. Provide boxes, cover plates and jacks in locations per plans.
- B. Test connect control unit to all jacks and check for proper operation of control unit, scoreboard and all features. Leave control unit in carrying case and other loose accessories with owner's designated representative.
- C. Verify earth ground does not exceed 15 ohms.

END OF SECTION 11 68 45

SECTION 31 10 00 – SITE CLEARING

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. This Section includes the following:
 - 1. Protecting existing trees, plants and grass to remain
 - 2. Removing existing trees, plants and grass
 - 3. Clearing and grubbing
 - 4. Stripping and stockpiling topsoil
 - 5. Disconnecting and capping or sealing site utilities
 - 6. Temporary erosion and sedimentation control measures
 - 7. Temporary construction fencing
- B. Related Section
 - 1. Section 31 20 00 – Earth Moving
 - 2. Section 31 25 00 – Erosion and Sedimentation Controls
 - 3. Section 32 92 00 – Turf and Grasses

1.3 MATERIAL OWNERSHIP

- A. Except for materials indicated to remain Owner's property, cleared materials shall become Contractor's property and shall be removed from Project site and disposed of in a legal manner.

1.4 PROJECT CONDITIONS

- A. Traffic: Minimize interference with adjoining roads, streets, walks, and other adjacent occupied or used facilities during site-clearing operations.
 - 1. Do not close or obstruct streets, walks, or other adjacent occupied or used facilities without permission from Owner and authorities having jurisdiction.
 - 2. Provide alternate routes around closed or obstructed traffic ways if required by authorities having jurisdiction.
- B. Salvable Improvements: Carefully remove items indicated to be salvaged and store on Owner's premises where indicated.
- C. Utility Locator Service: Notify utility locator service, "Call Before You Dig" at 1-800-922-4455 for area where Project is located prior to site clearing.

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

1.5 QUALITY ASSURANCE

- A. Workmen: all workmen shall be thoroughly trained and experienced in the necessary crafts, and completely familiar with the specified requirements and the methods needed for proper performance of the work of this section
- B. Submittals
 - 1. Silt fence

PART 2 - PRODUCTS

2.1 SOIL MATERIALS

- A. Topsoil: Requirements for topsoil are specified Section 32 92 00 "Turf and Grasses."

2.2 SEDIMENT AND EROSION CONTROL MEASURES

- A. Materials: As specified as on the Contract Drawings.

PART 3 - EXECUTION

3.1 PREPARATION

- A. Protect and maintain benchmarks and survey control points from disturbance during construction.
- B. Locate and clearly flag trees and vegetation to remain.
- C. Protect existing site improvements to remain from damage during construction.
 - 1. Restore damaged improvements to their original condition, as acceptable to Owner.

3.2 TEMPORARY EROSION AND SEDIMENTATION CONTROL

- A. Provide temporary erosion and sedimentation control measures to prevent soil erosion and discharge of soil-bearing water runoff or airborne dust to adjacent properties and walkways, according to City of Meriden and DEEP requirements and sediment and erosion control drawings.
- B. Inspect, repair, and maintain erosion and sedimentation control measures during construction until permanent vegetation has been established.
- C. Remove erosion and sedimentation controls and restore and stabilize areas disturbed during removal.

3.3 TREE PROTECTION

- A. Erect and maintain temporary fencing around tree protection zones before starting site clearing. Remove fence when construction is complete.
- B. Do not excavate within tree protection zones, unless otherwise indicated.
- C. Repair or replace trees and vegetation indicated to remain that are damaged by construction operations, in a manner approved by Landscape Architect.

3.4 UTILITIES

- A. Locate, identify, disconnect, and seal or cap off utilities indicated to be removed.
 - 1. Arrange with utility companies to shut off indicated utilities.
- B. Existing Utilities: Do not interrupt utilities serving facilities occupied by Owner or others unless permitted under the following conditions and then only after arranging to provide temporary utility services according to requirements indicated:
 - 1. Notify Architect not less than two days in advance of proposed utility interruptions.
 - 2. Do not proceed with utility interruptions without Landscape Architect's written permission.

3.5 TOPSOIL STRIPPING

- A. Use of a glyphosate-based herbicide such as RoundUp shall be permitted to kill existing grass prior to stripping.
- B. Strip topsoil to whatever depths are encountered in a manner to prevent intermingling with underlying subsoil or other waste materials.
- C. Stockpile topsoil materials away from edge of excavations without intermixing with subsoil in locations required by the construction manager. Grade and shape stockpiles to drain surface water. Cover to prevent windblown dust.

3.6 DISPOSAL

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

END OF SECTION 31 10 00

SECTION 31 15 00 – EROSION AND SEDIMENTATION CONTROLS

PART 1 - GENERAL

1.1 SUMMARY

- A. Work shall include the furnishing of all materials, labor, and equipment to place and maintain erosion controls including but not limited to construction entrance pad, filter fence, erosion control blanket, sediment traps, diversion berms, inlet protection and/or hay bales to control surface water.
- B. Compliance with permit requirements of the local inland wetlands.

1.2 RELATED WORK SPECIFIED IN OTHER SECTIONS

- A. Section 31 20 00 – Site Preparation

1.3 QUALITY ASSURANCE

- A. Codes and Standards: All materials and construction methods shall conform to the "2002 Connecticut Guidelines for Soil Erosion and Sediment Control."
- B. Workers: all workers shall be thoroughly trained and experienced in the necessary crafts, and completely familiar with the specified requirements and the methods needed for proper performance of the work of this section.

PART 2 - PRODUCTS

2.1 MATERIALS

- A. Filter fabric fencing shall be a woven filter fabric and will meet the AASHTO M-288 and ASTM D-4439 for silt fence and geotextile usage.
- B. Hay bales shall be made of hay with forty pounds minimum weight and one hundred twenty pounds maximum weight. Wood stakes shall be a minimum of 1 inch by 1 inch normal size by a minimum of 3 feet long.
- C. Broken stone for construction entrance shall be 1 inch to 2 inch broken stone.
- D. Check dam stone shall be rounded stone riprap conforming to the following gradation requirements for Modified Riprap conforming to the requirements of M.12.02-3.

PART 3 - EXECUTION

- A. Filter fabric fencing and hay bales shall be placed by the Contractor in locations shown on the plans, in accordance with the details shown on the plans.
- B. Maintain/replace filter fabric fencing and hay bales as necessary and/or as directed by the Owner or Owner's representative.

- C. Filter fabric fencing shall be installed by the Contractor in locations shown on the plans, in accordance with the details shown on the plans.
- D. Contractor shall inspect erosion controls weekly and after storm events. Inspection reports shall be prepared and kept on-site.

END OF SECTION 31 15 00

SECTION 31 20 00 – EARTH MOVING

PART 1 - GENERAL

1.1 SUMMARY

- A. Refer to Geotechnical Engineering Report included in Appendix A of this Project Manual.
- B. Work shall include all materials, labor and equipment to complete all earth moving operations including but not limited to the following:
 - 1. Preparing subgrade for structures, walks, synthetic turf fields and lawns and grasses.
 - 2. Excavating and backfilling for structures
 - 3. Processed aggregate base for bituminous and concrete walks
 - 4. Excavating and backfilling for utility trenches and storm drainage structures
 - 5. Rock Excavation
 - 6. Rock-in Trench Excavation
- C. Related Sections
 - 1. Section 32 12 16 – Asphalt Paving
 - 2. Section 32 32 13 – Cast-in-Place Concrete (Site)
 - 3. Section 32 92 00 – Turf and Grasses
 - 4. Section 33 41 00 – Storm Utility Drainage Piping
 - 5. Section 33 46 00 - Synthetic Turf Subsurface Drainage

1.2 DEFINITIONS

- A. Fill: General term for soil materials used to raise existing grades.
- B. Excavation: Removal of material encountered above subgrade elevations and to lines and dimensions indicated.
 - 1. Authorized Additional Excavation: Excavation below subgrade elevations or beyond indicated lines and dimensions as directed by Engineer.
 - 2. Unauthorized Excavation: Excavation below subgrade elevations or beyond indicated lines and dimensions without direction by Engineer. Unauthorized excavation, as well as remedial work directed by Engineer, shall be without additional compensation.
- C. Backfill: General term used for soil material used to fill an excavation.
 - 1. Initial Backfill: Backfill placed over excavated subgrade, 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.
- D. Processed Aggregate: Course placed between the subbase course and hot-mix asphalt paving.

- E. Bedding Course: Initial Backfill placed over the excavated subgrade in a trench before laying pipe.
- F. Sand and Gravel: Fill placed over the excavated subgrade before placing crushed stone slab-on-grade base course.
- G. Structural Fill: Fill placed over the excavated subgrade in the building area, exterior foundation wall backfill, outside of the zone of crushed stone backfill.
- H. Borrow Soil: Satisfactory soil imported from off-site for use as ordinary fill or backfill.
- I. Drainage Course / Crushed Stone: Course supporting the slab-on-grade that also minimizes upward capillary flow of pore water.
- J. Ordinary Fill: General fill and backfill placed outside the limits of Structural Fill, Sand and Gravel, and Crushed Stone.
- K. Subbase: Course placed between the subgrade and base course for hot-mix asphalt pavement, and sidewalk pavements, and between the subgrade and topsoil in lawn and landscaped areas.
- L. Subgrade: Surface or elevation remaining after completing excavation for site remediation, or top surface of a fill or backfill immediately below subbase, drainage fill, or earthen cap materials. The elevation at which the remediation geotextile barrier layer is installed.
- M. Proof-roll: The application of compactive energy to subgrade for the geotechnical engineer's evaluation of suitability of subgrade for bearing.
- N. 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.
- O. Utilities: On-site underground pipes, conduits, ducts, and cables, as well as underground services within buildings.

1.3 PROJECT CONDITIONS

- A. Visit the site to review all details of the work and working conditions and to verify dimensions in the field including headroom and interferences from adjacent structures. Notify the Engineer in writing of any discrepancy before performing any work.
- B. Consult official records of existing utilities, both surface and subsurface, and their connection to be fully informed on all existing conditions and limitations as they apply to this work and its relation to other construction work.
- C. Existing Utilities: Do not interrupt utilities serving facilities occupied by Owner or others unless permitted in writing by Engineer and then only after arranging to provide temporary utility services according to requirements indicated.

D. Verify that survey benchmark and intended elevations for work are as indicated.

1.4 QUALITY ASSURANCE

- A. Workers: all workers shall be thoroughly trained and experienced in the necessary crafts, and completely familiar with the specified requirements and the methods needed for proper performance of the work of this section.
- B. Testing and Inspection: The Contractor shall employ and pay for a qualified independent laboratory to perform testing and inspection service required by these specifications and in compliance with the specifications outlined in the Form 818 - State of Connecticut Department of Transportation "Specifications for Roads, Bridges, Facilities and Incidental Construction" 2020. Test results shall be sent directly to the owner.

1.5 SUBMITTALS

- A. Product data including but not limited to sieve test, abrasion, hardness, proctor, percentage of recycled content, source of material for all materials.

PART 2 - PRODUCTS

2.1 SOIL MATERIALS

- A. General: Provide borrow soil materials when sufficient satisfactory soil materials are not available from excavations. Materials shall be free from ice, snow, roots, sod, rubbish or other deleterious or organic matter and shall conform to the gradations specified for each soil material. In addition, submit laboratory analytical results for sample(s) of the material, at least two (2) weeks prior to the import of material.
- B. Processed Aggregate: per CT DOT Standard Specification M.05.01 modified as follows:
 - 1. Under Section M.05, 2. Coarse Aggregate, delete the phrase "the coarse aggregate shall not have a loss of more than 50%" and substitute the phrase "the coarse aggregate shall not have a loss of more than 40%".
 - 2. Maximum aggregate size shall not exceed 1-1/2 inches.
- C. Subbase: per CT DOT Standard Specification M.02.06 Grading "A" and section M.02.06.04 Soundness.
- D. Ordinary Fill: General fill and backfill placed outside the limits of Structural Fill, Sand-Gravel, and Crushed Stone. Ordinary Fill shall be friable soil, free of rubbish, ice, snow, tree stumps, roots, and other organic matter; no stone greater than two thirds loose lift thickness see Section 3.11 COMPACTION OF SOIL BACKFILLS AND FILLS of this specification.
- E. Traprock: Clean Stone used as a base for various types of pavement. Nominal Size as specified in the contract drawings. Meets CT DOT Standard Specifications M.02.06 2-M.02.06.04 for Soundness using AASHTO Method T 104, Resistance to Abrasion using AASHTO Method T 96, and Plasticity using AASHTO Method T 90.

- F. Bedding Course: Course placed over the excavated subgrade in a trench before laying pipe. Bedding Course shall consist of Sand free of silt, clay, loam, and organic matter. Bedding material shall pass a 3/8" sieve, with not more than 10% passing a No. 200 sieve
- G. Crushed Stone: Material shall be per Section M.02.01 per CT DOT Form 817.
- H. Pervious structure backfill: Pervious material placed adjacent to structure shall conform to Standard Specification M.02.05. Reclaimed miscellaneous aggregate shall not be used.
- I. Stone Dust Surface/Screenings: Material shall conform to the gradation in Section M.01.01 of the Standard Specifications. No reclaimed miscellaneous aggregate will be allowed.
- J. Sand: Layer placed between concrete slab and base. Material shall be per Section M.02, Article M.03.01 per CT DOT Form 817.

2.1 ACCESSORIES

- A. Warning Tape: Acid- and alkali-resistant polyethylene film warning tape manufactured for marking and identifying underground utilities, 6 inches wide and 5 mils thick, with aluminum backing and continuously inscribed with a description of the utility.

PART 3 - EXECUTION

3.1 PREPARATION

- A. Identify and flag structures, utilities, sidewalks, pavements, and other facilities and protect from damage caused by settlement, lateral movement, undermining, washout, and other hazards created by earthwork operations. Maintain and protect existing utilities remaining which pass through work area.
- B. Preparation of subgrade for earthwork operations including removal of vegetation, topsoil, debris, obstructions, and deleterious materials from ground surface.
- C. Protect and maintain erosion and sedimentation controls.

3.2 EXCAVATION FOR SITE

- A. Classified Excavation: Excavate to subgrade elevations regardless of the character of surface and subsurface conditions encountered within a tolerance of plus or minus 1 inch. Classified excavated materials may include rock and obstructions. Classified surface and subsurface conditions when encountered, and as defined in 3.3 Rock Excavation shall be measured and compensated as described.
 - 1. If excavated materials intended for fill and backfill include unsatisfactory soil materials and rock, replace with satisfactory soil materials.

3.3 EXCAVATION FOR STRUCTURES

- A. Unclassified Excavation: Excavate to required elevations and dimensions regardless of the character of surface and subsurface conditions encountered within a tolerance of plus or minus 1 inch. If applicable, extend excavations a sufficient distance from structures for placing and removing concrete formwork, for installing services and other construction, and for inspections. No changes in the Contract Sum or the Contract Time will be authorized for rock excavation or removal of obstructions.

3.4 EXCAVATION FOR WALKS AND PAVEMENTS

- A. Excavate surfaces under walks and pavements to indicated lines, cross sections, elevations, and subgrades.

3.5 EXCAVATION FOR UTILITY TRENCHES

- A. Excavate trenches to indicated gradients, lines, depths, and elevations.
- B. Trench Bottoms: Excavate and shape trench bottoms to provide uniform bearing and support of pipes and conduit. Shape subgrade to provide continuous support for bells, joints, and barrels of pipes and for joints, fittings, and bodies of conduits. Remove projecting stones and sharp objects along trench subgrade.

3.6 SUBGRADE EVALUATION

- A. Proof-roll subgrade with 10 passes of a vibratory drum roller weighing at least 10,000 pounds at the drum or other approved equipment to identify soft pockets and areas of excess yielding. Soft pockets and zones of yielding shall be excavated and proof-rolled again. Do not proof-roll wet or saturated subgrades.
- B. Reconstruct subgrades damaged by freezing temperatures, frost, rain, accumulated water, or construction activities, as directed by Engineer, without additional compensation or change in Contract Time.
- C. Alternate No. 1 - For subgrade areas beneath athletic fields designated to receive a layer of free draining material above the subgrade, the subgrade slopes are to match the proposed slopes for finish grade. The Contractor shall provide a survey by a licensed surveyor of as built subgrade elevations at 50' on center each way for approval by the Engineer prior to placement of free draining material. Preparation of subgrade operations is to be performed in conditions free of mud, frost, snow and ice.
- D. Prior to the commencement of subgrade preparation, the Engineer shall be notified of any potential unsuitable soil conditions and a determination made as to the acceptable nature of the subgrade soils.

3.7 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, with 28-day compressive strength of 2500 psi, may be used when approved by Engineer, without additional compensation or change in Contract Time.

- B. Fill unauthorized excavations under other construction or utility pipe as directed by Engineer, without additional compensation or change in Contract Time.

3.8 STORAGE OF SOIL MATERIALS AND PROTECTION OF SUBGRADE

- A. Stockpile borrow soil materials and excavated satisfactory soil materials without intermixing. Place, grade, and shape stockpiles to drain surface water. Cover to prevent windblown dust and for protection from precipitation
- B. Dewater to maintain water at least two feet below bottom of all excavations.
- C. Protect all subgrade soils. Excavate disturbed subgrade and backfill in accordance with specifications at Contractor's expense.
- D. Excavate soil and all other materials required to accommodate slabs, paving and site structures, and construction operations.
- E. Do not excavate to full depth when freezing temperatures may be expected unless subgrade is protected from freezing or footings or slabs can be placed immediately after excavation is completed and are protected from freezing.
- F. Maintain safe and stable banks.
- G. Excavate in a manner that will not disturb existing foundations. Plans for excavating near existing foundations shall be submitted to the Architect for approval prior to beginning such excavation.
- H. Correct unauthorized excavations at no additional cost to the Owner or change in Contract Time.
- I. Stockpile soil materials away from edge of excavations. Do not store within drip line of remaining trees.

3.9 UTILITY TRENCH BACKFILL

- A. Place backfill on subgrades free of mud, frost, snow, or ice.
- B. Place and compact bedding course on trench bottoms and where indicated. Shape bedding course to provide continuous support for bells, joints, and barrels of pipes and for joints, fittings, and bodies of conduits.
- C. Place and compact initial backfill of subbase material, free of particles larger than 1 inch in any dimension, to a height of 12 inches over the utility pipe or conduit.

1. Carefully compact initial backfill under pipe haunches and compact evenly up on both sides and along the full length of utility piping or conduit to avoid damage or displacement of piping or conduit. Coordinate backfilling with utilities testing.
- D. Place and compact final backfill of satisfactory soil to final subgrade elevation.
- E. Install warning tape directly above utilities, 12 inches below finished grade, except 6 inches below subgrade under pavements and slabs.

3.10 SOIL FILL

- A. Plow, scarify, bench, or break up sloped surfaces steeper than 1 vertical to 4 horizontal so fill material will bond with existing material.

3.11 SOIL MOISTURE CONTROL

- A. Uniformly moisten or aerate subgrade and each subsequent fill or backfill soil layer before compaction to within 2 percent of optimum moisture content.
1. Do not place backfill or fill soil material on surfaces that are muddy, frozen, or contain frost or ice.
 2. Remove and replace, or scarify and air dry otherwise satisfactory soil material that exceeds optimum moisture content by 2 percent and is too wet to compact to specified dry unit weight.

3.12 COMPACTION OF SOIL BACKFILLS AND FILLS

- A. Place backfill and fill soil materials as indicated on the plans and as specified in Form 817. Compaction shall be performed in accordance with the following:

Minimum compaction for fill and backfill, based on percentage of maximum dry density (as determined by ASTM D1557 or AASHTO T-180 (Modified Proctor)), is:

| | | |
|--------------------------------|---|-----|
| Below Structures | - | 95% |
| Behind Retaining Walls | - | 92% |
| Pavement Base/Subbase | - | 95% |
| Below Pavement Subbase | - | 95% |
| Areas of General Landscaping | - | 90% |
| Subgrade below Athletic Fields | - | 85% |

Loose lift thickness for Fill and Backfill and the minimum number of passes of compaction equipment are summarized on the following table:

| Compaction Method | Max Stone Size | Maximum Loose Lift Thickness | | Minimum Number of Passes | |
|-------------------|----------------|-------------------------------|---------------------|-------------------------------|---------------------|
| | | Below Structures and Pavement | Less Critical Areas | Below Structures and Pavement | Less Critical Areas |
| | | | | | |

| | | | | | |
|--|-----|-----|-----|---|---|
| Hand-operated vibratory plate or light roller in confined areas | 4" | 6" | 8" | 6 | 4 |
| Hand-operated vibratory drum rollers weighing at least 1,000# | 6" | 8" | 10" | 6 | 4 |
| Light vibratory drum roller, minimum dynamic force 3,000# per ft. of drum width | 6" | 10" | 14" | 6 | 4 |
| Medium vibratory drum roller, minimum dynamic force 5,000# per ft. of drum width | 8" | 12" | 18" | 6 | 4 |
| Large vibratory drum roller, minimum dynamic force 8,000# per ft. of drum width | 10" | 16" | 24" | 6 | 4 |

- B. Place backfill and fill soil materials evenly on all sides of structures to required elevations, and uniformly along the full length of each structure. Uneven backfill outside foundation walls are permitted after slabs or suitable bracing are installed at the tops of the walls.

3.13 GRADING

- A. General: Uniformly grade areas to a smooth surface, free of irregular surface changes. Comply with compaction requirements and grade to cross sections, lines, and elevations indicated.
- B. Site Grading: Slope grades to direct water away from buildings and to prevent ponding.

3.14 SUBBASE AND PROCESSED AGGREGATE BASE

- A. Place subbase and base course on subgrades free of mud, frost, snow, or ice.
- B. On prepared subgrade, place subbase and base course under pavements and walks as follows:
1. Shape subbase and base course to required crown elevations and cross-slope grades.
 2. Processed aggregate base shall be placed in accordance with Section 3.04 of the Standard Specifications Form 817.
 3. Compact subbase and base course as specified in Form 817 Section 3.12, plus the requirements that compaction shall be continued until the dry density of each layer is not less than 95% of the dry density achieved by AASHTO T 180, Method D.
 4. Field testing will be performed in accordance with AASHTO T 310 and ASTM D6938 as indicated in the latest edition of the "Minimum Schedule for Acceptance Testing." Should the subbase or subgrade material become churned up or mixed with the processed aggregate base at any time, the Contractor shall, without additional

compensation remove the mixture. The Contractor shall add new subbase material, if required, and reshape and recompact the subbase in accordance with the requirements of Article 2.12.03. New aggregate material shall be added, compacted and bound, as hereinbefore specified, to match the surrounding surface. Any surface irregularities which develop during, or after work on each course, shall be corrected by loosening material already in place and removing or adding aggregate as required. The entire area, including the surrounding surface, shall be re-compacted and rebound until it is brought to a firm and uniform surface satisfactory to the Engineer. In addition, the finished surface shall be tested for level using a 10-foot straight edge. The surface shall not vary from the specified grade by more than ¼ inch in 10 feet measured in any direction. Irregularities shall be corrected to the satisfaction of the Engineer.

3.15 DRAINAGE COURSE

- A. Place free draining course on subgrades free of mud, frost, snow, or ice.
 - 1. On prepared subgrade, place and compact drainage course under bituminous concrete trail as specified.

3.16 FIELD QUALITY CONTROL

- A. Testing Agency: Contractor will engage a qualified independent testing agency to perform field quality control testing.
- B. Allow geotechnical engineer and/or testing agency to inspect and test subgrades and each fill or backfill layer. Proceed with subsequent earthwork only after test results for previously completed work comply with requirements.
- C. Footing Subgrade: Footing subgrades shall be evaluated by the geotechnical engineer for suitability for foundation bearing.
- D. When geotechnical engineer and/or testing agency reports show that subgrades, fills, or backfills have not achieved degree of compaction specified, scarify and moisten or aerate, or remove and replace soil to depth required; re-compact and retest until specified compaction is obtained.

3.17 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 at no additional compensation or change in Contract Time.
- C. Where settling occurs before Project correction period elapses, remove finished surfacing, backfill with additional soil material, compact, and reconstruct surfacing.

1. Restore appearance, quality, and condition of finished surfacing to match adjacent work, and eliminate evidence of restoration to greatest extent possible.

3.18 DISPOSAL OF SURPLUS AND WASTE MATERIALS

- A. Disposal: Remove surplus soil and waste material, including unsatisfactory soil, trash, and debris, and legally dispose of it off Owner's property at no additional cost.

END OF SECTION 31 20 00

SECTION 31 23 19 – DEWATERING

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 construction dewatering.
- B. Related Section
 - 1. Section 31 20 00 – Earth Moving

1.3 PERFORMANCE REQUIREMENTS

- A. Dewatering Performance: Design, furnish, install, test, operate, monitor, and maintain dewatering system of sufficient scope, size, and capacity to control hydrostatic pressures and to lower, control, remove, and dispose of ground water and permit excavation and construction to proceed on dry, stable subgrades.

1.4 SUBMITTALS

- A. Shop Drawings: For dewatering system. Show arrangement, locations, and details of wells and well points; locations of risers, headers, filters, pumps, power units, discharge lines, piezometers, and flow-measuring devices; and means of discharge, control of sediment, and disposal of water.
- B. Delegated-Design Submittal: For dewatering system 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 QUALITY ASSURANCE

- A. Regulatory Requirements: Comply with governing EPA notification regulations before beginning dewatering. Comply with hauling and disposal regulations of authorities having jurisdiction.
- B. Preinstallation Conference: Conduct conference at Project site.

1.6 PROJECT CONDITIONS

- A. Survey Work: Engage a qualified land surveyor or professional engineer to survey adjacent existing buildings, structures, and site improvements, establishing exact elevations at fixed points to act as benchmarks. Clearly identify benchmarks and record existing elevations.

1. During dewatering, regularly resurvey benchmarks, maintaining an accurate log of surveyed elevations for comparison with original elevations. Promptly notify Architect if changes in elevations occur or if cracks, sags, or other damage is evident in adjacent construction.

PART 2 - PRODUCTS (Not Used)

PART 3 - EXECUTION

3.1 INSTALLATION

- A. Provide temporary grading to facilitate dewatering and control of surface water.
- B. Monitor dewatering systems continuously.
- C. Protect and maintain temporary erosion and sedimentation controls, which are specified in Section 31 10 00 "Site Clearing" during dewatering operations.
- D. Install dewatering system utilizing wells, well points, or similar methods complete with pump equipment, standby power and pumps, filter material gradation, valves, appurtenances, water disposal, and surface-water controls.
 1. Space well points or wells at intervals required to provide sufficient dewatering.
 2. Use filters or other means to prevent pumping of fine sands or silts from the subsurface.
- E. Before excavating below ground-water level, place system into operation to lower water to specified levels. Operate system continuously until drains, sewers, and structures have been constructed and fill materials have been placed or until dewatering is no longer required.
- F. Provide an adequate system to lower and control ground water to permit excavation, construction of structures, and placement of fill materials on dry subgrades. Install sufficient dewatering equipment to drain water-bearing strata above and below bottom of foundations, drains, sewers, and other excavations.
 1. Do not permit open-sump pumping that leads to loss of fines, soil piping, subgrade softening, and slope instability.
- G. Reduce hydrostatic head in water-bearing strata below subgrade elevations of foundations, drains, sewers, and other excavations.
 1. Maintain piezometric water level a minimum of 24 inches below surface of excavation.
- H. Provide standby equipment on site, installed and available for immediate operation, to maintain dewatering on continuous basis if any part of system becomes inadequate or fails. If dewatering requirements are not satisfied due to inadequacy or failure of dewatering system, restore damaged structures and foundation soils at no additional expense to Owner and at no change in Contract Time.

1. Remove dewatering system from Project site on completion of dewatering. Plug or fill well holes with sand or cut off and cap wells a minimum of 36 inches below overlying construction.

END OF SECTION 31 23 19

32 16 14 - CONCRETE PAVING JOINT SEALANTS

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. This Section includes the following:
 - 1. Joints between cement concrete.
- B. Related Sections
 - 1. Section 32 16 13 –Cast-In-Place Concrete (Site)

1.3 SUBMITTALS

- A. Product Data: For each type of product indicated.
- B. Samples: For each type and color of joint sealant required.
- C. Product certificates and test reports.
- D. Compatibility and Adhesion Test Reports: From sealant manufacturer.

PART 2 - PRODUCTS

2.1 MATERIALS, GENERAL

- A. Compatibility: Provide joint sealants, backing materials, and other related materials that are compatible with one another and with joint substrates under conditions of service and application, as demonstrated by joint-sealant manufacturer based on testing and field experience.
 - 1. Primers: Product recommended by joint-sealant manufacturer where required for adhesion of sealant to joint substrates indicated, as determined from preconstruction joint-sealant-substrate tests and field tests.
- B. Colors of Exposed Joint Sealants: As selected by Engineer.

2.2 COLD-APPLIED JOINT SEALANTS

- A. Type SL Silicone Sealant for Concrete and Asphalt: Single-component, low-modulus, neutral-curing, self-leveling silicone sealant complying with ASTM D 5893 for Type SL.
- B. Multicomponent Low-Modulus Sealant for Concrete and Asphalt: Proprietary formulation consisting of reactive petropolymer and activator components producing a pourable, self-leveling sealant.

2.3 HOT-APPLIED JOINT SEALANTS

- A. Sealant for Concrete and Asphalt: Single-component formulation complying with ASTM D 3405.

2.4 JOINT-SEALANT BACKER MATERIALS

- A. General: Provide joint-sealant backer materials that are non-staining; are compatible with joint substrates, sealants, primers, and other joint fillers; and are approved for applications indicated by joint-sealant manufacturer based on field experience and laboratory testing.
- B. Round Backer Rods for Cold- and Hot-Applied Sealants: ASTM D 5249, Type 1, of diameter and density required to control sealant depth and prevent bottom-side adhesion of sealant.
- C. Backer Strips for Cold- and Hot-Applied Sealants: ASTM D 5249; Type 2; of thickness and width required to control sealant depth, prevent bottom-side adhesion of sealant, and fill remainder of joint opening under sealant.
- D. Round Backer Rods for Cold-Applied Sealants: ASTM D 5249, Type 3, of diameter and density required to control sealant depth and prevent bottom-side adhesion of sealant.

PART 3 - EXECUTION

3.1 INSTALLATION

- A. Surface Cleaning of Joints: Clean out joints immediately before installing joint sealants to comply with joint-sealant manufacturer's written instructions.
- B. Joint Priming: Prime joint substrates where indicated or where recommended in writing by joint-sealant manufacturer, based on preconstruction joint-sealant-substrate tests or prior experience.
- C. Sealant Installation Standard: Comply with recommendations in ASTM C 1193 for use of joint sealants as applicable to materials, applications, and conditions indicated.
- D. Install backer materials to support sealants during application and at position required to produce optimum sealant movement capability. Do not leave gaps between ends of backer materials. Do not stretch, twist, puncture, or tear backer materials. Remove absorbent backer

materials that have become wet before sealant application and replace them with dry materials.

- E. Install sealants at the same time backings are installed to completely fill recesses provided for each joint configuration and to produce uniform, cross-sectional shapes and depths relative to joint widths that allow optimum sealant movement capability.
- F. Tooling of Non-sag Sealants: Immediately after sealant application and before skinning or curing begins, tool sealants to form smooth, uniform beads of configuration indicated; to eliminate air pockets; and to ensure contact and adhesion of sealant with sides of joint.
- G. Clean off excess sealants or sealant smears adjacent to joints as the Work progresses by methods and with cleaning materials approved by manufacturers of joint sealants and of products in which joints occur.

END OF SECTION 32 16 14

32 18 14 - SYNTHETIC TURF SURFACING

PART 1 - GENERAL

1.1 SUMMARY

1. Furnish all labor, materials, tools and equipment necessary to install artificial grass field turf as indicated on the plans and as specified herein. The installation of all new materials shall be performed in strict accordance with the Turf Manufacturer's* installation instructions and in accordance with the Contract Documents. The work will include, without limitation, the survey layout for the placement of the synthetic turf fabric; the placement of the fabric and the sewing of seams; fastening the fabric to the concrete edge; installing lines and marks for each sport; installing the infill; final grooming; and training of school personnel on maintenance procedures.
2. As part of the Turf Vendor's bid for this project, provide written acceptance that the design of the synthetic turf system including the stone base, synthetic turf surface and infill system as proposed will have no bearing on the turf system performing in accordance with the product warranties under all climactic conditions that are experienced in the Northeast where this project is located. If any portion of this system is not acceptable to the turf vendors, a written description of any matters in question shall be submitted with the bid. No future claims may be made by the turf or infill vendors that the design of the system as specified impacts the product performing in accordance with the vendors warranties for the project.
3. Provide written acceptance from the turf manufacturer that the perimeter edge detail meets the requirements for the installation of the synthetic turf. It is the responsibility of the Contractor to install the perimeter edge details required for the system in strict accordance with the Manufacturer's requirements and as approved by the Owner.

*For the purpose of this specification, the term Turf Manufacturer may be interpreted as meaning Turf Vendor since it is understood that some, but not all, suppliers of synthetic turf purchase the carpet (fabric) from an independent carpet mill.

1.2 RELATED SECTIONS

- A. Section 11 68 23 – Playfield Equipment and Structures
- B. Section 31 20 00 – Earth Moving
- C. Section 33 46 23 – Synthetic Turf Subsurface Drainage

1.3 REFERENCES

- A. FM P7825 - Approval Guide; Factory Mutual Research Corporation; current edition
- B. American Society for Testing and Materials (ASTM) Standard Test Methods, International Standards Organization (ISO), and European Committee for Standardization (EN) :

- D1577 - Standard Test Method for Linear Density of Textile Fiber
- D5848 - Standard Test Method for Mass Per Unit Area of Pile Yarn Floor Covering
- ASTM D418 - Standard Test Method for Testing Pile Yarn Floor Covering Construction
- ASTM D1338 - Standard Test Method for Tuft Bind of Pile Yarn Floor Coverings
- ASTM D1682 - Standard Method of Test for Breaking Load and Elongation of Textile Fabrics
- ASTM D5034 - Standard Test Method of Breaking Strength and Elongation of Textile Fabrics (Grab Test)
- ASTM F1015 - Standard Test Method for Relative Abrasiveness of Synthetic Turf Playing Surfaces
- ASTM D4491 - Standard Test Methods for Water Permeability of Geotextile by Permittivity
- ASTM D2859 - Standard Test Method for Ignition Characteristics of Finished Textile Floor Covering Materials
- ASTM F355 - Standard Test Method for Shock-Absorbing Properties of Playing Surface Systems and Materials.
- ASTM F1936 - Standard Test Method for Shock-Absorbing Properties of North American Football Field Playing Systems as Measured in the Field
- ASTM D1557 - Test Method for Laboratory Compaction Characteristics of Soil Using Modified Effort.
- ISO 8295 - Plastic Film and Sheet – Determination of Coefficient of Friction
- ISO 4897 - Cellular plastics - Determination of coefficient of linear thermal expansion.
- ISO 8301 - Thermal resistance.
- ISO 1798 - Standard Specification for Flexible Materials – Tensile Strength.
- ISO 1856 - Flexible cellular polymeric materials – Determination of compression set.
- EN 12616 - Water Infiltration Rate
- EN 14809 - Surfaces for sports areas – Determination of vertical deformation.

- C. Current NFHS, and CIAC Rules and Interpretations
- D. Current "Suggested Guidelines for the Essential Elements of Synthetic Turf Systems" of the Synthetic Turf Council (STC).

1.4 SUBMITTALS

- A. Prior to the Owner's approval of a specified artificial turf system, the Turf Manufacturer/Vendor shall provide a notarized affidavit that its turf system does not violate any other manufacturer's patents, patents allowed, or patents pending.
- B. Prior to the Engineer/Landscape Architect's approval of the specified turf system, the Turf Manufacturer/Vendor shall provide a notarized Affidavit that its turf system, including the fiber, and infill after installation will meet or exceed the requirements related to discharges into surface or ground water and emissions in effect at the time of installation established by the U.S. Environmental Protection Agency, the State of Connecticut Departments of Energy and Environmental Protection and Public Health, and any other agency of competent jurisdiction.

- C. Submit the following:
1. One rag sample of turf, 12x12 inch in size, illustrating details of finished product.
 2. A bagged or jarred sample of rubber infill.
 3. A bagged or jarred sample of sand infill.
 4. A letter and specification sheet certifying that the products of this section meet or exceed specified requirements.
 5. Certified copies of independent (third-party) laboratory reports on ASTM tests specified in Section 2.1.B below.
 6. List of existing recent installations using the specified turf system in the United States, including Owner representative and telephone number. All Connecticut, and other north east installations shall be highlighted.
 7. The Turf Manufacturer/Vendor shall provide a sample copy of insured, non-prorated warranty and insurance policy information.
 8. Letter from the turf vendor in accordance with Summary Item 1.1B above.
- D. Prior to ordering of materials:
1. The Turf Manufacturer/Vendor shall submit through the General Site Contractor Shop Drawings indicating:
 - a. Field Layout, as directed by the Owner and indicated on the contract drawings.
 - b. Field Marking Plan and details for the specified sports meeting the requirements of NFHS and CIAC.
 - c. Roll/Seaming Layout.
 - d. Methods of attachment, field openings, and perimeter conditions.
 - e. Dimensions and colors for the centerfield logo.
 - f. At no cost to the Owner the Turf/Manufacturer shall engage the services of an independent testing laboratory to test the Dimensional Stability of the specific turf product that will be utilized on this field in accordance with ASTM Standard D1204 (modified) – *Linear Dimensional Changes of Nonrigid Thermoplastic Sheeting of Film at Elevated Temperatures*. The turf shall be tested with a minimum of 20 “hot” and 20 “cold” cycles with temperature range from zero degrees (cold) to 180 degrees (hot) Fahrenheit. Testing results should be provided to the Engineer for review prior to approval of the manufacturing of the turf for the project.
 2. The Turf Manufacturer/Vendor shall submit:
 - a. The fiber manufacturer's name, type of fiber, and composition of the fiber
 - b. Infill manufacturer's name, composition of material, and MSDS and other related environmental test data.
 - c. A list of the chemical composition of all components of the turf system, including but not limited to infill material(s), turf fiber, and backing material(s)
 - d. Certification that turf fiber is comprised of 100% polyethylene fiber.

- e. Rag samples for colors to be used in the field event line stripping and centerfield logo.
- E. Prior to Final Acceptance, the Contractor shall submit to the Owner:
1. Two (2) printed copies and one (1) electronic copy (pdf) of Maintenance Manuals, which will include all necessary instructions for the proper care and preventative maintenance of the synthetic turf system, including painting and markings.
 2. The testing data and certification from an approved independent testing laboratory that the finished field meets and/or exceeds the required impact attenuation G-max, as per ASTM F355 and these specifications.
 3. Project Record Documents: Record actual locations of seams, drains, or other pertinent information.
 4. Warranty: Submit Manufacturer Warranty and ensure that forms have been completed in Owner's name and registered with Manufacturer.
 5. **Attic Stock:** Provide an additional 15 feet by 20 feet of both green and "clay" turf. Provided one sack (minimum one ton) of surplus rubber infill material, separated into manageable plastic containers for storage at a location specified by the Owner. Plastic containers shall be Rubbermaid BRUTE Rollout Container(s), maximum 65 gallon size, constructed from HDPE, with heavy-duty wheel and attached lid, or approved equal.

1.5 QUALITY ASSURANCE

- A. Manufacturer/Vendor Qualifications: Company whose primary business specializes in manufacturing and installing synthetic infill athletic turf products specified in this section. The turf manufacturer/vendor and its installation personnel:
1. Must be experienced in the manufacture and self-installation of this specific type of synthetic grass surface for at least five years.
 2. Must have experience with NFHS for football, soccer, lacrosse or field hockey fields installed with the product specified in these Contract Documents.
 3. Must have fields of 75,000 sq. ft. or more of the specified material in play in the New England region for at least three years. .
- B. Installer Qualifications: Company specializing in performing the work of this section.
1. The manufacturer must provide competent workers skilled in this specific type of synthetic turf installation. Such employees shall be directly employed by the turf manufacturer/vendor or by a licensee of the Manufacturer installing the Manufacturer's products as the principal turf product. Independent subcontractors shall not be permitted. Evidence of such employment shall be submitted to the Owner prior to the installation of the turf.
 2. The designated supervisory personnel on the project must have five years of experience and be certified, in writing by the Turf Manufacturer/Vendor, as competent in the installation of this turf product, including sewing seams and proper installation of the infill mixture.

1.6 PRE-INSTALLATION MEETING

- A. Convene one week before starting work of this section.

1.7 DELIVERY, STORAGE, AND PROTECTION

- A. Deliver products to project site in wrapped condition.
- B. Store products under cover and elevated above grade.

1.8 WARRANTIES

- A. The Turf Manufacturer/Vendor shall provide a warranty to the Owner that covers defects in materials, installation, and workmanship of the turf for a period of eight years from the date of Substantial Completion. The Turf Manufacturer/Vendor shall verify in writing to the Owner that their on-site representative has inspected the installation and that the work conforms to the Manufacturer's requirements. The synthetic grass field turf must maintain an ASTM F355/ASTM F1936 measured G-max below 165 for the life of the warranty.
- B. The Turf Manufacturer/Vendor's warranty shall include general wear and damage caused from UV degradation.
- C. The Turf Manufacturer/Vendor's warranty must be supported by a third party prepaid, non-cancelable insurance policy for the full eight (8) year period from an insurance company with an AM Best rating of A- or better, no maximum limit on a single claim, no deductible or retention amount per claim. The insurance policy shall be in favor of the Owner and shall be specific to the project site.
- D. A draft copy of the full policy shall be submitted by bidders with their bid and shall indicate that such coverage is now in effect or will be in effect at the time of the execution of the contract with the Owner. The synthetic turf manufacturer/vendor shall also submit a signed affidavit affirming the warranty requirements of these specifications. The effective date of the policy shall begin at the time of substantial completion of the field and shall terminate eight (8) years thereafter.

1.9 MAINTENANCE SERVICE

- A. The Turf Manufacturer/Vendor will train the Owner's facility maintenance staff in the use of the Turf Manufacturer's/Vendor's recommended groomer and other appropriate maintenance practices. Up to eight hours of training are included in this specification.

PART 2 - PRODUCTS

2.1 APPROVED TURF MANUFACTURERS

- A. A-Turf
Cheektowaga, NY 14225

P: 888-777-6910
Local Representative:
Jim Kilmeade: 516-732-1552

B. Astroturf LLC
Dalton, GA
P: 800-723-8873
Local Representative:
Ryan Matthews – 315-439-6288

C. FieldTurf USA Inc.
175 N. Industrial Blvd
Calhoun, GA 30701
P: 800-724-2969
Local Representative:
Andrew Dyjak – 860-333-7839

D. Greenfields, USA
1131 Broad Street
Dayton, TN 37321
P: 855-773-6668
Local Representative:
Mark Curran – 978-761-5340

E. Shaw Sports Turf
185 S. Industrial Blvd
Calhoun, GA 30701
P: 866-703-4004
Local Representative:
Aaron Goebbel – 508-365-7486

F. Sprinturf LLC
146 Fairchild St., Suite 150
Daniel Island, SC 29492
P: 877-686-8873
Local Representative:
Andrew Giobbi – 202-403-4348

2.2 TURF MATERIALS

- A. The component materials of the synthetic turf consist of:
1. A carpet made of UV-resistant polyethylene slit-film fibers tufted a fibrous, either perforated or non-perforated, porous multi-layer backing.
 2. Glue, thread, paint, seaming fabric, and other materials used to install and mark the artificial turf.

- B. The installed artificial turf shall have at a **minimum** the following properties:

| Standard | Property | Specification |
|------------------|---------------------------|---------------------------------|
| ASTM D1577 | Fiber Denier (Total) | 10,800 nominal minimum |
| ASTM D418/D5848 | Pile Height | 2.0" nominal |
| ASTM D418/D5848 | Pile Weight | 40 oz./sq. yd. minimum |
| ASTM D1335 | Tuft Bind | 9 lbs. (without infill) minimum |
| ASTM D1682/D5034 | Grab Tear (width) | >200 lbs./force minimum* |
| ASTM D1682/D5034 | Grab Tear (length) | >200 lbs./force minimum* |
| ASTM D5793 | Stitch Gauge | 3/8" min. |
| ASTM D4491 | Carpet Permeability | >40 inches/hour |
| ASTM F1936 | Impact Attenuation, G-max | ≤120 (±10) @ installation |
| | | ≤165 over field life |

*Grab tear strength shall be for installed system including strength at sewn/glued seams

- C. The carpet shall consist of fibers tufted into a primary backing with a secondary backing, at a minimum.
1. The carpet shall be furnished in 15' wide rolls. Rolls shall be long enough to go from sideline to sideline without splicing.
 2. The carpet's primary backing shall be a double-layered polypropylene fabric treated with UV inhibitors. The secondary backing shall consist of an application of porous, heat-activated urethane to permanently lock the fiber tufts in place.
 3. The fiber shall be low friction, UV-resistant fiber measuring 2.0-inches high nominal. Systems other than 2.0 inches (nominal) fiber will not be permitted
- D. Thread for sewing seams of turf shall be as recommended by the synthetic Turf Manufacturer/Vendor.
- E. Glue and seaming fabric for inlaying lines and markings shall be as recommended by the synthetic Turf Manufacturer/Vendor.

2.3 INFILL MATERIALS

- A. The infill shall consist of a resilient layered granular system comprised of 30% to 50% high quality crumb rubber (SBR) and 50% to 70% graded dust-free silica sand free of foreign material. After infill placement and settlement, average infill depth shall be between 1.25" and 1.5".

2.4 MAINTENANCE EQUIPMENT

- A. Field Groomer
1. Synthetic Sports Turf Groomer (920SDE)
As Manufactured by:
GreensGroomer WorldWide, Inc.
10992 Hwy 136 E Bldg D

Indianapolis, IN 46234
Tel: 1-888-298-8852 x 2002 Fax: 1-317-298-8852

- B. Turf Sweeper w/ Magnet
 - 1. LitterKat w/ tow-behind Sports Field Magnet
As Manufactured by:
GreensGroomer WorldWide, Inc.
10992 Hwy 136 E Bldg D
Indianapolis, IN 46234
Tel: 1-888-298-8852 x 2002 Fax: 1-317-298-8852

Or Approved Equal.

PART 3 - EXECUTION

3.1 GENERAL

- A. The installation shall be performed in full compliance with the Contract Documents, approved Shop Drawings, and the instructions of the Manufacturer.
- B. Only trained technicians, skilled in the installation of athletic caliber synthetic turf systems working under the direct supervision of the approved installer supervisors, shall undertake any cutting, sewing, gluing, shearing, and topdressing or brushing operations.
- C. All designs, markings, layouts, and materials shall conform to all currently applicable NFHS rules and/or any other rules or standards that may apply to this type of synthetic grass installation. All designs, markings, and layouts must first be approved by the Owner in the form of approved shop drawings. All markings will be installed in full compliance with those drawings. Prior to the beginning of installation, the Turf Manufacturer/Vendor for the synthetic turf shall inspect and accept the sub-base for planarity. The Turf Manufacturer/Vendor shall also accept in writing that the stone base is in compliance with the synthetic Turf Manufacturer's/Vendor's specifications for permeability, compaction, and gradation. The Turf Manufacturer/Vendor shall have the dimensions of the field and locations for markings measured to verify conformity to the specifications and applicable standards. A record of the finished field as-built measurements shall be made.
- D. The existing, or supplemented base material will be tested by the General Contractor for permeability prior to the installation of the synthetic turf using the non-confined area flood test. Should the installed base not meet the requirements of the Turf Manufacturer/Vendor, the General Contractor shall be required to take all necessary corrective actions to meet the desired permeability. The General Contractor shall be responsible for the costs of all subsequent permeability tests.
- E. The Turf Manufacturer/Vendor shall provide the necessary testing data to the owner that the finished field exceeds the required shock attenuation as per ASTM F355-A.

3.2 EXAMINATION

- A. Verify that all sub-base leveling is complete prior to installation.
- B. The surface to receive the synthetic turf shall be inspected by the Turf Manufacturer/Vendor, and prior to the beginning of installation, the Manufacturer must accept the sub-base planarity in writing. The acceptance will be based on the Owner providing the Manufacturer with test results indicating that compaction and planarity are in compliance with the synthetic Turf Manufacturer's/Vendor's specifications. The surface must be perfectly clean as installation commences and shall be maintained in that condition throughout the process.
- C. The compaction of the base material shall be 95%, $\pm 1.5\%$ according to the Modified Proctor procedure (ASTM D1557), and the surface tolerance shall not exceed 0-1/4" over 10 feet and 0-1/2" from design grade.

3.3 INSTALLATION

- A. Install in accordance with Turf Manufacturer's/Vendor's instructions. The Turf Manufacturer/Vendor shall strictly adhere to the installation procedures outlined under this section. Any variance from these requirements must be accepted in writing by the Manufacturer's on-site representative and submitted to the Architect/Owner, verifying that the changes do not in any way affect the warranty. Infill materials shall be approved by the Manufacturer and installed in accordance with the Manufacturer's standard procedures.
- B. The carpet rolls are to be installed directly over the properly prepared aggregate base and fastened to the concrete curb or edge drain as shown on the plans. Extreme care should be taken to avoid disturbing the aggregate base, both in regard to compaction and planarity. A two- to five-ton static roller shall be on site and available to repair and properly compact any disturbed areas of the aggregate base.
- C. The full width rolls shall be laid out across the field. Turf shall be of sufficient length to permit full cross-field installation from sideline to sideline. No head or cross seams will be allowed in the main playing area between the sidelines. Utilizing standard state of the art sewing procedures, each roll shall be attached to the next. When all of the rolls of the playing surface have been installed, the sideline areas shall be installed at right angles to the playing field turf.
- D. This is a 99% sewn installation. Gluing of rolls shall not be acceptable. Gluing will only be permitted to repair problem areas, corner completions, and to cut in any logos or inlaid lines as required by the specifications. All seams shall be sewn using double bagger stitches and polyester thread or, in the case of inlays only, adhered using seaming tape and high grade adhesive (per the Manufacturer's standard procedures). Seams shall be flat, tight, and permanent with no separation or fraying.
- E. Infill materials shall be applied in numerous thin lifts. The turf shall be brushed as the mixture is applied. The infill material shall be installed to a depth indicated on the drawings.

- F. Infill materials shall be installed to fill the voids between the fibers and allow the fibers to remain vertical and non-directional. The infill shall be placed to expose the fibers to the depth indicated on the Contract Drawings.
- G. Synthetic turf shall be attached to the perimeter edge detail in accordance with the Manufacturer's standard procedures.

3.4 FIELD MARKINGS

- A. All markings are to be installed in accordance with the Contract Drawings and approved shop drawings.

3.5 CLEANING

- A. Protect installed field turf from subsequent construction operations.
- B. Do not permit traffic over unprotected field surface.
- C. Contractor shall provide the labor, supplies, and equipment as necessary for final cleaning of surfaces and installed items.
- D. All usable remnants of new material shall become the property of the Owner.
- E. The Contractor shall keep the area clean throughout the project and clear of debris.
- F. Surfaces, recesses, enclosures, etc. shall be cleaned as necessary to leave the work area in a clean, immaculate condition ready for immediate occupancy and use by the Owner.

3.6 ANNUAL INSPECTION, TESTING, AND REPORTING BY TURF MANUFACTURER/VENDOR

- A. On or before the annual anniversary date of acceptance of the synthetic turf by the Owner **for the term of the warranty**, the Turf Manufacturer/Vendor or its authorized representative, including any successor to the company, at no cost to the Owner shall inspect the field to identify deficiencies that may be apparent and that could have an effect on the terms and conditions of the warranty. The findings of such inspection shall be provided to the Owner within one week of such inspection. Any remedial actions that are deemed by the Owner to be the responsibility of the Turf Manufacturer/Vendor and not related to the Owner's maintenance practices shall be undertaken within 15 days of the submission of the inspection report to the Owner.

B. Annual G-max Testing

On or before the annual anniversary date of acceptance of the synthetic turf by the Owner for the term of the warranty (8 years), the Turf Manufacturer/Vendor or its authorized representative, including any successor to the company, at no additional cost to the Owner shall engage the services of an independent testing laboratory to test the impact attenuation G-max, per ASTM F1936 of the field and advise the Owner of measures to be taken to maintain the G-max within the specified limits.

END OF SECTION 32 18 14

SECTION 32 18 23.53 – CONCRETE COURT SURFACING – BID ALTERNATE NO.1

PART 1 - GENERAL

1.1 GENERAL DESCRIPTION

- A. This specification covers the application of a new wearing surface for new or existing concrete sport courts that have a sound, well-drained base of adequate thickness and stability. Surfaces should be properly sloped for good drainage, and free from cracks. The process consists of the repair of any minor depressions and cracks, followed by applications of the Plexipave System (or approved equal).

NOTE: The success of all-weather characteristics of coating is dependent on a sound base with good drainage, the concrete surface being prepared in accordance to Specification 10.0 of California Products Corporation and the U.S. Tennis Court & Track Builders Association. Care should be taken to provide adequate surface water drainage and an appropriate vapor barrier below the concrete slab. Surface variation should not exceed 1/8 inch in 10 ft. when measured in any direction with a straight edge and slope 1 inch in 10 ft., all in one plane.

1.2 RELATED SECTIONS

- A. Related Work
 - 1. Section 033800 – Post-Tensioned Concrete Court System
 - 2. Section 116823 – Playfield Equipment

PART 2 - PRODUCTS

2.1 MATERIALS

- A. Concrete Preparer – shall comply with Specification 10.13 of California Products Corporation.
- B. California Ti-Coat – shall conform with Specification 10.17 of California Products Corporation.
- C. Plexipave Court Patch Binder – shall comply with Specification 10.14 of California Products Corporation
- D. Acrylic Resurfacer – shall comply with Specification 10.8 of California Products Corporation.
- E. Plexipave Color Base – shall conform to Specification 10.5 of California Products Corporation.
- F. Plexichrome – shall conform to Specification 10.1 of California Products Corporation.
- G. Plexicolor Textured Line Paint – shall conform to Specification 10.4 of California Products Corporation.

H. Water – The water used in all mixtures shall be fresh potable.

PART 3 - EXECUTION – Concrete (new constructions)

3.1 SLAB PREPARATION

A. Surface Preparation – Concrete shall have a wood float or medium broom finish. DO NOT PROVIDE STEEL – TROWEL FINISH. DO NOT ALLOW ANY CURING AGENTS OR HARDENERS TO BE USED. Concrete must cure for a minimum of 28 days. Thoroughly remove all dirt, dust, mud, oil, and all foreign matter. Flood the surface, locate and mark all depressions greater than the thickness of a nickel.

B. Concrete Preparer – Concrete surface must be etched with Concrete Preparer solution. After drying, all latent material must be removed from the surface.

C. Depressions – After the surface has dried, fill marked depressions with Court Patch Binder according to specifications using the following mix:

100lbs. 60-80 mesh silica sand (dry)
3 gallons Plexipave Court Patch Binder
1 or 2 gallons Portland Cement, Type 1 (20lbs. min.)

D. Tack Coat – A tack coat is necessary under patches only and shall be mixed as follows:

Plexipave Court Patch Binder diluted 1 part Court Patch Binder to 2 parts water and allowed to thoroughly dry prior to patching. After patching the surface shall not vary more than 1/8" in ten feet measured in any direction.

E. Primer Coat – Mix and apply California Ti-Coat epoxy primer according to Specification 10.17. Use only on uncoated surfaces.

NOTE: Plexibond may be used as an alternate for priming concrete courts. Consult manufacturer before mixing.

F. Acrylic Filler Coat – A coat of Acrylic Resurfacer shall be applied within 1 to 3 hours of the application of Ti – Coat while still tacky to fingertip touch.

Acrylic Resurfacer – 55 gallons
Sand (60-80 mesh) – 600-900 lbs.
Water – 20-40 gallons
Liquid Yield = 112-138 gallons

3.2 PLEXIPAVE COLOR BASE AND PLEXICHROME

A. Plexipave Acrylic textured coats shall be applied on the clean, dry underlying surface in 3 applications to obtain a total quantity of not less than .15 nor more than .23 gallons per sq. yd. of area, based on the material prior to dilution. No application shall be covered by a succeeding application until thoroughly dried.

- B. Dilution with Plexichrome and water to obtain proper application consistency will be as follows:

Plexipave Color Base – 30 gallons
Plexichrome – 20 gallons
Water – 20 gallons

(NOTE: Other mix ratios may be used after consulting the manufacturer and with written approval from the owner.)

The diluted material shall be homogeneous. Segregation before or during application will not be permitted. The finished surface shall have a uniform appearance and shall be free from ridges and tool marks.

3.3 PLAYING LINES

- A. Four hours minimum after completion of the color coating, 2-inch wide, textured playing lines shall be accurately located, marked and painted with textured Plexicolor Line Paint as specified on the construction documents.

3.4 LIMITATIONS

- A. No parts of the construction involving Plexipave System shall be conducted during rainfall or when rain is imminent. The air temperature must be at least 50 degrees F and rising. Do not apply when surface temperature is in excess of 140 degrees F. The Plexipave System will not prevent surface or structural crack from reoccurring.

END OF SECTION 32 18 23.53

32 31 13 - COLOR CHAIN LINK FENCE AND GATES

PART 1 - GENERAL

1.1 SUMMARY

- A. Provide all equipment, materials, and appurtenances to do all work necessary to construct the color chain link fence and gates, as indicated on the drawings and as specified. Work includes but is not limited to the following:
 - 1. Color fence framing system
 - 2. Color chain link fence fabric

1.2 RELATED WORK

- A. Examine contract documents for requirements that affect work of this section.

1.3 QUALITY ASSURANCE

- A. Chain link fencing manufactured in accordance with the requirements of the CLFMI Manual. Manufacturer of the fencing system must be a CLFMI member.
- B. Form 818 – State of Connecticut Department of Transportation "Standard Specification for Road, Bridges, and Incidental Construction" 2020 edition with supplements shall be used for material compliance and execution of the work in this section.

1.4 SUBMITTALS

- A. Product Data: Submit catalog cuts and manufacturer's detail specifications for all materials and equipment to be incorporated into the work.
- B. Warranty: Color chain link fence systems supplied with minimum fifteen (15) year factory warranty.

PART 2 - PRODUCTS

2.1 MANUFACTURER

- A. Framework for color chain link fence systems shall conform to Ameristar® PermaCoat® PC-40™ Fence Pipe (industrial weight), as manufactured by Ameristar Fence Products in Tulsa, Oklahoma or approved equal. Qualified manufacturers shall have a minimum of five years experience manufacturing PVC coated chain link fencing.
- B. Obtain chain link fences and gates, including accessories, fittings, and fastenings, from a single source.

C. Approved Manufacturer:

Ameristar Fence Products
Phone: (800) 321-8724 Fax: (877) 926-3747

Or approved equal

2.2 MATERIAL – STEEL FRAMEWORK

- A. The steel material used to manufacture fence pipe shall be zinc-coated steel strip, galvanized by the hot-dip process conforming to the criteria of ASTM A653 and the general requirements of ASTM A924.
- B. The zinc used in the galvanizing process shall conform to ASTM B6. Weight of zinc shall be determined using the test method described in ASTM A90 and shall conform to the weight range allowance for ASTM A653, Designation G-210.
- C. The framework shall be manufactured in accordance with commercial standards to meet the strength (50,000 psi minimum yield strength) and coating requirements of the following standards: 1.) ASTM F1043, Group IC, Electrical Resistance Welded Round Steel Pipe, heavy industrial weight. 2.) M181, Type I, Grade 2, Electrical Resistance Welded Steel Pipe. 3.) RR-F-191/3, Class 1, Grade B, Electrical Resistance Welded Steel Pipe.
- D. The exterior surface of the electrical resistance weld shall be recoated with the same type of material and thickness as the basic zinc coating.
- E. The manufactured framework shall be subjected to a complete thermal stratification coating process (multi-stage, high-temperature, multi-layer) including, as a minimum, a six-stage pretreatment/wash (with zinc phosphate), an electrostatic spray application of an epoxy base, and a separate electrostatic spray application of a polyester finish.
- F. The material used for the base coat shall be a zinc-rich (gray color) thermosetting epoxy; the minimum thickness of the base coat shall be (2) mils. The material used for the finish coat shall be a thermosetting "no-mar" TGIC polyester powder; the minimum thickness of the finish coat shall be (2) mils. The stratification-coated pipe shall demonstrate the ability to endure a salt-spray resistance test in accordance with ASTM B117 without loss of adhesion for a minimum exposure time of 3,500 hours. Additionally, the coated pipe shall demonstrate the ability to withstand exposure in a weather-ometer apparatus for 1,000 hours without failure in accordance with ASTM D1499 and to show satisfactory adhesion when subjected to the crosshatch test, Method B, in ASTM D3359. The polyester finish coat shall not crack, blister, or split under normal use.
- G. The color of all framework is as indicated on the plan sheets and shall be in accordance with ASTM F934.
- H. The strength of fence pipe shall conform to the requirements of ASTM F1043; the minimum weight shall not be less than 90% of the nominal weight. The strength of line, end, corner, and pull posts shall be determined by the use of 4' or 6' cantilevered beam test. An alternative method of determining pipe strength is by the calculation of bending moment. Conformance

with this specification can be demonstrated by measuring the yield strength of a randomly selected piece of pipe from each lot and calculating the section modulus. The yield strength shall be determined according to the methods described in ASTM E8. For materials under this specification, the 0.2 offset method shall be used in determining yield strength. Terminal posts, line posts, and top/bottom rails shall be pre-cut to specified lengths.

2.3 MATERIAL – FENCE FABRIC

- A. The material for chain link fence fabric shall be manufactured from galvanized steel wire. The weight of zinc shall meet the requirements of ASTM F668, Table 4. Galvanized wire shall be PVC-coated to meet the requirements of ASTM F668. The class of the fence fabric shall be Class 2B – Fused and Bonded.
- B. Selvage: Top edge knuckled, and bottom edge knuckled.
- C. Color: The coating color for the fence fabric is as indicated on the plan sheets. Reference ASTM F688 and ASTM F934.
- D. Wire Size: The size of the steel wire core shall be as indicated on the plan sheets. The finished size of the coated wire is as indicated on the plan sheets.
- E. Height and Mesh Size: The fabric height shall be as indicated on the plan sheets with a mesh size as is indicated on the plan sheets.

2.4 MATERIAL – FENCE FITTINGS

- A. The material for fence fittings shall be manufactured to meet the requirements of ASTM F626. The coating for all fittings shall be the same PermaCoat color coating system required for the framework; the color for all fittings shall be as indicated on the plan sheets in accordance with ASTM F934.

2.5 MATERIAL – GATES

- A. Swing gates shall be manufactured and coated to meet the requirements of ASTM F900. The color of all gates shall be as indicated on plan sheets.

PART 3 - EXECUTION

3.1 EXAMINATION

- A. Verify areas to receive fencing are completed to final grades and elevations.
- B. Ensure property lines and legal boundaries of work are clearly established.

3.2 CHAIN LINK FENCE FRAMING INSTALLATION

- A. Install chain link fence in accordance with ASTM F567.
- B. Space line posts uniformly.

- C. Concrete set terminal and gate posts: Drill holes in firm, undisturbed or compacted soil. Holes should have a diameter 4 times greater than outside of post, and depths approximately 6" (150 mm) deeper than post bottom. Excavate deeper as required for adequate support in soft and loose soils, and for posts with heavy lateral loads. Set post bottom 36" (900 mm) below surface when in firm, undisturbed soil. Place concrete around posts in a continuous pour. Trowel finish around post. Slope to direct water away from posts.
- D. Gate hardware: Set keepers, stops, sleeves, and other accessories into concrete.
- E. Check each post for vertical and top alignment and maintain in position during placement and finishing operations.
- F. Bracing: Install horizontal pipe brace at mid-height for fences 6' (1830 mm) and over, on each side of terminal posts. Firmly attach with fittings. Install diagonal truss rods at these points. Install braces and adjust truss rod, ensuring posts remain plumb.
- G. Tension wire: Provide tension wire at bottom of fabric. Install tension wire before stretching fabric and attach to each post with ties or clips. Secure tension wire to fabric with 12-1/2 gauge [.0985" (2.502 mm)] hog rings 24" on center (609.6 mm).
- H. Top rail: Install lengths, 21' (6400 mm). Connect joints with sleeves for rigid connections for expansion/contraction.
- I. Rails: Center rails are to be installed when fence fabric is 12' (3658 mm) or higher or when shown on drawings. Bottom rails (optional) are to be installed when shown on drawings.

3.3 CHAIN LINK FABRIC INSTALLATION

- A. Fabric: Install fabric on security side and attach so that fabric remains in tension after pulling force is released. Leave approximately 2" (50 mm) between finish grade and bottom selvage. Attach fabric with wire ties to line posts at 15" (380 mm) on center and to rails, braces, and tension wire at 24" (600 mm) on center.
- B. Tension (stretcher) bars: Pull fabric taut; thread tension bar through fabric and attach to terminal posts with bands spaced maximum of 15" (380 mm) on center.

3.4 GATE INSTALLATION

- A. Install gates plumb, level, and secure for full opening without interference.
- B. Attach hardware by means which will prevent unauthorized removal.
- C. Adjust hardware for smooth operation.

3.5 ACCESSORIES

- A. Tie wires: Bend ends of wire to minimize hazard to persons and clothing.

B. Fasteners: Install nuts on side of fence opposite fabric side for added security.

3.6 CLEANING

A. Clean up debris and unused material and remove from the site.

END OF SECTION 32 31 13

SECTION 32 32 13 – CAST-IN-PLACE CONCRETE (SITE)

PART 1 - GENERAL

1.1 RELATED DOCUMENTS

- A. The Contractor, Subcontractors, and/or suppliers providing goods or services referenced in or related to this Section shall also be bound by the Documents identified in Division 01 Section "Summary", Paragraph 1.1A, entitled "Related Documents."
- B. RELATED SECTIONS
 - 1. Section 31 20 00 Earth Moving
 - 2. Section 32 13 73 Concrete Paving Joint Sealants

1.2 SUBMITTALS

- A. Product Data: For each type of product indicated.
- B. Design Mixtures: For each concrete mixture.
- C. Shop Drawings: For steel reinforcement and formwork.
- D. Material test reports and certificates.

1.3 SUMMARY

- A. Work under this Section specifies cast-in place concrete, including formwork, reinforcement, concrete materials, mixture design, placement procedures, and finishes.

1.4 QUALITY ASSURANCE

- A. 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."
- B. ACI Publications: Comply with the following unless modified by requirements in the Contract Documents:
 - 1. ACI 301, "Specification for Structural Concrete"
 - 2. ACI 117, "Specifications for Tolerances for Concrete Construction and Materials"
- C. Pre-installation Conference: Conduct conference at Project site.

- D. Testing and Inspection: Contractor shall employ and pay for a qualified independent laboratory to perform testing and inspection service required by these specifications.

PART 2 - PRODUCTS

2.1 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.
- 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.

2.2 STEEL REINFORCEMENT

- A. Reinforcing Bars: ASTM A 615/A 615M, Grade 60 deformed.
 - 1. Epoxy-Coated Reinforcing Bars: ASTM A 775/A 775M, epoxy coated, with less than 2 percent damaged coating in each 12-inch (300-mm) bar length.
- B. Plain-Steel Welded Wire Reinforcement: ASTM A 185, plain, fabricated from as-drawn steel wire into flat sheets.
- C. Deformed-Steel Welded Wire Reinforcement: ASTM A 497, flat sheet.
- D. Epoxy-Coated Welded Wire Reinforcement: ASTM A 884/A 884M, Class A coated, Type 1, deformed steel.
- E. 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."
- F. Dowels: as specified on the Contract Drawings.

2.3 CONCRETE MATERIALS

- A. Cementitious Material: Use the following cementitious materials, of the same type, brand, and source, throughout Project:
 - 1. Portland Cement: ASTM C 150, Type II.
- B. Normal-Weight Aggregates: ASTM C 33, graded, 3/4-inch (19-mm) nominal maximum coarse-aggregate size.
 - 1. Fine Aggregate: Free of materials with deleterious reactivity to alkali in cement.
- C. Water: ASTM C 94/C 94M and potable.
- D. Air-Entraining Admixture: ASTM C 260.

- E. Chemical Admixtures: Provide admixtures certified by manufacturer to be compatible with other admixtures and that will 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/C 494M, Type A.
 - 2. Retarding Admixture: ASTM C 494/C 494M, Type B.
 - 3. Water-Reducing and Retarding Admixture: ASTM C 494/C 494M, Type D.
 - 4. High-Range, Water-Reducing Admixture: ASTM C 494/C 494M, Type F.
 - 5. High-Range, Water-Reducing and Retarding Admixture: ASTM C 494/C 494M, Type G.
 - 6. Plasticizing and Retarding Admixture: ASTM C 1017/C 1017M, Type II.

2.4 VAPOR RETARDERS

- A. Plastic Vapor Retarder: ASTM E 1745, Class A. Include manufacturer's recommended adhesive or pressure-sensitive tape.
- B. Plastic Vapor Retarder: ASTM E 1745, Class B. Include manufacturer's recommended adhesive or pressure-sensitive tape.
- C. Plastic Vapor Retarder: ASTM E 1745, Class C, or polyethylene sheet, ASTM D 4397, not less than 10 mils (0.25 mm) thick. Include manufacturer's recommended adhesive or pressure-sensitive joint tape.

2.5 CURING MATERIALS

- A. Evaporation Retarder: Waterborne, monomolecular film forming, manufactured for application to fresh concrete.
- B. Absorptive Cover: AASHTO M 182, Class 2, burlap cloth made from jute or kenaf, weighing approximately 9 oz./sq. yd. (305 g/sq. m) when dry.
- C. Moisture-Retaining Cover: ASTM C 171, polyethylene film or white burlap-polyethylene sheet.
- D. Water: Potable.
- E. Clear, Waterborne, Membrane-Forming Curing Compound: ASTM C 309, Type 1, Class B, dissipating.
- F. Clear, Waterborne, Membrane-Forming Curing Compound: ASTM C 309, Type 1, Class B, non-dissipating [certified by curing compound manufacturer to not interfere with bonding of floor covering].
- G. Clear, Solvent-Borne, Membrane-Forming Curing and Sealing Compound: ASTM C 1315, Type 1, Class A.
- H. Clear, Waterborne, Membrane-Forming Curing and Sealing Compound: ASTM C 1315, Type 1, Class A.

2.6 RELATED MATERIALS

- A. Expansion- and Isolation-Joint-Filler Strips: [ASTM D 1751, asphalt-saturated cellulosic fiber or ASTM D 1752, cork or self-expanding cork.]

2.7 CONCRETE MIXTURES

- A. Prepare design mixtures for each type and strength of concrete, proportioned on the basis of laboratory trial mixture or field test data, or both, according to ACI 301.
- B. Proportion normal-weight concrete mixture as follows:
 1. Minimum Compressive Strength: 4400 psi at 28 days as specified on the Contract Drawings.
 2. Maximum Water-Cementitious Materials Ratio: 0.50, watertight concrete 0.45.
 3. Slump Limit: 4 inches (100 mm) for concrete with verified slump of 2 to 4 inches (50 to 100 mm) before adding high-range water-reducing admixture or plasticizing admixture , plus or minus 1 inch (25 mm).
 4. Air Content: 6 percent, plus or minus 1.5 percent at point of delivery for 3/4-inch (19-mm)] nominal maximum aggregate size.

2.8 FABRICATING REINFORCEMENT

- A. Fabricate steel reinforcement according to CRSI's "Manual of Standard Practice."

2.9 CONCRETE MIXING

- A. Ready-Mixed Concrete: Measure, batch, mix, and deliver concrete according to ASTM C 94/C 94M and ASTM C 1116 and furnish batch ticket information.
 1. When air temperature is between 85 and 90 deg F (30 and 32 deg C), reduce mixing and delivery time from 1-1/2 hours to 75 minutes; when air temperature is above 90 deg F (32 deg C), reduce mixing and delivery time to 60 minutes.

PART 3 - EXECUTION

3.1 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. Chamfer exterior corners and edges of permanently exposed concrete.

3.2 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. Provide and install a protective coating between all concrete and aluminum materials.

3.3 VAPOR RETARDERS

- A. Plastic Vapor Retarders: Place, protect, and repair vapor retarders according to ASTM E 1643 and manufacturer's written instructions.
 - 1. Lap joints 6 inches (150 mm) and seal with manufacturers recommended tape.

3.4 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.

3.5 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 the Engineer. Provide a chamfered joint in accordance with the Contract Drawings or as approved by the Engineer.
- C. Contraction Joints in Slabs-on-Grade: Form weakened-plane contraction joints, sectioning concrete into areas as indicated. Construct contraction joints for a depth equal to at least one-fourth of concrete thickness as follows:
 - 1. Grooved Joints: Form contraction joints after initial floating by grooving and finishing each edge of joint to a radius of 1/8 inch (3.2 mm). Repeat grooving of contraction joints after applying surface finishes. Eliminate groover tool marks on concrete surfaces.
 - 2. Sawed Joints: Form contraction joints with power saws equipped with shatterproof abrasive or diamond-rimmed blades. Cut 1/8-inch- (3.2-mm-) wide joints into concrete when cutting action will not tear, abrade, or otherwise damage surface and before concrete develops random contraction cracks.
- D. Expansion Joints in Slabs-on-Grade: After removing formwork, install joint-filler strips at slab junctions with vertical surfaces, such as column pedestals, foundation walls, grade beams, and other locations, as indicated.

3.6 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. 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. Consolidate placed concrete with mechanical vibrating equipment according to ACI 301.
- C. Cold-Weather Placement: Comply with ACI 306.1.
- D. Hot-Weather Placement: Comply with ACI 301.

3.7 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. Retain rubbed finish in first paragraph below with smooth-formed finish above.
- 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.
 - 2. Grout-Cleaned Finish: Wet concrete surfaces and apply grout of a consistency of thick paint to coat surfaces and fill small holes. Mix one part portland cement to one and one-half parts fine sand with a 1:1 mixture of bonding admixture and water. Add white portland cement in amounts determined by trial patches so color of dry grout will match adjacent surfaces. Scrub grout into voids and remove excess grout. When grout whitens, rub surface with clean burlap and keep surface damp by fog spray for at least 36 hours.
 - 3. Cork-Floated Finish: Wet concrete surfaces and apply a stiff grout. Mix one part portland cement and one part fine sand with a 1:1 mixture of bonding agent and water. Add white portland cement in amounts determined by trial patches so color of dry grout will match adjacent surfaces. Compress grout into voids by grinding surface. In a swirling motion, finish surface with a cork float.

- 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.

3.8 FINISHING FLOORS AND SLABS

- A. General: Comply with ACI 302.1R recommendations for screeding, re-straightening, and finishing operations for concrete surfaces. Do not wet concrete surfaces.
- B. Scratch Finish: While still plastic, texture concrete surface that has been screeded and bull-floated or darbied. Use stiff brushes, brooms, or rakes to produce finished profile amplitude of 1/4 inch (6 mm) in 1 direction.
- C. Float Finish: Consolidate surface with power-driven floats or by hand floating if area is small or inaccessible to power driven floats. Restraighten, cut down high spots, and fill low spots. Repeat float passes and restraightening until surface is left with a uniform, smooth, granular texture.
- D. Trowel Finish: After applying float finish, apply first troweling and consolidate concrete by hand or power-driven trowel. Continue troweling passes and restraighten until surface is free of trowel marks and uniform in texture and appearance. Grind smooth any surface defects that would telegraph through applied coatings or floor coverings.
- E. Trowel and Fine-Broom Finish: Apply a first trowel finish to surfaces indicated. While concrete is still plastic, slightly scarify surface with a fine broom.
 - 1. Comply with flatness and levelness tolerances for trowel finished floor surfaces.
- F. Broom Finish: Apply a broom finish with picture frame border to exterior concrete platforms, steps, and ramps, and elsewhere as indicated.

3.9 CONCRETE PROTECTING AND CURING

- A. General: Protect freshly placed concrete from premature drying and excessive cold or hot temperatures. Comply with ACI 306.1 for cold-weather protection and ACI 301 for hot-weather protection during curing.
- B. Evaporation Retarder: Apply evaporation retarder to unformed concrete surfaces if hot, dry, or windy conditions cause moisture loss approaching 0.2 lb/sq. ft. x h (1 kg/sq. m x h) before and during finishing operations. Apply according to manufacturer's written instructions after placing, screeding, and bull floating or darbying concrete, but before float finishing.
- C. Cure concrete according to ACI 308.1, by one or a combination of the following methods:
 - 1. Moisture Curing: Keep surfaces continuously moist for not less than seven days.
 - 2. Moisture-Retaining-Cover Curing: Cover concrete surfaces with moisture-retaining cover for curing concrete, placed in widest practicable width, with sides and ends lapped at least 12 inches (300 mm), and sealed by waterproof tape or adhesive. Cure

for not less than seven days. Immediately repair any holes or tears during curing period using cover material and waterproof tape.

3. Curing Compound: Apply uniformly in continuous operation by power spray or roller according to manufacturer's written instructions. Recoat areas subjected to heavy rainfall within three hours after initial application. Maintain continuity of coating and repair damage during curing period.

After curing period has elapsed, remove curing compound without damaging concrete surfaces by method recommended by curing compound manufacturer. Curing and sealing compound in subparagraph below is usually for floors and slabs and may act as a permanent surface finish.

4. Curing and Sealing Compound: Apply uniformly to floors and slabs indicated in a continuous operation by power spray or roller according to manufacturer's written instructions. Recoat areas subjected to heavy rainfall within three hours after initial application. Repeat process 24 hours later and apply a second coat. Maintain continuity of coating and repair damage during curing period.

3.10 CONCRETE SURFACE REPAIRS

- A. Defective Concrete: Repair and patch defective areas when approved by Engineer. Remove and replace concrete that cannot be repaired and patched to Engineer's approval.

3.11 FIELD QUALITY CONTROL

- A. Testing and Inspecting: Contractor shall employ and pay for a qualified independent laboratory and inspecting agency to perform testing and inspection services and prepare test reports required by these specifications.
 1. Testing Services: Tests shall be performed according to ACI 301.
 2. Concrete testing shall be performed at a minimum testing frequency of one slump, air, and temperature test per day or per 50 cubic yards of concrete placed, whichever is greater.
 3. Compressive cylinder specimens shall be prepared at the frequency of one set of cylinders per day or per 50 cubic yards of concrete placed, whichever is greater. A minimum of one 7-day cylinder and two 28-day cylinders shall be prepared per cylinder set for acceptance.

END OF SECTION 32 32 13

32 92 00 - TOPSOIL, SEEDING AND MULCHING

PART 1 – GENERAL

1.1 DESCRIPTION

- A. Contractor shall conduct furnishing, placement, grading and treatment of topsoil to finish grade elevations.

1.2 WORK INCLUDED

- A. Topsoil shall be applied in areas designated by the Engineer both inside and outside of excavation boundaries. Replacement of topsoil is required to restore grades to pre-remediation grades.
- B. Grass seed will be applied in all areas designated by the Engineer.
- C. Maintain cultivation of lawn areas, including, but not limited to: fertilization, seeding, watering, weeding and correcting the grade in areas of settlement.

1.3 SUBMITTALS

- A. Product data sheets, specifications, performance data, physical properties for the following:
 - 1. Seed mixture
 - 2. Fertilizer
- B. Manufacturer's Certificates or labels from containers certifying that the product meets the specified requirements for the following:
 - 1. Seed mixture, if pre-mixed, also show compliance with State and federal seed laws
 - 2. Fertilizers
 - 3. Shredded mulch.
- C. Identify location of topsoil source and provide brief site history.
- D. Samples (and test report), in the following quantities:
 - 1. Topsoil, five-gallon pail – Provide representative testing to indicate percent organic content for both on-site and off-site source material. Only topsoil meeting organic content specification (6% min. – 20% max.) is acceptable. Contractor is responsible for providing proof that topsoil is free from contaminants.

1.4 QUALITY ASSURANCE

- A. The Owner reserves the right to test and reject for cause any material not meeting material specifications by tests in accordance with methods adopted by the Association of Official Agricultural Chemists. Costs for these tests shall be borne by the Contractor [subcontractor].
- B. Acceptance of the final grassed areas shall be established by the Engineer in writing, following the completion of all maintenance work requirements as specified herein, and following the correction of all punch list deficiencies by the Contractor.
- C. Do not make substitutions. If specified seeding material is not obtainable, submit proof of non-availability to the Engineer, together with proposal for use of equivalent material.
- D. Analysis and standards - Package standard products with manufacturers certified analysis. For other materials, provide analysis by recognized laboratory made in accordance with methods established by the Association of Official Agricultural Chemists, wherever applicable.

1.5 DELIVERY, STORAGE AND HANDLING

- A. Deliver grass seed mixture in new, sealed, containers showing percentage of seed mix, year of production, net weight, date of packaging, and location of packaging. Seed in damaged packaging is not acceptable.
- B. Deliver fertilizer in sealed waterproof bags showing weight, chemical analysis and name of manufacturer.

1.6 JOB CONDITIONS

- A. Seeding shall be performed when weather and soil conditions are suitable in accordance with locally accepted practice, as specified herein.
- B. Seeding dates are as follows unless otherwise directed by the Owner or Engineer:

April 15 - May 30
August 15 - September 30
- C. Do not install grass seed when wind velocity exceeds 5 mph.

1.7 SEQUENCING AND SCHEDULING

- A. Coordinate the work of this Section with the respective trades responsible for installing interfacing work to ensure that the work performed thereunder is scheduled to minimize damage to lawn areas.

1.8 MAINTENANCE SERVICE

- A. Continue maintenance of seeded areas immediately after placement until grass is well established and exhibits a vigorous growing condition.

1.9 SPECIAL PRODUCT WARRANTY

- A. Warranty lawns until final acceptance.

PART 2 - PRODUCTS

2.1 MATERIALS

- A. Grass Seed - Seed mixture shall be fresh, clean, new crop seed. Grass shall be of the previous year's crop with a weed seed content of less than 0.5 percent, by weight. All seed shall comply with State and federal seed laws. Seed, which has become wet, moldy or otherwise damaged, shall not be acceptable.

- B. Seed may be mixed on-site by an approved method or pre-mixed by a dealer. If the seed is to be mixed on-site, seed shall be delivered to the site in separate containers for each variety of seed.

- C. Seed mix shall be:

Black Beauty Ultra Grass Seed
By Jonathan Green

Or approved equal

Base bid includes placement of lawn seed mix in all disturbed lawn areas and at locations as indicated on the contract drawings.

- D. Topsoil shall be natural, friable loam, free of subsoil, roots, sticks, clay, stones larger than 3/4 inch in any dimension, or any other objectionable extraneous matter or debris including but not limited to concrete or asphalt fragments. It shall contain no anthropogenic contaminants as determined by the laboratory testing specified in Section 1.03C. Topsoil shall contain at least 6 percent organic matter (humus) but not to exceed more than 20 percent organic matter and shall have a pH not less than 5.5 or more than 7.0.

- E. Additional loam, if required, shall be fertile, friable, agricultural soil, typical for locality, pH value compatible, capable of sustaining vigorous plant growth, taken from drained site; free of subsoil, clay lumps, stones, and other objects over 2 inches in diameter, and free from other impurities, plants, weeds and roots.

- F. Soil Additives - Ground agricultural limestone containing not less than 85 percent total carbonates by weight. Limestone shall be graded per the following:

1. 100 percent passing a Number 10 sieve.
 2. 90 percent passing a Number 20 sieve.
 3. 60 percent passing a Number 100 sieve.
- G. Fertilizer - 10-10-10 recommended for grass, with 50 percent of the elements derived from organic sources, of proportion necessary to eliminate any deficiencies of topsoil as indicated in analysis.
- H. Straw Mulch - Oat or wheat straw, free from weeds, foreign matter detrimental to plant life, and dry. Hay or chopped cornstalks are not acceptable.
- I. Peat Moss - Shredded, loose, sphagnum moss; free of lumps, roots, inorganic material or acidic materials. According to the methods of AOAC methods of testing, the acidity range shall be approximately 3.5 to 5.5 pH and a maximum moisture content of 30 percent. Organic matter content shall be not less than 90 percent, and ash content shall not be more than 10 percent, by weight on an oven-dry basis.
- J. Accessories - Water - Clean, fresh and free of substances or matter that could inhibit vigorous growth of vegetation.

2.2 MISCELLANEOUS LANDSCAPE MATERIALS

- A. Mulch - Provide clean, shredded bark mulch.
- B. Anti-Desiccant - Emulsion type, film-forming agent designed to permit transpiration, but retard excesses loss of moisture from plants. Deliver in manufacturer's fully identified containers and mix in accordance manufacturer's instructions.

PART 3 - EXECUTION

3.1 EXAMINATION

- A. Verify prepared soil base is properly rough graded and ready to receive the work of this Section.
- B. Verify backfilling has been inspected.
- C. Verify substrate base has been contoured and compacted.
- D. Beginning of landscaping work means acceptance of existing soil base, and site conditions.

3.2 PREPARATION

- A. Prepare subsoil to eliminate uneven areas and low spots. Maintain lines, levels, profiles and contours. Make changes in grade gradual. Blend slopes in level areas.

- B. Remove foreign materials, debris, weeds, undesirable plants, roots, branches, stones in excess of 1/2 inch in size. Remove subsoil contaminated with petroleum products, or other materials, which would inhibit healthy plant growth.
- C. Scarify subgrade to depth of 3 inches where topsoil is scheduled. Scarify in areas where equipment is used for hauling and spreading topsoil and has compacted subsoil.
- D. Saturate soil with water to test drainage.

3.3 PLACING AND TREATING TOPSOIL

- A. Place both stockpiled topsoil and additional loam during dry weather; place to achieve minimum depths as shown on the drawings, on dry unfrozen subgrade. Treat additional loam with ground limestone.
- B. Fine grade topsoil, making changes in grade gradual, eliminating rough or low areas. Blend slopes into level areas. Manually spread topsoil close to trees, plants, and building to prevent damage. Roll and fill depressions to ensure positive drainage.
- C. Remove roots, weeds, rocks and foreign material while spreading.
- D. Remove surplus subsoil and topsoil from site. Leave stockpile areas and site clean and raked ready to receive grass.
- E. Apply fertilizer in accordance with manufacturer's instructions, or testing agency recommendations (if tests are made), within 10 days of seeding, after smooth raking of topsoil and prior to roller compaction.
- F. Do not apply fertilizer at same time or with same machine as will be used to apply seed.
- G. Mix thoroughly into upper 6 inches of topsoil.
- H. Lightly water to aid the dissipation of fertilizer.
- I. After incorporation of fertilizer and limestone into the soil, fine grade seed bed to remove all ridges and depressions, and the surface cleared of all stones one inch or more in diameter and all other debris.
- J. Smooth rake again and clear surface of all stones one inch or more in diameter and all other debris.

3.4 SEEDING

- A. Apply seed by mechanical spreader at a rate 5 pounds per 1000 square feet evenly in two uniform applications. Direction of the second application shall be perpendicular to the first application. Rake in lightly.
- B. Do not seed areas in excess of that which can be mulched on same day.

- C. Do not sow immediately following rain or snow, when ground is too dry, or during windy periods.
- D. After seeding, lightly rake areas to mix 1/8 to 1/4 inch depth of soil with seed.
- E. Roll seeded area with roller of 24 inch diameter and not exceeding 90 pounds per 24 inch roller width.
- F. Immediately following seeding and compacting, apply approved straw mulch to a thickness of 1/8 inch, keeping clear of shrubs and trees.
- G. Apply water with a fine spray immediately after each area has been mulched. Saturate to 4 inches of soil.

3.5 SITE CLEANING AND REPAIR

- A. Absolutely no debris may be left on the site. Excavated material shall be removed as directed. Repair any damage to site or structures to restore them to their original condition.

3.6 PROTECTION OF LAWNS

- A. Identify lawn seeded areas with stakes and string around area periphery.
- B. Cover seed slopes where grade is 4 inches per foot or greater with erosion fabric. Roll fabric onto slopes without stretching or pulling. Lay fabric smoothly on surface, bury top end of each section in 6-inch-deep excavated topsoil trench. Provide 12-inch overlap of adjacent rolls. Backfill trench and rake smooth, level with adjacent soil. Secure outside edges and overlaps at 36-inch intervals with stakes. Lightly dress slopes with topsoil to ensure close contact between fabric and soil.
- C. At sides of ditches, lay fabric laps in direction of water flow; lap ends and edges minimum 6 inches.

3.7 MAINTENANCE

- A. Begin maintenance after planting and according to schedule provided by the Owner.
- B. See plans for additional notes regarding maintenance.

3.8 CLEANUP AND PROTECTION

- A. During landscape work, keep pavements clean and work area in an orderly condition.
- B. Protect landscape work and materials from damage due to landscape operations, operations by other contractors and trades, and trespassers. Maintain protection during

installation and maintenance periods. Treat, repair, or replace damaged landscape work as directed.

3.9 INSPECTION AND ACCEPTANCE

- A. When landscape work is completed, including maintenance, the Engineer will, upon request, make an inspection to determine acceptability.
- B. When inspected landscape work does not comply with requirements, replace rejected work and continue specified maintenance until re-inspected by the Engineer and found to be acceptable. Remove rejected materials promptly from project site.
- C. Final acceptance of seeded lawns is based on an established turf thickly uniform and well developed over 95% of the bed and ready for the Owner to use and occupy as indicated by the Owner or Engineer.

END OF SECTION 32 92 00

SECTION 32 93 00 – PLANTS – BID ALTERNATE NO.5

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. Trees
 - 2. Mulching

1.3 DEFINITIONS

- A. Backfill: The earth used to replace or the act of replacing earth in an excavation.
- B. Finish Grade: Elevation of finished surface of planting soil.
- C. Manufactured Topsoil: Soil produced off-site by homogeneously blending mineral soils or sand with stabilized organic soil amendments to produce topsoil or planting soil.
- D. Planting Soil: Native or imported topsoil, manufactured topsoil, or surface soil modified to become topsoil; mixed with soil amendments.
- E. Subgrade: Surface or elevation of subsoil remaining after completing excavation, or top surface of a fill or backfill, before placing planting soil.
- F. Subsoil: All soil beneath the topsoil layer of the soil profile, and typified by the lack of organic matter and soil organisms.

1.4 SUBMITTALS

- A. Product Data: For each type of product indicated.
- B. Product certificates.
- C. Planting Schedule: Indicating anticipated planting dates for exterior plants.
- D. Maintenance Instructions: Recommended procedures to be established by Owner for maintenance of exterior plants during a calendar year.

1.5 QUALITY ASSURANCE

- A. Installer's Field Supervision: Require Installer to maintain an experienced full-time supervisor on Project site when planting is in progress.
- B. Topsoil Analysis: Furnish soil analysis by a qualified soil-testing laboratory.
 - 1. Report suitability of topsoil for plant growth. State-recommended quantities of nitrogen, phosphorus, and potash nutrients and soil amendments to be added to produce satisfactory topsoil.
- C. Provide quality, size, genus, species, and variety of exterior plants indicated, complying with applicable requirements in ANSI Z60.1, "American Standard for Nursery Stock."
- D. Form 818 - State of Connecticut Department of Transportation "Specifications for Roads, Bridges, Facilities and Incidental Construction" and supplements shall be used for materials compliance and execution of the work in this section.
- E. Preinstallation Conference: Conduct conference at Project site.

1.6 DELIVERY, STORAGE, AND HANDLING

- A. Do not prune trees and shrubs before delivery. Protect bark, branches, and root systems from sun scald, drying, sweating, whipping, and other handling and tying damage. Do not bend or bind-tie trees or shrubs in such a manner as to destroy their natural shape. Provide protective covering of exterior plants during delivery. Do not drop exterior plants during delivery and handling.
- B. Handle planting stock by root ball.
- C. Deliver exterior plants after preparations for planting have been completed and install immediately. If planting is delayed more than six hours after delivery, set exterior plants and trees in shade, protect from weather and mechanical damage, and keep roots moist.

1.7 WARRANTY

- A. Special Warranty: Installer's standard form in which Installer agrees to repair or replace plantings that fail in materials, quality of work, or growth within specified warranty period.
 - 1. Failures include, but are not limited to, the following:
 - a. Death and unsatisfactory growth, except for defects resulting from lack of adequate maintenance, neglect, abuse by Owner, or incidents that are beyond Contractor's control.
 - b. Structural failures including plantings falling or blowing over.
 - 2. Warranty Periods from Date of Substantial Completion:
 - a. Trees and Shrubs: One year.
 - b. Ground Cover and Plants: One year.

1.8 MAINTENANCE SERVICE

- A. Initial Maintenance Service: Provide full maintenance by skilled employees of landscape Installer. Maintain as required in Part 3. Begin maintenance immediately after each area is planted and continue until plantings are acceptably healthy and well established, but for not less than maintenance period below.
 - 1. Maintenance Period for Trees and Shrubs: 12 months from date of planting completion.
 - 2. Maintenance Period for Ground Covers and Plants: 12 months from date of planting completion.

PART 2 - PRODUCTS

2.1 TREE MATERIAL

- A. General: Furnish nursery-grown trees and shrubs complying with ANSI Z60.1, with healthy root systems developed by transplanting or root pruning. Provide well-shaped, fully branched, healthy, vigorous stock free of disease, insects, eggs, larvae, and defects such as knots, sun scald, injuries, abrasions, and disfigurement.
- B. Root-Ball Depth: Furnish trees and shrubs with root balls measured from top of root ball, which shall begin at root flare according to ANSI Z60.1. Root flare shall be visible before planting.
- C. Provide balled and burlapped or container-grown trees.

2.2 TOPSOIL

- A. Topsoil: ASTM D 5268, pH range of 5.5 to 7, a minimum of 6 percent organic material content; free of stones 1 inch or larger in any dimension and other extraneous materials harmful to plant growth.
 - 1. Topsoil Source: Reuse surface soil stockpiled on-site. Verify suitability of stockpiled surface soil to produce topsoil. Clean surface soil of roots, plants, sod, stones, clay lumps, and other extraneous materials harmful to plant growth.
 - a. Supplement with imported or manufactured topsoil from off-site sources when quantities are insufficient.

2.3 INORGANIC SOIL AMENDMENTS

- A. Lime: ASTM C 602, agricultural limestone containing a minimum of 80 percent calcium carbonate equivalent and as follows:
 - 1. Class: O, with a minimum of 95 percent passing through No. 8 sieve and a minimum of 55 percent passing through No. 60 sieve.

- B. Sulfur: Granular, biodegradable, containing a minimum of 90 percent sulfur, with a minimum of 99 percent passing through No. 6 sieve and a maximum of 10 percent passing through No. 40 sieve.

2.4 ORGANIC SOIL AMENDMENTS

- A. Compost: Well-composted, stable, and weed-free organic matter, pH range of 5.5 to 8; moisture content 35 to 55 percent by weight; 100 percent passing through 3/4-inch sieve; soluble salt content of 5 to 7 decisiemens/m.
- B. Peat: Finely divided or granular texture, with a pH range of 6 to 7.5, containing partially decomposed moss peat, native peat, or reed-sedge peat and having a water-absorbing capacity of 1100 to 2000 percent.
- C. Wood Derivatives: Decomposed, nitrogen-treated sawdust, ground bark, or wood waste; of uniform texture, free of chips, stones, sticks, soil, or toxic materials.
- D. Manure: Well-rotted, unleached, stable or cattle manure containing not more than 25 percent by volume of straw, sawdust, or other bedding materials; free of toxic substances, stones, sticks, soil, weed seed, and material harmful to plant growth.

2.5 FERTILIZER

- A. Bonemeal: Commercial, raw or steamed, finely ground; a minimum of 4 percent nitrogen and 10 percent phosphoric acid.

2.6 MULCHES

- A. Organic Mulch: Ground or shredded bark.

2.7 PLANTING SOIL MIX

- A. Planting Soil Mix: Mix topsoil with the following soil amendments and fertilizers in the following quantities:
 1. Ratio of Loose Compost to Topsoil by Volume: 1:4.
 2. Ratio of Loose Peat to Topsoil by Volume: 1:4.
 3. Ratio of Loose Wood Derivatives to Topsoil by Volume: 1:4.
 4. Weight of Lime per 1000 Sq. Ft.: per PH test to achieve 6.0 – 6.5.

PART 3 - EXECUTION

3.1 PLANTING BED ESTABLISHMENT

- A. Loosen subgrade of planting beds to a minimum depth of 12 inches. Remove stones larger than 1 inch in any dimension and sticks, roots, rubbish, and other extraneous matter and legally dispose of them off Owner's property.
 - 1. Thoroughly blend planting soil mix off-site before spreading; or spread topsoil, apply soil amendments and fertilizer on surface, and thoroughly blend planting soil mix.
 - 2. Spread planting soil mix to a depth of 12 inches but not less than required to meet finish grades after natural settlement. Do not spread if planting soil or subgrade is frozen, muddy, or excessively wet.
- B. Finish Grading: Grade planting beds to a smooth, uniform surface plane with loose, uniformly fine texture. Roll and rake, remove ridges, and fill depressions to meet finish grades.

3.2 TREES

- A. Excavation of Pits and Trenches for Trees: Excavate circular pits with sides sloped inward. Install and compact approved soil mix at bottom of pit as shown on the Contract Drawings leaving center area raised slightly to support root ball and assist in drainage. Do not further disturb base. Scarify sides of plant pit smeared or smoothed during excavation.
 - 1. Excavate approximately two- and one-half times as wide as ball diameter.
- B. Before planting, verify that root flare is visible at top of root ball according to ANSI Z60.1.
- C. Stock with Root Balls: Set trees and shrubs plumb and in center of pit or trench with top of root ball flush with adjacent finish grades.
 - 1. Balled and Burlapped: Remove burlap and wire baskets from tops of root balls and partially from sides, but do not remove from under root balls. Remove pallets, if any, before setting. Do not use planting stock if root ball is cracked or broken before or during planting operation.
 - 2. Container Grown: Carefully remove root ball from container without damaging root ball or plant.
 - 3. Place planting soil mix around root ball in layers, tamping to settle mix and eliminate voids and air pockets. When pit is approximately one-half backfilled, water thoroughly before placing remainder of backfill. Repeat watering until no more water is absorbed. Water again after placing and tamping final layer of planting soil mix.
- D. Organic Mulching: Apply 4-inch average thickness of organic mulch extending 12 inches beyond edge of planting pit or trench. Do not place mulch within 3 inches of trunks or stems.

3.3 TREE PRUNING

- A. Remove only dead, dying, or broken branches. Do not prune for shape.

3.4 PLANTING BED MULCHING

- A. Mulch backfilled surfaces of planting beds and other areas indicated.
 - 1. Organic Mulch: Apply 4-inch average thickness of mulch, and finish level with adjacent finish grades. Do not place mulch against plant stems.

3.5 PLANT MAINTENANCE

- A. Tree Maintenance: Maintain plantings by pruning, cultivating, watering, weeding, fertilizing, restoring planting saucers, and resetting to proper grades or vertical position, as required to establish healthy, viable plantings. Spray or treat as required to keep trees and shrubs free of insects and disease.
- B. Protect exterior plants from damage due to landscape operations, operations by other contractors and trades, and others. Maintain protection during installation and maintenance periods. Treat, repair, or replace damaged plantings.

END OF SECTION 329300

SECTION 33 41 00 – STORM UTILITY DRAINAGE PIPING

PART 1 - GENERAL

1.1 SUMMARY

- A. This Section includes gravity-flow, non-pressure storm drainage outside the building, with the following components:
 - 1. Storm drainage pipe
 - 2. Precast concrete manholes.
 - 3. Precast concrete yard drains.

1.2 SUBMITTALS

- A. Product Data: For each type of product indicated.
- B. Shop Drawings: For manholes, catch basins, yard drains, flared end sections, hydrodynamic separators, outlet structures and stormwater chambers. Include plans, elevations, sections, details, and manhole frames and covers and catch basin frames and grates.
- C. Coordination Drawings: Show pipe sizes, locations, and elevations.
- D. Field quality-control test reports. Product Data: For each type of product indicated.

1.3 QUALITY ASSURANCE

- A. Workers: all workers shall be thoroughly trained and experienced in the necessary crafts, and completely familiar with the specified requirements and the methods needed for proper performance of the work of this section.

PART 2 - PRODUCTS

2.1 PIPING MATERIALS

- A. All materials shall conform to the applicable sections of the Standard Specifications. Storm drainage pipe shall be as indicated on the drawings and with conforming to Article M.08. Bedding shall be No. 6 crushed stone conforming to Article M.01.01 of the Standard Specifications. Joint sealant and materials, culvert ends, and elbows or specials, shall conform to the requirements of Articles M.08 of the Standard Specifications.

2.2 MANHOLES, OUTLET STRUCTURE, CATCH BASINS AND YARD DRAINS

- A. Precast Concrete, Outlet Structure, Manholes, Catch Basins Yard Drains and Concrete Galleries: The materials to be used for the work under this Item shall be those indicated on the Contract Drawings or ordered by the Engineer and shall conform to Article M.08 of the CT DOT Standard Specifications. Protective compound material shall conform to Article M.03.01.11 of the Standard Specifications. Mortar shall conform to article M.11.04 of the

CT DOT Standard Specifications. Bedding shall be No. 6 crushed stone conforming to Article M.01.01 of the Standard Specifications.

PART 3 - EXECUTION

3.1 PIPING APPLICATIONS

- A. Pipe couplings and fittings with pressure ratings at least equal to piping rating may be used in applications below, unless otherwise indicated.
 - 1. Use nonpressure-type flexible couplings where required to join gravity-flow, nonpressure sewer piping, unless otherwise indicated.
 - a. Flexible couplings for same or minor difference OD pipes.
 - b. Unshielded, increaser/reducer-pattern, flexible couplings for pipes with different OD.
 - c. Ring-type flexible couplings for piping of different sizes where annular space between smaller piping's OD and larger piping's ID permits installation.
- B. Gravity-Flow, Nonpressure Sewer Piping: As indicated on the drawings.

3.2 PIPING INSTALLATION

- A. General Locations and Arrangements: Drawing plans and details indicate general location and arrangement of underground storm drainage piping. Location and arrangement of piping layout take design considerations into account. Install piping as indicated, to extent practical. Where specific installation is not indicated, follow piping manufacturer's written instructions.
- B. Install piping beginning at low point, true to grades and alignment indicated with unbroken continuity of invert. Place bell ends of piping facing upstream. Install gaskets, seals, sleeves, and couplings according to manufacturer's written instructions for using lubricants, cements, and other installation requirements.
- C. Install manholes for changes in direction unless fittings are indicated. Use fittings for branch connections unless direct tap into existing sewer is indicated.
- D. Install proper size increasers, reducers, and couplings where different sizes or materials of pipes and fittings are connected. Reducing size of piping in direction of flow is prohibited.
- E. Clear interior of piping and manholes of dirt and superfluous material as work progresses.
- F. Join gravity-flow, nonpressure drainage piping according to the following:
 - 1. Join PVC sewer piping according to ASTM D 2321 and ASTM D 3034 for elastomeric-gasket joints.
 - 2. Join dissimilar pipe materials with nonpressure-type flexible couplings.

3.3 MANHOLE INSTALLATION

- A. General: Install manholes, complete with appurtenances and accessories indicated.
- B. Install precast concrete drainage structures sections with sealants according to ASTM C 891.

3.4 CATCH BASIN, YARD DRAINS, AND OUTLET CONTROL STRUCTURES INSTALLATION

- A. Set frames and grates to elevations indicated.

3.5 CONNECTIONS

- A. Make connections to existing piping and underground manholes.
 - 1. Use commercially manufactured wye fittings for piping branch connections. Remove section of existing pipe; install wye fitting into existing piping; and encase entire wye fitting, plus 6-inch overlap, with not less than 6 inches of concrete with 28-day compressive strength of 3000 psi.

3.6 FIELD QUALITY CONTROL

- A. Inspect interior of piping to determine whether line displacement or other damage has occurred. Inspect after approximately 24 inches of backfill is in place, and again at completion of Project.
 - 1. Submit separate report for each system inspection.
 - 2. Defects requiring correction include the following:
 - a. Alignment: Less than full diameter of inside of pipe is visible between structures.
 - b. Deflection: Flexible piping with deflection that prevents passage of ball or cylinder of size not less than 92.5 percent of piping diameter.
 - c. Crushed, broken, cracked, or otherwise damaged piping.
 - d. Infiltration: Water leakage into piping.
 - e. Exfiltration: Water leakage from or around piping.
 - 3. Replace defective piping using new materials, and repeat inspections until defects are within allowances specified.
 - 4. Re-inspect and repeat procedure until results are satisfactory.
- B. Test new piping systems, and parts of existing systems that have been altered, extended, or repaired, for leaks and defects.
 - 1. Do not enclose, cover, or put into service before inspection and approval.
 - 2. Test completed piping systems according to requirements of authorities having jurisdiction.
 - 3. Schedule tests and inspections by authorities having jurisdiction with at least 24 hours' advance notice.
 - 4. Submit separate report for each test.

5. Air Tests: Test storm drainage according to requirements of authorities having jurisdiction, UNI-B-6, and the following:
 - a. Option: Test plastic gravity sewer piping according to ASTM F 1417.
- C. Leaks and loss in test pressure constitute defects that must be repaired.
- D. Replace leaking piping using new materials, and repeat testing until leakage is within allowances specified.

END OF SECTION 33 41 00

33 46 00 - SYNTHETIC TURF SUBSURFACE DRAINAGE

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. Furnish all labor, equipment, and materials to install the Athletic Field Subsurface Drainage System, consisting of perimeter underdrain/collector pipe, geotextile, composite flat drains, and bottom and top layer stone bases all as indicated on the Contract Drawings and as specified herein.
- B. Coordinate Work with Contractor's artificial grass field Turf Manufacturer/Vendor.
- C. Related Sections:
 - 1. Section 312000 Earth Moving
 - 2. Section 334100 Storm Utility Drainage Piping

1.3 REFERENCES

- A. Comply with applicable requirements of the following standards. Should the standards conflict with other specified requirements, the most restrictive requirement shall govern.
 - 1. American Association of State Highway and Transportation Officials (AASHTO).
 - 2. American Society for Testing and Materials (ASTM):
 - F 405 Corrugated Polyethylene (PE) Tubing and Fittings
 - F 449 Subsurface Installation of Corrugated Thermoplastic Tubing for Agricultural Drainage or Water Table Control
 - F 667 8-, 10-, 12-, and 15-inch Corrugated Polyethylene Tubing and Fittings
 - 3. Occupational Safety and Health Administration (OSHA)

1.4 SUBMITTALS

- A. Provide Shop Drawings for all material to be supplied.
- B. Provide certifications stating that the materials used to comprise the system comply with the requirements.
- C. Provide bagged samples of the dynamic stone to the Engineer.
- C. Provide laboratory test results for sieve analysis, resistance to abrasion, and soundness for all stone materials.

- D. Record Drawings: Submit as-builts of the subgrade prior to installation of the dynamic stone. The record drawing of the subgrade must be accepted by the engineer/landscape architect prior to work in section being considered complete.
- E. Record Drawings: Submit as-builts of the dynamic stone prior to installation of the synthetic turf system. The record drawing of the dynamic stone must be accepted by the synthetic turf vendor/installer prior to work in section being considered complete.

1.5 QUALITY ASSURANCE

- A. Workmen: all workmen shall be thoroughly trained and experienced in the necessary crafts, and completely familiar with the specified requirements and the methods needed for proper performance of the work of this section.
- C. All piping and appurtenances shall be new, clean, and in accordance with material specifications, unless specifically noted on the plans.
- D. Pipe size and classification shall be as shown on the plans or as specified herein.
- E. Dynamic stone base material gradations shall be submitted for review prior to delivery of any material.

1.6 PRODUCT DELIVERY

- A. Take all required measures to ensure that all piping and related appurtenances are protected from damage.
- B. Special care shall be exercised during delivery and storage to avoid damage or contamination to the products.
- C. All materials shall be delivered and stored within the Contractor's work limits or in an area approved by the Owner.
- D. Products that are damaged will be removed and replaced unless the product can be repaired in a manner acceptable to the Owner
- E. Protect aggregates and base materials from soil contamination.

PART 2 – PRODUCTS

2.1 MATERIALS

- A. Perimeter Underdrain/ Collector Pipe:
 - 1. All specific pipe sizes are noted on the Contract Drawings.

2. 4" through 10" solid wall and perforated drain pipe shall be smooth interior wall conforming to AASHTO M 252, Hi-Q, as manufactured by Hancor, Inc., Findlay, Ohio or an approved equal.
 3. 12" through 36" solid wall and perforated drain pipe shall be smooth interior wall conforming to AASHTO M 294 Type S, Hi-Q, as manufactured by Hancor, Inc., Findlay, Ohio or an approved equal.
 4. Fittings and couplers shall be split couplings or snap couplings manufactured by the same manufacturer as the corrugated polyethylene pipe.
 5. Approved Equal – ADS N-12 as manufactured by Advanced Drainage Systems.
 6. Underdrain/Collector Pipe bedding shall conform to #67 stone of the requirements of Article M01.01 of the Standard Specifications.
- B. Nonwoven geotextile and shall be a nonwoven needle-punched construction and consist of long-chain polymeric fibers composed of polypropylene, polyethylene, or polyamide. The fibers shall be oriented into a multidirectional stable network whereby they retain their positions relative with each other and allow the passage of water as specified. The fabric shall be free of any chemical treatment or coating that reduces permeability and shall be inert to chemicals commonly found in soil. The geotextile shall conform to the following minimum average roll values:

| | | |
|--------------------------------|-------------|-------------------------------|
| Weight | ASTM D-3776 | 4.0 |
| Tensile Strength | ASTM D-4632 | 100 |
| Elongation % | ASTM D-4632 | 50 |
| Puncture, lb. | ASTM D-751 | 50 |
| Mullen Burst, psi | ASTM D-3786 | 200 |
| Trapezoidal Tear, lb. | ASTM D-4533 | 42 |
| Coefficient of Permeability | ASTM D-4491 | .1 cm/sec |
| Flow Rate, gpm/ft ² | ASTM D-4491 | 100 |
| Permittivity, 1/sec | ASTM D-4491 | 1.8 |
| Apparent Opening Size | ASTM D-4751 | 70 Max. US Std. Sieve Opening |
| Seam Strength, lb./ft. | ASTM D-4595 | 100 |
| Fungus | ASTM G-21 | No growth |

- B. The composite flat drain shall be made of a high-density polyethylene. The core shall be constructed of polyethylene to provide flow channels and structural integrity of the drain. The geotextile shall function only as a filter. The core of the drain shall conform to the following physical property requirements:

| | | |
|----------------------|---------------------------------------|-------------------|
| Thickness | ASTM D-1777 | 1.0 to 1.5 inches |
| Flow Rate* | ASTM D-4716 | 20 gpm/ft. |
| Compressive Strength | ASTM D-1621 (modified sand method) | 6000 psf |

*At gradient = 0.1, pressure = 10 psi for 100 hours

- C. The fittings used with the collection system shall be of a "snap together" design. In no case shall any product be joined without the use of the Manufacturer's connector designed specifically for the purpose.

- E. Dynamic Stone Base-Bottom Layer and Dynamic Stone Base-Top Layer shall conform to the following:
 1. The material shall consist of clean, washed durable broken or crushed stone and shall be the product resulting from the artificial crushing of rocks, boulders, or large cobblestones, substantially all faces of which have resulted from the crushing operation. Broken or crushed stone shall consist of sound, tough, durable stone (generally basalt, granite, gneiss), reasonably free from soft, thin, elongated, laminated, friable, micaceous or disintegrated pieces, mud, dirt, or other deleterious material and shall be sized to meet the requirements of the gradations below for each layer of stone base. The use of reclaimed miscellaneous aggregate will not be allowed for any part of the mixture for these materials.

 2. Test for Resistance to Abrasion. Gravel materials shall show a loss on abrasion of not more than 25% using AASHTO Method T 96.

 3. Soundness: When tested with magnesium sulfate solution for soundness using AASHTO Method T 104, coarse aggregate shall not have a loss of more than 12% at the end of five cycles.

 4. Gradations:

Dynamic Stone Base – Bottom Layer

ASTM 57 or ASTM 67 Stone

Dynamic Stone Base – Top Layer

| Sieve Size | Percent Passing by Weight |
|------------|---------------------------|
| ½" | 100 |
| 3/8" | 85-100 |
| #4 | 60-90 |
| #8 | 35-75 |
| #16 | 10-55 |
| #30 | 0-40 |
| #60 | 0-15 |
| #100 | 0-8 |
| #200 | 0-2 |

PART 3 – EXECUTION

3.1 PREPARATION

- A. Examine the areas and conditions under which the subsurface drainage system work is to be installed. Correct any and all conditions detrimental to the proper completion of the work. Do not proceed with the work until satisfactory conditions have been achieved.
- B. Provide a survey of the finished subgrade prior to installation of the dynamic stone for review and approval by the engineer. The as-built shall indicate spot elevations 50 feet on center, including elevations at the crown along the entire length of the subgrade. Correct all deficiencies as necessary.
- D. Do not proceed with any installations before receiving written approval from the Owner for the material.

3.2 PERIMETER UNDERDRAIN/COLLECTOR PIPE

- A. Install pipe and bedding in conformance with the Storm Drainage requirements of these specifications and as recommended by the pipe manufacturer.
- B. Excavation for installation of pipes shall be in trenches to the lines, grades and widths as per the Contract Drawings and in accordance with Safety and Health Regulations (OSHA).
- C. After installation of pipe, inspect to determine whether line displacement or other damage has occurred.
- D. Make inspections after lines have been installed prior to backfilling and during the backfilling process and again at the completion of backfilling. Backfill material shall conform to the material as specified on the contract drawings.
- E. If inspection indicates poor alignment, debris, displaced pipe, infiltration or other defects, take whatever steps are necessary to correct such defects.

3.3 GEOTEXTILE

- A. The geotextile fabric shall be installed as per Manufacturer's recommendations on the entire surface of the finished subgrade.

3.4 COMPOSITE FLAT DRAIN

- A. The composite flat drain system shall be installed true to line and grade in accordance with the Manufacturer's recommendations and in conformance with the Contract Drawings.

3.5 STONE BASES

- A. Upon the completion of constructing an approved field subgrade, the Contractor shall install both the bottom and top dynamic stone base layers within a 20'x20' test area for the purpose of determining that the Contractor means and methods of placing the material conforms to the following requirements:

1. Compaction of both layers: The dry density after compaction shall be 95%, $\pm 1.5\%$ of the dry density for the material being tested in accordance with Modified Proctor procedure according to ASTM 1557.
 2. Permeability of base top layer shall be greater than 20 in. /hr. (7.0×10^{-3} cm/ sec.)
 3. Porosity of both layers shall be greater than 25% (when base is saturated and compacted to 95% proctor).
- B. The above testing and any subsequent retesting shall be pre-formed by an independent testing laboratory with the cost borne by the Contractor.
- C. When the results of the above testing requirements are not satisfactory to the Engineer, the Contractor shall adjust his procedure as required to attain the necessary results.
- D. Upon desired test results and approval from the Engineer, the Contractor may proceed with the complete installation of bottom layer stone base and then the top layer stone base following the approved installation procedure.
- E. The surface of each stone base layer shall be formed to meet the design elevations to within $1/2"$, and the surface shall not deviate more than $1/4"$ over 10' in any direction.
- F. Check surface tolerance prior to installation of synthetic athletic surface.
- G. Provide a survey of the finished dynamic stone surface prior to installation of the synthetic turf for review and approval by the engineer and synthetic turf vendor/installer. The as-built shall indicate spot elevations 10 feet on center along the entire length of the dynamic stone. Correct all deficiencies as necessary.

END OF SECTION 33 46 00

**CITY OF MERIDEN
STANDARD SPECIFICATIONS**

SECTION 01001

INTRODUCTION TO THE TECHNICAL SPECIFICATIONS

The following Standard Specifications shall apply to the various items of work which constitute the construction contemplated under this Contract except as supplemented and/or amended by the Special Provisions contained herein. In cases of conflict between the Standard Specifications and the Special Provisions, the Special Provisions shall apply.

To avoid excessive overlapping and repetition, there are certain sections and items that are referred to in other sections. In these cases, it is understood that words such as culverts and sewer; sanitary and storm; utility and sewer; manhole and catch basins; structure and culvert; etc., are interchangeable. In cases where references are not given and the need arises for a specification, similar sections or related items shall govern.

Further, it is provided that whenever anything is, or is to be, done if, as, or, when, or where "contemplated, required, determined, directed, specified, authorized, given, designated, indicated, considered necessary, deemed necessary, permitted, reserved, suspended, established, approval, approved, disapproved, acceptable, unacceptable, sufficient, insufficient, rejected, or condemned", it shall be understood as if the expression were followed by the words "by the Engineer" or "to the Engineer".

Within the Technical Specifications and/or Special Provisions of this Contract, the following definitions shall apply:

1. "Standard Specifications": Shall mean the State of Connecticut, Department of Transportation, Bureau of Highways, "Standard Specifications for Roads, Bridges and Incidental Construction, Form 814" as amended. All applicable portions of the Standard Specifications not supplemented and/or amended shall apply. Within the applicable portions of the Standard Specifications wherein the following terms are used they shall mean respectively:

| State, Department, Commissioner | Local Public Agency |
|---------------------------------|--|
| Engineer | City of Meriden City Engineer or other authorized representative |
| Inspector | Representatives of the City of Meriden City Engineer or other authorized representative |
| Laboratory | Laboratory designated by the Engineer |

2. "Applicable Safety Code: Shall mean the latest edition including any and all amendments, revisions and additions thereto of the Federal Department of Labor, Occupational Safety and Health Administration's "Occupational Safety and Health Standards" and "Safety and Health Regulations for Construction", the State of Connecticut, Labor Department, "Construction Safety Code", or State of Connecticut "Building Code", whichever is the more stringent for the applicable requirements.

3. "Items: Reference within the text of these Specifications to Items "without a number but title only are Technical Specification Items within this Contract. Sections or Articles referred to with a number refer to the State of Connecticut Department of Transportation, Bureau of Highways Specification Sections or Articles.

4. "Local Regulatory agency(ies): Local Regulatory agency(ies) shall be defined as the governing body or authority having jurisdiction over or responsibility for a particular activity within the scope of this Contract. They "may be as specifically defined within the Special Conditions, otherwise, the Contractor shall be responsible to determine same in the local area of the Contract.

5. ""These Specifications": Where used in the text of the Technical Specifications Items shall mean the Technical Specifications of this Contract.

6. "Bid Proposal Items: Payment will "only be made for items in the "Bid Proposal . Other items may be included in the specifications but payment for items not listed in the Bid proposal will be included in the cost of other items of work. Bid Proposal items shall have the same basic alphanumeric designation as the same item in the specifications with significant suffixes added as required.

General

1. The information shown on drawings/sketches supplied by the City of Meriden Public Works Department Engineering Division represents the location of underground utilities owned by the City of Meriden, to the best of its knowledge. The users of these documents are responsible for the interpretation of this information and shall design their work accordingly. The actual location of the municipal utilities must be verified by the contractor. The City of Meriden shall not be liable for any loss, damages or claims that arise from the use of these drawings/sketches.
2. The contractor must contact "Call Before You Dig", 1-800-922-4455 for location and marking of all existing utilities prior to any excavation. Permits will not be issued until the Contractor has a valid "Call Before You Dig" number.
3. All property owners affected by the work must be notified a minimum of 48 hours prior to the beginning of construction.
4. Permittee must contact the Department of Public Works Construction Inspection at (203) 537-3202 or (203) 630-4019 a minimum of 24 hours prior to beginning construction. Failure to do so may result in shut down of activities. Public Works Construction Inspection must inspect and approve all permitted work. Work will not be accepted nor will any bonds be released without inspection and approval.
5. Contractor is responsible to protect the City's infrastructure. Claims of damage remain with contractor for repair.
6. Any excavation within the drip line of trees within the City's Right of Way must receive City Tree Warden approval prior to beginning work. Contact the City Parks Department – 460 Liberty Street, telephone number (203) 630-4259. No trees shall be removed within City ROW without permission of the City Tree Warden. Tree applications must be filed with the City Parks Department. 21 days' advance notice required.

Traffic

1. Uniformed City of Meriden Police Officer(s) to provide traffic control when required. Police Scheduling can be reached at 203-630-6305.
2. Contractor must restore pavement markings disturbed by the construction immediately upon completion of the work in materials suitable to DPW – Traffic Division. Temporary tape, if used, must be maintained in good condition until the permanent markings are placed.
3. All temporary traffic control devices must conform to the Standards of the Manual on Uniform Traffic Control Devices (M.U.T.C.D.) and the City of Meriden. A Maintenance of Traffic plan (MOT) will be required for lane closures that will last for more than 1 day.

Technical

1. All work must conform to the City Standard Specifications and Details. ConnDOT Form 818 specifications and details are to be used if City details and specifications are not available. This includes, but is not limited to: trench backfill materials; pavement repair; curb replacements; and City sidewalks.
2. Existing curbing, sidewalks, pavement and related infrastructure shall be repaired, in-kind, at no cost to the City should these be damaged during construction.
3. Contractor is responsible for maintaining trenches pending permanent pavement repair. Failure to do so may result in forfeiture of Right-of-Way license fee.

4. Pavement repair is considered temporary until a permanent patch is installed per Engineering Standard Details. One winter is required before the permanent patch can be installed. Permanent patch must be in place for at least one year prior to bond release.
5. Sidewalk repair and replacement must be in place for one year prior to bond release.
6. Sidewalk contractors must be approved by the City prior to placing sidewalk within right of way. Samples of past work are required.
7. Final asphalt repair and/or replacement must be coordinated and approved by Engineering.
8. Prior to placement of concrete, Permittee must contact Public Works Construction Inspection at (203) 537-3202 or (203) 630-4019 for form inspection.
9. Erosion and sediment controls must comply with the latest Sediment and Erosion Control Manual published by the Connecticut Department of Energy and Environmental Protection.

Utilities - Sanitary

1. All sanitary sewer laterals shall be 6" PVC, SDR 35, ASTM D-3034 with a minimum 2% slope and a minimum three feet of cover.
2. Maximum preferred slope for sewer laterals is 8%. All laterals greater than 12% will require a drop. No drops into manholes will be permitted without WPCF approval.
3. 5' recommended minimum offset from edge of main to new utilities (10' offset from water). Offsets less than 5' require approval of Department of Public Utilities.
4. Cleanouts are to be located every 100' and direction changes. Cleanouts are to be shown on plot plan. Identify cleanouts on As-built with ties. Cleanouts in driveways must be enclosed in a traffic bearing frame and cover.
5. Manholes are required at major junctions to facilitate maintenance, particularly if the junction is not easily accessible.
6. Manholes over 8 feet deep require a 5' internal diameter.
7. A backwater valve must be installed if any plumbing fixtures are below the top of the nearest upstream sanitary sewer manhole.
8. Backwater valve location to be shown on plans in addition to being indicated on General Notes. Backwater valve may be placed inside or outside house, but must be accessible for maintenance. Identify backwater valves on As-built with ties. **Backwater valves are to be installed inside the foundation, unless prior approval is granted by the Department of Public Utilities.**
9. Visual inspection required for all existing sanitary laterals prior to permitting new connection. Video inspection required for laterals over 20' in length or more than 10 years old, unless otherwise directed by the Engineer.
10. City ownership and responsibility is for the sanitary main only. Property owner is responsible for the lateral from the wye to the building, including the wye connection and all cleanouts.
11. Engineering permits required for all sewer work outside the foundation and all work within the City right of way.
12. Contractor must contact Public Works Construction Inspection at (203) 537-3202 or (203) 630-4019 to inspect and approve work. Work will not be accepted without inspection and approval.

Utilities-Water

1. Water services shall be a minimum 1", Type "K" copper. Copper pipe (minimum 1", Type K) is required between the water main and either the curb box or meter pit. Only Type K copper and ductile iron are permitted for services. Plastic pipe is not permitted outside of the foundation.
2. Repairs to water services are allowed only for copper or brass services. Iron and galvanized pipe shall be replaced from curb box to meter. Repair joints are not allowed under sidewalks.

3. New water services shall have a minimum ten feet horizontal separation and an 18” vertical separation from any sanitary sewer line. Replacement water services should achieve the greatest separation practical.
4. 5’ recommended minimum offset from edge of water main to new utilities. Offsets less than 5’ require approval of Department of Public Utilities.
5. Single Family Residential meters are 5/8” unless otherwise required. Meter pits are required as determined by the PUC or when service length exceeds 100 feet. The “City of Meriden Conceptual Approval Form” must be completed and returned to the Engineering Department for meter sizing prior to approval.
6. Meter pits shall not be placed in driveways or any traffic load bearing surfaces. A minimum 5’ offset from such surfaces is required. 2’ offset is permitted with curbing. Meter pits are to be installed per City specifications and details. Meter pits are property owner responsibility and damage to meters resulting from meter pit damage is property owner responsibility.
7. City ownership and responsibility is from the water main to, and including, the curb box, along with the physical water meter. Property owner is responsible for the lateral from the curb box to water meter and all water meter pits and connections.
8. Engineering permits required for all water work outside the foundation and all work within the City right of way.
9. Contractor to notify Public Works Utilities Inspector when work is complete.

Utilities - Other

1. The following minimum horizontal & vertical clearances between utilities shall be maintained:

Gas – Utility Separations

| <u>Utility</u> | <u>Vertical</u> | <u>Horizontal</u> |
|------------------------|-----------------|-------------------|
| Sanitary Sewer Main | 12" | 84" |
| Sanitary Sewer Lateral | 12" | 60" |
| Water Main | 12" | 60" |
| Water Service | 12" | 60" |
| Storm Sewer | 12" | 48" |

As-Builts and Survey

1. Contractor is responsible for submitting as-builts on all work, including ties to all new or modified utilities. Bonds will not be released until as-built information is submitted and approved by Engineer. Refer to “City of Meriden As-Built Requirements” document.
2. All survey monuments to be left undisturbed. If disturbance is necessary, City of Meriden Engineering Survey party to be contacted prior to work. Resetting of survey monuments must be performed by CT Licensed Surveyor.
3. Contractor may not begin work until existing monumentation is documented by City of Meriden Engineering Survey party.

SECTION 01540

MAINTENANCE AND PROTECTION OF TRAFFIC

1.0 DESCRIPTION

This work shall consist of the maintenance and protection of vehicular and pedestrian traffic on public streets and sidewalks in conformity with the requirements of this specification and other Contract Documents. The Contractor assumes full liability for the maintenance and protection of vehicular and pedestrian traffic.

2.0 MATERIALS

All signs, barricades, lights, flashers, traffic cones, trafficmen, and other items necessary to forewarn and guide vehicular and pedestrian traffic shall be of a number and quality satisfactory to the Engineer and governmental agencies having jurisdiction. The Contractor shall provide all signs, barricades, lights, flashers, traffic cones and other items necessary to forewarn and guide vehicular and pedestrian traffic.

3.0 CONSTRUCTION METHODS

- a. **GENERAL**: The Contractor shall obey all applicable state and local regulations regarding maintenance and protection of traffic.
- b. **MEETING AND PROPOSAL**: Prior to the commencement of any construction whatsoever, the Contractor shall meet with the Engineer or his representative and representatives from the Public Works and Police Department and shall present a detailed written plan showing the sequence of construction and the method of protecting vehicular and pedestrian traffic during each sequence. The plan shall show the location, width and construction details of travel lanes and the number and location of all proposed signs, barricades, flashers, traffic cones or other appurtenances to forewarn and guide traffic. Approval of the schedule of operations and plan by the Engineer shall in no way relieve the Contractor from his full responsibility for the maintenance and protection of traffic.
- c. **EXISTING STREETS OPEN**: Except as otherwise provided in this section, or permitted by the Engineer, the Contractor shall keep all existing streets open to traffic for the full length of the project and shall provide a sufficient number of travel lanes to move that traffic ordinarily using the roadway. The travel lanes shall be drained and kept reasonably smooth and in suitable condition at all times in order to provide minimum interference to traffic consistent with the proper prosecution of the work.
- d. **LANES OF TRAVEL**: Travel lanes shall be maintained by the Contractor in a suitable manner at all times. The Contractor will be responsible for removal of snow and ice on all streets and detours within the Area of Work while he is actively

prosecuting the completion of the Contract. If there is a temporary shutdown approved by the Engineer, the Contractor will not normally be responsible for snow and ice removal. The Contractor will maintain the trench in good repair during these periods.

- e. STREET CLOSINGS: The closing of any street for any purpose whatsoever shall be for the length of time and subject to the restrictions the Engineer may impose. No street will be closed without the Contractor having received prior approval of the Police Department and the Department of Public Works of the City of Meriden. The Contractor will make sure that the Fire Department and any other agencies which may be affected by the closing are notified.
- f. PEDESTRIAN TRAFFIC: ALL SIDEWALKS OPEN: Except as provided in this Section, or as permitted by the Engineer, the Contractor shall keep all public sidewalks open. On sidewalks open to the public the Contractor shall be responsible for removal of snow and ice and for repairs necessary to obtain safe pedestrian conditions. Sidewalks broken up during construction shall be removed and replaced and/or patched temporarily with bituminous concrete.

During temporary shutdowns approved by the Engineer, snow and ice removal will normally be performed by others. The Contractor will maintain the sidewalks and other pedestrian walkways in good repair during these periods.

- g. SIGNS FOR CLOSING: In those instances where the Contractor is permitted to eliminate pedestrian access, the Contractor shall erect signs to warn pedestrians of the closing. Such signs shall be erected at the nearest street intersection at either end of the sidewalk on which pedestrian access is to be eliminated. Signs shall warn pedestrians of the closing and shall indicate the nearest alternate route of pedestrian passage. In addition, barricades shall be placed to separate areas in which pedestrian access is permitted.
- h. ENGINEER'S RESTRICTIONS: Elimination of pedestrian access at any area shall be for the length of time and subject to restrictions the Engineer may impose.
- i. PEDESTRIAN DETOURS: When work is to be done which will not necessitate eliminating pedestrian access but which will temporarily interfere with pedestrian access, adequate signs, barricades and other devices shall be employed to warn pedestrians. During non-working hours pedestrian detours shall be provided such that pedestrians will not be required to travel in the street or on private property. Work temporarily interfering with pedestrian movement shall be completed and the site cleaned up as quickly as is reasonably possible.
- j. PROVISION FOR PRIVATE ACCESS: The Contractor shall schedule his operations to cause a minimum of inconvenience to occupants of existing properties within the area of work. Prior to restricting or eliminating vehicular access to any property the Contractor shall give the occupants of the property twenty-four hours

notice. Thereafter, the Contractor shall complete the items of work and restore access as rapidly as reasonably possible. Restrictions of access shall at all times be subject to the approval of the Engineer. At no time shall the Contractor prevent pedestrian access to any existing building. Where existing access is eliminated and other access substituted therefor, the substituted access shall be maintained by the Contractor to a quality equal to or better than the eliminated access

- k. **SIGNS AND OTHER WARNING DEVICES: ILLUMINATION OF WARNING DEVICES:** All signs and barricades or other appurtenances for the protection of the public shall be illuminated by lanterns, flashers, flares or other acceptable means during the hours of darkness or low visibility. The Contractor shall keep all signs in proper position, clean and legible at all times. Care shall be taken that weeds, shrubbery, construction materials or equipment and soil are not allowed to obscure any sign, light or barricade. Signs that do not apply to existing conditions shall be removed or adjusted so that the legend is not visible to approaching traffic.
- l. **MATERIALS FOR PROTECTION OF TRAFFIC:** At any time, the Engineer may order materials furnished or work performed by the Contractor as the Engineer deems necessary for the maintenance and protection of traffic. The Contractor shall comply with such orders at no additional cost to the City. The omission of the Engineer to so order shall not relieve the Contractor of his full responsibility for the maintenance and protection of traffic. If the Contractor fails to respond to the Engineer's order for work or material within the shortest reasonable time possible, the Engineer shall have the right to have the work done by other City or private forces and shall deduct the cost thereof from monies due the Contractor.

4.0 **METHOD OF MEASUREMENT:**

The costs for construction, maintenance and removal of detours, signs, barricades, flashers and all else necessary to maintain and protect traffic all in accordance with the provisions of the Contract Document will be measured for payment on a lump sum basis.

5.0 **BASIS OF PAYMENT:**

Maintenance and Protection of Vehicular and Pedestrian Traffic required for or forming a part of the work called for by the Drawings, these Specifications or other Contract Documents will be paid for at the lump sum price when the item appears in the Schedule of Prices in the Proposal. The price shall include construction, maintenance and removal of detours, signs, barricades, flashers, cones, and all else necessary to maintain and protect traffic all in accordance with the provisions of the Contract Documents

SECTION 01562

DUST CONTROL

1.0 **DESCRIPTION:**

This item shall consist of furnishing water and/or calcium chloride and spreading it on the subgrade or in other areas of a project under construction, for the purpose of allaying dust conditions.

LIMITATIONS: Calcium chloride or other chemicals shall not be used on the project in areas that could result in potential contamination of well water.

2.0 **MATERIALS:**

Calcium chloride shall conform to the requirements of AASHTO M144, except that the pellet form and the flake form shall be equally acceptable. Water shall be non-polluted.

3.0 **CONSTRUCTION METHODS:**

Calcium chloride shall be applied at the locations, at such times and in the amounts necessary to prevent and control dust from becoming a nuisance to the public and to abutting property owners. It shall be spread in such manner and by such devices that uniform distribution is attained over the entire area on which it is placed.

4.0 **METHOD OF MEASUREMENT:**

This item will not be measured for payment.

5.0 **BASIS OF PAYMENT:**

No separate payment will be made for "Dust Control". Compensation for such work, including all labor, equipment and materials, shall be considered to be included in the prices bid for other items of work.

SECTION 4.06 – HOT MIX ASPHALT PAVEMENTS

DESCRIPTION

The work under this item shall consist of furnishing hot mix asphalt (HMA) composed of mineral aggregate and asphalt binder, mixed in a central mixing plant and placed on a prepared course in accordance with the Standard Specification Sections 4.06 Revised January 1, 2011 and M.04 Revised October 1, 2012, or as amended herein.

Each course shall be constructed to the depth, typical section, or elevation required by the contract and/or plans and shall be rolled, finished, and approved before the placement of the next course.

QUALITY CONTROL

Refer to Standard Section 04.06.03-9 “Contractor Quality Control of HMA Pavement” except as amended herein.

04.06.03-9

Contractor Quality Control (QC) Requirements for HMA Placement: *A Quality Control Plan (QCP) shall be required for any project that has a total of 2500 tons or more of HMA. Quality Control is defined as all those planned and specified actions or operations necessary to produce bituminous concrete that will meet contract specification requirements. The Contractor shall be responsible for quality control throughout the production and placement operations. Therefore, the Contractor must ensure that the materials, mixture and work provided by Subcontractors, Suppliers and Producers also meet contract specification requirements.*

Quality Control Plan: *Prior to placement and production, the Contractor shall submit a QCP to the Engineer for approval. The QCP shall include separate sections; HMA Plant Production and HMA Placement. The sections shall describe the organization and procedures which the Contractor shall use to administer quality control. The QCP shall include the procedures used to control the HMA production and placement process, to determine when immediate changes to the processes are needed, and to implement the required changes. The QCP must address the actions, inspection, sampling and testing necessary to keep the production and placement operations in control, to determine when an operation has gone out of control and to respond to correct the situation and bring it back into control.*

The QCP shall also include the name and qualifications of a Quality Control Manager. The Quality Control Manager shall be responsible for the administration of the QCP, including compliance with the plan and any plan modifications. The Quality Control Manager shall be directly responsible to the Contractor and shall have the authority to make decisions where the quality of the work or product is concerned. All sampling, inspection and test reports shall be reviewed and signed by the Quality Control Manager prior to submittal to the Engineer.

The Contractor assumes the responsibility of the quality for all materials and construction incorporated into the work and will control all the processes leading to the final result through this function. Quality Control activities should include:

Maintain a Contractor Quality Control System;

Quality Control Plan when the total project tonnage is 5000 tons or more;

Proficiency testing prior to production with Engineer;

Inspection and Testing of Hot Mix Asphalt Production;

Inspection and Testing of Hot Mix Asphalt Placement.

QUALITY ACCEPTANCE

The City of Meriden, or their authorized agent, will perform the Quality Acceptance function for this work. All material will be considered for acceptance through a sampling and testing program performed by the Engineer or their agent. Quality Acceptance activities include:

- Proficiency testing prior to production with Contractor;
- Inspection of HMA Production Plant and Testing Laboratory;
- Production Trials of HMA Products Intended For Use in Meriden;
- Inspection/Testing for Acceptance of Hot Mix Asphalt Production;
- Inspection/Testing for Acceptance of Hot Mix Asphalt Placement;
- HMA Quality Acceptance Daily Report of Activities;

MATERIALS

Aggregate

Refer to Standard Section M.04.01 and as noted herein.

M.04.01

Bituminous Concrete Materials and Facilities: Each source of material, and facility or plant used to produce and test bituminous concrete must be qualified on an annual basis by the Engineer. Test Procedures and Specifications referenced herein are in accordance with the latest AASHTO and ASTM Standard Test Procedures and Specifications. Such references when noted with an (M) have been modified by the Engineer and are detailed in Table M.04.03-6.

The Contractor shall submit to the Engineer all sources of coarse aggregate, fine aggregate, mineral filler, PG binder, and if applicable any additives such as but not limited to anti-strip, warm mix, and polymer modifiers. The Contractor shall submit a Material Safety Data Sheet (MSDS) for each grade of binder, and additive to be used on the Project. The Contractor shall not change any material sources without prior approval of the Engineer.

An adequate quantity of each size aggregate, mineral filler, bitumen, and additives, shall be maintained at the bituminous concrete plant site at all times while the plant is in operation to ensure that the plant can consistently produce bituminous concrete mixtures that meet the job mix formula (JMF) as specified in Article M.04.02. The quantity of such material shall be reviewed by the Engineer on an individual plant basis and is dependent upon the plant's daily production capacity. A total quantity of any material on site that amounts to less than one day's production capacity may be cause for the job mix formula to be rejected.

Aggregate shall consist of crushed stone, or crushed gravel, with or without sand or other inert finely divided mineral aggregate. The portion of the materials retained on the #4 sieve (4.75mm) shall be known as coarse aggregate, the portion passing the #4 sieve (4.75mm) and being retained by the #200 sieve (0.075mm) as fine aggregate, and the portion passing the #200 sieve (0.075mm) as mineral filler when tested in accordance with AASHTO T27 and AASHTO T11.

Coarse Aggregate

Refer to Standard Section M.04.01-1.

M.04.01-1

Coarse Aggregate:

- a. **Requirements:** *The coarse aggregate shall consist of clean, hard, tough, durable fragments of crushed stone or crushed gravel of uniform quality. Aggregates from multiple sources of supply must not be mixed or stored in the same stockpile.*
- b. **Basis of Approval:** *The request for approval of the source of supply shall include a washed sieve analysis in accordance with AASHTO T 27. The G_{sa} , G_{sb} , and P_{wa} shall be determined in accordance with AASHTO T 85. The coarse aggregate must not contain more than 1% crusher dust, sand, soft disintegrated pieces, mud, dirt, organic and other injurious materials. When tested for abrasion using AASHTO T 96, the aggregate loss must not exceed 40%. When tested for soundness using AASHTO T 104 with a magnesium sulfate solution, the coarse aggregate must not have a loss exceeding 10% at the end of 5 cycles.*

For all bituminous mixtures, materials shall also meet the coarse aggregate angularity criteria as specified in Tables M.04.02-2 thru M.04.02-4 for blended aggregates retained on the #4 sieve when tested according to ASTM D 5821. The amount of aggregate particles of the coarse aggregate blend retained on the #4 sieve that are flat or elongated shall be determined in accordance with ASTM D 4791 and shall not exceed 10% by weight when tested to a 3:1 ratio, as shown in Tables M.04.02-2 thru M.04.02-4.

**TABLE M.04.02-3
SUPERPAVE MASTER RANGE FOR CONSENSUS PROPERTIES OF COMBINED AGGREGATE STRUCTURES**

| Notes: (1) <i>If less than 25 % of a given layer is within 4 inches of the anticipated top surface, the layer may be considered to be below 4 inches for mixture design purposes.</i> | | | | | |
|--|---|--|--|---|--|
| Traffic Level | Design ESALs (80 kN) | Coarse Aggregate Angularity ⁽¹⁾ ASTM D 5821 | Fine Aggregate Angularity ⁽⁷⁾ AASHTO T 304 | Flat or Elongated Particles ASTM D 4791 | Sand Equivalent AASHTO T 176 |
| ----- | (million) | | | > # 4 | ----- |
| 1* | < 0.3 | 55/- - | 40 | 10 | 40 |
| 2 | 0.3 to < 3.0 | 75/- - | 40 | 10 | 40 |
| 3 | ≥ 3.0 | 95/90 | 45 | 10 | 45 |
| | <i>Design ESALs are the anticipated project traffic level expected on the design lane, projected over a 20 year period, regardless of the actual expected design life of the roadway.</i> | <i>Criteria presented as minimum values. 95/90 denotes that a minimum of 95% of the coarse aggregate, by mass, shall have one fractured face and that a minimum of 90% shall have two fractured faces.</i> | <i>Criteria presented as minimum percent air voids in loosely compacted fine aggregate passing the #8 sieve.</i> | <i>Criteria presented as maximum Percent by mass of flat or elongated particles of materials retained on the #4 sieve, determined at 3:1 ratio.</i> | <i>Criteria presented as minimum values for fine aggregate passing the #8 sieve.</i> |

*** NOTE: Level 1 for use by Towns and Municipalities ONLY.**

Fine Aggregate

Refer to Standard Section M.04.01-2 except that Marshall Mixtures shall have the combined aggregate structure conforming to TABLE M.04.02-3 “Superpave Master Range for Consensus Properties of Combined Aggregate Structures” Traffic Level 2, not Level 1 as indicated.

M.04.01-2

Fine Aggregate:

Requirements: The fine aggregate from each source quarry/pit deposit shall consist of clean, hard, tough, rough-surfaced and angular grains of natural sand; manufactured sand prepared from washed stone screenings; stone screenings, slag or gravel; or combinations thereof, after mechanical screening or manufactured by a process approved by the Engineer. The Contractor is prohibited from mixing two or more sources of fine aggregate on the ground for the purpose of feeding into a plant.

- a. All fine aggregate shall meet the listed criteria shown in items #1 thru #7 of Table M.04.01-1. Table M.04.01-1 indicates the quality tests and criteria required for all fine aggregate sources. Individually approved sources of supply shall not be mixed or stored in the same stockpile. The fine aggregates must be free from injurious amounts of clay, loam, and other deleterious materials.*

For Superpave mixtures, in addition to the above requirements, the fine aggregate angularity shall be determined by testing the materials passing the #8 sieve in accordance with AASHTO T 304, Method A. Qualification shall be based on the criteria listed in Tables M.04.02-2 thru M.04.02-4. The fine aggregate shall also be tested for clay content as a percentage contained in materials finer than the #8 sieve in accordance with AASHTO T 176.

Table M.04.01-1: Fine Aggregate Criteria by Pit/Quarry Source

| <i>Item</i> | <i>Title</i> | <i>AASHTO Protocol(s)</i> | <i>Criteria</i> |
|--------------------|---|--------------------------------------|--|
| <i>1</i> | <i>Grading</i> | <i>T 27 & T 11</i> | <i>100% Passing 3/8 inch 95% Passing the #4 min.</i> |
| <i>2</i> | <i>Absorption</i> | <i>T 84</i> | <i>3% maximum</i> |
| <i>3</i> | <i>Plasticity limits</i> | <i>T 90</i> | <i>0 or not detectable</i> |
| <i>4</i> | <i>L.A. Wear</i> | <i>T 96</i> | <i>50% maximum(fine agg. particle size # 8 and above)</i> |
| <i>5</i> | <i>Soundness by Magnesium Sulfate</i> | <i>T 104</i> | <i>20% maximum @ 5 cycles</i> |
| <i>6</i> | <i>Clay Lumps and Friable Particles</i> | <i>T 112</i> | <i>3% maximum</i> |
| <i>7</i> | <i>Deleterious Material</i> | <i>As determined by the Engineer</i> | <i>Organic or inorganic calcite, hematite, shale, clay or clay lumps, friable materials, coal-lignite, shells, loam, mica, clinkers, or organic matter (wood, etc). -Shall not contain more than 3% by mass of any individual listed constituent and not more than 5% by mass in total of all listed constituents.</i> |
| <i>8</i> | <i>Petrographic Analysis</i> | <i>ASTM C 295</i> | <i>Terms defined in Section M.04.01-2c.</i> |

- a. Basis of Approval: A Quality Control Plan for Fine Aggregate (QCPFA) provided by the Contractor shall be submitted for review and approval for each new source documenting how conformance to Items 1 through 7 as shown in Table M.04.01-1 is monitored. The QCPFA must be resubmitted any time the process, location or manner of how the fine aggregate (FA) is manufactured changes, or as requested by the Engineer. The QCPFA must include the locations and manufacturing processing methods. The QCPFA for any source may be suspended by the Engineer due to the production of inconsistent mixtures.*

The Contractor shall submit all test results to the Engineer for review. The Contractor shall also include a washed sieve analysis in accordance with AASHTO T 27/T 11. Any fine aggregate component or final combined product shall have 100% passing the 3/8 inch sieve and a minimum of 95% passing the # 4. The G_{sa}, G_{sb}, and P_{w_a} shall be determined in accordance with AASHTO T 84.

The Contractor will be notified by the Engineer if any qualified source of supply fails any portion of Table M.04.01-1. One retest will be allowed for the Contractor to make corrections and/or changes to the process. If, upon retest, the material does not meet the requirements of items 1-7, additional testing will be required in accordance with item 8.

- b. The Contractor may provide a Petrographic analysis of the material performed by a third party acceptable to the Engineer at its' own expense. The Contractor shall submit the results of the analysis with recommended changes to the manufacturing process to the Engineer. The Contractor shall submit fine aggregate samples for testing by the Engineer after the recommended changes have been made.*

The Contractor may request the use of such fine aggregate on select project(s) for certain applications of bituminous concrete pavement. Such material will be monitored for a period no less than 48 months, at no cost to the State. Terms of any evaluation and suitable application will be determined by the Engineer.

Mineral Filler

Refer to Standard Section M.04.01-3

M.04.01-3

Mineral Filler:

- a. Requirements: Mineral filler shall consist of finely divided mineral matter such as rock dust, including limestone dust, slag dust, hydrated lime, hydraulic cement, or other accepted mineral matter. At the time of use it shall be freely flowing and devoid of agglomerations. Mineral filler shall be introduced and controlled at all times during production in a manner acceptable to the Engineer.*
- b. Basis of Approval: The request for approval of the source of supply shall include the location, manufacturing process, handling and storage methods for the material. Mineral filler shall conform to the requirements of AASHTO M-17*

Recycled Asphalt Pavement (RAP)

Refer to Standard Sections M.04.01-5 and M.04.02-3(a) except as amended herein.

Standard Section M.04.02-1(d) Marshall Mixtures with RAP shall be deleted.

M.04.01-5

Reclaimed Asphalt Pavement (RAP):

- a. Requirements: RAP shall consist of asphalt pavement constructed with asphalt and aggregate reclaimed by cold milling or other removal techniques approved by the Engineer. For bituminous mixtures containing RAP, the Contractor shall submit a JMF in accordance with Article M.04.02 to the Engineer for review.*
- b. Basis of Approval: The RAP material will be accepted on the basis of one of the following criteria:*
 - i. When the source of all RAP material is from pavements previously constructed on Department projects, the Contractor shall provide a materials certificate listing the detailed locations and lengths of those pavements and that the RAP is only from those locations listed.*
 - ii. When the RAP material source or quality is not known, the Contractor shall test the material and provide the following information along with a request for approval to the Engineer at least 30 calendar days prior to the start of the paving operation. The request shall include a material certificate stating that the RAP consists of aggregates that meet the specification requirements of subarticles M.04.01-1 through 3 and that the binder in the RAP is substantially free of solvents, tars and other contaminants. The Contractor is prohibited from using unapproved material on Department projects and shall take necessary action to prevent contamination of approved RAP stockpiles. Stockpiles of unapproved material shall remain separate from all other RAP materials at all times. The request for approval shall include the following:*

1. A 50-pound sample of the RAP to be incorporated into the recycled mixture.
2. A 25-pound sample of the extracted aggregate from the RAP.
3. After recovery of binder from the RAP by AASHTO T 170(M), the viscosity test results shall be reported when tested at 140°F by AASHTO T 202 or T 316.
4. A statement that RAP material has been crushed to 100% passing the ½ inch sieve and remains free from contaminants such as joint compound, wood, plastic, and metals.

M.04.02-3(a)

Superpave Design Method – S0.25, S0.375, S0.5, and S1

- a. Requirements: The Contractor or its representative shall design and submit Superpave mix designs annually for approval. The design laboratory developing the mixes shall be approved by the Engineer. The mix design shall be based on the specified Equivalent Single-Axle Loads (ESAL). Each bituminous concrete mix type must meet the requirements shown in Tables M.04.02-2 thru Table M.04.02-5 and in accordance with AASHTO M 323(M) and AASHTO R 35(M). The mix design shall include the nominal maximum aggregate size and a JMF consisting of target values for gradation and bitumen content for each bituminous concrete mix type designated for the project.

The contractor shall provide test results with supporting documentation from an AASHTO Materials Reference Laboratory (AMRL) with the use of NETTCP Certified Technicians for the following tests;

1. Aggregate consensus properties for each type & level, as specified in Table M.04.02-3. In addition the G_{sa} , G_{sb} , P_{wa} shall also be provided for each component aggregate.
2. New mixes shall be tested in accordance with AASHTO T 283(M) Standard Method of Test for Resistance of Compacted Hot-Mix Asphalt (HMA) to Moisture-Induced Damage, (TSR). The compacted specimens may be fabricated at a bituminous concrete facility and then tested at an AMRL accredited facility.

The AASHTO T 283(M) test results, specimens, and corresponding JMF sheet (Form MAT-429s) shall be submitted by the Contractor for review.

The Contractor shall supply the Engineer with 1 gallon of the specified PG binder and 1 gallon of the same PG binder with the warm mix additive blended into it. The MSDS for the WMA additive shall be included with every submittal.

In addition, minimum binder content values apply to all types of bituminous concrete mixtures, as stated in Table M.04.02-5. For mixtures containing RAP, the virgin production and the anticipated proportion of binder contributed by the RAP cannot be less than the total permitted binder content value for that type nor the JMF minimum binder content.

- i. Superpave Mixture (virgin): For bituminous concrete mixtures that contain no recycled material, the limits prescribed in Tables M.04.02-2 thru Table M.04.02-5 apply. The Contractor shall submit a JMF, on a form provided by the Engineer, with the individual fractions of the aggregate expressed as percentages of the total weight of the mix and the source(s) of all materials to the Engineer for approval. The JMF shall indicate the corrected target binder content and applicable binder correction factor (ignition oven or extractor) for each mix type by total weight of mix. The mineral filler (dust) shall be defined as that portion of blended mix that passes the #200 sieve by weight when tested in accordance with AASHTO T 30(M). The dust-to-effective asphalt (D/Pbe) ratio shall be between 0.6 and 1.2 by weight. The dry/wet mix times and hot bin proportions (batch plants only) for each type shall be included in the JMF.

The percentage of aggregate passing each sieve shall be plotted on a 0.45 power gradation chart and shall be submitted for all bituminous concrete mixtures. This chart shall delineate the percentage of material passing each test sieve size as defined by the JMF. The percentage of aggregate passing each standard sieve shall fall within the specified control points, but outside the restricted zone limits as shown in Tables M.04.02-2 thru Table M.04.02-5. Mixes with documented performance history which pass through the restricted zone may be permitted for use as long as all other physical and volumetric criteria meets specifications as specified in Tables M.04.02-2 thru Table M.04.02-5 and with prior approval from the Engineer. A change in the JMF requires that a new chart be submitted.

- ii. Superpave Mixtures with RAP: Use of approved RAP may be allowed with the following conditions:

- *RAP amounts up to 15% may be used with no binder grade modification.*
- *RAP amounts up to 20% may be used provided a new JMF is approved by the Engineer. The JMF submittal shall include the grade of virgin binder added and test results that show the combined binder (recovered binder from the RAP, virgin binder at the mix design proportions and warm mix asphalt additive if used) meets the requirements of the specified binder grade.*

Unless approved by the Engineer, RAP material shall not be used with any other recycling option.

The laboratory RAP-virgin binder blend viscosity value established from the RTFO residue at 140°F (60°C) shall establish the maximum viscosity allowed for the binder after discharge from the HMA plant and/or silo storage, if applicable, when recovered by AASHTO T170 and tested in accordance with AASHTO T202 and AASHTO TP48.

For design purposes, the specific gravity of the combined aggregate blend with RAP used in a HMA mixture shall be determined in accordance with AASHTO R35.

Sampling and Testing

All aggregates samples required for testing shall be furnished by the Contractor when requested. AASHTO T2 shall be used in sampling coarse aggregate and fine aggregate, and AASHTO T127 shall be used in sampling mineral filler.

Asphalt Binder Material

The types, grades, and controlling specifications, the maximum mixing temperatures and compaction temperatures for the asphalt binder materials shall conform to the following:

Refer to Standard Section M.04.01-4 except as amended herein.

M.04.01-4

Liquid Bituminous Materials:

a. General:

- i. Liquid PG binders shall be uniformly mixed and blended and be free of contaminants such as fuel oils and other solvents. Binders shall be properly heated and stored to prevent damage or separation.*
- i. The blending at mixing plants of PG binder from different suppliers is strictly prohibited. Contractors who blend PG binders will be classified as a supplier and will be required to certify the binder in accordance with AASHTO R-26(M). The binder shall meet the requirements of AASHTO M-320(M) and AASHTO R-29(M). The Contractor shall submit a Certified Test Report and bill of lading representing each delivery in accordance with AASHTO R-26(M). The Certified Test Report must also indicate the binder specific gravity at 77°F; rotational viscosity at 275°F and 329°F and the mixing and compaction viscosity-temperature chart for each shipment.*
- ii. The Contractor shall submit the name(s) of personnel responsible for receipt, inspection, and record keeping of PG binder materials. Contractor plant personnel shall document specific storage tank(s) where binder will be transferred and stored until used, and provide binder samples to the Engineer upon request. The person(s) shall assure that each shipment (tanker truck) is accompanied by a statement certifying that the transport vehicle was inspected before loading and was found acceptable for the material shipped and that the binder will be free of contamination from any residual material, along with two (2) copies of the bill of lading.*
- iii. Basis of Approval: The request for approval of the source of supply shall list the location where the material will be manufactured, and the handling and storage methods, along with necessary certification in accordance with*

AASHTO R-26(M). Only suppliers/refineries that have an approved “Quality Control Plan for Performance Graded Binders” formatted in accordance with AASHTO R-26(M) will be allowed to supply PG binders to Department projects.

b. Neat Performance Grade (PG) Binder:

- i. PG binder shall be classified by the supplier as a “Neat” binder for each lot and be so labeled on each bill of lading. Neat PG binders shall be free from modification with: fillers, extenders, reinforcing agents, adhesion promoters, thermoplastic polymers, acid modification and other additives, and shall indicate such information on each bill of lading and certified test report.*
- ii. The asphalt binder shall be Performance Grade PG 64-22.*

c. Modified Performance Grade (PG) Binder

Unless otherwise noted, the asphalt binder shall be Performance Grade PG 76-22 asphalt modified with a Styrene-Butadiene-Styrene (SBS) polymer. The polymer modifier shall be added at either the refinery or terminal and delivered to the bituminous concrete production facility as homogenous blend. The stability of the modified binder shall be verified in accordance with ASTM D7173 using the Dynamic Shear Rheometer (DSR). The DSR $G^/\sin(\delta)$ results from the top and bottom sections of the ASTM D7173 test shall not differ by more than 10%. The results of ASTM D7173 shall be included on the Certified Test Report. The binder shall meet the requirements of AASHTO M-320(M) and AASHTO R-29(M).*

d. Warm Mix Additive or Technology:

- 1. The warm mix additive or technology must be listed on the NEAUPG Qualified Warm Mix Asphalt (WMA) Technologies List at the time of bid, which may be accessed online at http://www.neaupg.uconn.edu/wma_info.html.*
- 2. The warm mix additive shall be blended with the asphalt binder in accordance with the manufacturer’s recommendations.*
- 3. The blended binder shall meet the requirements of AASHTO M-320(M) and AASHTO R-29(M) for the specified binder grade. The Contractor shall submit a Certified Test Report showing the results of the testing demonstrating the binder grade. In addition, it must include the grade of the virgin binder, the brand name of the warm mix additive, the manufacturer’s suggested rate for the WMA additive, the water injection rate (when applicable) and the WMA Technology manufacturer’s recommended mixing and compaction temperature ranges.*

4. Cut-backs (medium cure type):

- i. Requirements: The liquid petroleum materials shall be produced by fluxing an asphalt base with appropriate petroleum distillates to produce the grade specified.*
- ii. Basis of Approval: The request for approval of the source of supply shall be submitted at least seven days prior to its use listing the location where the materials will be produced, and manufacturing, processing, handling and storage methods. The Contractor shall submit a Certified Test Report in accordance with Section 1.06 and a Material Safety Data Sheet (MSDS) for the grade to be used on the Project. The liquid asphalt shall be MC-250 conforming to AASHTO M-82.*

e. Emulsions

- i. Requirements: The emulsified asphalt shall be homogeneous and not be used if exposed to freezing temperatures.*
- ii. Basis of Approval: The request for approval of the source of supply must include the location where the materials will be produced, and manufacturing, processing, handling and storage methods.*

1. *Emulsified asphalts shall conform to the requirements of AASHTO M-140. Materials used for tack coat shall not be diluted and meet grade RS-1. When ambient temperatures are 80°F and rising, grade SS-1 or SS-1h may be substituted if accepted by the Engineer. Each shipment shall be accompanied with a Certified Test Report listing Saybolt viscosity, residue by evaporation, penetration of residue, and weight per gallon.*
2. *Cationic emulsified asphalt shall conform to the requirements of AASHTO M-208(M). Materials used for tack coat shall not be diluted and meet grade CRS-1. The settlement and demulsibility test will not be performed unless deemed necessary by the Engineer. When ambient temperatures are 80°F and rising, grade CSS-1 or CSS-1h may be substituted if accepted by the Engineer. Each shipment shall be accompanied with a Certified Test Report listing Saybolt viscosity, residue by evaporation, penetration of residue, and weight per gallon.*

The City may specify that a modified binder be used under certain traffic conditions as noted below:

TABLE 2. SUPERPAVE PGAB Adjustment for Design Traffic Conditions

| <u>Traffic Loading</u> | <u>Adjustment to PGAB Grade</u> |
|--|---|
| Standing <12mph (<20 km/h) | Increase high temperature grade by 2 grades (12° C), or 76-XX. Use low temperature grade as determined by LTTP BIND software. |
| Slow Transient 12 to 44mph (20 to 70 km/h) | Increase high temperature grade by 1 grade (6° C), or 70-XX. Use low temperature grade as determined by LTTP BIND software. |
| | |
| <u>Traffic Level (ESALs)</u> | <u>Adjustment to PGAB Grade</u> |
| 1 x 10 ⁷ to 3 x 10 ⁷ | Consideration should be given to increasing high temperature grade by 1 grade (6° C), or 70-XX. Use low temperature grade as determined by LTPP BIND software |
| >3 x 10 ⁷ | Increase high temperature grade by 1 grade (6° C), or 70-XX. Use low temperature grade as determined by LTTP BIND software. |

Asphalt Binder Anti-Stripping Additive

This specification provides for an additive to asphalt to assist in the coating of wet aggregate and to increase the resistance of the binder coating to stripping in the presence of water. The additive shall be chemically inert to asphalt (heat stable) and when blended with asphalt shall withstand storage at a temperature of 400°F (204°C) for extended periods without loss-of effectiveness.

Composition: Anti-stripping compound shall be an organic chemical compound, free from inorganic mineral salts or inorganic mineral soaps. It shall contain no ingredient harmful to the binder material or to the operator, and shall not appreciably alter the specified characteristics of the binder material.

Anti-stripping additive shall be incorporated and thoroughly dispersed in the asphalt binder material in an amount equal to the percent by weight established by the job mix formula. This percent is based on the efficiency of the additive as determined by laboratory tests.

The treated composite mixture shall have a minimum tensile strength ratio (TSR) of not less than 80, when tested in accordance with AASHTO T283 with the freeze/thaw cycle. The specimens for the

AASHTO procedure shall be 4” (100mm) in diameter, compacted with the Marshall hammer or 6” diameter molds by the Superpave gyratory compactor to the desired air void level of $7.0 \pm .5\%$.

If the TSR ratio is less than 80, the aggregates shall be treated with an approved antistripping additive in sufficient quantity to produce acceptable results. The hot mix asphalt materials and asphalt binder material that require antistripping additives (either liquid or mineral) shall continue to meet all requirements specified herein for binder and HMA. The anti-strip agent shall be included in the bid price.

The contractor shall submit the results of the TSR testing prior to production as part of the JMF submittal.

COMPOSITION OF HMA MIXTURES

Hot Mix Asphalt

HMA plant mix may be composed of a homogeneous mixture of aggregate, filler if required, bitumen, and/or additives, combined to meet the composition limits by weight and other characteristics as specified. The several aggregate fractions shall be sized, uniformly graded and combined in such proportions that the resulting mixture meets the grading requirements of these specifications.

Hot Mix Asphalt Mix Design

Delete Standard Sections M.04.02-1 and M.04.02-2 Marshall Method and Cold Patch Method and refer to Standard Section M.04.02-3.

M.04.02-3

Superpave Design Method – S0.25, S0.375, S0.5, and S1

- b. *Requirements: The Contractor or its representative shall design and submit Superpave mix designs annually for approval. The design laboratory developing the mixes shall be approved by the Engineer. The mix design shall be based on the specified Equivalent Single-Axle Loads (ESAL). Each bituminous concrete mix type must meet the requirements shown in Tables M.04.02-2 thru Table M.04.02-5 and in accordance with AASHTO M 323(M) and AASHTO R 35(M). The mix design shall include the nominal maximum aggregate size and a JMF consisting of target values for gradation and bitumen content for each bituminous concrete mix type designated for the project.*

The contractor shall provide test results with supporting documentation from an AASHTO Materials Reference Laboratory (AMRL) with the use of NETTCP Certified Technicians for the following tests;

- 3. Aggregate consensus properties for each type & level, as specified in Table M.04.02-3. In addition the G_{sa} , G_{sb} , Pw_a shall also be provided for each component aggregate.*

- 4. New mixes shall be tested in accordance with AASHTO T 283(M) Standard Method of Test for Resistance of Compacted Hot-Mix Asphalt (HMA) to Moisture-Induced Damage, (TSR). The compacted specimens may be fabricated at a bituminous concrete facility and then tested at an AMRL accredited facility.*

The AASHTO T 283(M) test results, specimens, and corresponding JMF sheet (Form MAT-429s) shall be submitted by the Contractor for review.

The Contractor shall supply the Engineer with 1 gallon of the specified PG binder and 1 gallon of the same PG binder with the warm mix additive blended into it. The MSDS for the WMA additive shall be included with every submittal.

In addition, minimum binder content values apply to all types of bituminous concrete mixtures, as stated in Table M.04.02-5. For mixtures containing RAP, the virgin production and the anticipated proportion of binder

contributed by the RAP cannot be less than the total permitted binder content value for that type nor the JMF minimum binder content.

- iii. Superpave Mixture (virgin): For bituminous concrete mixtures that contain no recycled material, the limits prescribed in Tables M.04.02-2 thru Table M.04.02-5 apply. The Contractor shall submit a JMF, on a form provided by the Engineer, with the individual fractions of the aggregate expressed as percentages of the total weight of the mix and the source(s) of all materials to the Engineer for approval. The JMF shall indicate the corrected target binder content and applicable binder correction factor (ignition oven or extractor) for each mix type by total weight of mix. The mineral filler (dust) shall be defined as that portion of blended mix that passes the #200 sieve by weight when tested in accordance with AASHTO T 30(M). The dust-to-effective asphalt (D/Pbe) ratio shall be between 0.6 and 1.2 by weight. The dry/wet mix times and hot bin proportions (batch plants only) for each type shall be included in the JMF.

The percentage of aggregate passing each sieve shall be plotted on a 0.45 power gradation chart and shall be submitted for all bituminous concrete mixtures. This chart shall delineate the percentage of material passing each test sieve size as defined by the JMF. The percentage of aggregate passing each standard sieve shall fall within the specified control points, but outside the restricted zone limits as shown in Tables M.04.02-2 thru Table M.04.02-5. Mixes with documented performance history which pass through the restricted zone may be permitted for use as long as all other physical and volumetric criteria meets specifications as specified in Tables M.04.02-2 thru Table M.04.02-5 and with prior approval from the Engineer. A change in the JMF requires that a new chart be submitted.

- iv. Superpave Mixtures with RAP: Use of approved RAP may be allowed with the following conditions:

- RAP amounts up to 15% may be used with no binder grade modification.
- RAP amounts up to 20% may be used provided a new JMF is approved by the Engineer. The JMF submittal shall include the grade of virgin binder added and test results that show the combined binder (recovered binder from the RAP, virgin binder at the mix design proportions and warm mix asphalt additive if used) meets the requirements of the specified binder grade.

Unless approved by the Engineer, RAP material shall not be used with any other recycling option.

- c. Basis of Approval: On an annual basis, the Contractor shall submit to the Engineer any bituminous concrete mix design, and JMF anticipated for use on Department projects. Prior to the start of any paving operations, the mix design and JMF must be approved by the Engineer. Bituminous concrete mixture supplied to the project without an approved mix design and JMF will be rejected. The following information must be included in the mix design submittal:
- a. Gradation, specific gravities and asphalt content of the RAP,
 - b. Source of RAP and percentage to be used.
 - c. Warm mix Technology and manufacturer's recommended additive rate and tolerances, mixing and compaction temperature ranges for the mix with and without the warm-mix technology incorporated.
 - d. Result of TSR testing, and if applicable Anti-strip manufacturer, and dosage rate.
 - e. Target Temperature at plant discharge.

Note – Testing to be performed shall be done in accordance with section M.04.03.

The JMF shall be accepted if the Plant mixture and materials meet all criteria as specified in Tables M.04.02-2 thru Table M.04.02-5. If the mixture does not meet the requirements, the contractor shall adjust the JMF within the ranges shown in Tables M.04.02-2 thru Table M.04.02-5 until an acceptable mixture is produced. All equipment, tests, and computations shall conform to the latest AASHTO R-35(M) and AASHTO M-323(M).

Any JMF, once approved, shall only be acceptable for use when it is produced by the designated plant, it utilizes the same component aggregates and binder source, and it continues to meet all criteria as specified herein, and component aggregates are maintained within the tolerances shown in Table M.04.02-2.

The Contractor shall not change any component source of supply including consensus properties after a JMF has been accepted. Before a new source of materials is used, a revised JMF shall be submitted to the Engineer for

approval. Any approved JMF applies only to the plant for which it was submitted. Only one mix with one JMF will be approved for production at any one time. Switching between approved JMF mixes with different component percentages or sources of supply is prohibited.

Superpave mixture with CRCG: In addition to subarticles M.04.02 – 3 a through c, for bituminous concrete mixtures that contain CRCG, the Contractor shall submit a materials certificate to the Engineer stating that the CRCG complies with requirements stated in Article M.04.01, as applicable. Additionally, 1% hydrated lime, or other accepted non-stripping agent, shall be added to all mixtures containing CRCG. CRCG material shall not be used with any other recycling option.

The Contractor shall submit the JMF to the City on the latest forms provided by ConnDOT along with all certifications required by this specification.

JOB MIX FORMULA (JMF)

Work shall not begin nor shall any mixture be accepted until the Engineer has reviewed and approved a job mix formula (JMF) submitted by the Contractor for each mixture.

The Engineer may approve the JMF if the production plant's current Mix Status report provided by ConnDOT, as outlined in the Standard Section M.04.02-3(c), is "A" Approved.

Delete M.04.02-3(c) "Ratings are defined as:" PPT (Pre-Production Trial) and U (No Acceptable Mix Design on File)

M.04.02-3(c)

c. Mix Status: Each facility will have each type of bituminous concrete mixture evaluated based on the previous year of production, for the next construction paving season, as determined by the Engineer. Based on the rating a type of mixture receives it will determine whether the mixture can be produced without the completion of a PPT. Ratings will be provided to each bituminous concrete producer annually prior to the beginning of the paving season.

The rating criteria are based on compliance with Air Voids and Voids in Mineral Aggregate (VMA) as indicated in Table M.04.03-3: Superpave Master Range for Bituminous Concrete Mixture Production, and are as follows:

Criteria A: Based on Air Voids. Percentage of acceptance results with passing air voids.

Criteria B: Based on Air Voids and VMA. The percentage of acceptance results with passing VMA, and the percentage of acceptance results with passing air voids, will be averaged.

The final rating assigned will be the lower of the rating obtained with Criteria A or Criteria B.

Ratings are defined as:

"A" – Approved:

A rating of "A" is assigned to each mixture type from a production facility with a current rating of 70% passing or greater.

JMF Tolerances

The job mix formula, operating with the allowable action limits for individual measurements as specified in Table 10 herein, shall be set within the design master limits specified for each mixture, as per TABLE M.04.02-2 of the Standard Specifications except that the Engineer may modify the design limits if they determine this to be necessary and in the best interest of the Engineer.

TABLE M.04.02- 2: SUPERPAVE MASTER RANGE FOR BITUMINOUS CONCRETE MIXTURE DESIGN CRITERIA

Notes:(1) Minimum Pb as specified in Table M.04.02-5. (2) Voids in Mineral Aggregates shall be computed as specified herein. (3) Control point range is also defined as the master range for that mix. (4) Dust is considered to be the percent of materials passing the #200 sieve. (5) For WMA, lower minimum aggregate temperature will require Engineer's approval. (6) For WMA and PMA, the mix temperature shall meet manufacturer's recommendations.

| Sieve | S0.25 | | | | S0.375 | | | | S0.5 | | | | S1 | | | |
|--------------------------|--|---------|-----------------|---------|-------------------------------|---------|-----------------|---------|-------------------------------|---------|-----------------|---------|-------------------------------|---------|-----------------|---------|
| | CONTROL POINTS ⁽³⁾ | | RESTRICTED ZONE | | CONTROL POINTS ⁽³⁾ | | RESTRICTED ZONE | | CONTROL POINTS ⁽³⁾ | | RESTRICTED ZONE | | CONTROL POINTS ⁽³⁾ | | RESTRICTED ZONE | |
| inches | Min (%) | Max (%) | Max (%) | Min (%) | Min (%) | Max (%) | Min (%) | Max (%) | Min (%) | Max (%) | Min (%) | Max (%) | Min (%) | Max (%) | Min (%) | Max (%) |
| 2.0 | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - |
| 1.5 | - | - | - | - | - | - | - | - | - | - | - | - | 100 | - | - | - |
| 1.0 | - | - | - | - | - | - | - | - | - | - | - | - | 90 | 100 | - | - |
| 3/4 | - | - | - | - | - | - | - | - | 100 | - | - | - | - | 90 | - | - |
| 1/2 | 100 | - | - | - | 100 | - | - | - | 90 | 100 | - | - | - | - | - | - |
| 3/8 | 97 | 100 | - | - | 90 | 100 | - | - | - | 90 | - | - | - | - | - | - |
| #4 | - | 90 | - | - | - | 90 | - | - | - | - | - | - | - | - | 39.5 | 39.5 |
| #8 | 32 | 67 | 47.2 | 47.2 | 32 | 67 | 47.2 | 47.2 | 28 | 58 | 39.1 | 39.1 | 19 | 45 | 26.8 | 30.8 |
| #16 | - | - | 31.6 | 37.6 | - | - | 31.6 | 37.6 | - | - | 25.6 | 31.6 | - | - | 18.1 | 24.1 |
| #30 | - | - | 23.5 | 27.5 | - | - | 23.5 | 27.5 | - | - | 19.1 | 23.1 | - | - | 13.6 | 17.6 |
| #50 | - | - | 18.7 | 18.7 | - | - | 18.7 | 18.7 | - | - | 15.5 | 15.5 | - | - | 11.4 | 11.4 |
| #100 | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - |
| #200 | 2.0 | 10.0 | - | - | 2.0 | 10.0 | - | - | 2.0 | 10.0 | - | - | 1.0 | 7.0 | - | - |
| Pb ⁽¹⁾ | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - |
| VMA ⁽²⁾ (%) | 16.0 ± 1 | | | | 16.0 ± 1 | | | | 15.0 ± 1 | | | | 13.0 ± 1 | | | |
| VA (%) | 4.0 ± 1 | | | | 4.0 ± 1 | | | | 4.0 ± 1 | | | | 4.0 ± 1 | | | |
| Gse | JMF value | | | | JMF value | | | | JMF value | | | | JMF value | | | |
| Gmm | JMF ± 0.030 | | | | JMF ± 0.030 | | | | JMF ± 0.030 | | | | JMF ± 0.030 | | | |
| Dust/Pbe ⁽⁴⁾ | 0.6 – 1.2 | | | | 0.6 – 1.2 | | | | 0.6 – 1.2 | | | | 0.6 – 1.2 | | | |
| Agg. Temp ⁽⁵⁾ | 280 – 350F | | | | 280 – 350F | | | | 280 – 350F | | | | 280 – 350F | | | |
| Mix Temp ⁽⁶⁾ | 265 – 325 F | | | | 265 – 325 F | | | | 265 – 325 F | | | | 265 – 325 F | | | |
| Design TSR | ≥ 80% | | | | ≥ 80% | | | | ≥ 80% | | | | ≥ 80% | | | |
| T-283 Stripping | Minimal, as determined by the Engineer | | | | | | | | | | | | | | | |

EQUIPMENT

Hot Mix Asphalt Mixing Plant

Refer to Standard Sections M.04.01-8 and as noted herein.

M.04.01-8

Plant Requirements:

a. Mixing Plant and Machinery:

The mixing plant used in the preparation of the bituminous concrete shall comply with AASHTO M-156(M)/ASTM D 995 for a Batch Plant or a Drum Dryer Mixer Plant, and be approved by the Engineer.

b. Storage Silos:

For all mixes, the Contractor may use silos for short-term storage of Superpave mixtures with prior notification and approval of the Engineer. A silo must have heated cones and an unheated silo cylinder if it does not contain a separate internal heating system. Prior approval must be obtained for storage times greater than those indicated. When multiple silos are filled, the Contractor shall discharge one silo at a time. Simultaneous discharge of multiple silos is not permitted.

| <u>Type of silo cylinder</u> | <u>Maximum storage time for all classes (hr)</u> | |
|------------------------------|--|---------------------|
| | HMA | WMA/PMA |
| Open Surge | 4 | Mfg Recommendations |
| Unheated – Non-insulated | 8 | Mfg Recommendations |
| Unheated – Insulated | 18 | Mfg Recommendations |
| Heated – No inert gas | TBD by the Engineer | |

c. Documentation System: *The mixing plant documentation system shall include equipment for accurately proportioning the components of the mixture by weight and in the proper order, controlling the cycle sequence and timing the mixing operations. Recording equipment shall monitor the batching sequence of each component of the mixture and produce a printed record of these operations on each delivery ticket, as specified herein. Material feed controls shall be automatically or manually adjustable to provide proportions within the tolerances listed below for any batch size.*

An asterisk () shall be automatically printed next to any individual batch weight(s) exceeding the tolerances in ASTM D 995 section 8.7.3. The entire batching and mixing interlock cut-off circuits shall interrupt and stop the automatic batching operations when an error exceeding the acceptable tolerance occurs in proportioning.*

There must be provisions so that scales are not manually adjusted during the printing process. In addition, the system shall be interlocked to allow printing only when the scale has come to a complete rest. A unique printed character (m) shall automatically be printed on the truck and batch plant printout when the automatic batching sequence is interrupted or switched to auto-manual or full manual during proportioning. For each day's production, each project shall be provided a clear, legible copy of these recordings on each delivery ticket.

d. Aggregates: *The Contractor shall ensure that aggregate stockpiles are managed to provide uniform gradation and particle shape, prevent segregation and cross contamination in a manner acceptable to the Engineer. For drum plants only, the Contractor shall determine the percent moisture content at a minimum, prior to production and half way through production.*

e. Mixture: *The dry and wet mix times shall be sufficient to provide proper coating (minimum 95% as determined by AASHTO T 195(M)) of all particles with bitumen and produce a uniform mixture.*

The Contractor shall make necessary adjustments to ensure all types of bituminous concrete mixtures contain no more than 0.5% moisture throughout when tested in accordance with AASHTO T 329.

- f. RAP: The Contractor shall indicate the percent of RAP, the moisture content (as a minimum determined twice daily – prior to production and halfway through production), and the net dry weight of RAP added to the mixture on each truck ticket. For each day of production, the production shall conform to the job mix formula and RAP percentage and no change shall be made without the prior approval of the Engineer.
- g. Asphalt Binder: The last day of every month, a binder log shall be submitted when the monthly production for the Department exceeds 5000 tons. Blending of PG binders from different suppliers or grades at the bituminous concrete production facility is strictly prohibited.
- h. Warm mix additive: For mechanically foamed WMA, the maximum water injection rate shall not exceed 2.0% water by total weight of binder and the water injection rate shall be constantly monitored during production.
- i. Field Laboratory: The Contractor shall furnish the Engineer an acceptable field laboratory at the production facility to test bituminous concrete mixtures during production. The field laboratory shall have a minimum of 300 square feet, have a potable water source and drainage in accordance with the CT Department of Public Health Drinking Water Division, be equipped with all necessary testing equipment as well as with a PC, printer, and telephone with a dedicated hard-wired phone line. In addition, the PC shall have a high speed internet connection with a minimum upstream of 384 Kbps and a functioning web browser with unrestricted access to <https://ctmail.ct.gov>. This equipment shall be maintained in clean and good working order at all times and be made available for use by the Engineer.

The laboratory shall be equipped with a suitable heating system capable of maintaining a minimum temperature of 65°F. It shall be clean and free of all materials and equipment not associated with the laboratory. Windows shall be installed to provide sufficient light and ventilation. During summer months adequate cooling or ventilation must be provided so the indoor air temperature shall not exceed the ambient outdoor temperature. Light fixtures and outlets shall be installed at convenient locations, and a telephone shall be within audible range of the testing area. The laboratory shall be equipped with an adequate workbench that has a suitable length, width, and sampling tables, and be approved by the Engineer.

The field laboratory testing apparatus, supplies, and safety equipment shall be capable of performing all tests in their entirety that are referenced in AASHTO R 35(M), Standard Practice for Superpave Volumetric Design for Hot-Mix Asphalt (HMA) and AASHTO M 323, Standard Specification for Superpave Volumetric Mix Design. In addition, the quantity of all equipment and supplies necessary to perform the tests must be sufficient to initiate and complete the number of tests identified in Table M.04.03-2 for the quantity of mixture produced at the facility on a daily basis. The Contractor shall ensure that the Laboratory is adequately supplied at all times during the course of the project with all necessary testing materials and equipment.

The Contractor shall maintain a list of laboratory equipment used in the acceptance testing processes including but not limited to, balances, scales, manometer/vacuum gauge, thermometers, gyratory compactor, clearly showing calibration and/or inspection dates, in accordance with AASHTO R-18. The Contractor shall notify the Engineer if any modifications are made to the equipment within the field laboratory. The Contractor shall take immediate action to replace, repair, and/or recalibrate any piece of equipment that is out of calibration, malfunctioning, or not in operation.

Hauling Equipment

Refer to Standard Section 4.06.03-2.

4.06.03-2

Transportation of Mixture: Trucks with loads of bituminous concrete being delivered to State projects must not exceed the statutory or permitted load limits referred to as gross vehicle weight (GVW). The Contractor shall furnish a list of all vehicles and allowable weights transporting mixture.

The State reserves the right to check the gross and tare weight of any delivery truck. A variation of 0.4 percent or less in the gross or tare weight shown on the delivery ticket and the certified scale weight shall be considered evidence that the weight shown on the delivery ticket is correct. If the gross or tare weight varies from that shown on the delivery ticket by more than 0.4 percent, the Engineer will recalculate the net weight. The Contractor shall take action to correct discrepancy to the satisfaction of the Engineer.

If a truck delivers mixture to the project and the ticket indicates that the truck is overweight, the load will not be rejected but a "Measured Weight Adjustment" will be taken in accordance with Article 4.06.04.

The mixture shall be transported from the mixing plant in trucks that have previously been cleaned of all foreign material and that have no gaps through which mixture might inadvertently escape. The Contractor shall take care in loading trucks uniformly so that segregation is minimized. Loaded trucks shall be tightly covered with waterproof covers acceptable to the Engineer. Mesh covers are prohibited. The front and rear of the cover must be fastened to minimize air infiltration. The Contractor shall assure that all trucks are in conformance with this specification. Trucks found not to be in conformance shall not be allowed to be loaded until re-inspected to the satisfaction of the Engineer.

Truck body coating and cleaning agents must not have a deleterious effect on the transported mixture. The use of solvents or fuel oil, in any concentration, is strictly prohibited for the coating of the inside of truck bodies. When acceptable coating or agents are applied, truck bodies shall be raised immediately prior to loading to remove any excess agent in an environmentally acceptable manner.

Pavers, Rollers, Lighting and Material Transfer Vehicle

Refer to Standard Section 4.06.03-3.

4.06.03-3

Paving Equipment: *The Contractor shall have the necessary paving and compaction equipment at the project site to perform the work. All equipment shall be in good working order and any equipment that is worn, defective or inadequate for performance of the work shall be repaired or replaced by the Contractor to the satisfaction of the Engineer. During the paving operation, the use of solvents or fuel oil, in any concentration, is strictly prohibited as a release agent or cleaner on any paving equipment (i.e., rollers, pavers, transfer devices, etc.).*

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.

Pavers: *Each paver shall have a receiving hopper with sufficient capacity to provide for a uniform spreading operation and a distribution system that places the mix uniformly, without segregation. The paver shall be equipped with and use a vibratory screed system with heaters or burners. The screed system shall be capable of producing a finished surface of the required evenness and texture without tearing, shoving, or gouging the mixture. Pavers with extendible screed units as part of the system shall have auger extensions and tunnel extenders as necessary. Automatic screed controls for grade and slope shall be used at all times unless otherwise authorized by the Engineer. The controls shall automatically adjust the screed to compensate for irregularities in the preceding course or existing base. The controls shall maintain the proper transverse slope and be readily adjustable, and shall operate from a fixed or moving reference such as a grade wire or floating beam.*

Rollers: *All rollers shall be self-propelled and designed for compaction of bituminous concrete. Rollers types shall include steel-wheeled, pneumatic or a combination thereof and may be capable of operating in a static or dynamic mode. Rollers that operate in a dynamic mode shall have drums that use a vibratory or oscillatory system or combination of. The vibratory system achieves compaction through vertical amplitude forces. Rollers with this system shall be equipped with indicators that provide the operator with amplitude, frequency and speed settings/readouts to measure the impacts per foot during the compaction process. The oscillatory system achieves compaction through horizontal shear forces. Rollers with this system shall be equipped with frequency indicators. Rollers can operate in the dynamic mode using the oscillatory system on concrete structures such as bridges and catch basins if at the lowest frequency setting.*

Pneumatic tire rollers shall be self-propelled and equipped with wide-tread compaction tires capable of exerting an average contact pressure from 60 to 90 pounds per square inch uniformly over the surface, adjusting ballast and tire inflation pressure as required. The Contractor shall furnish evidence regarding tire size; pressure and loading to confirm that the proper contact pressure is being developed and that the loading and contact pressure are uniform for all wheels.

Lighting: For paving operations, which will be performed during hours of darkness, the paving equipment shall be equipped with lighting fixtures as described below, or with approved lighting fixtures of equivalent light output characteristics. A sufficient number of spare lamps shall be available on site as replacements in the event of failures. The Contractor shall provide brackets and hardware for mounting light fixtures and generators to suit the configuration of the rollers and pavers. Mounting brackets and hardware shall provide for secure connection of the fixtures, minimize vibration, and allow for adjustable positioning and aiming of the light fixtures. Lighting shall be aimed to maximize the illumination on each task and minimize glare to passing traffic. The Contractor shall provide generators on rollers and pavers of the type, size, and wattage, to adequately furnish 120 V AC of electric power to operate the specified lighting equipment. A sufficient amount of fuel shall be available on site. There shall be switches to control the lights. Wiring shall be weatherproof and installed to all applicable codes. The minimum lighting requirements are found in tables 4.06-1 and 4.06-2:

Table 4.06-1: Paver Lighting

| Fixture | Quantity | Remarks |
|----------------------------------|-----------------|-----------------------------------|
| Type A | 3 | Mount over screed area |
| Type B (narrow) or Type C (spot) | 2 | Aim to auger and guideline |
| Type B (wide) or Type C (flood) | 2 | Aim 25 feet behind paving machine |

Table 4.06-2: Roller Lighting

| Fixture* | Quantity | Remarks |
|-----------------|-----------------|--|
| Type B (wide) | 2 | Aim 50 feet in front of and behind roller |
| Type B (narrow) | 2 | Aim 100 feet in front of and behind roller |
| OR | | |
| Type C (flood) | 2 | Aim 50 feet in front of and behind roller |
| Type C (spot) | 2 | Aim 100 feet in front of and behind roller |

*All fixtures shall be mounted above the roller.

Type A: Fluorescent fixture shall be heavy-duty industrial type. It shall be enclosed and sealed to keep out dirt and dampness. It shall be UL listed as suitable for wet locations. The fixture shall contain two 4-foot long lamps - Type "F48T12CWHO". The integral ballast shall be a high power factor, cold weather ballast, and 120 volts for 800 MA HO lamps. The housing shall be aluminum, and the lens shall be acrylic with the lens frame secured to the housing by hinging latches. The fixture shall be horizontal surface mounting, and be made for continuous row installation.

Type B: The floodlight fixture shall be heavy-duty cast aluminum housing, full swivel and tilt mounting, tempered-glass lens, sealed door, reflector to provide a wide distribution or narrow distribution as required, mogul lamp socket for 250 watt Metal Halide lamp, 120 volt integral ballast, and be UL listed as suitable for wet locations.

Type C: The power beam holder shall have ribbed die cast aluminum housing and a clear tempered-glass lens to enclose the fixture. There shall be an arm fully adjustable for aiming, with a male-threaded mount with serrated teeth and lock nuts. There shall be a 120-volt heatproof socket with extended fixture wiring for an "Extended Mogul End Prong" lamp base. The fixture shall have gaskets, and shall be UL listed as suitable for wet locations. The lamps shall be 1000-watt quartz PAR64, both Q1000PAR64MFL (flood) and Q1000PARNSP (spot) will be required.

Material Transfer Vehicle (MTV): A MTV shall be used when placing a HMA surface course that is a minimum of 5,000 feet in length and on a roadway that has an overall width of 28 feet or more. A surface course is defined as the total thickness of the same HMA mix that extends up to and includes the final wearing surface whether it is placed in a single or multiple lifts, and regardless of any time delays between lifts.

The MTV must be a self-propelled vehicle specifically designed for the purpose of delivering the HMA mixture from the delivery truck to the paver. The MTV must have the capability to remix the bituminous concrete mixture.

The use of a MTV will be subject to the requirements stated in Article 1.07.05- Load Restrictions. The Engineer may limit the use of the vehicle if it is determined that the use of the MTV may damage highway components, utilities, or bridges. The Contractor shall submit to the Engineer at time of pre-construction the following information:

- *The make and model of the MTV to be used.*
- *The individual axle weights and axle spacing for each separate piece of paving equipment (haul vehicle, MTV and paver).*
- *A working drawing showing the axle spacing in combination with all three pieces of equipment that will comprise the paving echelon.*

HMA CONSTRUCTION

Refer to Standard Section 4.06.03 except as noted herein.

Weather Limitations

Refer to Standard Section 4.06.04 and as noted herein.

4.06.04

Seasonal Requirements: Paving, including placement of temporary pavements, shall be divided into two seasons; In-Season and Extended Season. In-Season shall be from May 1 – September 30 and Extended Season shall be from October 1- April 30. The following requirements shall apply unless otherwise authorized or directed by the Engineer:

- *The final lift of HMA shall not be placed during the Extended Season.*
- *HMA mixes shall not be placed when the air or base temperature is below 40°F.*

Additional Requirements for Extended Season:

- *The minimum mixture temperature for all HMA mixtures when discharged into the paver or transfer vehicle hopper shall be 290°F. The temperature will be taken from the initial discharge of mixture from the truck. If found to be below the minimum requirement, the truck will not be allowed to unload remaining mixture.*
- *The Contractor shall use a minimum of 3 rollers with operators for paving lengths greater than 1000 feet. Two rollers must be capable of operating in the dynamic mode.*
- *The Contractor's Quality Control Plan shall include a section on Extended Season paving and address paver speed, roller patterns and balancing mixture delivery and placement operations to meet specification requirements.*

The hot mix asphalt shall not be placed when weather conditions of fog or rain prevail or when the pavement surface or base shows signs of free moisture (film of water).

The Engineer will not permit work to continue when overtaken by sudden storms until the pavement surface shows no signs of free moisture. The material in transit at the time of shutdown will not be placed until the pavement surface shows no signs of free moisture, provided the mixture is within temperature limits as specified.

Tack Coat

Refer to Standard Section 4.06.03-7 except as amended herein.

4.06.03-7

Tack Coat Application: 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 in contact with the HMA that have been in place longer than 3 calendar days shall have an application of tack coat. The tack coat shall be applied by a non-gravity pressurized spray system that results in uniform overlapping coverage at an application rate of 0.03 to 0.05 gallons per square yard for a non-milled surface and an application rate of 0.05 to 0.07 gallons per square yard for a milled surface. For areas where both milled and un-milled surfaces occur, the tack coat shall be an application rate of 0.03 to 0.05 gallons per square yard. 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.

Contact surfaces of manholes, structures, longitudinal joints, vertical pavement edges, etc. shall be painted with a thin, uniform tack coat just before the material is placed against them.

All surfaces in contact with the HMA that have been in place over night shall have an application of tack coat.

Paving courses will be evaluated for bond after 15 days have elapsed since the date of placement. Two (2) core samples shall be randomly taken by the Engineer using a 6 inch diameter wet-core bit specifically designed for cutting pavement. These cores may also be used for density gauge correlation, density verification, thickness determinations, and for density adjustment at the option of the Engineer.

If it is determined that there is poor or no bond between paving layers then the Engineer may require that an increase in tack coat be applied.

HMA Production

The aggregates and the asphalt binder material shall be weighed or metered and introduced into the mixer in the amount specified by the JMF and within the allowable action limits as stated in Table 10 HMA PRODUCTION LIMITS. These limits shall be applied to the target values established in the JMF. Corrective action shall be taken by the Contractor when the calculated individual result for gradation or asphalt content falls outside the target JMF value beyond the action limits listed in Table 10. The Contractor shall take the appropriate action when results indicate the material is out of tolerance. The Contractor shall be required to suspend production when the calculated individual results fall outside the target JMF values beyond the limits allowed in the CORRECTIVE ACTION section of the specification.

Plant Trials

If production is suspended, the Contractor shall be required to produce material on a trial basis for testing purposes without shipment to the project. No payment will be made for material and labor employed for nonconforming plant trials. The Contractor shall pay for any acceptance sampling and testing for the trials necessary to determine conformance with the specification requirements during production suspension. When trials have been approved, the plant will return to its normal operation.

Failure to stop production and make adjustments when required due to an individual test not meeting the specified requirements shall subject all mix from the stop point to the point when the next individual test is back on or within the action limits, or to the point when production is actually stopped, whichever occurs first, to be considered unacceptable. This material shall be removed and replaced with materials that comply with the specifications at the Contractor's expense. Any sampling, testing, or evaluation services required during the Contractor's failure to stop production shall be paid for by the Contractor.

Placing and Finishing

Refer to Standard Section 4.06.03-6 and 4.06.03-7 and as noted herein.

4.06.03-6

Transitions for Roadway Surface: Transitions shall be formed at any point on the roadway where the pavement surface deviates, vertically, from the uniform longitudinal profile as specified on the plans. Whether formed by milling or by bituminous concrete mixture, all transition lengths shall conform to the criteria below unless otherwise specified.

Permanent Transitions: A permanent transition is defined as any transition that remains as a permanent part of the work. All permanent transitions, leading and trailing ends shall meet the following length requirements:

- a) Posted speed limit is greater than 35 MPH: 30 feet per inch of vertical change (thickness)
- b) Posted speed limit is 35 MPH or less: 15 feet per inch of vertical change (thickness).
- c) Bridge Overpass and underpass transition length will be 75 feet either
 - (1) Before and after the bridge expansion joint, or
 - (2) Before or after the parapet face of the overpass.

In areas where it is impractical to use the above described permanent transition lengths the use of a shorter permanent transition length may be permitted when approved by the Engineer.

Temporary Transitions: A temporary transition is defined as a transition that does not remain a permanent part of the work. All temporary transitions shall meet the following length requirements:

- a) Posted speed limit is greater than 35 MPH
 - (1) Leading Transitions = 15 feet per inch of vertical change (thickness)
 - (2) Trailing Transitions = 6 feet per inch of vertical change (thickness)
- b) Posted speed limit is 35 MPH or less
 - (1) Leading and Trailing = 4 feet per inch of vertical change (thickness)

Note: Any temporary transition to be in-place over the winter shutdown period, holidays, or during extended periods of inactivity (more than 7 calendar days) shall conform to the "Permanent Transition" requirements shown above.

4.06.03-7

Spreading and Finishing of Mixture: Prior to the placement of the bituminous concrete, the underlying base course shall be brought to the plan grade and cross section within the allowable tolerance. Immediately before placing the mixture, the area to be surfaced shall be cleaned by sweeping or by other means acceptable to the Engineer. The HMA mixture shall not be placed whenever the surface is wet or frozen. The temperature of the mix at time of placement must be between 265°F and 325°F. The Engineer will verify the mix temperature by means of a probe or infrared type of thermometer. Rejection of mixture based on temperature will only be allowed if verified by means of a probe type thermometer.

Placement: The HMA mixture shall be placed and compacted to provide a smooth, dense surface with a uniform texture and no segregation at the specified thickness and dimensions indicated in the plans and specifications. The maximum paver speed during placement shall not exceed 40 ft/min unless authorized by the Engineer.

When unforeseen weather conditions prevent further placement of the mix, the Engineer is not obligated to accept or place the bituminous concrete mixture that is in transit from the plant.

In advance of paving, traffic control requirements shall be set up daily, maintained throughout placement, and shall not be removed until all associated work including density testing is completed.

The Contractor shall inspect the newly placed pavement for defects in the mixture or placement before rolling is started. Any deviation from standard crown or section shall be immediately remedied by placing additional mixture or removing surplus mixture. Such defects shall be corrected to the satisfaction of the Engineer.

Where it is impractical 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 thickness that will result in a completed pavement meeting the designed grade and elevation.

Placement Tolerances: Each lift of HMA placed at a uniform specified thickness shall meet the following requirements for thickness and area. Any pavement exceeding these limits shall be subject to an HMA adjustment or removal. Lift tolerances will not relieve the Contractor from meeting the final designed grade. Lifts of specified non-uniform thickness, i.e. wedge or shim course, shall not be subject to thickness and area adjustments.

- a) *Thickness- Where the total thickness of the lift of mixture exceeds that shown on the plans beyond the tolerances shown in Table 4.06-3, the longitudinal limits of such variation including locations and intervals of the measurements will be documented by the Engineer for use in calculating a HMA adjustment in Article 4.06.04.*

TABLE 4.06-3 Thickness Tolerances

| Mixture Designation | Lift Tolerance |
|--|-----------------------|
| <i>Class 4 and HMA S1</i> | <i>+/- 3/8 inch</i> |
| <i>Class 1, 2 and 12 and HMA S0.25, S0.375, S0.5</i> | <i>+/- 1/4 inch</i> |

Where the thickness of the lift of mixture is less than that shown on the plans beyond the tolerances shown in Table 4.06-3, the Contractor, with the approval of the Engineer, shall take corrective action in accordance with this specification.

- b) *Area- Where the width of the lift exceeds that shown on the plans by more than the specified thickness of each lift, the longitudinal limits of such variation including locations and intervals of the measurements will be documented by the Engineer for use in calculating a HMA adjustment in Article 4.06.04.*
- c) *Delivered Weight of Mixture - When the delivery ticket shows that the truck exceeds the allowable gross weight for the vehicle type the quantity of tons representing the overweight amount will be documented by the Engineer for use in calculating a HMA adjustment in Article 4.06.04.*

Transverse Joints: *All 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 thickness of the lift. A brush of tack coat shall be used on any cold joint immediately prior to additional bituminous concrete mixture being placed.*

Tack Coat Application: *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 in contact with the HMA that have been in place longer than 3 calendar days shall have an application of tack coat. The tack coat shall be applied by a non-gravity pressurized spray system that results in uniform overlapping coverage at an application rate of 0.03 to 0.05 gallons per square yard for a non-milled surface and an application rate of 0.05 to 0.07 gallons per square yard for a milled surface. For areas where both milled and un-milled surfaces occur, the tack coat shall be an application rate of 0.03 to 0.05 gallons per square yard. 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.*

Compaction: *The Contractor shall compact the mixture to meet the density requirements as stated in Article 4.06.03 and eliminate all roller marks without displacement, shoving, cracking, or aggregate breakage.*

The Contractor shall only operate rollers in the dynamic mode using the oscillatory system at the lowest frequency setting on concrete structures such as bridges and catch basins. The use of the vibratory system on concrete structures is prohibited.

Rollers operating in the dynamic mode shall be shut off when reversing directions.

If the Engineer determines that the use of compaction equipment in the dynamic vibratory mode may damage highway components, utilities, or adjacent property, the Contractor shall provide alternate compaction equipment. The Engineer may allow the Contractor to operate rollers in the dynamic mode using the oscillatory system at the lowest frequency setting.

These allowances will not relieve the Contractor from meeting pavement compaction requirements.

Surface Requirements: *The pavement surface of any lift shall meet the following requirements for smoothness and uniformity. Any irregularity of the surface exceeding these requirements shall be corrected by the Contractor.*

- a) *Smoothness- Each lift of the surface course shall not vary more than 1/4 inch from a Contractor-supplied 10 foot straightedge. For all other lifts of HMA, the tolerance shall be 3/8 inch. Such tolerance will apply to all paved areas.*
- b) *Uniformity- The paved surface shall not exhibit segregation, rutting, cracking, disintegration, flushing or vary in composition as determined by the Engineer.*

No traffic of any kind shall be permitted on binder or base when dirt or any other foreign substance may be tracked thereon.

Suspension Control Test Section

Refer to Standard Section 4.06.03-5 except as amended herein.

4.06.03-5

Superpave Test Section: The Engineer may require the Contractor to place a test section whenever the requirements of this specification or Section M.04 are not met.

The Contractor shall submit the quantity of mixture to be placed and the location of the test section for review and acceptance by the Engineer. The equipment used in the construction of a passing test section shall be used throughout production.

If a test section fails to meet specifications, the Contractor shall stop production, make necessary adjustments to the job mix formula, plant operations, or procedures for placement and compaction. The Contractor shall construct test sections, as allowed by the Engineer, until all the required specifications are met. All test sections shall also be subject to removal as set forth in Article 1.06.04.

If it is determined by the Engineer during the performance of the contract, that the Marshall or Superpave pavement does not conform to the specifications, tolerance, density and/or uniformity requirements, the Engineer may order the Contractor to cease all operations and construct an HMA SUSPENSION CONTROL TEST SECTION.

The amount of mixture should be sufficient, at a minimum, to construct a test section 300 feet long and 20 to 30 feet wide placed in two lanes, with a longitudinal joint, and shall be of the same depth specified for the construction of the course which it represents. A control section may be required each time a change is made in the Job Mix Formula, sources of supply or paving and rolling equipment. A suspension control test section will be required when either of the following conditions exist:

1. Two consecutive streets or two consecutive 1,000 ton lots of material tested for mat density or longitudinal joint density falls below the minimum threshold density for 100% adjustment, as noted in Table 11 and Table 12.
2. When the average of the last five streets or five 1,000 ton lots of material tested for mat density or longitudinal joint density falls below the threshold density for 100% adjustment, as noted in Table 11 and Table 12.

The mixture shall be prepared, placed, and compacted in accordance with this specification. When the control section pavement has cooled sufficiently, a total of six (6) samples of the finished pavement including three (3) samples from the longitudinal joint, shall be taken and tested for conformance to density requirements.

If the suspension control section tests conducted by the Engineer, and paid for by the Contractor, indicate that pavement does not conform to specification requirements, necessary adjustment to plant operation and placement/rolling procedures shall be made and another control section constructed.

The Contractor shall not be permitted to re-core a control section or place HMA courses until a control section is approved by the Engineer.

Transverse Joints

Refer to Standard Section 4.06.03-7.

4.06.03-7

Transverse Joints: All 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 thickness of the lift. A brush of tack coat shall be used on any cold joint immediately prior to additional bituminous concrete mixture being placed.

Longitudinal Joints

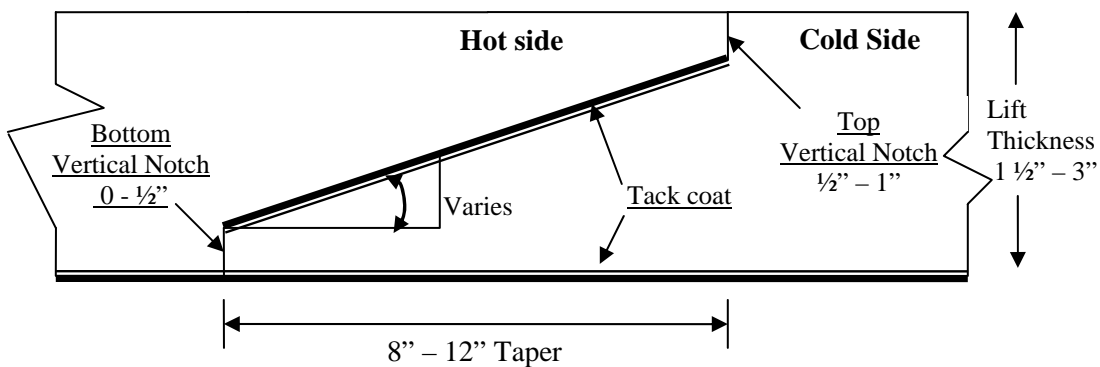
Refer to Standard Section 4.06.03-8.

4.06.03-8

HMA Longitudinal Joint Construction Methods: Unless noted on the plans or the contract documents or directed by the Engineer, the Contractor shall use Method I- Notched Wedge Joint (see figure 4.06-1) when constructing longitudinal joints where lift thicknesses are between 1½ and 3 inches, except for HMA S1 and Class 4 mixes. Method II Butt Joint (see figure 4.06-2) shall be used for lifts less than 1½ inches or greater than 3 inches and HMA S1 and Class 4 mixes. During placement of multiple lifts of HMA, the longitudinal joint shall be constructed in such a manner that it is located at least 6 inches from the joint in the lift immediately below. The joint in the final lift shall be at the centerline or at lane lines.

Method I - Notched Wedge Joint:

Figure 4.06-1



A notched wedge joint shall be constructed, as shown in the figure using a device that is capable of adjusting the top and bottom vertical notches independently and is attached to the paver screed.

The taper portion of the joint must be placed over the longitudinal joint in the lift immediately below. The top vertical notch must be located at the centerline or lane line in the final lift. The requirement for paving full width "curb to curb" as described in Method II will be waived in those areas where the notched wedge joint is utilized.

The taper portion of the wedge joint shall be compacted and not be exposed to traffic for more than 5 calendar days.

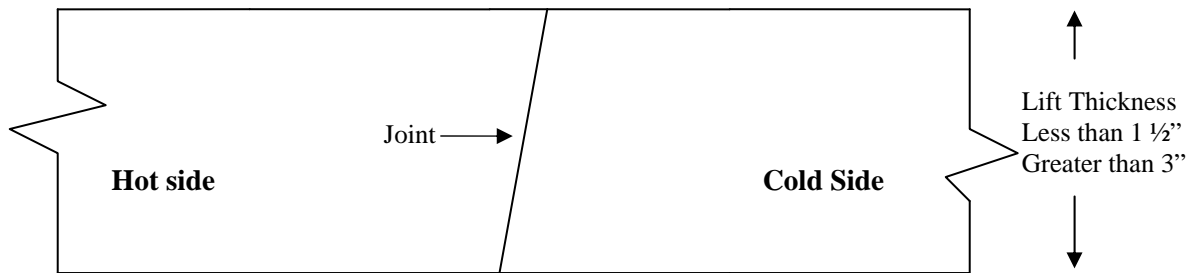
The existing pavement surface under the wedge joint must have an application of tack coat material. Prior to placing completing pass (hot side), an application of tack coat must be applied to the tapered section.

Any exposed wedge joint must be located to allow for the free draining of water from the road surface.

The Engineer reserves the right to define the paving limits when using a wedge joint that will be exposed to traffic.

Method II - Butt Joint:

Figure 4.06-2

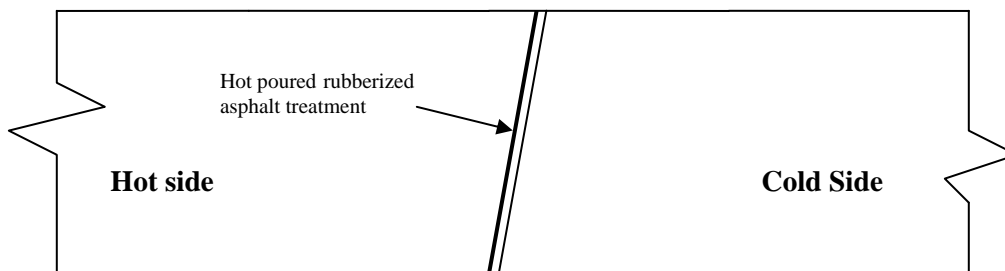


When adjoining HMA passes are placed, the Contractor shall utilize equipment that creates a near vertical edge (refer to figure). The completing pass (hot side) shall have sufficient mixture so that the compacted thickness is not less than the previous pass (cold side). The end gate on the paver should be set so there is an overlap onto the cold side of the joint.

The Contractor shall not allow any butt joint to be incomplete at the end of a work shift unless otherwise allowed by the Engineer. When using this method, the Contractor is not allowed to leave a vertical edge exposed at the end of a work shift and must complete paving of the roadway full width "curb to curb."

Method III- Butt Joint with Hot Poured Rubberized Asphalt Treatment: *When required by the contract or allowed by the Engineer, Method III (see figure 4.06-3) may be used.*

Figure 4.06-3



All of the requirements of Method II must be met with Method III. In addition, the longitudinal vertical edge must be treated with a joint seal material meeting the requirements of Section M.04 prior to placing a completing pass. The joint seal material shall be applied in accordance with the manufacturer's recommendation so as to provide a uniform coverage and avoid excess bleeding onto the newly placed pavement.

Method III – Butt Joint with Hot Poured Rubberized Asphalt Treatment will be at the contractor's expense.

For Methods II and III, the top of the longitudinal joint in one course shall offset the top of the longitudinal joint in the course immediately below by at least 1 foot, however, the joint in the top layer shall be at the centerline for two lane roadways. Longitudinal paving joints shall not fall within the

travel lanes but be located on the solid, skip, or edge lines established for that roadway. Longitudinal joint(s) of the top layer shall be marked prior to paving so as to create a neat, straight line at the lane breaks where necessary. First paver pass shall use the marked joint as the guide to develop the longitudinal joint of the top layer; using the curb edge or edge of pavement as a guide is unacceptable. The goal is to end up with a true straight longitudinal joint at centerline or at lane breaks. The Contractor shall inform the Engineer of the proposed paving joint locations for the entire pavement structure prior to placing the first intermediate course.

Compaction of HMA Mixture after Placing

Refer to Standard Section 4.06.03-7 and as amended herein.

4.06.03-7

Compaction: The Contractor shall compact the mixture to meet the density requirements as stated in Article 4.06.03 and eliminate all roller marks without displacement, shoving, cracking, or aggregate breakage.

The Contractor shall only operate rollers in the dynamic mode using the oscillatory system at the lowest frequency setting on concrete structures such as bridges and catch basins. The use of the vibratory system on concrete structures is prohibited.

Rollers operating in the dynamic mode shall be shut off when reversing directions.

If the Engineer determines that the use of compaction equipment in the dynamic vibratory mode may damage highway components, utilities, or adjacent property, the Contractor shall provide alternate compaction equipment. The Engineer may allow the Contractor to operate rollers in the dynamic mode using the oscillatory system at the lowest frequency setting.

These allowances will not relieve the Contractor from meeting pavement compaction requirements.

The speed of the roller shall, at all times, be sufficiently slow and of uniform speed to avoid displacement of the hot mixture and be effective in compaction. Any displacement occurring as a result of reversing the direction of the roller, or from any other cause, shall be corrected at once.

Pneumatic rollers may be used in the intermediate mode.

In areas not accessible to the roller, the mixture shall be thoroughly compacted with hand tampers and vibratory plate compactors.

Any mixture that becomes loose and broken, mixed with dirt, contains check-cracking, or in any way defective shall be removed and replaced with fresh hot mixture and immediately compacted to conform to the surrounding area. This work shall be done at the Contractor's expense. Skin patching shall not be allowed.

Shaping Edges

While the surface is being compacted and finished, the Contractor shall carefully trim the outside edges of the pavement to the proper alignment. Edges so formed shall be beveled while still hot with the back of a lute or smoothing iron and thoroughly compacted by tampers or by other satisfactory methods.

Surface Smoothness

Refer to Standard Section 4.06.03-7.

04.06.03-7

Surface Requirements: The pavement surface of any lift shall meet the following requirements for smoothness and uniformity. Any irregularity of the surface exceeding these requirements shall be corrected by the Contractor.

- a) *Smoothness-* Each lift of the surface course shall not vary more than ¼ inch from a Contractor-supplied 10 foot straightedge. For all other lifts of HMA, the tolerance shall be ⅜ inch. Such tolerance will apply to all paved areas.

Corrective Work

Refer to Standard Section 4.06.03-13 and as noted herein.

04.06.03-13

Corrective Work Procedures: Any portion of the completed pavement that does not meet the requirements of the specification shall be corrected at the expense of the Contractor. Any corrective courses placed as the final wearing surface shall not be less than 1½ inches in thickness after compaction.

If pavement placed by the Contractor does not meet the specifications, and the Engineer requires its replacement or correction, the Contractor shall:

- a) *Propose a corrective procedure to the Engineer for review and approval prior to any corrective work commencing. The proposal shall include:*
- *Limits of pavement to be replaced or corrected, indicating stationing or other landmarks that are readily distinguishable.*
 - *Proposed work schedule.*
 - *Construction method and sequence of operations.*
 - *Methods of maintenance and protection of traffic.*
 - *Material sources.*
 - *Names and telephone numbers of supervising personnel.*
- b) *Perform all corrective work in accordance with the Contract and the approved corrective procedure.*

The corrective method(s) chosen by the Contractor shall be approved for use by the Engineer and shall be performed at the Contractor's expense, including all necessary equipment and traffic control. Areas of removal and replacement shall be removed the full width of the lane. The removal areas shall begin and end with a transverse butt joint which shall be constructed with a transverse saw cut perpendicular to the centerline. Replacement materials shall be paver placed in sufficient quantity so the finished surface will conform to grade, smoothness and cross-section requirements.

The Engineer shall retest any sections where corrections were made to verify that the corrections produced a surface that conforms to the grade and smoothness requirements.

Uniformity

Refer to Standard Section 4.06.03-7 and as amended herein.

4.06.03-7

Surface Requirements: The pavement surface of any lift shall meet the following requirements for smoothness and uniformity. Any irregularity of the surface exceeding these requirements shall be corrected by the Contractor.

- a) *Uniformity-* The paved surface shall not exhibit segregation, rutting, cracking, disintegration, flushing or vary in composition as determined by the Engineer

The Contractor shall review all potential causes of segregation as it relates to its operation, including but not limited to HMA plant production and storage, loading and transportation, paver/equipment, placement and/or handwork. The Contractor shall employ additional investigation methods and make the necessary changes in their operation such that segregation is eliminated and mat uniformity is acceptable.

At the Engineer’s discretion, the Engineer shall obtain two (2) six inch diameter cores from the identified (segregated) area and two (2) six inch diameter cores from the non-segregated area. The cores may be evaluated for resilient modulus, dry tensile strength, change in air voids, maximum in place air voids, aggregate gradation and binder content. The results of the data obtained on the cores from the segregated area will be compared to the results of tests performed on the cores from the non-segregated area.

If any mix property is beyond the tolerance limits stated in the table below, that area shall be considered segregated and shall be repaired by the Contractor.

SEGREGATION LIMITS

| <u>Change in Mix Properties Expressed as a Percentage of the Properties in the Non-Segregated Areas</u> | |
|--|-----------------------------------|
| Property | Limits |
| Resilient Modulus, psi @ 77°F | <80% |
| Dry Tensile Strength, psi @ 77°F | <90% |
| Aggregate Gradation and Binder Content | Refer to Table 10 (Action Limits) |
| Change in Air Voids | >2.5% |

The samples for the segregation analysis will be considered separately from the mat and joint cores tested for acceptance.

Segregated areas not meeting the requirements stated above or areas having more than 11% air voids shall be removed and replaced for the entire pavement thickness and lane width, and be paver-machine placed, or as directed by the Engineer. All corrective methods shall be performed at the Contractor’s expense. The removal areas shall begin and end with a transverse butt joint which shall be constructed with a transverse saw cut perpendicular to the centerline. The corrective area shall conform to all grades, smoothness, material, and density specification requirements. The Engineer may retest any areas where corrections were made to verify that the material meets specification requirements.

Thickness

Refer to Standard Section 4.06.03-7 and 4.06.04-2 and as noted herein.

4.06.03-7

Placement Tolerances: Each lift of HMA placed at a uniform specified thickness shall meet the following requirements for thickness and area. Any pavement exceeding these limits shall be subject to an HMA adjustment or removal. Lift tolerances will not relieve the Contractor from meeting the final designed grade. Lifts of specified non-uniform thickness, i.e. wedge or shim course, shall not be subject to thickness and area adjustments.

- a) Thickness- Where the total thickness of the lift of mixture exceeds that shown on the plans beyond the tolerances shown in Table 4.06-3, the longitudinal limits of such variation including locations and intervals of the measurements will be documented by the Engineer for use in calculating a HMA adjustment in Article 4.06.04.*

TABLE 4.06-3 Thickness Tolerances

| Mixture Designation | Lift Tolerance |
|--|-----------------------|
| <i>Class 4 and HMA SI</i> | <i>+/- 3/8 inch</i> |
| <i>Class 1, 2 and 12 and HMA S0.25, S0.375, S0.5</i> | <i>+/- 1/4 inch</i> |

Where the thickness of the lift of mixture is less than that shown on the plans beyond the tolerances shown in Table 4.06-3, the Contractor, with the approval of the Engineer, shall take corrective action in accordance with this specification.

- b) *Area- Where the width of the lift exceeds that shown on the plans by more than the specified thickness of each lift, the longitudinal limits of such variation including locations and intervals of the measurements will be documented by the Engineer for use in calculating a HMA adjustment in Article 4.06.04.*
- c) *Delivered Weight of Mixture - When the delivery ticket shows that the truck exceeds the allowable gross weight for the vehicle type the quantity of tons representing the overweight amount will be documented by the Engineer for use in calculating a HMA adjustment in Article 4.06.04.*

04.06.04-2

HMA Adjustments: *Adjustments may be applied to bituminous concrete quantities and will be measured for payment using the following formulas:*

Yield Factor for Adjustment Calculation = 0.0575 Tons/SY/inch

Actual Area = [(Measured Length (ft)) x (Avg. of width measurements (ft))]

Actual Thickness (t) = Total tons delivered / [Actual Area (SY) x 0.0575 Tons/SY/inch]

- a) *Area: If the average width exceeds the allowable tolerance, an adjustment will be made using the following formula. The tolerance for width is equal to the specified thickness (in.) of the lift being placed.*

Tons Adjusted for Area (T_A) = [(L x W_{adj})/9] x (t) x 0.0575 Tons/SY/inch = (-) Tons

Where: L = Length (ft)

(t) = Actual thickness (inches)

W_{adj} = (Designed width (ft) + tolerance /12) - Measured Width

- b) *Thickness: If the actual thickness is less than the allowable tolerance, the Contractor shall submit a repair procedure to the Engineer for approval. If the actual thickness exceeds the allowable tolerance, an adjustment will be made using the following formula:*

Tons Adjusted for Thickness (T_T) = A x t_{adj} x 0.0575 = (-) Tons

Where: A = Area = {[L x (Designed width + tolerance (lift thickness)/12)] / 9}

t_{adj} = Adjusted thickness = [(Dt + tolerance) - Actual thickness]

Dt = Designed thickness (inches)

The thickness requirements contained herein shall apply only when each pavement layer is specified to be a uniform compacted thickness of 1 inch (25mm) or greater. Measurements of thickness for acceptance shall be made by the Engineer using six-inch minimum diameter pavement cores (removed also for subsequent density measurement), and then verified according to Section 4.06.04-2.

CONTRACTOR QUALITY CONTROL OF HMA PAVEMENT

Standard Section 4.06.03-9 is deleted and replaced as amended herein.

General

The Contractor is encouraged to establish, provide, and maintain a Quality Control System (QCS) that will detail the methods and procedures that will be taken to assure that all materials and completed construction conform to project specifications, plans, technical specifications and other requirements, whether manufactured or processed by the Contractor or procured from subcontractors or vendors.

If the project data during production indicates a problem and the Contractor is not taking satisfactory corrective action as is their responsibility under quality control, then the Engineer may suspend production or acceptance of the material, in accordance with these specifications.

TABLE 10 HMA Production Limits for Individual Measurements

| <u>Sieve Size</u> | <u>Action</u> | <u>Suspension</u> |
|--------------------------|----------------------|--------------------------|
| 1-1/2" (37.5mm) | 0% | 0% |
| 1" (25.0 mm) | ±6% | ±9% |
| 3/4" (19.0 mm) | ±6% | ±9% |
| 1/2" (12.5 mm) | ±6% | ±9% |
| 3/8" (9.5 mm) | ±6% | ±9% |
| #4 (4.75 mm) | ±6% | ±9% |
| #8 (2.36 mm) | ±5% | ±7.5% |
| #16 (1.18 mm) | ±5% | ±7.5% |
| #30 (0.600 mm) | ±4% | ±5.5% |
| #50 (0.300 mm) | ±3% | ±4.5% |
| #100 (0.150 mm) | ±3% | ±4.5% |
| #200 (0.075 mm) | ±2% | ±3% |
| Asphalt Binder Content | ±0.4% | ±0.70% |
| Design Air Voids (4.0%) | ±1.0% | ±1.7% |

When evaluating the production limits, the sieve sizes above the maximum size aggregate should be deleted from the Individual Measurements Chart and the maximum aggregate sieve size Action and Suspension Limits should be changed to 0%.

CORRECTIVE ACTION

The Contractor's Quality Control system shall include an appropriate action to be taken when the process is believed to be out of tolerance. The Contractor should review the control charts on a continuous basis making adjustments to the process when necessary to keep the product consistent.

As a minimum, a process shall be deemed out of control and production stopped and corrective action taken, if:

One point falls outside the Suspension Limit line for individual measurements; or

Design Air Voids falls outside the Suspension Limit line for its individual measurement or range as indicated in Table 10; or

Design Air Voids and two or more points fall outside the Action Limit line for individual measurements as indicated in Table 10; or

Design Air Voids fall outside the Action Limit and one point falls outside the Suspension Limit for individual measurements or range as indicated in Table 10; or

Three points in a row fall outside the Action Limit line for individual measurements as indicated in Table 10.

Three nonconsecutive samples out of five samples fall outside the Action Limit line for individual measurements as indicated in Table 10.

The dust to effective binder ratio on two consecutive samples fall outside the Control Point limits for individual measurements as indicated in Table 6.

Dust to effective binder ratio of three (3) nonconsecutive samples out of five (5) samples fall outside the Control Point limits for individual measurements as indicated in Table 6.

Two consecutive streets or two consecutive 1,000 ton lots of material tested for mat density or longitudinal joint density falls below the threshold density for 100% adjustment, as noted in Table 11 and Table 12.

The average of the last five streets or five 1,000 ton lots of material tested for mat density or longitudinal joint density falls below the threshold density for 100% adjustment, as noted in Table 12 and Table 13.

Acceptance testing requirements are the responsibility of the Engineer.

QUALITY ACCEPTANCE OF HMA

Standard Section M.04.03-1 and M.04.03-2 are deleted and replaced as amended herein.

All acceptance sampling and testing necessary to determine conformance with the requirements specified in this section will be performed by the Engineer at no cost to the Contractor, unless otherwise stated herein. Testing organizations performing these tests shall meet the requirements of ASTM D 3666. All equipment in Contractor furnished laboratories shall be calibrated and verified by a testing organization prior to the start of operations. Such verification/certification shall be furnished to the Engineer prior to production. Engineer's testing personnel shall be certified by the Northeast

Transportation Training and Certification Program (NETTCP). This function does not relieve the Contractor from performing their daily quality control tasks as part of their normal operating business.

The Engineer or their agent shall have access at any time to all parts of the producing plant for:

- Inspection of the condition and operations of the yard, plant and laboratory.
- Confirmation of the adequacy of equipment in use.
- Verification of the character and proportions of the mixture.
- Determination of temperatures being maintained in the preparation of the mixtures.
- Inspection of incidental related procedures.

Samples of all material including compacted specimens and certified copies of all reports and printouts shall be made available to the Engineer or its agent as often as requested including: asphalt binder; recycling agents; virgin aggregates; reclaimed pavement materials; modifiers, loose and compacted mixture specimens; and combined aggregate samples.

Plant-Produced Material

Plant-produced material shall be sampled and tested for VMA, gradation, asphalt binder content, and air voids (Marshall or Superpave) at N_{design} (Superpave only) on a lot basis. The Engineer's testing personnel shall be certified by the Northeast Transportation Training and Certification Program (NETTCP), as HMA Plant Technicians. Sampling shall be from material deposited into trucks at the plant or from trucks at the job site. A lot will consist of:

- one day's production

Where more than one plant is simultaneously producing material for, the job, the lot sizes shall apply separately for each plant.

Sampling

Each lot will be divided into 300 ton sublots. Sufficient material for analysis and preparation of test specimens will be sampled by the Engineer on a random basis, in accordance with the procedures contained in ASTM D 3665. One set of laboratory compacted specimens will be prepared for each subplot in accordance with AASHTO T312, at the number of gyrations at N_{design} required by Table 5 herein for Superpave, or in accordance with AASHTO T245, at the number of blows required by Table M.04.02-1. Each set of laboratory compacted specimens will consist of two test portions prepared from the same field sample, with the volumetric analysis based on the average of the two specimens and a minimum of one theoretical maximum specific gravity sample.

The sample of hot mix asphalt may be put in a covered metal tin and placed in an oven for not more than 30 minutes to regulate or adjust the temperature. The compaction temperature of the specimens should be as specified in the JMF.

In addition to the hot mix asphalt samples, the Contractor shall take one, one-quart sample of the PG binder used to produce the hot mix asphalt at the start of the work. The PG sample shall be turned over to the Engineer on the first day of project production.

Testing

Bulk Specific Gravity - Sample specimens shall be tested for bulk specific gravity in accordance with AASHTO T166 or T275, whichever is applicable, for use in computing air voids and density. Air voids will be determined in accordance with AASHTO T269.

Stability and Flow (Marshall specimens) – Sample specimens shall be tested for stability and flow in accordance with AASHTO T245, paragraph 4.

Gradation and Asphalt Binder Content - The gradation and asphalt binder content of the mixture shall be measured for each subplot in accordance with the following:

Asphalt Binder Content - Extraction tests shall be performed once per subplot in accordance with AASHTO T164 or AASHTO T308 for determination of asphalt content. The weight of ash portion of the extraction test, as described in AASHTO T164, shall be determined as part of the first extraction test performed at the beginning of plant production; and as part of every twentieth extraction test performed thereafter, for the duration of plant production. The last weight of ash value obtained shall be used in the calculation of the asphalt content for the mixture. If utilizing AASHTO T308 for asphalt content determination, the calibration process and calibration factor, as described in AASHTO T308, shall be determined as stated, prior to acceptance testing. A verification shall be performed as part of every twentieth test performed thereafter or when changes in the mix are apparent.

Gradation - Aggregate gradations shall be determined once for each subplot from mechanical analysis of extracted aggregate in accordance with AASHTO T30 and AASHTO T27 (Dry Sieve).

The Dust-to-Effective Asphalt ratio shall be determined once for each subplot from the mechanical analysis of extracted aggregate and the effective asphalt binder content. The Dust-to-Effective Asphalt ratio shall be determined by the Engineer in accordance with AASHTO R35.

HMA mixtures shall contain a dust to effective asphalt ratio by mass between 0.6 and 1.2 utilizing AASHTO T30 and a washed sieve, the #4 mixture shall have a dust to effective asphalt ratio between 0.9 and 2.0, utilizing AASHTO T30 and a washed sieve. If the gradation of the mixture passes beneath the Primary Control Sieve (PCS), the Engineer may increase the dust to effective asphalt from 0.6 – 1.2 to 0.8 – 1.6, utilizing AASHTO T30 and a washed sieve.

When tested in accordance with AASHTO T30 utilizing a dry sieve analysis the dust to effective asphalt ratio shall be 0.3 to 0.9, the #4 mixture shall have a dust to effective asphalt ratio between 0.6 to 1.2. If the gradation of the mixture passes beneath the PCS the Engineer may increase the dust to effective asphalt ratio from 0.3 – 0.9 to 0.5-1.3, the #4 mixture may be increased from 0.6-1.2 to 0.8-1.6 based on a dry gradation. The Primary Control Sieve (PCS) shall be as determined in accordance with AASHTO M323 for both the Marshall mixes and Superpave mixes.

The Theoretical Maximum Specific Gravity of the mixture shall be measured for each subplot in accordance with AASHTO T209, Type C, D, or E container. Samples shall be taken on a random basis in accordance with ASTM D 3665. The value used in the field placed density computations shall be the average of the most recent maximum specific gravity lot measurements.

Temperatures. Temperatures shall be checked, at least three times per lot, at necessary locations to determine the temperatures of the dryer, the asphalt binder in the storage tank, the mixture at the plant, and the mixture at the job site.

Voids in Mineral Aggregate (VMA), for each plant sample, will be determined by the Engineer in accordance with the procedures contained in Chapter 4, VOLUMETRIC PROPERTIES OF COMPACTED PAVING MIXTURES, of the Asphalt Institute's Manual Series No. 6 (MS-2), Mix Design Methods for Asphalt Concrete. The VMA, and air voids for each subplot shall be computed by averaging the results of the two test specimens representing that subplot.

Acceptance of Plant Produced HMA

Acceptance of plant produced HMA material will be based upon plant air voids, Marshall stability and flow (if applicable), VMA, gradation, asphalt binder content, dust to effective binder ratio, mix temperature, and shall be determined by the Engineer in accordance with these specifications.

Field Placed HMA Material

HMA material placed in the field shall be tested for mat and longitudinal joint density on a completed street or public facility basis. The Engineer's testing personnel shall be certified by the Northeast Transportation Training and Certification Program (NETTCP), as HMA Paving Technicians or HMA Plant Technicians. The Engineer may conduct any necessary testing to monitor the specified density, uniformity and smoothness. A properly correlated density gauge may be used to monitor the pavement density in accordance with ASTM D2950 or ASTM 7113 and these specifications. Monitoring density with density gauges by the Engineer does not imply acceptance or rejection; the Contractor is ultimately responsible to meet the requirements of the specification.

Sampling for Density Adjustment

Density gauges may be used by the Engineer to determine density of the surface course mat and/or surface course longitudinal joints in accordance with the correlation procedures outlined in this specification. Cores of surface course material shall be minimized and only taken at the direction of the Engineer and approval of the City.

Mat and longitudinal joint acceptance density tests will be located by the Engineer on a stratified random sampling basis for each street or facility paved within three days of construction. The length of the longitudinal paving joint will be divided into sub-lots for sampling and testing purposes. If more than one longitudinal joint is formed on a street, then the random sample length will be the total lineal feet of longitudinal joint placed. A mat and longitudinal joint test will be taken by the Engineer randomly from each of these sub-lot intervals. Sub-lots will be determined on the basis of five (5) sub-lots per one thousand (1,000) tons of material placed or a minimum of five (5) sub-lots from each street or facility paved. Sampling and testing for density will be conducted in the following manner:

Intermediate paving courses will be tested with the density gauge (for correlation), then sampled by coring the mat and the longitudinal joint using a 6 inch diameter wet-core bit specifically designed for cutting pavement. The cores will be tested for density and thickness.

Surface courses will be tested for density with a density gauge that has been correlated as described in this section.

When sampling of the longitudinal joint for density determinations by coring, the center of the core will be taken on the hot side of the joint and 6-inches from the top of the wedge joint, or directly over the vertical edge of an existing longitudinal joint.

A core sample for intermediate course density and a density sample for surface course density will be tested from each sub-lot segment. The total width of the paved surface (curb to curb) will be determined at the longitudinal sub-lot location to sample and test for mat density. A transverse off-set distance from the centerline of the roadway will be established for mat density sampling and testing. The location, either right or left of centerline, will be based on whether a random number is “odd or even” (odd=left; even=right). When the off-set location is within 2 foot of the pavement edge, curb, catch basin or structure, or 1 foot off a longitudinal joint, or 10 foot off a transverse joint, the sample shall be relocated.

For nuclear gauge test locations, two 60 second increments will be taken with the gauge turned 180 degrees for each reading. The average of the two surface course mat density values will be reported for each location. For non-nuclear density tests, five (5) increments will be used, moving the gauge six inches after each reading in a square pattern, taking one reading in each corner and one in the center using the manufacturers operating procedures. The average of the five density values will be reported for each location.

If the results of the average density gauge readings for a street or pavement facility are below the threshold for 100% adjustment as indicated in Table 12 and Table 13, pavement cores will be removed as per this specification, and used for determining the actual pavement density.

In-Place Density Gauge Correlation to Pavement Cores

This procedure covers the determination of the in-place density of HMA by using an approved density gauge correlated to HMA cores from the project on a periodic basis.

The correlation (bias) value for each density gauge shall be mix, plant and project specific. A bias for a density gauge cannot be carried over from one project to another using the same mix from the same plant. A new correlation may also be required when a different paver is used, the paver screed is repaired or replaced, a mix design change occurs, conditions otherwise change and at the start of the construction season.

- a) The location selected for the correlation shall be on the project site on the street but in a location that is safely accessible for the duration of the project (such as a driveway apron area or non-parking pavement toward the curbline).
- b) Five gauge (5) readings and three (3) cores will be used to establish the correct bias and correlation. These readings must be taken four (4) feet from an unconfined edge and a minimum of 50 feet beyond the beginning of a paver pass or as directed by the Engineer. No reading shall be taken in the vicinity of a vertical object or other interferences according to manufacturers' instructions.
- c) The five gauge readings will be spaced 4 feet apart for a total distance of sixteen feet thereby taking a reading at 0 foot, 4 foot, 8 foot, 12 foot and 16 foot location. The three (3) cores for the correlation will be taken in the same line and offset and location of the density gauge readings specifically at the 0 foot, 8 foot and 16 foot location. The cores must be taken from within the center of each of the density gauge footprints. Ice should be used to minimize any distortion or damage to the cores.

- d) Each density gauge shall be operated using the number of test increments and locations of test increments as given under Sampling for Density Adjustment.
- e) The gauge readings must be taken parallel to the direction of paving for nuclear density gauges and on the same longitudinal tangent line for any density gauge.
- f) The density difference from the high-low reading of the 5 locations must be ≤ 1.0 percent of the mean of the determined density or a new location will be selected.
- g) Core thicknesses must match the project plans for the street or a new location must be selected.
- h) The final core average of percent maximum density from the three cores must be determined and written on the project pavement near the correlation site to serve as a correlation reference site. The core density average must meet specifications or a new location must be established.
- i) The density gauge correlation (bias) will be determined as the difference from the known average core density to the known average gauge density value, as determined above.
- j) If the density gauge cannot meet the accuracy requirements of less than or equal to 1.0 percent of know density, the gauge must be repaired.
- k) The bias must be utilized by the density gauge user and recorded on the daily test reports.

All core samples shall be neatly cut with a core drill and water cooled bit where the cutting edge of the core drill bit shall be of hardened steel or other suitable material with diamond chips embedded in the metal cutting edge. The minimum diameter of the sample shall be 6 inches. Samples that are clearly defective, as a result of sampling, shall be documented and retained, then another sample taken for testing. The Engineer or the Owner's agent shall furnish all tools, labor, and materials for cutting samples and filling the cored pavement. Cored holes shall be filled by the Engineer and within one day after sampling.

Pavement cores will be used to determine the average percent density and thickness of intermediate courses and correlated density gauge readings may be used for density testing of surface courses. The average density will be used to determine the percent payment. Resampling of the pavement shall be in accordance with applicable provisions of the NETTCP Quality Assurance Technologist Manual, latest edition and these specifications.

With the exception of any Control Strips, if the Contractor is concerned about the test results obtained by the Engineer, the Contractor may request up to one time, that an equal number of random core samples be obtained and tested to supplement (not replace) the original core or density gauge samples. The coring, patching and testing of the additional samples will be the responsibility of the Contractor. Cores for the mat and/or longitudinal joint density tests will be located by the Engineer and witnessed by the Contractor. Cores locations will be based on a new stratified random sampling plan for each street or facility paved in accordance with the procedures stated above. Upon approval of the coring operation, the Contractor will notify the Engineer 48 hours in advance of the cores being taken such that the Engineer can witness the sampling. The additional cores must be tested by a certified HMA plant technician or HMA paving technician in the presence of the Engineer or his designated representative.

Only one (1) set of additional mat and/or longitudinal joint cores will be allowed on a street or lot.

Testing

The bulk specific gravity of each cored sample will be measured by the Engineer's NETTCP certified technician in accordance with AASHTO T166 or T275, whichever is applicable. The theoretical maximum specific gravity shall be measured once for each HMA sub-lot in accordance with the plant-produced material section. The theoretical value used for the percent density determinations of the

random samples shall be the average of the daily sub-lot measurements for maximum specific gravity. When daily sub-lot measurements are not available, the average of the previous five (5) laboratory measurements for that mix, or a representative test sample from the lift cored shall be used. The percent density of each test sample will be determined in accordance with AASHTO T269, using the bulk specific gravity obtained by cores or density gauge readings and the average theoretical maximum specific gravity. Retesting of pavement shall be in accordance with applicable provisions of the NETTCP Quality Assurance Technologist Manual, latest edition and these specifications.

Adjustment Pay Schedule for Density

The total HMA Adjustment (%) will be determined as described below based on the density adjustment schedule (Table 12) for Mat and (Table 13) for Longitudinal Joint (LJ). The total HMA Adjustment (%) shall be applied to the bid price per ton for compacted mixtures greater than or equal to 1 1/2 inches (37.5mm) in thickness as shown in the contract award to arrive at the total Asphalt Adjustment Cost based on density. Any incentive adjustments (greater than 100) will first be applied to offset penalty adjustments (less than 100).

Adjustment Pay Schedule for Mat Density - The pay factor based on the density adjustment schedule will be applied to the bid price per ton for compacted mixtures greater than or equal to 1-1/2 inches thickness as shown in the contract award.

Table 12.
HOT MIX ASPHALT MAT DENSITY
Adjustment Schedule

| Average Percent of Maximum Density (minimum 5 samples) | Percent Payment |
|---|-----------------|
| 100.0 - 98.1 | 98 |
| 98.0 - 95.0 | 102 |
| 94.9 - 92.0 | 100 |
| 91.9 – 89.0 | 90 |
| 88.9 – 87.0 | 75 |
| 86.9 or less | rejection |

Adjustment Pay Schedule for Longitudinal Joint Density - The pay factor based on the joint density adjustment schedule will be applied to the bid price per ton for compacted mixtures greater than or equal to 1 1/2 inches thickness as shown in the contract award.

Table 13.
HOT MIX ASPHALT LONGITUDINAL-JOINT DENSITY
Adjustment Schedule

| Average Percent of Maximum Density (minimum 5 samples) | Percent Payment |
|---|------------------|
| 100.0 - 98.1 | 98 |
| 98.0 - 95.0 | 102 |
| 94.9 - 90.0 | 100 |
| 89.9 - 89.0 | 90 |
| 88.9 - 88.0 | 80 |
| 87.9 - 87.0 | 70 |
| 86.9 or less | 50% or rejection |

The total hot mix asphalt adjustment will be based on the weighted sum as follows:

$$.60 \text{ Mat Adjustment} + .40 \text{ LJ Adjustment} = \text{Total HMA Adjustment}$$

When the construction of the pavement does not include the construction of a longitudinal joint, the payment adjustment will be based on Table 12 only, no weighted sum will be calculated. Any bonus will be credited against any payment adjustment in the contract for HMA, but in no case will the payment for HMA exceed 100%.

Rejection of Inferior HMA

The Engineer may at any time, notwithstanding previous plant acceptance, reject and require the Contractor to dispose of any batch of hot mix asphalt which is rendered unfit for use due to contamination, segregation, incomplete coating of aggregate, or improper mix temperature. Such rejection may be based on only visual inspection or temperature measurements. Similarly, the Engineer may at any time, notwithstanding field acceptance for mat density, reject and require the Contractor to correct any HMA pavement that was placed with unacceptable mat uniformity or paving joints, due to low density, lack of bond, segregation, improper elevation, or tearing. In the event of such rejection, the Contractor and Engineer may take random split samples of the area(s) in question in the presence of the Engineer, and if it can be demonstrated in the laboratory, in the presence of the Engineer, that such material/pavement was erroneously rejected, payment will be made for the material at the contract unit price.

MEASUREMENT

Method of Measurement

The quantity of hot mix asphalt to be paid for shall be measured by the number of tons of hot mix asphalt used in the accepted work. The quantity of each truckload shall be obtained from printed tickets indicating the recorded batch weights or certified truck scale weights that have been properly countersigned by an authorized representative of the Engineer at the time of delivery. HMA quantities shall be verified by the Engineer using HMA yield calculations which will include the in-place bulk specific gravity and actual area and nominal depth for the mixture placed.

PAYMENT

Basis of Payment

Payment shall be made at the contract unit prices per ton complete in place with any applicable adjustments. This payment shall be full compensation for furnishing and placing all quality hot mix asphalt materials, including tack coat where specified, cutting of keyways or milling/stripping of pavement to produce neat joints, mechanical sweeping of streets, costs for Engineer testing due to inferior production or placement, and for all labor, tools, equipment, materials, and all incidentals necessary to complete the work. The payment for individual pavement lifts will be based on the tolerances identified in Table 4.06-3 of the Standard Specifications. An adjustment to the overall tonnage for the roadway will be made prior to paying for the surface course based on the overall tolerance as identified in the table. The Contractor will not be paid for any quantity over these tolerances.

The cost for tack coat and saw cutting of pavement limits where specified on the plans will be paid for under their respective items in the contract.

Adjustment for Density

A payment adjustment for density shall be made when the HMA material varies from the specification target limits, but is within the tolerances stated in Section "Adjustment Pay Schedule for Density". The 'Total HMA Adjustment' for that street or facility shall be applied to the actual tonnage accepted for that street or facility. Incentives will be applied to offset any penalties. Penalties resulting from the "Adjustment Pay Schedule for Density" shall be incorporated into the "Asphalt Adjustment Cost" (AAC) pay item as follows:

$$\text{AAC} = (\text{Total HMA Adjustment (\%)} - 100) \times \text{Contract Price/Ton} \times \text{Accepted Tonnage}$$

The "Asphalt Adjustment Cost" will be calculated using the formulas indicated above for the Adjustment for Density. An increase in contract payment will NOT be made for incentive density results, any incentive densities payments will be applied to off-set penalty adjustments. A deduction from monies due the contractor will be made for any penalty densities remaining after deducting for incentive densities.

The sum of money shown on the estimate for Asphalt Adjustment Cost, and in the itemized proposal as "Estimated Cost", for this item will be considered the bid price although payment will be made as described above but in no case will the payment for HMA exceed 100%.

| <u>PAY ITEM</u> | <u>DESCRIPTION</u> | <u>PAY UNIT</u> |
|-----------------|--------------------------|-----------------|
| Bid Item ????? | Superpave S0.25 Level 1 | TON |
| Bid Item ????? | Superpave S0.375 Level 1 | TON |
| Bid Item ????? | Superpave S0.5 Level 1 | TON |
| Bid Item ????? | Superpave S1.0 Level 1 | TON |
| Bid Item ????? | Superpave S0.25 Level 2 | TON |
| Bid Item ????? | Superpave S0.375 Level 2 | TON |
| Bid Item ????? | Superpave S0.5 Level 2 | TON |
| Bid Item ????? | Superpave S1.0 Level 2 | TON |
| Bid Item ????? | Superpave S0.25 Level 3 | TON |
| Bid Item ????? | Superpave S0.375 Level 3 | TON |
| Bid Item ????? | Superpave S0.5 Level 3 | TON |
| Bid Item ????? | Superpave S1.0 Level 3 | TON |
| Bid Item ????? | Asphalt Adjustment Cost | EST |

SECTION 09222

BITUMINOUS CONCRETE PATCHING

Description:

The work under this item shall consist of the permanent patching of any pavement surfaces or pedestrian passways which have become rutted, broken, damaged or otherwise unserviceable, and at such other locations as the Engineer may designate.

Materials:

The materials furnished and used in this work shall conform to the requirements of Form 816 Section 4.06 and M.04. The specific material to be used for patching shall be as directed by the Engineer and shall be Class 1, 2, or 4.

Construction Methods:

Patching shall be done only at the locations and at such time as is deemed necessary by the Engineer. Prior to placing the patching material, the areas to be patched shall be cleaned of dirt and other debris and shall be dry. Areas shall be squared off with a neat finished edge. Gravel base and subbase shall be compacted by methods approved by the Engineer. Where compaction cannot be achieved, contractor is to remove and replace gravel base and/or subbase to suitable depth with processed aggregate. Compaction of the patching material shall be attained by methods approved by the Engineer. Contractor to adhere to specifications provided in the Contract Documents.

Method of Measurement:

The quantity of bituminous patching material to be included for payment will be determined by the square yards installed. Compaction of the gravel base and/or subbase is incidental to this item. The quantity of processed aggregate material to be included for payment will be paid for at the contract unit price per ton. The excavated gravel base and/or subbase material below the bottom of the installed bituminous concrete patch will be paid for at the contract unit price per cubic yard for Roadway Excavation..

Basis of Payment:

This work will be paid for at the contract unit price per square yard for "Bituminous Concrete for Patching," complete in place, which price shall include furnishing all materials, equipment, tools, labor and work incidental thereto. Where indicated in the Contract, separate contract unit prices may be established for work within an overlay project and external to other operations.

ITEM NO. 0921001A - CONCRETE SIDEWALK

ITEM NO. 0921005A – CONCRETE SIDEWALK RAMP

ITEM NO. 0924006A – CONCRETE DRIVEWAY RAMP

Description:

This item shall consist of Portland Cement Concrete sidewalks, driveway ramps and pedestrian ramps constructed on a processed aggregate base course in the locations and to the dimensions and details shown on the plans or as ordered and in accordance with these specifications.

This item shall include furnishing and installing Detectable Warning Strips in the locations and to the dimensions and details shown on the plans or as ordered by the Engineer.

Materials:

Materials for this work shall conform to the requirements of Article M.03.01 of ConnDOT Form 817 for Class “C” Concrete.

a. Portland Cement Concrete

The concrete mix shall conform to Class “C” concrete and shall be proportioned in accordance with the following requirements:

Approximate Proportions by Weight: 1-2-3
Water/Cement Ratio: 0.53
Cement Factor (pounds/cubic yard): 658
Max. Aggregate size: No. 6

b. Air-Entraining Admixtures

Air entraining admixtures conform to the requirements of Article M.03.01 of ConnDOT Form 817.

c. Coarse Aggregate

Coarse aggregate shall be broken stone or gravel consisting of clean, hard, tough, durable fragments of uniform quality throughout; free from soft pieces, mud, dirt, organic or other injurious material and shall contain not more than 1% dust by weight. When tested with magnesium sulphate solution for soundness using AASHTO Method T-104, coarse aggregate shall not have lost more than 10% after 5

cycles; when tested by the Los Angeles machine using AASHTO Method T-96, coarse aggregate shall not have a loss of more than 40%. The required grading shall be obtained by using 100 percent of ¾ inch coarse aggregate.

d. Fine Aggregate

Fine aggregate shall be sand consisting of clean, hard, durable, uncoated particles of quartz or other rock, free from lumps of clay, soft or flaky material, loam, organic or other injurious material. In no case shall sand containing frozen lumps be used. Fine aggregate shall contain not more than 3% of material finer than the #200 sieve, using AASHTO method T-11. When subjected to colorimetric test shall not produce a color darker than Gardner Color Standard No. 11, using AASHTO Method T-21. If the fine aggregate fails to meet this requirement, the provisions of AASHTO M6 Section 5.2 will govern. Fine aggregate shall be uniformly graded from coarse to fine and shall meet the following gradation:

| | | | | | | | |
|---------------------------------|------|--------|--------|-------|-------|-------|------|
| Square Mesh Sieve | 3/8" | #4 | #8 | #16 | #30 | #50 | #100 |
| Percent Passing By Weight | 100 | 95-100 | 80-100 | 50-85 | 25-60 | 10-30 | 2-10 |

e. Portland Cement: Portland cement shall be Type IIA and shall conform to the requirements of AASHTO M-134. Cement having a temperature exceeding 160 degrees F at the time of delivery to the mixer shall not be used.

f. Water: Water shall be reasonably clean, shall not be salty or brackish and shall be free from oil, acid, and injurious alkali or vegetable matter and shall be tested as prescribed by AASHTO T-26.

g. Processed Gravel Base: Coarse and fine aggregates shall be combined and mixed by approved methods so that the resulting material shall conform to the following gradation requirements:

| | | | | | | |
|---------------------------------|--------|--------|-------|-------|-------|------|
| Square Mesh Sieve | 2-1/2" | 1-3/4" | ¾" | ¼" | #40 | #100 |
| Percent Passing By Weight | 100 | 95-100 | 50-75 | 25-45 | 10-25 | 3-12 |

h. Welded Wire Mesh Reinforcement: Welded wire mesh reinforcement shall be cold drawn steel wire conforming to the requirements of AASHTO M-55. The type of mesh shall be approved by the Engineer.

i. Preformed Expansion Joint Filler: Preformed expansion joint filler shall be the bituminous cellular type and shall conform to the requirements of AASHTO M-213.

j. Detectable Warning Strip: The Detectable Warning Strip shall be a prefabricated detectable warning surface tile for the application designated as manufactured from Armor-Tile, 300 International Drive, Suite 100 Williamsville, NY 14221, telephone number (800) 682-2525 or the approved equal from ADA Solutions, INC. P.O. Box 179 North Billerica, MA 01862 telephone number (978) 262-9900. The tile shall conform to the dimensions shown on the plans and have a brick red homogeneous color throughout in compliance with Federal Standard 595A Color #22144 or approved equal.

Construction Methods:

a. Excavation: Excavation, including removal of any existing sidewalk, shall be made to the required depths below the finished grade, as shown on the plans or as directed. All soft and yielding material shall be removed and replaced with suitable material.

b. Processed Aggregate Base: The processed aggregate base shall be placed in layers not over 6 inches in depth and to such a depth that after compaction it shall be at the specified depth (eight inches or as directed by the Engineer) below the finished grade of the walk. The base shall be wetted and rolled or tamped after the spreading of each layer. The base shall be placed full depth six (6") inches wider on each side than the neat lines of the concrete.

The finished surface of the base shall be fine graded after compaction to within 3/8" plus or minus of subgrade. The finished base course shall be maintained true to line and grade in a compact condition until placement of the concrete. The completed base must be approved by the Engineer prior to setting of forms.

c. Forms: Forms shall be standard metal forms or 2" surfaced plank, straight, free from warp and of sufficient strength to prevent springing. At corner radii, thinner material may be used but the material and installation must be approved by the Engineer prior to use. Forms shall be of approved cross-section, have a flat surface on top and shall be of depth equal to the concrete being placed. Forms shall be securely staked, braced and held firmly to the required line and grade and shall be of sufficient strength and tightness to retain plastic concrete. All forms shall be cleaned of mortar and dirt and

shall be coated with suitable form oil prior to each use.

Preformed expansion joints shall be held securely in place by means of a steel template or steel pins to true line and grade and shall be 1/4 inch minimum deeper than the concrete trimmed flush with the concrete walk after the curing cycle.

Dummy joints or planes of weakness shall be hand formed, straight and true, and shall consist of grooves formed in the top surface of the concrete at a depth of 1/4 of the depth of the concrete. Dummy joints shall be located transversely every five (5) feet and as detailed on the plans or as ordered.

d. Mixing and Placing Concrete:

1. Concrete shall be mixed in approved transit mixers (concrete mixed in truck mixer en route to or at point of placement). Transit mixers shall be loaded in approved batching plants. Batching and mixing on job site will not be allowed. Truck mixing shall not be less than four (4) revolutions at mixing speed. Concrete shall be incorporated into the work within 45 minutes after the water was added to the mix. Concrete shall be discharged within 1-1/2 hours from the time the dry aggregates are loaded into the mixture. Truck mixers shall be equipped with accurate gauges to measure the quantity of water incorporated into the mix and with an accurate drum revolution counter.
2. Slump of the concrete, as determined by AASHTO method T-119, shall be not less than two (2) inches nor more than four (4) inches. Concrete shall contain not less than 4 nor more than 6 percent entrained air at the time the concrete is deposited in the forms, as determined by AASHTO Methods T-152 or T-121.
3. Immediately before concrete is placed, the base course shall be moistened. It shall be compact and smooth. The entire base course under the walk to be constructed in that pour shall be complete and accepted prior to beginning or placing of concrete. At no time shall concrete be placed on soft, muddy, frozen, porous or rutted base.
4. Concrete shall be placed only in the presence of an inspector. It shall be deposited in a plastic condition and shall be a homogeneous mass without segregation of aggregates during depositing and spreading. All chutes used to deposit concrete shall be metal or metal lined. Depositing and spreading concrete shall be continuous between transverse joints. Workmen shall not walk in concrete during placing and spreading. Concrete alongside forms and each side of transverse joints shall be thoroughly consolidated. Concrete shall be placed only when the temperature is 40 degrees F and rising, and when it can be expected that the placing and finishing can be accomplished at that temperature or above.

5. Reinforcement shall be placed in the sidewalk at driveway crossings two (2) inches above the bottom surface of the concrete and parallel to the finished grade of the walk. Care shall be taken to hold the reinforcing mesh to the proper line and grade. Successive and adjacent pieces of reinforcing mesh shall be lapped six (6) inches. Reinforcing mesh shall be one (1) inch clear from the side of forms and expansion joints.

6. A 1/4 inch thick preformed expansion joint shall be installed at transverse locations not to exceed twenty longitudinal feet, between curbs and walks, at

structures projecting into and adjacent to the walk and concrete ramps as shown on the plans and details, or as directed by the Engineer.

7. Formed surfaces shall be kept continuously wet for the duration of the curing period (prior to, during, and after form removal) or until curing compound is applied.

8. If moist curing is discontinued before the end of the curing period, white pigmented curing compound shall be applied immediately, following the procedures specified under "Curing."

e. Consolidation and Finishing: Consolidation and finishing shall be by hand or mechanical equipment. Experienced concrete finishers shall be used at all times in the finishing of the surface. Concrete shall be struck off by means of a hand screed resting on the side form and weighing not less than 10 pounds per linear foot or by portable non-vibrating screed. Strike off shall bring the concrete to the required grade and contour. Screeding shall be a transverse, sawing motion carrying a roll or mortar in front of it. As soon as possible after screeding, the surface shall be longitudinally floated with a sawing motion commencing at one side and wasting excess material over the other side. Movement ahead in a longitudinal direction shall be one-half the length of the float. The surface irregularities shall be removed by use of a finishing lute. The initial edging shall be performed, then the surface shall be dragged with a clean, wet, stiff bristle broom. Before initial set, the final edging against forms and expansion joints and of dummy joints shall be made. All edging shall be true to line and grade and shall not create depressions in the surface.

f. Curing: Liquid curing compound shall be applied immediately following the disappearance of the water sheen following the final finishing and before any marked dehydration of the concrete or surface checking occurs. The compound shall be applied in two even coats of one gallon per 200 square feet, with a continuous even film at right angles to each other and with not more than 30 minutes between coats. Application shall be by pressure sprayer giving a fine uniform spray. Should rain fall

on the newly coated surface before it dries, a new application shall be maintained to protect the concrete surface from rain during finishing operations and until the curing compound dries. The walk shall be barricaded and all traffic shall be restricted for at least seven (7) days.

g. Removal of Forms and Backfilling: Forms shall not be removed until the concrete has set at least 12 hours unless approved by the Engineer or inspector. Care shall be taken in removal so that no damage is done to the edges of the walk and to the surface membrane curing. All honeycomb shall be pointed and the sides sprayed with liquid curing compound if not immediately backfilled.

The sides of the walk and/or ramp shall be backfilled with a suitable material as directed by the Engineer and shall be graded and thoroughly compacted flush with the top of the walk and to meet the existing adjacent grade with no pockets or depressions to trap water. All surplus material shall be removed, the concrete surface swept clean and the site left in a neat and presentable condition to the satisfaction of the Engineer.

h. Cold Weather: When, in the opinion of the Engineer, the weather is such that that any concrete work which has not completely cured is liable to be frozen, such concrete shall be protected by covering as soon as it has hardened sufficiently. On top of the curing compound shall be placed 6-8 inches of hay or straw, or an approved thermal blanket. A cover sheet of width sufficient to overlap the edges of the walk or ramp shall then be placed and securely fastened down. The protective material shall remain in place until ordered removed by the Engineer and all material promptly removed from the site. Any concrete placed during cold weather and not properly protected will not be accepted.

i. Concrete in Hot Weather: When climatic or other conditions are such that the temperature of the concrete may reasonably be expected to exceed 90 degrees F at the time of delivery at the work site, during placement, or during the first 25 hours after placement, the following provisions also apply:

1. The contractor shall maintain the temperature of the concrete below 90 degrees F during mixing, conveying, and placing. Methods used shall conform to "Recommended Practice for Hot Weather Concreting", ACI Standard 305.
2. The concrete shall be placed in the work immediately after mixing. Truck mixing shall be delayed until only time enough remains to accomplish it before the concrete is placed.
3. Exposed concrete surfaces which tend to dry or set too rapidly shall be continuously moistened by means of fog sprays or otherwise protected from drying during the time between placement and finishing and after finishing.

4. Finishing of exposed surfaces shall be started as soon as the condition of the concrete allows and shall be completed without delay.

5. Concrete surfaces exposed to the air shall be covered as soon as the concrete has hardened sufficiently and shall be kept continuously wet for at least the first 24 hours of the curing period and for the entire curing period unless curing compound is applied as specified under “Curing.”

j. Water Gates and Gas Gates: All of the water gates and gas gates which are encountered within the limits of the work shall be aligned properly over shutoff and shall be adjusted to meet the grade of the proposed surface. All boxes shall be free of all dirt, rocks, etc. The Contractor shall be responsible for replacing any broken gate boxes. Materials shall be provided by the Meriden Water Department if gate boxes were damaged prior to construction. All labor costs are the Contractor’s responsibility. The Contractor will coordinate with Eversource Gas and Meriden Water Department to obtain replacement boxes.

k. Detectable Warning Strip: The Detectable Warning Strip shall be set directly in poured concrete according to the plans and the manufacturer’s specifications or as directed by the Engineer. The contractor shall place two 25 pound concrete blocks or sandbags on each tile to prevent the tile from floating after installation in wet concrete. The Contractor is responsible for removing any material spatters or debris and repairing any damage to the existing sidewalk arising from the installation of the tile. The protective film on the detectable warning strip shall be removed as soon as the concrete has cured.

l. Timeframe for Placement: Placement of concrete for sidewalks, sidewalk ramps and driveway ramps may only be performed between April 15th thru October 15th. This timeframe may be extended to October 31st at the discretion of the Director of Public Works.

Method of Measurement

Concrete sidewalk and ramps shall be measured for payment by the total square feet of the top surfaces of the sidewalk, driveway ramps, and pedestrian ramps, excluding the exposed top surface of the concrete curbing.

The Detectable Warning strip will be paid separately.

Basis of Payment

Payment for concrete sidewalks and pedestrian ramps shall be at the contract unit price per square foot of “Concrete Sidewalk” or “Concrete Sidewalk Ramp” or “Concrete Driveway Ramp” complete in place and accepted.

Price and payment for “Concrete Sidewalk” and “Concrete Sidewalk Ramp” and “Concrete Driveway Ramp” shall include the removal of all existing sidewalks and curbing, the removal and replacement of all bituminous concrete pavement, all forms necessary for tree pits, grass and brush and all equipment and labor, excavation, backfill (except rock excavation), bedding, and all other miscellaneous items necessary to complete the work, and not listed for separate payment in the bid.

| <u>Pay Item</u> | <u>Pay Unit</u> |
|------------------------|-----------------|
| Concrete Sidewalk | S.F. |
| Concrete Sidewalk Ramp | S.F. |
| Concrete Driveway Ramp | S.F. |

ITEM # 1403001A- MANHOLE – SANITARY SEWER

ITEM # 1403501A- RESET MANHOLE – SANITARY SEWER

ITEM # 1403010A- MANHOLE FRAME AND COVER – SANITARY SEWER

Description

- A. The work covered by this section includes the furnishing of all plant, labor, equipment, appliances and materials and performing all operations in connection with the satisfactory installation of precast reinforced concrete manholes and all incidental work, complete, in strict accordance with the specifications and applicable drawings and conditions of the contract.
- B. The Contractor shall provide the Engineer with shop drawings for all precast materials with a description of all methods of jointing. In addition shop drawings for manhole steps, manhole frames and manhole covers shall be submitted to the Engineer for approval prior to installation.
- C. It is the intention of these specifications and the desire of the Engineer that the manholes, including all component parts, have adequate space, strength and leak proof qualities considered necessary by the Engineer for the intended service. Space requirements and configurations, shall be as shown on the drawings. Manholes shall be an assembly of precast sections with steel reinforcement, with approved jointing or concrete cast monolithically in place with reinforcement. In any approved manhole, the complete structure shall be of such material and quality as to withstand loads of 8 tons (H-2O loading) without failure and excess leakage for the life of the structure. A period generally in excess of 25 years is to be understood as the life of the structure.
- D. Manholes shall be constructed at the locations, to the elevations, and in accordance with notes and details shown on the drawings.
- E. “Reset” shall mean the minor adjustment of frames and covers of existing units to the proposed grade NOT involving major reconstruction of the unit. Examples of resetting: are adding several courses of brick/block or use of an approved manhole extension ring to bring frame to required grade; removing some masonry courses for lowering a frame without reconstruction below required elevation of bottom of frame; providing that the frame is properly seated.

Materials

A. Precast reinforced concrete units:

1. Precast reinforced concrete manhole bases, risers, tops and grade rings shall be of the types indicated or as directed.
2. Precast reinforced concrete manhole bases, risers, transition sections and tops shall conform to the requirements of ASTM C478, latest revision except as modified herein and/or on the drawings.
3. The height and diameter of manhole bases shall be as required to accommodate the size of sewer pipe used.
4. The manhole risers shall be available in 2, 3, or 4-foot lengths. Manhole tops of the eccentric cone type shall be 3 or 4 feet high with a 36-inch inside diameter opening at the top. Wall thickness of manhole risers shall not be less than 5 inches. Manholes over 8 feet deep shall have 5-foot inside diameter.
5. When shallow installations do not permit the use of a cone type top or where directed, flat slab tops shall be used. Flat slab tops shall not be less than 6 inches thick, and shall have an opening with an inside diameter of 36 inches.
6. Transition sections shall be similar to the tops and used as reducers to join the larger bases with the four-foot diameter risers. The transition sections shall be of the length required and have a four-foot opening at the top. Wall thickness of transition sections and cone type tops shall not be less than 5 inches at the base and shall taper to a thickness not less than 8 inches at the top.
7. Manhole steps shall be provided in each manhole. Manhole steps shall be arranged in the manhole bases, transition sections, risers and cones so as to provide a manhole step ladder approximately 12 inches on center for the full height of installation. Manhole steps shall be copolymer polypropylene plastic coated ½" grade 60 steel reinforced step Model No. PS2-PFSL in conformance with ASTM C478 paragraph 11 as revised, as manufactured by M.A. Industries, Peachtree City, Ga. or approved equal.
8. All manhole bases, transition sections, risers and tops shall be joined using Butyl Rubber Section Joints conforming to Federal Specification SS-S-210.

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ITEM # 1403700A

9. The exterior surfaces of all manholes shall be shop coated with two coats of Super Service Black as manufactured by Koppers Company Inc., or Heavy Duty Black 46-449 as manufactured by Tnemec or equal.

B. Openings In Manhole Bases And Risers

1. Openings for pipes entering manhole bases and risers shall be provided at the locations and to the arrangements and dimensions shown on the approved shop drawings.
2. Openings in manhole bases and risers shall be provided with a prefabricated mechanical type joint seal between manhole walls and entering pipes. Joint seal shall be of a type to insure water tight jointing between manhole and pipes under all conditions of installation. The type of joint seals to be used shall be subject to approval and shall be as shown on the approved shop drawings.

C. Mortar Grout

Non-shrink type mortar or grout shall be a factory-mixed ready-to-use product containing an especially prepared metallic aggregate, cement and sand and other components which shall produce a mortar or grout with properties to counteract shrinkage, increase density, withstand impact, improve workability and produce watertight joints.

D. Concrete

1. The concrete used for precast manhole bases, transition sections, risers and tops shall have an average strength of 5,000 psi at 28 days.
2. Strength shall be determined by tests on 6-inch by 12-inch vibrated test cylinders cured in the same manner as the manhole bases, transition sections, risers and tops or by any other approved method.
3. Not less than two concrete strength tests shall be made for each 100 vertical linear feet of manhole bases, transition sections, risers and tops.
4. Testing may be conducted at the manufacturer's plant or at an approved testing laboratory and shall be the responsibility of the Contractor, at no additional expense to the Owner.

E. Reinforcing Steel

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1. Reinforcing steel used for precast manhole bases, transition sections, risers, and tops shall conform to ASTM A185, latest revision.

F. Cement

Cement shall be moderate heat-of-hardening portland cement conforming to ASTM Designation C 150, latest revision, Type I for Brick work and Type II for precast units.

G. Absorption

Absorption is to be determined by absorption test described in ASTM Designation C 478, latest revision, and shall not exceed 8 percent of dry weight.

H. Brick

1. Brick for manholes shall conform in all respects to ASTM Designation C 32, Grade SM, latest revision, size 2-1/2 inches by 3-3/4 inches by 8 inches.
2. Bricks that are broken, warped, cracked or of improper size or quality or unduly chipped or otherwise defective shall not be used in the work and shall be removed from the site.

I. Mortar Plaster

1. Mortar and plaster for brick work shall be composed of one part Portland cement and two parts sand with only sufficient water added to make a stiff plastic mortar of a consistency and texture satisfactory to the Owner.
2. Mortar shall be used so that it will be in place before the initial setting of cement has taken place; retempering of mortar in which the cement has started to set will not be permitted.

J. Sand

1. Sand for mortar shall be graded uniformly from fine to coarse and when dry shall pass a screen having 8 meshes to the inch.
2. Sand shall consist of an aggregate having clean, hard, durable, strong, uncoated grains and free from deleterious amounts of dust, lumps, soft

or flaky particles, shale, alkali, organic matter, loam or other deleterious substances.

3. The sand shall be washed clean before loading on delivery trucks. Natural sand which shows a color darker than the standard color when tested in accordance with the Standard Method of Test for Organic Impurities of ASTM Designation C 40, latest revision, will be cause for rejection.

K. Water

Mixing water for concrete and mortar shall be clean and fit to drink and obtained preferably from the municipal supply.

L. Bedding Materials

1. Gravel bedding shall consist of hard durable material free from roots, sod, rubbish, organic material, clay or loam and meeting ASTM C33 stone size No. 67 as follows:

| | |
|-----------|---------------------|
| 100% | passing 1" screen |
| 90 - 100% | passing 3/4" screen |
| 20 - 55% | passing 3/8" screen |
| 0 - 10% | passing #4 sieve |
| 0 - 5% | passing #8 sieve |

2. Where ordered by the Engineer to stabilize the base, screened gravel or crushed stone 1/2 inch to 1-1/2 inches shall be used.

M. Manhole Frames And Covers

Due to the lead time required to manufacture sewer frames and covers, the Water Pollution Control Facility (WPCF) will provide the required frames and covers with the stipulation that they be replaced prior to payment for same. **Please contact WPCF at 203-630-4261 to coordinate.**

1. Cast-iron manhole covers and cast-iron watertight frames and covers shall conform to the details, types and styles as specified and as shown on the drawings. Shop drawings shall be submitted to the WPCF for approval before fabrication.
2. Gray iron castings shall conform to the requirements of AASHTO Designation: AASHTO M 105 (ASTM A48), Class 35B. For castings

subject to traffic loads furnish gray iron castings conforming to AASHTO M 105 (ASTM A48), Class 35B and AASHTO M306, latest edition, and shall be rated H20 per AASHTO M306, "PROOF-LOAD TESTING."

3. Iron castings shall be true to pattern in form and dimensions, free from pouring faults, sponginess, cracks, blow-holes and other defects in positions effecting the strength and value for the service intended.
4. The surface of the manhole covers shall have a diamond pattern with the words "MERIDEN" and "SEWER" or "STORM" as required, cast in raised letters.
5. Covers shall have two non-penetrating ergonomic pick slots, for ease of cover removal.
6. The cast-iron manhole covers and cast-iron watertight manhole frame and covers for manhole structures shall be as manufactured by EJ USA, INC., Campbell Foundry Company, or approved equal.

N. Sealant Materials

Sealant materials for manhole frames shall be manufactured by Avanti International (AV-219 Fibrotite and Polyurethane Hydrophylic Resin), Parsons Environmental (Parson PoxyF6) or approved equal.

O. Extension / adaptor rings

Manhole Extension/Adjustment/Riser Rings shall conform to the City Standard Details

1. Above Ground:

All material shall be domestic carbon steel conforming to ASTM A36. The bottom (inner) ring shall be rolled from $\frac{3}{4}$ " thick material, and the top (outer) ring shall be rolled from $\frac{1}{2}$ " thick material. The top (outer) ring shall have a nominal inside diameter equal to the existing top cover diameter plus $\frac{3}{16}$ ". The inner and outer rings shall be concentric and be joined together by welding.

For non-adjustable riser rings, the inner and outer rings shall be joined together with a full circumferential weld.

For adjustable riser rings, an adjustment system shall be supplied and welded in line with the bottom (inner) bearing bar. The mechanical adjustment stud shall be made of type 304 stainless steel, and have a positive lock nut. The adjustment system shall allow for the manhole riser diameter to adjust +/-3/8" from nominal.

For cover adjustments less than the thickness of the cover, the inner and outer rings shall be joined together with 12 or 14 gage strip steel conforming to ASTM A1011.

After fabrication, risers shall be coated with either water based bituminous asphalt paint or a BASF E-coat with charcoal black topcoat.

The manhole riser ring shall be anchored to the manhole frame with three 1" cone tip set screws to prevent any movement from traffic.

All welding shall be performed by AWS D1.5 certified welders.

2. Below Ground:

All below ground frame adjustments shall be completed with the use of a rubber composite adjustment ring. The ring shall be used to minimize water infiltration between the manhole frame and concrete cone or brick layer, and to protect the substructure from traffic vibration and concentrated load stresses. The rubber composite adjustment ring shall be an appropriate size (flat or tapered) with which the adjusted manhole frame will achieve the best match to the finished road surface

Below ground adjustment rings shall be a molded rubber composite ring.

Molded rubber composite rings shall be minimum 80% by weight recycled rubber and minimum 10% by volume, recycled coated fiber for added strength and durability.

The rubber composite adjustment ring shall be installed in conjunction with a polyurethane sealant, per the manufacturer's installation instructions.

All rubber composite manhole adjustment risers Rubber composite shall be the EJ USA, INC. INFRA-RISER® as manufactured and supplied by EJ USA, INC. or approved equal.

Construction Methods

A. Inspection

1. All manhole bases, transition sections, risers, tops, steps, frames and covers will be inspected upon delivery. Those, which do not conform to these specification requirements, will be rejected and shall be removed immediately from the site by the Contractor. The Contractor shall furnish all labor and facilities necessary to assist the inspector in inspecting the material.
2. All manhole bases, transition sections, risers, tops, steps, frames and covers which have been damaged after delivery or during installation shall be removed and replaced by the Contractor with new, sound and approved material, at no additional expense to the Owner. At the time of inspection, the surfaces of bases, transition sections, risers and tops shall be dense and close-textured. Cores shall serve as a basis for rejection of manhole bases, transition sections, risers and tops if poor bond with reinforcement steel exists or reinforcement is exposed.
3. The quality of all materials, process of manufacture, and the finished manhole bases, transition sections, risers, and tops shall be subject to inspection and approval by the Owner. Such inspection may be made at the place of manufacture and/or on the site, and the manhole bases, transition sections, risers, and tops shall be subject to rejection at any time on account of failure to meet any of the specification requirements, even though sample manhole bases, transition sections, risers, and tops may have been accepted as satisfactory.

B. Excavation And Backfilling

1. Excavation, backfilling and compacting shall be completed in accordance with the Specifications in this Contract.

C. Installation Of Manhole Bases And Sections

1. Precast bases shall be placed on a six-inch layer of compacted bedding material as described elsewhere in this Specification. The excavation shall be properly dewatered while placing bedding material and setting the base.
2. Each manhole base, transition section, riser, and top shall be eased into its position in the trench using materials and methods as recommended by the manufacturer of the precast units. The Contractor shall provide

all necessary slings, straps and other devices for the safe and satisfactory handling and support of manhole bases, transition sections, risers and tops during lifting, installation and final positioning. Lifting holes may be permitted provided the holes are plugged and sealed watertight with mortar, all as approved.

3. Manhole bases, transition sections, risers and tops shall be installed using approved jointing methods which are completed in accordance with the manhole manufacturer's recommendations, and as approved. Manhole bases, transition sections, risers, and tops shall be installed level and plumb. Water shall not be permitted to rise over newly made joints until after inspection and acceptance. All jointing shall be done in a manner to ensure watertight joints.
4. Openings shall be provided in the precast manhole bases and risers to receive entering pipes, and these openings shall be made at the place of manufacture. The openings for all entering pipes shall be provided with the approved type mechanical joint sealing device shown on the approved shop drawings and the installation of pipes entering the manholes and the installation of the mechanical joint sealing device made in strict conformance with the manhole manufacturer's printed recommendations and so as to obtain watertight joints between manholes and pipe and in a satisfactory manner. Five copies of the manufacturer's printed recommendations shall be furnished to the owner.
5. Care shall be taken to assure that the openings are made to permit setting of the entering pipe at its correct elevation as indicated or directed. Mortar used in sealing spaces between entering pipes and openings in manhole walls shall be of the non-shrink type. Damaged bases and risers by jointing devices will be rejected and shall be replaced by the Contractor at no additional expense to the Owner.
6. Manhole bases, transition sections, risers and tops shall be installed so that the manhole steps are in alignment.
7. Manhole steps shall be installed in accordance with the requirements of the U.S. Department of Labor, Occupational Safety and Health Administration, CFR 29, Part 1910.27g, as amended.

D. Drop Manhole Connections

Drop manhole connections shall be constructed as shown on the drawings. The

encasement for the drop pipe shall be constructed after the installation of the pipe. Special care shall be taken to provide a water tight seal between the pipe and the manhole wall.

E. Installation Of Cast Iron Frames And Covers

1. Cast iron frames and covers shall be installed where shown on the plans. Frames shall be set concentric with the top of the masonry and in a full bed of mortar so that the space between the top of the manhole masonry and the bottom flange of the frame shall be completely filled and made watertight. A thick ring of mortar extending to the outer edge of the masonry shall be placed all around and on the top of the bottom flange. The mortar shall be smoothly finished and have a slight slope to shed water away from the frame.
2. The cover shall not have vent holes, and shall fit firmly within the existing frame, with the top being flush with the existing frame. Gaskets or fillers will not be allowed. The cover shall have concealed pick holes.

F. Installation - Cast Iron Watertight Frames And Covers

1. Cast iron watertight frames and covers shall be installed where shown on the plans. Frames shall be set concentric with the top of the masonry and in a full bed of mortar so that the space between the top of the manhole masonry and the bottom flange of the frame shall be completely filled and made watertight. A thick ring of mortar extending to the outer edge of the masonry shall be placed all around and on the top of the bottom flange. The mortar shall be smoothly finished and have a slight slope to shed water away from the frame.
2. The cover shall fit firmly within the frame with the top being flush. The entire installation shall be watertight. There shall be no vent holes.

G. Masonry Construction

1. Brick masonry shall include brick masonry walls for extending manhole walls to grade when directed; formed brick masonry for constructing manhole inverts and invert tables, mortar, building-in or manhole steps and pipes and appurtenant work.
2. Brick masonry shall be provided to the details and dimensions indicated or as directed. All exterior surfaces of brick masonry manhole walls

shall be plastered with a 1:2 Portland cement and sand mortar plaster to provide a minimum thickness of ½ inch; mortar plaster shall be applied with sufficient pressure to ensure a dense plaster completely filling all voids and thoroughly bonded to the brick work.

3. Inverts shall have a cross section shaped to conform with connecting sewers; changes in size shall be made gradually and evenly.
4. Brick masonry construction shall be done in a manner to ensure watertight construction and all leaks in brick masonry shall be sealed. Brick masonry shall be repaired or replaced so as to obtain watertight construction at no additional expense to the Owner.
5. All workmanship shall conform to the best standard practice and all brick masonry shall be laid by skilled workmen. Brick masonry walls shall be constructed to the thickness indicated. All beds on which masonry is to be laid shall be cleaned and wetted properly. Brick shall be wetted as required and shall be damp but free of any surface water when placed in the work.
6. Bed joints shall be formed of a thick layer of mortar which shall be smoothed or furrowed slightly. Head joints shall be formed by applying to the brick to be laid a full coat of mortar on the entire end or on the entire sides as the case requires, and then shoving the mortar-covered end or side of the brick tightly against the bricks laid previously; the practice of buttering at the corners of the brick and then throwing mortar or scrapings into the empty joints will not be permitted. Dry or butt joints will not be permitted. Joints shall be uniform in thickness and shall be approximately 1/4 inch thick. Joints on the inside face of walls shall be tooled slightly concave with an approved jointer when the mortar is thumb print hard, the mortar shall be compressed with complete contact along the edges to seal the surface of the joints.
7. Brickwork shall be constructed accurately to dimensions and brickwork at top of manholes shall be to the dimensions of the flange of the cast iron frames.
8. No water shall be allowed to flow against brickwork or to rise on the masonry for 60 hours after it has been laid and any brick masonry damaged in this manner shall be replaced as directed at no additional expense to the Owner.
9. Adequate precautions shall be taken in freezing weather to protect the

masonry from damage by frost.

10. All pipes, or castings to be embedded in the brickwork shall be accurately set and built-in as the work progresses; pipe stubs shall be closed with suitable plugs in an approved manner.
11. The outside face of all brickwork shall be plastered to the thickness and using the mortar specified herein; plaster shall be troweled to a smooth, hard finish and no backfill shall be placed until the mortar has thoroughly hardened.

H. Leakage Tests

1. Leakage tests shall be made by the Contractor at his expense and observed by the Engineer on each manhole. The test shall be by vacuum in accordance with ASTM Specification C-828-80. Notarized records of the test results shall be submitted by the Contractor to the Owner for approval.
2. The vacuum testing system shall be as supplied by NPC Systems, Inc., or approved equal. The testing shall be done immediately after assembly of the manhole and before back-filling. A 60-inch/lb. torque wrench shall be used to tighten the external clamps that secure the test cover to the top of the manhole. All lift holes shall be plugged with a non-shrinking mortar, as specified. The Contractor shall plug the pipe openings, taking care to securely brace the plugs and the pipe to prevent the pipes from being drawn into the manhole. A vacuum of 10 inches Hg (4.9 psi) shall be drawn and the vacuum pump shut off. The test shall pass if the vacuum remains at 10-inches of Hg or drops to 9 inches Hg (4.4 psi) in a time greater than one minute.
3. If the manhole fails the initial test, the Contractor shall locate the leak and make proper repairs. Leaks may be filled with a wet slurry of accepted quick setting material. The manhole shall then be retested, repeatedly, if necessary, by the Contractor, until the required conditions are met, at no additional expense to the Owner.

Method of Measurement

- A. Precast concrete manholes shall be measured for payment by the unit "each" as listed in the Bid. The depth of a unit shall be the total depth from the top of the manhole frame to the invert of the sewer at the center of the manhole.

- B. Reset manholes shall be measured for payment by the unit "each" as listed in the Bid.
- C. Manhole frame and cover shall be measured for payment by the unit "each" as listed in the Bid.

Basis of Payment

- A. Precast concrete manholes measured in place as provided in the preceding paragraph, will be paid for at the contract unit price bid "each", as listed in the bid.
- B. The price and payments listed above shall constitute full compensation for furnishing and constructing precast manhole bases, transition sections, risers, cones, flat tops, complete with cast iron frames and covers, including watertight frames and covers if applicable, all pipe and pipe fittings and encasements for drop manholes, steps, brick masonry, for furnishing openings and connecting existing sewer pipelines, excavating and backfill and appurtenant work, for leakage tests complete in place; and for all labor, equipment, tools, materials, and all other costs and appurtenant work incidental and necessary to complete the items as specified, as indicated and as directed by the Owner.

| <u>Pay Item</u> | <u>Pay Unit</u> |
|--|-----------------|
| Manholes - Sanitary Sewer | Each |
| Reset Manhole – Sanitary Sewer | Each |
| Manhole Frame and Cover – Sanitary sewer | Each |

APPENDIX A
GEO TECHNICAL INVESTIGATION

March 15, 2022

Mr. Michael Grove
Meriden Public Schools
22 Liberty Street
Meriden, CT 06450

**Re: Geotechnical Engineering Report
North End Field Reconstruction
Meriden, Connecticut
SLR #141.14792.00004**

Dear Mr. Grove,

SLR International Corporation (SLR) is pleased to submit our geotechnical engineering report for the proposed field lighting structures being installed as part of the North End Field Reconstruction project located at 234 Britannia Street in Meriden, Connecticut. Refer to Figure 1 – Locus Plan in Appendix 1 for the general location of the project.

This report includes subsurface information and geotechnical design and construction recommendations for the project. Our recommendations are based in part on guidance from the 2018 Connecticut State Building Code, which includes the 2015 International Building Code (IBC) and the 2018 Connecticut Amendments. Design recommendations are based on Allowable Stress Design Methods.

PURPOSE AND SCOPE

SLR observed subsurface explorations and performed a geotechnical engineering evaluation for the proposed field lighting structures. Our scope of services included characterizing the subsurface conditions at the site, performing geotechnical engineering analyses, and providing geotechnical recommendations.

SITE AND PROJECT DESCRIPTION

The site is located east of Tremont Street, north of Britannia Street, south of Locust Street, and west of residential apartment buildings and is currently occupied by three baseball fields, a basketball court, several outbuildings, and associated paved parking and drive aisles. Site grades are generally level and range from approximately El. 142 to El. 147.

Ten lighting structures are proposed around the baseball fields. Specific details regarding the foundations of these structures have not been made available; however, we anticipate the foundation loading primarily

in lateral shear and bending due to wind loads and any potential offset weight of the light pole. The foundations should be designed for the reactions of all loads and load combinations, including axial, shear, flexural, and torsional effects.

REGIONAL GEOLOGY

According to published surficial geology data (1:24,000 scale, Surficial Geologic Map of the Meriden Quadrangle, Connecticut, Penelope M. Hanshaw, 1962), the subsurface material at the site is mapped as artificial fill over swamp deposits. According to published bedrock geology data (1:24,000 scale, Contour Map of the Bedrock Surface, Meriden Quadrangle, Connecticut by F.P. Haeni, 1976), bedrock at the site is mapped as New Haven Arkose, an arkosic conglomerate and sandstone approximately 55 feet below existing grades at about El. 100.

SUBSURFACE EXPLORATIONS

SLR observed ten borings (SLR-1 through SLR-10) drilled by SITE, LLC of Beacon Falls, Connecticut, on February 1, 2, and 7, 2022. The borings were performed to explore the subsurface conditions near each of the proposed lighting structures. The borings were located using a handheld Global Positioning System unit, and the approximate ground surface elevation at each was estimated from available topographic data. Boring locations are shown on Figure 2 – Subsurface Exploration Location Plan contained in Appendix 1.

Hollow-stem auger drilling methods were used to advance the borings to depths ranging between approximately 22 and 47 feet below current site grades. Representative soil samples were obtained by split-barrel sampling procedures in general accordance with American Society for Testing and Materials (ASTM) Specification D-1586. Logs of the borings are included in Appendix 2.

The split-barrel sampling procedure utilizes a standard 2-inch-outside-diameter (O.D.) split-barrel sampler that is driven into the bottom of the boring with a 140-pound hammer falling 30 inches. The number of blows required to advance the sampler the middle 12 inches of a normal 24-inch penetration is recorded as the Standard Penetration Resistance Value (N). The blows are indicated on the boring logs at their depth of occurrence and provide an indication of the relative density of the material. Groundwater levels were measured using a weighted tape in the open drill holes and inferred from the soil samples during drilling.

SUBSURFACE CONDITIONS

The subsurface profile generally consists of topsoil or asphalt over fill, over organics, over sand and gravel to the depths explored. Below are more detailed descriptions of the subsurface materials encountered:

Topsoil was encountered at the surface of each boring, except SLR-1. Where encountered, the topsoil is approximately 5 to 14 inches thick. The topsoil generally consists of loose to medium dense, dark brown, fine to coarse sand, little silt, trace fine gravel, trace organics.

Asphalt was encountered at the surface of Boring SLR-1 and is approximately 2.5 inches thick.

Fill (F) was encountered below the topsoil or asphalt in each boring and is between 3.8 and 21.0 feet thick. The fill consists of loose to medium dense, light brown to reddish brown to black, fine to coarse sand, trace to and fine to coarse gravel, trace to some silt, trace organics, trace debris (brick, concrete, plastic, asphalt) OR fine to coarse gravel, little to some fine to coarse sand, trace silt.

Organics (O) and organic-containing materials were encountered in each boring below the fill with a total thickness ranging between 6.5 and 16.0 feet thick. This layer generally consists of up to 9 feet of very loose to loose, black to brown, fine to coarse sand, some to and silt, trace to some organics over five to 10 feet of very loose to loose, brown, organic matter over up to six feet of soft to medium, dark gray to gray, clayey silt, trace fine sand, trace to little organics.

Sand & Gravel (S&G) was encountered in each boring below the organics and is at least 8.5 to 13.5 feet thick. The sand and gravel generally consists of medium dense, reddish brown, fine to coarse sand, little to and fine to coarse gravel, trace silt OR fine to coarse gravel, little to and fine to coarse sand, trace silt.

Groundwater was encountered in each boring between approximately 1.4 and 5 feet below existing grades, or between approximately El. 139.1 and El. 141.5. Groundwater levels will vary depending on factors such as season, precipitation, construction activity, and other conditions, which may be different from those at the time of these observations.

GEOTECHNICAL IMPLICATIONS

The subsurface conditions in the project area vary significantly depending on location, and a substantial portion of the subsurface profile includes loose fill and soft organics that extend between 13 and 33 feet below existing grades. Field lighting structures, such as those proposed for this project, are typically supported on a single, 24- to 36-inch-diameter drilled shaft that extends up to 20 feet below grade to develop the capacity to resist the imposed loads. The presence and thickness of the loose fill and soft organics may render a single drilled shaft foundation unviable, and an alternate arrangement may be required.

Actual foundation loads have not been provided; however, we recommend that the design of each foundation consider the subsurface conditions at that structure location and the actual loads that must be resisted.

GEOTECHNICAL RECOMMENDATIONS

Drilled shaft foundations for the light pole foundations should be designed and constructed in accordance with the applicable requirements of Section 1808.2, Piers and Piles, and Section 1812.2 – 10, Pier Foundations, of the Connecticut State Building Code.

For a single drilled shaft foundation, the geotechnical design should consider a free-head condition and account for any sloping of the finished grade. The foundations should be sufficiently sized and penetrate to a depth that provides an appropriate factor of safety against collapse and such that the deformations are within tolerable levels. The required embedment to resist lateral loading can be determined by either elastic (e.g., p-y method) or static (e.g., Brom’s method) methods, and required embedment to resist axial and torsional loading can be determined from the frictional resistance of the drilled shaft on the adjacent soils.

Depending on the method used to analyze the selected foundation, various geotechnical parameters may be required, which may include, as appropriate, values of total and effective soil unit weight, friction angle, cohesion, k_s (the soil stiffness) and K_p (soil passive resistance), and the frictional resistance of the shaft against the adjacent soils. Based on the above, we recommend the following parameters for the geotechnical design of the drilled shaft foundations for the lighting structures, which neglects any contribution from the soft organic soils.

| Strata | Unit Weight (pcf) | | Friction Angle (ϕ) | Cohesion (ksf) | K_s (pci) | | K_p | Ultimate Side Resistance (ksf) |
|--------|-------------------|-----------|---------------------------|----------------|-------------------|-------------------|-------|--------------------------------|
| | Total | Effective | | | Above Groundwater | Below Groundwater | | |
| F | 100 | 38 | 26 | 0 | 25 | 20 | 2.5 | 0.5 |
| O | 95 | 33 | - | - | - | - | - | - |
| S&G | 135 | 73 | 34 | 0 | 90 | 60 | 3.5 | 1.0 |

Notes: pcf =pounds per cubic foot; pci = pounds per cubic inch; ksf = kips per square foot

We anticipate the overburden soils can be excavated by conventional drilling techniques. We also recommend that the selected foundations be constructed by a method that will allow for inspection of the final excavation and proper construction of foundation, which may include using temporary casing to support the softer overburden soils and facilitate dewatering during construction.

CONSTRUCTION DOCUMENTS AND QUALITY CONTROL

If changes are made to the location or type of structure, the recommendation in this report will need to be reviewed and may be subject to revision. We recommend that SLR observe the installation of foundations to monitor actual conditions and to ensure compliance with the recommendation herein and project specifications.

LIMITATIONS

This report is subject to the limitations included in Appendix 3.

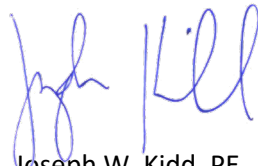
Thank you for the opportunity to be of service. Please feel free to call either of the undersigned if you have any questions.

Sincerely,

SLR International Corporation



Marie G. Bartels, PE
Senior Geotechnical Engineer

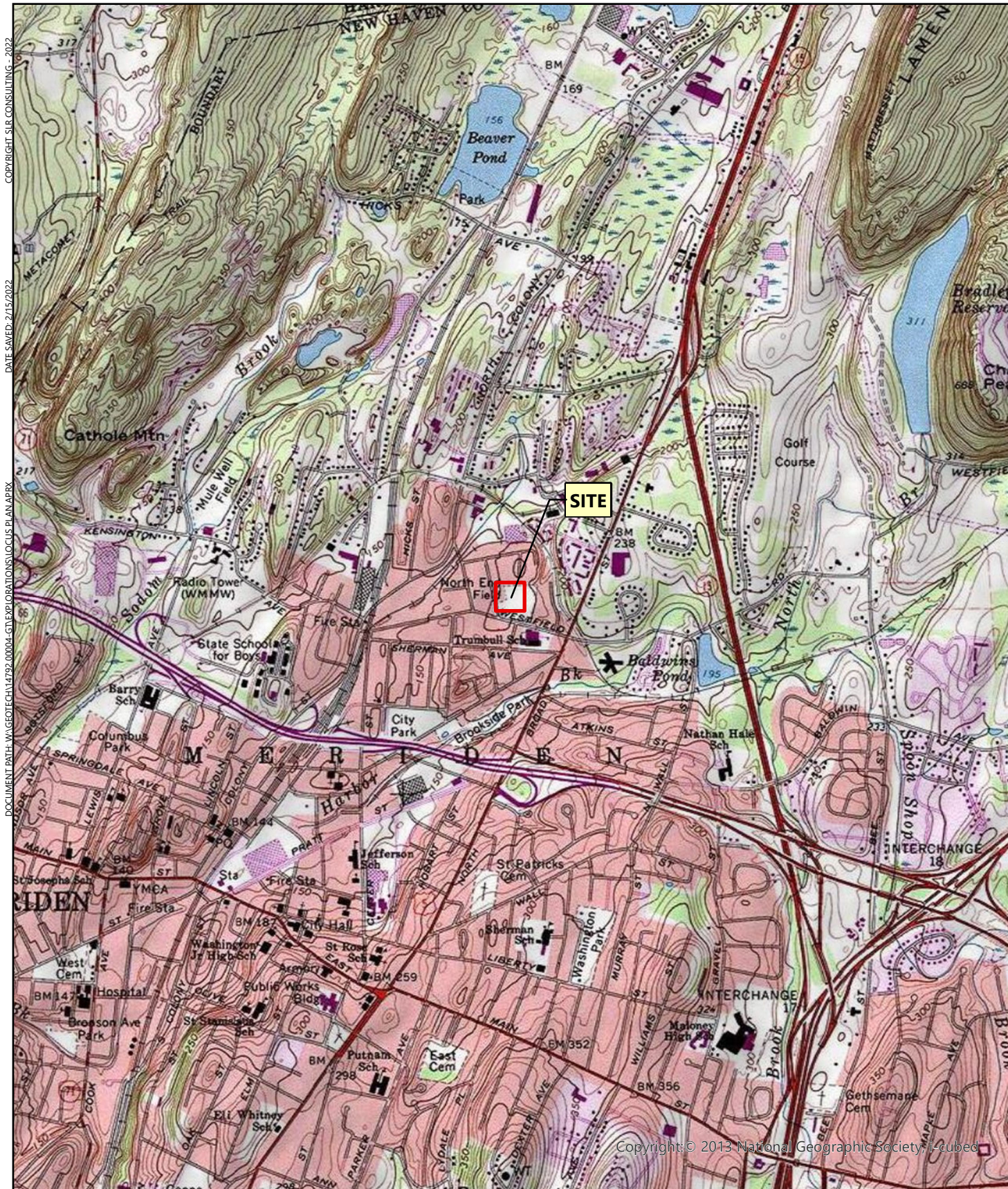


Joseph W. Kidd, PE
Principal Geotechnical Engineer

Attachments: Appendix 1 – Figures
Appendix 2 – Boring Logs
Appendix 3 – Limitations

14792.00004.mr1522.ltr.docx

APPENDIX 1
FIGURES



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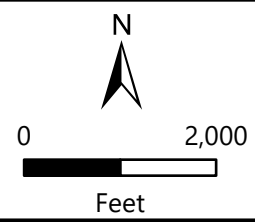
DATE SAVED: 2/15/2022

DOCUMENT PATH: W:\GEO\14792.00004-GT\EXPLORATIONS\LOCUS PLAN APPX

Copyright © 2013 National Geographic Society, I-cubed

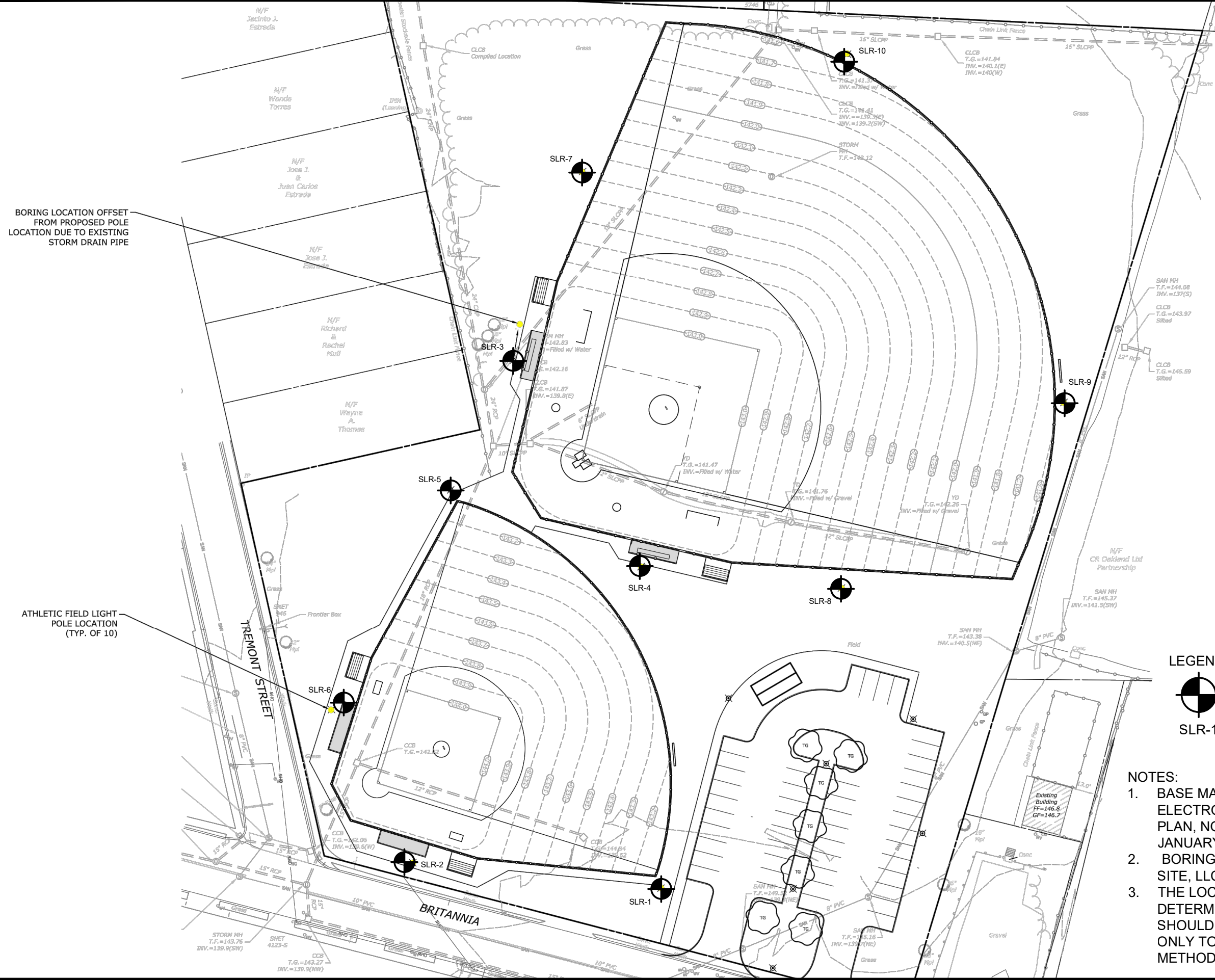
SLR
 99 REPLY DRIVE
 CHESHIRE, CT 06410
 203.271.1773

LOCUS PLAN
 NORTH END FIELD RECONSTRUCTION
 BRITANNIA STREET
 MERIDEN, CONNECTICUT



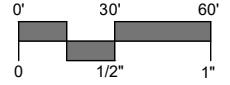
SCALE 1" = 2000'
 DATE 2/15/2022
 PROJ. NO. 141.14792.00004

FIG. 1



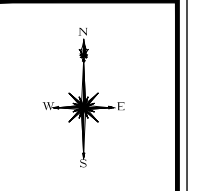
BORING LOCATION OFFSET FROM PROPOSED POLE LOCATION DUE TO EXISTING STORM DRAIN PIPE

ATHLETIC FIELD LIGHT POLE LOCATION (TYP. OF 10)



LEGEND:
 BORING BY SLR INTERNATIONAL CORPORATION (SLR)
 SLR-1

- NOTES:**
1. BASE MAP DEVELOPED FROM AN ELECTRONIC FILE BY SLR TITLED "INDEX PLAN, NOTES AND LEGEND" AND DATED JANUARY 20, 2022.
 2. BORINGS BY SLR WERE PERFORMED BY SITE, LLC ON FEBRUARY 1, 2, & 7, 2022.
 3. THE LOCATIONS OF THE BORINGS WERE DETERMINED BY GPS. THESE LOCATIONS SHOULD BE CONSIDERED ACCURATE ONLY TO THE DEGREE IMPLIED BY THE METHOD USED.



SLR
 99 REEDY DRIVE
 SUITE 100
 203.271.1775
 SLRCONSULTING.COM

| NO. | DESCRIPTION | DATE |
|-----|-------------|------|
| | | |
| | | |
| | | |
| | | |

SUBSURFACE EXPLORATION LOCATION PLAN
NORTH END FIELD RECONSTRUCTION
 BRITANNIA STREET
 MERIDEN, CONNECTICUT

| | | |
|--------------------------------|--------------|----------------|
| JWK DESIGNED | RDG DRAWN | JWK CHECKED |
| SCALE 1"=60' | | |
| DATE FEBRUARY 11, 2022 | | |
| PROJECT NO. 141.14792.00004 | | |

FIG. 2

APPENDIX 2
BORING LOGS

BORING LOG



SLR International Corporation

99 Realty Drive, Cheshire, CT 06410
203.271.1773 | www.slrconsulting.com

| | | |
|---|--|----------------------|
| PROJECT: NORTH END FIELD RECONSTRUCTION | BORING NO.: SLR-1 | SHEET: 1 of 2 |
| LOCATION: BRITANNIA STREET, MERIDEN, CONNECTICUT | CONTRACTOR: SITE, LLC | |
| PROJ. NO.: 141.14792.00004 | FOREMAN: J. DEANGELIS | |
| CLIENT: MERIDEN PUBLIC SCHOOLS | INSPECTOR: R. GOWISNOCK | |
| DATE: FEBRUARY 1, 2022. | GROUND SURFACE ELEVATION: ±146.5' | |

| EQUIPMENT: | AUGER | CASING | SAMPLER | COREBRL. | GROUNDWATER DEPTH (FT.) | | | TYPE OF RIG: |
|-----------------|-------|--------|---------|----------|-------------------------|---------|-------------|---------------------------|
| TYPE | HSA | - | SS | - | DATE | TIME | WATER DEPTH | TRACK W/ AUTOMATIC HAMMER |
| SIZE ID (IN.) | 2 1/4 | - | 1 3/8 | - | 2022-02-01 | 8:30 AM | ±5.0' | RIG MODEL: |
| HMR. WT (LB.) | - | - | 140 | - | | | | CME-55 LCX |
| HMR. FALL (IN.) | - | - | 30 | - | | | | |

| Depth (FT) | SAMPLE NUMBER | RECOVERY (IN) | BLOWS PER 6" | SOIL AND ROCK CLASSIFICATION-DESCRIPTION | | DEPTH (FT.) | STRATUM DESCRIPTION | ELEV. (FT.) | Remark |
|------------|---------------|---------------|--------------|--|---------------------------------------|-------------|---------------------|-------------|--------|
| | | | | BURMISTER SYSTEM (SOIL) | U.S. CORPS OF ENGINEERS SYSTEM (ROCK) | | | | |
| 1 | S-1 | 16 | 9 | Top 2.5": ASPHALT. Middle 5.5": Gray, fine to coarse GRAVEL and fine to coarse SAND, trace Silt. | | 0.2' | ASPHALT | 146.3' | |
| 2 | | | 10 | Bottom 4": Light brown, fine to coarse SAND, some fine to coarse Gravel, trace Silt. | | | | | |
| 3 | | | 9 | S-1: Medium dense, Top 4": Light brown, fine to coarse SAND, some fine to coarse Gravel, trace Silt. | | | | | |
| 4 | S-2 | 14 | 5 | Middle 8": Reddish brown, fine to coarse SAND, little fine to coarse Gravel, trace Silt. | | | | | |
| 5 | | | 4 | Bottom 4": Dark brown, fine to coarse SAND, little Silt, trace fine Gravel, trace Organics. | | | | | |
| 6 | | | 2 | S-2: Loose, brown, fine to coarse SAND, little fine to coarse Gravel, trace Silt, trace Debris (e.g., asphalt). | | | | | |
| 7 | S-3 | 10 | 1 | S-3: Very loose, brown, fine to coarse SAND, some Silt, little fine to coarse Gravel, trace Debris (e.g., concrete). | | 5.0' | G.W.T. ▼ | 141.5' | |
| 8 | | | 2 | | | | | | |
| 9 | | | 1 | | | | | | |
| 10 | S-4 | 4 | 1 | S-4: Very loose, black, fine to coarse SAND, little fine to coarse Gravel, little Silt, little Debris (e.g., plastic). | | | | | |
| 11 | | | 1 | | | | | | |
| 12 | | | 2 | | | | | | |
| 13 | S-5 | 22 | 2 | S-5: Loose, Top 12": Black, fine to coarse SAND, some Silt, little Organics. | | 12.0' | SAND & SILT WITH | 134.5' | |
| 14 | | | 2 | Bottom 10": Brown, ORGANICS. | | | | | |
| 15 | | | 3 | | | | | | |
| 16 | S-6 | 24 | 4 | S-6: Very loose, brown, ORGANICS. | | | | | |
| 17 | | | 1 | | | | | | |
| 18 | | | 2 | | | | | | |
| 19 | S-7 | 8 | 4 | | | | | | |
| 20 | | | 5 | S-7: Medium dense, reddish brown, fine to coarse SAND and fine to coarse GRAVEL, trace Silt. | | | | | |
| 21 | | | 8 | | | | | | |
| 22 | | | 10 | | | | | | |
| | | | | | | | | | |

| | | | | |
|-----------------|---|---|--|---|
| Remarks: | NON-PLASTIC (SPT-N) | PLASTIC (SPT-N) | SAMPLE TYPE | PROPORTIONS |
| | 0-4 = VERY LOOSE 4-10 = LOOSE 10-30 = MEDIUM DENSE 30-50 = DENSE 50+ = VERY DENSE | 0-2 = VERY SOFT 2-4 = SOFT 4-8 = MEDIUM 8-15 = STIFF 15-30 = VERY STIFF 30+ = HARD | C = ROCK CORE S = SPLIT SPOON UP = UNDISTURBED PISTON UT = UNDISTURBED THINWALL | trace = <10% little = 10% - 20% some = 20% - 35% and = 35% - 50% |

BORING LOG



SLR International Corporation

99 Realty Drive, Cheshire, CT 06410
203.271.1773 | www.slrconsulting.com

| | | |
|---|--|----------------------|
| PROJECT: NORTH END FIELD RECONSTRUCTION | BORING NO.: SLR-1 | SHEET: 2 of 2 |
| LOCATION: BRITANNIA STREET, MERIDEN, CONNECTICUT | CONTRACTOR: SITE, LLC | |
| PROJ. NO: 141.14792.00004 | FOREMAN: J. DEANGELIS | |
| CLIENT: MERIDEN PUBLIC SCHOOLS | INSPECTOR: R. GOWISNOCK | |
| DATE: FEBRUARY 1, 2022 | GROUND SURFACE ELEVATION: ±146.5' | |

| EQUIPMENT: | AUGER | CASING | SAMPLER | COREBRL. | GROUNDWATER DEPTH (FT.) | | | TYPE OF RIG: |
|-----------------|-------|--------|---------|----------|-------------------------|---------|-------------|---------------------------|
| TYPE | HSA | - | SS | - | DATE | TIME | WATER DEPTH | TRACK W/ AUTOMATIC HAMMER |
| SIZE ID (IN.) | 2 1/4 | - | 1 3/8 | - | 2022-02-01 | 8:30 AM | ±5.0' | RIG MODEL: CME-55 LCX |
| HMR. WT (LB.) | - | - | 140 | - | | | | |
| HMR. FALL (IN.) | - | - | 30 | - | | | | |

| Depth (FT) | SAMPLE NUMBER | RECOVERY (IN) | BLOWS PER 6" | SOIL AND ROCK CLASSIFICATION-DESCRIPTION BURMISTER SYSTEM (SOIL) U.S. CORPS OF ENGINEERS SYSTEM (ROCK) | DEPTH (FT.) | STRATUM DESCRIPTION | ELEV. (FT.) | Remark |
|------------|---------------|---------------|--------------|---|-------------|---------------------|-------------|--------|
| 24 | | | | | | | | |
| 25 | | | 6 | S-8: Medium dense, reddish brown, fine to coarse SAND, little fine to coarse Gravel, trace Silt. | | SAND & GRAVEL | | |
| 26 | S-8 | 19 | 7 | | | | | |
| 26 | | | 7 | | | | | |
| 27 | | | 9 | | | | | |
| 27 | | | | Bottom of Exploration ±27.0' | 27.0' | | 119.5' | |
| 28 | | | | | | | | |
| 29 | | | | | | | | |
| 30 | | | | | | | | |
| 31 | | | | | | | | |
| 32 | | | | | | | | |
| 33 | | | | | | | | |
| 34 | | | | | | | | |
| 35 | | | | | | | | |
| 36 | | | | | | | | |
| 37 | | | | | | | | |
| 38 | | | | | | | | |
| 39 | | | | | | | | |
| 40 | | | | | | | | |
| 41 | | | | | | | | |
| 42 | | | | | | | | |
| 43 | | | | | | | | |
| 44 | | | | | | | | |
| 45 | | | | | | | | |

| | | | | |
|----------|---|---|--|---|
| Remarks: | NON-PLASTIC (SPT-N) | PLASTIC (SPT-N) | SAMPLE TYPE | PROPORTIONS |
| | 0-4 = VERY LOOSE 4-10 = LOOSE 10-30 = MEDIUM DENSE 30-50 = DENSE 50+ = VERY DENSE | 0-2 = VERY SOFT 2-4 = SOFT 4-8 = MEDIUM 8-15 = STIFF 15-30 = VERY STIFF 30+ = HARD | C = ROCK CORE S = SPLIT SPOON UP = UNDISTURBED PISTON UT = UNDISTURBED THINWALL | trace = <10% little = 10% - 20% some = 20% - 35% and = 35% - 50% |

BORING LOG



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| | | |
|---|--|----------------------|
| PROJECT: NORTH END FIELD RECONSTRUCTION | BORING NO.: SLR-2 | SHEET: 1 of 2 |
| LOCATION: BRITANNIA STREET, MERIDEN, CONNECTICUT | CONTRACTOR: SITE, LLC | |
| PROJ. NO.: 141.14792.00004 | FOREMAN: J. DEANGELIS | |
| CLIENT: MERIDEN PUBLIC SCHOOLS | INSPECTOR: R. GOWISNOCK | |
| DATE: FEBRUARY 1, 2022 | GROUND SURFACE ELEVATION: ±143.5' | |

| EQUIPMENT: | AUGER | CASING | SAMPLER | COREBRL. | GROUNDWATER DEPTH (FT.) | | | TYPE OF RIG: |
|-----------------|-------|--------|---------|----------|-------------------------|----------|-------------|---------------------------|
| TYPE | HSA | - | SS | - | DATE | TIME | WATER DEPTH | TRACK W/ AUTOMATIC HAMMER |
| SIZE ID (IN.) | 2 1/4 | - | 1 3/8 | - | 2022-02-01 | 10:00 AM | ±3.5' | RIG MODEL: |
| HMR. WT (LB.) | - | - | 140 | - | | | | CME-55 LCX |
| HMR. FALL (IN.) | - | - | 30 | - | | | | |

| Depth (FT) | SAMPLE NUMBER | RECOVERY (IN) | BLOWS PER 6" | SOIL AND ROCK CLASSIFICATION-DESCRIPTION | | DEPTH (FT.) | STRATUM DESCRIPTION | ELEV. (FT.) | Remark | | | |
|------------|---------------|---------------|--------------|---|---------------------------------------|-------------|---------------------------|-------------|--------|--|--|--|
| | | | | BURMISTER SYSTEM (SOIL) | U.S. CORPS OF ENGINEERS SYSTEM (ROCK) | | | | | | | |
| 1 | S-1 | 16 | 4 | S-1: Medium dense, Top 6": Brown, fine to coarse SAND, some Silt, trace fine Gravel, trace Organics. Bottom 10": Brown, fine to coarse SAND, some fine to coarse Gravel, trace Silt. | | 0.5' | TOPSOIL | 143.0' | | | | |
| | | | 6 | | | | | | | | | |
| | | | 9 | | | | | | | | | |
| 2 | S-2 | 15 | 4 | S-2: Loose, brown, fine to coarse SAND, little fine to coarse Gravel, little Silt. | | 3.5' | FILL | 140.0' | | | | |
| | | | 7 | | | | | | | | | |
| | | | 4 | | | | | | | | | |
| 3 | S-3 | 6 | 3 | S-3: Loose, reddish brown, fine to coarse GRAVEL and fine to coarse SAND, trace Silt. | | 7.5' | SAND & SILT WITH ORGANICS | 136.0' | | | | |
| | | | 4 | | | | | | | | | |
| | | | 5 | | | | | | | | | |
| 4 | S-4 | 10 | 5 | S-4: Very loose, black, fine to medium SAND and SILT, little Organics. | | 13.5' | ORGANICS | 130.0' | | | | |
| | | | 3 | | | | | | | | | |
| | | | 2 | | | | | | | | | |
| 5 | S-5 | 24 | 1 | S-5: Very loose, brown, ORGANICS. | | 20.5' | CLAYEY SILT | 123.0' | | | | |
| | | | 1 | | | | | | | | | |
| | | | 1 | | | | | | | | | |
| 6 | S-6 | 24 | WOH | S-6: Top 8": Very loose, brown, ORGANICS. Bottom 16": Soft, gray, Clayey SILT, little Organics, trace fine Sand. | | | | | | | | |
| | | | 1 | | | | | | | | | |
| | | | 2 | | | | | | | | | |

| | | | | |
|----------|---|---|--|---|
| Remarks: | NON-PLASTIC (SPT-N) | PLASTIC (SPT-N) | SAMPLE TYPE | PROPORTIONS |
| | 0-4 = VERY LOOSE 4-10 = LOOSE 10-30 = MEDIUM DENSE 30-50 = DENSE 50+ = VERY DENSE | 0-2 = VERY SOFT 2-4 = SOFT 4-8 = MEDIUM 8-15 = STIFF 15-30 = VERY STIFF 30+ = HARD | C = ROCK CORE S = SPLIT SPOON UP = UNDISTURBED PISTON UT = UNDISTURBED THINWALL | trace = <10% little = 10% - 20% some = 20% - 35% and = 35% - 50% |

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| | | |
|---|--|----------------------|
| PROJECT: NORTH END FIELD RECONSTRUCTION | BORING NO.: SLR-2 | SHEET: 2 of 2 |
| LOCATION: BRITANNIA STREET, MERIDEN, CONNECTICUT | CONTRACTOR: SITE, LLC | |
| PROJ. NO.: 141.14792.00004 | FOREMAN: J. DEANGELIS | |
| CLIENT: MERIDEN PUBLIC SCHOOLS | INSPECTOR: R. GOWISNOCK | |
| DATE: FEBRUARY 1, 2022. | GROUND SURFACE ELEVATION: ±143.5' | |

| EQUIPMENT: | AUGER | CASING | SAMPLER | COREBRL. | GROUNDWATER DEPTH (FT.) | | | TYPE OF RIG: |
|-----------------|-------|--------|---------|----------|-------------------------|----------|-------------|---------------------------|
| TYPE | HSA | - | SS | - | DATE | TIME | WATER DEPTH | TRACK W/ AUTOMATIC HAMMER |
| SIZE ID (IN.) | 2 1/4 | - | 1 3/8 | - | 2022-02-01 | 10:00 AM | ±3.5' | RIG MODEL: |
| HMR. WT (LB.) | - | - | 140 | - | | | | CME-55 LCX |
| HMR. FALL (IN.) | - | - | 30 | - | | | | |

| Depth (FT) | SAMPLE NUMBER | RECOVERY (IN) | BLOWS PER 6" | SOIL AND ROCK CLASSIFICATION-DESCRIPTION BURMISTER SYSTEM (SOIL) U.S. CORPS OF ENGINEERS SYSTEM (ROCK) | DEPTH (FT.) | STRATUM DESCRIPTION | ELEV. (FT.) | Remark |
|------------|---------------|---------------|--------------|---|-------------|---------------------|-------------|--------|
| 24 | | | | | 23.5' | CLAYEY SILT | 120.0' | |
| 25 | | | 4 | S-7: Medium dense, reddish brown, fine to coarse GRAVEL, some fine to coarse Sand, trace Silt. | | SAND & GRAVEL | | |
| 26 | S-7 | 8 | 6 | | | | | |
| 27 | | | 6 | | | | | |
| 28 | | | 6 | | | | | |
| 29 | | | | | | | | |
| 30 | | | 7 | S-8: Medium dense, reddish brown, fine to coarse GRAVEL, some fine to coarse Sand, trace Silt. | | | | |
| 31 | S-8 | 12 | 9 | | | | | |
| 32 | | | 9 | | | | | |
| 33 | | | 7 | | | | | |
| 34 | | | | Bottom of Exploration ±32.0' | | | | |
| 35 | | | | | | | | |
| 36 | | | | | | | | |
| 37 | | | | | | | | |
| 38 | | | | | | | | |
| 39 | | | | | | | | |
| 40 | | | | | | | | |
| 41 | | | | | | | | |
| 42 | | | | | | | | |
| 43 | | | | | | | | |
| 44 | | | | | | | | |
| 45 | | | | | | | | |

| | | | | |
|----------|---|---|--|---|
| Remarks: | NON-PLASTIC (SPT-N) | PLASTIC (SPT-N) | SAMPLE TYPE | PROPORTIONS |
| | 0-4 = VERY LOOSE 4-10 = LOOSE 10-30 = MEDIUM DENSE 30-50 = DENSE 50+ = VERY DENSE | 0-2 = VERY SOFT 2-4 = SOFT 4-8 = MEDIUM 8-15 = STIFF 15-30 = VERY STIFF 30+ = HARD | C = ROCK CORE S = SPLIT SPOON UP = UNDISTURBED PISTON UT = UNDISTURBED THINWALL | trace = <10% little = 10% - 20% some = 20% - 35% and = 35% - 50% |

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| | | |
|---|--|----------------------|
| PROJECT: NORTH END FIELD RECONSTRUCTION | BORING NO.: SLR-3 | SHEET: 1 of 1 |
| LOCATION: BRITANNIA STREET, MERIDEN, CONNECTICUT | CONTRACTOR: SITE, LLC | |
| PROJ. NO.: 141.14792.00004 | FOREMAN: J. DEANGELIS | |
| CLIENT: MERIDEN PUBLIC SCHOOLS | INSPECTOR: R. GOWISNOCK | |
| DATE: FEBRUARY 1, 2022. | GROUND SURFACE ELEVATION: ±143.5' | |

| EQUIPMENT: | AUGER | CASING | SAMPLER | COREBRL. | GROUNDWATER DEPTH (FT.) | | | TYPE OF RIG: |
|-----------------|-------|--------|---------|----------|-------------------------|----------|-------------|---------------------------|
| TYPE | HSA | - | SS | - | DATE | TIME | WATER DEPTH | TRACK W/ AUTOMATIC HAMMER |
| SIZE ID (IN.) | 2 1/4 | - | 1 3/8 | - | 2022-02-01 | 12:00 PM | ±3.2' | RIG MODEL: |
| HMR. WT (LB.) | - | - | 140 | - | | | | CME-55 LCX |
| HMR. FALL (IN.) | - | - | 30 | - | | | | |

| Depth (FT) | SAMPLE NUMBER | RECOVERY (IN) | BLOWS PER 6" | SOIL AND ROCK CLASSIFICATION-DESCRIPTION BURMISTER SYSTEM (SOIL) U.S. CORPS OF ENGINEERS SYSTEM (ROCK) | DEPTH (FT.) | STRATUM DESCRIPTION | ELEV. (FT.) | Remark | |
|------------------------------|---------------|---------------|--------------|--|-------------|---------------------|-------------|--------|--|
| 1 | S-1 | 16 | 6 | S-1: Medium dense, Top 8": Dark brown, fine to coarse SAND, little Silt, trace fine Gravel, trace Organics. Bottom 8": Brown, fine to coarse SAND, some fine to coarse Gravel, little Silt. | 0.7' | TOPSOIL | 142.8' | | |
| 2 | | | 5 | | | | | | |
| | | | 12 | | | | | | |
| | | | 10 | | | | | | |
| 3 | S-2 | 8 | 4 | S-2: Medium dense, reddish brown, fine to coarse SAND, some fine to coarse Gravel, little Silt. | 3.2' | G.W.T. ▼ | 140.3' | | |
| 4 | | | 4 | | | | | | |
| | | | 9 | | | | | | |
| 5 | | | 7 | | 4.5' | | 139.0' | | |
| 6 | S-3 | 8 | 2 | S-3: Very loose, black, fine to medium SAND and SILT, little Organics. | | | | | |
| 7 | | | 2 | | | | | | |
| 8 | | | 1 | | | | | | |
| | | | 2 | | | | | | |
| 10 | | | WOH | S-4: Very loose, brown, ORGANICS. | | | | | |
| 11 | S-4 | 20 | 1 | | | | | | |
| 12 | | | 1 | | | | | | |
| 13 | | | | | 13.5' | | 130.0' | | |
| 15 | | | | S-5: Medium dense, brown, fine to coarse SAND and fine to coarse GRAVEL, trace Silt. | | | | | |
| 16 | S-5 | 10 | 3 | | | | | | |
| 17 | | | 5 | | | | | | |
| 18 | | | 6 | | | | | | |
| 19 | | | 5 | | | | | | |
| 20 | | | | S-6: Medium dense, reddish brown, fine to coarse SAND and fine to coarse GRAVEL, trace Silt. | | | | | |
| 21 | S-6 | 17 | 6 | | | | | | |
| 22 | | | 8 | | | | | | |
| | | | 8 | | | | | | |
| | | | 8 | | | | | | |
| | | | 6 | | 22.0' | | 121.5' | | |
| Bottom of Exploration ±22.0' | | | | | | | | | |

| | | | | |
|----------|---|---|--|---|
| Remarks: | NON-PLASTIC (SPT-N) | PLASTIC (SPT-N) | SAMPLE TYPE | PROPORTIONS |
| | 0-4 = VERY LOOSE 4-10 = LOOSE 10-30 = MEDIUM DENSE 30-50 = DENSE 50+ = VERY DENSE | 0-2 = VERY SOFT 2-4 = SOFT 4-8 = MEDIUM 8-15 = STIFF 15-30 = VERY STIFF 30+ = HARD | C = ROCK CORE S = SPLIT SPOON UP = UNDISTURBED PISTON UT = UNDISTURBED THINWALL | trace = <10% little = 10% - 20% some = 20% - 35% and = 35% - 50% |

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| | | |
|---|--|----------------------|
| PROJECT: NORTH END FIELD RECONSTRUCTION | BORING NO.: SLR-4 | SHEET: 1 of 3 |
| LOCATION: BRITANNIA STREET, MERIDEN, CONNECTICUT | CONTRACTOR: SITE, LLC | |
| PROJ. NO.: 141.14792.00004 | FOREMAN: J. DEANGELIS | |
| CLIENT: MERIDEN PUBLIC SCHOOLS | INSPECTOR: R. GOWISNOCK | |
| DATE: FEBRUARY 1, 2022 & FEBRUARY 2, 2022 | GROUND SURFACE ELEVATION: ±142.5' | |

| EQUIPMENT: | AUGER | CASING | SAMPLER | COREBRL. | GROUNDWATER DEPTH (FT.) | | | TYPE OF RIG: |
|-----------------|-------|--------|---------|----------|-------------------------|---------|-------------|---------------------------|
| TYPE | HSA | - | SS | - | DATE | TIME | WATER DEPTH | TRACK W/ AUTOMATIC HAMMER |
| SIZE ID (IN.) | 2 1/4 | - | 1 3/8 | - | 2022-02-01 | 1:30 PM | ±2.5' | RIG MODEL: |
| HMR. WT (LB.) | - | - | 140 | - | | | | CME-55 LCX |
| HMR. FALL (IN.) | - | - | 30 | - | | | | |

| Depth (FT) | SAMPLE NUMBER | RECOVERY (IN) | BLOWS PER 6" | SOIL AND ROCK CLASSIFICATION-DESCRIPTION | | DEPTH (FT.) | STRATUM DESCRIPTION | ELEV. (FT.) | Remark |
|------------|---------------|---------------|--------------|--|---------------------------------------|-------------|---------------------|-------------|--------|
| | | | | BURMISTER SYSTEM (SOIL) | U.S. CORPS OF ENGINEERS SYSTEM (ROCK) | | | | |
| 1 | S-1 | 16 | 3 | S-1: Loose, Top 10": Dark brown, fine to coarse SAND, little Silt, trace fine Gravel, trace Organics. Bottom 6": Reddish brown, fine to coarse SAND, little fine to coarse Gravel, little Silt, trace Organics. | | 0.8' | TOPSOIL | 141.7' | |
| | | | 1 | | | | | | |
| | | | 3 | | | | | | |
| | | | 9 | | | | | | |
| 2 | S-2 | 8 | 20 | S-2: Very dense, reddish brown, fine to coarse GRAVEL, little fine to coarse Sand, trace Silt. | | 2.5' | G.W.T. ▼ | 140.0' | |
| | | | 33 | | | | | | |
| | | | 27 | | | | | | |
| | | | 11 | | | | | | |
| 5 | S-3 | 14 | 4 | S-3: Loose, reddish brown, fine to coarse SAND, some Clayey Silt, little fine to coarse Gravel. | | | | | |
| | | | 2 | | | | | | |
| | | | 3 | | | | | | |
| | | | 1 | | | | | | |
| 11 | S-4 | 5 | 3 | S-4: Medium dense, brown, fine to coarse SAND, little fine to coarse Gravel, little Silt. | | | FILL | | |
| | | | 10 | | | | | | |
| | | | 7 | | | | | | |
| | | | 4 | | | | | | |
| 16 | S-5 | 8 | 5 | S-5: Very dense, reddish brown, fine to coarse SAND, some fine to coarse Gravel, little Silt. | | | | | |
| | | | 50/4" | | | | | | |
| | | | | | | | | | |
| | | | | | | | | | |
| 21 | S-6 | 24 | 2 | S-6: Loose, brown, ORGANICS. | | | ORGANICS | | |
| | | | 2 | | | | | | |
| | | | 3 | | | | | | |
| | | | 3 | | | | | | |

| | | | | |
|-----------------|---|---|--|---|
| Remarks: | NON-PLASTIC (SPT-N) | PLASTIC (SPT-N) | SAMPLE TYPE | PROPORTIONS |
| | 0-4 = VERY LOOSE 4-10 = LOOSE 10-30 = MEDIUM DENSE 30-50 = DENSE 50+ = VERY DENSE | 0-2 = VERY SOFT 2-4 = SOFT 4-8 = MEDIUM 8-15 = STIFF 15-30 = VERY STIFF 30+ = HARD | C = ROCK CORE S = SPLIT SPOON UP = UNDISTURBED PISTON UT = UNDISTURBED THINWALL | trace = <10% little = 10% - 20% some = 20% - 35% and = 35% - 50% |

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| | | |
|---|--|----------------------|
| PROJECT: NORTH END FIELD RECONSTRUCTION | BORING NO.: SLR-4 | SHEET: 2 of 3 |
| LOCATION: BRITANNIA STREET, MERIDEN, CONNECTICUT | CONTRACTOR: SITE, LLC | |
| PROJ. NO.: 141.14792.00004 | FOREMAN: J. DEANGELIS | |
| CLIENT: MERIDEN PUBLIC SCHOOLS | INSPECTOR: R. GOWISNOCK | |
| DATE: FEBRUARY 1, 2022 & FEBRUARY 2, 2022 | GROUND SURFACE ELEVATION: ±142.5' | |

| EQUIPMENT: | AUGER | CASING | SAMPLER | COREBRL. | GROUNDWATER DEPTH (FT.) | | | TYPE OF RIG: |
|-----------------|-------|--------|---------|----------|-------------------------|---------|-------------|---------------------------|
| TYPE | HSA | - | SS | - | DATE | TIME | WATER DEPTH | TRACK W/ AUTOMATIC HAMMER |
| SIZE ID (IN.) | 2 1/4 | - | 1 3/8 | - | 2022-02-01 | 1:30 PM | ±2.5' | RIG MODEL: |
| HMR. WT (LB.) | - | - | 140 | - | | | | CME-55 LCX |
| HMR. FALL (IN.) | - | - | 30 | - | | | | |

| Depth (FT) | SAMPLE NUMBER | RECOVERY (IN) | BLOWS PER 6" | SOIL AND ROCK CLASSIFICATION-DESCRIPTION BURMISTER SYSTEM (SOIL) U.S. CORPS OF ENGINEERS SYSTEM (ROCK) | DEPTH (FT.) | STRATUM DESCRIPTION | ELEV. (FT.) | Remark |
|------------|---------------|---------------|--------------|---|-------------|---------------------------|-------------|--------|
| 24 | | | | | | | | |
| 25 | | | 1 | S-7: Very loose, brown, ORGANICS. | | ORGANICS | | |
| 26 | S-7 | 24 | 1 | | | | | |
| | | | 2 | | | | | |
| | | | 3 | | | | | |
| 27 | | | | | | | | |
| 28 | | | | | 28.5' | | 114.0' | |
| 29 | | | | | | | | |
| 30 | | | WOH | S-8: Soft, gray, Clayey SILT, little Organics. | | CLAYEY SILT WITH ORGANICS | | |
| 31 | S-8 | 24 | 1 | | | | | |
| | | | 2 | | | | | |
| 32 | | | 2 | S-9: Medium, gray, Clayey SILT, trace Organics. | | | | |
| 33 | S-9 | 24 | 3 | | | | | |
| | | | 3 | | | | | |
| 34 | | | 3 | | | | | |
| 35 | | | | S-10: Medium dense, reddish brown, fine to coarse SAND, some fine to coarse Gravel, little Silt. | 34.5' | | 108.0' | |
| 36 | S-10 | 10 | 4 | | | | | |
| | | | 7 | | | | | |
| | | | 9 | | | | | |
| 37 | | | 8 | | | | | |
| 38 | | | | | | | | |
| 39 | | | | | | | | |
| 40 | | | 7 | S-11: Medium dense, reddish brown, fine to coarse SAND, some fine to coarse Gravel, trace Silt. | | SAND & GRAVEL | | |
| 41 | S-11 | 12 | 7 | | | | | |
| | | | 6 | | | | | |
| 42 | | | 8 | | | | | |
| 43 | | | | | | | | |
| 44 | | | | | | | | |
| 45 | | | | S-12: Medium dense, reddish brown, fine to coarse SAND, little fine to coarse Gravel, trace Silt. | | | | |
| | S-12 | 12 | 7 | | | | | |
| | | | 2 | | | | | |

| | | | | |
|--|---|---|--|---|
| Remarks: 1. Boring was drilled to ±34.0' on 2/1/2022 and completed on 2/2/2022. | NON-PLASTIC (SPT-N) | PLASTIC (SPT-N) | SAMPLE TYPE | PROPORTIONS |
| | 0-4 = VERY LOOSE 4-10 = LOOSE 10-30 = MEDIUM DENSE 30-50 = DENSE 50+ = VERY DENSE | 0-2 = VERY SOFT 2-4 = SOFT 4-8 = MEDIUM 8-15 = STIFF 15-30 = VERY STIFF 30+ = HARD | C = ROCK CORE S = SPLIT SPOON UP = UNDISTURBED PISTON UT = UNDISTURBED THINWALL | trace = <10% little = 10% - 20% some = 20% - 35% and = 35% - 50% |

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|---|--|----------------------|
| PROJECT: NORTH END FIELD RECONSTRUCTION | BORING NO.: SLR-4 | SHEET: 3 of 3 |
| LOCATION: BRITANNIA STREET, MERIDEN, CONNECTICUT | CONTRACTOR: SITE, LLC | |
| PROJ. NO.: 141.14792.00004 | FOREMAN: J. DEANGELIS | |
| CLIENT: MERIDEN PUBLIC SCHOOLS | INSPECTOR: R. GOWISNOCK | |
| DATE: FEBRUARY 1, 2022 & FEBRUARY 2, 2022 | GROUND SURFACE ELEVATION: ±142.5' | |

| EQUIPMENT: | AUGER | CASING | SAMPLER | COREBRL. | GROUNDWATER DEPTH (FT.) | | | TYPE OF RIG: |
|-----------------|-------|--------|---------|----------|-------------------------|---------|-------------|---------------------------|
| TYPE | HSA | - | SS | - | DATE | TIME | WATER DEPTH | TRACK W/ AUTOMATIC HAMMER |
| SIZE ID (IN.) | 2 1/4 | - | 1 3/8 | - | 2022-02-01 | 1:30 PM | ±2.5' | RIG MODEL: |
| HMR. WT (LB.) | - | - | 140 | - | | | | CME-55 LCX |
| HMR. FALL (IN.) | - | - | 30 | - | | | | |

| Depth (FT) | SAMPLE NUMBER | RECOVERY (IN) | BLOWS PER 6" | SOIL AND ROCK CLASSIFICATION-DESCRIPTION BURMISTER SYSTEM (SOIL) U.S. CORPS OF ENGINEERS SYSTEM (ROCK) | DEPTH (FT.) | STRATUM DESCRIPTION | ELEV. (FT.) | Remark | |
|------------|---------------|---------------|--------------|---|-------------|---------------------|-------------|--------|--|
| 47 | S-12 | 12 | 11 8 | Bottom of Exploration ±47.0' | 47.0' | SAND & GRAVEL | 95.5' | | |
| 48 | | | | | | | | | |
| 49 | | | | | | | | | |
| 50 | | | | | | | | | |
| 51 | | | | | | | | | |
| 52 | | | | | | | | | |
| 53 | | | | | | | | | |
| 54 | | | | | | | | | |
| 55 | | | | | | | | | |
| 56 | | | | | | | | | |
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| 61 | | | | | | | | | |
| 62 | | | | | | | | | |
| 63 | | | | | | | | | |
| 64 | | | | | | | | | |
| 65 | | | | | | | | | |
| 66 | | | | | | | | | |
| 67 | | | | | | | | | |
| 68 | | | | | | | | | |

| | | | | |
|----------|---|---|--|---|
| Remarks: | NON-PLASTIC (SPT-N) | PLASTIC (SPT-N) | SAMPLE TYPE | PROPORTIONS |
| | 0-4 = VERY LOOSE 4-10 = LOOSE 10-30 = MEDIUM DENSE 30-50 = DENSE 50+ = VERY DENSE | 0-2 = VERY SOFT 2-4 = SOFT 4-8 = MEDIUM 8-15 = STIFF 15-30 = VERY STIFF 30+ = HARD | C = ROCK CORE S = SPLIT SPOON UP = UNDISTURBED PISTON UT = UNDISTURBED THINWALL | trace = <10% little = 10% - 20% some = 20% - 35% and = 35% - 50% |

BORING LOG



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| | | |
|---|--|----------------------|
| PROJECT: NORTH END FIELD RECONSTRUCTION | BORING NO.: SLR-5 | SHEET: 1 of 2 |
| LOCATION: BRITANNIA STREET, MERIDEN, CONNECTICUT | CONTRACTOR: SITE, LLC | |
| PROJ. NO.: 141.14792.00004 | FOREMAN: J. DEANGELIS | |
| CLIENT: MERIDEN PUBLIC SCHOOLS | INSPECTOR: R. GOWISNOCK | |
| DATE: FEBRUARY 2, 2022. | GROUND SURFACE ELEVATION: ±142.5' | |

| EQUIPMENT: | AUGER | CASING | SAMPLER | COREBRL. | GROUNDWATER DEPTH (FT.) | | | TYPE OF RIG: |
|-----------------|-------|--------|---------|----------|-------------------------|----------|-------------|---------------------------|
| TYPE | HSA | - | SS | - | DATE | TIME | WATER DEPTH | TRACK W/ AUTOMATIC HAMMER |
| SIZE ID (IN.) | 2 1/4 | - | 1 3/8 | - | 2022-02-02 | 10:30 AM | ±3.4' | RIG MODEL: |
| HMR. WT (LB.) | - | - | 140 | - | | | | CME-55 LCX |
| HMR. FALL (IN.) | - | - | 30 | - | | | | |

| Depth (FT) | SAMPLE NUMBER | RECOVERY (IN) | BLOWS PER 6" | SOIL AND ROCK CLASSIFICATION-DESCRIPTION | | DEPTH (FT.) | STRATUM DESCRIPTION | ELEV. (FT.) | Remark |
|------------|---------------|---------------|--------------|---|---------------------------------------|-------------|---------------------------|-------------|--------|
| | | | | BURMISTER SYSTEM (SOIL) | U.S. CORPS OF ENGINEERS SYSTEM (ROCK) | | | | |
| 1 | S-1 | 15 | 2 | S-1: Loose, Top 6": Dark brown, fine to coarse SAND, little Silt, trace fine Gravel, trace Organics. Bottom 9": Reddish brown, fine to coarse SAND, little fine to coarse Gravel, little Silt. | | 0.5' | TOPSOIL | 142.0' | |
| | | | 3 | | | | | | |
| | | | 2 | | | | | | |
| 2 | S-2 | 12 | 2 | S-2: Loose, reddish brown, fine to coarse SAND, some Clayey Silt, little fine to coarse Gravel. | | 3.4' | G.W.T. ▼ | 139.1' | |
| | | | 4 | | | | | | |
| | | | 6 | | | | | | |
| 3 | S-3 | 10 | 2 | S-3: Loose, brown, fine to coarse SAND, some fine to coarse Gravel, trace Silt. | | 13.5' | FILL | 129.0' | |
| | | | 1 | | | | | | |
| | | | 3 | | | | | | |
| 4 | S-4 | 12 | 3 | S-4: Medium dense, reddish brown, fine to coarse GRAVEL, some fine to coarse Sand, trace Silt. | | 21.5' | CLAYEY SILT WITH ORGANICS | 121.0' | |
| | | | 3 | | | | | | |
| | | | 4 | | | | | | |
| 5 | S-5 | 17 | 4 | S-5: Loose, brown, ORGANICS. | | | | | |
| | | | 12 | | | | | | |
| | | | 4 | | | | | | |
| 6 | S-6 | 24 | 5 | S-6: Top 16": Very loose, brown, ORGANICS. Bottom 8": Soft, gray, Clayey SILT, trace fine Sand, trace Organics. | | | | | |
| | | | 1 | | | | | | |
| | | | 1 | | | | | | |
| 7 | | | 1 | | | | | | |
| | | | 1 | | | | | | |
| | | | 3 | | | | | | |

| | | | | |
|-----------------|---|---|--|---|
| Remarks: | NON-PLASTIC (SPT-N) | PLASTIC (SPT-N) | SAMPLE TYPE | PROPORTIONS |
| | 0-4 = VERY LOOSE 4-10 = LOOSE 10-30 = MEDIUM DENSE 30-50 = DENSE 50+ = VERY DENSE | 0-2 = VERY SOFT 2-4 = SOFT 4-8 = MEDIUM 8-15 = STIFF 15-30 = VERY STIFF 30+ = HARD | C = ROCK CORE S = SPLIT SPOON UP = UNDISTURBED PISTON UT = UNDISTURBED THINWALL | trace = <10% little = 10% - 20% some = 20% - 35% and = 35% - 50% |

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| | | |
|---|--|----------------------|
| PROJECT: NORTH END FIELD RECONSTRUCTION | BORING NO.: SLR-5 | SHEET: 2 of 2 |
| LOCATION: BRITANNIA STREET, MERIDEN, CONNECTICUT | CONTRACTOR: SITE, LLC | |
| PROJ. NO.: 141.14792.00004 | FOREMAN: J. DEANGELIS | |
| CLIENT: MERIDEN PUBLIC SCHOOLS | INSPECTOR: R. GOWISNOCK | |
| DATE: FEBRUARY 2, 2022. | GROUND SURFACE ELEVATION: ±142.5' | |

| EQUIPMENT: | AUGER | CASING | SAMPLER | COREBRL. | GROUNDWATER DEPTH (FT.) | | | TYPE OF RIG: |
|-----------------|-------|--------|---------|----------|-------------------------|----------|-------------|---------------------------|
| TYPE | HSA | - | SS | - | DATE | TIME | WATER DEPTH | TRACK W/ AUTOMATIC HAMMER |
| SIZE ID (IN.) | 2 1/4 | - | 1 3/8 | - | 2022-02-02 | 10:30 AM | ±3.4' | RIG MODEL: |
| HMR. WT (LB.) | - | - | 140 | - | | | | CME-55 LCX |
| HMR. FALL (IN.) | - | - | 30 | - | | | | |

| Depth (FT) | SAMPLE NUMBER | RECOVERY (IN) | BLOWS PER 6" | SOIL AND ROCK CLASSIFICATION-DESCRIPTION BURMISTER SYSTEM (SOIL) U.S. CORPS OF ENGINEERS SYSTEM (ROCK) | DEPTH (FT.) | STRATUM DESCRIPTION | ELEV. (FT.) | Remark |
|------------|---------------|---------------|--------------|---|-------------|---------------------|-------------|--------|
| 24 | | | | | 23.5' | | 119.0' | |
| 25 | | | 4 | S-7: Medium dense, reddish brown, fine to coarse GRAVEL, little fine to coarse Sand, trace Silt. | | SAND & GRAVEL | | |
| 26 | S-7 | 10 | 5 | | | | | |
| 27 | | | 8 | | | | | |
| 28 | | | 8 | | | | | |
| 29 | | | | | | | | |
| 30 | | | 6 | S-8: Medium dense, reddish brown, fine to coarse GRAVEL and fine to coarse SAND, trace Silt. | | | | |
| 31 | S-8 | 12 | 9 | | | | | |
| 32 | | | 8 | | | | | |
| 33 | | | 9 | | 32.0' | | 110.5' | |
| 34 | | | | Bottom of Exploration ±32.0' | | | | |
| 35 | | | | | | | | |
| 36 | | | | | | | | |
| 37 | | | | | | | | |
| 38 | | | | | | | | |
| 39 | | | | | | | | |
| 40 | | | | | | | | |
| 41 | | | | | | | | |
| 42 | | | | | | | | |
| 43 | | | | | | | | |
| 44 | | | | | | | | |
| 45 | | | | | | | | |

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|----------|---|---|--|---|
| Remarks: | NON-PLASTIC (SPT-N) | PLASTIC (SPT-N) | SAMPLE TYPE | PROPORTIONS |
| | 0-4 = VERY LOOSE 4-10 = LOOSE 10-30 = MEDIUM DENSE 30-50 = DENSE 50+ = VERY DENSE | 0-2 = VERY SOFT 2-4 = SOFT 4-8 = MEDIUM 8-15 = STIFF 15-30 = VERY STIFF 30+ = HARD | C = ROCK CORE S = SPLIT SPOON UP = UNDISTURBED PISTON UT = UNDISTURBED THINWALL | trace = <10% little = 10% - 20% some = 20% - 35% and = 35% - 50% |

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| | | |
|---|--|----------------------|
| PROJECT: NORTH END FIELD RECONSTRUCTION | BORING NO.: SLR-6 | SHEET: 1 of 2 |
| LOCATION: BRITANNIA STREET, MERIDEN, CONNECTICUT | CONTRACTOR: SITE, LLC | |
| PROJ. NO.: 141.14792.00004 | FOREMAN: J. DEANGELIS | |
| CLIENT: MERIDEN PUBLIC SCHOOLS | INSPECTOR: R. GOWISNOCK | |
| DATE: FEBRUARY 2, 2022. | GROUND SURFACE ELEVATION: ±143.5' | |

| EQUIPMENT: | AUGER | CASING | SAMPLER | COREBRL. | GROUNDWATER DEPTH (FT.) | | | TYPE OF RIG: |
|-----------------|-------|--------|---------|----------|-------------------------|----------|-------------|---------------------------|
| TYPE | HSA | - | SS | - | DATE | TIME | WATER DEPTH | TRACK W/ AUTOMATIC HAMMER |
| SIZE ID (IN.) | 2 1/4 | - | 1 3/8 | - | 2022-02-02 | 12:00 PM | ±4.0' | RIG MODEL: |
| HMR. WT (LB.) | - | - | 140 | - | | | | CME-55 LCX |
| HMR. FALL (IN.) | - | - | 30 | - | | | | |

| Depth (FT) | SAMPLE NUMBER | RECOVERY (IN) | BLOWS PER 6" | SOIL AND ROCK CLASSIFICATION-DESCRIPTION | | DEPTH (FT.) | STRATUM DESCRIPTION | ELEV. (FT.) | Remark |
|------------|---------------|---------------|--------------|--|---------------------------------------|-------------|---------------------------|-------------|--------|
| | | | | BURMISTER SYSTEM (SOIL) | U.S. CORPS OF ENGINEERS SYSTEM (ROCK) | | | | |
| 1 | S-1 | 20 | 2 | S-1: Loose, Top 14": Dark brown, fine to coarse SAND, little Silt, trace fine Gravel, trace Organics. Bottom 6": Brown, fine to coarse SAND, some fine to coarse Gravel, little Silt. | | 1.5' | TOPSOIL | 142.0' | |
| | | | 2 | | | | | | |
| | | | 3 | | | | | | |
| 2 | S-2 | 15 | 5 | S-2: Medium dense, brown, fine to coarse SAND, some Silt, little fine to coarse Gravel, trace Debris (e.g., brick). | | 4.0' | G.W.T. ▼ | 139.5' | |
| | | | 6 | | | | | | |
| | | | 7 | | | | | | |
| 3 | S-3 | 10 | 3 | S-3: Loose, brown, fine to coarse GRAVEL, some fine to coarse Sand, trace Silt. | | | FILL | | |
| | | | 2 | | | | | | |
| | | | 2 | | | | | | |
| 4 | S-4 | 12 | 3 | S-4: Very loose, Top 6": Brown-black, fine to coarse SAND, little fine to coarse Gravel, trace Silt, trace Debris. Bottom 6": Black, fine to coarse SAND, some Silt, trace Organics. | | 11.5' | SAND & SILT WITH ORGANICS | 130.0' | |
| | | | 2 | | | | | | |
| | | | 1 | | | | | | |
| 5 | S-5 | 22 | 1 | S-5: Very loose, brown, ORGANICS. | | | ORGANICS | | |
| | | | 1 | | | | | | |
| | | | 3 | | | | | | |
| 6 | S-6 | 20 | WOH | S-6: Top 8": Very loose, brown, ORGANICS. Bottom 12": Soft, gray, Clayey SILT, little Organics. | | 21.5' | CLAYEY SILT WITH ORGANICS | 122.0' | |
| | | | 1 | | | | | | |
| | | | 1 | | | | | | |
| 7 | S-6 | 20 | 3 | | | | | | |
| | | | 1 | | | | | | |
| | | | 3 | | | | | | |

| | | | | |
|----------|---|---|--|---|
| Remarks: | NON-PLASTIC (SPT-N) | PLASTIC (SPT-N) | SAMPLE TYPE | PROPORTIONS |
| | 0-4 = VERY LOOSE 4-10 = LOOSE 10-30 = MEDIUM DENSE 30-50 = DENSE 50+ = VERY DENSE | 0-2 = VERY SOFT 2-4 = SOFT 4-8 = MEDIUM 8-15 = STIFF 15-30 = VERY STIFF 30+ = HARD | C = ROCK CORE S = SPLIT SPOON UP = UNDISTURBED PISTON UT = UNDISTURBED THINWALL | trace = <10% little = 10% - 20% some = 20% - 35% and = 35% - 50% |

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| | | |
|---|--|----------------------|
| PROJECT: NORTH END FIELD RECONSTRUCTION | BORING NO.: SLR-6 | SHEET: 2 of 2 |
| LOCATION: BRITANNIA STREET, MERIDEN, CONNECTICUT | CONTRACTOR: SITE, LLC | |
| PROJ. NO.: 141.14792.00004 | FOREMAN: J. DEANGELIS | |
| CLIENT: MERIDEN PUBLIC SCHOOLS | INSPECTOR: R. GOWISNOCK | |
| DATE: FEBRUARY 2, 2022. | GROUND SURFACE ELEVATION: ±143.5' | |

| EQUIPMENT: | AUGER | CASING | SAMPLER | COREBRL. | GROUNDWATER DEPTH (FT.) | | | TYPE OF RIG: |
|-----------------|-------|--------|---------|----------|-------------------------|----------|-------------|---------------------------|
| TYPE | HSA | - | SS | - | DATE | TIME | WATER DEPTH | TRACK W/ AUTOMATIC HAMMER |
| SIZE ID (IN.) | 2 1/4 | - | 1 3/8 | - | 2022-02-02 | 12:00 PM | ±4.0' | RIG MODEL: |
| HMR. WT (LB.) | - | - | 140 | - | | | | CME-55 LCX |
| HMR. FALL (IN.) | - | - | 30 | - | | | | |

| Depth (FT) | SAMPLE NUMBER | RECOVERY (IN) | BLOWS PER 6" | SOIL AND ROCK CLASSIFICATION-DESCRIPTION BURMISTER SYSTEM (SOIL) U.S. CORPS OF ENGINEERS SYSTEM (ROCK) | DEPTH (FT.) | STRATUM DESCRIPTION | ELEV. (FT.) | Remark |
|------------|---------------|---------------|--------------|---|-------------|---------------------|-------------|--------|
| 24 | | | | | 23.5' | | 120.0' | |
| 25 | | | 4 | S-7: Medium dense, reddish brown, fine to coarse SAND and fine to coarse GRAVEL, trace Silt. | | SAND & GRAVEL | | |
| 26 | S-7 | 12 | 6 | | | | | |
| 27 | | | 8 | | | | | |
| 28 | | | 4 | | | | | |
| 29 | | | | | | | | |
| 30 | | | 8 | S-8: Medium dense, reddish brown, fine to coarse SAND and fine to coarse GRAVEL, trace Silt. | | | | |
| 31 | S-8 | 10 | 11 | | | | | |
| 32 | | | 12 | | | | | |
| 33 | | | 12 | | | | | |
| 34 | | | | Bottom of Exploration ±32.0' | | | | |
| 35 | | | | | | | | |
| 36 | | | | | | | | |
| 37 | | | | | | | | |
| 38 | | | | | | | | |
| 39 | | | | | | | | |
| 40 | | | | | | | | |
| 41 | | | | | | | | |
| 42 | | | | | | | | |
| 43 | | | | | | | | |
| 44 | | | | | | | | |
| 45 | | | | | | | | |

| | | | | |
|----------|---|---|--|---|
| Remarks: | NON-PLASTIC (SPT-N) | PLASTIC (SPT-N) | SAMPLE TYPE | PROPORTIONS |
| | 0-4 = VERY LOOSE 4-10 = LOOSE 10-30 = MEDIUM DENSE 30-50 = DENSE 50+ = VERY DENSE | 0-2 = VERY SOFT 2-4 = SOFT 4-8 = MEDIUM 8-15 = STIFF 15-30 = VERY STIFF 30+ = HARD | C = ROCK CORE S = SPLIT SPOON UP = UNDISTURBED PISTON UT = UNDISTURBED THINWALL | trace = <10% little = 10% - 20% some = 20% - 35% and = 35% - 50% |

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|---|--|----------------------|
| PROJECT: NORTH END FIELD RECONSTRUCTION | BORING NO.: SLR-7 | SHEET: 1 of 1 |
| LOCATION: BRITANNIA STREET, MERIDEN, CONNECTICUT | CONTRACTOR: SITE, LLC | |
| PROJ. NO.: 141.14792.00004 | FOREMAN: J. DEANGELIS | |
| CLIENT: MERIDEN PUBLIC SCHOOLS | INSPECTOR: R. GOWISNOCK | |
| DATE: FEBRUARY 2, 2022. | GROUND SURFACE ELEVATION: ±144.0' | |

| EQUIPMENT: | AUGER | CASING | SAMPLER | COREBRL. | GROUNDWATER DEPTH (FT.) | | | TYPE OF RIG: |
|-----------------|-------|--------|---------|----------|-------------------------|---------|-------------|---------------------------|
| TYPE | HSA | - | SS | - | DATE | TIME | WATER DEPTH | TRACK W/ AUTOMATIC HAMMER |
| SIZE ID (IN.) | 2 1/4 | - | 1 3/8 | - | 2022-02-02 | 1:30 PM | ±4.0' | RIG MODEL: |
| HMR. WT (LB.) | - | - | 140 | - | | | | CME-55 LCX |
| HMR. FALL (IN.) | - | - | 30 | - | | | | |

| Depth (FT) | SAMPLE NUMBER | RECOVERY (IN) | BLOWS PER 6" | SOIL AND ROCK CLASSIFICATION-DESCRIPTION | | DEPTH (FT.) | STRATUM DESCRIPTION | ELEV. (FT.) | Remark |
|------------|---------------|---------------|--------------|--|---------------------------------------|-------------|---------------------------|-------------|--------|
| | | | | BURMISTER SYSTEM (SOIL) | U.S. CORPS OF ENGINEERS SYSTEM (ROCK) | | | | |
| 1 | S-1 | 16 | 10 | S-1: Medium dense, Top 6": Dark brown, fine to coarse SAND, little Silt, little fine Gravel, trace Organics. Bottom 10": Reddish brown, fine to coarse SAND, some fine to coarse Gravel, little Silt. | | 0.5' | TOPSOIL | 143.5' | |
| | | | 12 | | | | | | |
| | | | 8 | | | | | | |
| | | | 10 | | | | | | |
| 2 | S-2 | 12 | 14 | S-2: Dense, reddish brown, fine to coarse SAND, some fine to coarse Gravel, little Silt, trace Debris (e.g., concrete). | | | FILL | | |
| | | | 10 | | | | | | |
| | | | 34 | | | | | | |
| | | | 20 | | | | | | |
| 3 | S-3 | 6 | WOH | S-3: Loose, black, fine to coarse SAND, some Silt, little Organics. | | | | | |
| | | | 2 | | | | | | |
| | | | 2 | | | | | | |
| | | | 2 | | | | | | |
| 4 | S-4 | 5 | WOH | S-4: Medium, brown-black, Clayey SILT, little fine Sand, trace Organics. | | | SAND & SILT WITH ORGANICS | | |
| | | | 1 | | | | | | |
| | | | 3 | | | | | | |
| | | | 5 | | | | | | |
| 5 | S-5 | 14 | 5 | S-5: Medium dense, reddish brown, fine to coarse GRAVEL and fine to coarse SAND, trace Silt. | | | | | |
| | | | 5 | | | | | | |
| | | | 6 | | | | | | |
| | | | 4 | | | | | | |
| 6 | S-6 | 10 | 6 | S-6: Medium dense, reddish brown, fine to coarse SAND and fine to coarse GRAVEL, trace Silt. | | | SAND & GRAVEL | | |
| | | | 12 | | | | | | |
| | | | 10 | | | | | | |
| | | | 8 | | | | | | |
| | | | | Bottom of Exploration ±27.0' | | | | | |

| | | | | |
|----------|---|---|--|---|
| Remarks: | NON-PLASTIC (SPT-N) | PLASTIC (SPT-N) | SAMPLE TYPE | PROPORTIONS |
| | 0-4 = VERY LOOSE 4-10 = LOOSE 10-30 = MEDIUM DENSE 30-50 = DENSE 50+ = VERY DENSE | 0-2 = VERY SOFT 2-4 = SOFT 4-8 = MEDIUM 8-15 = STIFF 15-30 = VERY STIFF 30+ = HARD | C = ROCK CORE S = SPLIT SPOON UP = UNDISTURBED PISTON UT = UNDISTURBED THINWALL | trace = <10% little = 10% - 20% some = 20% - 35% and = 35% - 50% |

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|---|--|----------------------|
| PROJECT: NORTH END FIELD RECONSTRUCTION | BORING NO.: SLR-8 | SHEET: 1 of 2 |
| LOCATION: BRITANNIA STREET, MERIDEN, CONNECTICUT | CONTRACTOR: SITE, LLC | |
| PROJ. NO.: 141.14792.00004 | FOREMAN: J. DEANGELIS | |
| CLIENT: MERIDEN PUBLIC SCHOOLS | INSPECTOR: R. GOWISNOCK | |
| DATE: FEBRUARY 7, 2022. | GROUND SURFACE ELEVATION: ±142.5' | |

| EQUIPMENT: | AUGER | CASING | SAMPLER | COREBRL. | GROUNDWATER DEPTH (FT.) | | | TYPE OF RIG: |
|-----------------|-------|--------|---------|----------|-------------------------|---------|-------------|---------------------------|
| TYPE | HSA | - | SS | - | DATE | TIME | WATER DEPTH | TRACK W/ AUTOMATIC HAMMER |
| SIZE ID (IN.) | 2 1/4 | - | 1 3/8 | - | 2022-02-07 | 8:30 AM | ±1.7' | RIG MODEL: CME-55 LCX |
| HMR. WT (LB.) | - | - | 140 | - | | | | |
| HMR. FALL (IN.) | - | - | 30 | - | | | | |

| Depth (FT) | SAMPLE NUMBER | RECOVERY (IN) | BLOWS PER 6" | SOIL AND ROCK CLASSIFICATION-DESCRIPTION | | DEPTH (FT.) | STRATUM DESCRIPTION | ELEV. (FT.) | Remark |
|------------|---------------|---------------|--------------|---|---------------------------------------|-------------|---------------------|-------------|--------|
| | | | | BURMISTER SYSTEM (SOIL) | U.S. CORPS OF ENGINEERS SYSTEM (ROCK) | | | | |
| 1 | S-1 | 15 | 6 | S-1: Medium dense, Top 6": Dark brown, fine to coarse SAND, little Silt, trace fine Gravel, trace Organics. | | 0.5' | TOPSOIL | 142.0' | |
| | | | 5 | | | 1.7' | G.W.T. ▼ | 140.8' | |
| | | | 8 | | | | | | |
| 2 | S-2 | 16 | 7 | Bottom 9": Brown-black, fine to coarse SAND, some fine to coarse Gravel, little Silt, trace Debris (e.g., organics). | | | | | |
| | | | 5 | | | | | | |
| | | | 8 | | | | | | |
| 3 | S-2 | 16 | 15 | S-2: Medium dense, brown-black, fine to coarse SAND, little fine to coarse Gravel, little Silt. | | | | | |
| | | | 16 | | | | | | |
| | | | | | | | | | |
| 4 | S-3 | 15 | 4 | S-3: Medium dense, reddish brown, fine to coarse SAND, some Silt, little fine to coarse Gravel. | | | | | |
| | | | 4 | | | | | | |
| | | | 6 | | | | | | |
| 5 | S-3 | 15 | 3 | | | | | | |
| | | | | | | | | | |
| | | | | | | | | | |
| 6 | S-4 | 17 | 5 | S-4: Loose, dark brown, fine to coarse SAND and fine to coarse GRAVEL, trace Silt. | | | FILL | | |
| | | | 5 | | | | | | |
| | | | 2 | | | | | | |
| 7 | S-4 | 17 | 3 | | | | | | |
| | | | | | | | | | |
| | | | | | | | | | |
| 8 | S-5 | 12 | 4 | S-5: Loose, reddish brown, fine to coarse SAND, little fine to coarse Gravel, little Silt. | | | | | |
| | | | 3 | | | | | | |
| | | | 4 | | | | | | |
| 9 | S-5 | 12 | 6 | | | | | | |
| | | | | | | | | | |
| | | | | | | | | | |
| 10 | S-6 | 5 | 5 | S-6: Loose, Top 4": Reddish brown, fine to coarse SAND, some fine to coarse Gravel, little Silt. Bottom 1": Black, SILT, little fine to medium Sand, little Organics. | | | | | |
| | | | 3 | | | 21.5' | | 121.0' | |
| | | | 4 | | | | | | |
| 11 | S-6 | 5 | 2 | | | | | | |
| | | | | | | | | | |
| | | | | | | | | | |
| 12 | S-6 | 5 | | | | | | | |
| | | | | | | | | | |
| | | | | | | | | | |
| 13 | S-6 | 5 | | | | | | | |
| | | | | | | | | | |
| | | | | | | | | | |
| 14 | S-6 | 5 | | | | | | | |
| | | | | | | | | | |
| | | | | | | | | | |
| 15 | S-6 | 5 | | | | | | | |
| | | | | | | | | | |
| | | | | | | | | | |
| 16 | S-6 | 5 | | | | | | | |
| | | | | | | | | | |
| | | | | | | | | | |
| 17 | S-6 | 5 | | | | | | | |
| | | | | | | | | | |
| | | | | | | | | | |
| 18 | S-6 | 5 | | | | | | | |
| | | | | | | | | | |
| | | | | | | | | | |
| 19 | S-6 | 5 | | | | | | | |
| | | | | | | | | | |
| | | | | | | | | | |
| 20 | S-6 | 5 | | | | | | | |
| | | | | | | | | | |
| | | | | | | | | | |
| 21 | S-6 | 5 | | | | | | | |
| | | | | | | | | | |
| | | | | | | | | | |
| 22 | S-6 | 5 | | | | | | | |
| | | | | | | | | | |
| | | | | | | | | | |

| | | | | |
|----------|---|---|--|---|
| Remarks: | NON-PLASTIC (SPT-N) | PLASTIC (SPT-N) | SAMPLE TYPE | PROPORTIONS |
| | 0-4 = VERY LOOSE 4-10 = LOOSE 10-30 = MEDIUM DENSE 30-50 = DENSE 50+ = VERY DENSE | 0-2 = VERY SOFT 2-4 = SOFT 4-8 = MEDIUM 8-15 = STIFF 15-30 = VERY STIFF 30+ = HARD | C = ROCK CORE S = SPLIT SPOON UP = UNDISTURBED PISTON UT = UNDISTURBED THINWALL | trace = <10% little = 10% - 20% some = 20% - 35% and = 35% - 50% |

BORING LOG



SLR International Corporation

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| | | |
|---|--|----------------------|
| PROJECT: NORTH END FIELD RECONSTRUCTION | BORING NO.: SLR-8 | SHEET: 2 of 2 |
| LOCATION: BRITANNIA STREET, MERIDEN, CONNECTICUT | CONTRACTOR: SITE, LLC | |
| PROJ. NO.: 141.14792.00004 | FOREMAN: J. DEANGELIS | |
| CLIENT: MERIDEN PUBLIC SCHOOLS | INSPECTOR: R. GOWISNOCK | |
| DATE: FEBRUARY 7, 2022. | GROUND SURFACE ELEVATION: ±142.5' | |

| EQUIPMENT: | AUGER | CASING | SAMPLER | COREBRL. | GROUNDWATER DEPTH (FT.) | | | TYPE OF RIG: |
|-----------------|-------|--------|---------|----------|-------------------------|---------|-------------|---------------------------|
| TYPE | HSA | - | SS | - | DATE | TIME | WATER DEPTH | TRACK W/ AUTOMATIC HAMMER |
| SIZE ID (IN.) | 2 1/4 | - | 1 3/8 | - | 2022-02-07 | 8:30 AM | ±1.7' | RIG MODEL: |
| HMR. WT (LB.) | - | - | 140 | - | | | | CME-55 LCX |
| HMR. FALL (IN.) | - | - | 30 | - | | | | |

| Depth (FT) | SAMPLE NUMBER | RECOVERY (IN) | BLOWS PER 6" | SOIL AND ROCK CLASSIFICATION-DESCRIPTION BURMISTER SYSTEM (SOIL) U.S. CORPS OF ENGINEERS SYSTEM (ROCK) | DEPTH (FT.) | STRATUM DESCRIPTION | ELEV. (FT.) | Remark | |
|------------|---------------|---------------|--------------|---|-------------|---------------------------|-------------|--------|--|
| 24 | | | | | 23.5' | | 119.0' | | |
| 25 | | | 1 | S-7: Loose, brown, ORGANICS. | | ORGANICS | | | |
| 26 | S-7 | 18 | 2 | | | | | | |
| 27 | | | 3 | | | | | | |
| 28 | | | 3 | | | | | | |
| 29 | | | | | 28.5' | | 114.0' | | |
| 30 | | | 1 | S-8: Medium, dark gray, Clayey SILT, trace Organics. | | CLAYEY SILT WITH ORGANICS | | | |
| 31 | S-8 | 24 | 2 | | | | | | |
| 32 | | | 2 | | | | | | |
| 33 | | | 2 | | | | | | |
| 34 | | | | | 33.5' | | 109.0' | | |
| 35 | | | 8 | S-9: Medium dense, reddish brown, fine to coarse GRAVEL, little fine to coarse Sand, trace Silt. | | SAND & GRAVEL | | | |
| 36 | S-9 | 8 | 11 | | | | | | |
| 37 | | | 9 | | | | | | |
| 38 | | | 7 | | | | | | |
| 39 | | | | | | | | | |
| 40 | | | 6 | S-10: Medium dense, reddish brown, fine to coarse SAND and fine to coarse GRAVEL, trace Silt. | | SAND & GRAVEL | | | |
| 41 | S-10 | 6 | 9 | | | | | | |
| 42 | | | 10 | | | | | | |
| 43 | | | 8 | | | | | | |
| 44 | | | | | 42.0' | | 100.5' | | |
| 45 | | | | Bottom of Exploration ±42.0' | | | | | |

| | | | | |
|-----------------|---|---|--|---|
| Remarks: | NON-PLASTIC (SPT-N) | PLASTIC (SPT-N) | SAMPLE TYPE | PROPORTIONS |
| | 0-4 = VERY LOOSE 4-10 = LOOSE 10-30 = MEDIUM DENSE 30-50 = DENSE 50+ = VERY DENSE | 0-2 = VERY SOFT 2-4 = SOFT 4-8 = MEDIUM 8-15 = STIFF 15-30 = VERY STIFF 30+ = HARD | C = ROCK CORE S = SPLIT SPOON UP = UNDISTURBED PISTON UT = UNDISTURBED THINWALL | trace = <10% little = 10% - 20% some = 20% - 35% and = 35% - 50% |

BORING LOG



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| | | |
|---|--|----------------------|
| PROJECT: NORTH END FIELD RECONSTRUCTION | BORING NO.: SLR-9 | SHEET: 1 of 2 |
| LOCATION: BRITANNIA STREET, MERIDEN, CONNECTICUT | CONTRACTOR: SITE, LLC | |
| PROJ. NO.: 141.14792.00004 | FOREMAN: J. DEANGELIS | |
| CLIENT: MERIDEN PUBLIC SCHOOLS | INSPECTOR: R. GOWISNOCK | |
| DATE: FEBRUARY 7, 2022. | GROUND SURFACE ELEVATION: ±143.0' | |

| EQUIPMENT: | AUGER | CASING | SAMPLER | COREBRL. | GROUNDWATER DEPTH (FT.) | | | TYPE OF RIG: |
|-----------------|-------|--------|---------|----------|-------------------------|----------|-------------|---------------------------|
| TYPE | HSA | - | SS | - | DATE | TIME | WATER DEPTH | TRACK W/ AUTOMATIC HAMMER |
| SIZE ID (IN.) | 2 1/4 | - | 1 3/8 | - | 2022-02-07 | 10:30 AM | ±3.8' | RIG MODEL: |
| HMR. WT (LB.) | - | - | 140 | - | | | | CME-55 LCX |
| HMR. FALL (IN.) | - | - | 30 | - | | | | |

| Depth (FT) | SAMPLE NUMBER | RECOVERY (IN) | BLOWS PER 6" | SOIL AND ROCK CLASSIFICATION-DESCRIPTION | | DEPTH (FT.) | STRATUM DESCRIPTION | ELEV. (FT.) | Remark |
|------------|---------------|---------------|--------------|---|---------------------------------------|-------------|---------------------|-------------|----------|
| | | | | BURMISTER SYSTEM (SOIL) | U.S. CORPS OF ENGINEERS SYSTEM (ROCK) | | | | |
| 1 | S-1 | 17 | 2 | S-1: Loose, Top 11": Dark brown, fine to coarse SAND, little Silt, trace fine Gravel, trace Organics. Bottom 6": Reddish brown, fine to coarse SAND, little fine to coarse Gravel, little Silt, trace Debris (e.g., organics). | | 0.9' | TOPSOIL | 142.1' | |
| | | | 1 | | | | | | |
| | | | 3 | | | | | | |
| | | | 4 | | | | | | |
| 2 | S-2 | 15 | 12 | S-2: Medium dense, reddish brown, fine to coarse GRAVEL, some fine to coarse Sand, trace Silt. | | 3.8' | G.W.T. ▼ | 139.2' | |
| | | | 8 | | | | | | |
| | | | 18 | | | | | | |
| | | | 17 | | | | | | |
| 5 | S-3 | 12 | 7 | S-3: Medium dense, reddish brown, fine to coarse SAND and fine to coarse GRAVEL, trace Silt. | | | FILL | | |
| | | | 6 | | | | | | |
| | | | 5 | | | | | | |
| | | | 7 | | | | | | |
| 10 | S-4 | 8 | 2 | S-4: Medium dense, brown, fine to coarse SAND, some fine to coarse Gravel, trace Silt. | | | | 13.5' | 129.5' |
| | | | 5 | | | | | | |
| | | | 6 | | | | | | |
| | | | 10 | | | | | | |
| 16 | S-5 | 22 | 1 | S-5: Very loose, brown, ORGANICS. | | | | | ORGANICS |
| | | | 1 | | | | | | |
| | | | 2 | | | | | | |
| | | | 2 | | | | | | |
| 20 | S-6 | 24 | 1 | S-6: Very loose, brown, ORGANICS. | | | | | |
| | | | 1 | | | | | | |
| | | | 2 | | | | | | |
| | | | 2 | | | | | | |

| | | | | |
|-----------------|---|---|--|---|
| Remarks: | NON-PLASTIC (SPT-N) | PLASTIC (SPT-N) | SAMPLE TYPE | PROPORTIONS |
| | 0-4 = VERY LOOSE 4-10 = LOOSE 10-30 = MEDIUM DENSE 30-50 = DENSE 50+ = VERY DENSE | 0-2 = VERY SOFT 2-4 = SOFT 4-8 = MEDIUM 8-15 = STIFF 15-30 = VERY STIFF 30+ = HARD | C = ROCK CORE S = SPLIT SPOON UP = UNDISTURBED PISTON UT = UNDISTURBED THINWALL | trace = <10% little = 10% - 20% some = 20% - 35% and = 35% - 50% |

BORING LOG



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| | | |
|---|--|----------------------|
| PROJECT: NORTH END FIELD RECONSTRUCTION | BORING NO.: SLR-9 | SHEET: 2 of 2 |
| LOCATION: BRITANNIA STREET, MERIDEN, CONNECTICUT | CONTRACTOR: SITE, LLC | |
| PROJ. NO.: 141.14792.00004 | FOREMAN: J. DEANGELIS | |
| CLIENT: MERIDEN PUBLIC SCHOOLS | INSPECTOR: R. GOWISNOCK | |
| DATE: FEBRUARY 7, 2022. | GROUND SURFACE ELEVATION: ±143.0' | |

| EQUIPMENT: | AUGER | CASING | SAMPLER | COREBRL. | GROUNDWATER DEPTH (FT.) | | | TYPE OF RIG: |
|-----------------|-------|--------|---------|----------|-------------------------|----------|-------------|---------------------------|
| TYPE | HSA | - | SS | - | DATE | TIME | WATER DEPTH | TRACK W/ AUTOMATIC HAMMER |
| SIZE ID (IN.) | 2 1/4 | - | 1 3/8 | - | 2022-02-07 | 10:30 AM | ±3.8' | RIG MODEL: |
| HMR. WT (LB.) | - | - | 140 | - | | | | CME-55 LCX |
| HMR. FALL (IN.) | - | - | 30 | - | | | | |

| Depth (FT) | SAMPLE NUMBER | RECOVERY (IN) | BLOWS PER 6" | SOIL AND ROCK CLASSIFICATION-DESCRIPTION BURMISTER SYSTEM (SOIL) U.S. CORPS OF ENGINEERS SYSTEM (ROCK) | DEPTH (FT.) | STRATUM DESCRIPTION | ELEV. (FT.) | Remark |
|------------|---------------|---------------|--------------|---|-------------|---------------------------|-------------|--------|
| 24 | | | | S-7: Soft, dark gray, Clayey SILT, little Organics. | 23.5' | ORGANICS | 119.5' | |
| 25 | | | WOH | | | CLAYEY SILT WITH ORGANICS | | |
| 26 | S-7 | 24 | 2 | | | | | |
| 27 | | | 1 | | | | | |
| 28 | | | 2 | | 28.5' | | | 114.5' |
| 29 | | | | S-8: Medium dense, reddish brown, fine to coarse GRAVEL, little fine to coarse Sand, trace Silt. | | SAND & GRAVEL | | |
| 30 | | | 6 | | | | | |
| 31 | S-8 | 8 | 9 | | | | | |
| 32 | | | 11 | | | | | |
| 33 | | | 23 | | | | | |
| 34 | | | | S-9: Medium dense, reddish brown, fine to coarse SAND and fine to coarse GRAVEL, little Silt. | | | | |
| 35 | | | 7 | | | | | |
| 36 | S-9 | 10 | 9 | | | | | |
| 37 | | | 10 | | | | | |
| 38 | | | 9 | | 37.0' | | 106.0' | |
| 39 | | | | Bottom of Exploration ±37.0' | | | | |
| 40 | | | | | | | | |
| 41 | | | | | | | | |
| 42 | | | | | | | | |
| 43 | | | | | | | | |
| 44 | | | | | | | | |
| 45 | | | | | | | | |

| | | | | |
|----------|---|---|--|---|
| Remarks: | NON-PLASTIC (SPT-N) | PLASTIC (SPT-N) | SAMPLE TYPE | PROPORTIONS |
| | 0-4 = VERY LOOSE 4-10 = LOOSE 10-30 = MEDIUM DENSE 30-50 = DENSE 50+ = VERY DENSE | 0-2 = VERY SOFT 2-4 = SOFT 4-8 = MEDIUM 8-15 = STIFF 15-30 = VERY STIFF 30+ = HARD | C = ROCK CORE S = SPLIT SPOON UP = UNDISTURBED PISTON UT = UNDISTURBED THINWALL | trace = <10% little = 10% - 20% some = 20% - 35% and = 35% - 50% |

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| | | |
|---|--|----------------------|
| PROJECT: NORTH END FIELD RECONSTRUCTION | BORING NO.: SLR-10 | SHEET: 1 of 2 |
| LOCATION: BRITANNIA STREET, MERIDEN, CONNECTICUT | CONTRACTOR: SITE, LLC | |
| PROJ. NO.: 141.14792.00004 | FOREMAN: J. DEANGELIS | |
| CLIENT: MERIDEN PUBLIC SCHOOLS | INSPECTOR: R. GOWISNOCK | |
| DATE: FEBRUARY 7, 2022. | GROUND SURFACE ELEVATION: ±142.0' | |

| EQUIPMENT: | AUGER | CASING | SAMPLER | COREBRL. | GROUNDWATER DEPTH (FT.) | | | TYPE OF RIG: |
|-----------------|-------|--------|---------|----------|-------------------------|----------|-------------|---------------------------|
| TYPE | HSA | - | SS | - | DATE | TIME | WATER DEPTH | TRACK W/ AUTOMATIC HAMMER |
| SIZE ID (IN.) | 2 1/4 | - | 1 3/8 | - | 2022-02-07 | 12:00 PM | ±1.4' | RIG MODEL: |
| HMR. WT (LB.) | - | - | 140 | - | | | | CME-55 LCX |
| HMR. FALL (IN.) | - | - | 30 | - | | | | |

| Depth (FT) | SAMPLE NUMBER | RECOVERY (IN) | BLOWS PER 6" | SOIL AND ROCK CLASSIFICATION-DESCRIPTION | | DEPTH (FT.) | STRATUM DESCRIPTION | ELEV. (FT.) | Remark |
|------------|---------------|---------------|--------------|---|---------------------------------------|-------------|---------------------|-------------|--------|
| | | | | BURMISTER SYSTEM (SOIL) | U.S. CORPS OF ENGINEERS SYSTEM (ROCK) | | | | |
| 1 | S-1 | 19 | 5 | S-1: Medium dense, Top 5": Brown, fine to coarse SAND, little Silt, trace fine Gravel, trace Organics. Bottom 14": Reddish brown, fine to coarse SAND, some fine to coarse Gravel, trace Silt. | | 0.5' | TOPSOIL | 141.5' | |
| | | | 8 | | | 1.4' | G.W.T. ▼ | 140.6' | |
| | | | 7 | | | | | | |
| 2 | S-2 | 10 | 10 | S-2: Medium dense, reddish brown, fine to coarse GRAVEL, little fine to coarse Sand, trace Silt. | | | | | |
| | | | 7 | | | | | | |
| | | | 8 | | | | | | |
| 3 | S-3 | 16 | 12 | S-3: Loose, dark brown-reddish brown, fine to coarse SAND, little fine to coarse Gravel, trace Silt. | | | | | |
| | | | 6 | | | | | | |
| | | | 5 | | | | | | |
| 4 | S-4 | 20 | 3 | S-4: Medium dense, reddish brown, fine to coarse SAND, some fine to coarse Gravel, trace Silt. | | | | | |
| | | | 3 | | | | | | |
| | | | 8 | | | | | | |
| 5 | S-5 | 12 | 7 | S-5: Very loose, dark brown-black, fine to medium SAND, some Silt, some Organics. | | 13.5' | | 128.5' | |
| | | | 1 | | | | | | |
| | | | 2 | | | | | | |
| 6 | S-6 | 24 | 1 | S-6: Very loose, brown, ORGANICS. | | 18.5' | | 123.5' | |
| | | | 1 | | | | | | |
| | | | 2 | | | | | | |

| | | | | |
|-----------------|---|---|--|---|
| Remarks: | NON-PLASTIC (SPT-N) | PLASTIC (SPT-N) | SAMPLE TYPE | PROPORTIONS |
| | 0-4 = VERY LOOSE 4-10 = LOOSE 10-30 = MEDIUM DENSE 30-50 = DENSE 50+ = VERY DENSE | 0-2 = VERY SOFT 2-4 = SOFT 4-8 = MEDIUM 8-15 = STIFF 15-30 = VERY STIFF 30+ = HARD | C = ROCK CORE S = SPLIT SPOON UP = UNDISTURBED PISTON UT = UNDISTURBED THINWALL | trace = <10% little = 10% - 20% some = 20% - 35% and = 35% - 50% |

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| | | |
|---|--|----------------------|
| PROJECT: NORTH END FIELD RECONSTRUCTION | BORING NO.: SLR-10 | SHEET: 2 of 2 |
| LOCATION: BRITANNIA STREET, MERIDEN, CONNECTICUT | CONTRACTOR: SITE, LLC | |
| PROJ. NO.: 141.14792.00004 | FOREMAN: J. DEANGELIS | |
| CLIENT: MERIDEN PUBLIC SCHOOLS | INSPECTOR: R. GOWISNOCK | |
| DATE: FEBRUARY 7, 2022. | GROUND SURFACE ELEVATION: ±142.0' | |

| EQUIPMENT: | AUGER | CASING | SAMPLER | COREBRL. | GROUNDWATER DEPTH (FT.) | | | TYPE OF RIG: |
|-----------------|-------|--------|---------|----------|-------------------------|----------|-------------|---------------------------|
| TYPE | HSA | - | SS | - | DATE | TIME | WATER DEPTH | TRACK W/ AUTOMATIC HAMMER |
| SIZE ID (IN.) | 2 1/4 | - | 1 3/8 | - | 2022-02-07 | 12:00 PM | ±1.4' | RIG MODEL: |
| HMR. WT (LB.) | - | - | 140 | - | | | | CME-55 LCX |
| HMR. FALL (IN.) | - | - | 30 | - | | | | |

| Depth (FT) | SAMPLE NUMBER | RECOVERY (IN) | BLOWS PER 6" | SOIL AND ROCK CLASSIFICATION-DESCRIPTION BURMISTER SYSTEM (SOIL) U.S. CORPS OF ENGINEERS SYSTEM (ROCK) | DEPTH (FT.) | STRATUM DESCRIPTION | ELEV. (FT.) | Remark |
|------------|---------------|---------------|--------------|---|-------------|---------------------------|-------------|--------|
| 24 | | | | S-7: Medium, dark gray, Clayey SILT, little Organics. | 23.5' | ORGANICS | 118.5' | |
| 25 | | | WOH | | | CLAYEY SILT WITH ORGANICS | | |
| 26 | S-7 | 24 | 2 | | | | | |
| 27 | | | 2 | | | | | |
| 28 | | | | | 28.5' | | | 113.5' |
| 29 | | | | S-8: Medium dense, reddish brown, fine to coarse GRAVEL and fine to coarse SAND, trace Silt. | | SAND & GRAVEL | | |
| 30 | | | 6 | | | | | |
| 31 | S-8 | 14 | 10 | | | | | |
| 32 | | | 8 | | | | | |
| 33 | | | | S-9: Medium dense, reddish brown, fine to coarse GRAVEL and fine to coarse SAND, trace Silt. | | | | |
| 34 | | | | | | | | |
| 35 | | | 5 | | | | | |
| 36 | S-9 | 10 | 7 | | | | | |
| 37 | | | 8 | | | | | |
| 38 | | | 7 | | 37.0' | | 105.0' | |
| 39 | | | | Bottom of Exploration ±37.0' | | | | |
| 40 | | | | | | | | |
| 41 | | | | | | | | |
| 42 | | | | | | | | |
| 43 | | | | | | | | |
| 44 | | | | | | | | |
| 45 | | | | | | | | |

| | | | | |
|----------|---|---|--|---|
| Remarks: | NON-PLASTIC (SPT-N) | PLASTIC (SPT-N) | SAMPLE TYPE | PROPORTIONS |
| | 0-4 = VERY LOOSE 4-10 = LOOSE 10-30 = MEDIUM DENSE 30-50 = DENSE 50+ = VERY DENSE | 0-2 = VERY SOFT 2-4 = SOFT 4-8 = MEDIUM 8-15 = STIFF 15-30 = VERY STIFF 30+ = HARD | C = ROCK CORE S = SPLIT SPOON UP = UNDISTURBED PISTON UT = UNDISTURBED THINWALL | trace = <10% little = 10% - 20% some = 20% - 35% and = 35% - 50% |

APPENDIX 3
LIMITATIONS

LIMITATIONS

This report has been prepared for the exclusive use of Meriden Public Schools in a manner consistent with generally accepted professional consulting principles and practices for the same locality under similar conditions. No other representations or warranties, expressed or implied, are made. These services were performed consistent with our agreement with our client. This work product is intended solely for the use and information of our client unless otherwise noted. Any reliance on this work product by a third party is at such party's sole risk.

Opinions and recommendations contained in this work product are based on conditions that existed at the time the services were performed and are intended only for the client, purposes, locations, time frames, and project parameters indicated. The data reported and the findings, observations, and conclusions expressed are limited by the scope of work. We are not responsible for the impacts of any changes in environmental standards, practices, or regulations subsequent to performance of services. We do not warrant the accuracy of information supplied by others, or the use of segregated portions of this work product.

The services described in this report were performed consistent with generally accepted geotechnical engineering principles and practices. No other warranty, express or implied, is made. These services were performed consistent with our agreement with our client. This report is solely for the use and information of our client unless otherwise noted. Any reliance on this report by a third Party is at such party's sole risk.

Opinions and recommendations contained in this report apply to conditions existing when services were performed and are intended only for the client, purposes, locations, time frames and project parameters indicated. We do not warrant the accuracy of information supplied by others, nor the use of segregated portions of this report.

The conclusions and recommendations in this report are invalid if:

- The assumed design loads change;
- The structures are relocated;
- The report is used for adjacent or other property or buildings;
- If grades, ground water levels, or both, change between the issuance of this report and construction; or
- Any other change is implemented that materially alters the project from that proposed when this report was prepared.

The exploration logs do not provide a warranty of the conditions that may exist at the entire site. The extent and nature of subsurface soil and groundwater variations may not become evident until construction begins. Variations in soil conditions between borings could possibly exist between or beyond the points of exploration or groundwater elevations may change, both of which may require additional studies, consultation, and possible design revisions. **Any person associated with this project who observes conditions or features of the site or surrounding areas that are different from those described in this report should report them immediately to the company for consideration and evaluation. This report was prepared solely for the use of our client and should be reviewed in its entirety.**

APPENDIX B

TOPSOIL ANALYSIS



Memorandum

To: Kevin Fusilier
From: Scott Bristol
Date: October 12, 2021
Subject: Soil Sampling Results, North End Fields, Meriden, CT

SLR has been retained by Meriden Public Schools to develop concept plans and preliminary cost opinions for the reconstruction of the existing athletic fields on Britannia Street (the "Site"). As part of the design effort, SLR performed a preliminary evaluation of the Site soils in an effort to determine if additional project costs would be expected based upon the potential presence of contaminants. No specific knowledge of environmental releases at the fields has been communicated to SLR and the sampling was therefore undertaken solely to inform the development of design concepts.

SLR developed a sampling plan prior to mobilizing the sampling team. The plan specified that 12 samples would be collected in a rough grid-like pattern throughout the area where soil disturbance activities could be expected to occur as a result of field reconstruction. The plan included the collection of soil from existing grade to a depth of approximately 24 inches. In areas where grass or other ground cover was present, the organic layer was discarded prior to homogenizing and collecting of a single composite sample representative of the sampled interval.

All samples were collected using hand augers and/or trowels on September 17, 2021. The samples were submitted to the State-certified laboratory Complete Environmental Testing, Inc. (CET) for analysis of Extractable Petroleum Hydrocarbons (EPH) and organochlorine pesticides as these were believed to be represent the most likely types of contaminants to be present based upon land use and Site location.

The results of the laboratory analyses were compared to the Connecticut Remediation Standard Regulations (RSRs) and the definition of "clean fill" under current Connecticut statutes and regulations. According to the Regulations of Connecticut State Agencies (RCSA), "clean fill" means "(1) natural soil (2) rock, brick, ceramics, concrete, and asphalt paving fragments which are virtually inert and pose neither a pollution threat to ground or surface waters nor a fire

October 12, 2021

Memo to: Kevin Fusilier

Page 2

hazard and (3) polluted soil as defined in subdivision (45) of subsection (a) of section 22a-133k-1 of the Regulations of Connecticut State Agencies which soil has been treated to reduce the concentration of pollutants to levels which do not exceed the applicable pollutant mobility criteria and direct exposure criteria established in sections 22a-133k-1 through 22a-133k-3 of the Regulations of Connecticut State Agencies and which soil is reused in accordance with R.C.S.A. subdivision (3) of subsection (h) of section 22a-133k-2 of such regulations.”

RCSA Section 22a-133k-2 requires polluted soil at a release area to be remediated to meet the Direct Exposure Criteria (DEC) to protect human health from exposure to COCs. The Pollutant Mobility Criteria (PMC) are used to evaluate the potential of the contaminants of concern (COCs) to pollute groundwater by leaching from impacted soil.

In general, the DEC apply to soil located within 15 feet of the ground surface. Soil impacted by a release must be remediated to a concentration that is consistent with the Residential DEC (RDEC) unless the Site is used exclusively for industrial or commercial activities.

A tabulated comparison of the soil results to the RDEC is provided in the appended table.

The results of the soil sampling program indicate that, while most of the shallow soils appear to meet the RDEC for those compounds analyzed, the soil in the southeast and the northwest portions of the Site do not meet the definition of clean fill.

Based upon the soil sampling, SLR recommends that efforts be made during the design phase to achieve a “balanced” Site such that no soil is required to be removed from the Site. Conversely, if soil must be removed, the soil to be removed should originate from those areas that appear to be free of contaminants (i.e., the northeast and southwest portions).

The area of sample HA-C-3 should be considered for off-Site disposal due to the elevated concentration of ETPH and the observation of buried debris in that area. Additional sampling and analysis of soil is recommended once concept designs for the field reconstruction have been finalized and prior to final design.

PESTICIDES RESULTS IN SOIL

SAMPLES COLLECTED

SEPTEMBER 17, 2021

| Parameter | Sample ID | HA-A-1 | HA-A-2 | HA-A-3 | HA-A-4 | HA-B-1 | HA-B-2 | HA-B-3 | HA-B-4 | HA-C-1 | HA-C-2 | HA-C-3 | HA-C-4 |
|--|---------------------------------------|--------|--------|--------|--------|--------|--------|--------|--------|--------|--------|--------------|--------|
| | CTDEEP Regulatory Criteria RDEC | | | | | | | | | | | | |
| Total Extractable Petroleum Hydrocarbons (ETPH) by the Connecticut ETPH Method (mg/kg dry) | | | | | | | | | | | | | |
| ETPH | 500 | 120 | 72 | ND<58 | ND<58 | ND<58 | ND<58 | 250 | 140 | ND<59 | ND<60 | 1,200 | 130 |
| Pesticides by EPA Method 8081B (ug/kg dry) | | | | | | | | | | | | | |
| 4,4-DDD | 1,800 | ND<1.2 | ND<1.1 | ND<1.1 | ND<1.1 | ND<1.2 | ND<1.2 | 17 | ND<1.2 | ND<1.2 | ND<1.2 | ND<1.1 | ND<1.2 |
| 4,4-DDE | 1,800 | ND<1.2 | ND<1.1 | ND<1.1 | ND<1.1 | ND<1.2 | ND<1.2 | ND<1.2 | ND<1.2 | ND<1.2 | ND<1.2 | ND<1.1 | 43 |
| 4,4-DDT | 1,800 | ND<1.2 | ND<1.1 | 41 | ND<1.1 | ND<1.2 | ND<1.2 | 22 | ND<1.2 | ND<1.2 | ND<1.2 | ND<1.1 | 44 |
| 4,4-Methoxychlor | 340,000 | ND<6.0 | ND<5.4 | ND<5.7 | ND<5.7 | ND<5.8 | ND<5.8 | ND<5.6 | ND<5.8 | ND<5.9 | ND<6.0 | ND<5.7 | ND<5.9 |
| alachlor | 7,700 | ND<6.0 | ND<5.4 | ND<5.7 | ND<5.7 | ND<5.8 | ND<5.8 | ND<5.6 | ND<5.8 | ND<5.9 | ND<6.0 | ND<5.7 | ND<5.9 |
| Aldrin | 40 | ND<6.0 | ND<5.4 | ND<5.7 | ND<5.7 | ND<5.8 | ND<5.8 | ND<5.6 | ND<5.8 | ND<5.9 | ND<6.0 | ND<5.7 | ND<5.9 |
| alpha-BHC | 340 | ND<6.0 | ND<5.4 | ND<5.7 | ND<5.7 | ND<5.8 | ND<5.8 | ND<5.6 | ND<5.8 | ND<5.9 | ND<6.0 | ND<5.7 | ND<5.9 |
| beta-BHC | 340 | ND<6.0 | ND<5.4 | ND<5.7 | ND<5.7 | ND<5.8 | ND<5.8 | ND<5.6 | ND<5.8 | ND<5.9 | ND<6.0 | ND<5.7 | ND<5.9 |
| Chlordane | 490 | ND<3.6 | ND<3.2 | ND<3.4 | ND<3.4 | ND<3.5 | ND<3.5 | ND<3.4 | ND<3.5 | ND<3.5 | ND<3.6 | ND<3.4 | ND<3.5 |
| Delta-BHC | 340 | ND<6.0 | ND<5.4 | ND<5.7 | ND<5.7 | ND<5.8 | ND<5.8 | ND<5.6 | ND<5.8 | ND<5.9 | ND<6.0 | ND<5.7 | ND<5.9 |
| Dieldrin | 38 | ND<1.2 | ND<1.1 | ND<1.1 | ND<1.1 | ND<1.2 | ND<1.2 | ND<1.2 | ND<1.2 | ND<1.2 | ND<1.2 | ND<1.1 | ND<1.2 |
| Endosulfan I | 41,000 | ND<6.0 | ND<5.4 | ND<5.7 | ND<5.7 | ND<5.8 | ND<5.8 | ND<5.6 | ND<5.8 | ND<5.9 | ND<6.0 | ND<5.7 | ND<5.9 |
| Endosulfan II | 41,000 | ND<6.0 | ND<5.4 | ND<5.7 | ND<5.7 | ND<5.8 | ND<5.8 | ND<5.6 | ND<5.8 | ND<5.9 | ND<6.0 | ND<5.7 | ND<5.9 |
| Endosulfan sulfate | 41,000 | ND<6.0 | ND<5.4 | ND<5.7 | ND<5.7 | ND<5.8 | ND<5.8 | ND<5.6 | ND<5.8 | ND<5.9 | ND<6.0 | ND<5.7 | ND<5.9 |
| Endrin | 20,000 | ND<6.0 | ND<5.4 | ND<5.7 | ND<5.7 | ND<5.8 | ND<5.8 | ND<5.6 | ND<5.8 | ND<5.9 | ND<6.0 | ND<5.7 | ND<5.9 |
| Endrin aldehyde | 20,000 | ND<6.0 | ND<5.4 | ND<5.7 | ND<5.7 | ND<5.8 | ND<5.8 | ND<5.6 | ND<5.8 | ND<5.9 | ND<6.0 | ND<5.7 | ND<5.9 |
| Endrin ketone | 20,000 | ND<6.0 | ND<5.4 | ND<5.7 | ND<5.7 | ND<5.8 | ND<5.8 | ND<5.6 | ND<5.8 | ND<5.9 | ND<6.0 | ND<5.7 | ND<5.9 |
| Gamma-BHC | 20,000 | ND<6.0 | ND<5.4 | ND<5.7 | ND<5.7 | ND<5.8 | ND<5.8 | ND<5.6 | ND<5.8 | ND<5.9 | ND<6.0 | ND<5.7 | ND<5.9 |
| Heptachlor | 140 | ND<6.0 | ND<5.4 | ND<5.7 | ND<5.7 | ND<5.8 | ND<5.8 | ND<5.6 | ND<5.8 | ND<5.9 | ND<6.0 | ND<5.7 | ND<5.9 |
| Heptachlor epoxide | 67 | ND<6.0 | ND<5.4 | ND<5.7 | ND<5.7 | ND<5.8 | ND<5.8 | ND<5.6 | ND<5.8 | ND<5.9 | ND<6.0 | ND<5.7 | ND<5.9 |
| Toxaphene | 560 | ND<120 | ND<110 | ND<110 | ND<110 | ND<120 | ND<120 | ND<110 | ND<120 | ND<120 | ND<120 | ND<110 | ND<120 |
| Total Solids by Method SM 2540 G (%) | | | | | | | | | | | | | |
| Percent Solids | NA | 82 | 91 | 86 | 86 | 86 | 86 | 88 | 86 | 84 | 83 | 87 | 84 |

Notes:

CTDEEP - CT Dept of Energy & Environmental Protection

RDEC - Residential Direct Exposure Criteria

mg/kg - Milligrams per kilogram

EPA - Environmental Protection Agency

ug/kg - Micrograms per kilogram

ND<58 - Not detected above the indicated reporting limit

BOLD value indicates an exceedance of the RDEC



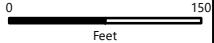
Source: Esri, DigitalGlobe, GeoEye, Earthstar Geographics, CNES/Airbus DS, USDA, USGS, AeroGRID, IGN, and the GIS User Community



99 REALTY DRIVE
CHESHIRE, CT 06410
203.271.1773

HAND AUGER SOIL SAMPLING LOCATIONS 9/17/2021

SITE INVESTIGATION
NORTH END FIELD
234 BRITANNIA STREET
MERIDEN, CT



| | |
|-----------|-----------------|
| SCALE | 1" = 150' |
| DATE | 10/7/2021 |
| PROJ. NO. | 141.14792.00004 |

FIG. 1

APPENDIX C
INLAND WETLANDS AND WATERCOURSE
INVESTIGATION

Memorandum

To: Mr. Michael Grove
From: Matthew Sanford
Date: September 1, 2021
Subject: North End Field Wetland Investigation
SLR #: 141.14792.00004.0020

On August 31, 2021, Marlee Antill, Environmental Scientist with SLR International Corporation (SLR), visited North End Field on Britannia Street in Meriden, Connecticut, to confirm the presence or absence of wetlands and watercourses within the approximately 6.6-acre park. The investigation was primarily focused within the approximately 0.8-acre undeveloped area in the northwest portion of the site. In summary, no wetlands or watercourses were identified within or in close proximity to the subject parcel. The northwest undeveloped portion of the lot features an invasive meadow with dry, compacted soils, identified on the United States Department of Agriculture – Natural Resources Conservation Services (USDA-NRCS) soil map as Urban land and Udorthents. Vegetation within this portion of the site largely comprises non-native and invasive species including dense thickets of Japanese knotweed (*Fallopia japonica*) and hedge bindweed (*Calystegia sepium*) around the perimeter, with common mugwort (*Artemisia vulgaris*), orchard grass (*Dactylis glomerata*), great burdock (*Arctium lappa*), and Canada goldenrod (*Solidago canadensis*) comprising 95 percent cover within the meadow area. A large cottonwood tree (*Populus deltoides*) exists along the northern site boundary, along with a small patch of giant reed (*Phragmites australis*), which are likely supported by stormwater runoff from the impervious lot situated atop an embankment just north of the park.



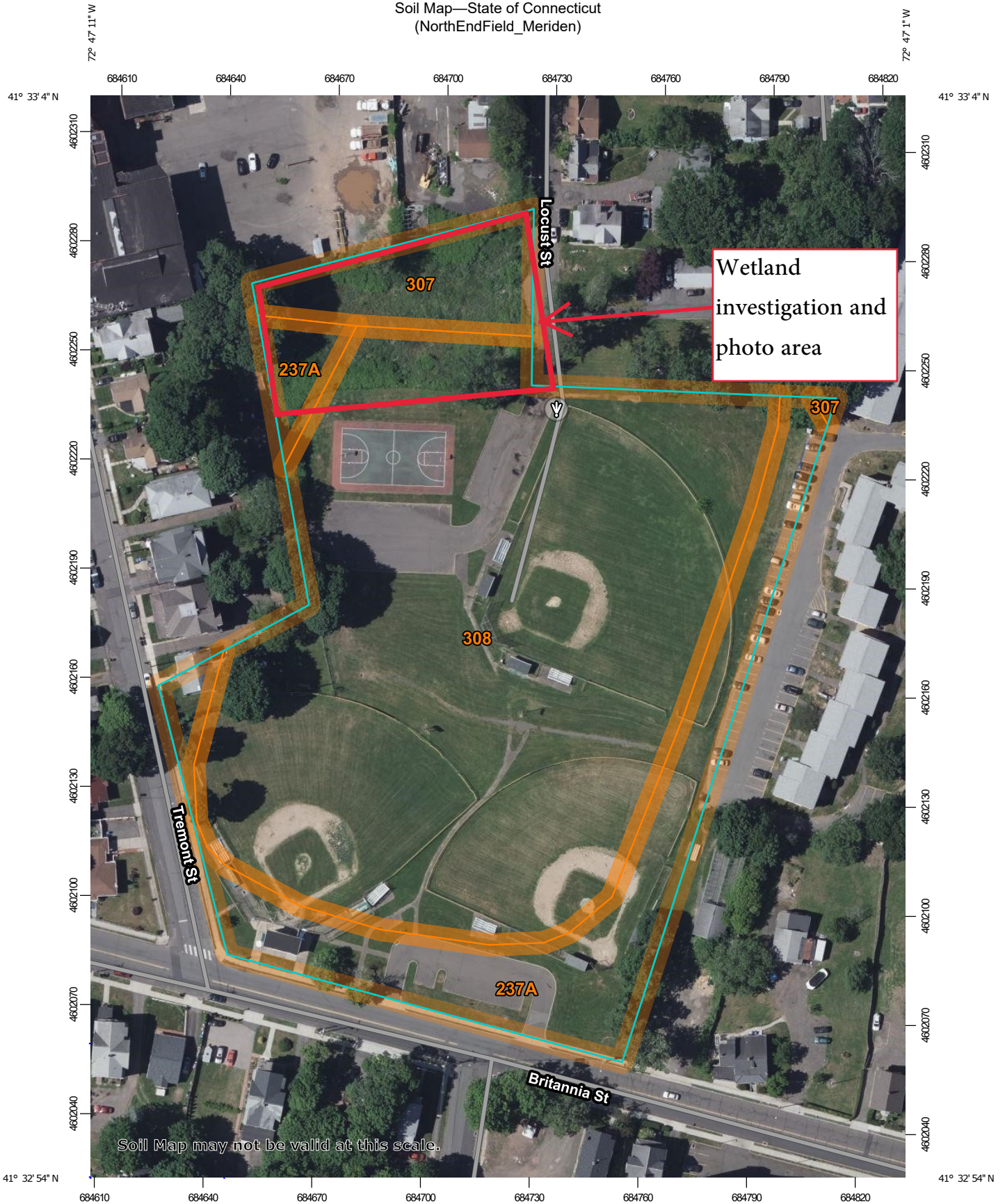
View of meadow area looking northwest



View of meadow area looking northeast

141.14792.00004.0020.s121.memo.docx

Soil Map—State of Connecticut
(NorthEndField_Meriden)




Map Scale: 1:1,450 if printed on A portrait (8.5" x 11") sheet.



MAP LEGEND

Area of Interest (AOI)

 Area of Interest (AOI)

Soils

 Soil Map Unit Polygons

 Soil Map Unit Lines

 Soil Map Unit Points

Special Point Features



Blowout



Borrow Pit



Clay Spot



Closed Depression



Gravel Pit



Gravelly Spot



Landfill



Lava Flow



Marsh or swamp



Mine or Quarry



Miscellaneous Water



Perennial Water



Rock Outcrop



Saline Spot



Sandy Spot



Severely Eroded Spot



Sinkhole



Slide or Slip



Sodic Spot



Spoil Area



Stony Spot



Very Stony Spot



Wet Spot



Other



Special Line Features

Water Features



Streams and Canals

Transportation



Rails



Interstate Highways



US Routes



Major Roads



Local Roads

Background



Aerial Photography

MAP INFORMATION

The soil surveys that comprise your AOI were mapped at 1:12,000.

Warning: Soil Map may not be valid at this scale.

Enlargement of maps beyond the scale of mapping can cause misunderstanding of the detail of mapping and accuracy of soil line placement. The maps do not show the small areas of contrasting soils that could have been shown at a more detailed scale.

Please rely on the bar scale on each map sheet for map measurements.

Source of Map: Natural Resources Conservation Service

Web Soil Survey URL:

Coordinate System: Web Mercator (EPSG:3857)

Maps from the Web Soil Survey are based on the Web Mercator projection, which preserves direction and shape but distorts distance and area. A projection that preserves area, such as the Albers equal-area conic projection, should be used if more accurate calculations of distance or area are required.

This product is generated from the USDA-NRCS certified data as of the version date(s) listed below.

Soil Survey Area: State of Connecticut

Survey Area Data: Version 20, Jun 9, 2020

Soil map units are labeled (as space allows) for map scales 1:50,000 or larger.

Date(s) aerial images were photographed: Jun 8, 2020—Jun 12, 2020

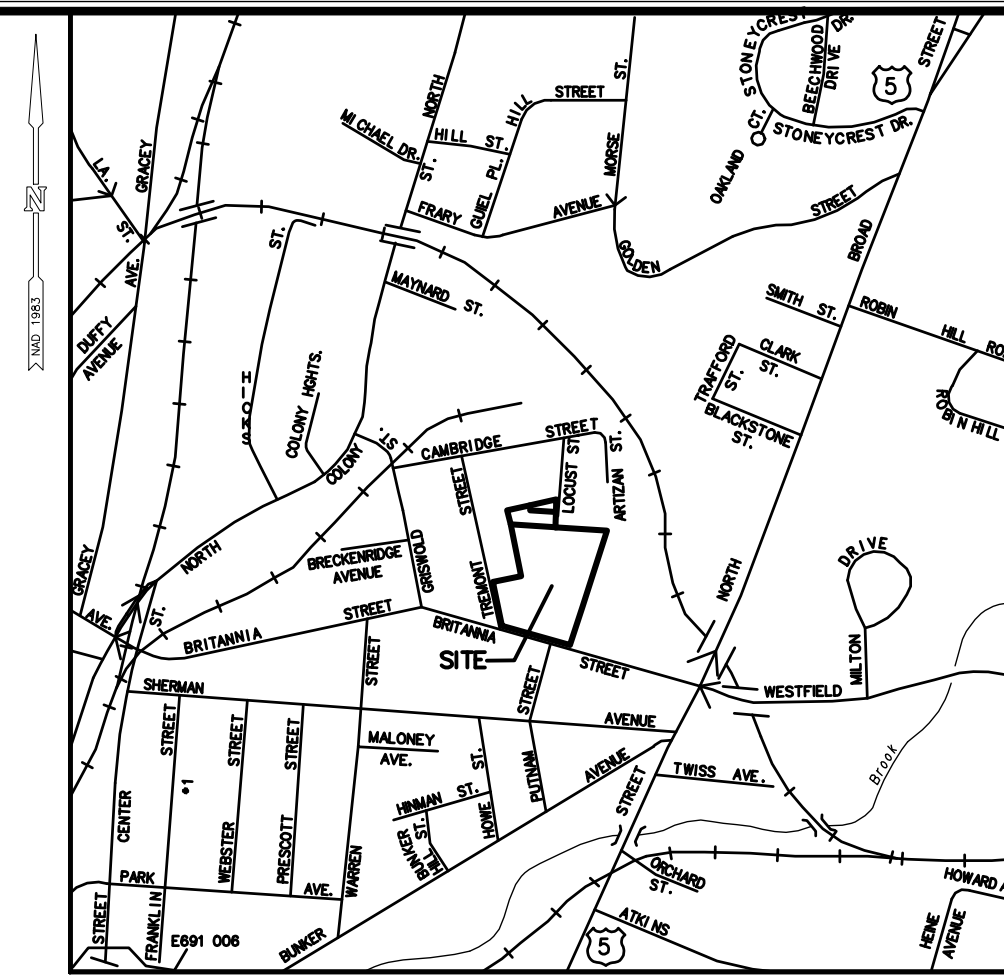
The orthophoto or other base map on which the soil lines were compiled and digitized probably differs from the background imagery displayed on these maps. As a result, some minor shifting of map unit boundaries may be evident.

Map Unit Legend

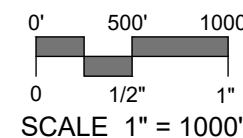
| Map Unit Symbol | Map Unit Name | Acres in AOI | Percent of AOI |
|------------------------------------|--|--------------|----------------|
| 237A | Manchester-Urban land complex, 0 to 3 percent slopes | 1.5 | 22.0% |
| 307 | Urban land | 0.4 | 6.5% |
| 308 | Udorthents, smoothed | 4.7 | 71.5% |
| Totals for Area of Interest | | 6.6 | 100.0% |

NORTH END FIELD BALLFIELD RECONSTRUCTION

210 BRITANNIA STREET
MERIDEN, CONNECTICUT



LOCATION MAP
SCALE: 1"=1000'



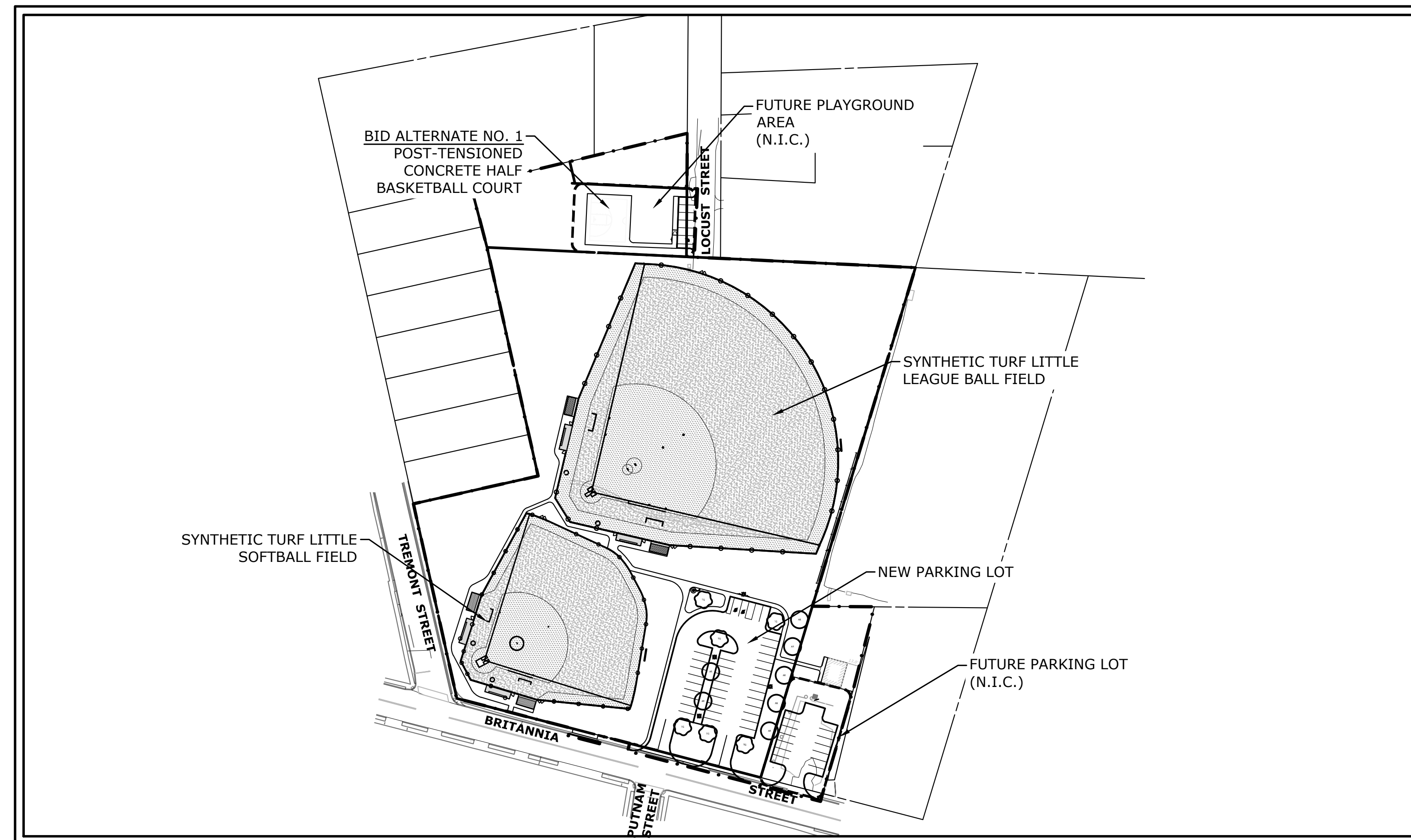
GENERAL NOTES

1. TOPOGRAPHIC INFORMATION IS BASED ON A SURVEY BY SLR CONSULTING INC., ENTITLED: "PROPERTY TOPOGRAPHIC, JACK BARRY FIELD BRITANNIA STREET MERIDEN, CONNECTICUT, DATED NOVEMBER 17, 2021, AT A SCALE 1"=40'."
2. NORTH BASED UPON THE CONNECTICUT COORDINATE SYSTEM NAD 1983 ESTABLISHED BY GPS.
3. VERTICAL DATUM BASED ON NAVD88 ESTABLISHED WITH GPS.
4. INFORMATION REGARDING THE LOCATION OF EXISTING UTILITIES HAS BEEN BASED UPON AVAILABLE INFORMATION AND MAY BE INCOMPLETE, AND WHERE SHOWN SHOULD BE CONSIDERED APPROXIMATE. THE LOCATION OF ALL EXISTING UTILITIES SHOULD BE CONFIRMED PRIOR TO BEGINNING CONSTRUCTION. CALL "CALL BEFORE YOU DIG", 1-800-922-4455. ALL UTILITY LOCATIONS THAT DO NOT MATCH THE VERTICAL OR HORIZONTAL CONTROL SHOWN ON THE PLANS SHALL IMMEDIATELY BE BROUGHT TO THE ATTENTION OF THE ENGINEER FOR RESOLUTION.
5. SLR CONSULTING INC. ACCEPTS NO RESPONSIBILITY FOR THE ACCURACY OF MAPS AND DATA WHICH HAVE BEEN SUPPLIED BY OTHERS.
6. ALL DIMENSIONS AND ELEVATIONS SHALL BE VERIFIED IN THE FIELD PRIOR TO CONSTRUCTION. ANY DISCREPANCIES SHALL BE BROUGHT TO THE ATTENTION OF THE ENGINEER.
7. ALL PROPOSED CONTOURS AND SPOT ELEVATIONS INDICATE FINISHED GRADE.
8. ALL CONSTRUCTION MATERIALS AND METHODS SHALL CONFORM TO THE CITY OF MERIDEN REQUIREMENTS AND TO THE APPLICABLE SECTIONS OF THE STATE OF CONNECTICUT DEPARTMENT OF TRANSPORTATION STANDARD SPECIFICATIONS FOR ROADS, BRIDGES, AND INCIDENTAL CONSTRUCTION, FORM 818 AND ADDENDUMS
9. THE PLANS REQUIRE A CONTRACTOR'S WORKING KNOWLEDGE OF LOCAL, MUNICIPAL, WATER COMPANY, AND STATE CODES FOR UTILITY SYSTEMS. ANY CONFLICTS BETWEEN MATERIALS AND LOCATIONS SHOWN, AND LOCAL REQUIREMENTS SHALL BE BROUGHT TO THE ATTENTION OF THE ENGINEER PRIOR TO THE EXECUTION OF WORK. THE ENGINEER WILL NOT BE HELD LIABLE FOR COSTS INCURRED TO IMPLEMENT OR CORRECT WORK WHICH DOES NOT CONFORM TO LOCAL CODE.
10. ALL FUEL, OIL, PAINT, OR OTHER HAZARDOUS MATERIALS SHOULD BE STORED IN A SECONDARY CONTAINER AND REMOVED TO A LOCKED INDOOR AREA WITH AN IMPERVIOUS FLOOR DURING NON-WORK HOURS.

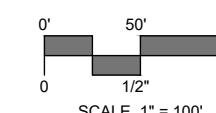
CONSTRUCTION SEQUENCE

1. PRIOR TO COMMENCEMENT OF WORK, A PRE-CONSTRUCTION MEETING SHALL BE HELD WITH CITY STAFF AND REPRESENTATIVES OF THE CONTRACTOR AND OWNER. AT THIS MEETING, ONE PERSON WILL BE PLACED IN CHARGE OF SEDIMENT AND EROSION CONTROL FOR THE ENTIRE SITE.
2. GENERAL CONTRACTOR TO SUBMIT A DETAILED CONSTRUCTION SEQUENCE FOR REVIEW AND APPROVAL BY THE TOWN AND PROJECT ENGINEER.
3. CITY STAFF WILL BE NOTIFIED ONCE A CONSTRUCTION SCHEDULE IS FINALIZED AND PRIOR TO THE START OF ANY SITE WORK.
4. CONTACT "CALL BEFORE YOU DIG" FOR MARK OUT OF ALL UTILITIES.
5. CONTRACTOR TO STAKE OUT LIMIT OF DISTURBANCE. NO DISTURBANCE IS TO TAKE PLACE BEYOND THE LIMITS OF WORK SHOWN.
6. CONTRACTOR TO INSTALL SEDIMENT AND EROSION CONTROLS ALONG THE PERIMETER AND STABILIZED CONSTRUCTION ENTRANCES.
7. STRIP TOPSOIL. PLACE SEDIMENT FILTER FENCE AND HAYBALES AROUND STOCKPILES.
8. INITIATE MASS EARTHWORK OPERATIONS AFTER ALL BASINS, BERMS, SILT FENCE & HAYBALES ARE INSTALLED.
9. INSTALL SITE UTILITIES AND FOUNDATIONS.
10. SLOPES ARE TO BE ESTABLISHED AS SOON AS PRACTICAL. STABILIZE ALL SLOPES IMMEDIATELY AFTER THEIR ESTABLISHMENT.
11. INSTALL SITE IMPROVEMENTS INCLUDING FENCING, NETTING, ETC.
12. SEDIMENT AND EROSION CONTROLS SHALL BE INSPECTED AT LEAST ONCE A WEEK AND WITHIN 24 HOURS OF THE END OF A STORM WITH A RAINFALL AMOUNT OF 0.5 INCH OR GREATER.
13. THE SEDIMENT AND EROSION CONTROL PLAN SHALL BE MODIFIED BY THE CONTRACTOR AT THE DIRECTION OF THE ENGINEER AND THE TOWN'S DESIGNATED REPRESENTATIVE AS NECESSITATED BY CHANGING SITE CONDITIONS
14. INSPECTION OF THE SITE FOR EROSION SHALL CONTINUE FOR A PERIOD OF THREE MONTHS AFTER COMPLETION WHEN RAINFALLS OF ONE INCH OR MORE OCCUR.
15. THE SITE SHOULD BE KEPT CLEAN OF LOOSE DEBRIS, LITTER, AND BUILDING MATERIALS SUCH THAT NONE OF THE ABOVE ENTER WATERS OR WETLANDS.
16. A COPY OF ALL PLANS AND REVISIONS, AND THE SEDIMENT AND EROSION CONTROL PLAN SHALL BE MAINTAINED ON-SITE AT ALL TIMES DURING CONSTRUCTION.

BID DOCUMENTS
AUGUST 29, 2022



PROJECT SITE VICINITY MAP:



PREPARED FOR:

MERIDEN PUBLIC SCHOOLS
22 LIBERTY STREET
MERIDEN, CT 06450

LIST OF DRAWINGS

| NO. | NAME | TITLE |
|-------|-----------|---|
| 01 | -- | TITLE SHEET |
| 02 | IN | INDEX PLAN |
| 03-04 | EX-1-EX-2 | EXISTING CONDITIONS |
| 05-06 | RM-1-RM-2 | SITE PLAN - REMOVALS |
| 07-08 | LA-1-LA-2 | SITE PLAN - LAYOUT & LANDSCAPING |
| 09-10 | GR-1-GR-2 | SITE PLAN - GRADING |
| 11-12 | UT-1-UT-2 | SITE PLAN - UTILITIES |
| 13-14 | SE-1-SE-2 | SITE PLAN - SEDIMENT & EROSION CONTROLS |
| 15 | SE-3 | SEDIMENT & EROSION CONTROL NOTES AND DETAILS |
| 16-20 | SD-1-SD-5 | SITE DETAILS |
| 22 | SD-6 | CITY OF MERIDEN STANDARD DETAILS |
| 22 | ES-0 | SITE ELECTRICAL SPECIFICATIONS, NOTES & ABBREVIATIONS |
| 23 | ES-1 | SITE ELECTRICAL DETAILS & SCHEDULES |
| 24 | ES-2 | SITE ELECTRICAL DETAILS |
| 25 | ES-3 | SITE ELECTRICAL PLAN |

PREPARED BY:



99 REALTY DRIVE
CHESHIRE, CT 06410
203.271.1773
SLRCONSULTING.COM



Know what's below.
Call before you dig.
www.cbyd.com

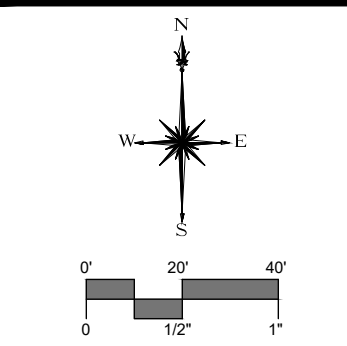
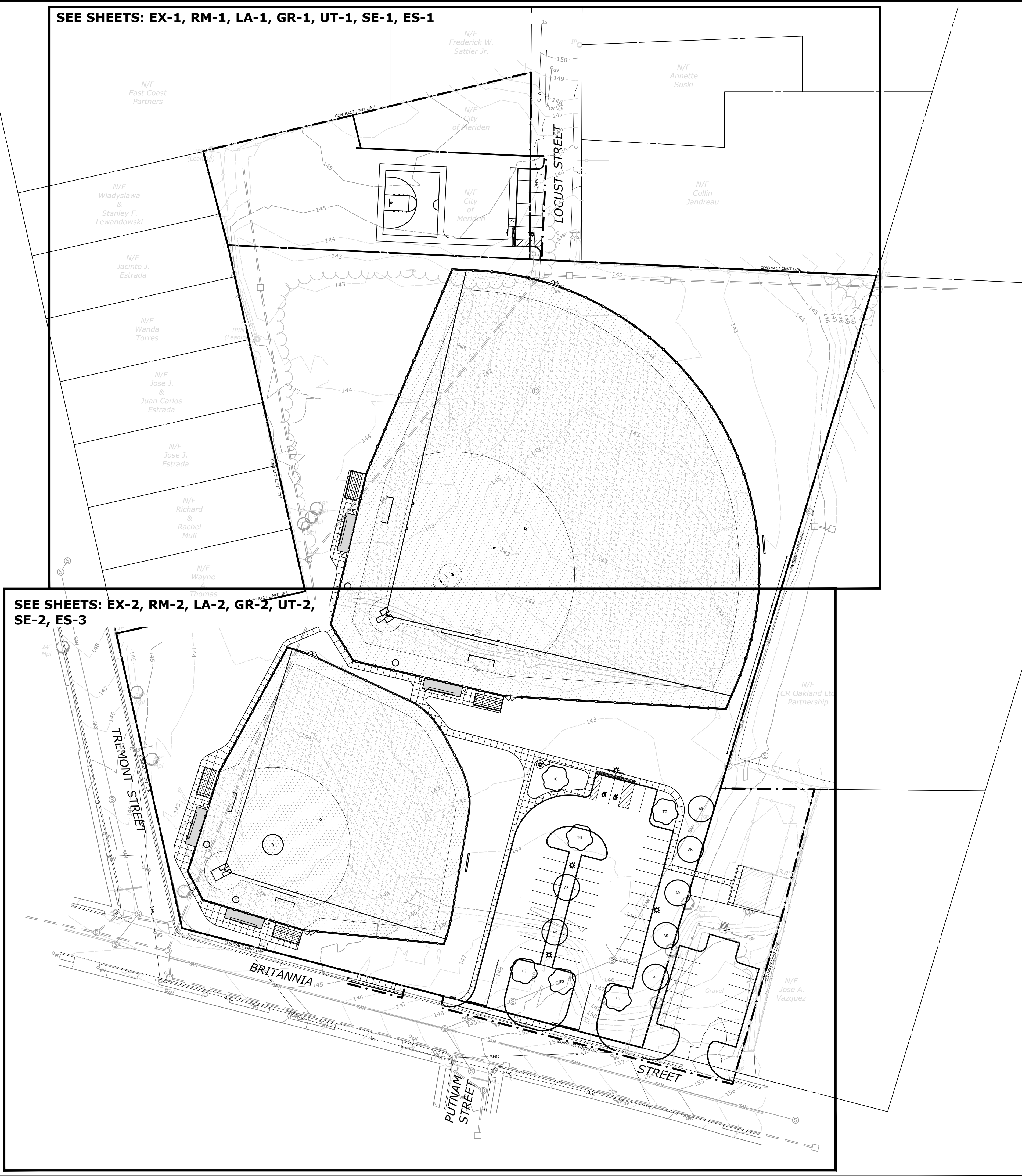
14792.00004 - 02 OF 25 - AUGUST 29, 2022 - 14792.00004 - 02 OF 25 - AUGUST 29, 2022
 14792.00004 - 02 OF 25 - AUGUST 29, 2022 - 14792.00004 - 02 OF 25 - AUGUST 29, 2022

| LEGEND | |
|----------|-----------------------------------|
| EXISTING | PROPOSED |
| | STREET LINE |
| | PROPERTY LINE |
| | CONTRACT LIMIT LINE |
| | MAJOR CONTOUR |
| | MINOR CONTOUR |
| | SPOT GRADE |
| | WETLANDS |
| | TREE LINE |
| | TREE |
| | SITE LIGHT |
| | HYDRANT |
| | WATER METER |
| | WATER VALVE |
| | GAS VALVE |
| | CATCH BASIN |
| | MANHOLE/YARD DRAIN/ AREA DRAIN |
| | SANITARY SEWER WITH MANHOLE |
| | STORM DRAIN WITH CATCH BASIN |
| | WATER MAIN |
| | DOMESTIC WATER |
| | FIRE PROTECTION WATER |
| | GAS MAIN |
| | ELECTRIC LINE |
| | ELECTRIC, TELEPHONE, CABLE |
| | UTILITY POLE |
| | TRAFFIC SIGN |
| | IRON PIPE |
| | MONUMENT |
| | EDGE OF PAVEMENT WITH CURB |
| | RETAINING WALL |
| | SIDEWALK |
| | BOLLARD |
| | GUARD RAIL |
| | PICKET FENCE |
| | CHAIN LINK FENCE |
| | BARBWIRE FENCE |
| | DIVERSION BERM |
| | BORING |

N.I.C. = NOT IN CONTRACT

SEE SHEETS: EX-1, RM-1, LA-1, GR-1, UT-1, SE-1, ES-1

**SEE SHEETS: EX-2, RM-2, LA-2, GR-2, UT-2,
SE-2, ES-3**

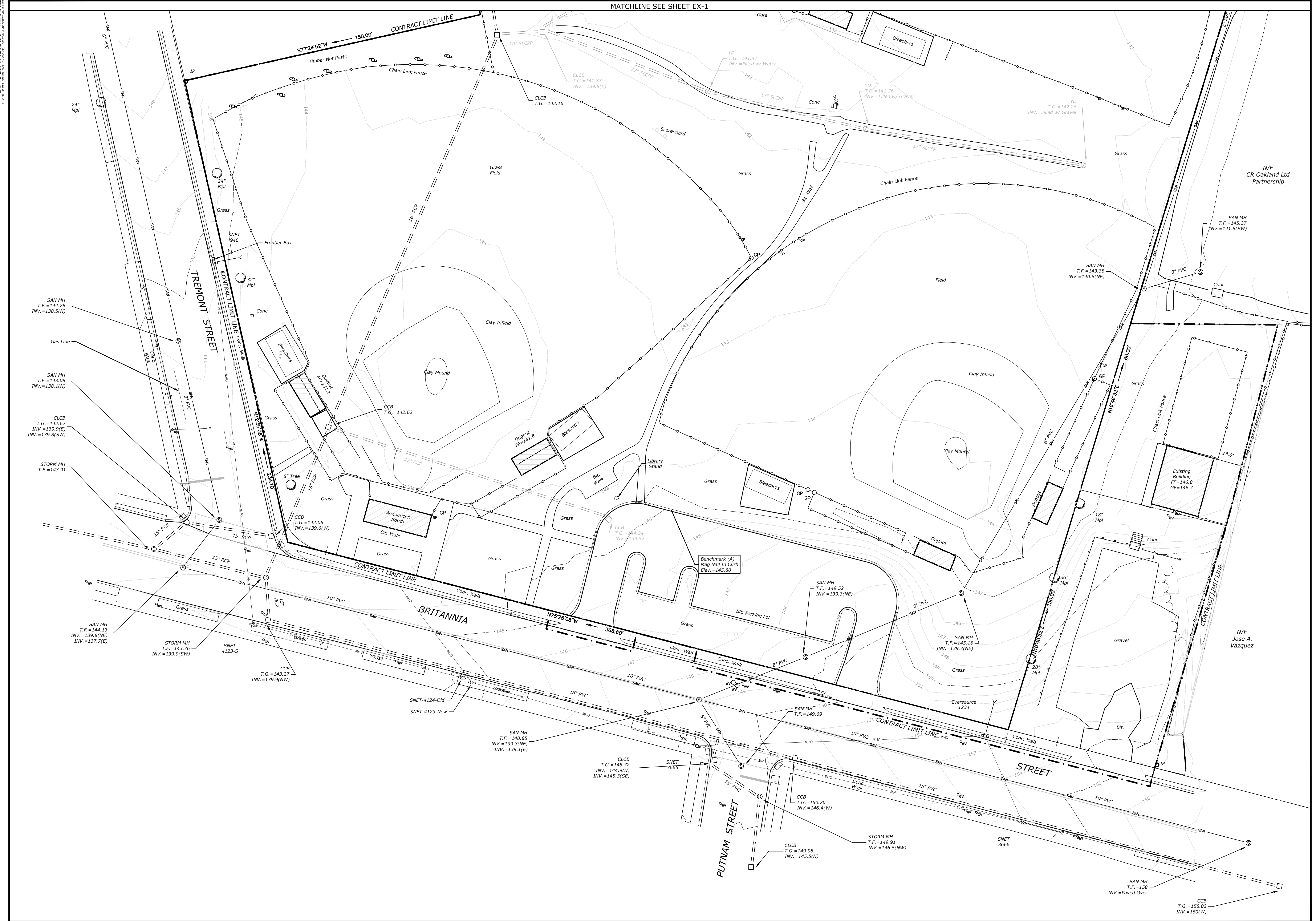


| DESCRIPTION | DATE | BY |
|-------------|------|----|
| | | |
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| | | |

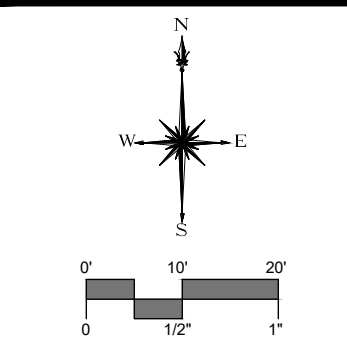
INDEX PLAN, NOTES AND LEGEND
NORTH END FIELD
BALLFIELD RECONSTRUCTION
 210 BRITANNIA STREET
 MERIDEN, CONNECTICUT

| | | |
|----------------------------|-------|---------|
| KCF | GB | KCF |
| DESIGNED | DRAWN | CHECKED |
| SCALE 1"=40' | | |
| DATE AUGUST 29, 2022 | | |
| PROJECT NO. 14792.00004 | | |
| SHEET NO. 02 OF 25 | | |

IN



MATCHLINE SEE SHEET EX-1

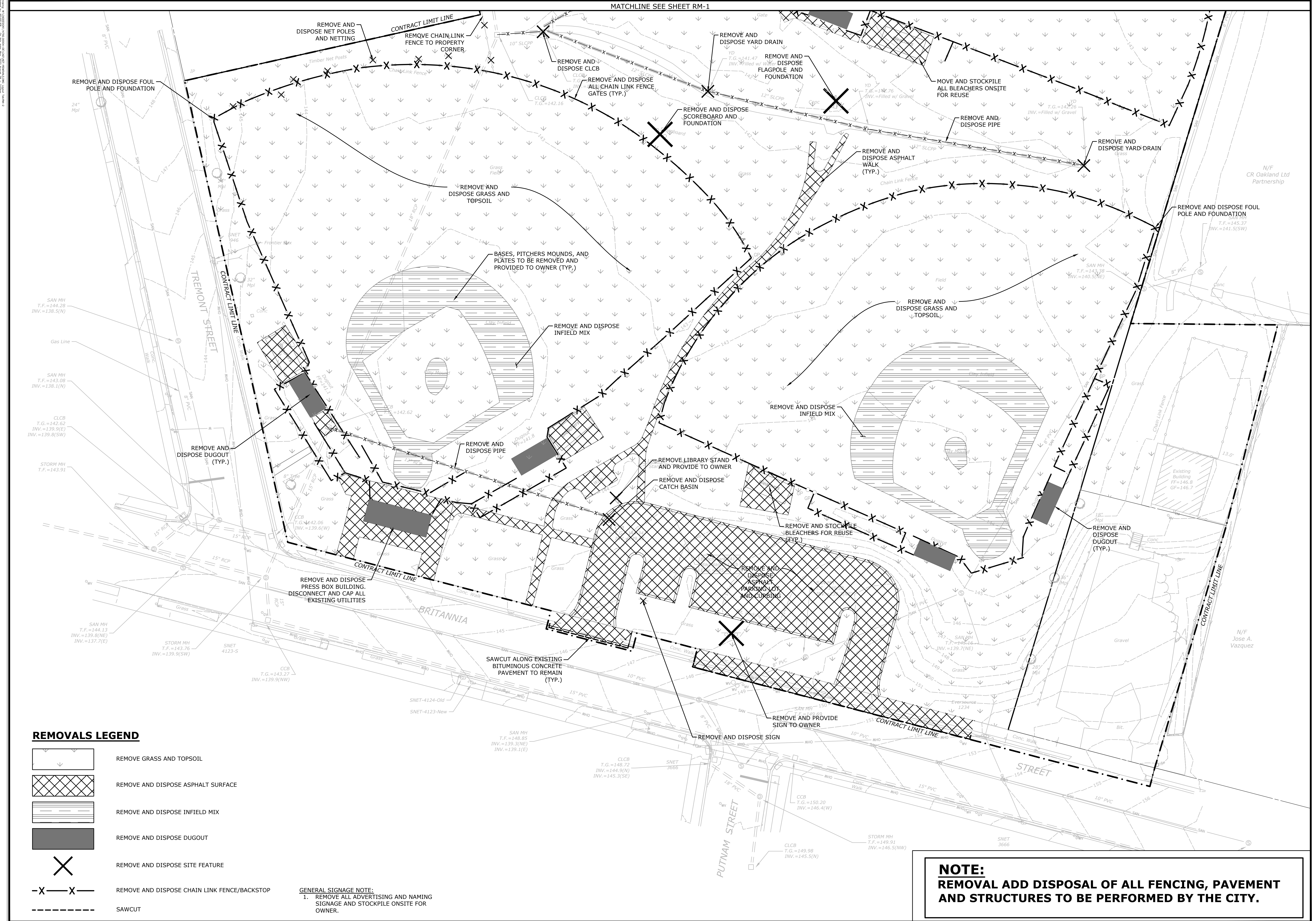


SLR
 99 REALTY DRIVE
 SUITE 200
 WESTFIELD, MA 01095
 TEL: 413-562-1111
 WWW.SLRCONSULTING.COM



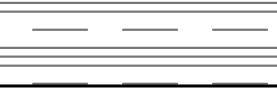




| DESCRIPTION | DATE | BY |
|-------------|------|----|
| | | |
| | | |
| | | |
| | | |

SITE PLAN - EXISTING CONDITIONS
NORTH END FIELD
BALLFIELD RECONSTRUCTION
 210 BRITANNIA STREET
 MERIDEN, CONNECTICUT

| | | |
|-------------|-----------------|-----|
| DESIGNED | GB | KCF |
| DRAWN | | |
| CHECKED | | |
| SCALE | 1"=20' | |
| DATE | AUGUST 29, 2022 | |
| PROJECT NO. | 14792.00004 | |
| SHEET NO. | 04 OF 25 | |
| SHEET NAME | EX-2 | |

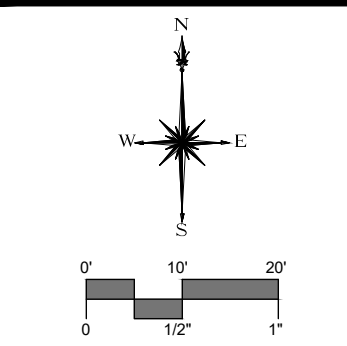


REMOVALS LEGEND

-  REMOVE GRASS AND TOPSOIL
-  REMOVE AND DISPOSE ASPHALT SURFACE
-  REMOVE AND DISPOSE INFIELD MIX
-  REMOVE AND DISPOSE DUGOUT
-  REMOVE AND DISPOSE SITE FEATURE
-  REMOVE AND DISPOSE CHAIN LINK FENCE/BACKSTOP
-  SAWCUT

GENERAL SIGNAGE NOTE:
 1. REMOVE ALL ADVERTISING AND NAMING SIGNAGE AND STOCKPILE ONSITE FOR OWNER.

NOTE:
 REMOVAL ADD DISPOSAL OF ALL FENCING, PAVEMENT AND STRUCTURES TO BE PERFORMED BY THE CITY.

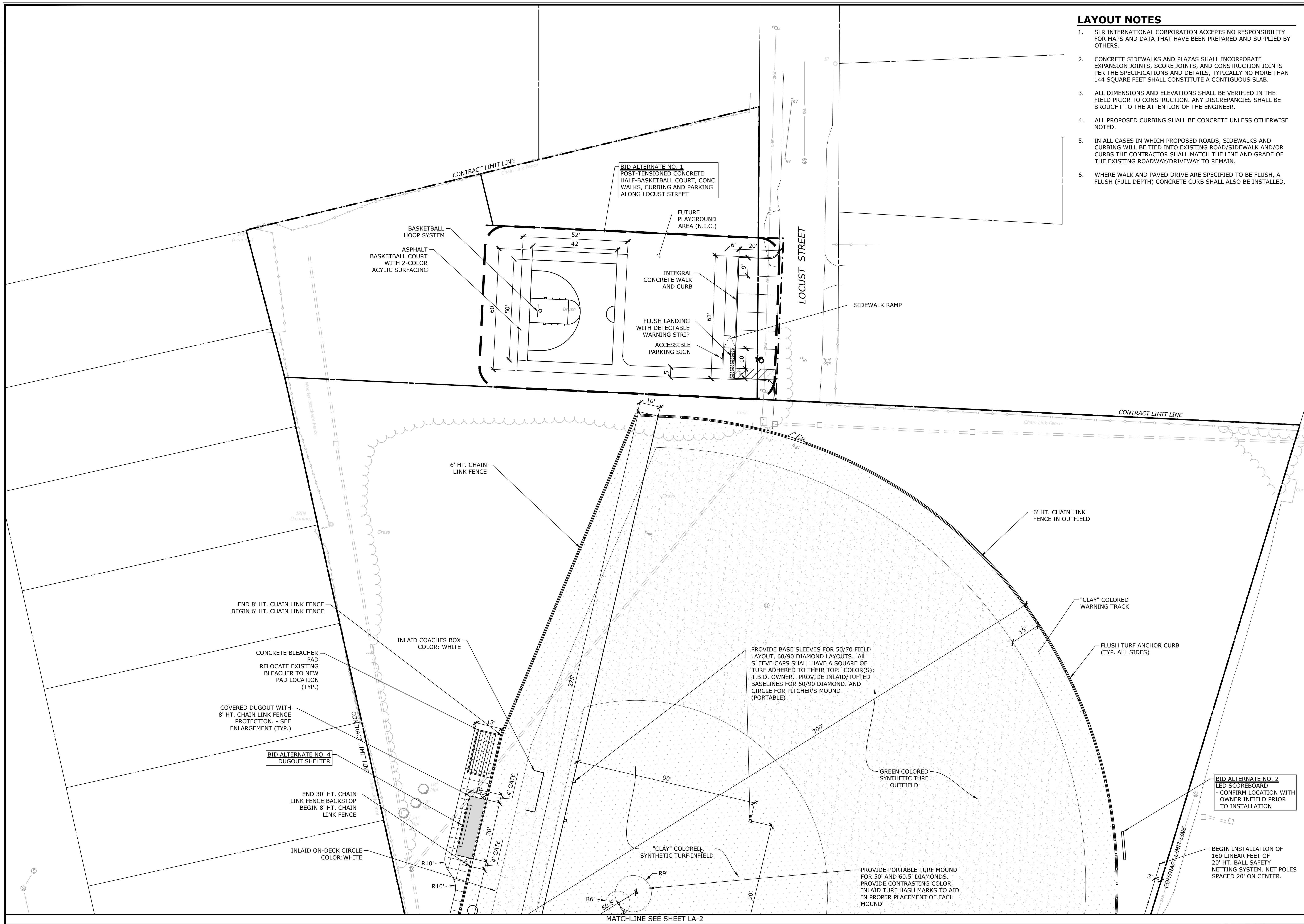


| DESCRIPTION | DATE | BY |
|-------------|------|----|
| | | |
| | | |
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| | | |

SITE PLAN - REMOVALS
NORTH END FIELD
BALLFIELD RECONSTRUCTION
 210 BRITANNIA STREET
 MERIDEN, CONNECTICUT

| | | |
|----------------------------|-------------|----------------|
| KCF DESIGNED | GB DRAWN | KCF CHECKED |
| SCALE 1"=20' | | |
| DATE AUGUST 29, 2022 | | |
| PROJECT NO. 14792.00004 | | |
| SHEET NO. 06 OF 25 | | |
| RM-2 | | |

14792.00004 - 08/29/2022 - 14792.00004 - 08/29/2022 - 14792.00004 - 08/29/2022
 14792.00004 - 08/29/2022 - 14792.00004 - 08/29/2022 - 14792.00004 - 08/29/2022



- ### LAYOUT NOTES
- SLR INTERNATIONAL CORPORATION ACCEPTS NO RESPONSIBILITY FOR MAPS AND DATA THAT HAVE BEEN PREPARED AND SUPPLIED BY OTHERS.
 - CONCRETE SIDEWALKS AND PLAZAS SHALL INCORPORATE EXPANSION JOINTS, SCORE JOINTS, AND CONSTRUCTION JOINTS PER THE SPECIFICATIONS AND DETAILS, TYPICALLY NO MORE THAN 144 SQUARE FEET SHALL CONSTITUTE A CONTIGUOUS SLAB.
 - ALL DIMENSIONS AND ELEVATIONS SHALL BE VERIFIED IN THE FIELD PRIOR TO CONSTRUCTION. ANY DISCREPANCIES SHALL BE BROUGHT TO THE ATTENTION OF THE ENGINEER.
 - ALL PROPOSED CURBING SHALL BE CONCRETE UNLESS OTHERWISE NOTED.
 - IN ALL CASES IN WHICH PROPOSED ROADS, SIDEWALKS AND CURBING WILL BE TIED INTO EXISTING ROAD/SIDEWALK AND/OR CURBS THE CONTRACTOR SHALL MATCH THE LINE AND GRADE OF THE EXISTING ROADWAY/DRIVEWAY TO REMAIN.
 - WHERE WALK AND PAVED DRIVE ARE SPECIFIED TO BE FLUSH, A FLUSH (FULL DEPTH) CONCRETE CURB SHALL ALSO BE INSTALLED.

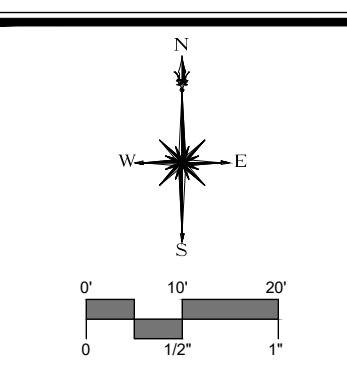
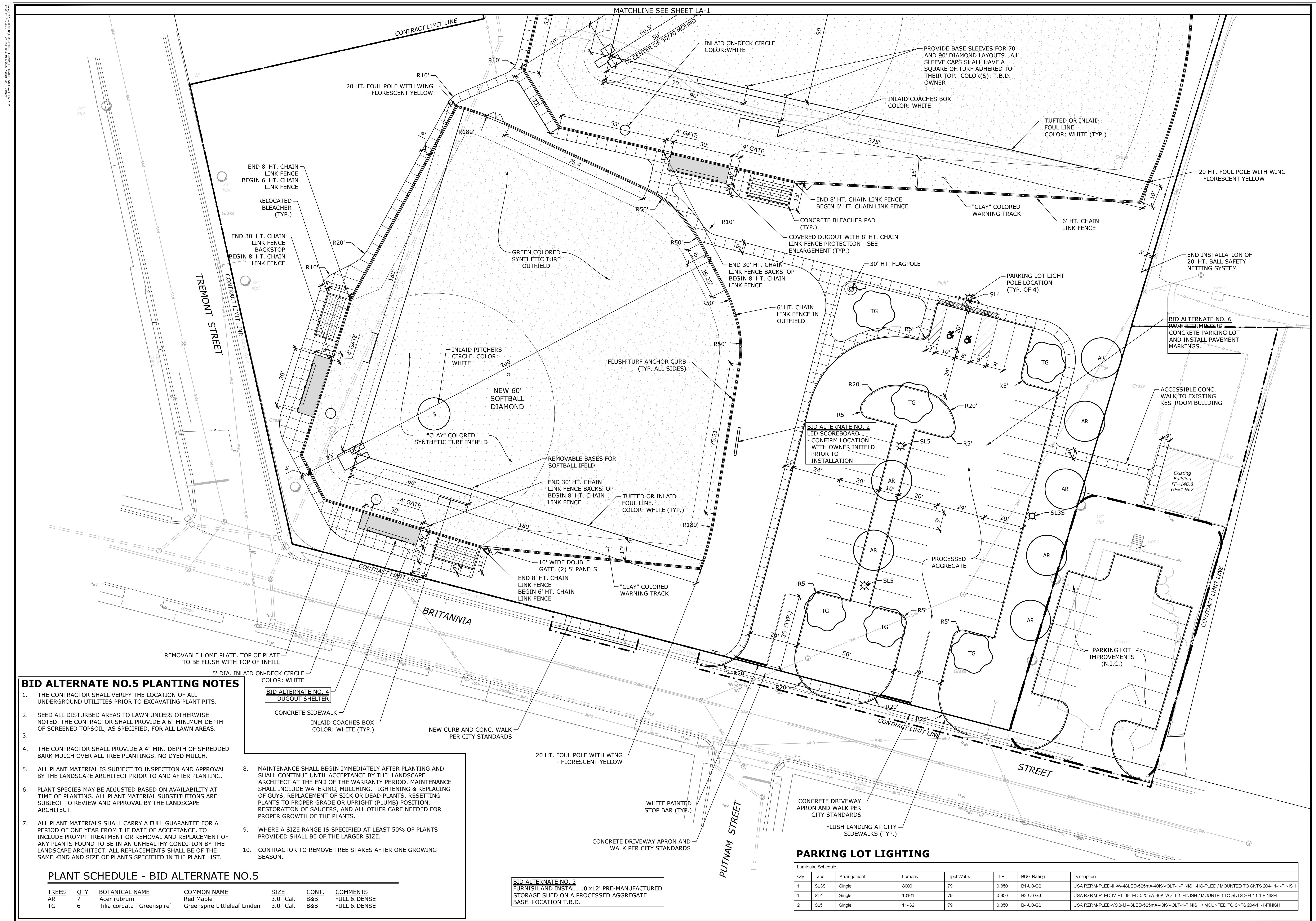


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SITE PLAN - LAYOUT & LANDSCAPING
NORTH END FIELD
BALLFIELD RECONSTRUCTION
 210 BRITANNIA STREET
 MERIDEN, CONNECTICUT

| | | |
|--------------------------|-------|---------|
| KCF | JDL | KCF |
| DESIGNED | DRAWN | CHECKED |
| SCALE: 1"=20' | | |
| DATE: AUGUST 29, 2022 | | |
| PROJECT NO.: 14792.00004 | | |
| SHEET NO.: 07 OF 25 | | |

LA-1
 SHEET NAME



SLR
 99 REAITY DRIVE
 SUITE 1000
 20327177
 SLRCONSULTING.COM

| DESCRIPTION | DATE | BY |
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BID ALTERNATE NO. 6
 DAVE STUMMIGLIUS
 CONCRETE PARKING LOT
 AND INSTALL PAVEMENT
 MARKINGS.

BID ALTERNATE NO. 2
 LED SCOREBOARD
 - CONFIRM LOCATION
 WITH OWNER INFIELD
 PRIOR TO
 INSTALLATION

BID ALTERNATE NO. 4
 DUGOUT SHELTER

BID ALTERNATE NO. 3
 FURNISH AND INSTALL 10'x12' PRE-MANUFACTURED
 STORAGE SHED ON A PROCESSED AGGREGATE
 BASE. LOCATION T.B.D.

BID ALTERNATE NO.5 PLANTING NOTES

1. THE CONTRACTOR SHALL VERIFY THE LOCATION OF ALL UNDERGROUND UTILITIES PRIOR TO EXCAVATING PLANT PITS.
2. SEED ALL DISTURBED AREAS TO LAWN UNLESS OTHERWISE NOTED. THE CONTRACTOR SHALL PROVIDE A 6" MINIMUM DEPTH OF SCREENED TOPSOIL, AS SPECIFIED, FOR ALL LAWN AREAS.
- 3.
4. THE CONTRACTOR SHALL PROVIDE A 4" MIN. DEPTH OF SHREDDED BARK MULCH OVER ALL TREE PLANTINGS. NO DYED MULCH.
5. ALL PLANT MATERIAL IS SUBJECT TO INSPECTION AND APPROVAL BY THE LANDSCAPE ARCHITECT PRIOR TO AND AFTER PLANTING.
6. PLANT SPECIES MAY BE ADJUSTED BASED ON AVAILABILITY AT TIME OF PLANTING. ALL PLANT MATERIAL SUBSTITUTIONS ARE SUBJECT TO REVIEW AND APPROVAL BY THE LANDSCAPE ARCHITECT.
7. ALL PLANT MATERIALS SHALL CARRY A FULL GUARANTEE FOR A PERIOD OF ONE YEAR FROM THE DATE OF ACCEPTANCE, TO INCLUDE PROMPT TREATMENT OR REMOVAL AND REPLACEMENT OF ANY PLANTS FOUND TO BE IN AN UNHEALTHY CONDITION BY THE LANDSCAPE ARCHITECT. ALL REPLACEMENTS SHALL BE OF THE SAME KIND AND SIZE OF PLANTS SPECIFIED IN THE PLANT LIST.
8. MAINTENANCE SHALL BEGIN IMMEDIATELY AFTER PLANTING AND SHALL CONTINUE UNTIL ACCEPTANCE BY THE LANDSCAPE ARCHITECT AT THE END OF THE WARRANTY PERIOD. MAINTENANCE SHALL INCLUDE WATERING, MULCHING, TIGHTENING & REPLACING OF GUYS, REPLACEMENT OF SICK OR DEAD PLANTS, RESETTING PLANTS TO PROPER GRADE OR UPRIGHT (PLUMB) POSITION, RESTORATION OF SAUCERS, AND ALL OTHER CARE NEEDED FOR PROPER GROWTH OF THE PLANTS.
9. WHERE A SIZE RANGE IS SPECIFIED AT LEAST 50% OF PLANTS PROVIDED SHALL BE OF THE LARGER SIZE.
10. CONTRACTOR TO REMOVE TREE STAKES AFTER ONE GROWING SEASON.

BID ALTERNATE NO. 4
 DUGOUT SHELTER

CONCRETE SIDEWALK
 INLAID COACHES BOX
 COLOR: WHITE (TYP.)

REMOVABLE HOME PLATE. TOP OF PLATE
 TO BE FLUSH WITH TOP OF INFILL
 5' DIA. INLAID ON-DECK CIRCLE
 COLOR: WHITE

PLANT SCHEDULE - BID ALTERNATE NO.5

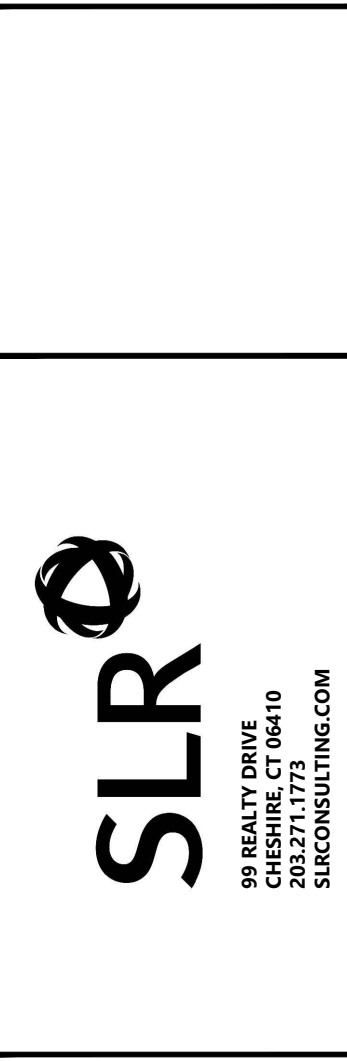
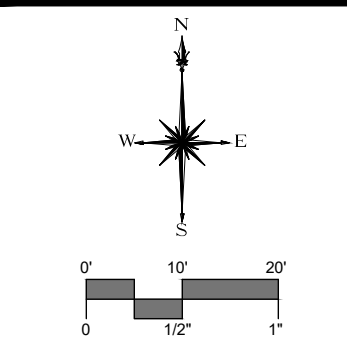
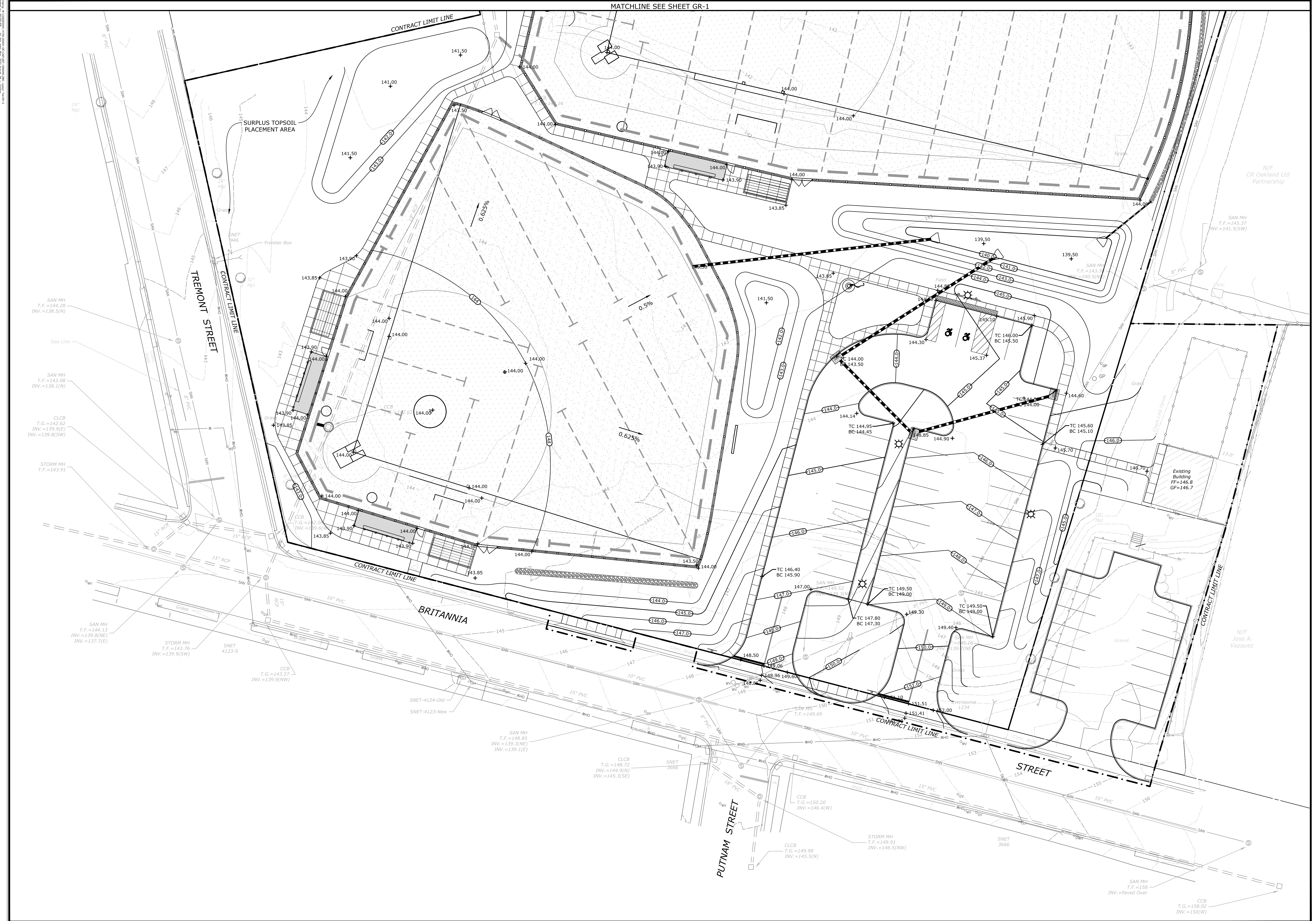
| TREES | QTY | BOTANICAL NAME | COMMON NAME | SIZE | CONT. | COMMENTS |
|-------|-----|----------------------------|------------------------------|-----------|-------|--------------|
| AR | 7 | Acer rubrum | Red Maple | 3.0" Cal. | B&B | FULL & DENSE |
| TG | 6 | Tilia cordata 'Greenspire' | Greenspire Littleleaf Linden | 3.0" Cal. | B&B | FULL & DENSE |

PARKING LOT LIGHTING

| Qty | Label | Arrangement | Lumens | Input Watts | LLF | BUG Rating | Description |
|-----|-------|-------------|--------|-------------|-------|------------|---|
| 1 | SL3S | Single | 8000 | 79 | 0.850 | B1-U0-G2 | USA R2RM-LED-III-W-48LED-525mA-40K-VOLT-1-FINISH-HS-LED / MOUNTED TO SNTS 204-11-1-FINISH |
| 1 | SL4 | Single | 10161 | 79 | 0.850 | B2-U0-G3 | USA R2RM-LED-IV-FT-48LED-525mA-40K-VOLT-1-FINISH / MOUNTED TO SNTS 204-11-1-FINISH |
| 2 | SL5 | Single | 11432 | 79 | 0.850 | B4-U0-G2 | USA R2RM-LED-VSQ-M-48LED-525mA-40K-VOLT-1-FINISH / MOUNTED TO SNTS 204-11-1-FINISH |

SITE PLAN - LAYOUT & LANDSCAPING
 NORTH END FIELD
 BALLFIELD RECONSTRUCTION
 210 BRITANNIA STREET
 MERIDEN, CONNECTICUT

KCF GB KCF
 DESIGNED DRAWN CHECKED
 SCALE 1"=20'
 DATE AUGUST 29, 2022
 PROJECT NO. 14792.00004
 SHEET NO. 08 OF 25
LA-2



| DESCRIPTION | DATE | BY |
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SITE PLAN - GRADING
NORTH END FIELD
BALLFIELD RECONSTRUCTION
 210 BRITANNIA STREET
 MERIDEN, CONNECTICUT

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| KCF | JHH | DLO |
| DESIGNED | DRAWN | CHECKED |

SCALE: 1"=20'
 DATE: AUGUST 29, 2022
 PROJECT NO.: 14792.00004
 SHEET NO.: 10 OF 25

GR-2

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| TEMPORARY SEDIMENT TRAP SIZING SUMMARY | | | | | |
|--|-------------------------------------|-------------------------------|-----------------------------|-----------|------------------------|
| TRAP NO. | CONTRIBUTING DISTURBED AREA (ACRES) | STORAGE VOLUME REQUIRED* (CY) | STORAGE DEPTH REQUIRED (FT) | AREA (SF) | VOLUME PROVIDED** (CY) |
| 1 | 1.49 | 200 | 2 | 3600 | 267 |

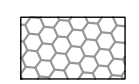


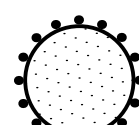

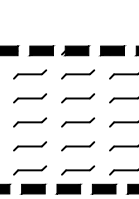
*134 CY STORAGE VOLUME REQUIRED PER ACRE CONTRIBUTING AREA TO TST
 **ONE HALF WET-STORAGE, ONE HALF DRY-STORAGE

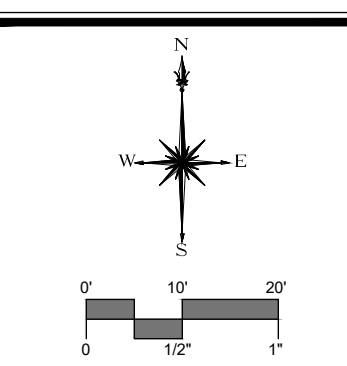
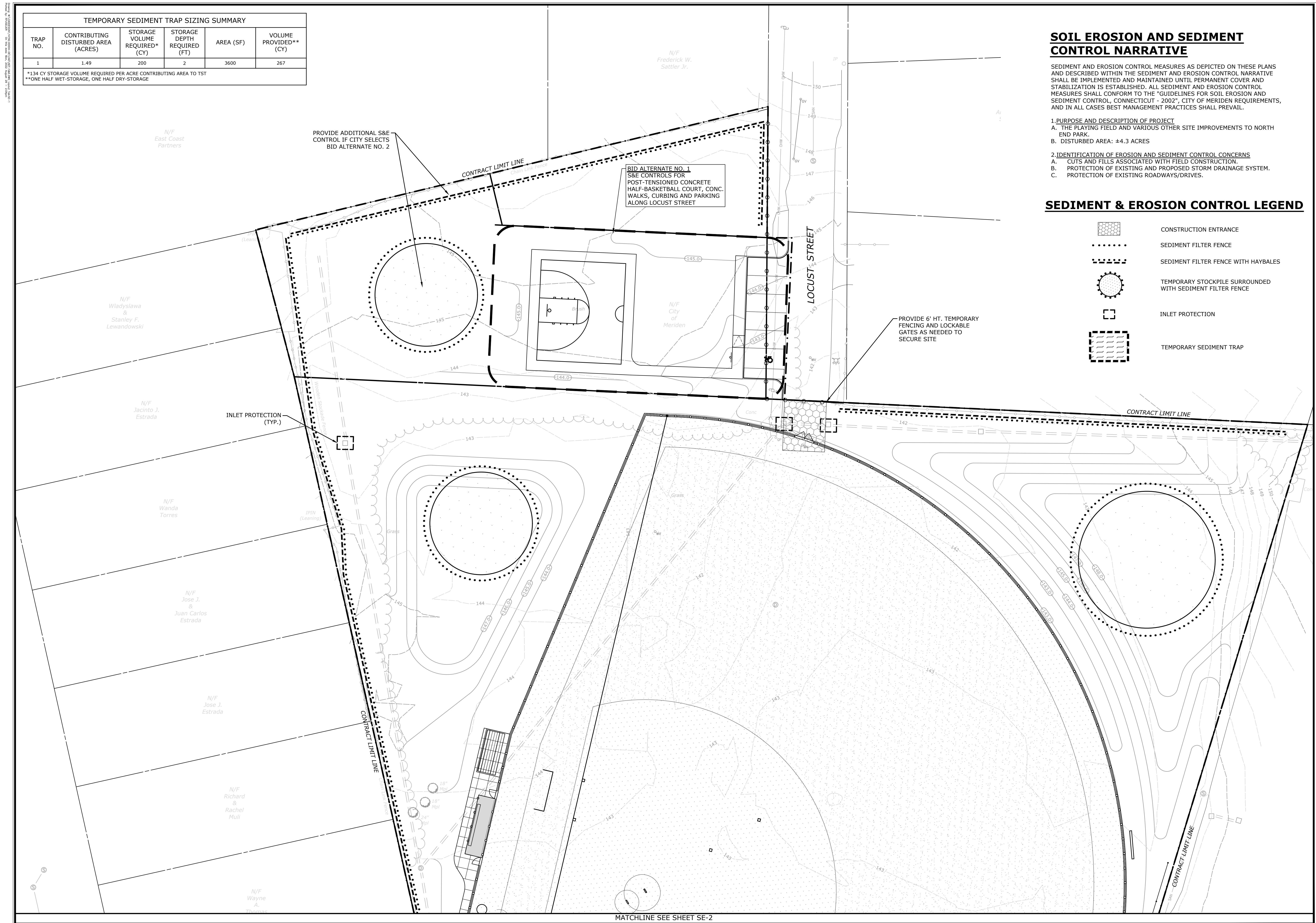
SOIL EROSION AND SEDIMENT CONTROL NARRATIVE

SEDIMENT AND EROSION CONTROL MEASURES AS DEPICTED ON THESE PLANS AND DESCRIBED WITHIN THE SEDIMENT AND EROSION CONTROL NARRATIVE SHALL BE IMPLEMENTED AND MAINTAINED UNTIL PERMANENT COVER AND STABILIZATION IS ESTABLISHED. ALL SEDIMENT AND EROSION CONTROL MEASURES SHALL CONFORM TO THE "GUIDELINES FOR SOIL EROSION AND SEDIMENT CONTROL, CONNECTICUT - 2002", CITY OF MERIDEN REQUIREMENTS, AND IN ALL CASES BEST MANAGEMENT PRACTICES SHALL PREVAIL.

- PURPOSE AND DESCRIPTION OF PROJECT
 - THE PLAYING FIELD AND VARIOUS OTHER SITE IMPROVEMENTS TO NORTH END PARK.
 - DISTURBED AREA: ±4.3 ACRES
- IDENTIFICATION OF EROSION AND SEDIMENT CONTROL CONCERNS
 - CUTS AND FILLS ASSOCIATED WITH FIELD CONSTRUCTION.
 - PROTECTION OF EXISTING AND PROPOSED STORM DRAINAGE SYSTEM.
 - PROTECTION OF EXISTING ROADWAYS/DRIVES.

SEDIMENT & EROSION CONTROL LEGEND

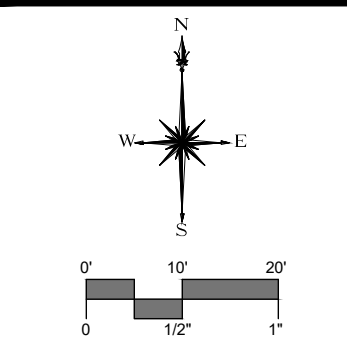
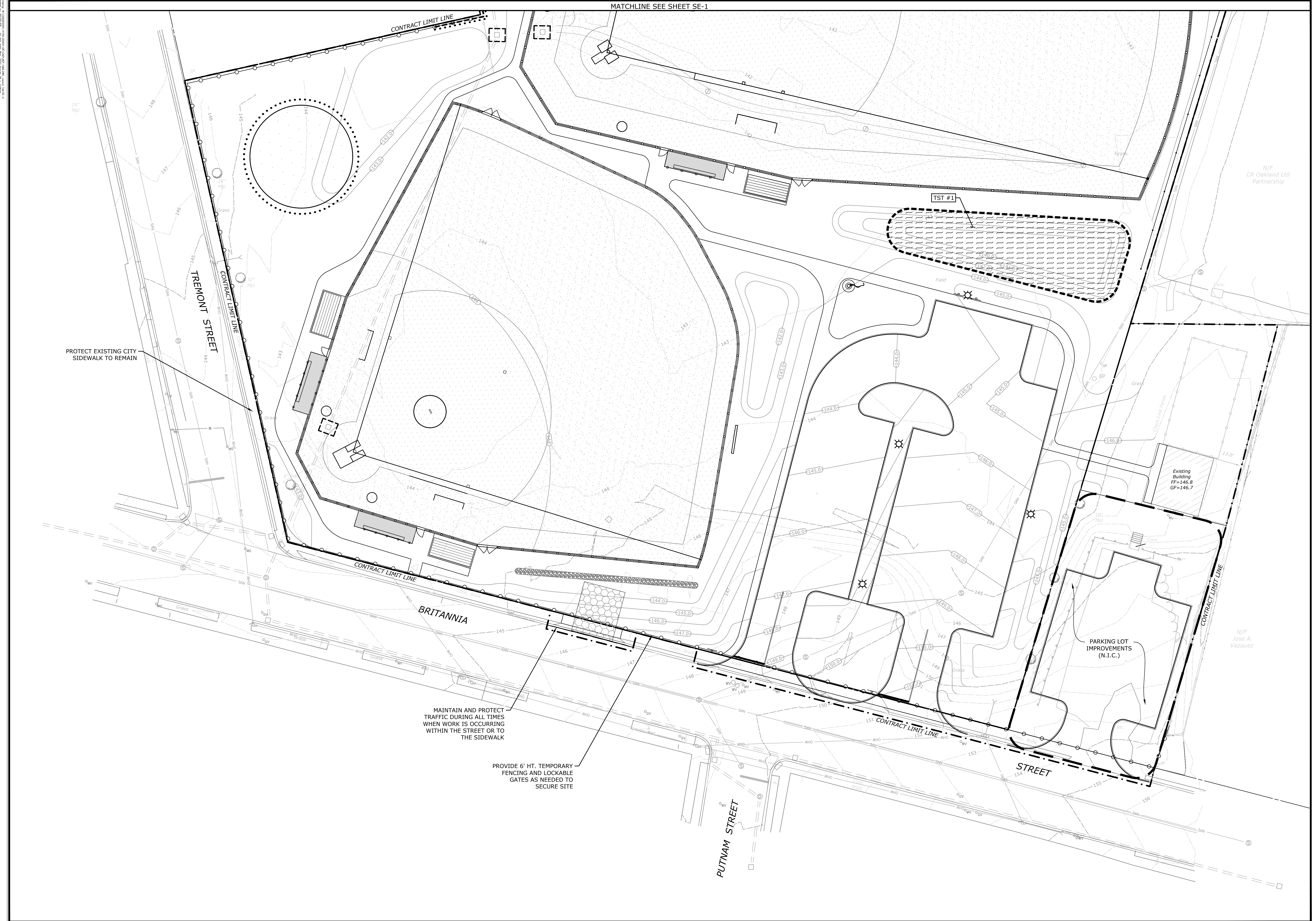
-  CONSTRUCTION ENTRANCE
-  SEDIMENT FILTER FENCE
-  SEDIMENT FILTER FENCE WITH HAYBALES
-  TEMPORARY STOCKPILE SURROUNDED WITH SEDIMENT FILTER FENCE
-  INLET PROTECTION
-  TEMPORARY SEDIMENT TRAP



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SITE PLAN - SEDIMENT AND EROSION CONTROL
 NORTH END FIELD
 BALLFIELD RECONSTRUCTION
 210 BRITANNIA STREET
 MERIDEN, CONNECTICUT

| | | |
|----------------------------|--------------|----------------|
| JLL DESIGNED | KCF DRAWN | DLO CHECKED |
| SCALE 1"=20' | | |
| DATE AUGUST 29, 2022 | | |
| PROJECT NO. 14792.00004 | | |
| SHEET NO. 13 OF 25 | | |
| SE-1 | | |



N/F
CR Oakland Ltd
Partnership

SLR
99 REALTY DRIVE
SUITE 200
MERRIDEN, CT 06461
203.271.1772
SLRCONSULTING.COM

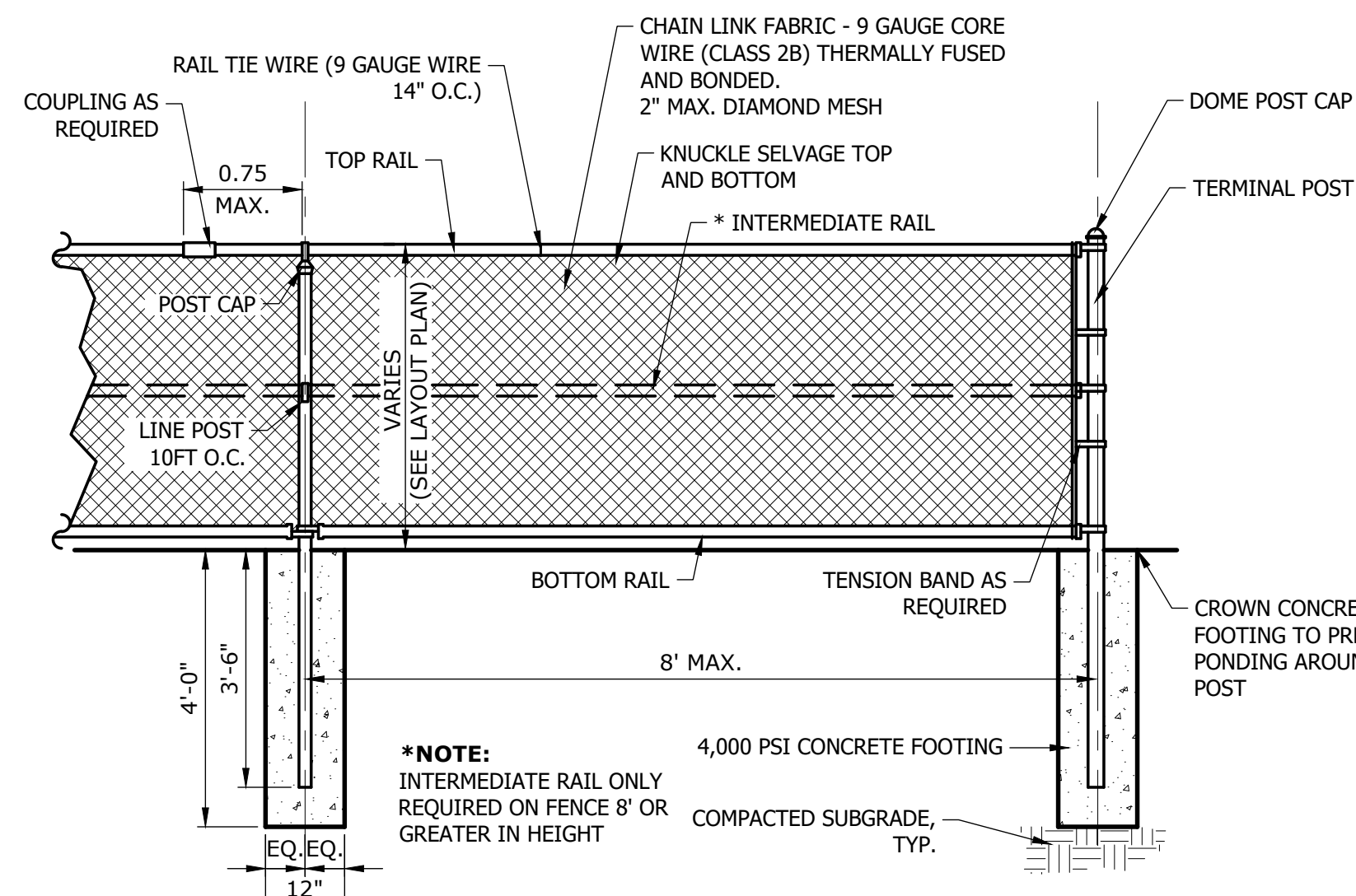
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N/F
Jose A. Vazquez

SITE PLAN - SEDIMENT AND EROSION CONTROL
NORTH END FIELD
BALLFIELD RECONSTRUCTION
210 BRITANNIA STREET
MERRIDEN, CONNECTICUT

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|----------------------------|--------------|----------------|
| JLL DESIGNED | KCF DRAWN | DLO CHECKED |
| SCALE 1"=20' | | |
| DATE AUGUST 29, 2022 | | |
| PROJECT NO. 14792.00004 | | |
| SHEET NO. 14 OF 25 | | |

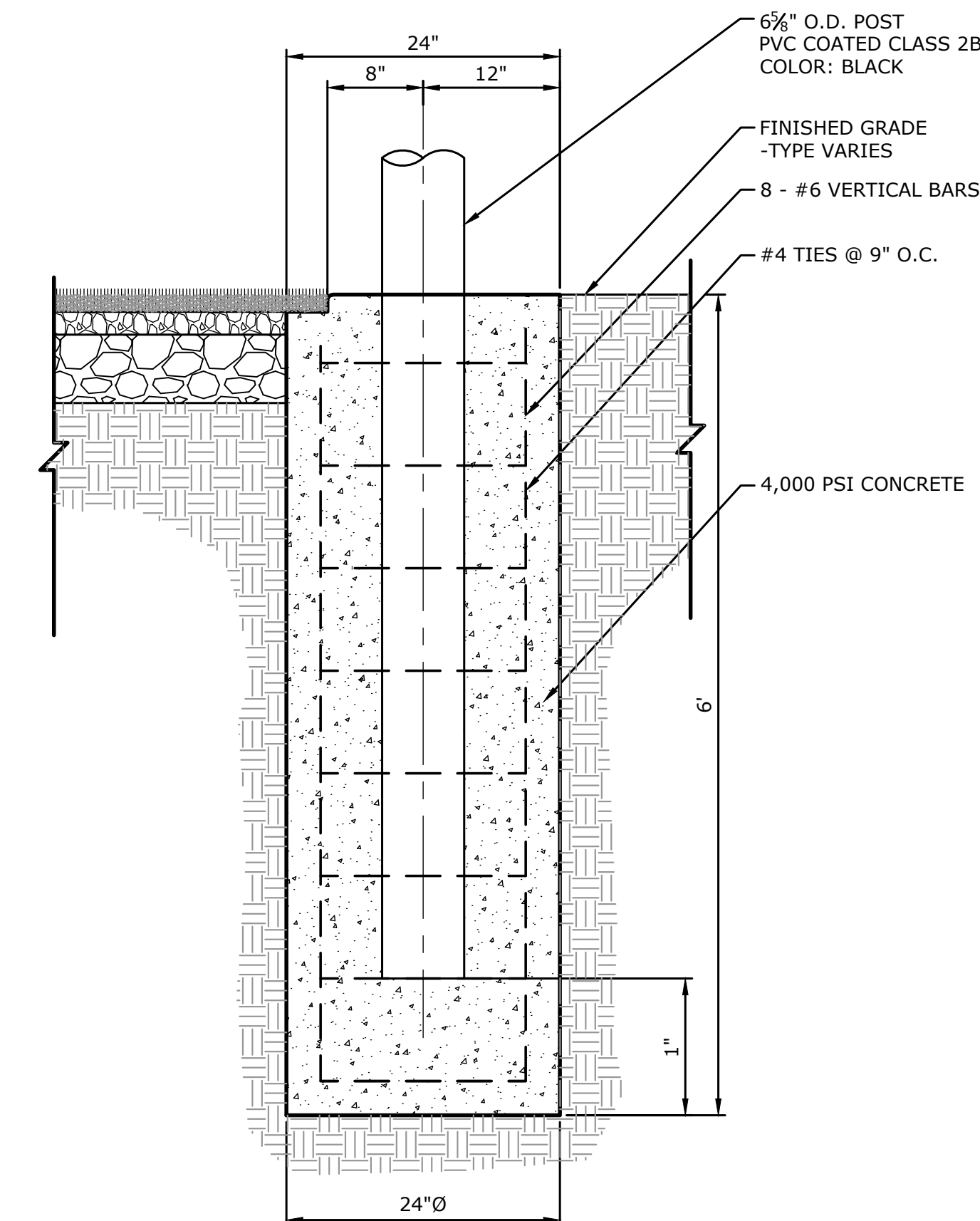
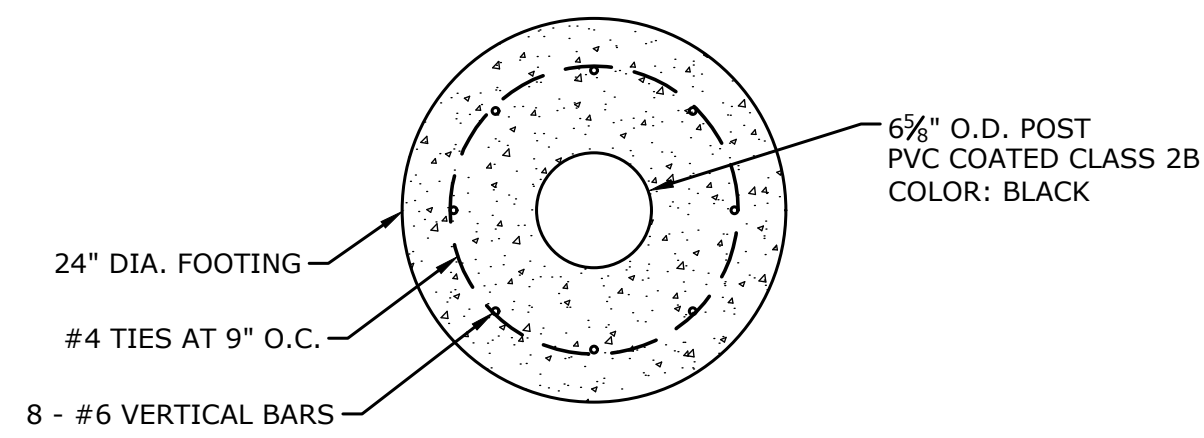
SE-2



| CHAIN LINK FENCE POST AND RAIL SIZING | | |
|---------------------------------------|-----------------|-----------------|
| POST OR RAIL TYPE | 6 FT HIGH FENCE | 8 FT HIGH FENCE |
| TERMINAL OR COMMON | 2-7/8" | 2-7/8" |
| LINE POST | 2-3/8" | 2-3/8" |
| TOP RAIL | 1-5/8" | 1-5/8" |
| INTERMEDIATE RAIL | NONE | 1-5/8" |
| BOTTOM RAIL | 1-5/8" | 1-5/8" |
| GATE POST | 2-7/8" | 2-7/8" |
| GATE FRAME | 1-7/8" | 1-7/8" |

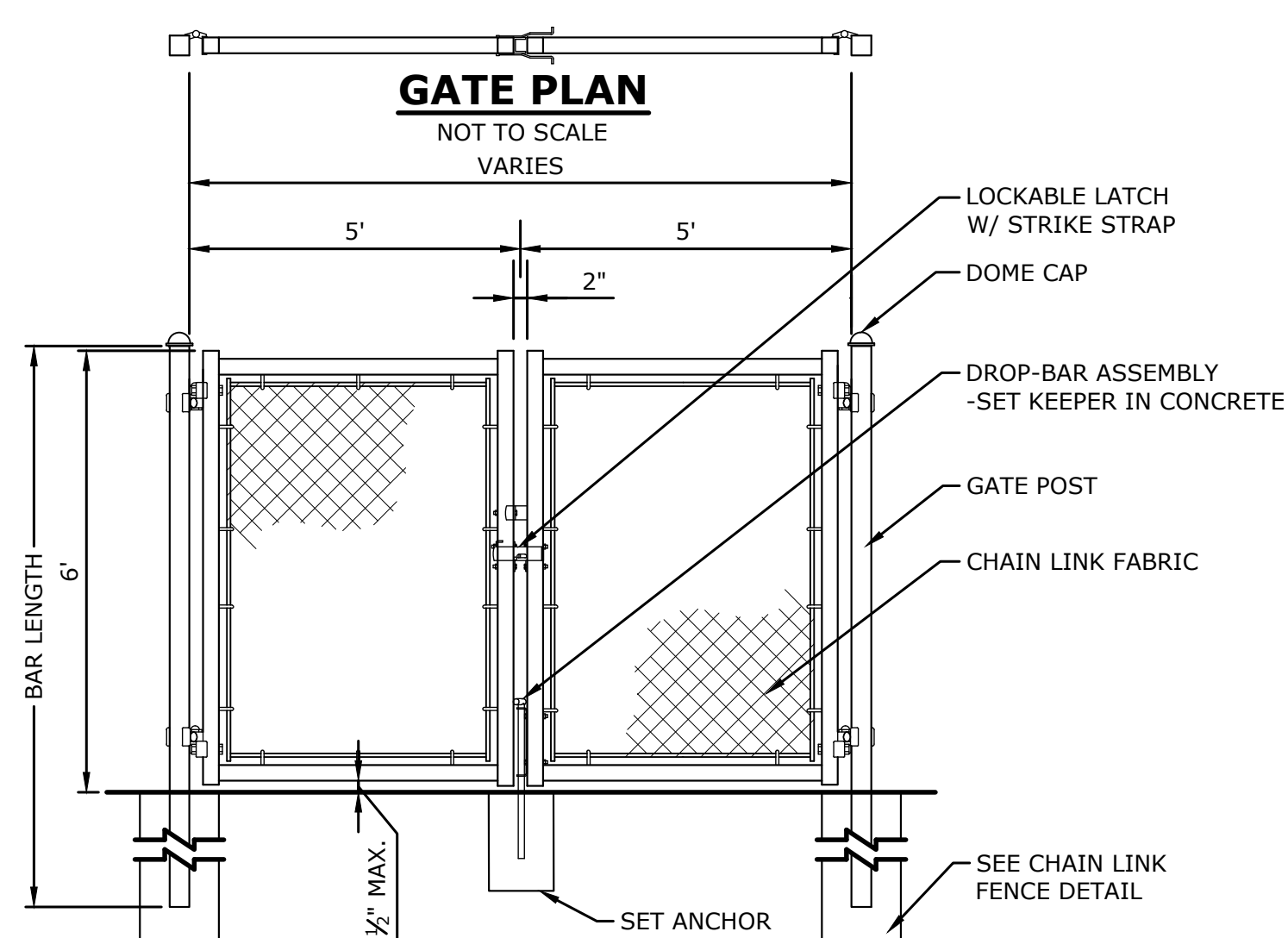
ALL POSTS TO BE ROUND

CHAIN LINK FENCE
NOT TO SCALE



NOTES:
1. REFER TO FLUSH CONCRETE CURB DETAIL THIS SHEET FOR ADDITIONAL INFORMATION.

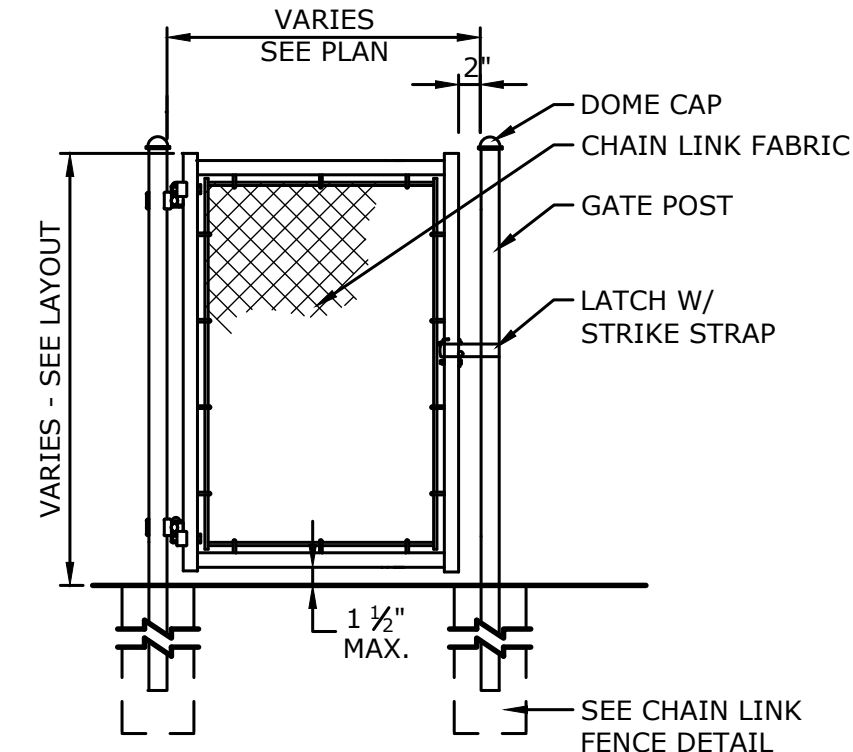
30' BACKSTOP FOUNDATION DETAIL
NOT TO SCALE



DOUBLE CHAIN LINK FENCE GATE
NOT TO SCALE

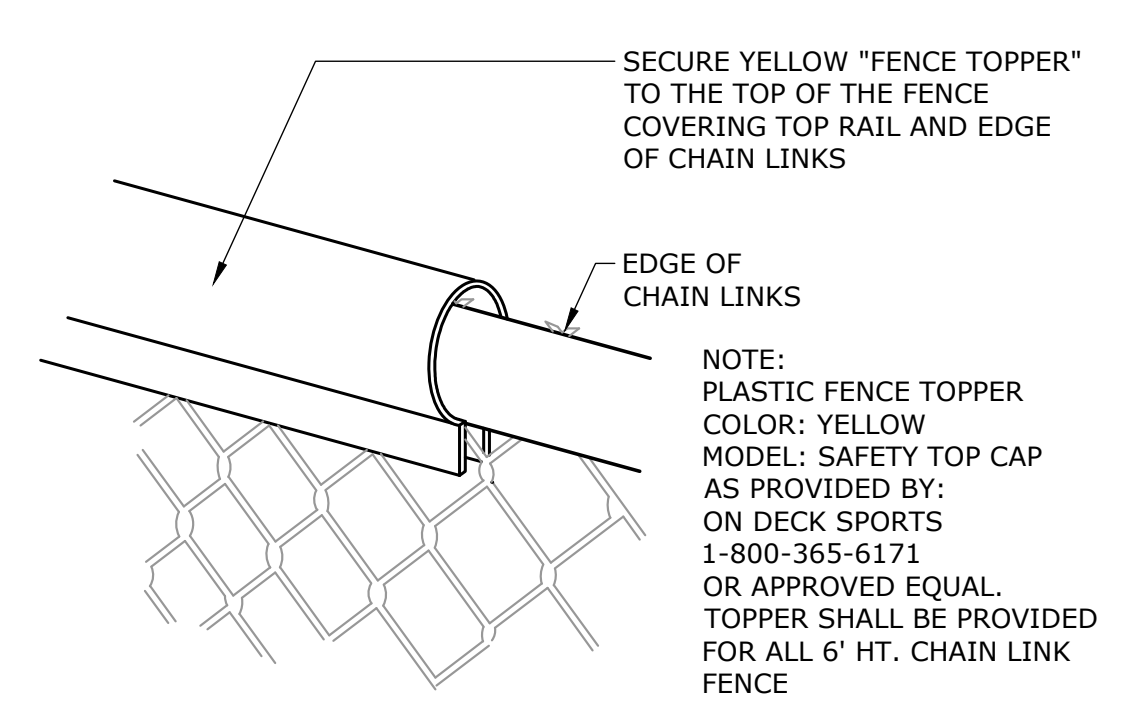
| DOUBLE LEAF GATES | | |
|-------------------|---------------------|---------------------------------------|
| OPENING | GATE POSTS | HINGE SPACE (S) |
| FACE TO FACE | SQ & RND SIZES | POST TO UPRIGHT |
| 10'-0" | 2 7/8" OR 2.875" OD | FOR SQUARE & ROUND GATE POSTS: 2 7/8" |

NOTES:
1. MATERIALS AND METHOD OF CONSTRUCTION SHALL CONFORM TO CHAIN LINK FENCE DETAIL ON THIS SHEET.
2. CONTRACTOR TO SUBMIT SHOP DRAWINGS.
3. ALL CHAIN LINK POSTS, RAILS, FABRIC, AND HARDWARE TO HAVE THERMALLY FUSED AND BONDED PVC. COLOR: BLACK

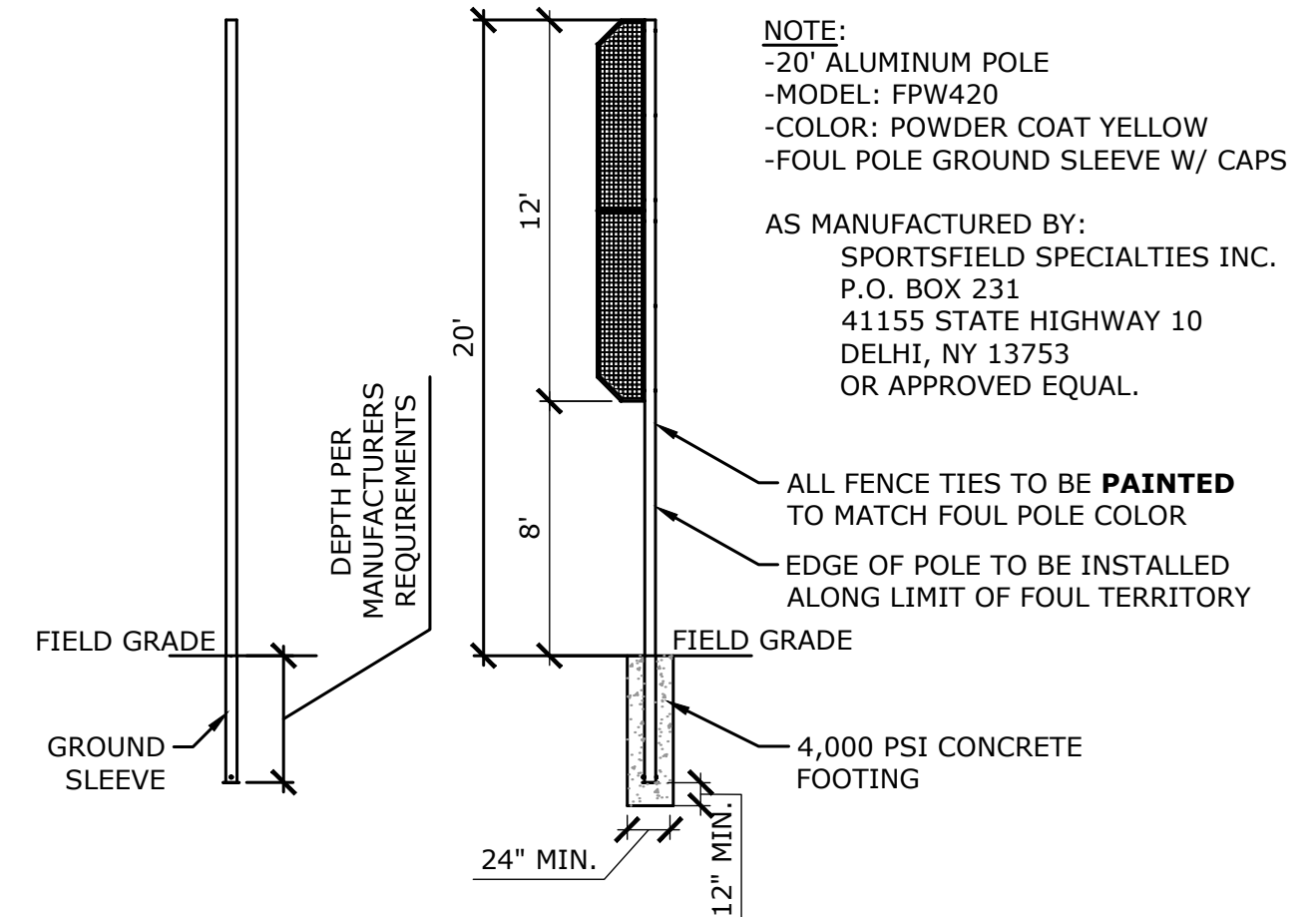


SINGLE CHAIN LINK FENCE GATE
N.T.S.

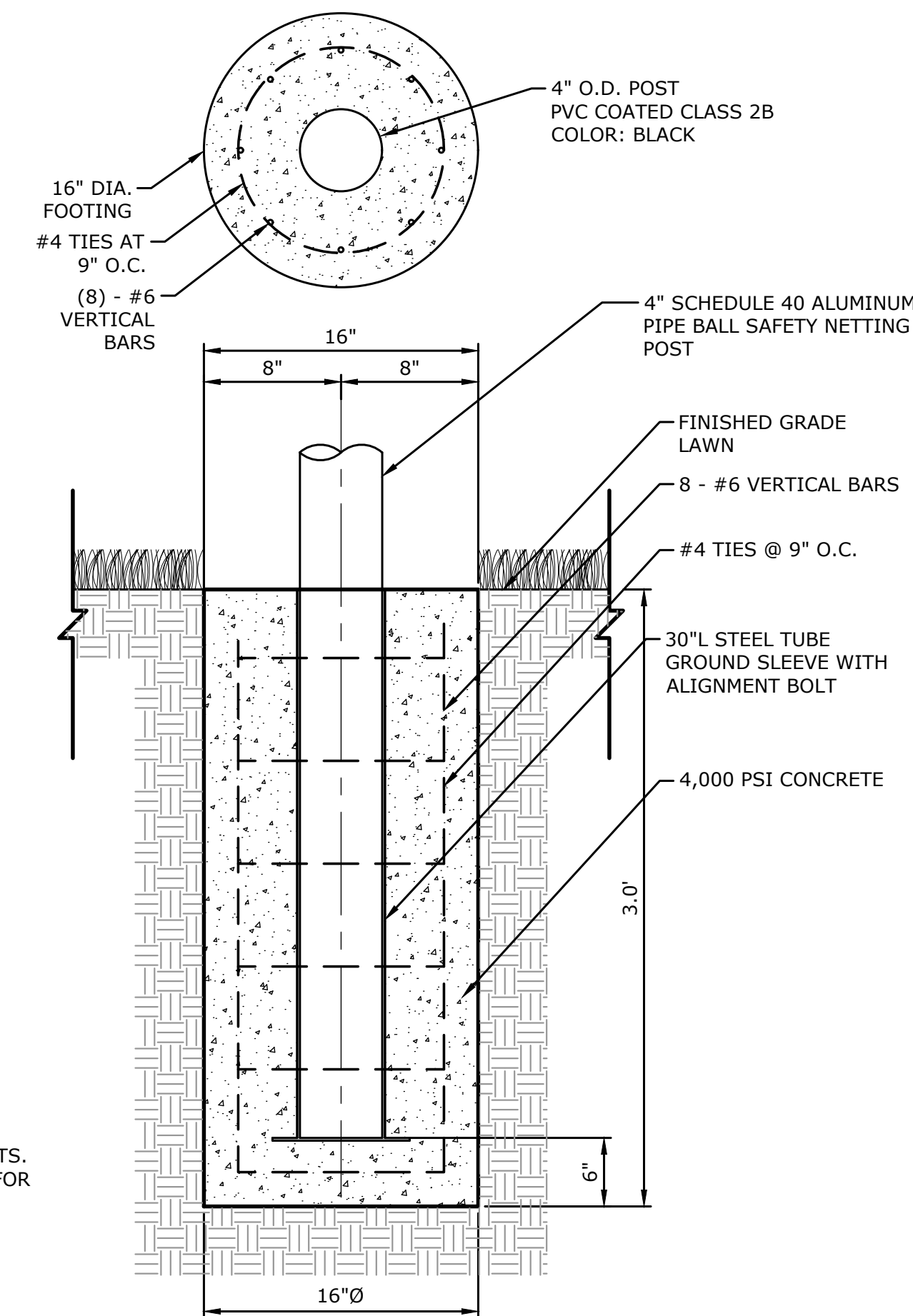
NOTES:
1. MATERIALS AND METHOD OF CONSTRUCTION SHALL CONFORM TO CHAIN LINK FENCE DETAIL ON THIS SHEET
2. CONTRACTOR TO SUBMIT SHOP DRAWINGS
3. GATE SWINGING DIRECTION:
3.1. ALL SWING GATES ADJACENT TO SYNTHETIC TURF SHALL SWING AWAY FROM THE SYNTHETIC TURF SURFACE.
3.2. ALL SWING GATES ADJACENT TO LAWN OR ASPHALT SHALL SWING ONTO THE ASPHALT UNLESS SHOWN OTHERWISE ON THE PLANS.
3.3. PROVIDE STOP AS REQUIRED TO PREVENT SWINGING OF GATE TOWARDS THE SYNTHETIC SURFACE.
4. ALL CHAIN LINK POSTS, RAILS, FABRIC, AND HARDWARE TO HAVE THERMALLY FUSED AND BONDED PVC. COLOR BLACK



FENCE TOPPER
NOT TO SCALE

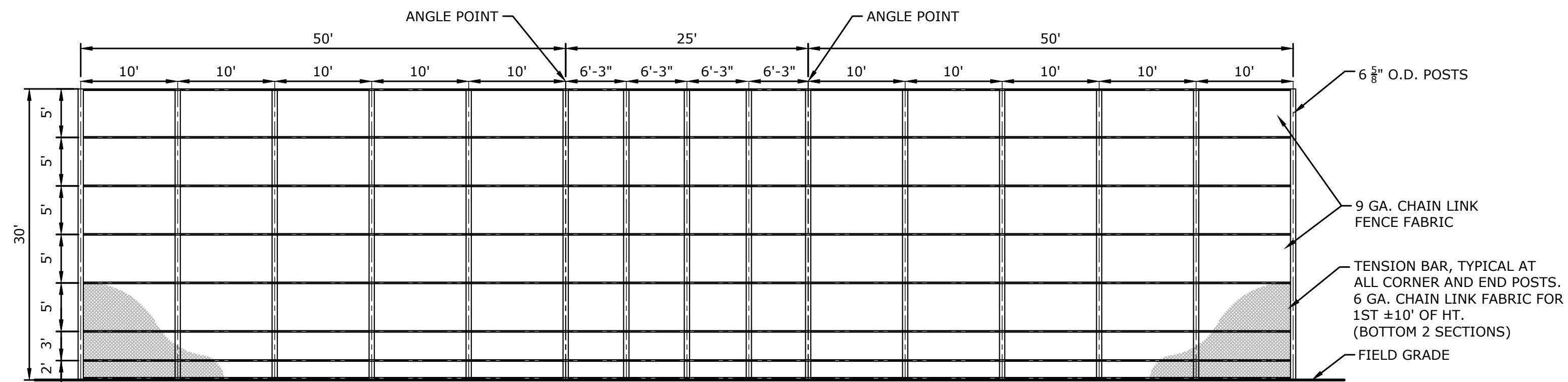


FOUL POLE DETAIL (W/ WING)
NOT TO SCALE

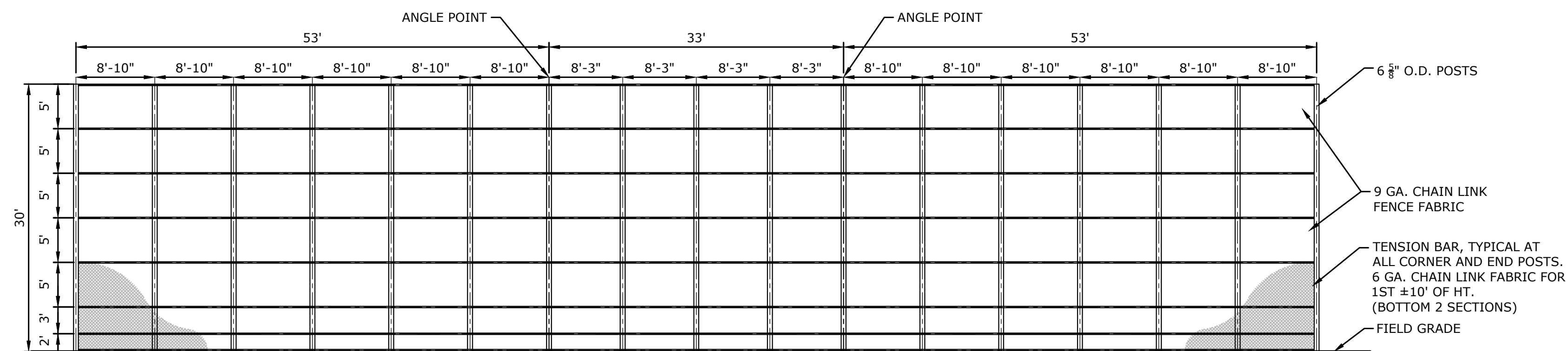


NOTES:
BALL SAFETY NETTING SYSTEM TO BE MODEL: BSS420 AS MANUFACTURED BY: SPORTSFIELD SPECIALTIES OR APPROVED EQUAL. SPACE POSTS AT 20' ON CENTER.

20' HT. BALL SAFETY NETTING
N.T.S.



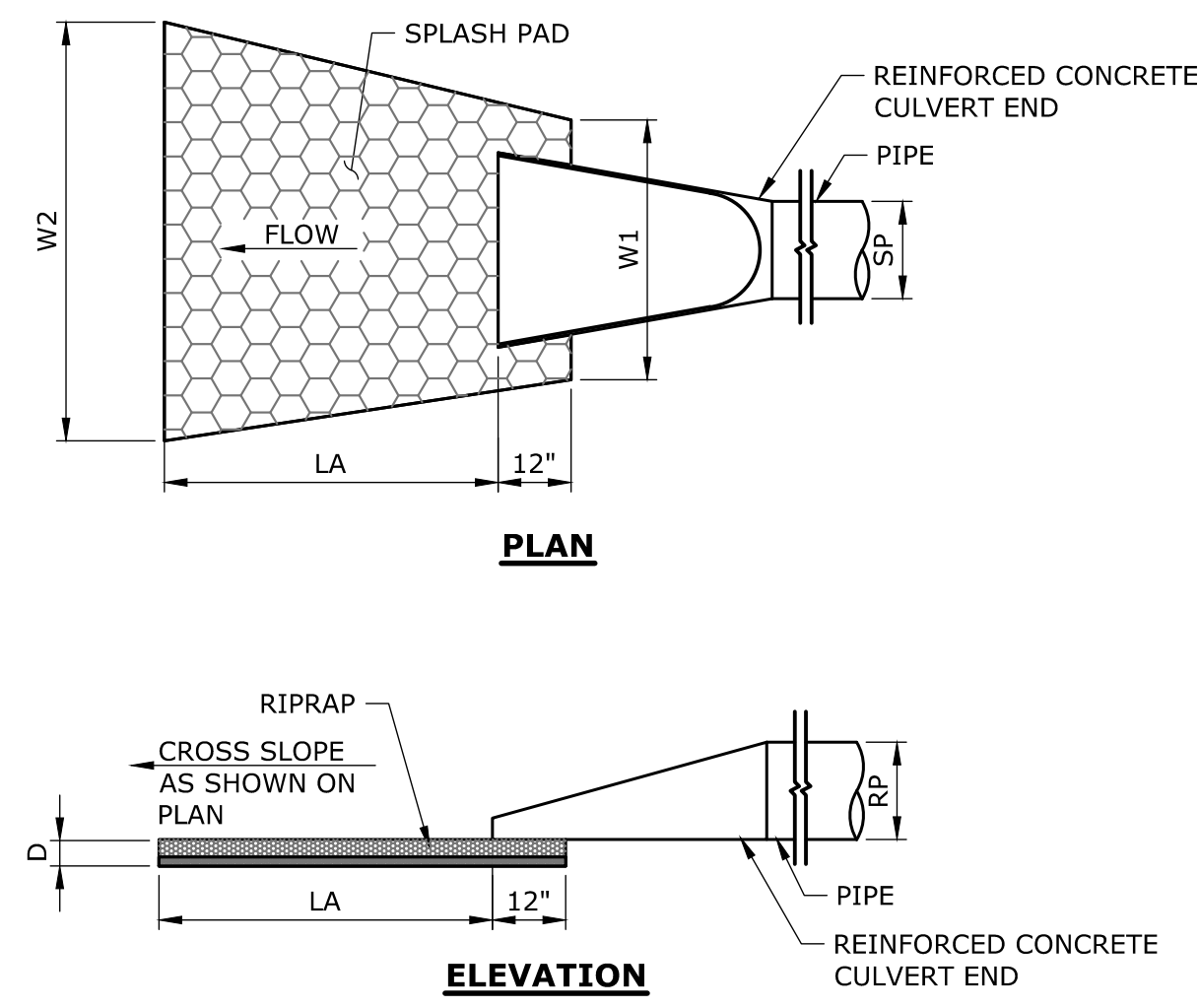
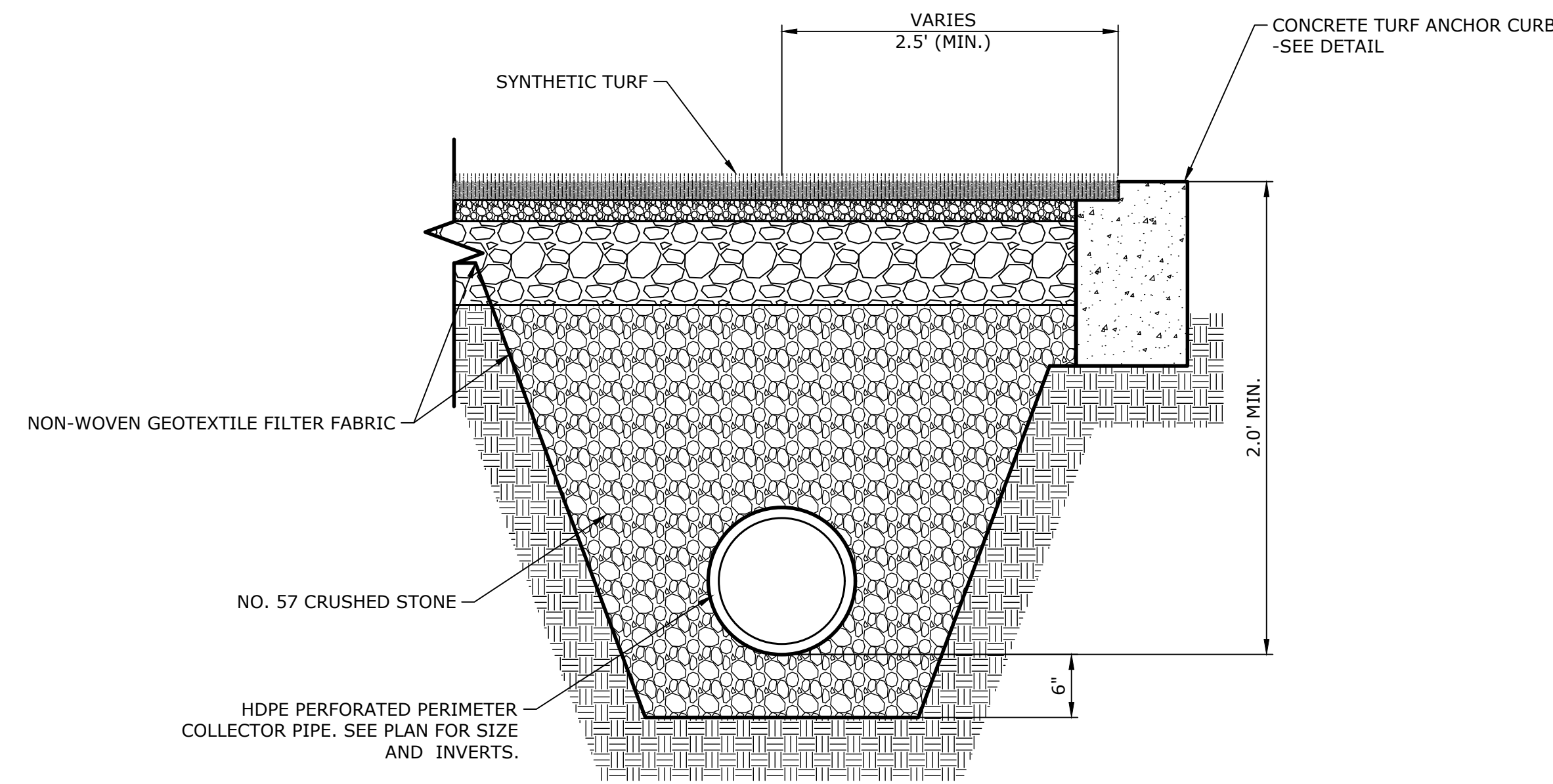
30' HT. CHAIN LINK FENCE SOFTBALL BACKSTOP
N.T.S.



30' HT. CHAIN LINK FENCE BASEBALL BACKSTOP
N.T.S.

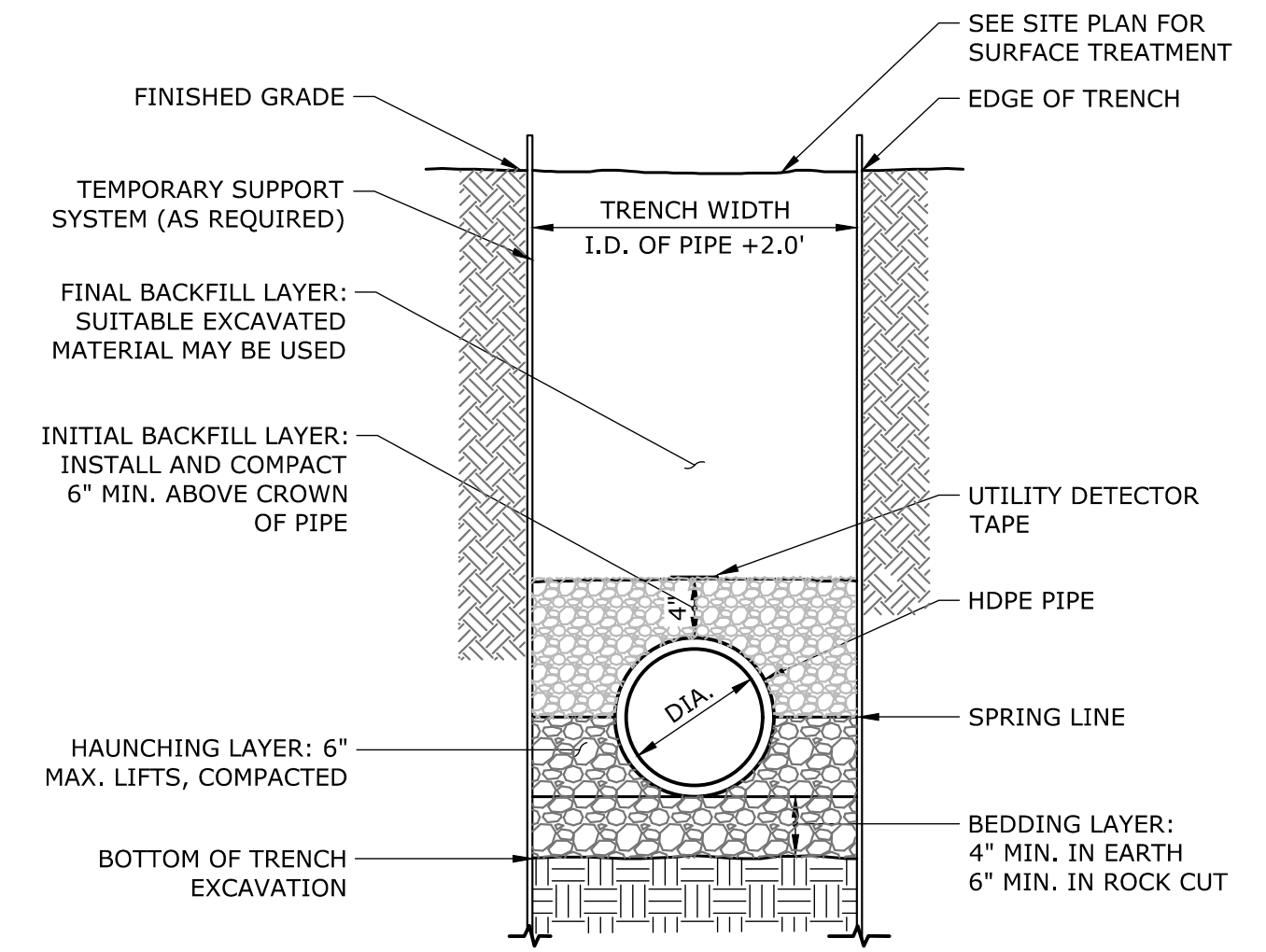
NOTES:
1. CONTRACTOR TO SUBMIT SHOP DRAWINGS FOR APPROVAL.
2. THE GAP BETWEEN THE BOTTOM RAIL AND FINISHED GRADE SHALL NOT EXCEED 1".
3. ALL RAILS SHALL BE 1-5/8" O.D.
4. ALL POSTS, RAILS, FABRIC AND HARDWARE SHALL HAVE A FUSED AND BONDED PVC POWDER COAT, COLOR: BLACK.
5. KNUCKLE SELVAGE OF CHAIN LINK FABRIC, TOP AND BOTTOM.

SHEET NO. 42 (REVISED) DATE: 08/29/2022
 PROJECT: NORTH END FIELD BALLFIELD RECONSTRUCTION
 DRAWN BY: J. B. [unreadable]
 CHECKED BY: [unreadable]



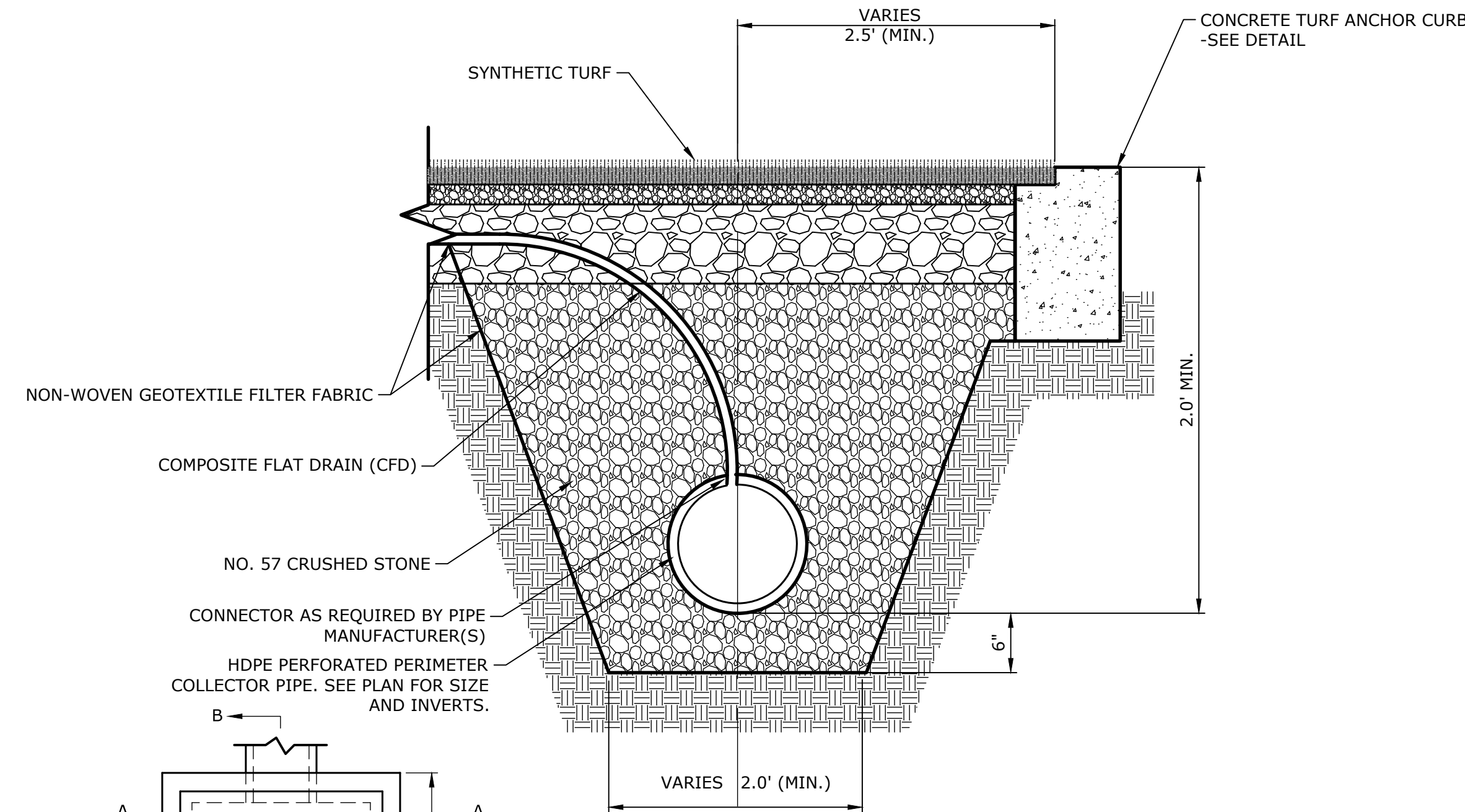
| OUTLET PROTECTION ID | TYPE | SP (FT) | RP (FT) | LA (FT) | W1 (FT) | W2 (FT) | D (IN) |
|----------------------|----------------------|---------|---------|---------|---------|---------|--------|
| FES ANALYSIS POINT C | TYPE B INTER-MEDIATE | 1.25 | 1.25 | 10.0 | 4.0 | 7.0 | 12 |

FLARED END WITH RIP RAP SPLASH PAD
NOT TO SCALE

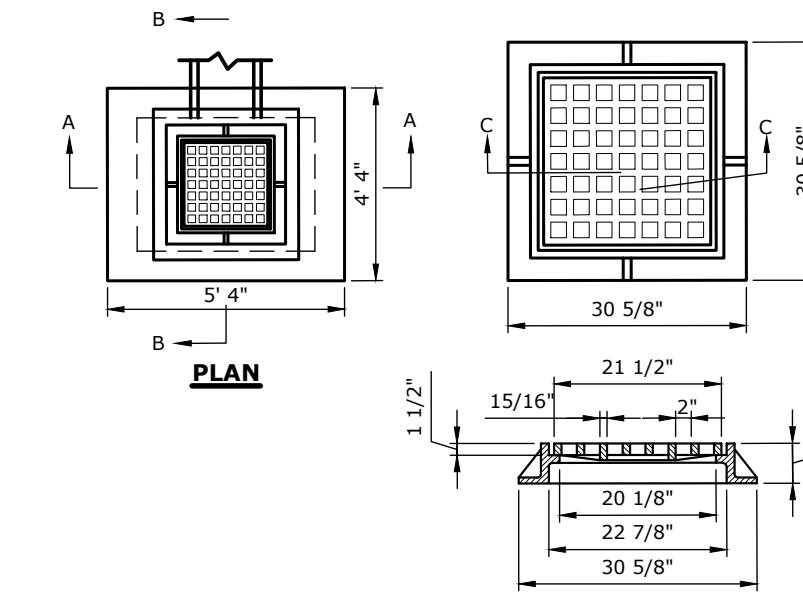


- NOTES:**
- BACKFILL MATERIAL USED IN BEDDING, HAUNCHING, AND INITIAL BACKFILL LAYERS SHALL BE 3/4\"/>
 - PAYMENT LIMIT FOR ROCK IN TRENCH TO BE PIPE DIAMETER + 2.0'

STORM DRAINAGE TRENCH
NOT TO SCALE

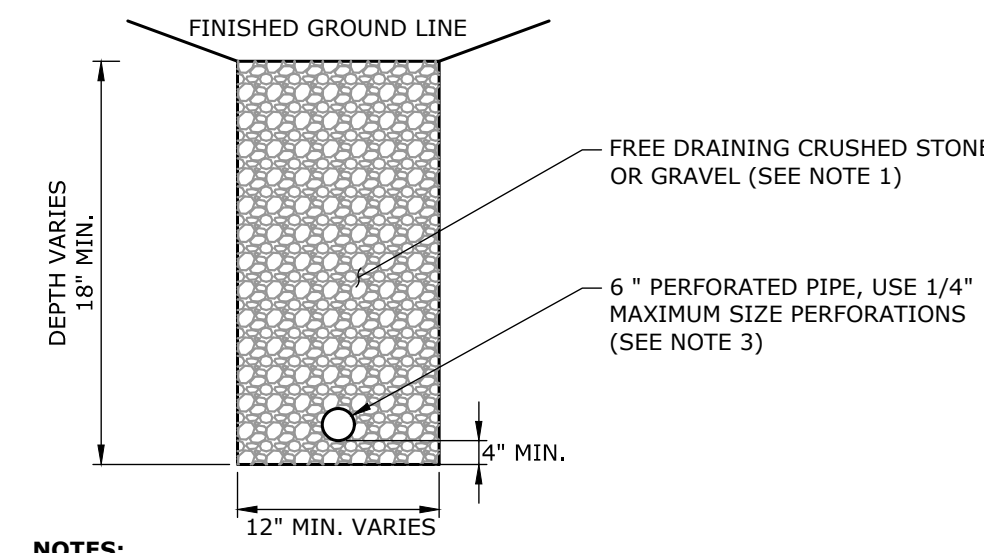


COLLECTOR PIPE SECTION
NOT TO SCALE



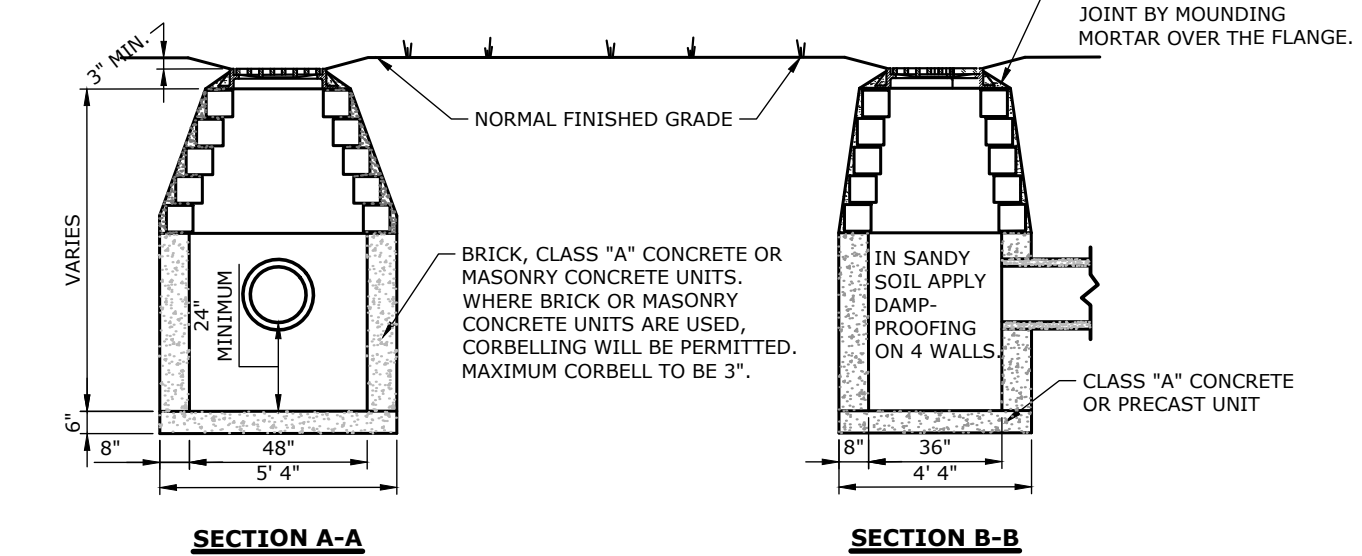
- NOTES:**
- YARD DRAIN FRAMES & GRATES SHALL BE PATTERN #R-3404 AS MANUFACTURED BY THE "NEENAH FOUNDRY COMPANY" OF NEENAH, WISCONSIN, OR APPROVED EQUAL.

YARD DRAIN FRAME & GRATE
NOT TO SCALE



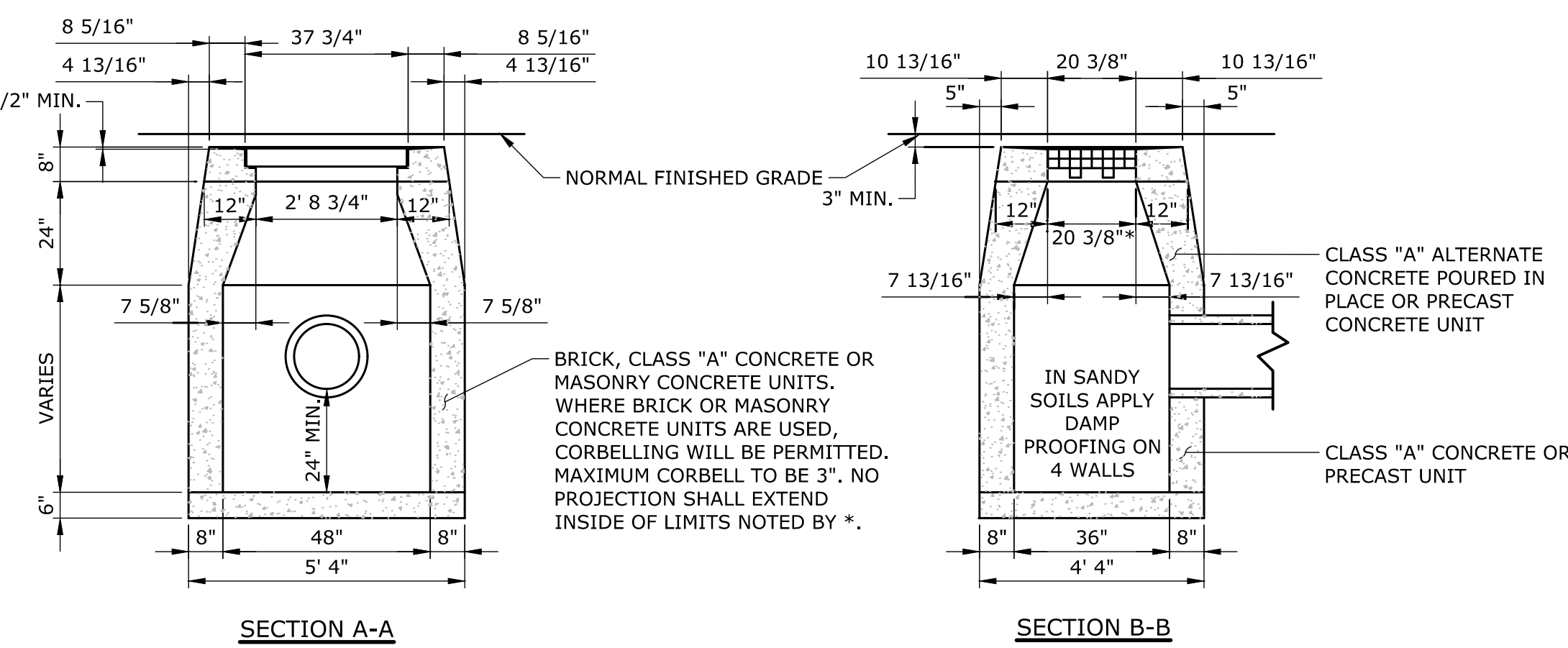
- NOTES:**
- SEE NARRATIVE FOR GRADATION REQUIREMENTS, ENVELOPE AND FILTER MATERIALS.
 - IF SURFACE WATER IS TO BE INTERCEPTED, EXTEND CRUSHED STONE OR GRAVEL TO THE GROUND SURFACE.
 - CONDUIT MAY BE HEAVY DUTY PERFORATED HIGH DENSITY POLYETHYLENE OR DRILLED P.V.C. SPR 35

FRENCH DRAIN
NOT TO SCALE



- NOTES:**
- WHERE PRECAST CONCRETE UNIT IS USED FOR SUMP, THE TOP OF THE UNIT SHALL BE AT LEAST 6\"/>

YARD DRAIN
NOT TO SCALE



- NOTES:**
- WHERE PRECAST CONCRETE UNIT IS USED FOR SUMP, THE TOP OF THE UNIT SHALL BE AT LEAST 6\"/>

TYPE "C-L" CATCH BASIN
NOT TO SCALE

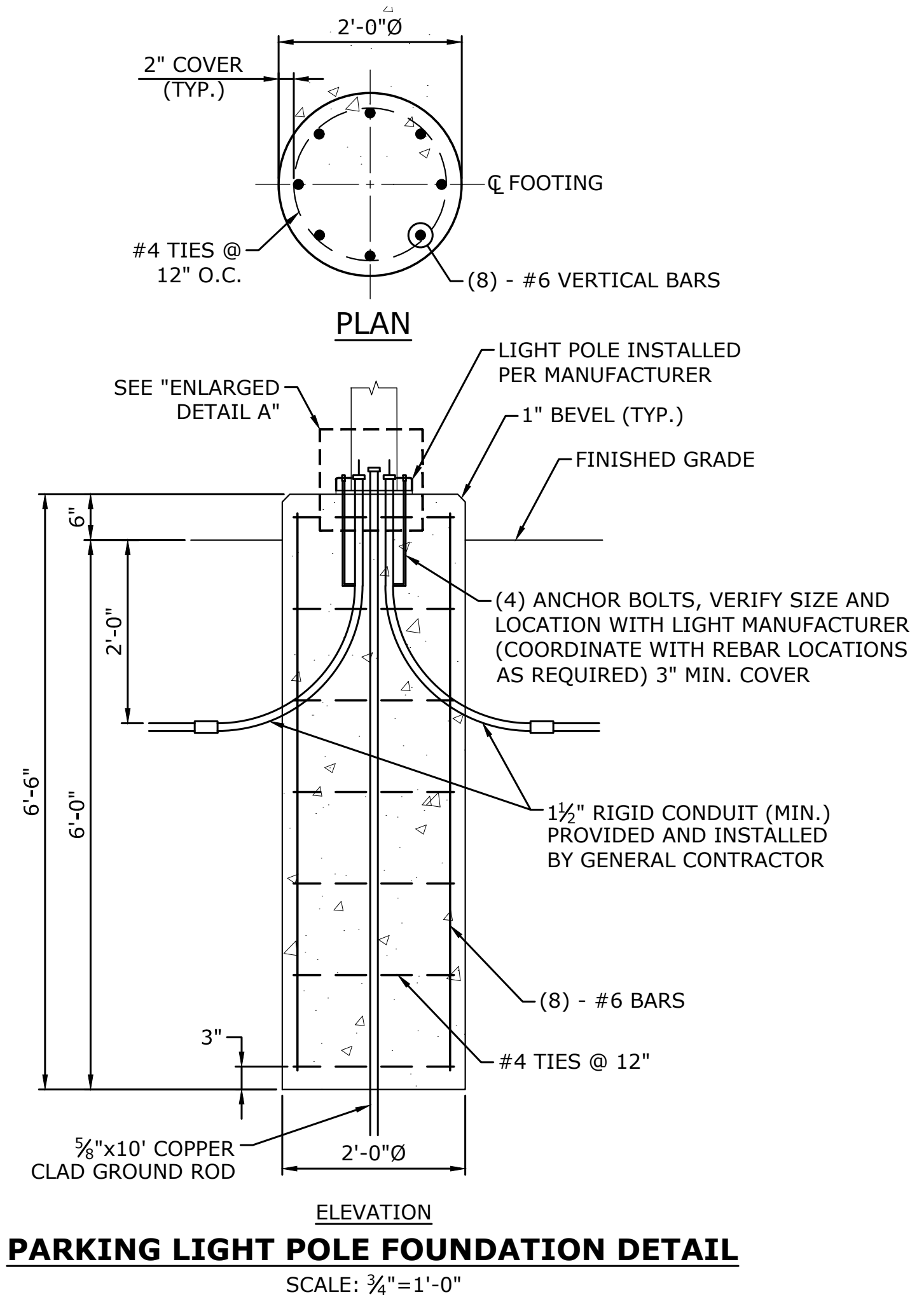


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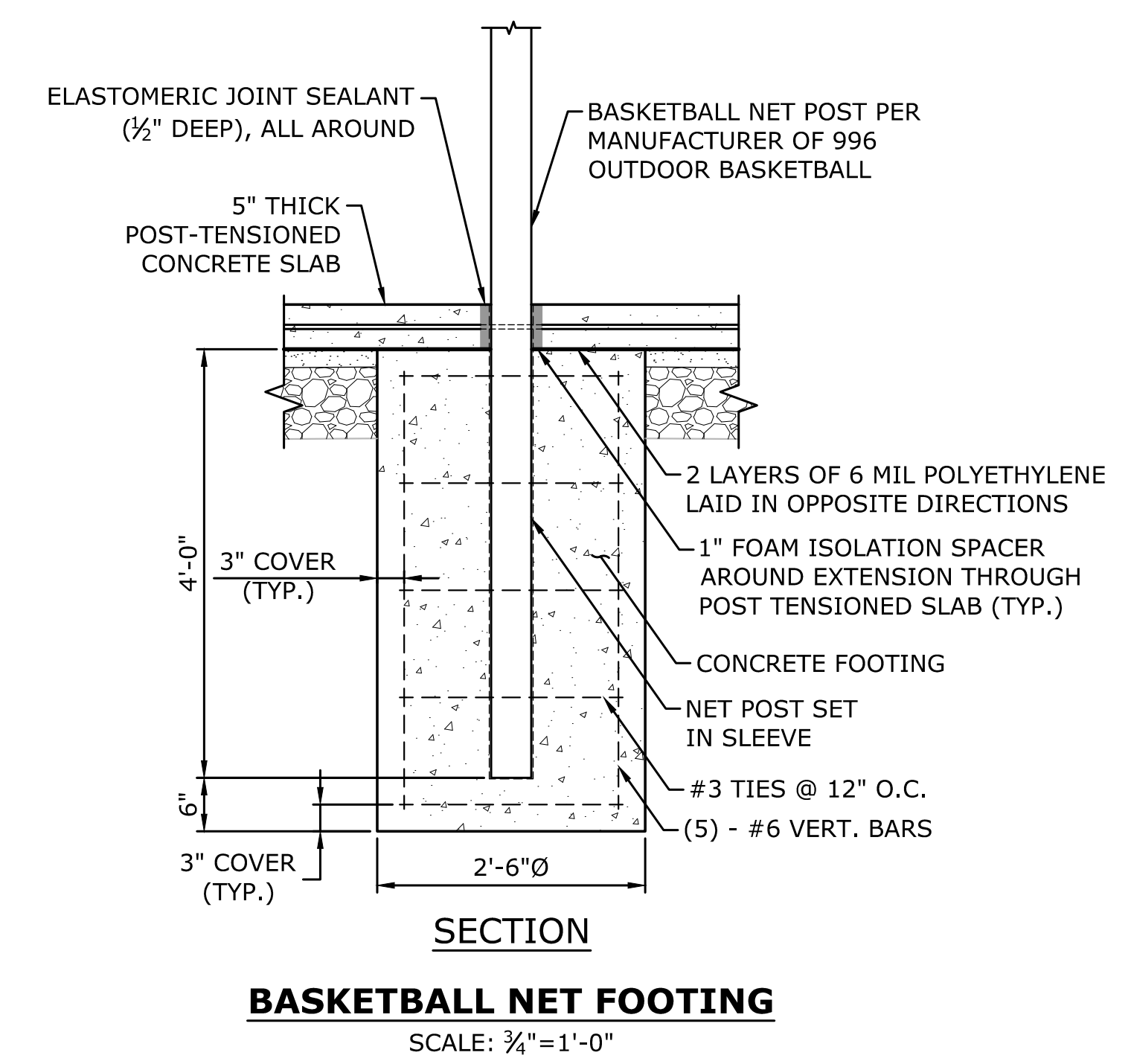
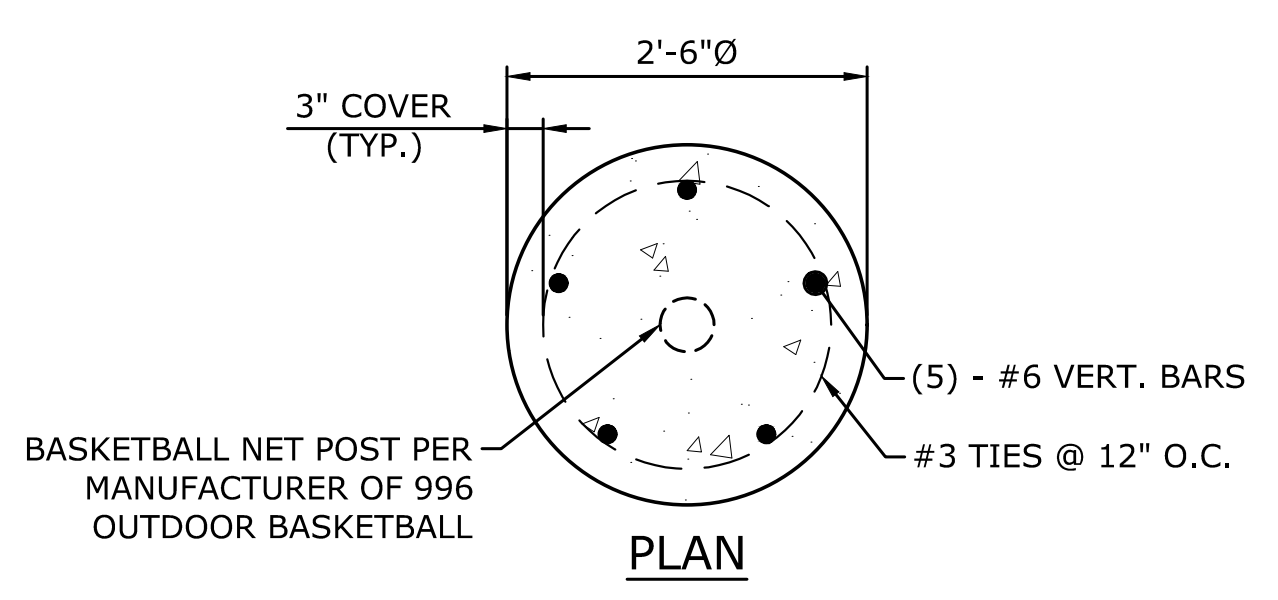
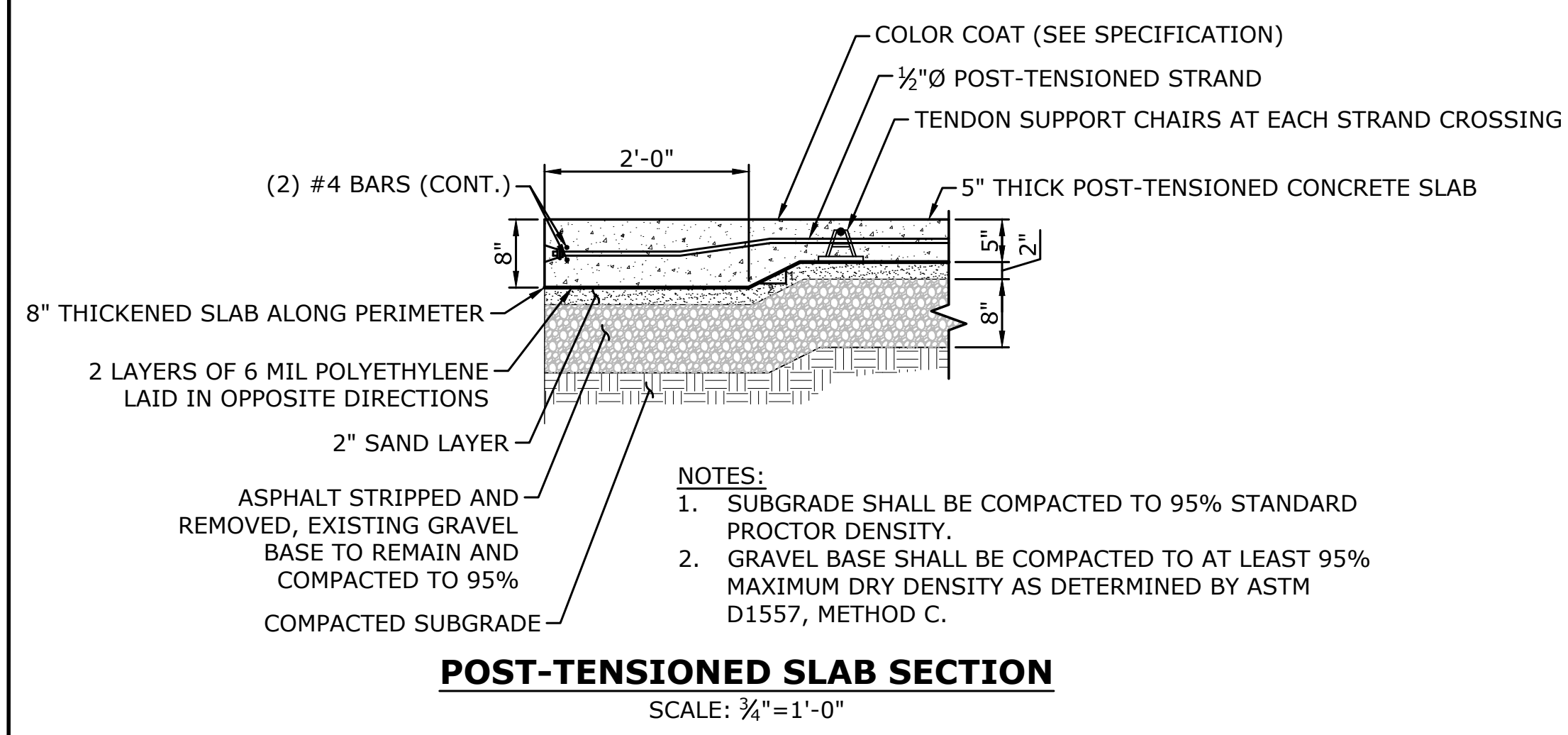
SITE DETAILS
 NORTH END FIELD
 BALLFIELD RECONSTRUCTION
 210 BRITANNIA STREET
 MERIDEN, CONNECTICUT

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|--------------------------|-------|---------|
| KCF | GB | KCF |
| DESIGNED | DRAWN | CHECKED |
| SCALE: N.T.S. | | |
| DATE: AUGUST 29, 2022 | | |
| PROJECT NO.: 14792.00004 | | |
| SHEET NO.: 19 OF 25 | | |

SD-4



BID ALTERNATE NO.1 - POST-TENSIONED BASKETBALL COURT



GENERAL NOTES FOR POST-TENSIONED CONCRETE SLAB SYSTEM:

- CONTRACTOR PERFORMING WORK SHALL HAVE A MINIMUM LEVEL 1 CERTIFICATION FROM THE POST TENSIONING INSTITUTE.
- ALL POST-TENSIONING MATERIALS SHALL BE SUPPLIED BY A POST-TENSIONING INSTITUTE (PTI) CERTIFIED PLANT.
- SPECIFICATIONS: LATEST POST-TENSIONING INSTITUTE (PTI) SPECIFICATIONS FOR UNBONDED SINGLE STRAND TENDONS AND LATEST ACI 423.7 SPECIFICATION FOR UNBONDED SINGLE-STRAND TENDON MATERIALS.
- INSTALL TENDONS ACCORDING TO INSTALLATION DRAWINGS AND PROCEDURES IN PTI'S "FIELD PROCEDURES MANUAL FOR UNBONDED SINGLE STRAND TENDONS."
- CONCRETE FOOTINGS: BASKETBALL POST SLEEVE SHALL BE PLACED IN INDEPENDENT ISOLATED CONCRETE FOOTINGS AND INSTALLED PRIOR TO PLACEMENT OF POST-TENSIONED CONCRETE SLAB. POST SHALL BE SEPARATED FROM THE SLAB BY A SEALED EXPANSION JOINT.
- POLYETHYLENE SHEETING: TWO (2) LAYERS OF 6 MIL POLY SHEETING LAID IN OPPOSITE DIRECTIONS SHALL COVER ENTIRE COURT AREA UNDER SLAB.
- POST-TENSIONED STRANDS: STRANDS SHALL BE 7 WIRE 1/2" DIAMETER LOW RELAXATION SHEATHED STRANDS CONFORMING TO THE REQUIREMENTS OF ASTM A416, LATEST REVISION, WITH A GUARANTEED MINIMUM ULTIMATE STRENGTH OF 270,000 PSI. JACKING FORCE SHALL BE 33,000 LBS/STRAND.
- STRANDS SHALL BE COATED WITH A RUST PREVENTIVE LUBRICANT AND ENCASED IN AN EXTRUDED PLASTIC SLIPPAGE SHEATHING. THE SHEATHING THICKNESS SHALL BE A MINIMUM OF 0.050 INCHES (50 MILS). AFTER INSTALLING FORMS AND PRIOR TO CONCRETE PLACEMENT, SHEATHING SHALL BE INSPECTED. DAMAGED AREAS SHALL BE REPAIRED BY RESTORING TENDON COATING AND REPAIRING SHEATHING. REPAIRS SHALL BE WATERTIGHT AND WITHOUT AIR SPACES. TAPE REPAIR PROCEDURES FOR SHEATHING SHALL CONFORM TO PTI'S "FIELD PROCEDURES MANUAL FOR UNBONDED SINGLE STRAND TENDONS."
- POCKET FORMERS SHALL BE PROVIDED AT ALL STRESSING ANCHORAGES AND SHALL BE COATED WITH FORM RELEASE AGENT PRIOR TO INSTALLATION FOR EASY REMOVAL.
- APPROPRIATE ANCHORAGES SHALL BE PROVIDED FOR DEAD END AND LIVE END STRESSING ANCHORS.
- TENDONS SHALL BE FABRICATED WITH SUFFICIENT LENGTH BEYOND THE EDGE FORMS TO ALLOW STRESSING, A MINIMUM LENGTH OF 18 INCHES FROM EACH STRESSING END IS REQUIRED.
- TENDONS THAT ARE TO BE STRESSED FROM ONE END ONLY SHALL HAVE FIXED-END ANCHORAGES ATTACHED TO ONE END PRIOR TO SHIPMENT.
- TO MINIMIZE TENDON SEATING LOSSES, JACKS SHALL BE EQUIPPED WITH A WEDGE SEATING DEVICE, EITHER SPRING OR HYDRAULICALLY ACTUATED. THE USE OF JACKS WITHOUT WEDGE SEATING DEVICES WILL NOT BE PERMITTED.
- PLACE CHAIRS AT THE INTERSECTIONS OF ALL TENDONS AND SECURELY TIE TENDONS TOGETHER AND TO CHAIRS WITHOUT DAMAGING SHEATHING. PLACE TENDONS STRAIGHT AND LEVEL. VERTICAL PLACEMENT TOLERANCE SHALL BE WITHIN 1/2" FROM THE SPECIFIED TENDON LOCATION. TENDONS SHALL BE INSTALLED PER THE RECOMMENDATIONS OF POST-TENSIONING INSTITUTE'S CONSTRUCTION AND MAINTENANCE PROCEDURES MANUAL FOR SLAB-ON-GROUND CONSTRUCTION, LATEST EDITION.
- PROVIDE PERIMETER REINFORCING BARS ALONG THE EDGES OF THE SLAB AT ANCHORAGES. REINFORCING BARS SHALL BE PROVIDED AT ALL EDGES AT BOTH DEAD ENDS AND LIVE STRESSING ENDS OF TENDONS.
- CONCRETE: CONCRETE SHALL BE 3500 PSI WITH 3/4" AGGREGATE - AS SPECIFIED IN ASTM C-150. CALCIUM CHLORIDE OR OTHER MATERIALS CONTAINING CHLORIDES ARE NOT PERMITTED AS ADMIXTURES. SLAB THICKNESS SHALL BE 5" MINIMUM AND SHALL BE POURED IN THE SEQUENCE COINCIDING WITH THE POUR NUMBER AND LAYOUT SHOWN.
- COMPRESSIBLE EXPANSION JOINT MATERIAL OR FILLER WITH A MINIMUM THICKNESS OF 1 INCH SHALL BE WRAPPED AROUND THE HOOP POST FOUNDATION FOR THE FULL DEPTH OF THE PENETRATIONS THROUGH THE COURT SLAB. THE MATERIAL MUST BE CAPABLE OF MAINTAINING THE MINIMUM 1 INCH DIMENSION DURING CONCRETE PLACEMENT.
- AFTER FORMS ARE REMOVED AND CONCRETE HAS REACHED A MINIMUM OF 2400 PSI, TENSIONING PROCEDURE MAY BE APPLIED ACCORDING TO PTI SPECIFICATIONS.
- STRESSING POCKETS SHALL BE FILLED WITH NON-SHRINK GROUT WITHIN ONE DAY AFTER TENDON ACCEPTANCE AND CUTTING.
- NON-SHRINK GROUT SHALL CONSIST OF A HIGH STRENGTH GROUT AND SHALL HAVE A MINIMUM 28 DAY COMPRESSIVE STRENGTH OF 8000 PSI. GROUT SHALL BE A NON-FERROUS MATERIAL BLENDED OF CAREFULLY GRADED SILICA AGGREGATE, SELECT PORTLAND CEMENT AND EXPANSIVE AGENTS OR ADMIXTURES.
- GROUT SHALL BE MIXED, PLACED AND CURED IN STRICT ACCORDANCE WITH THE MANUFACTURER'S RECOMMENDATIONS. PLACEMENT SHALL BE IN A MANNER AS TO PREVENT OR AVOID AIR POCKETS OR VOIDS.
- SURFACE COURSE: THE COLOR FINISH SHALL BE IN THE SELECTED AND APPROVED BY OWNER. SEE PROJECT SPECIFICATIONS.
- THE CONTRACTOR SHALL SURVEY, MARK, AND APPLY 2" WIDE, WHITE PLAYING LINES ACCORDING TO THE PLANS AND SPECIFICATIONS. BASE LINE SHALL BE 4" WIDE.
- BASKETBALL HOOP: SEE SPECIFICATIONS.
- CONTRACTOR SHALL PROVIDE SHOP-DRAWINGS PRIOR TO START OF WORK, PRODUCED AND SIGNED BY A POST TENSION ENGINEER, AND MUST BE ACCOMPANIED BY DESIGN CALCULATIONS AND CONSTRUCTION SEQUENCE.

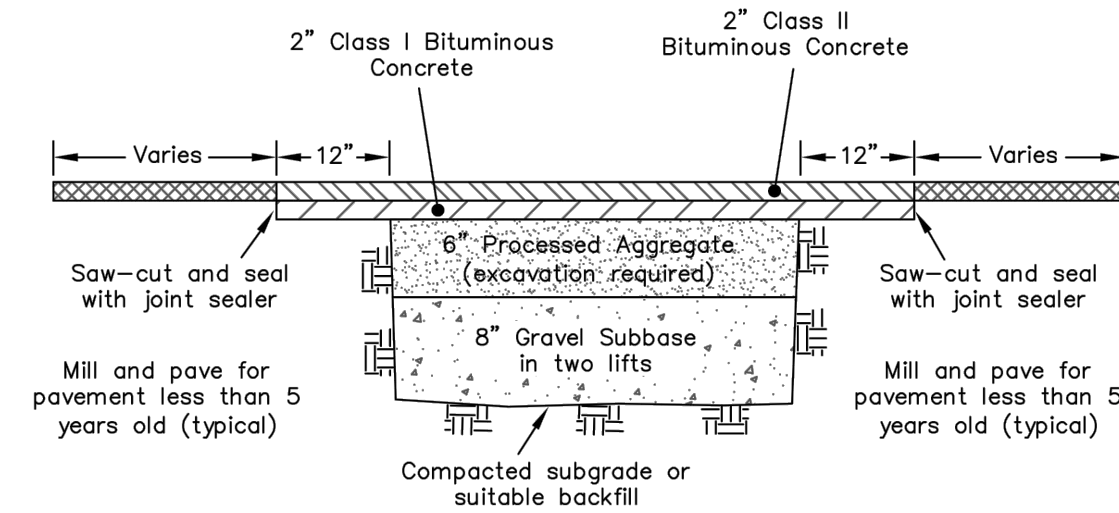


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SITE DETAILS
NORTH END FIELD
BALLFIELD RECONSTRUCTION
210 BRITANNIA STREET
MERIDEN, CONNECTICUT

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| KCF DESIGNED | GB DRAWN | KCF CHECKED |
| SCALE N.T.S. | | |
| DATE AUGUST 29, 2022 | | |
| PROJECT NO. 14792.00004 | | |
| SHEET NO. 20 OF 25 | | |

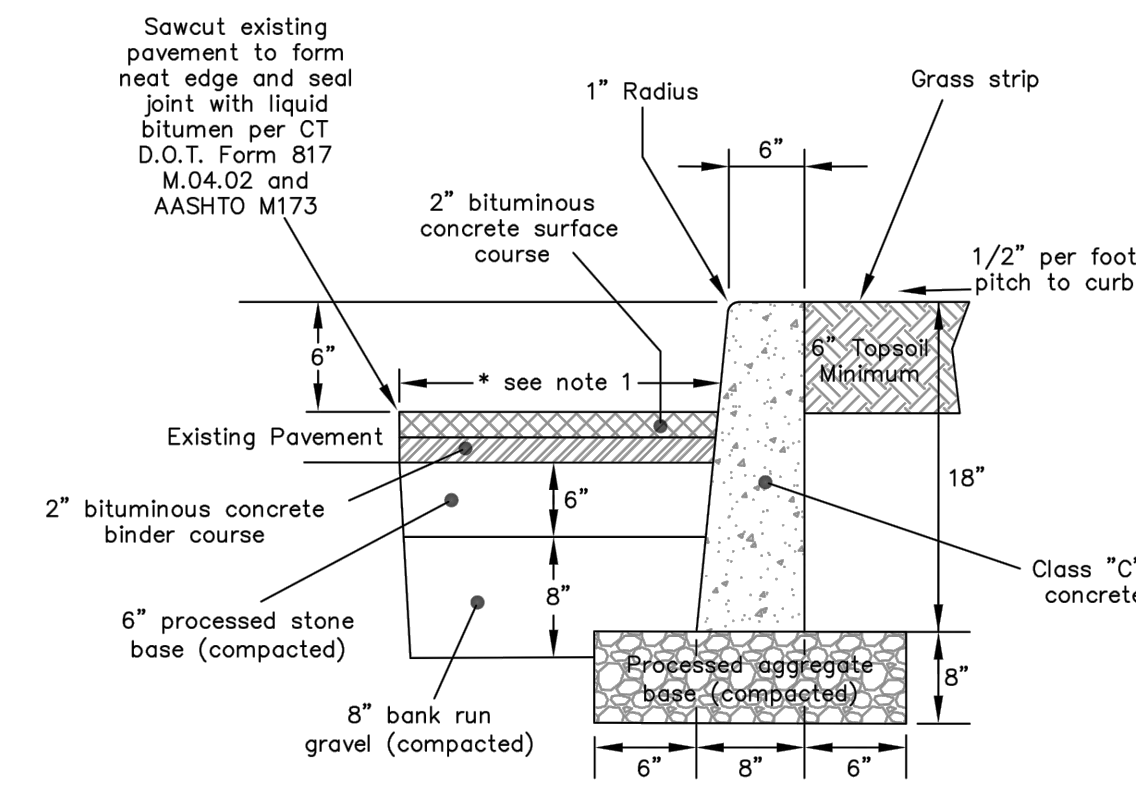
SD-5



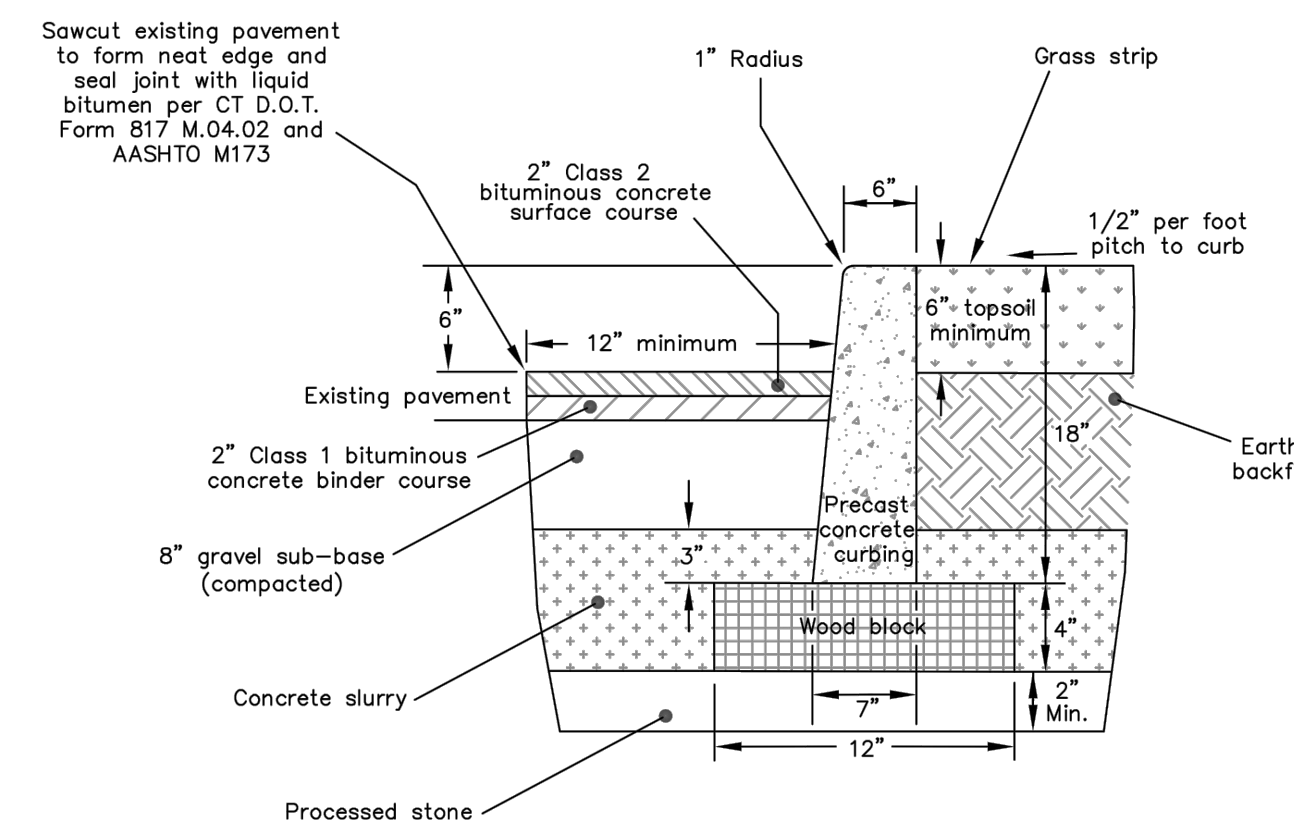
NOTE: Match existing pavement thickness up to 9" with Class I bituminous concrete in 3" maximum lifts.

Permanent Pavement Repair Detail

Not To Scale

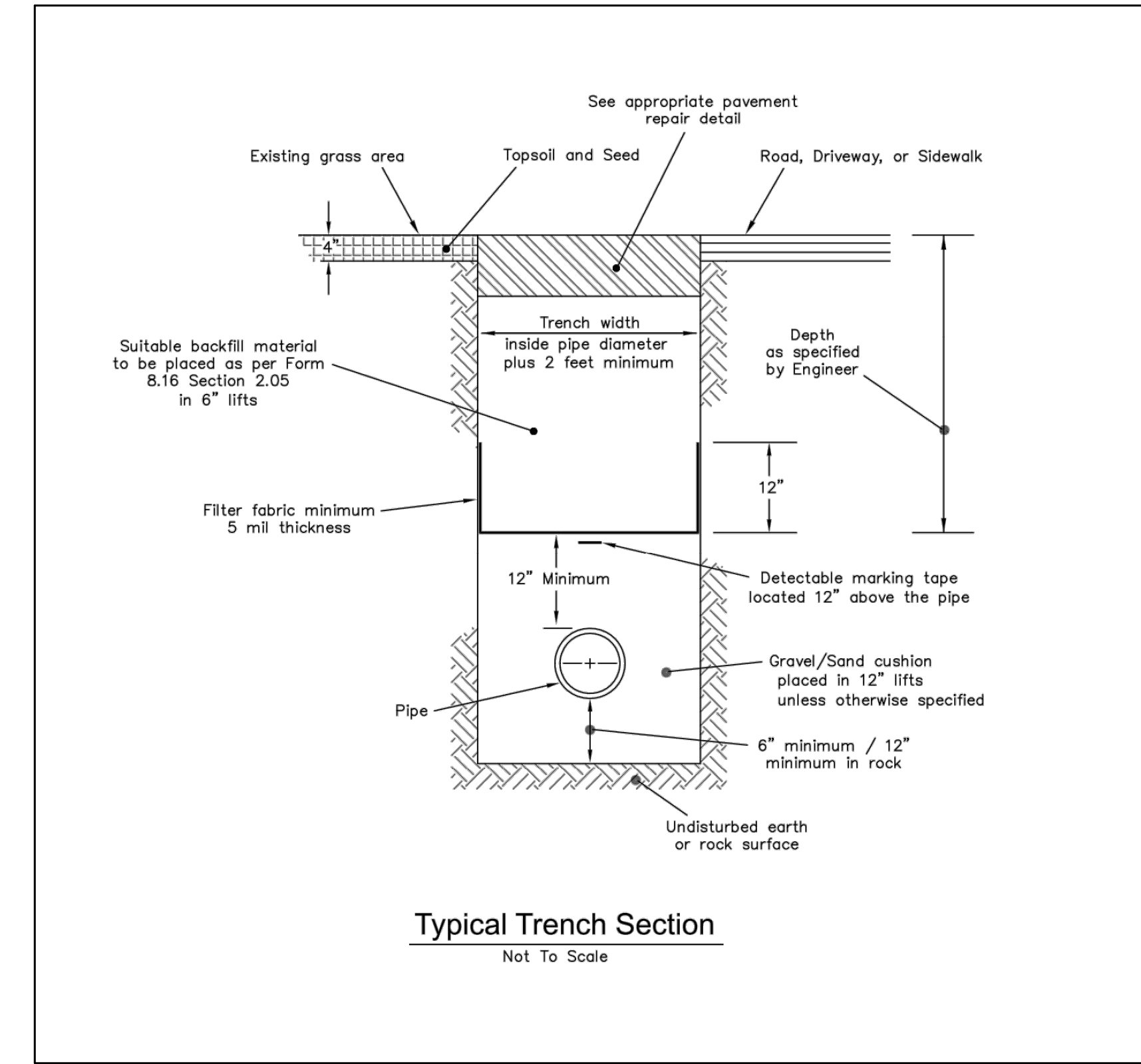


Poured in Place Concrete Curb



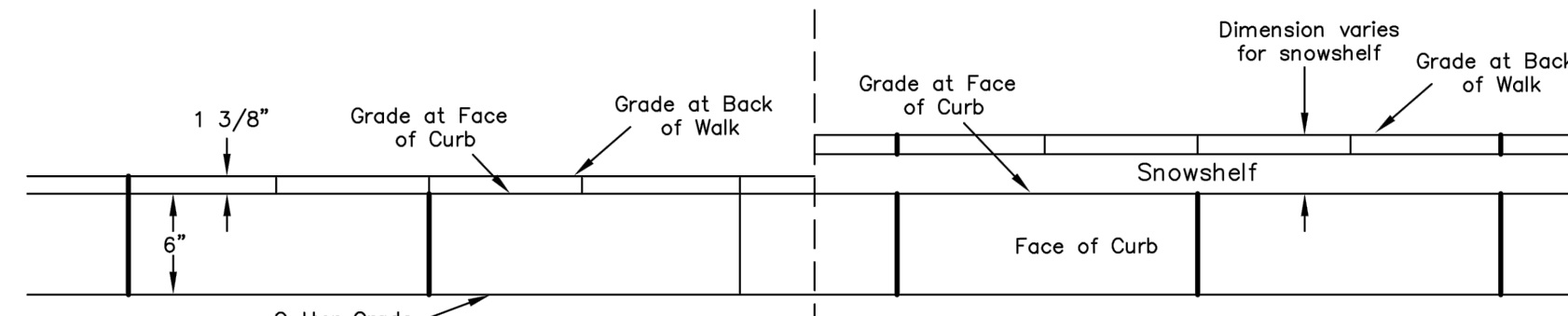
Precast Concrete Curb Detail

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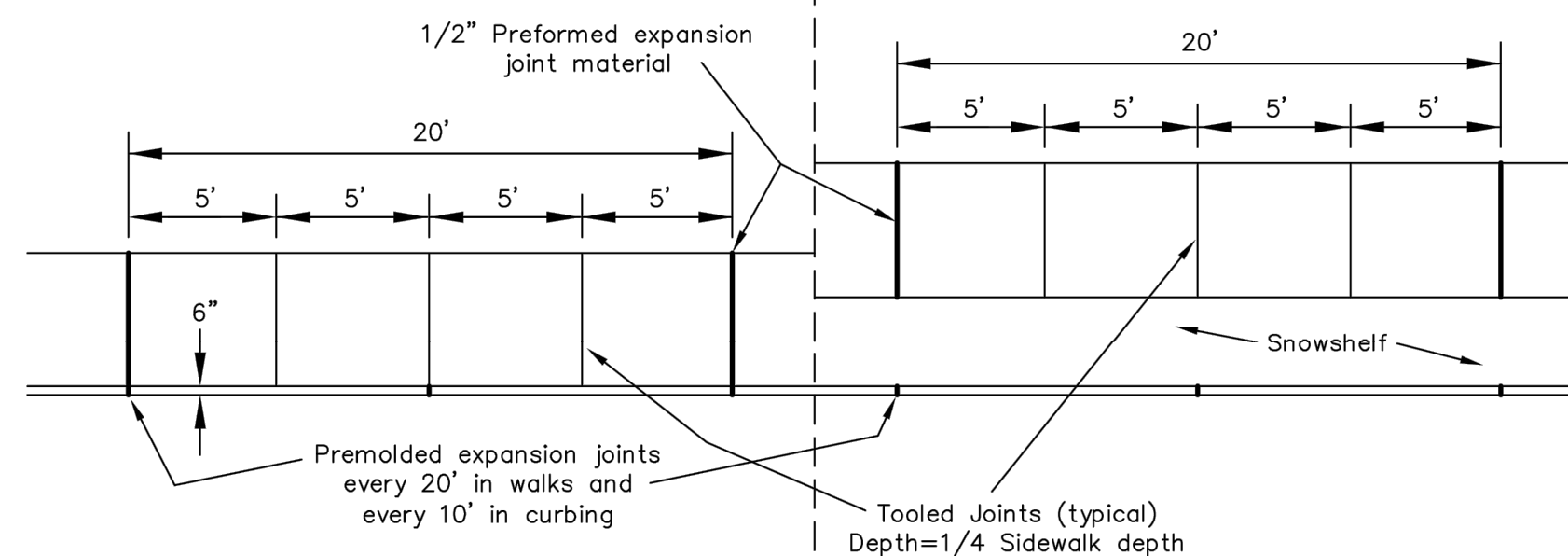
Typical Trench Section

Not To Scale



Profile

Profile



Monolithic Sidewalk Plan

CONCRETE SHALL BE CLASS 'C' AND 3300 PSI OR BETTER (N.T.S.)

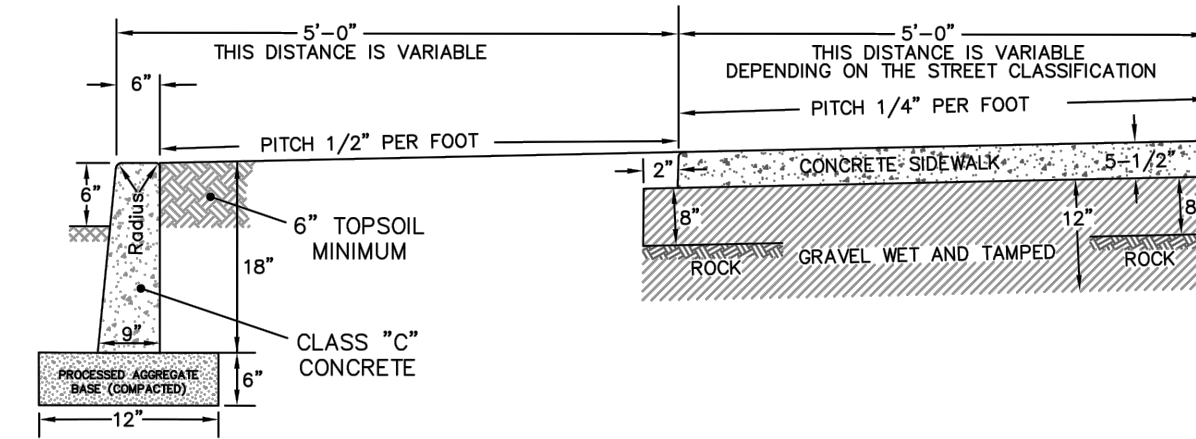
Concrete Curbing and Walk

(N.T.S.)

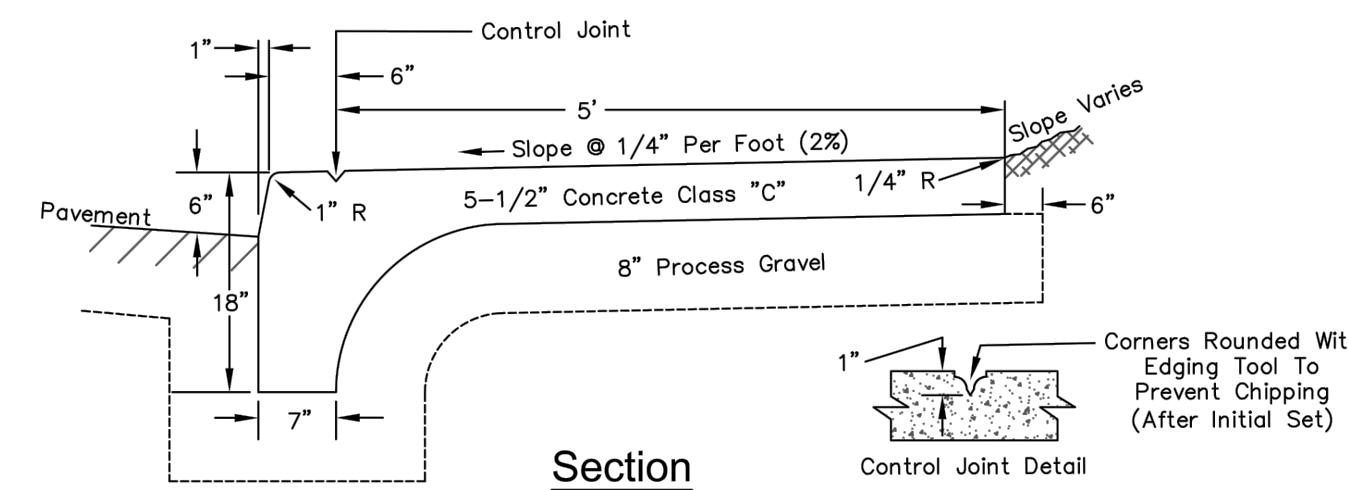
CURBING
CONCRETE CURBING WILL BE INSTALLED IN ACCORDANCE WITH STATE OF CONNECTICUT DEPARTMENT OF TRANSPORTATION STANDARD SPECIFICATIONS FORM 817, SECTION 8.11 EXCLUDING PARAGRAPHS 8.11.04 AND 8.11.05 FOR MEASUREMENT AND PAYMENT.

CONCRETE WALKS
CONCRETE WALKS WILL BE INSTALLED IN ACCORDANCE WITH STATE OF CONNECTICUT DEPARTMENT OF TRANSPORTATION STANDARD SPECIFICATIONS FORM 817, SECTION 9.21 EXCLUDING PARAGRAPHS 9.21.04 AND 9.21.05 FOR MEASUREMENT AND PAYMENT.

NOTE: Sidewalks must be formed with 2"x6" lumber or 5-1/2" high metal or wood forms



Typical Curb & Sidewalk



Typical Monolithic Curb & Sidewalk

NOTE: Sidewalks must be formed with 2"x6" lumber or 5-1/2" high metal or wood forms



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CITY OF MERIDEN STANDARD DETAILS
NORTH END FIELD
BALLFIELD RECONSTRUCTION
210 BRITANNIA STREET
MERIDEN, CONNECTICUT

| | | |
|-----------------|-------|---------|
| KCF | GB | KCF |
| DESIGNED | DRAWN | CHECKED |
| SCALE | | |
| N.T.S. | | |
| DATE | | |
| AUGUST 29, 2022 | | |
| PROJECT NO. | | |
| 14792.00004 | | |
| SHEET NO. | | |
| 21 OF 25 | | |

SD-6

ELECTRICAL GENERAL NOTES

- UNLESS OTHERWISE INDICATED, FURNISH AND INSTALL A COMPLETE AND OPERATIONAL ELECTRICAL SYSTEM INCLUDING ALL NECESSARY MATERIAL, LABOR, AND EQUIPMENT.
- ELECTRICAL PLANS AND DETAILS, AND ONE LINE DIAGRAMS SHOW THE GENERAL LOCATION AND ARRANGEMENT OF THE ELECTRICAL SYSTEM. THEY ARE DIAGRAMMATIC AND DO NOT SHOW ALL CONDUIT BODIES, CONNECTORS, BENDS, FITTINGS, HANGERS, AND ADDITIONAL PULL AND JUNCTION BOXES WHICH THE CONTRACTOR MUST PROVIDE TO COMPLETE THE ELECTRICAL SYSTEM.
- ALL EQUIPMENT AND MATERIAL SHALL BE LABELED AND LISTED, AND INSTALLED IN ACCORDANCE WITH THEIR LISTING.
- THE CONTRACTOR SHALL OBTAIN ALL REQUIRED PERMITS AND ARRANGE FOR ALL REQUIRED INSPECTIONS IN ACCORDANCE WITH STATE GOVERNING AUTHORITIES.
- ALL WORK SHALL BE DONE WITH LICENSED WORKMEN IN ACCORDANCE WITH STATE GOVERNING AUTHORITY.
- THE DEFINITION OF ELECTRICAL TERMS USED SHALL BE AS DEFINED IN THE NATIONAL ELECTRICAL CODE, 2017 EDITION.
- THE TERM "INDICATED" SHALL MEAN "AS SHOWN ON CONTRACT DOCUMENTS (SPECIFICATIONS, DRAWINGS, AND RELATED ATTACHMENTS)".
- THE TERM "SIZE" SHALL MEAN ONE OR MORE OF THE FOLLOWING: "LENGTH, CURRENT AND VOLTAGE RATING, NUMBER OF POLES, NEMA SIZE, AND OTHER SIMILAR ELECTRICAL CHARACTERISTICS".
- THE TERM "SPACE" ON PANEL BOARD AND SWITCHBOARD SCHEDULES SHALL MEAN "PROVIDE SPACE TO INSTALL THE NUMBER OF POLES AND SIZE OF THE PROTECTIVE DEVICE INDICATED WITH ALL THE NECESSARY BUS AND FITTINGS TO INSTALL THE DEVICE AT SOME FUTURE DATE".
- COORDINATE ELECTRICAL WORK WITH OWNER.
- COORDINATE ELECTRICAL WORK WITH OTHER DIVISIONS OF THIS PROJECT.
- BEFORE SELECTING MATERIAL AND EQUIPMENT, AND PROCEEDING WITH WORK, INSPECT AREAS WHERE MATERIAL AND EQUIPMENT ARE TO BE INSTALLED TO INSURE SUITABILITY, AND CHECK NEEDED SPACE FOR REPLACEMENT, CLEARANCES AND INTERCONNECTIONS.
- BEFORE CUTTING OR DRILLING INTO BUILDING ELEMENTS INSPECT AND LAYOUT WORK TO AVOID DAMAGING STRUCTURAL ELEMENTS AND BUILDING UTILITIES.
- ALL WORK SHALL BE DONE IN ACCORDANCE WITH THE NATIONAL ELECTRICAL CODE, 2017 EDITION.

ELECTRICAL LEGEND

| SYMBOL | DESCRIPTION |
|--------|---|
| | HANDHOLE / PULL BOX |
| | DUPLEX RECEPTACLE / OUTLET |
| | QUADRUPLEX RECEPTACLE / OUTLET |
| | POLE MOUNTED PARKING LOT LIGHT FIXTURE - REFER TO SCHEDULE ON DRAWING ES-1 FOR ADDITIONAL INFORMATION |

ABBREVIATIONS

| ABBREVIATIONS | DESCRIPTION |
|---------------|--|
| A | AMPERES |
| AC | ALTERNATING CURRENT (60 HZ) |
| A/C | AIR CONDITIONING |
| ADA | AMERICANS WITH DISABILITIES ACT |
| AF/CI | AIR FAULT CIRCUIT INTERRUPTER |
| AFV | ABOVE FINISHED FLOOR |
| ATS | AUTOMATIC TRANSFER SWITCH |
| AUX | AUXILIARY |
| AWG | AMERICAN WIRE GAUGE |
| BF | BALLAST FACTOR |
| BR | BRANCH |
| C | CONDUIT |
| CB | CIRCUIT BREAKER |
| CIR | CIRCUIT |
| CT | CURRENT TRANSFORMER |
| CU | COPPER |
| D | DISHWASHER |
| DISC | DISCONNECT |
| DW | DISHWASHER |
| DWG | DRAWING |
| DWU | DISTILLED WATER UNIT |
| E | EXISTING TO REMAIN |
| EMT | ELECTRICAL METALLIC TUBING |
| EQUIP | EQUIPMENT |
| EX/ETR | EXISTING EQUIPMENT TO REMAIN |
| FDR | FEEDER |
| FL | FLOOR |
| FEET | FEET |
| GF/CI/GFI | GROUND-FAULT CIRCUIT-INTERRUPTER |
| GFE | GROUND-FAULT CIRCUIT EQUIPMENT BREAKER |
| GFP | GROUND-FAULT PROTECTION |
| GRD | GROUND |
| H | HEAD DETECTOR |
| HD | HAND-HOLE |
| HP | HORSEPOWER |
| IG | INSULATED GROUND |
| IM | ICE MAKER |
| IMP | IMPEDANCE |
| IN | INCHES |
| J | JUNCTION |
| KA | KILO AMPERE |
| Kcmils | KILO CIRCUM CIRCUIT MILLS |
| KV | KILOVOLT |
| KW | KILO VOLT-AMPERE |
| Im | KILOWATT |
| LP | LIGHTING PANELBOARD |
| LTG | LIGHTING |
| M | METER |
| MC | MOTOR CONTROLLER |
| MCB | MAIN CIRCUIT BREAKER |
| MCC/MCB | MOLDED CASE CIRCUIT BREAKER |
| MCS | MOTOR-CIRCUIT SWITCH |
| MDP | MAIN DISTRIBUTION PANELBOARD |
| NF | NONFUSED |
| MLO | MAIN LUG ONLY |
| MW | MICROWAVE OVEN |
| N/A | NOT APPLICABLE |
| NEC | NATIONAL ELECTRIC CODE |
| NECA | NATIONAL ELECTRICAL CONTRACTORS ASSOC. |
| NEMA | NATIONAL ELECTRICAL MANUFACTURERS ASSOC. |
| NEUT | NEUTRAL |
| NF | NONFUSED |
| NIC | NOT IN CONTRACT |
| NL | NEW LOCATION OF RELOCATED ITEM |
| N.T.S. | NOT TO SCALE |
| OC | OVERCURRENT |
| P | POLE |
| PA | PUBLIC ADDRESS |
| PB | PULL BOX |
| PC | PHOTO CELL |
| PH | PHASE |
| PNL | PANELBOARD |
| PRI | PRIMARY |
| PSI | POUNDS PER SQUARE INCH |
| PVC | POLYVINYL CHLORIDE |
| PWR | POWER |
| R | REMAIN |
| RE | REMOVE EXISTING ITEM |
| RECP/T | RECEPTACLE |
| RGS | RIGID GALVANIZED STEEL CONDUIT |
| RL | RELOCATE EXISTING ITEM |
| RM | ROOM |
| RNC | RIGID NONMETALLIC CONDUIT |
| REF | REFRIGERATOR |
| RSC | RIGID STEEL CONDUIT |
| RT | RAINTIGHT |
| S | SMOKE DETECTOR |
| SC | SERVICE CONDUCTORS |
| SCHD | SCHEDULE |
| SCR | SHORT CIRCUIT RATING |
| SD | SERVICE DROP |
| SE | SERVICE EQUIPMENT |
| SEC | SECONDARY |
| ST | STUNT TRIP |
| SURF | SURFACE |
| SV | SOLENOID VALVE |
| SW | SWITCH |
| SYM | SYMMETRICAL |
| SYMB | SYMBOL |
| TC | TIME CONTROLLER |
| TEL | TELEPHONE |
| TV | TELEVISION |
| TYP | TYPICAL |
| UG | UNDERGROUND |
| UL | UNDERWRITER'S LABORATORY |
| U.O.N. | UNLESS OTHERWISE NOTED |
| UTIL | UTILITY |
| UV/R | UNDER VOLTAGE RELEASE |
| V | VOLTS |
| VA | VOLT-AMPERES |
| W | WATTS |
| WG | WIRE GUARD |
| WP | WALL PHONE OR WEATHERPROOF |
| WH | WEIGHT IN POUNDS |
| WT | WATERTIGHT |
| X | REMOVE |
| XFMR | TRANSFORMER |
| % | PERCENT |
| # | NUMBER |
| ' | FEET |
| " | INCHES |

ELECTRICAL SPECIFICATIONS

PART 1 - GENERAL PROVISIONS FOR ELECTRICAL WORK

REFERENCES

THIS SECTION COVERS THE GENERAL REQUIREMENTS FOR ELECTRICAL WORK. EXAMINE ALL CONTRACT DRAWINGS AND ALL OTHER SECTIONS OF THE SPECIFICATIONS FOR ADDITIONAL WORK RELATED TO THE WORK OF THIS DIVISION.

DEFINITIONS

"PROVIDE" - TO FURNISH, INSTALL AND CONNECT UP COMPLETE AND READY FOR SAFE AND REGULAR OPERATION OF PARTICULAR WORK REFERRED TO UNLESS SPECIFICALLY OTHERWISE NOTED.

"INSTALL" - TO ERECT, MOUNT AND CONNECT COMPLETE WITH RELATED ACCESSORIES.

"WORK" - LABOR, MATERIALS, EQUIPMENT, APPARATUS, CONTROLS, ACCESSORIES AND OTHER ITEMS REQUIRED FOR PROPER AND COMPLETE INSTALLATION.

"WIRING" - RACEWAY, FITTINGS, WIRE, BOXES, MOUNTING HARDWARE AND RELATED ITEMS.

"CONCEALED" - EMBEDDED IN MASONRY OR OTHER CONSTRUCTION CAVITY, INSTALLED IN FURRED SPACES, WITHIN DOUBLE PARTITIONS OR HUNG CEILINGS.

"SIMILAR OR EQUAL" - EQUAL MATERIALS, WEIGHT, SIZE, DESIGN AND EFFICIENCY OF SPECIFIED PRODUCT.

"CONTRACTOR" - THE ELECTRICAL CONTRACTOR.

"NOTED" - AS INDICATED ON THE DRAWINGS AND/OR SPECIFICATIONS.

SCOPE

THIS WORK SHALL CONSIST OF THE FURNISHINGS OF ALL LABOR, MATERIALS AND SERVICES REQUIRED COMPLETE, READY FOR CORRECT OPERATION FOR ALL ELECTRICAL WORK CALL FOR BY THE ACCOMPANYING DRAWINGS AND SPECIFICATIONS. ALL ELECTRICAL WORK SHALL BE PERFORMED IN ACCORDANCE WITH THE NATIONAL ELECTRICAL CODE, STATE AND LOCAL CODES.

THE DATA INDICATED IN THESE DRAWINGS AND SPECIFICATIONS ARE AS EXACT AS COULD BE SECURED. BUT THEIR ABSOLUTE ACCURACY IS NOT GUARANTEED. DO NOT SCALE DRAWINGS. EXACT LOCATIONS, DISTANCES, LEVELS AND OTHER CONDITIONS WILL BE GOVERNED BY THE BUILDING. USE THE DRAWINGS AND SPECIFICATIONS FOR GUIDANCE AND SECURE THE ENGINEER'S APPROVAL OF CHANGES IN LOCATIONS, CIRCUITS, WHERE SHOWN ON AN ELECTRICAL DRAWING, ARE SO INDICATED PRIMARILY FOR THE PURPOSE OF INDICATING THE GENERAL CIRCUIT PLAN AND DO NOT NECESSARILY INDICATE THE EXACT LOCATION OF ROUTING OF THE RACEWAYS. UNLESS SPECIFICALLY INDICATED, CIRCUITS SHALL BE RUN IN SUITABLE CONDITIONS CONSIDERING STRUCTURAL FEATURES, OTHER TRADES, CONSTRUCTION METHODS AND GOOD INSTALLATION PRACTICE.

BEFORE SUBMITTING A BID, THE CONTRACTOR SHALL VISIT THE SITE AND BECOME THOROUGHLY FAMILIAR WITH ALL EXISTING CONDUIT UNDER WHICH THE WORK AND WORK OF OTHER TRADES WILL BE INSTALLED. THIS CONTRACT INCLUDES ALL NECESSARY OFFSETS, TRANSITIONS, MODIFICATIONS AND RELOCATION REQUIRED TO INSTALL ALL NEW EQUIPMENT IN NEW OR EXISTING SPACES. CONTRACTOR SHALL INCLUDE ANY MODIFICATIONS REQUIRED IN EXISTING ELECTRICAL EQUIPMENT FOR INSTALLATION OF NEW ELECTRICAL EQUIPMENT AND NEW EQUIPMENT OF OTHER TRADES (LIGHTING FIXTURES, DEVICES, CONDUIT WIRING, ETC.) ALL NEW AND EXISTING EQUIPMENT AND SYSTEMS SHALL BE FULLY OPERATIONAL UNDER THIS CONTRACT BEFORE THE PROJECT IS CONSIDERED COMPLETE. THE CONTRACTOR SHALL BE HELD RESPONSIBLE FOR ANY ASSUMPTIONS THAT ARE MADE. ANY OMISSIONS OR ERRORS MADE AS A RESULT OF FAILURE TO VISIT THE SITE AND BECOME THOROUGHLY FAMILIAR WITH THE EXISTING CONDITIONS AND THE CONTRACT DOCUMENTS OF ALL TRADES.

CODES, REGULATIONS AND STANDARDS

ALL ELECTRICAL WORK SHALL BE PERFORMED IN ACCORDANCE WITH THE FOLLOWING APPROVED CODES:

STATE DEMOLITION CODE
STATE BUILDING CODE
STATE FIRE SAFETY CODE
LOCAL BUILDING CODE
IBC - INTERNATIONAL BUILDING CODE
NFPA - NATIONAL FIRE PROTECTION CODE
ANSI - AMERICAN NATIONAL STANDARDS INSTITUTE
ASTM - AMERICAN SOCIETY FOR TESTING AND MATERIALS
OSHA - OCCUPATIONAL SAFETY AND HEALTH ADMINISTRATION
U.L. - UNDERWRITERS LABORATORIES
NFPA 101 - LIFE SAFETY CODE
NFPA 99 - HEALTH FACILITIES CODE
NFPA 70 - NATIONAL ELECTRICAL CODE
NFPA 72 - NATIONAL FIRE ALARM CODE
EPA - ENVIRONMENTAL PROTECTION AGENCY
IEEE - INSTITUTE OF ELECTRICAL AND ELECTRONIC ENGINEERS
NEMA - NATIONAL ELECTRICAL MANUFACTURERS ASSOCIATION
IEC - INTERNATIONAL ENERGY CONSERVATION CODE
ICC/ANSI A117.1 ACCESSIBLE AND USABLE BUILDINGS AND FACILITIES

PERMITS, FEES AND INSPECTIONS

THE CONTRACTOR SHALL GIVE ALL NECESSARY NOTICES, OBTAIN ALL PERMITS, PAY FOR ALL GOVERNMENT, STATE SALES TAXES AND APPLICABLE FEES. THE CONTRACTOR SHALL FILE ALL DRAWINGS, COMPLETE ALL DOCUMENTS AND OBTAIN ALL NECESSARY APPROVALS FROM THE PROPER AUTHORITY OR AGENCY HAVING JURISDICTION. OBTAIN ALL REQUIRED CERTIFICATES OF INSPECTION COVERING WORK. THE CONTRACTOR SHALL SEE THAT ALL REQUIRED INSPECTIONS AND TESTS ARE MADE AND SHALL COOPERATE TO MAKE THESE TESTS AS THOROUGH AND AS READILY MADE AS POSSIBLE.

MATERIALS AND WORKMANSHIP

ALL MATERIALS AND APPARATUS REQUIRED FOR THE WORK, EXCEPT AS OTHERWISE SPECIFIED, SHALL BE NEW AND OF FIRST-CLASS QUALITY. IT SHALL BE FURNISHED, DELIVERED, ERECTED, CONNECTED, FINISHED IN EVERY DETAIL AND SO SELECTED AND ARRANGED AS TO FIT PROPERLY INTO THE BUILDING SPACES, WHERE NO SPECIFIC KIND OR QUALITY MATERIAL IS GIVEN, A FIRST-CLASS STANDARD ARTICLE AS ACCEPTED BY THE ENGINEER SHALL BE FURNISHED.

ALL EQUIPMENT AND MATERIALS SHALL BE SPECIFICATION GRADE AND BEAR THE UNDERWRITERS LABEL. NO SUBSTITUTE OR ALTERNATE MATERIAL, ETC. WILL BE CONSIDERED FOR THIS PROJECT.

ALL WORK SHALL BE OF A QUALITY CONSISTENT WITH GOOD TRADE PRACTICE AND SHALL BE INSTALLED IN A NEAT, WORKMANLIKE MANNER. THE ENGINEER/OWNER RESERVES THE RIGHT TO REJECT ANY WORK WHICH, IN HIS OPINION, HAS BEEN INSTALLED IN A SUBSTANDARD, DANGEROUS OR IN A UNSERVICEABLE MANNER. THE CONTRACTOR SHALL REPLACE REJECTED WORK IN A SATISFACTORY MANNER AT NO EXTRA COST TO THE OWNER.

GUARANTEES

ALL WORKMANSHIP AND MATERIALS SHALL BE FULLY GUARANTEED FOR A PERIOD OF ONE YEAR AFTER ACCEPTANCE OF THE ENTIRE INSTALLATION COVERED BY THIS CONTRACT. SHOULD ANY DEFECTS OCCUR DURING THE GUARANTEED PERIOD, THE CONTRACTOR SHALL REPAIR AND/OR REPLACE ALL DEFECTIVE EQUIPMENT, MATERIAL AND/OR WORK AT NO EXTRA CHARGE TO THE OWNER.

RECORD DRAWINGS

MAINTAIN, AT THE JOB SITE, A SET OF ELECTRICAL DRAWINGS INDICATING ALL CHANGES IN LOCATION OF THE EQUIPMENT, PANELS, DEVICES, ETC. FROM THE ORIGINAL LAYOUT. CLEARLY MARK IN RED ALL CHANGES ON THE DRAWINGS. AT THE COMPLETION OF THE PROJECT THE CONTRACTOR SHALL TURN OVER THE RECORD DRAWINGS TO THE ENGINEER/OWNER.

COORDINATION

ALL WORK SHALL BE CARRIED OUT IN CONJUNCTION WITH OTHER TRADES AND FULL COOPERATION SHALL BE GIVEN IN ORDER THAT ALL WORK MAY PROCEED WITH A MINIMUM OF DELAY AND INTERFERENCE.

SHOP DRAWINGS

SUBMIT ELECTRICAL COPIES FOR REVIEW. DETAILED SHOP DRAWINGS OF ALL EQUIPMENT AND MATERIAL SPECIFIED. THE CONTRACTOR SHALL REVIEW ALL SHOP DRAWINGS PRIOR TO SUBMISSION TO THE ENGINEER FOR REVIEW. NO MATERIAL OR EQUIPMENT MAY BE DELIVERED TO THE JOB SITE OR INSTALLED UNTIL CONTRACTOR HAS IN THEIR POSSESSION APPROVED SHOP DRAWINGS FOR THE PARTICULAR MATERIAL OR EQUIPMENT. SHOP DRAWINGS SHALL BE SPECIFIC WITH ITEMS SUBMITTED FOR APPROVAL CLEARLY IDENTIFIED.

THE FOLLOWING IS A LIST OF ELECTRICAL ITEMS THAT MUST BE SUBMITTED FOR REVIEW:

- LIGHTING FIXTURES, DRIVERS AND OTHER RELATED COMPONENTS
- LIGHTING CONTROLS SYSTEM
- CONDUIT WIRE AND CABLE
- DEVICES (E.G. RECEPTACLES)
- HANDHOLES / PULLBOXES
- PANELBOARD
- UTILITY METER SOCKET

OPERATING INSTRUCTIONS

THE CONTRACTOR SHALL FURNISH TO THE OWNER ELECTRONIC SETS OF TYPEWRITTEN OR BLUEPRINTED INSTRUCTIONS FOR OPERATING AND MAINTAINING ALL SYSTEMS AND EQUIPMENT INCLUDED IN THIS DIVISION. MANUFACTURERS ADVERTISING LITERATURE OR CATALOGS WILL NOT BE ACCEPTED FOR OPERATING AND MAINTENANCE INSTRUCTIONS.

THE CONTRACTOR, IN THE ABOVE-MENTIONED INSTRUCTIONS, SHALL INCLUDE THE MAINTENANCE SCHEDULE FOR THE PRINCIPAL ITEMS OF EQUIPMENT FURNISHED UNDER THIS DIVISION.

AN AUTHORIZED MANUFACTURER'S REPRESENTATIVE SHALL ATTEST IN WRITING THAT HIS EQUIPMENT HAS BEEN PROPERLY INSTALLED PRIOR TO STARTUP. THESE LETTERS WILL BE BOUND INTO OPERATING AND MAINTENANCE BOOKS.

EQUIPMENT PROTECTION

PROPERLY AND COMPLETELY PROTECT AGAINST ALL DAMAGE, ALL APPARATUS, EQUIPMENT, ETC., INCLUDED IN THIS CONTRACT. THE CONTRACTOR WILL BE HELD RESPONSIBLE FOR ANY DAMAGE TO FURNISHED APPARATUS, EQUIPMENT, ETC., UNTIL FINAL ACCEPTANCE.

PROPERTY PROTECTION

THE CONTRACTOR SHALL TAKE WHATEVER MEANS NECESSARY AND/OR REQUIRED TO PROTECT OWNER'S PROPERTY WITHIN THE WORKING AREAS FROM DUST, DEBRIS AND OTHER MATTER GENERATED BY THE WORK. NO WORK SHALL COMMENCE IN AREAS WHERE PROTECTION IS REQUIRED UNTIL APPROVAL HAS BEEN GIVEN TO THE CONTRACTOR BY THE OWNER.

MANUFACTURERS INSTRUCTION

INSTALL ALL EQUIPMENT IN ACCORDANCE WITH MANUFACTURERS INSTRUCTIONS OR REQUIREMENTS FOR PROPER OPERATION AND MAINTENANCE.

EQUIPMENT PAINTING AND CLEANING

THOROUGHLY CLEAN ALL ELECTRICAL EQUIPMENT DEVICES AND ENCLOSURES UPON COMPLETION OF ALL WORK. REPAINT ANY EQUIPMENT WHOSE FINISH IS DAMAGED OR RUSTED. MATCH MANUFACTURERS ORIGINAL FINISH.

PENETRATION SEALANT

ALL PENETRATIONS SHALL BE SEALED WITH 3M INTUMESCENT FIRE BARRIER PENETRATION SEALANT, APPLIED PER MANUFACTURERS AND U.L. GUIDELINES.

CUTTING, PATCHING, REPAIRING AND PAINTING

THE GENERAL CONTRACTOR SHALL PERFORM ALL CUTTING, PATCHING, REPAIRING AND PAINTING FOR ALL ELECTRICAL ITEMS AND EQUIPMENT CALLED FOR UNDER THIS CONTRACT.

TEMPORARY LIGHT AND POWER

FURNISH AND INSTALL TEMPORARY ELECTRICAL SERVICE OF SUFFICIENT SIZE FOR POWER AND LIGHTING USE BY ALL TRADE CONTRACTORS DURING THE COURSE OF CONSTRUCTION. ALL TEMPORARY WORK SHALL BE DONE IN COMPLIANCE WITH ALL APPLICABLE ARTICLES IN THE NATIONAL ELECTRICAL CODE, O.S.H.A. AND WITH ALL REQUIREMENTS OF ANY AUTHORITY HAVING JURISDICTION OVER THE WORK. PROVIDE TEMPORARY POWER CONNECTION TO A CONSTRUCTION TRAILER. THE LOCATION OF THE TRAILER IS TO BE DETERMINED ON SITE. PROVIDE FEEDER TO TRAILER OF SUFFICIENT SIZE TO POWER HEATING, AIR CONDITIONING, GENERAL POWER AND LIGHTING.

PART 2 - PRODUCTS

DESCRIPTION

ALL MATERIALS AND EQUIPMENT PROVIDED UNDER THIS SECTION SHALL BE NEW, FIRST GRADE, BEST OF THEIR RESPECTIVE KINDS AND IN NO WAY SHALL THEY BE LESS THAN THE QUALITY AND INTENT SET FORTH UNDER THIS SECTION. THEY SHALL MEET THE REQUIREMENTS OF ALL STANDARDS SET UP TO GOVERN THE MANUFACTURER OF ELECTRICAL MATERIALS AND COMPLY WITH ALL APPLICABLE CODES AND STANDARDS.

WIRE

CONDUCTORS SHALL BE U.L. LISTED, 600 VOLTS, 90 DEG. C. SINGLE CONDUCTOR TYPE THW/THHN, 98% CONDUCTIVITY, ANNEALED UNCOATED COPPER WITH PVC INSULATION COVERED WITH NYLON SHEATH JACKET TESTED IN ACCORDANCE WITH THE REQUIREMENTS OF UNDERWRITERS LABORATORIES STANDARD 83. WIRE SHALL BE IDENTIFIED BY SURFACE MARKING INDICATING MANUFACTURER'S IDENTIFICATION CONDUCTOR SIZE AND METAL VOLTAGE RATING, U.L. SYMBOL AND TYPE DESIGNATION. CONDUCTORS SHALL BE STRANDED. MINIMUM SIZE SHALL BE #12 AWG UNLESS OTHERWISE INDICATED. MANUFACTURED BY ROME CABLE, TRIANGLE WIRE & CABLE, GENERAL CABLE OR ESSEX WIRE & CABLE.

RIGID GALVANIZED STEEL CONDUIT (RGS)

RIGID STEEL CONDUIT SHALL BE FULL WEIGHT, HEAVY WALL STEEL PIPE WITH GALVANIZED PROTECTIVE COATING. MANUFACTURED BY TRIANGLE WIRE AND CABLE, ALLETT TUBO AND CONDUIT, REPUBLIC OR STEELDUCT. CONDUIT FITTINGS SHALL BE MALLEABLE IRON, CADMIUM PLATED WITH FULL THREADED HUBS.

RIGID POLYVINYL CHLORIDE CONDUIT (PVC)

RIGID POLYVINYL CHLORIDE CONDUIT SHALL BE SUNLIGHT RESISTANT, RATED OR USE WITH 90 DEGREES C. CONDUCTORS, U.L. RATED, ALL PVC CONDUIT AND FITTINGS SHALL BE SOLVENT WELDED. MANUFACTURED BY CARLON, ELECTRI-FLEX OR PLASTINE.

USE SCHEDULE 80 PVC CONDUIT UNDER PARKING LOT AND OTHER AREAS SUBJECT TO VEHICULAR TRAVEL.

USE SCHEDULE 40 PVC CONDUIT UNDER WALKWAYS AND GRASS AREAS.

ELECTRICAL METALLIC TUBING (EMT)

ELECTRICAL METALLIC TUBING SHALL BE GALVANIZED THIN WALL STEEL CONDUIT, MANUFACTURED BY TRIANGLE WIRE AND CABLE, ALLETT TUBO AND CONDUIT, REPUBLIC OR STEELDUCT. THE CONNECTORS AND COUPLINGS SHALL BE HEAVY DUTY, STEEL-ZINC PLATED, SET SCREW TYPE.

FITTINGS

CONDUIT BODIES FOR RIGID GALVANIZED STEEL CONDUIT (RGS) SHALL BE MALLEABLE IRON-ZINC PLATED WITH TAPERED HUBS AND GASKETED ALUMINUM COVER.

CONDUIT BODIES FOR ELECTRICAL METALLIC TUBING (EMT) SHALL BE CAST ALUMINUM-ALUMINUM ENAMEL FINISH WITH SET SCREW HUBS AND ALUMINUM COVER.

INSULATION BUSHINGS SHALL BE HIGH IMPACT THERMOPLASTIC PHENOLIC WITH 150 DEG. C. UL TEMPERATURE RATING.

INSULATED GROUNDING BUSHINGS SHALL BE MALLEABLE IRON ZINC PLATED WITH MOLDED ON PHENOLIC INSULATION AND LAY-IN GROUNDINGS LUG.

CONDUIT LOCKNUTS SHALL BE HEAVY NUT STOCK STEEL-ZINC PLATED.

OFFSET NIPPLES SHALL BE MALLEABLE IRON ZINC PLATED WITH RIGID CONDUIT THREADING AND 3/4" OFFSET.

CONNECTORS AND COUPLINGS FOR ELECTRICAL METALLIC TUBING (EMT) SHALL BE HEAVY STEEL-ZINC PLATED WITH PRE-SET/PRE-SHAKED SET SCREWS.

CONDUIT STRAPS SHALL BE SNAP-TYPE, DOUBLE RIBBED STEEL-ZINC PLATED.

CONDUIT FITTINGS SHALL BE MANUFACTURED BY OZ GEDNEY, CROUSE-HINDS OR APPLETON.

SUPPORT FITTINGS

SUPPORT CHANNEL SHALL BE ROLL-FORMED #12 GAUGE STEEL, SOLID BASE OR BOLT HOLE BASE - HOT DIP GALVANIZED FINISH, COMPLETE WITH ANGLE FITTINGS, SPRINGS NUTS, CONDUIT SUPPORTS, 3/8" OR 1/2" THREADED RODS (SIZE REQUIRED FOR LOAD), ETC.

CABLE TIES

CABLE TIES SHALL BE FABRICATED OF ONE-PIECE HALLAR WITH NO METAL PARTS, MANUFACTURED BY BURNDY, TAB, PANDUIT OR BLACKBURN.

OUTLET BOXES

OUTLET BOXES SHALL BE GALVANIZED STEEL, FLUSH OR SURFACE MOUNTED AND OF PROPER TYPE AND SIZE AS REQUIRED FOR THE PARTICULAR APPLICATION. SIZE AND TYPE DICTATED BY THE NUMBER OF DEVICES (3 GANG MINIMUM WITH SINGLE GANG PLASTER RING FOR SINGLE DEVICE LOCATIONS), NUMBER OF CONDUCTORS AND WIRING METHOD UTILIZED. BOXES SHALL BE ADEQUATE SIZE FOR THE INSTALLATION OF CONDUCTORS WITHOUT EXCESSIVE BENDING OR CRIMPING OF THE CONDUCTORS AND DAMAGING OF CONDUCTOR INSULATION. MANUFACTURED BY STEEL CITY OR RACO.

OUTLET BOXES SHALL BE SECURED FIRMLY IN PLACE AND SET TRUE AND SQUARE. PROVIDE SUITABLE MEANS TO SUPPORT OUTLET BOX TO TAKE THE WEIGHT OF THE LIGHTING FIXTURE OR CEILING. OUTLET BOX OR BOX EXTENSION RINGS SHALL BE SET FLUSH TO THE FINISHED WALL OR CEILING. BOXES MUST BE ATTACHED THAT THEY WILL NOT ROT, SHIFT OR MOVE IN AND OUT WHEN DEVICES ARE USED. IN NO CASE SHALL BOXES BE INSTALLED BACK-TO-BACK IN A COMMON WALL DIVIDING TWO SPACES.

PANELBOARDS

PANELBOARDS SHALL BE THE COMBINATION THERMALMAGNETIC CIRCUIT BREAKER TYPE, 3 PHASE, 4 WIRE WITH THE NUMBER OF BRANCH CIRCUITS AS INDICATED ON THE SCHEDULES. PROVIDE WITH FULLY RATED HARD-DRAWN COPPER, 18 PERCENT CONDUCTIVE PHASE AND GROUND BUS. LUGS SIZED TO ACCOMMODATE WIRE QUALITY AND SIZES. PANELS SHALL BE U.L. LISTED, DOOR-IN-DOOR DESIGN. BOXES SHALL BE CORROSION RESISTANT, ZINC FINISH GALVANIZED. FRONTS SHALL BE REINFORCED STEEL POWDER FINISH PAINTED LIGHT GRAY (ANSI-61) AND SHALL BE EQUIPPED WITH CONCEALED HINGES AND CONCEALED TRIM ADJUSTING SCREWS. DIRECTORY CARD HOLDERS SHALL BE CORROSION-PROOF VALOX WITH RETRACTABLE LATCH, KEYS ALIKE. PHASE BUS SHALL BE SEQUENCED AND FULLY INSULATED RATINGS SHALL BE DISPLAYED ON THE DEAD FRONT SHIELD AND TOTALLY VISIBLE WITH THE DOOR OPEN. REFER TO SCHEDULES FOR OTHER REQUIREMENTS.

CIRCUIT BREAKERS

BRANCH CIRCUIT BREAKERS SHALL BE QUICK-MAKE, QUICK-BREAK, BOLT-IN THERMALMAGNETIC TYPE WITH VISIBLE CURRENT RATING AND TRIP POSITION, MANUFACTURED BY GENERAL ELECTRIC, SIEMENS, SQUARE D OR CUTLER-HAMMER. REFER TO SCHEDULES FOR A.C. RATING.

ALL MULTI-POLE BREAKERS SHALL BE EQUIPPED WITH HANDLE TIES FOR MULTI-POLE USE.

PHASE SEQUENCE AND BALANCING

MAINTAIN CORRECT PHASE SEQUENCE OF ALL FEEDERS AND CIRCUITS WITH PHASE IDENTIFICATION THROUGHOUT THE ENTIRE SYSTEM, BALANCING ALL FEEDERS AND CIRCUITS TO WITHIN 10 PERCENT.

JUNCTION BOXES, PULLBOXES AND HANDHOLES

JUNCTION BOXES, PULLBOXES AND WIREWAYS SHALL BE OF PROPER TYPE AND SIZES AS REQUIRED. CODE GAUGE, GALVANIZED STEEL WITH KNOCKOUTS AND FLANGES TO RECEIVE THE COVERS. COVERS SHALL BE FLAT. OF THE SAME MATERIAL AS THE BOX AND FASTENED TO THE BOX WITH MACHINE SCREWS, MANUFACTURED BY HOFFMAN, SQUARE D, OR LEE PRODUCTS.

UNDERGROUND HANDHOLES SHALL BE POLYMER CONCRETE, OPEN BOTTOM TYPE. SIZE AS REQUIRED TO ACCOMMODATE CONDUIT QUANTITIES AND ENTRY POINTS. TIERS RATING AS APPROPRIATE FOR INSTALLATION LOCATION. QUATITEZ OR EQUAL.

WIRING DEVICES

ALL DEVICES SHALL BE COMMERCIAL SPECIFICATION GRADE, U.L. LISTED, SELF-GROUNDING, GROUND LUG, SIDE-BACK WIRED, 20A RATED. COLOR SHALL BE SELECTED BY ARCHITECT OR OWNER UNLESS OTHERWISE INDICATED. MANUFACTURED BY HUBBELL, LEVITON, OR PASS A SEMOUR.

RECEPTACLES LOCATED IN WET LOCATIONS SHALL BE INSTALLED WITH AN OUTLET ENCLOSURE CLEARLY MARKED "SUITABLE FOR WET LOCATIONS" WHILE IN USE. THERE MUST BE A GASKET BETWEEN THE COVER AND THE BASE TO ASSURE A PROPER SEAL. THE ENCLOSURE MUST EMPLOY STAINLESS STEEL MOUNTING HARDWARE AND BE CONSTRUCTED OF IMPACT RESISTANT POLYCARBONATE. THE OUTLET ENCLOSURE SHALL BE U.L. LISTED, MANUFACTURED BY TAYMCK, CARLON, OR APPROVED EQUAL.

LIGHTING FIXTURES

FURNISH AND INSTALL ALL LIGHTING FIXTURES AS SPECIFIED ON THE SCHEDULES, COMPLETE WITH ALL ACCESSORIES, LOUVERS, LAMPS AND MOUNTING HARDWARE. THE FIXTURES SHOWN ARE MARKED AS TYPE A, B, C, ETC.

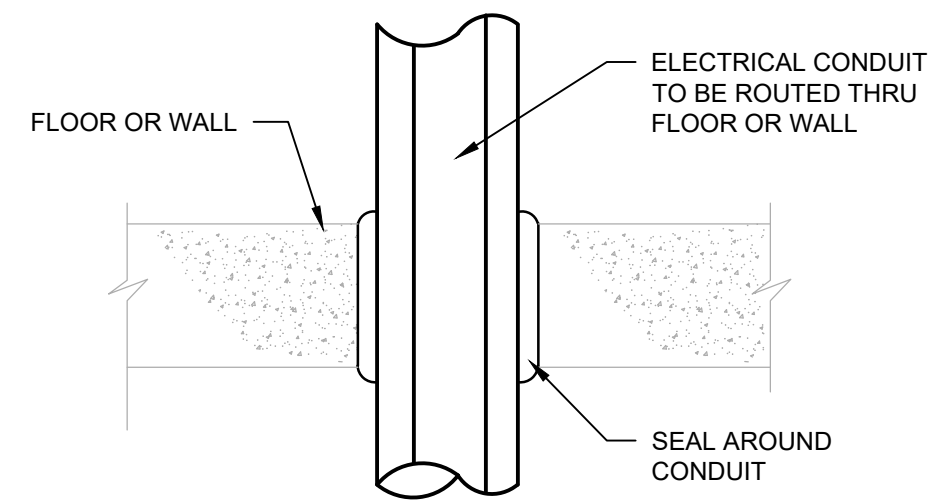
PROVIDE BASIS OF DESIGN FIXTURES LISTED IN LIGHTING FIXTURE SCHEDULE. ANY PROPOSED ALTERNATIVE LIGHTING FIXTURES SHALL BE EQUAL TO OR BETTER THAN THE BASIS OF DESIGN FIXTURES AS IT RELATES TO LIGHT CONTROL, SPILL, LIGHT LEVELS, UNIFORMITY, EFFICIENCY, GLARE AND OTHER SUCH CHARACTERISTICS.

CLEAN AND REMOVE ALL PAINT, STICKERS, DIRT, SMUDGES AND FINGERPRINTS FROM LIGHTING FIXTURES AFTER FINAL BUILDING CLEAN-UP.

LIGHTING CONTROLS SYSTEM

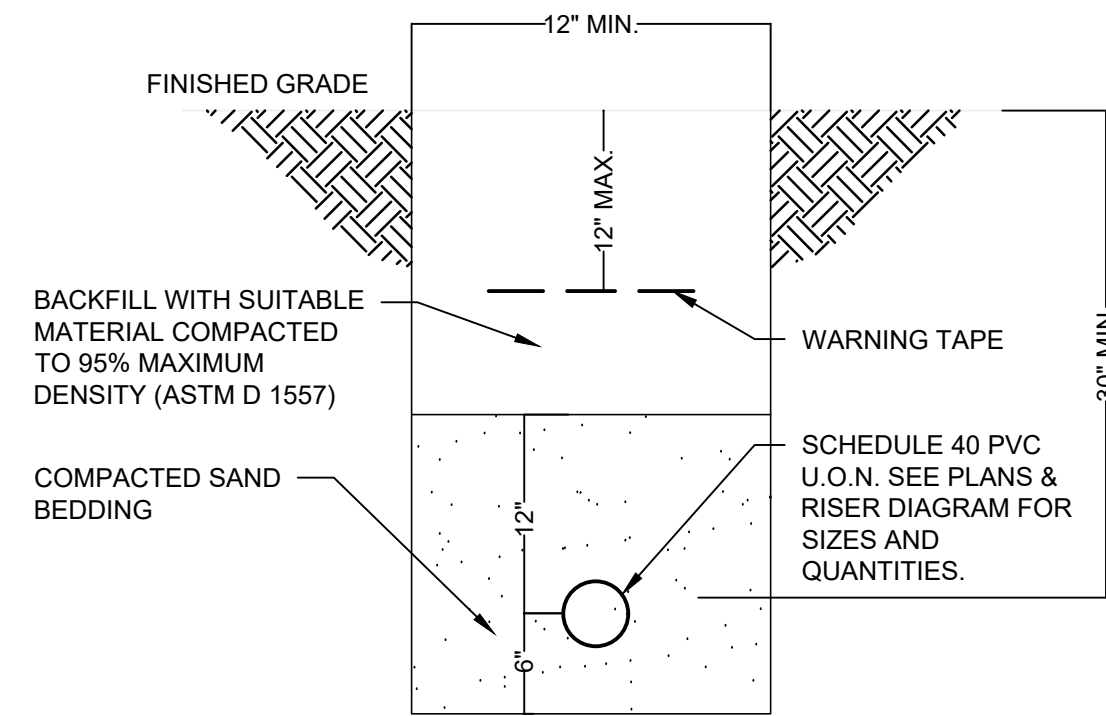
PROVIDE BASIS OF DESIGN LIGHTING CONTROL SYSTEM SHOWN ON THE DRAWINGS. ANY PROPOSED ALTERNATIVE LIGHTING CONTROL SYSTEM SHALL BE EQUAL TO OR GREATER THAN THE BASIS OF DESIGN SYSTEM CONTROLLABILITY, FUNCTIONALITY, PROGRAMMABILITY AND REMOTE ACCESS.

PROVIDE ALL COMPONENTS AS REQUIRED FOR A FULLY FUNCTIONAL SYSTEM, INCLUDING CONTROL DEVICES, WIRING, SWITCHES, LINE VOLTAGE CONNECTIONS, 0-10V CONTROL WIRING AND OTHER SUCH ITEMS.</



NON-FIRE RATED CONDUIT PENETRATION THROUGH FLOOR OR WALL DETAIL

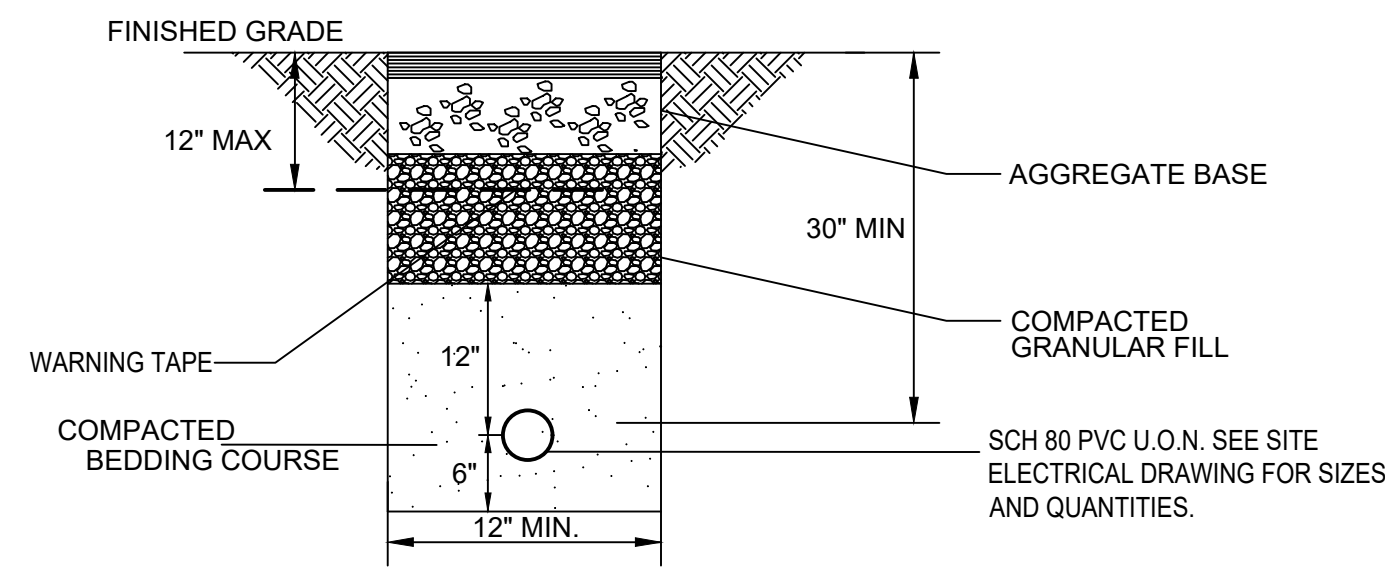
1 ES-1 NOT TO SCALE



- NOTES:
1. THE CLEAN FILL SHALL PASS THROUGH A 3/8" MESH SCREEN AND SHALL NOT CONTAIN SHARP STONES. OTHER BACKFILL SHALL NOT CONTAIN ASHES, CINDERS, SHELLS, FROZEN MATERIAL, LOOSE DEBRIS OR STONES LARGER THAN 2" IN MAXIMUM DIMENSION. THE TRENCH SHALL BE BACKFILLED IMMEDIATELY FOLLOWING PLACEMENT OF OTHER CONDUITS.
 2. WHERE EXISTING UTILITIES ARE LIKELY TO BE ENCOUNTERED, CONTRACTOR SHALL HAND DIG AND PROTECT EXISTING UTILITIES
 3. MAINTAIN 12" SEPARATION FROM OTHER UTILITIES (E.G. WATER, COMMUNICATIONS, SANITARY, ETC.)

CONDUIT INSTALLATION IN GRASS

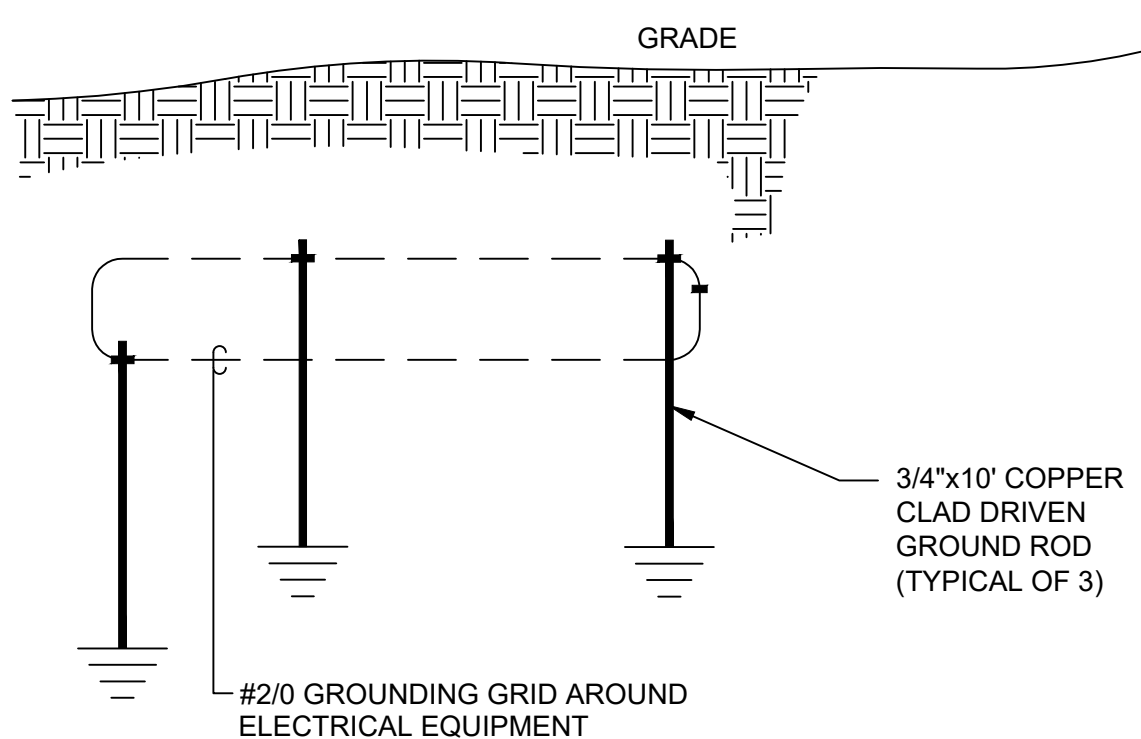
2 ES-1 NTS



- NOTES:
1. THE CLEAN FILL SHALL PASS THROUGH A 3/8" MESH SCREEN AND SHALL NOT CONTAIN SHARP STONES. OTHER BACKFILL SHALL NOT CONTAIN ASHES, CINDERS, SHELLS, FROZEN MATERIAL, LOOSE DEBRIS OR STONES LARGER THAN 2" IN MAXIMUM DIMENSION. THE TRENCH SHALL BE BACKFILLED IMMEDIATELY FOLLOWING PLACEMENT OF THE CONDUITS.
 2. WHERE EXISTING UTILITIES ARE LIKELY TO BE ENCOUNTERED, CONTRACTOR SHALL HAND DIG AND PROTECT EXISTING UTILITIES.
 3. MAINTAIN 12" SEPARATION FROM OTHER UTILITIES (E.G. WATER, COMMUNICATIONS, SANITARY, ETC.)

CONDUIT INSTALLATION IN BITUMINOUS

3 ES-1 NTS



- NOTES:
1. ALL ASPECTS OF GROUNDING SYSTEM SHALL COMPLY FULLY WITH ARTICLE 250 OF N.E.C.
 2. UTILIZE GROUNDING BUSHINGS AS REQUIRED.
 3. PROVIDE AT PAD MOUNTED ENCLOSURE & CONNECT TO SERVICE GROUND BAR.
 4. GROUND RODS SHALL BE 6'-0" APART.

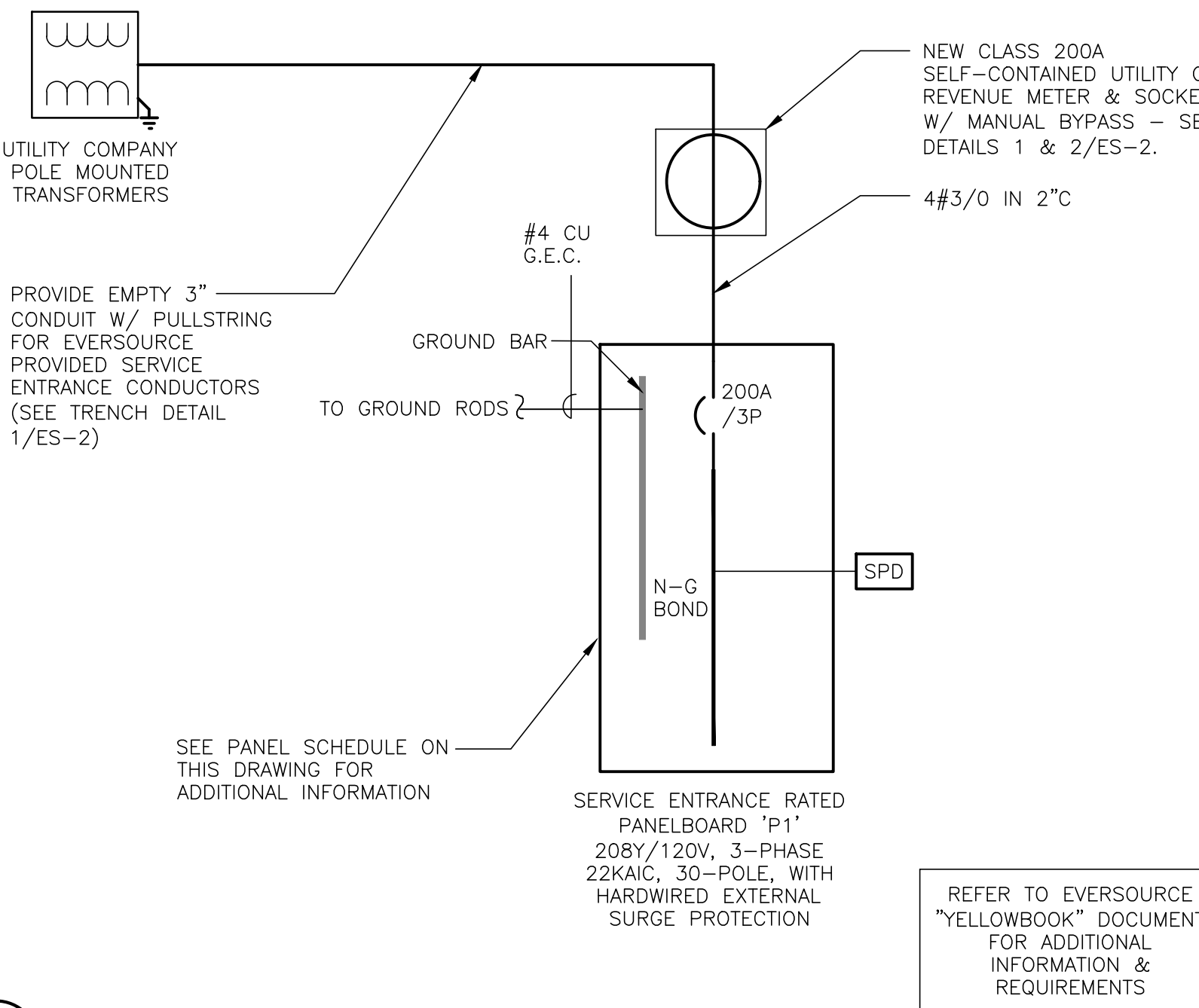
GROUND RODS / RING DETAIL

4 ES-1 NTS

LIGHT FIXTURE SCHEDULE

| TYPE | BASIS OF DESIGN | DESCRIPTION | VOLTAGE | LAMPING | REMARKS |
|------|--|--|---------|----------|---------|
| SL3S | U.S. ARCHITECTURAL LIGHTING RZRM-PLED-III-W-48LED-525mA-40K-120-1-BLACK-HS-PLED (FIXTURE) SNTS-204-11-1-BLK (POLE) | POLE MOUNTED LED AREA LIGHT, TYPE III WIDE DISTRIBUTION, 4000°K, BLACK FINISH, MOUNTED TO A 20' HIGH 4" STRAIGHT SQUARE STEEL POLE | 120V | LED, 81W | 1, 2 |
| SL4 | U.S. ARCHITECTURAL LIGHTING RZRM-PLED-IV-FT-48LED-525mA-40K-120-1-BLACK-HS-PLED (FIXTURE) SNTS-204-11-1-BLK (POLE) | SAME AS TYPE 'SL3S', BUT WITH TYPE IV FORWARD THROW DISTRIBUTION PATTERN | 120V | LED, 81W | 1, 2 |
| SL5 | U.S. ARCHITECTURAL LIGHTING RZRM-PLED-VSQ-M-48LED-525mA-40K-120-1-BLACK-HS-PLED (FIXTURE) SNTS-204-11-1-BLK (POLE) | SAME AS TYPE 'SL3S', BUT WITH MEDIUM SQUARE DISTRIBUTION PATTERN | 120V | LED, 81W | 1, 2 |

- NOTES:
1. PROVIDE ALL NECESSARY MOUNTING HARDWARE, BRACKETS, ETC.
 2. PROVIDE PRODUCTS AS SPECIFIED. ANY PROPOSED ALTERNATIVE FIXTURES MUST BE EQUAL TO OR BETTER THAN BASIS OF DESIGN AS IT RELATES TO MATERIAL/CONSTRUCTION, EFFICIENCY, COLORS/FINISHES, WATTAGE, LUMEN OUTPUT, ETC. PROVIDE PHOTOMETRIC CALCULATIONS DEMONSTRATING EQUAL PERFORMANCE.



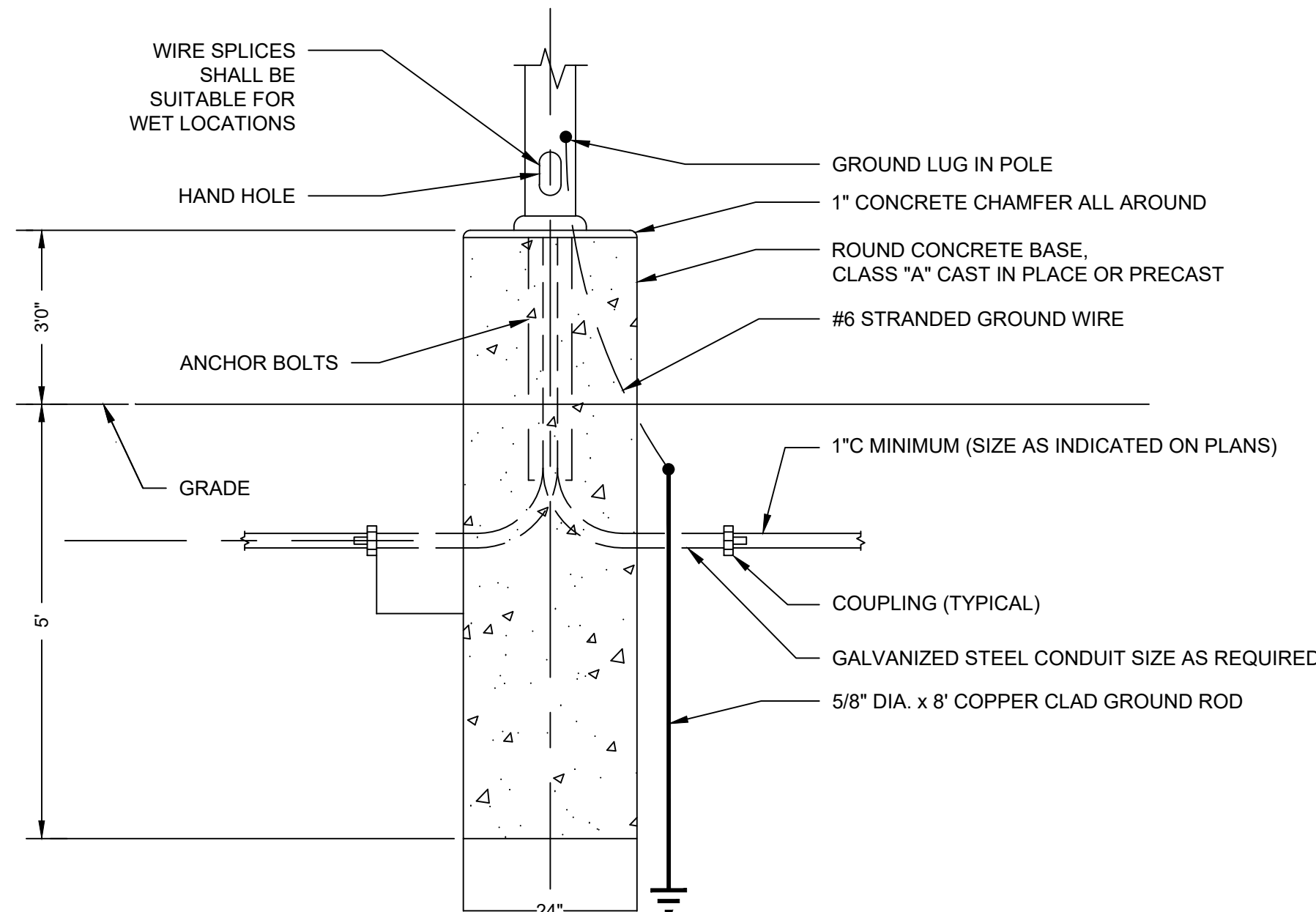
ONE-LINE POWER RISER DIAGRAM

5 ES-1 NOT TO SCALE

| MANUFACTURER: T.B.D. (NEW) | | MLO OR MCB: MCB | | PANEL: PANEL P1 | | | |
|----------------------------|--------------------------|---------------------|------|-----------------------------|------|-------------------------|---------|
| TYPE: PANEL | | FEED: SEE RISER | | VOLTAGE: 208Y/120V, 3-PHASE | | | |
| MOUNTING: SURFACE | | CU OR AL WIRE: CU | | MAIN AMPS: 200A MCB | | | |
| LOCATION: SEE PLANS | | AIC RATING: 22 KAIC | | FEEDER: SEE RISER | | | |
| BREAKER OPTIONS: | | | | | | | |
| CKT NO. | LOAD | KVA | BRKR | BRKR | KVA | LOAD | CKT NO. |
| 1 | SPARE | | 20 | 20 | | SPARE | 2 |
| 3 | SPARE | | 20 | 20 | | SPARE | 4 |
| 5 | SPARE | | 20 | 20 | | SPARE | 6 |
| 7 | SPARE | | 20 | 20 | | SPARE | 8 |
| 9 | SPARE | | 20 | 20 | | SPARE | 10 |
| 11 | SPARE | | 20 | 20 | | SPARE | 12 |
| 13 | SPARE | | 20 | 20 | | SPARE | 14 |
| 15 | SPARE | | 20 | 20 | 0.50 | RECEPTACLE IN ENCLOSURE | 16 |
| 17 | SPARE | | 20 | 20 | 0.50 | ENCLOSURE HEATER | 18 |
| 19 | SCOREBOARD #1 | 0.20 | 20 | 20 | 1.00 | RECEPTACLES (SOUTH) | 20 |
| 21 | SCOREBOARD #2 | 0.20 | 20 | 20 | 0.40 | PARKING LOT LIGHTING | 22 |
| 23 | SPARE | | 20 | 20 | 1.50 | RECEPTACLES (NORTH) | 24 |
| 25 | EMPTY SPACE / PROVISIONS | | 100 | | | SURGE PROTECTIVE DEVICE | 26 |
| 27 | EMPTY SPACE / PROVISIONS | | | | | | 28 |
| 29 | EMPTY SPACE / PROVISIONS | | | | | | 30 |

MAIN SERVICE PANEL 'P1' SCHEDULE

6 ES-1 NTS



- DETAIL NOTES:
1. CONTRACTOR SHALL CHECK AND VERIFY ALL ANCHOR BOLT DIMENSIONS, SIZE OF BOLT CIRCLE, ETC. WITH THE POLE MANUFACTURER PRIOR TO INSTALLATION OF THE POLE BASES.
 2. CHAMFER ALL EXPOSED EDGES OF THE POLE BASES.
 3. PROVIDE INSULATED GROUNDING BUSHING ON EXPOSED END OF ALL GALVANIZED STEEL BENDS IN BASE OF POLE.
 4. BASE SHALL BE CAST IN PLACE OR PRECAST.

PARKING LOT LIGHT POLE FOUNDATION DETAIL

7 ES-1 NTS

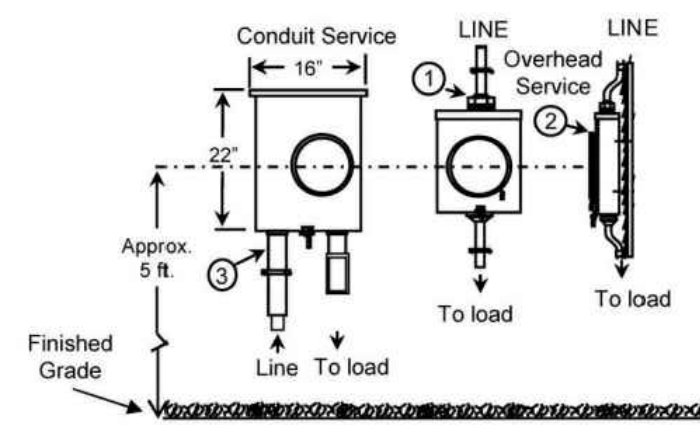


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SITE ELECTRICAL DETAILS & SCHEDULES
NORHT END FIELD
BALLFIELD RECONSTRUCTION
 210 BRITANNIA STREET
 MERIDEN, CONNECTICUT

| SG | SG | SG |
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| DESIGNED | DRAWN | CHECKED |
| | | |
| SCALE: AS NOTED | | |
| DATE: AUGUST 29, 2022 | | |
| PROJECT NO.: 14792.00004 | | |
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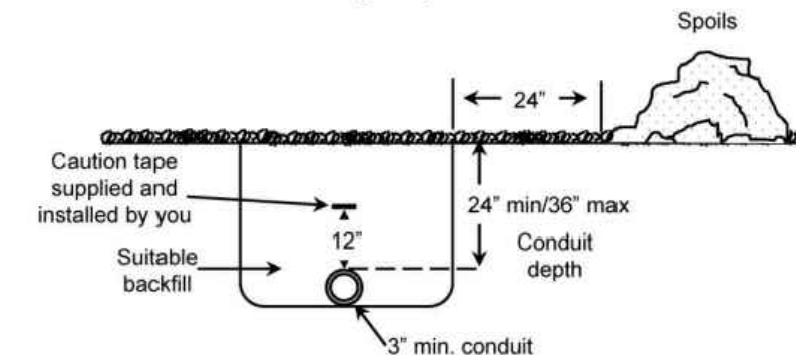
**FIGURE 10
Self-Contained Meter Socket Sequence and Mounting Arrangement**



1. Weatherproof joint with removable or non-removable hub.
2. Socket shall be mounted plumb. On clapboard shingle siding, socket shall be located on the high point of two clapboards.
3. Slip joint for conduit service shall be installed on left side of meter socket only.

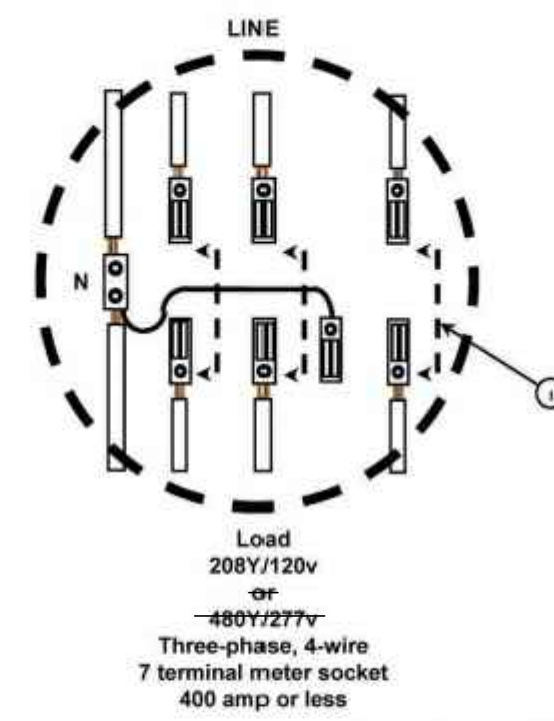
- Notes:**
- A. All network and 480Y/277 volt services will require a main disconnect ahead of the meter (cold sequence).
 - B. Self-contained meter sockets are required for:
 - Single-phase 120/240 volt, 400 amp service entrance capacity or less.
 - Single-phase 120/208 volt, 400 amp service entrance capacity or less.
 - Three-phase 400 amp service entrance capacity or less.
 - C. All equipment (except meter) furnished, installed, owned and maintained by you.
 - D. Bond at service equipment in accordance with NEC Article 250. The grounding electrode conductor connection shall be made at an accessible location in the service equipment and not in the meter socket. The grounding electrode conductor shall not be run through the meter socket. For Cold Sequenced service see p 39 Section 8.E.1a.

**FIGURE 9
Trenching Requirements**

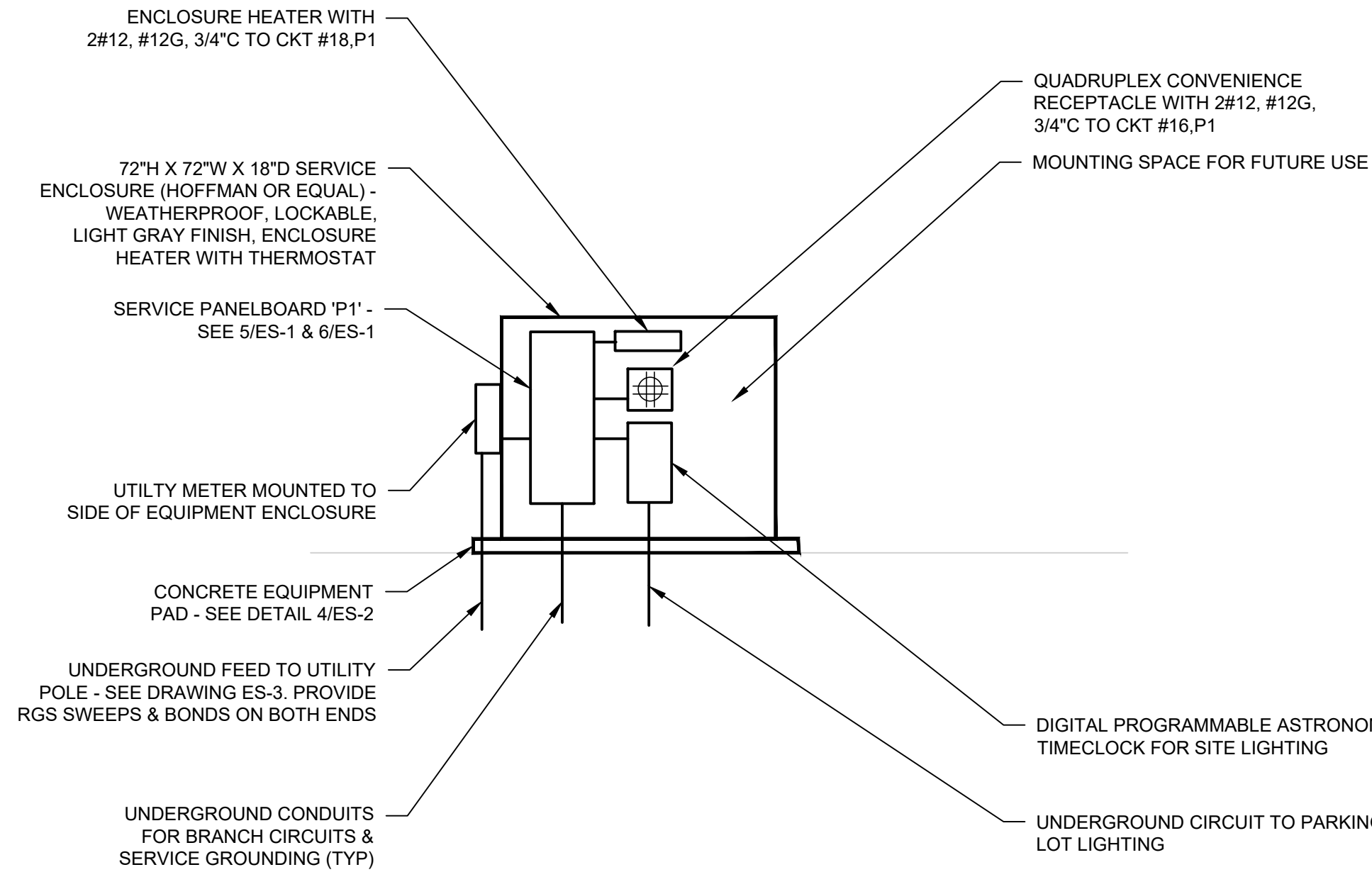


- Notes:**
- A. OSHA standards require that spoils shall be placed 24" from edge of trench.
 - B. Suitable backfill shall not contain ash, cinder, shell, frozen material, loose debris or stones larger than 2" max. dimension.
 - C. All Electrical grade Schedule 40 PVC conduit will be listed and labeled for Direct Buried and above ground use.
 - D. **Horizontal Clearance** - shall be 12 inches minimum or more as necessary to permit access for maintenance of all facilities without damage to the others. This includes private wiring. Fuel (Gas and Oil) and Water Lines shall be no closer than 18 inches in all directions.
 - E. **Vertical Crossing Clearance** - shall be so constructed and supported that upper facility will not transfer harmful load onto any lower facility. There shall be adequate vertical clearance to permit access for maintenance of all facilities without damage to the others. In general, 12 inches is considered adequate separation, but the parties involved may agree to a lesser separation. Fuel (Gas and Oil) and Water Lines shall be no closer than 18 inches in all directions.
 - F. You will provide and install the caution tape which meets the requirements of Section 16-345-3 of the Regulations of Connecticut State Agencies. The tape shall be red polyethylene, 6" wide X 4 mils thick with black lettering of a minimum letter size of 120 Helvetica Light. It shall contain the following continuous printed warning: "Caution - Electric Line Buried Below"
Metallic Foil tape is NOT acceptable.
 - F. All conduit shall be inspected by the local municipal authority prior to backfilling.

**FIGURE 21
Three-Phase Self-Contained Meter Connections**



1. An approved lever operated manual bypass with jaw release and flash shield.
- Notes:**
- A. Bond at service equipment in accordance with NEC Article 250. The grounding electrode conductor connection shall be made at an accessible location in the service equipment and not in the meter socket. The grounding electrode conductor shall not be run through the meter socket.
 - B. All three-phase network and 480Y/277 volt services will require a main disconnect with over current protection ahead of the meter (Cold Sequence).



- NOTES:**
1. PROVIDE EQUIPMENT PAD UNDER ENCLOSURE - SEE PAD DETAIL 4/ES-2.
 2. PROVIDE GROUND RING AROUND ENCLOSURE PAD - SEE GROUND RING DETAIL 4/ES-1.
 3. SEE DRAWING ES-1 FOR PANEL SCHEDULE, EQUIPMENT RATINGS, CONDUIT SIZING AND CONDUCTOR SIZING.
 4. CONDUIT SWEEPS SHALL BE RIGID GALVANIZED STEEL.

1 EVERSOURCE TRENCH & METER DETAILS

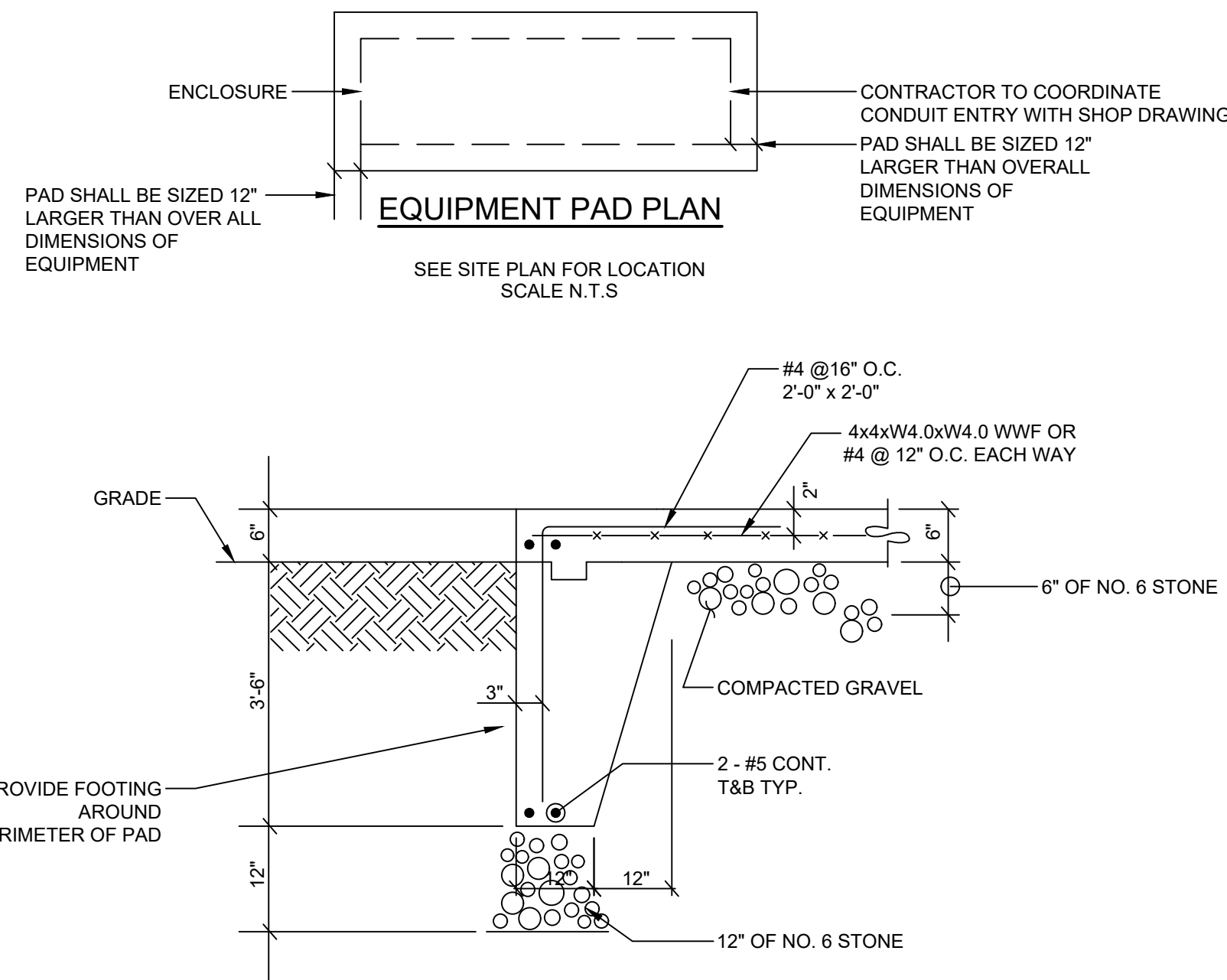
ES-2 NOT TO SCALE

2 EVERSOURCE SELF-CONTAINED METER DETAIL

ES-2 NTS

3 PAD MOUNTED ENCLOSURE DETAILS

ES-2 NTS



- NOTES:**
1. 4,000 PSI CONCRETE WITH 6% AIR ENTRAINMENT
 2. ASTM A-615, 60,000 PSI REINFORCING STEEL
 3. ASTM A-185 WELDED WIRE FABRIC
 4. PROVIDE A SMOOTH BROOM FINISH
 5. PROVIDE #2/0 FROM UNCOATED REBAR TO GROUND RING ON OPPOSITE CORNERS OF THE EQUIPMENT PAD - SEE DETAIL 4/ES-1 FOR GROUND RING DETAIL.

4 EQUIPMENT PAD DETAIL

ES-2 NTS

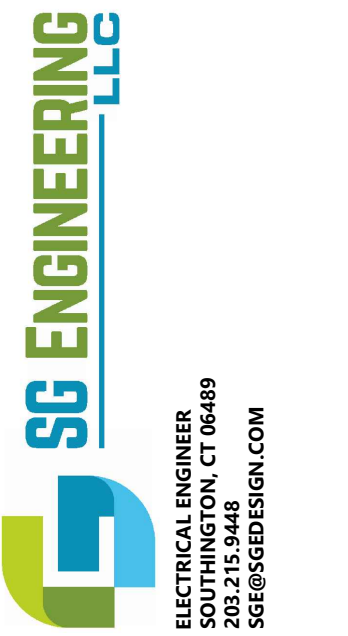
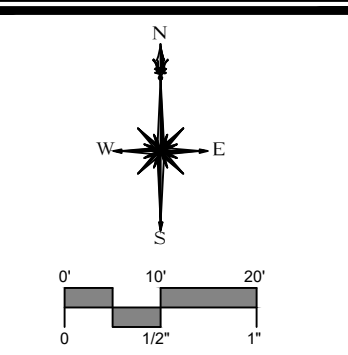


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SITE ELECTRICAL DETAILS
NORTH END FIELD
BALLFIELD RECONSTRUCTION
210 BRITANNIA STREET
MERIDEN, CONNECTICUT

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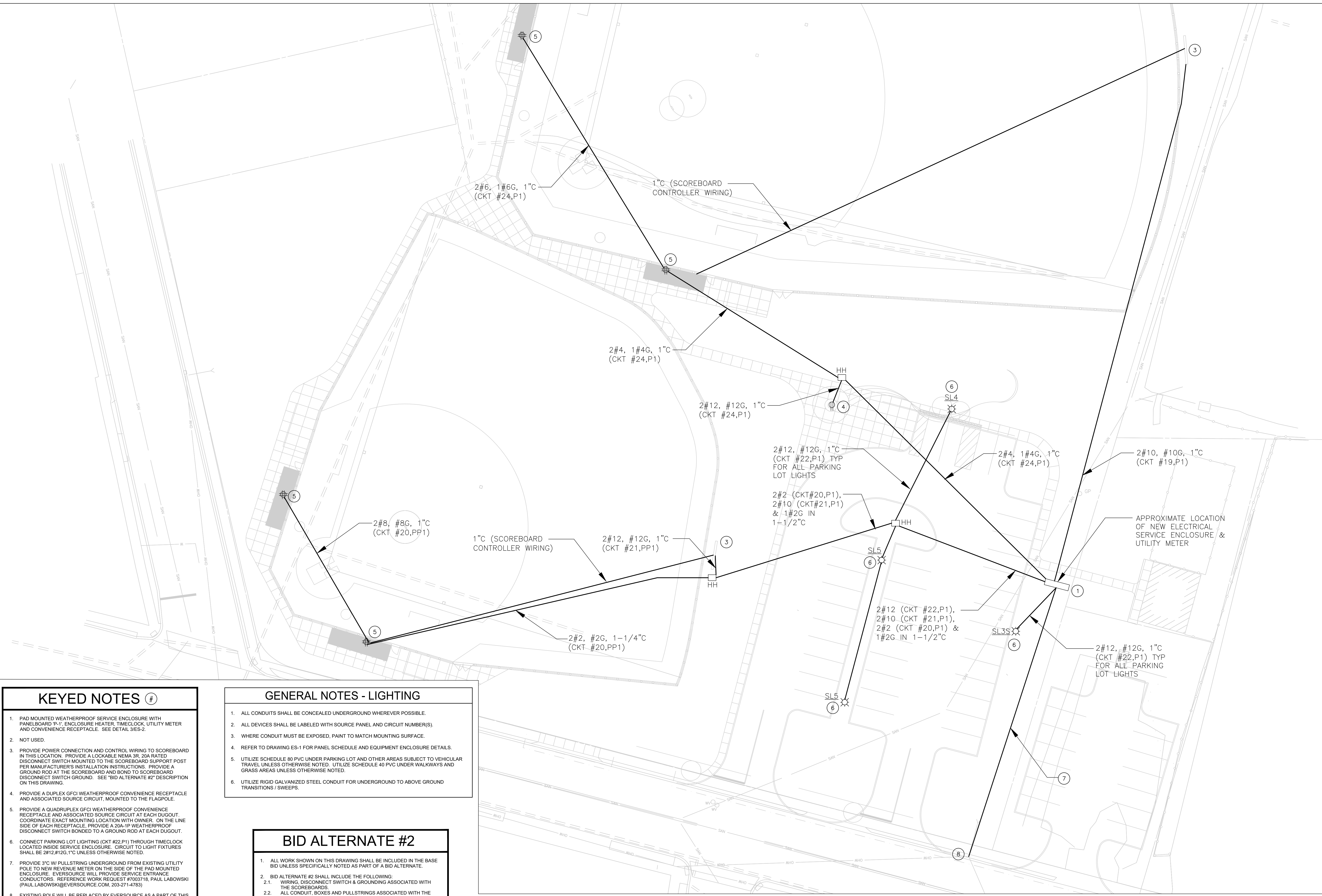
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SITE ELECTRICAL PLAN
NORHT END FIELD
BALLFIELD RECONSTRUCTION
 210 BRITANNIA STREET
 MERIDEN, CONNECTICUT

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|-------------|-----------------|----|----|
| DESIGNED | SG | SG | SG |
| DRAWN | | | |
| CHECKED | | | |
| SCALE | AS NOTED | | |
| DATE | AUGUST 29, 2022 | | |
| PROJECT NO. | 14792.00004 | | |
| SHEET NO. | -- OF -- | | |
| SHEET NAME | ES-3 | | |



- ### KEYED NOTES #
- PAD MOUNTED WEATHERPROOF SERVICE ENCLOSURE WITH PANELBOARD P-1; ENCLOSURE HEATER, TIMECLOCK, UTILITY METER AND CONVENIENCE RECEPTACLE. SEE DETAIL 3ES-2.
 - NOT USED.
 - PROVIDE POWER CONNECTION AND CONTROL WIRING TO SCOREBOARD IN THIS LOCATION. PROVIDE A LOCKABLE NEMA 3R, 20A RATED DISCONNECT SWITCH MOUNTED TO THE SCOREBOARD SUPPORT POST PER MANUFACTURER'S INSTALLATION INSTRUCTIONS. PROVIDE A GROUND ROD AT THE SCOREBOARD AND BOND TO SCOREBOARD DISCONNECT SWITCH GROUND. SEE 'BID ALTERNATE #2' DESCRIPTION ON THIS DRAWING.
 - PROVIDE A DUPLEX GFCI WEATHERPROOF CONVENIENCE RECEPTACLE AND ASSOCIATED SOURCE CIRCUIT, MOUNTED TO THE FLAGPOLE.
 - PROVIDE A QUADRUPLEX GFCI WEATHERPROOF CONVENIENCE RECEPTACLE AND ASSOCIATED SOURCE CIRCUIT AT EACH DUGOUT. COORDINATE EXACT MOUNTING LOCATION WITH OWNER. ON THE LINE SIDE OF EACH RECEPTACLE, PROVIDE A 20A-1P WEATHERPROOF DISCONNECT SWITCH BONDED TO A GROUND ROD AT EACH DUGOUT.
 - CONNECT PARKING LOT LIGHTING (CKT #22,P1) THROUGH TIMECLOCK LOCATED INSIDE SERVICE ENCLOSURE. CIRCUIT TO LIGHT FIXTURES SHALL BE 2#12,#12G,1" C UNLESS OTHERWISE NOTED.
 - PROVIDE 3" CW PULLSTRING UNDERGROUND FROM EXISTING UTILITY POLE TO NEW REVENUE METER ON THE SIDE OF THE PAD MOUNTED ENCLOSURE. EVERSOURCE WILL PROVIDE SERVICE ENTRANCE CONDUCTORS. REFERENCE WORK REQUEST #703718, PAUL LABOWSKI (PAUL.LABOWSKI@EVERSOURCE.COM, 203-271-4783)
 - EXISTING POLE WILL BE REPLACED BY EVERSOURCE AS A PART OF THIS PROJECT. HOLD CONDUIT ~10' BACK FROM POLE UNTIL IT IS REPLACED. PROVIDE STEEL SWEEP AT THE BASE OF THE UTILITY POLE. EVERSOURCE WILL BOND THE SWEEP AT THIS LOCATION.

- ### GENERAL NOTES - LIGHTING
- ALL CONDUITS SHALL BE CONCEALED UNDERGROUND WHEREVER POSSIBLE.
 - ALL DEVICES SHALL BE LABELED WITH SOURCE PANEL AND CIRCUIT NUMBER(S).
 - WHERE CONDUIT MUST BE EXPOSED, PAINT TO MATCH MOUNTING SURFACE.
 - REFER TO DRAWING ES-1 FOR PANEL SCHEDULE AND EQUIPMENT ENCLOSURE DETAILS.
 - UTILIZE SCHEDULE 80 PVC UNDER PARKING LOT AND OTHER AREAS SUBJECT TO VEHICULAR TRAVEL UNLESS OTHERWISE NOTED. UTILIZE SCHEDULE 40 PVC UNDER WALKWAYS AND GRASS AREAS UNLESS OTHERWISE NOTED.
 - UTILIZE RIGID GALVANIZED STEEL CONDUIT FOR UNDERGROUND TO ABOVE GROUND TRANSITIONS / SWEEPS.

- ### BID ALTERNATE #2
- ALL WORK SHOWN ON THIS DRAWING SHALL BE INCLUDED IN THE BASE BID UNLESS SPECIFICALLY NOTED AS PART OF A BID ALTERNATE.
 - BID ALTERNATE #2 SHALL INCLUDE THE FOLLOWING:
 - WIRING, DISCONNECT SWITCH & GROUNDING ASSOCIATED WITH THE SCOREBOARDS.
 - ALL CONDUIT, BOXES AND PULLSTRINGS ASSOCIATED WITH THE SCOREBOARDS SHALL BE INCLUDED IN THE BASE BID.

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ELECTRICAL SITE PLAN
 ES-3 SCALE: 1"= 20'-0"