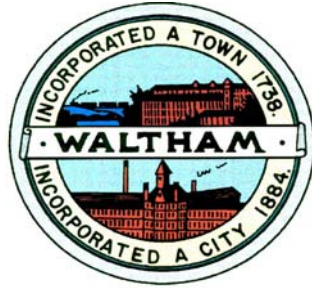


The City of Waltham



**Invites
Interested Parties
To propose the best offer and or bid
For the service or product herewith described:**

DRAKE PLAYGROUND IMPROVEMENTS

The bid opening will be held: 10:00 AM on Thursday December 17, 2015

A pre-bid conference: 2:00 PM on Tuesday December 8, 2015
(Meet 3 Hazel Street Waltham, MA 02451)

Last day for written questions: 12 Noon Wednesday December 9, 2015.

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Drake Playground Improvements

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Order of Conditions DEP File No. 316-0690

DRAWINGS

DIVISION 00

**SECTION 00020
CITY OF WALTHAM
MASSACHUSETTS**

**NOTICE TO BIDDERS
DRAKE PLAYGROUND, IMPROVEMENTS
3 HAZEL STREET
WALTHAM, MASSACHUSETTS 02451**

The City of Waltham, Massachusetts invites sealed bids from Contractors for the **Drake Playground, Improvements, 3 Hazel Street, Waltham, Massachusetts 02451**. The work of this Contract includes, but is not limited to:

1. Demolition of miscellaneous park elements as shown on the Demolition plan.
2. Installation of the following items supplied by the Owner:
 - a. Play equipment
 - b. Benches
 - c. Shade structures
3. The Contractor shall furnish and install all other improvements noted on the Drawings which are not specifically listed as furnished by the Owner. These include but are not necessarily limited to site preparation and demolition, earthwork, site drainage and infiltration system, field panel drainage system, concrete paving, bituminous concrete paving, color-coating, pre-cast concrete curbing, cast-in-place concrete walls and stairway, poured-in-place safety surfacing, chain link fencing, wood guard rail, Big Belly Kiosk, new basketball standards, backboards and goals, signage, drinking fountain and irrigation system with associated water service, reconstruction of existing athletic field including removal of existing topsoil and replacement with root zone mix, infield mix, hydro-seeding and sodding lawns and planting.
4. The work of the project is subject to DEP Order of Conditions File No. 316-60690 which conditions the work of this project, a copy of which is included as Appendix A, and is a Special Condition of the Contract. Refer to Section 01571 Order of Conditions.

PLANS, SPECIFICATIONS and other Contract Documents may be obtained by visiting the City's Web Site at www.city.waltham.ma.us/open-bids

Copies of Addenda will be e- mailed to the registered Bidders without charge. Addenda will also be posted on the web site above

Sealed **GENERAL BIDS** for this project will be accepted from eligible bidders by Joseph Pedulla, CPO at the Purchasing Department, Waltham City Hall, 610 Main Street, Waltham, MA 02452 until **10 AM on December 17, 2015**, at which place and time they shall be publicly opened, read aloud and recorded for presentation to the Awarding Authority.

A **PRE-BID CONFERENCE AND SITE INSPECTION** will be held for all interested parties at **2 PM on December 8, 2015** at the site – **Drake Playground, 3 Hazel Street, Waltham, Massachusetts 02451**. Attendance at this pre-bid conference is strongly recommended but not mandatory for parties submitting a bid. It will be the only opportunity to visit the site prior to the bid opening.

**NOTICE TO BIDDERS
00020 - 1**

Drake Playground, Improvements

LAST DAY FOR WRITTEN QUESTIONS is at 12 noon December 9, 2015. Questions are to be sent via e-mail only to Jpedulla@city.waltham.ma.us

Each general bid shall be accompanied by a bid deposit in the form of a bid bond, certified check, or a treasurer's or cashier's check issued by a responsible bank or trust company, payable to the City of Waltham in the amount of five percent (5%) of the value of the bid

Bids shall be made on the basis of the Minimum Wage Rates as determined by the Commissioner of Labor and Industries, Pursuant to the Provisions of Chapter 149, Sections 26 to 27D inclusive of Massachusetts General Laws, a copy of which is found in the City's Web site at www.city.waltham.ma.us/open-bids.

Bidders' selection procedures and contract award shall be in conformity with the rules of Commonwealth of Massachusetts statute Chapter 30, §39M.

Performance and Labor and Materials payment bonds in the full amount of the contract price will be required from the successful bidder.

The Awarding Authority reserves the right to reject any or all general bids, if it be in the public interest to do so, and to reject any sub-bid on any sub-trade if it determines that such sub-bid does not represent the sub-bid of a person competent to perform the work as specified or that less than three such sub-bids were received and that the prices are not reasonable for acceptance without further competition.

The successful bidder will be required to furnish a Certificate of Insurance, **naming the City of Waltham as an Additional Named Insured with a waiver of subrogation, for General Liability** in the amount of \$1,000,000 per occurrence and \$1,000,000 in the aggregate and Worker's Compensation Insurance as prescribed by law.

In accordance with the laws of the Commonwealth of Massachusetts the undersigned certifies that all employees to be employed at the worksite will have successfully completed a course in construction safety and health approved by OSHA that is at least 10 hours in duration at the time the employee begins work and shall furnish documentation of successful completion of said course with the first certified payroll report for each employee.

CITY ORDINANCE. APPROVAL OF CONTRACTS BY MAYOR, SEC. 3-12 OF THE CITY ORDINANCES.

All contract made by any department, board or commission where the amount involved is two thousand dollars (\$2,000) or more shall be in writing, and no such contract shall be deemed to have been made or executed until the approval of the Mayor is affixed thereto. Any construction contract shall, and all other contracts may, where the contract exceed five thousand dollars (\$5,000) be required to be accompanied by a bond with sureties satisfactory to the Mayor.

CITY OF WALTHAM

Joseph Pedulla, CPO
Purchasing Department
City Hall, 610 Main Street
Waltham, MA 02452

**NOTICE TO BIDDERS
00020 - 2**

Drake Playground, Improvements

SECTION 00100 - INSTRUCTION TO BIDDERS

PART 1 - GENERAL

1.01 SCHEDULE OF DATES

- A. Advertisement appears in Central Register, Plans and Specifications ready for Bidders at the Offices of the Waltham Purchasing Agent after 4:30 P.M. on November 25, 2015.
- B. **Pre-bid walkthrough and site inspection: December 8, 2015, at 2.30 PM. Meet at the project site 3 Hazel Street Waltham**
- C. **Questions** and requests for interpretations may be submitted in writing via e-mail ONLY to Jpedulla@city.waltham.ma.us up to **12:00 noon Wednesday December 9, 2015.**
- D. Addenda will be issued with interpretations as determined by the Purchasing Department only via e-mail and posting on the web site.
- E. **General Bids Deadline: 10 A.M. on Thursday December 17, 2015,** to Joseph Pedulla, CPO Purchasing Department, City Hall, 610 Main Street, Waltham, MA 02452, where the bids will be publicly open and read.

1.02 BIDDING PROCEDURE

- A. Bids for the work are subject to the provisions of General Laws, Chapter 30, § 39M, as amended. Regulations governing the bidding procedures as set forth in the above mentioned amended General Laws must be followed.
- B. In the event of any inconsistencies between any of the provisions of these Contract Documents and of the cited statute, anything herein to the contrary notwithstanding, the provisions of the said statute shall control.
- C. No General Bid received by the Awarding Authority after the time respectively established herein for the opening of General Bids will be considered, regardless of the cause for the delay in the receipt of any such bid.

1.03 WITHDRAWAL OF BIDS

- A. Bids may be withdrawn prior to the time respectively established for the opening of General Bids only on written request to the Awarding Authority.

1.04 INTERPRETATION OF CONTRACT DOCUMENTS

- A. No oral interpretation will be made to any bidder. All questions or requests for interpretations must be made in writing to the Architect.

**NOTICE TO BIDDER
00020 - 10**

Drake Playground, Improvements

- B. Every interpretation made to a bidder will be in the form of an Addendum to the drawings and/or specifications, which will be made available to all persons to whom Contract Documents have been issued.
- C. Failure of the Awarding Authority to send or of any bidder to receive any such Addendum shall not relieve any bidder from obligation under his bid as submitted.
- D. All such Addenda shall become a part of the Contract Documents.

1.05 EXAMINATION OF SITE AND CONTRACT DOCUMENTS

- A. Each bidder may visit the site of the proposed work and fully acquaint himself with conditions as they exist, and may also thoroughly examine the Contract Documents. Failure of any bidder to visit the site and acquaint himself with the Contract Documents shall not relieve any bidder from any obligation with respect to his bid.
- B. By submitting a bid, the bidder agrees that the Contract Documents are adequate and that the required result for a full and complete installation can be produced. The successful bidder shall furnish any and all labor, materials, insurance, permits and all other items needed to produce the required result to the satisfaction of the Awarding Authority.

1.06 BID SECURITY

- A. The General Contractor's bid must be accompanied by bid security in the amount of five percent (5%) of the bid.
- B. At the option of the bidder, the security may be bid bond, certified, treasurer's or cashier's check issued by a responsible bank or trust company. No other type of bid security is acceptable.

Bid Bonds shall be issued by a Surety Company qualified to do business under the laws of the Commonwealth of Massachusetts.

- C. Certified, Treasurer's or Cashier's check shall be made payable to the City of Waltham, Massachusetts.
- D. The bid security shall secure the execution of the Contract and the furnishing of a Performance and Payment Bond by the successful General Bidder for 50% of the contract value.
- E. Should any General Bidder to whom an award is made fail to enter into a contract therefore within five (5) days, Saturdays, Sundays and Legal Holidays, excluded, after notice of award has been mailed to him or fail within such time to furnish a Performance Bond and also a Labor and Materials or Payment Bond as required, the amount so received from such General Bidder through his Bid Bond, Certified, Treasurer's or Cashier's check as bid deposit shall become the property of the City of

**NOTICE TO BIDDER
00020 - 10**

Drake Playground, Improvements

Waltham, Massachusetts as liquidated damages; provided that the amount of the bid deposit, which becomes the property of the City of Waltham, Massachusetts, shall not in any event exceed the difference between his bid price and the bid price of the next lowest responsible and eligible bidder; and provided further that, in case of death, disability, bona fide clerical error or mechanical error of a substantial nature, or other unforeseen circumstances affecting the General Bidder, his deposit shall be returned to him.

1.07 BID FORM

- A. General Bids shall be submitted on the "FORM FOR GENERAL BID" enclosed. Erasures or other changes must be explained or noted over the signature of the bidder.
- B. Bid forms must be completely filled in. Bids which are incomplete, conditional, or obscure, or which contain additions not called for will be rejected.
- C. General Bidders shall submit one set of executed bid forms to the Awarding Authority.

1.08 SUBMISSION OF BIDS AND BID SECURITIES

- A. Each bid submitted by a General Contractor shall be enclosed in a sealed envelope that shall be placed with the bid security in an outer envelope. The outer envelope shall be sealed and clearly marked as follows:

(Firm Name): _____
General Bid and Bid Security for:
Drake Playground

1.09 AWARD OF CONTRACT

- A. The Contract shall be awarded to the lowest responsible and eligible General Bidder on the basis of competitive bids in accordance with the procedure set forth in the provision of Chapter 30, §39M of the General Laws of the Commonwealth of Massachusetts.
- B. If the bidder selected as the General Contractor fails to perform his agreement to execute a contract in accordance with the terms of his General Bid, and furnish a Performance Bond and also a Labor and Materials or Payment Bond, as stated in his General Bid an award shall be made to the next lowest responsible and eligible bidder.
- C. The words "lowest responsible and eligible bidder" shall be the bidder whose name is the lowest of those bidders possessing the skill, ability and integrity necessary for the faithful performance of the work and who shall certify that he is able to furnish labor that can work in harmony with all other elements of labor employed, or to be employed, on the work. Essential information in regard to such qualifications shall be submitted in such form as the Awarding Authority may require.

**NOTICE TO BIDDER
00020 - 10**

Drake Playground, Improvements

- D. Action on the award will be taken within sixty (60) days, Saturdays, Sundays and Legal Holidays excluded after the opening of the bids.

1.10 SECURITY FOR FAITHFUL PERFORMANCE

- A. The successful bidder must deliver to the Awarding Authority simultaneously with his delivery of the executed contract, an executed Performance Bond, and also a Labor and materials or Payment Bond, each issued by a surety company qualified to do business under the laws of the Commonwealth and satisfactory to the Awarding Authority and each in the sum of One Hundred Percent (100%) of the Contract Price, as surety for the faithful performance of his contract, and for the payment of all persons performing labor or furnishing materials in connection therewith. Said bonds shall provide that, if the General Contractor fails or refuses to complete the Contract, the Surety Company will be obligated to do so.
- B. Premiums are to be paid by the General Contractor, and are to be included in the Contract Price.

1.11 EQUAL OPPORTUNITY

- A. The City of Waltham is an Equal Opportunity employer and will require compliance with the minority business enterprise plan (MBE) on file in the Purchasing Department

1.12 PRE-BID WALK-THRU

- A. A pre-bid conference will be held at the site on **December 8, 2015, at 2.30 PM.** at the **Drake Playground, 5 Hazel Street, Waltham MA 02451.** Interested parties are encouraged to attend given that this will be the only time the site is available prior to the submission of bids. Further, prior to the bid opening, potential bidders may not go onto the site any time other than the aforementioned pre-bid conference.

1.13 SITE VISITS

- A. Prospective bidders are prohibited from going onto the site prior to the Bid Opening or any time other than the pre-bid walk-thru, as set forth in Section 1.12 above, unless authorized by the Architect in an Addendum to the bid documents.

1.14 CONTRACT DOCUMENTS

- A. The Awarding Authority shall make available the bid documents and addenda in the City Web site at www.city.waltham.ma.us/open-bids. No plans will be mailed.

1.15 EQUALITY

- A. Except where otherwise specifically provided to the contrary, the words "or approved equal" are hereby inserted immediately following the name or description of each article, assembly, system, or any component part thereof in the Contract Documents. It

**NOTICE TO BIDDER
00020 - 10**

Drake Playground, Improvements

is the Contractor's responsibility to provide all the research and documentation that would prove a product or assembly is "equal". Failure to provide research or documentation does not alleviate the Contractor's responsibility to meet the schedule.

1.16 TAX FREE NUMBER

- A. The City of Waltham has a tax-free number.

1.17 SCHEDULE

- A. The work of the Contract shall be Substantially Complete in **120 calendar days** after the date of the Notice-to-Proceed or 120 calendar days from April 15, 2016.

1.18 INTENTIONALLY LEFT BLANK

1.19 WEEKLY JOB MEETINGS

- A. There will be a weekly job meeting at the site on the same agreed-upon day and time. Time will be provided to discuss and view the progress of the work and to answer questions. The Contractor's job Superintendent and Project Manager shall attend each meeting. The City reserves the right to have job meetings conducted in the location of its choosing.

1.20 PROJECT SUPERINTENDENT

- A. The Contractor shall provide the same person as Superintendent for the entire duration of the project. Failure to maintain the same person in this position shall result in a One Thousand Dollar (\$1,000.00) penalty per incident which shall cover the Architect's time to re-orient new personnel.

1.21 AWARD

- A. The Awarding Authority reserves the right to reject any or all bids if it be in the public interest to do so, and to act upon the bids and make its award in any lawful manner.

1.22 PREVAILING WAGE SCHEDULE

- A. Bids shall be made on the basis of the Prevailing Wage Schedule, as determined by the Commissioner of Labor and Industries, pursuant to the provision of the Massachusetts General Laws. The Prevailing wage Schedule for this project can be found in the City's web Site at www.city.waltham.ma.us/open-bids

1.23 CONFLICT OF INTEREST

- A. A bidder filing a proposal thereby certifies that the proposal is made in good faith, without fraud, collusion, or connection of any kind with any other bidder for the same work, and

NOTICE TO BIDDER 00020 - 10

Drake Playground, Improvements

that the bidder is competing solely on its own behalf without connection with, or obligation to, any undisclosed person or firm.

1.24 PROCEED ORDERS

- A. No bidder is to proceed without a proceed order as set out in the contract.

1.25 INTENTIONALLY LEFT BLANK

1.26 COMPLIANCE WITH MASSACHUSETTS GENERAL LAWS

- A. Pursuant to Massachusetts General Laws, Chapter 62C, Section 49A, I certify under the penalty of perjury that I, to the best of my knowledge and belief have filed all state tax returns and paid all the state taxes required under law.

1.27 CONSTRUCTION BARRICADES

- A. The General Contractor shall provide all barricades to enclose the work area to prevent unauthorized access to the site.
 - 1. The barricades shall provide enough room for all construction activities to be performed while separated from pedestrians, students, and staff on site.
 - 2. Safety is the sole responsibility of the Contractor and any barricades necessary to protect the work and the public shall be provided.
 - 3. Provide entrance protection.

1.28 INSURANCE

- A. The contractor shall purchase and maintain, at his expense all insurance required by the Contract. Documents and all insurance required by the applicable laws of Massachusetts, including but not limited to, General Laws, Chapter 146, in connection with all hoisting equipment.
- B. The Contractor shall purchase and maintain such insurance as will protect him from claims under workmen's compensation acts and from claims for damages because of bodily injury, including death and all property damage including, without limitation, damage to buildings and adjoining the site of construction which might arise from and during operations under this contract, whether such operations be by himself or by any subcontractor or anyone directly or indirectly employed by either of them including:
 - 1. Statutory Worker's Compensation and Employer's Liability

The contractor shall provide insurance for the payment of compensation and the furnishing of other benefits under Chapter 152 of the General Laws (so-

NOTICE TO BIDDER 00020 - 10

Drake Playground, Improvements

called Worker's Compensation Act) to all persons to be employed under this contract and shall continue in force such insurance as aforesaid shall be deemed a material breach of this Contract and shall operate as an immediate termination thereof. The contractor shall, without limiting the generality of the foregoing, conform to the provisions of Section 34A of Chapter 149 of the General Laws, which Section is incorporated herein by reference and made a part of hereof.

2. Comprehensive General Liability Insurance

Minimum bodily injury limits of \$ 1,000,000 per person and \$ 1,000,000 per accident, and property damage limits of \$ 500,000 per accident and \$ 1,000,000 aggregate during any 12 month period, shall include the following:

- a. Public liability (bodily injury and property damage)
- b. X.C.U. (explosion, collapse, and underground utilities)
- c. Independent contractor's protective liability.
- d. Products and completed operations.
- e. Save harmless agreement for Owner and Architects set forth in ARTICLE 10.11 of the GENERAL CONDITIONS.

3. Comprehensive All Risk Motor Vehicle Liability Insurance

Minimum bodily injury limits of \$ 500,000 per person, \$ 1,000,000 per accident, and property damage limit of \$ 1,000,000 per accident.

4. All Risk Insurance

Covering all Contractors' equipment with a provision for Waiver of Subrogation against the Owner.

5. Excess Liability Insurance in Umbrella Form with combined Bodily Injury and Property Damage Limit of \$ 1,000,000.

6. **City of Waltham shall be a Named Additional Insured for General Liability only with a Waiver of Subrogation on the insurance policy for this project.**

1.29 SITE ACCESS

- A. The General Contractor shall gain access to the site via routes approved by the Owner.
 1. The General Contractor as part of the bid price will restore all roads, curbs, driveways, walks and grassed or landscaped areas damaged during construction.

**NOTICE TO BIDDER
00020 - 10**

Drake Playground, Improvements

1.30 CONSTRUCTION TRAILER

- A. The General Contractor shall locate the construction trailer at locations approved by the Owner.
- B. The General Contractor shall locate all on site stored or staged materials within the enclosed area designated by the Owner.

1.31 INTENTIONALLY LEFT BLANK

1.32 COMPLETE BID FORMS

- A. Please Note: Each bidder must fill in all the blanks on all the bid forms, even if the information is “zero dollars” or “not applicable”. Also, please acknowledge all Addenda issued by the Awarding Authority

2.00 FUNDS APPROPRIATION and LOAN AUTHORIZATION.

- A. THE CONTRACT OBLIGATION ON BEHALF OF THE CITY IS SUBJECT TO PRIOR APPROPRIATION OF MONIES FROM THE GOVERNMENTAL BODY AND AUTHORIZATION BY THE MAYOR.

3.0 CITY ORDINANCE. APPROVAL OF CONTRACTS BY MAYOR, SEC. 3-12 OF THE CITY ORDINANCES.

- A. All contract made by any department, board or commission where the amount involved is two thousand dollars (\$2,000) or more shall be in writing, and no such contract shall be deemed to have been made or executed until the approval of the Mayor is affixed thereto. Any construction contract shall, and all other contracts may, where the contract exceed five thousand dollars (\$5,000) be required to be accompanied by a bond with sureties satisfactory to the Mayor

Signature of Individual or Corporate Name

By:

(Signature of Corporate Officer if applicable)

Title: _____

Social Security Number or Federal Identification Number: _____

**END OF SECTION
NOTICE TO BIDDER
00020 - 10**

**DRAKE PLAYGROUND, IMPROVEMENTS
WALTHAM, MASSACHUSETTS**

General Bid Opening Date: 10 AM Thursday December 17, 2015

Joseph Pedulla, CPO
City of Waltham
610 Main Street
Waltham, MA 02452

A. Base Price

The undersigned:

_____ (Please type or print the business name of the bidding firm)

having visited the site of the above project and having familiarized myself with the local conditions affecting the cost of the work and with the contract documents, including Amendments and Addenda No's. _____ hereby proposes to furnish all labor (including Sub Bids), materials, tools, equipment, insurance, permits and taxes, and to do and lawfully perform all things as provided in the specifications, all in accordance with the contract documents, for the sum of:

BASE Bid (in words) _____, Dollars, \$ _____ (a)

POLICE DETAIL ALLOWANCE..... \$ 5,000.00 (b)

ENVIRONMENTAL REMEDIATION ALLOWANCE..... \$75,000.00 (c)

GRAND TOTAL (a + b + c) \$ _____

B. The undersigned agrees that, if s/he is selected as General Contractor, s/he will within five days, Saturdays, Sundays and legal holidays excluded, after presentation thereof by the Awarding Authority, execute a contract in accordance with the terms of this bid and furnish a performance bond and also a labor and materials or payment bond, each issued by a surety company qualified to do business under the laws of the Commonwealth and satisfactory to the Awarding Authority and each in the sum of the contract price, the premiums for which are to be paid by the General Contractor and are included in the contract price.

C. The undersigned certifies that s/he is able to furnish labor that can work in harmony with all other elements of labor employed or to be employed in the work and that s/he will comply fully with all laws and regulations applicable to awards made subject to section forty-four A.

D. The undersigned as Bidder certifies that if this proposal is accepted, s/he will furnish to the City of Waltham with the invoice for the material or equipment supplied two copies of any and all Material

Drake Playground, Improvements

Safety Data Sheets applicable to such material or equipment, as required by M.G.L. Chapter 111F, so called "Right to Know Law".

E. The undersigned certifies under penalties of perjury that this bid is in all respects bona fide, fair and made without collusion or fraud with any other person. The word "person" shall mean any natural person, joint venture, partnership, corporation, or other business or legal entity.

F. Substantial Completion

1. The work of the Contract shall be Substantially Completed in one hundred and twenty (120) calendar days from the date of the Notice-to-Proceed (NTP) or no later than one hundred and twenty (120) days from April 15, 2016.

G. In accordance with M.G.L. 30, 39M, the undersigned certifies that all employees to be employed at the worksite will have successfully completed a course in construction safety and health approved by OSHA that is at least 10 hours in duration at the time the employee begins work and shall furnish documentation of successful completion of said course with the first certified payroll report for each employee.

Sincerely,

(Bidder)

(Address of Bidder)

By:

(Title - Owner*, Partner*)

(Seal, if Corporation)

By:

(If Corporation - Name and Office)

* If the business owned by the individual or partnership is conducted under a trade or assumed name, a certified copy of doing business under an assumed name should be annexed.

SECTION 00500

AGREEMENT

CITY OF WALTHAM

ARTICLE 1. This agreement, made this _____ day of _____, 2015 by and between the CITY OF WALTHAM, party of the first part, hereinafter called the CITY, by its MAYOR, and

hereinafter called the CONTRACTOR.

ARTICLE 2. Witnesseth, that the parties to this agreement, each in consideration of the agreement on the part of the others herein contained, do hereby agree, the CITY OF WALTHAM for itself, and said contractor for his heirs, executors, administrators and assigns as follows:

To furnish all equipment, machinery, tools and labor, to furnish and deliver all materials required to be furnished (except as otherwise specified) and deliver in and about the project and to do and perform all work in strict conformity with the provisions of this Contract and of the Notice to Bidders, bid, Project Manual, and Drawings hereto annexed. The said Notice to Bidders, bid, Project Manual, and Drawings are hereby made a part of this contract as fully and to the same effect as if the same had been set forth at length and incorporated in the contracts.

ARTICLE 3. In consideration of the foregoing premises the CITY agrees to pay and the CONTRACTOR agrees to receive as full compensation for everything furnished and done by the CONTRACTOR under this contract, including all work required by not included in the items herein mentioned, and also for all loss or damage arising out of the nature of the work aforesaid, or from the action of the elements, or from any unforeseen obstruction or difficulty encountered in the prosecution of the work, and for all expenses incurred by or in consequence of the suspension or discontinuance of the work specified, and for well and faithfully completing the work, and the whole thereof, as herein provided, such prices as are set forth in the accompanying bid.

This Agreement entered into as of the day and year first written above.

00500

CITY OF WALTHAM, MASSACHUSETTS

FOR THE CITY

Jeannette A. McCarthy, MAYOR,
City of Waltham
Date: _____

Luke Stanton, Asst. City Solicitor
Date: _____
APPROVED AS TO FORM ONLY

Sandra Tomasello, Recreation Director
Date: _____

Joseph Pedulla, Purchasing Agent
Date: _____

Paul Centofanti, Auditor
Date: _____

I CERTIFY THAT SUFFICIENT FUNDS
ARE AVAILABLE FOR THIS CONTRACT

FOR THE COMPANY

CONTRACTOR (Signature),
Date: _____

Company

Address

00500

SECTION 00503

GENERAL CONDITIONS

1. INFORMATION

All information shall come from the Office of the City Purchasing Agent. The Contractor shall inquire at this office for any information needed. Wherever the words “or equal as approved” are used, it is to be understood that the opinion of the City Purchasing Agent shall govern.

2. SUITS

The Contractor shall assume defense of and shall indemnify and hold the City and its agents harmless from all suits and claims against the City and its sub-contractors arising from the use of any invention, patent right labor or employment, or from any act of omission or neglect of the City, its agents, employees or any subcontractor in performing the work, under this contract.

3. LAWS AND REGULATIONS

The Contractor shall conform to all the applicable rules, regulations, laws and ordinances of the City of Waltham, the Commonwealth of Massachusetts, the United States of America and all agencies having jurisdiction over this contract.

4. PROTECTION OF PROPERTY

The Contractor shall take all proper precautions to protect the City’s property from damage and unnecessary inconvenience. Any City property damaged by the Contractor in carrying out the provisions of this contract shall be restored to its original condition, by and at the expense of the Contractor.

5. PROTECTION OF PERSONS

The Contractor shall take all proper precautions to protect persons from injury, unnecessary inconvenience, and shall be responsible for his failure to do so. The Contractor agrees to hold the City harmless from any and all liabilities of every nature and description, which may be suffered through bodily injury, including death, to any person, by reason of negligence of the Contractor, his agents or employees, or any subcontractor.

6. INSURANCE

A. **WORKMAN’S COMPENSATION:** The Contractor shall provide by insurance for the payment of compensation and furnishing of other benefits under Chapter 152 of the General Laws of the Commonwealth of Massachusetts to all persons to be employed under this contract, the premiums for which shall be paid by the Contractor.

B. **COMPREHENSIVE GENERAL LIABILITY**

Bodily Injury:	\$1,000,000 Each Occurrence
	\$2,000,000 Aggregate
Property Damage:	\$1,000,000 Each Occurrence
	\$2,000,000 Aggregate

C. **AUTOMOBILE (VEHICLE) LIABILITY**

Bodily Injury	\$2,000,000 Each Occurrence
Property Damage	\$1,000,000 Aggregate

D. **UMBRELLA POLICY**

General liability	\$2,000,000
-------------------	-------------

Your bid response must include a Certificate of Insurance with the above limits as a minimum. In addition, the Certificate of Insurance must have the following text contained in the bottom left box of the Certificate: [“The City of Waltham is a Named Additional Insured for all Insurance”](#). The Certificate of Insurance must be mailed directly to:

Office of the Purchasing Agent
Purchasing Department
City of Waltham
610 Main Street
Waltham, MA 02452

7. LABOR AND MATERIALS BOND

The Contractor agrees to execute and deliver to the City, a Performance Bond and a Labor and Materials Bond equal to 50% of the contract value. This contract shall not be in force until said bond has been delivered and accepted by the City. Bond to be issued by a company licensed by the Commonwealth of Massachusetts.

A LETTER FROM A SURETY COMPANY CERTIFYING THAT THE CONTRACTOR IS QUALIFIED AND CAPABLE OF OBTAINING THE ABOVE BONDS MUST BE INCLUDED WITH HIS/HERS BID.

8. PERSONNEL:

The Contractor shall employ a competent supervisor and all properly licensed personnel necessary to perform the services required in this contract. The City Purchasing Agent shall have the right to require the Contractor to remove and/or replace any of the personnel for nonperformance or for unprofessional behavior. The City Purchasing Agent may require the Contractor to submit a weekly performance record of the areas and of the work performed, on forms approved by the City Purchasing Agent. The Contractor or his supervisor shall be available to inspect such work as required by the City Purchasing Agent.

9. PREVAILING WAGES

The Contractor is required to pay the prevailing wages as determined under the provisions of Chapter 149, Sections 26 and 27D of the Massachusetts General Laws, including the submission of weekly payrolls to the awarding authority. Copies of the Prevailing Wage Schedule is found on line at www.city.waltham.ma.us/open-bids

10. MATERIALS

The City or its Agent reserves the right to approve or reject any supplies, material or equipment used by the Contractor. The Contractor agrees to replace any supplies, material or equipment used by the Contractor. The Contractor agrees to replace any rejected supplies, materials or equipment, to the satisfaction of the City or its Agents.

11. TERMINATION OF CONTRACT

This contract may be terminated by the City upon deliverance to the Contractor of a five-day written notice of said termination.

12. CONTRACT OBLIGATIONS

Contract obligations on behalf of the City are subject to an annual appropriation to cover the contract obligation.

13. BIDDER EXPERIENCE EVALUATION

Each bidder shall submit with his bid, all the information relative to their experience and qualifications in performing the work required under this contract and shall have been in business for a minimum of five (5) years, in order for their bid to be considered.

14. NOT-TO-EXCEED AMOUNT

The bid amount proposed in your company's response is a "not-to- Exceed" amount unless the City makes changes, in writing, to the scope of work to be performed. The Change Order must be signed and approved by the City's Purchasing Agent, City Auditor, Law Department and the Mayor prior to the commencement of the change order work. No work is to begin until the proper approvals have been obtained. A change order will be priced at the unit price. Failure to comply with this procedure will result in the cancellation of the contract and the non-payment of services provided

16. FINANCIAL STATEMENTS.

The City may require, within five (5) days after the bid opening, a complete and detailed Financial Statement prepared by a Certified Public Account, to determine a bidder's financial stability.

17 BREACH OF CONTRACT/ NON PERFORMANCE

If the Contractor shall provide services in a manner, which is not to the satisfaction of the City, the City may request that the Contractor refurnish services at no additional cost to the City until approved by the City. If the Contractor shall fail to provide services, which are satisfactory to the City, the City in the alternative may make any reasonable purchase or Contract to purchase services in substitution for those due from the Contractor. The City may deduct the cost of any substitute Contract for nonperformance of services together with incidental and consequential damages from the Contract price and shall withhold such damages from sums due or to become due to the Contractor. If the damages sustained by the City exceed sums due or to become due, the Contractor shall pay the difference to the City upon demand. The Contractor shall not be liable for any damages sustained by the City due to the Contractor's failure to furnish services under the terms of this Contract if such failure is in fact caused by the occurrence of a contingency the nonoccurrence of which was a basic assumption under which this Contract was made, including a state of war, embargoes, expropriation of labor strike or any unanticipated federal, state or municipal governmental regulation of order, provided that the Contractor has notified the City in writing of such cause within seven (7) days after its occurrence.

18 RIGHT TO AUDIT

The City of Waltham has the right to review and audit documents related to this contract. This right extends to any subcontractor, supplier or other entity used by the prime contractor to fulfill the obligations under this contract.

19. CITY ORDINANCE. APPROVAL OF CONTRACTS BY MAYOR, SEC. 3-12 OF THE CITY ORDINANCES.

All contract made by any department, board or commission where the amount involved is two thousand dollars (\$2,000) or more shall be in writing, and no such contract shall be deemed to have been made or executed until the approval of the Mayor is affixed thereto. Any construction contract shall, and all other contracts may, where the contract exceed five thousand dollars (\$5,000) be required to be accompanied by a bond with sureties satisfactory to the Mayor.

20. BID OPENING INCLEMENT WEATHER

If, at the time of the originally scheduled bid opening, City Hall is closed to inclement weather or another unforeseeable event, the bid opening will be extended until 2:00 PM on the next normal business day. Bids will be accepted until that date and time.

21 FUNDS APPROPRIATION.

THE CONTRACT OBLIGATION ON BEHALF OF THE CITY IS SUBJECT TO PRIOR APPROPRIATION OF MONIES FROM THE GOVERNMENTAL BODY AND AUTHORIZATION BY THE MAYOR.

22 THE AWARDING AUTHORITY RESERVES THE RIGHT TO REJECT ANY OR ALL BIDS, OR ANY PART OF ANY BID, WHICH IN THE OPINION OF THE AWARDING AUTHORITY, IS IN THE BEST INTERESTS OF THE CITY OF WALTHAM.

SECTION 00600

Compliance

These documents must be signed and returned with your bid

Compliance

The compliance documents in this section must be completed, signed and returned **with your bid package**.

Purchasing Department

City of Waltham
610 Main Street
Waltham, MA 02452

Failure to submit the completed documents will cause the disqualification of the proposal.

Section Index

Check when Complete

- Non-collusion form and Tax Compliance form..... _____
- Corporation Identification Form..... _____
- Certificate of Vote Authorization..... _____
- Certificate of Insurance (showing all limits of WC &GL)..... _____
- Three (3) References..... _____
- 5% Bid Bond or Certified Check>..... _____
- Debarment Certificate _____
- Prevailing Wage Certificate..... _____
- Right-to-know Law..... _____
- OSHA 10 Certificate for all Assigned Employees (MGL ch30, §39M and Ch 149) _____

Before the commencement of the Job, the contractor must provide to the above office:

- Performance Bond for 100% of the contract value and naming the City of Waltham
(Letter must be included with your response)

Your Company's Name: _____

Service or Product Bid _____

NOTE: Failure to submit any of the required documents, in this or in other sections, with your bid response package may cause the disqualification of your proposal.

NON-COLLUSION FORM AND TAX COMPLIANCE FORM

CERTIFICATE OF NON-COLLUSION

The undersigned certifies under penalties of perjury that this bid or proposal has been made and submitted in good faith and without collusion or fraud with any other person. As used in this certification, the word “person” shall mean any natural person, business, partnership, corporation, union, committee, club, or other organization, entity or group of individuals. The undersigned certifies that no representations made by any City officials, employees, entity, or group of individuals other than the Purchasing Agent of the City of Waltham was relied upon in the making of this bid

_____, _____
(Signature of person signing bid or proposal) Date

(Name of business)

TAX COMPLIANCE CERTIFICATION

Pursuant to M.G.L. c. 62C, & 49A, I certify under the penalties of perjury that, to the best of my knowledge and belief, I am in compliance with all laws of the Commonwealth relating to taxes, reporting of employees and contractors, and withholding and remitting child support.

_____, _____
Signature of person submitting bid or proposal Date

Name of business

NOTE

Failure to submit any of the required documents, in this or in other sections, with your bid response package may cause the disqualification of your proposal.

CERTIFICATE OF VOTE OF AUTHORIZATION

Date:

I _____, Clerk of _____ hereby certify that at a meeting of the Board of Directors of said Corporation duly held on the _____ day of _____ at which time a quorum was present and voting throughout, the following vote was duly passed and is now in full force and effect:

VOTED: That _____ (*name*) is hereby authorized, directed and empowered for the name and on behalf of this Corporation to sign, seal with the corporate seat, execute, acknowledge and deliver all contracts and other obligations of this Corporation; the execution of any such contract to be valid and binding upon this Corporation for all purposes, and that this vote shall remain in full force and effect unless and until the same has been altered, amended or revoked by a subsequent vote of such directors and a certificate of such later vote attested by the Clerk of this Corporation.

I further certify that _____ is duly elected/appointed _____ of said corporation

SIGNED:

(Corporate Seal)

Clerk of the Corporation:

Print Name: _____

COMMONWEALTH OF MASSACHUSETTS

County of _____

Date:

Then personally appeared the above named and acknowledged the foregoing instrument to be their free act and deed before me, _____

Notary Public;

My Commission expires: _____

CORPORATION IDENTIFICATION

The bidder for the information of the Awarding Authority furnishes the following information.

If a Corporation:

Incorporated in what state _____
President _____
Treasurer _____
Secretary _____
Federal ID Number _____

If a foreign (out of State) Corporation – Are you registered to do business in Massachusetts?

Yes _____, No _____

If you are selected for this work you are required under M.G.L.ch. 30S, 39L to obtain from the Secretary of State, Foreign Corp. Section, State House, Boston, a certificate stating that you Corporation is registered, and furnish said certificate to the Awarding Authority prior to the award.

If a Partnership: (Name all partners)

Name of partner _____
Residence _____
Name of partner _____
Residence _____

If an Individual:

Name _____
Residence _____

If an Individual doing business under a firm's name:

Name of Firm _____
Name of Individual _____
Business Address _____
Residence _____
Date _____

Name of Bidder _____

By _____
Signature

Title

Business Address (POST OFFICE BOX NUMBER NOT ACCEPTABLE)

State Telephone Number Today's Date

PROVIDE THREE (3) SERVICE APPROPRIATE REFERENCES

1. Company Name:

Address:

Contact Name:

Phone #

Type of service/product provided to this Company:

Dollar value of service provided to this Company:

2. Company Name:

Address:

Contact Name:

Phone #

Type of service/product provided to this Company:

Dollar value of service provided to this Company:

3. Company Name:

Address:

Contact Name:

Phone #

Type of service/product provided to this Company:

Dollar value of service provided to this Company:

NOTE

Failure to submit any of the required documents, in this or in other sections, with your bid response package will be cause for the disqualification of your company.

**WEEKLY PAYROLL RECORDS REPORT &
STATEMENT OF COMPLIANCE**

In accordance with Massachusetts General Law c. 149, §27B, a true and accurate record must be kept of all persons employed on the public works project for which the enclosed rates have been provided, A Payroll Form has been printed on the reverse of this page and includes all the information required to be kept by law. Every contractor or subcontractor is required to keep these records and preserve them for a period of three years from the date of completion of the contract.

In addition, every contractor and subcontractor is required to submit, on a weekly basis, a copy of his or her weekly payroll records to the awarding authority. For every week in which an apprentice is employed, a photocopy of the apprentice's identification card must be attached to the payroll report. Once collected, the awarding authority is also required to preserve those reports for three years.

In addition, each such contractor, subcontractor, or public body shall furnish to the awarding authority directly, within fifteen days after completion of its portion of the work, a statement, executed by the contractor, subcontractor or public body who supervises the payment of wages, in the following form:

STATEMENT OF COMPLIANCE

_____, 200_____

I _____,
(Name of signatory party) (Title)

I do hereby state that I pay or supervise the payment of the persons employed by

_____ on the _____
(Contractor, subcontractor or public body) (Building or project)

and that all mechanics and apprentices, teamsters, chauffeurs and laborers employed on said project have been paid in accordance with wages determined under the provisions of sections twenty-six and twenty-seven of chapter one hundred and forty nine of the General Laws.

Signature _____, Title _____

Print _____

RIGHT TO KNOW LAW

Any vendor who receives an order or orders resulting from this invitation agrees to submit a Material Safety Data Sheet (MSDS) for each toxic or hazardous substance or mixture containing such substance, pursuant to M.G.L. c. 111F, §§8,9 and 10 and the regulations contained in 441 CMR 21.06 when deliveries are made. The vendor agrees to deliver all containers properly labeled pursuant to M.G.L. c. 111F §7 and regulations contained in 441 CMR 21.05. Failure to furnish MSDS and/or labels on each container may result in civil or criminal penalties, including bid debarment and action to prevent the vendor from selling said substances, or mixtures containing said substances within the Commonwealth. All vendors furnishing substances or mixtures subject to Chapter 111F or M.G.L. are cautioned to obtain and read the laws, rules and regulations referenced above. Copies may be obtained from the State House Bookstore, Secretary of State, State House, Room 117, Boston, MA (617) 727-2834.

Authorized Signature Indicating Compliance with the Right-to-know laws:

Signature **Date**

Print Name

NOTE

Failure to submit any of the required documents, in this or in other sections, with your bid response package may cause the disqualification of your proposal.

DEBARMENT CERTIFICATION

In connection with this bid and all procurement transactions, by signature thereon, the respondent certifies that neither the company nor its principals are suspended, debarred, proposed for debarment, declared ineligible, or voluntarily excluded from the award of contracts, procurement or non procurement programs from the Commonwealth of Massachusetts, the US Federal Government and /or the City of Waltham. "Principals" means officers, directors, owners, partners and persons having primary interest, management or supervisory responsibilities with the business entity. Vendors shall provide immediate written notification to the Purchasing Agent of the City of Waltham at any time during the period of the contract of prior to the contract award if the vendor learns of any changed condition with regards to the debarment of the company or its officers. This certification is a material representation of fact upon which reliance will be placed when making the business award. If at any time it is determined that the vendor knowingly misrepresented this certification, in addition to other legal remedies available to the city of Waltham, the contract will be cancelled and the award revoked.

Company Name _____

Address _____

City _____, State _____, Zip Code _____

Phone Number (____) _____

E-Mail Address _____

Signed by Authorized Company Representative:

Print name _____,

Date _____

10 HOURS OSHA TRAINING CONFIRMATION

Chapter 306 of the Acts of 2004

CONSTRUCTION PROJECTS

AN ACT RELATIVE TO THE HEALTH AND SAFETY ON PUBLIC

The undersigned hereby certifies that all employees to be employed at a worksite for construction, reconstruction, alteration, remodeling, repair, installation, demolition, maintenance or repair of any public work or any public building estimated to cost more than \$10,000.00 have successfully completed a course in construction safety and health approved by the **United States Occupational Safety and Health Administration** that is at least **10 hours** in duration at the time the employee begins work and who shall furnish documentation of successful completion of said course with the first payroll report for each employee and will comply with all laws and regulations applicable to awards of subcontracts subject to section 44F.

Company Name: _____

Address: _____

Signature: _____

Title: _____

Print Name _____

Date _____

See Chapter 306 of the Acts of 2004

NOTE

Failure to submit any of the required documents, in this or in other sections, with your bid response package will be cause for the disqualification of your company.

Improvements To Drake Playground

3 Hazel Street
Waltham, Massachusetts 02451

Technical Specifications

*CITY OF WALTHAM RECREATION
DEPARTMENT Sandra J. Tomasello,
Director 510 Moody Street
Waltham, MA 02453
Ph 781-314-3475*

*Prepared by:
CAROLYN COONEY & ASSOCIATES
Landscape Architects
13 Elm Street
Milford, MA 01757
Ph 508-478-8426; Fax 508-478-8607*

November 10, 2015

DIVISION 1

Technical Specifications

DIVISION 1

01010 Summary of Work
01020 Allowances
01025 Measurement and Payment
01028 Change Order
01040 Control of the Work
01050 Field Engineering
01200 Project Meetings
01300 Submittals
01400 Quality Control
01500 Temporary Facilities
01571 Order of Conditions
01700 Project Close-out

DIVISION 2

02100 Site Preparation and Demolition
02200 Earthwork
02500 Granite Curb
02510 Bituminous Concrete Paving
02540 Safety Surfacing
02545 Precast Concrete Curbing
02590 Color Coating & Crack Sealing
02622 Field Drainage System
02667 Water Service Systems
02670 Backflow Preventer Cabinet
02725 Drainage Pipe
02728 Drainage Structures
02800 Site Furnishings
02810 Irrigation System
02825 Chain Link Fencing
02845 Wood Guardrail
02850 Athletic Equipment
02860 Playground Equipment
02901 Planting Soils
02902 Fertilizers
02910 Athletic Field Root Zone & Infield Mix
02930 Sodded Athletic Field
02950 Planting
03300 Cast-in-Place Concrete
05520 Metal Railings
10430 Exterior Signs
15400 Drinking Fountain

Appendix A

Order of Conditions DEP File No. 316-0690

SECTION 01010

SUMMARY OF WORK

PART 1- GENERAL

1.01 PROJECT DESCRIPTION

- A. The project consists of improvements to the existing Drake Playground, 3 Hazel Street, Waltham, MA 02451 as described in the Contract Documents.

1.02 WORK TO BE DONE

- A. The work of this Contract includes, but is not limited to:
 - 1. Demolition of miscellaneous park elements as shown on the Demolition plan.
 - 2. Installation of the following items supplied by the Owner:
 - a. Play equipment
 - b. Benches
 - c. Shade structures
 - 3. The Contractor shall furnish and install all other improvements noted on the Drawings which are not specifically listed as furnished by the Owner. These include but are not necessarily limited to site preparation and demolition, earthwork, site drainage and infiltration system, field panel drainage system, concrete paving, bituminous concrete paving, color-coating, pre-cast concrete curbing, cast-in-place concrete walls and stairway, poured-in-place safety surfacing, chain link fencing, wood guard rail, Big Belly Kiosk, new basketball standards, backboards and goals, signage, drinking fountain and irrigation system with associated water service, reconstruction of existing athletic field including removal of existing topsoil and replacement with root zone mix, infield mix, hydro-seeding and sodding lawns and planting.
 - 4. The work of the project is subject to DEP Order of Conditions File No. 316-60690 which conditions the work of this project, a copy of which is included as Appendix A, and is a Special Condition of the Contract. Refer to Section 01571 Order of Conditions.

1.03 ITEMS TO BE SUPPLIED BY THE OWNER

- A. For those items to be supplied by the Owner, the Contractor shall provide any incidental hardware and all footings and other materials not supplied by the manufacturer, but required for installation of these items.
- B. The Contractor has certain responsibilities in connection with Owner furnished goods. Refer to Paragraph 1.13 of Section 01040 Control of the Work.

Summary of Work
01010-1

1.03 CONTRACT TIME

- A. Refer to Bid Form for the required time for Completion of the Work.
- B. The Contractor shall submit shop drawings, data and samples and place his/her orders sufficiently early to permit consideration and approval by the Landscape Architect before materials are necessary for incorporation into the Work. Any delay resulting from the Contractor's failure to do so shall not be used as a basis of a claim against the Owner.

1.04 CONTRACT DOCUMENTS

- A. The Contract Documents are enumerated in the Agreement, and include these Specifications and the Drawings, for the City of Waltham, by Carolyn Cooney & Associates, Landscape Architects, 13 Elm Street, Milford, MA 01757.
- B. The Contract Documents include, listed as Appendix A of the Specifications, Order of Conditions File Number 316-0690 issued by the Waltham Conservation Commission.

1.05 INSPECTION OF THE SITE

- A. It is a requirement of the Contract that the Contractor and his/her subcontractors shall have thoroughly inspected the site during the bidding period. By submitting a bid they confirm that they are thoroughly familiar with the site and all existing conditions which impact and affect their work. Requests for extra compensation will not be considered for any work which could have been foreseen by a visual inspection of the site.

1.06 CONTRACTOR'S USE OF THE SITE

- A. Vehicular access to the site will be limited to that equipment necessary to install the improvements.
- B. The Contractor shall furnish his/her own toilet facilities on-site.
- C. The Contractor shall take all precautions necessary to protect the abutting properties during construction. Any and all damage caused by construction operations shall be repaired.
- D. The project site shall be kept clean and free from accumulation of waste material and debris.
 - 1. The Contractor, his/her Subcontractors, and their employees shall be respectful and courteous of the neighborhood while working on site.

1.07 CITY OF WALTHAM NOISE ORDINANCE

- A. The Contractor is advised that the City of Waltham has a Noise Ordinance, Section 10-6, which has the authority to regulate the noise generating activities of this Contract. In general the Ordinance prohibits excessive noise created by construction, building, remodeling, excavating, land clearing, or by any of the equipment associated with such work. The Police Department considers the startup or idle running of truck engines and/or equipment prior to 7:00 AM a violation.

1.08 ENCLOSURES

- A. Provide at the earliest practical time temporary enclosure of materials, work in progress and completed portions of the work to provide protection to the work and the employees.

1.09 SAFETY AND SECURITY

- A. The Contractor shall be responsible for the safety and security of those areas of the park site where construction is occurring and for the safety of all persons who enter within the Contract Limit Line.
 - 1. Drake Playground shall be closed to the public throughout the duration of construction activity. Gates or other temporary openings in the fencing used to allow construction personnel or equipment access shall be maintained closed at all times to prevent access by the public.
 - 2. The Contractor shall provide signage, in locations as indicated on the Drawings and as described 01500-Temporary Controls & Facilities, indicating the temporary closure of the park.
 - 3. Safety measures shall include all those actions deemed necessary by the Contractor to ensure the safety of park users. These shall include but are not necessarily limited to:
 - (a) Temporary fencing at perimeter of the park as indicated on the Drawings.
 - (b) Filling in of all excavations at the end of the work day.
- B. The Contractor shall be responsible for initiating, maintaining, and supervising all safety precautions & programs in connection with the work. He/she shall promulgate safety regulations and shall notify the Owner of particular hazards.
- C. The Contractor shall erect and maintain, as required by existing conditions and progress of work, all reasonable safeguards for safety and security. This includes the construction of barriers and the posting of danger signs and other warnings against hazards. By these and other necessary methods the Contractor shall stop unauthorized entry within the Contract Limit of Work Line, which for this project is defined by the temporary

construction fencing shown on the Drawings.

- D. The Contractor is responsible for provision of additional safeguards not specifically required by the Drawings if these are necessary to protect health and safety.
- E. The Contractor shall cooperate with and maintain a close liaison with the Recreation Department, Planning Department, Police Department, and Fire Department, and he/she shall abide by safety or security related requests from any of these authorities.

END OF SECTION

SECTION 01020

ALLOWANCES

PART 1- GENERAL

1.01 ALLOWANCE FOR POLICE DETAIL

- A. The Contractor shall include as a line item in his/her bid, an allowance in the amount of \$5000 for the cost of police detail. This sum shall be included in the total bid price proposed by the Contractor.
- B. This allowance will cover the cost to the Contractor for police detail, if required to complete the work of this Contract.
 - 1. The cost for police detail will be reimbursed to the Contractor as described in Section 1040 - Control of Work, Section 1.05 Traffic Police.
- C. If the cost for Police Detail is more or less than the allowance, the Contract Sum shall be adjusted accordingly by Change Order.
- D. The allowance and reimbursement for police detail does not include any provisions for Contractor overhead and profit or other expenses related to police detail, other than the direct costs billed to the Contractor by the City of Waltham Police Department.

1.02 ENVIRONMENTAL CONDITIONS ALLOWANCE

- A. The intent of this Allowance is for changes in the work related to unanticipated subsurface conditions the mitigation of which is necessary to complete the work of the project. The Sum to be included for this Allowance shall be Seventy-Five Thousand dollars (\$75,000). This sum shall be included in the total bid price proposed by the Contractor, and shall be shown as a line item on the Bid Form.
- B. The work relating to this Allowance will be completed only when and as directed by the Owner. The Contractor may not proceed with any work under this Allowance without the written notice of the Owner, at a mutually agreed upon fair and equitable price for the change in the work.
- C. If at the completion of the project, the cost for this work is more or less than the Allowance, the Contract Sum shall be adjusted accordingly by Change Order.

END OF SECTION

Allowances
01020-1

SECTION 01025

MEASUREMENT AND PAYMENT

PART 1- GENERAL

1.01 BASE BID & ALTERNATES

A. Measurement & Payment

1. Payment for construction of Improvements to Drake Playground will be on a lump-sum basis.
2. Payment of the lump-sum price under the Base Bid of the Proposal will fully compensate the Contractor for furnishing all labor, materials, equipment and incidentals required for work described in Section 01010, Summary of Work of this Specification.

1.02 PAYMENT PROCEDURES

- A. Contractor shall submit substantiated monthly estimates for progress payments. The period covered by each Application for Payment shall be one (1) calendar month ending on the last day of the month.
- B. Payment will be made in accordance with the requirements of Section 39K, M.G.L.
- C. Initial Application for Payment: Administrative actions and submittals that must precede or coincide with submittal of first Application for Payment include the following:
 1. List of subcontractors.
 2. Schedule of Values.
 3. Contractor's Construction Schedule (preliminary if not final).
 4. Products list.
 5. Submittals Schedule (preliminary if not final).
 6. Copies of permits.
 7. Initial progress report.
 8. Certificates of insurance and insurance policies.
- D. Refer to Section 01700 - Project Close-out for additional requirements for payments at Substantial Completion and Final Completion.

1.03 ADDITIONAL WORK

- A. Additional Work, if any, shall be performed at a mutually satisfactory price agreed upon between the Contractor and the Owner through the process described in Section 01028 - Change Order Procedure.

END OF SECTION

Measurement & Payment
01025-1

SECTION 01028

CHANGE ORDER PROCEDURE

PART 1 - GENERAL

1.01 GENERAL PROVISIONS

- A. Attention is directed to Attachment A and D of the Contract, concerning Change Orders. All Change Orders must be signed and approved by the Mayor of Waltham, the Chief Procurement Officer and the City Auditor prior to execution of the Work.

1.02 SCOPE OF WORK

- A. Work included: Make such changes in the Work, in the Contract Sum, in the Contract Time of Completion, or any combination thereof, as are described in written Change Orders signed by the Owner and issued after execution of the Contract, in accordance with the provisions of this Section.

1.03 SUBMITTALS

- A. Make submittals directly to the Landscape Architect at the address shown on the Project Manual.
- B. Prepare in accordance with change order format in Appendix A of the Contract.

1.04 PRODUCT HANDLING

- A. Maintain a "Register of Proposal Requests and Change Orders" at the job Site, accurately reflecting current status of all pertinent data.
- B. Make the Register available to the Landscape Architect/Engineer for review at his/her request.

1.05 CHANGES INITIATED BY THE OWNER

- A. Should the City contemplate making a change in the Work or a change in the Contract Time of Completion, the Landscape Architect will issue a "Proposal Request" to the Contractor.
 - 1. Proposal Requests will be dated and will be numbered in sequence.
 - 2. The Proposal Request will describe the contemplated change, and will carry one of the following instructions to the Contractor:
 - (a) Make the described change in the Work at no change in the Contract Sum and no change in the Contract Time of Completion.
 - (b) Make the described change in the Work, credit or cost for which will be determined in accordance with pertinent paragraphs of Appendix D Change Orders.

Change Order Procedure

01028-1

1.06 CHANGES INITIATED BY THE CONTRACTOR

- A. Should the Contractor discover a discrepancy among the Contract Documents, a concealed condition, or other cause for suggesting a change in the Work, a change in the Contact Sum, or a change in the Contact Time of Completion, he shall notify the Landscape Architect.
- B. Upon agreement by the Landscape Architect that there is reasonable cause to consider the Contractor's proposed change, the Landscape Architect will issue a Proposal Request in accordance with the provisions described in Article 1.05 above.

1.07 PROCESSING PROPOSAL REQUESTS

- A. In response to each Request for Proposal, the Contractor shall:
 - 1. Submit to the Landscape Architect for review one copy of completed Change Order Form (Appendix A of the Contract).
 - 2. Meet with the Landscape Architect as required to explain costs and, when appropriate, to determine other acceptable ways to achieve the desired objective.
 - 3. Alert pertinent personnel and subcontractors as to the impending change and, to the maximum extent possible, avoid such work as would increase the Owner's cost for making the change, advising the Landscape Architect in writing when such avoidance no longer is practicable.
- B. Upon the signature of the Chief Procurement Officer and the City Auditor, the Landscape Architect will issue a "Change Order" to the Contractor.

1.08 CHANGE ORDERS

- A. Change Orders will be dated and will be numbered in sequence.
- B. The Change Order will describe the change or changes and will refer to the Proposal Request(s) involved.
- C. The Landscape Architect will issue four copies of each Change Order to the Contractor.
 - 1. The Contractor promptly shall sign all four copies and transmit all four copies to the Owner for processing.

END OF SECTION

SECTION 01040

CONTROL OF WORK

PART 1 - GENERAL

1.01 GENERAL PROVISIONS

- A. Attention is directed to the General Conditions of the Contract, all Divisions of the Specifications and the Contract Drawings, all of which apply to this section.
- B.

1.02 EQUIPMENT

- A. The Contractor shall furnish equipment which will be efficient, appropriate, and of sufficient quantity to secure a satisfactory quality of work and a rate of progress which will insure the completion of the Work within the time stipulated in the Contract Documents. If at any time such equipment appears to the Owner to be inefficient, inappropriate or insufficient for securing the quality of work required or for producing the rate of progress aforesaid, he may order the Contractor to increase the efficiency, change the character, or increase the equipment and the Contractor shall conform to such order. Failure of the Owner to give such order shall in no way relieve the Contractor of his obligations to secure the quality of work and rate of progress required. In addition, the Contractor shall maintain his equipment, including mufflers, oil seals or gaskets, and air pollution control devices, in proper working order.

1.03 PROJECT MANAGEMENT

- A. The Work must be completed in a continuous uninterrupted operation. The Contractor must use sufficient labor and equipment to complete all the necessary work requirements within a minimum period of time and as stated in the Contract Documents.
- B. Prior to the start of work, the Contractor shall submit a Progress Schedule in a bar chart form at the preconstruction meeting to the Landscape Architect for completing the Work. See Section 01300 - Submittals of this Specification.
- C. The Contractor is fully responsible for the security and safety of partially completed work until the Project is finally accepted by the Owner and the Landscape Architect.
- D. Hours of work for construction activities are limited to 8:00 AM to 4:00 PM Monday through Friday. Any changes to the work schedule must be authorized by the Landscape Architect and City Officials.
- E. All work areas shall be secured, and materials and equipment shall be removed at the end of each work day.

- F. The Contractor shall retain on the Project during its progress, a competent full-time representative. This representative shall not be changed except with the consent of the Owner and Landscape Architect. The representative shall be in full charge of the Work and all instructions given to him shall be binding.

1.04 CONSERVATION COMMISSION ORDER OF CONDITIONS

- A. The work of the project is subject to DEP Order of Conditions File No. 316-60690 which conditions the work of this project, a copy of which is included as Appendix A, and is a Special Condition of the Contract. Refer to Section 01571 Order of Conditions.

1.05 CITY OF WALTHAM NOISE ORDINANCE

- A. The Contractor is advised that the City of Waltham has a Noise Ordinance, Section 10-6, which has the authority to regulate the noise generating activities of this Contract. In general the Ordinance prohibits excessive noise created by construction, building, remodeling, excavating, land clearing, or by any of the equipment associated with such work. The Police Department considers the startup or idle running of truck engines and/or equipment prior to 7:00 AM a violation. Permits to waive the noise ordinance must be approved and issued by the Chief of Police.

1.06 TRAFFIC POLICE

- A. The Contractor shall provide for traffic control by uniformed police officers during all work within City streets. All bills for police detail must be paid in full by the Contractor. The Contractor will be reimbursed for these payments only after a qualifying bill stamped "Paid" by the City of Waltham Treasurer's Office is submitted to the Landscape Architect for reimbursement. Payment for special duty police will be made to the Contractor at a dollar for dollar reimbursement. Said price and payment shall be full compensation for furnishing all special duty police. The Contractor shall include in the lump sum bid price his/her line item an allowance for police detail as described in Section 01020 - Allowances.
- B. The rate of payment for any police officer employed by the Contractor shall be at the rate established by the police department providing services for special duty police officers (MGL 149 34B). Payment shall be made by the Contractor within 30 days of billing. Failure to pay an outstanding bill within 30 days may result in a penalty charge to the Contractor for late payment. There will be no reimbursement for any penalties or late charges that may be assessed against the Contractor for late payment. Furthermore, the Landscape Architect will accept no further requests for payment if police detail bills are more than 30 days in arrears.
 - 1. The estimated cost for police detail is \$369.60 per officer per day (8 hrs). One-half day (4hrs) is \$184.80, which is the minimum charge per day.
- C. It is suggested that payments be made in person at the Treasurer's Office and that a photocopy of the bill be presented to the Treasurer's Office at the same time so that it

may be stamped "PAID" and then presented to the Landscape Architect by the Contractor as proof of payment.

- D. The Contractor will not be reimbursed for any detail that he fails to cancel when it is not required (inclement weather, change of plans, etc.). Reimbursement shall be made on all qualifying bills stamped "PAID" by the appropriate Treasurer's Office, less any amount for unnecessary details not cancelled by the Contractor, and presented to the Landscape Architect. Reimbursement may be entered in the next following request for payment.

1.07 SITE INVESTIGATION OF EXISTING CONDITIONS

- A. The Contractor acknowledges that he/she has satisfied him/herself as to the conditions existing at the Site of the Work, the type of equipment required to perform the Work, the quality and the quantity of the materials to be furnished insofar as this information is reasonably ascertainable from an inspection of the Site, as well as from information presented by the Specifications made a part of the Contract. Any failure of the Contractor to acquaint himself/herself with available information will not relieve him from the responsibility for estimating properly the difficulty or cost of successfully performing the Work.
- B. No claim for extra compensation or extension of time will be allowed due to the Contractor's failure to estimate properly the quantities, locations and measurements of all items required to complete the Work.
- C. Report any discrepancies to the Landscape Architect and request her/his interpretation.

1.08 PROTECTION OF WORK AREA

- A. The Contractor shall secure all work areas by 4:00 PM each work day.
- B. All of the Contractor's equipment, supplies, etc. left on-site, shall be secured daily. In no case will the Owner assume responsibility for damage or loss of materials, tools or equipment left on-site.
- C. The Contractor shall take precautions to prevent injury to the public due to open excavations or excavated materials. All trenches, excavated materials, equipment, or other obstacles which could be dangerous to the public shall be secured in an agreed upon staging area.

1.09 LAWS AND REGULATIONS

- A. The Contractor shall keep himself fully informed of all State and Federal laws and Municipal ordinances and regulations in any manner affecting those engaged or employed in the Work, or the materials used in the Work, or in any way affecting the conduct of the Work, and of all such orders and decrees of bodies or tribunals having any jurisdiction or authority over the same.

- B. If any discrepancy or inconsistency is discovered in the Plans, Specifications, or Contract for the Work in relation to any such laws, ordinances, regulations, orders or decrees, the Contractor shall forthwith report the same to the Landscape Architect in writing. He/she shall at all times himself/herself observe and comply with, and shall cause all his/her agents and employees to observe and comply with all such laws, ordinances, regulations, orders, and decrees, and shall protect and indemnify the Owner and its officers, agents and servants against any claim or liability arising from or based on the violation of any such laws, ordinances, regulations, and orders or decrees, whether by himself/herself or his/her employees or subcontractors.

1.10 PERMITS AND CODES

- A. Under this Contract, all work shall be as shown in the Contract Drawings and Specifications and shall comply with applicable codes and regulations at the local, county, state, and federal levels. All labor, materials, equipment and services necessary to make the Work comply with such requirements shall be provided without additional cost to the Owner.
- B. Do not close any street, sidewalk, alley, or passageway. Conduct operations as to interfere as little as possible with the use ordinarily made of roads, driveways, alleys, sidewalks, or other facilities near enough to the Work to be affected thereby.
- C. Where code references are given, the latest issue of that Code in effect at the time of bidding shall be used. Code references are given to indicate the minimum quality and performance acceptable. Where Specifications and/or Contract Drawings indicate more stringent requirements, the Specifications or Contract Drawings shall govern.
- D. The Contractor, under this Contract shall be responsible for providing and filing all Plans, Specifications and other documents, pay all requisite fees and secure all permits, inspections and approvals necessary for legal installation and operation of the systems and or equipment furnished under this Contract, except as otherwise specified.
 - 1. Fees for City of Waltham permits will be waived by the City.
- E. Comply also with applicable provisions of American National Standard Code for Building Construction ANSI A10.6.

1.11 INSPECTION AND TESTS

- A. Testing shall be as specified in Section 01400-Quality Control.
- B. All material and workmanship shall be subject to inspection and examination by the Landscape Architect at any and all times during construction.
- C. All work that is unsatisfactory, or fails to comply with the Specifications in the opinion of the Landscape Architect or City Officials, shall be corrected by the Contractor at his own

expense to the satisfaction of the Landscape Architect.

1.12 SANITARY REGULATIONS

- A. The Contractor shall provide adequate sanitary facilities for the use of those employed on the Work. Such facilities shall be made available when the first employees arrive on the Site of the Work, shall be properly secluded from public observation, and shall be constructed and maintained during the progress of the Work.
- B. The Contractor shall maintain the sanitary facilities in a satisfactory and sanitary condition at all times and shall enforce their use. He/she shall vigorously prohibit the committing of nuisance on the Site of the Work, on lands of the Owner, or an adjacent property.

1.13 COORDINATION AND RECEIPT OF OWNER FURNISHED MATERIALS

- A. The Contractor shall coordinate with the Owner concerning the scheduling and delivery of Owner furnished items and as follows:
 - 1. Upon receipt of the Notice to Proceed, the Contractor shall provide the Owner with their contact information and address for delivery. Subsequently, the Owner will provide this information to the Supplier, after which the Contractor shall assume complete responsibility for coordinating with the Supplier.
- B. The Contractor shall be responsible for receipt, unloading, inspection of and storage of all Owner furnished items from the time of delivery.
 - 1. The Contractor shall be responsible for unloading of all deliveries. The Contractor shall pay any extra delivery charges at the point of delivery such as off-loading by the supplier, lift-gate or inside deliveries should these services be required.
 - 2. The Contractor is responsible for inspecting deliveries to ensure correct quantities and undamaged goods. The Contractor shall be responsible for addressing any deficiencies of the order with the supplier to obtain the correct goods.
 - 3. The Contractor shall be responsible for following suppliers stated policies for time to return or notify of damaged goods.
 - 4. The Owner assumes no responsibility for communicating with the supplier concerning damaged, missing, or incorrect goods.

1.14 COORDINATION WITH UTILITIES

- A. The Contractor shall coordinate his/her Work with the utility companies to prevent damages or disruption to existing equipment and to coordinate new utility

installations. The Contractor shall contact the utility companies owning underground equipment in the area of his work prior to commencing excavation. Contact with the utility companies shall be made sufficiently in advance so they can properly locate their equipment.

- B. The contractor shall be responsible for locating all site items such as utilities which could be affected by this Contract prior to the start of construction. The Contractor shall contact Dig-Safe (1-888-344-7233) prior to the start of construction, and obtain a Certificate verifying that the location work has been completed. Contact the City of Waltham Engineer to verify the location of additional on-site utilities. Contact telephone and communications companies to verify location of cables.
- C. All right-of-way and site utilities (water, sewer, drainage) shall be inspected and approved by the City Engineer's Office.
- D. Site information: No representations are made indicating subsurface conditions. It is expressly understood that the Owner/Landscape Architect will not be responsible for interpretations or conclusions drawn therefrom by the Contractor.

1.15 FIRE PROTECTION

- A. Gasoline and other flammable liquids shall not be stored on site. They shall be dispensed from a UL listed safety containers in conformance with the National Board of Fire Underwriters recommendations. Do not store flammables near buildings.

1.16 CLEANUP

- A. During the course of the Work, the Contractor shall keep the Site in as clean and neat a condition as possible. He/she shall dispose of all residue resulting from the work. At the conclusion of the day's work, the Contractor shall leave the entire Site of the Work in a neat and orderly condition.

END OF SECTION

SECTION 01050

FIELD ENGINEERING

PART 1 - GENERAL

1.01 GENERAL PROVISIONS

- A. Attention is directed to the General Conditions of the Contract, all Divisions of the Specifications and the Contract Drawings, all of which apply to this section.
- B. Examine and coordinate all Contract Drawings and other section of the Specifications for requirements which affect work of this section whether or not such work is specifically mentioned in this section. Coordinate work with other trades to assure the steady progress of all work under the Contract.

1.02 SCOPE OF WORK

- A. The Work under this Section consists of, but is not limited to:
 - 1. Field staking the horizontal and vertical alignment of site improvements.
 - 2. All major site features, including steps, walls, play areas and field shall be laid out by a Surveyor registered in the State of Massachusetts.
- B. Refer to Section 01700 Project Close-out for As Built Survey requirements.

PART 2 - MATERIALS

2.01 LAYOUT AND STAKING

- A. The Contractor shall be responsible for furnishing all stakes, pins, and grade markings as required to implement the work of layout and staking and shall make all field adjustments ordered by the Landscape Architect at no extra cost to the Owner.
- B. Upon request by the Landscape Architect, the Contractor shall make available to the Owner survey instruments necessary to check proposed vertical and horizontal alignments at no extra cost.

PART 3 - EXECUTION

3.01 SURVEY LAYOUT

- A. The Contractor shall use the alignments shown on the Plans to obtain the alignment which shall be approved subject to field adjustments as ordered by the Landscape Architect.

- B. The Contractor shall inform the Landscape Architect when the general layout is completed and shall not begin excavation until the various alignments are approved by the Landscape Architect. Any discrepancies encountered in field conditions shall be reported to the Landscape Architect immediately.
- C. The Contractor shall be responsible for maintaining the correct vertical and horizontal alignment of all elements, which responsibility shall not be waived by the Landscape Architect's approval of the basic layout and stakeout.

END OF SECTION

SECTION 01200

PROJECT MEETINGS

PART 1 - GENERAL

1.01 GENERAL PROVISIONS

- A. Attention is directed to the General Conditions of the Contract, all Divisions of the Specifications, and the Contract Documents, all of which apply to work of this section.

1.02 SCOPE OF WORK

- A. Attend project meetings to enable orderly review during progress of the Work, and to provide for systematic discussion of problems, as long as deemed necessary by the Landscape Architect throughout the construction period.
- B. The Contractor's relations with his subcontractors and materials suppliers, and discussion relative thereto, are the Contractor's responsibility and normally are not part of Project Meetings content.

1.03 QUALITY ASSURANCE

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

1.04 MEETING NOTES

- A. The Landscape Architect will compile minutes of each Project Meeting and furnish copies to the attendees, Contractor, and Owner before the next scheduled meeting.

PART 2 - NOT USED

PART 3 - EXECUTION

3.01 PRECONSTRUCTION MEETING

- A. The Contractor shall arrange for a Preconstruction Meeting within 5 days after the award of contract, prior to commencing any work on site, in order to coordinate between him/herself, his/her Subcontractors, the Owner, and the Landscape Architect the procedures to be followed on the project.
- B. Contractor is to coordinate attendance by authorized representatives of the Owner, the Contractor, site work subcontractors, and the Landscape Architect. Authorized representatives of the Owner include the City of Waltham Engineering Department, 119 School Street, Waltham, MA 02451-4596, (781) 314-3830, the City of Waltham Planning Department, 119 School Street, Waltham, MA (781) 314-3370 and the City of Waltham

Recreation Department, 510 Moody Street, Waltham, MA (781) 314-3475.

- C. Minimum agenda: Data will be distributed and discussed on at least the following items:
1. Organizational arrangement of Contractor's forces and personnel, and those of subcontractors, materials suppliers and Owner.
 2. Channels and procedures for communication.
 3. Construction schedule, including sequence of critical work.
 4. Contract Documents and revisions.
 5. Processing of Shop Drawings and other data submitted to the Owner for review, including the process for reviewing water, sewer and drainage submittals.
 6. Processing of Bulletins, field decisions, and Change Orders.
 7. Procedures for safety, first aid, security, quality control, housekeeping, and related matters.
 8. Submittal of Construction Fence layout.
 9. Submittal of Progress Schedule, Tabulation of Submittals and Schedule of Values.

3.02 PROJECT MEETINGS

- A. Frequency: Project Meeting shall in general be held at regular intervals not less frequently than once a week. Meetings will be chaired by the Landscape Architect.
- B. Location: Project meetings will be held at the job site.
- C. Attendance:
1. To the maximum extent practicable, assign the same person or persons to represent the Contractor at Project Meetings throughout the progress of the work.
 2. Site work subcontractors, material suppliers, and others may be invited to attend those Project Meetings in which their aspect of the Work is involved.
- D. Minimum Agenda:
1. Review progress of the Work since last meetings, including status of submittals for approval.
 2. Identify problems which impede planned progress.
 3. Develop corrective measures and procedures to regain planned schedule.
 4. Complete other current business.
- E. Revision to Minutes:
1. Unless published minutes are challenged in writing prior to the next regularly

scheduled Project Meeting, they will be accepted as properly stating the activities and decisions of the meeting.

2. Persons challenging published minutes shall reproduce and distribute copies of the challenge to all indicated recipients of the particular set of minutes.
3. Challenge to minutes shall be settled at the start of the next regularly scheduled meeting.

END OF SECTION

SECTION 01300

SUBMITTALS

PART 1- GENERAL

1.01 GENERAL PROVISIONS

- A. Attention is directed to the General Conditions of the Contract, all Divisions of the Specifications, and the Contract Drawings, all of which apply to this section.
- B. Consult the individual Sections of the Specifications for the specific submittals required under those sections and for further details and descriptions of the requirements.

1.02 SCOPE OF WORK

- A. The scope of the work under this Specification section, without limiting the generality thereof, includes the furnishing of all labor material, equipment, services and incidentals necessary to complete all the work in accordance with the contract documents, which are intended to describe and provide for a finished piece of work.
- B. The type of work includes the following without limiting the generality thereof:
 - 1. Progress Schedules.
 - 2. Schedule of Values.
 - 3. Shop drawings.
 - 4. Product Data.
 - 5. Samples.

1.03 QUALITY ASSURANCE

- A. Coordination of submittals:
 - 1. Prior to each submittal, carefully review and coordinate all aspects of each item being submitted.
 - 2. Verify that each item and the associated submittal conform in all respects with the specified requirements.
 - 3. By affixing the Contractor's signature to each submittal, certify that this coordination has been performed.
- B. Timeliness - The Contractor shall transmit each submittal to the Landscape Architect well in advance of performing related Work or other applicable activities, so that the installation shall not be delayed by processing times, including disapproval and re-submittal (if required), coordination with other submittals, testing, purchasing, fabrication, delivery, and similar sequenced activities. **Items with long lead times for orders such as site furnishings need to be submitted immediately.** No extension of

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time will be authorized because of the Contractor's failure to transmit submittals to the Landscape Architect in advance of the Work.

1. Sequence - The Contractor shall transmit each submittal in a sequence which will not result in the approval having to be later modified or rescinded by reason of subsequent submittals which should have been processed earlier or concurrently for coordination.
- C. Contractor's Review and Approval - Only submittals received from and bearing the stamp of approval of the Contractor will be considered for review by the Landscape Architect. Submittals shall be accompanied by a transmittal notice stating name of Project, date of submittal, "To" or "From" (Contractor, Subcontractor, Installer, Manufacturer, Supplier), Specification Section or Drawing No. to which the submittal refers, purpose (first submittal, re-submittal), description, remarks, distribution record, and signature of transmitter.
- D. "Or-Equals", "or equal as approved" or "or approved equal" - On the transmittal, or on a separate sheet attached to the transmittal, the Contractor shall direct attention to any deviations including minor limitations and variations, from the Contract Documents. Do not assume that the materials, equipment, or methods will be approved as equal unless the item has been specifically so approved for this Work by the Owner.
1. The Contractor and all Subcontractors shall submit to the Landscape Architect for consideration of any Or-Equal substitution, a written point by point comparison containing the name and full particulars of the proposed product to the product named or described in the Contract Documents.
 2. Such submittal shall in no event be made later than 30 calendar days prior to the incorporation of the item into the Work. In any case in which the time period specified in the Contract Documents from the Notice to Proceed to Substantial Completion is less than 30 days, this requirement can be waived by the Landscape Architect.
 3. Upon receipt of a written request for approval of an Or-Equal substitution, the Landscape Architect shall investigate whether the proposed item shall be considered equal to the item named or described in the Contract Documents. Upon conclusion of the investigation, the Landscape Architect shall promptly advise that the item is, or is not, considered acceptable as an Or-Equal substitution. Such written notice must have the concurrence of the Owner.
 4. In no case may an item be furnished on the Work other than the item named or described, unless the Landscape Architect, with the Authority's concurrence, shall consider the item equal to the item so named or described, as provided by M.G.L. c.30 § 39M.
 5. The equality of items offered as "equal" to items named or described shall be proved to the satisfaction of the Landscape Architect at the expense of the Contractor or Subcontractor submitting the substitution.

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6. The Landscape Architect and/or the Authority may require that full size samples of both the specified and proposed products be submitted for review and evaluation. The Contractor or Subcontractor, as the case may be, shall bear full cost for providing, delivering, and disposal of all such samples.
 7. The Contractor or Subcontractor, as the case may be, shall assume full responsibility for the performance of any item submitted as an "Or-Equal" and assume the costs of any changes in any Work which may be due to such substitution.
- E. Processing - All costs for printing, preparing, packaging, submitting, resubmitting, handling, inspecting and mailing, or delivering submittals required by this contract shall be included in the Contract Sum.
 - F. Unless otherwise indicated on the Contract Drawings, or specified, only new materials and equipment shall be incorporated into the Work. All materials and equipment furnished by the Contractor shall be subject to the inspection and approval of the Owner. No materials shall be delivered to the work without prior approval of the Owner.
 - G. Contractor represents that he has determined and verified all materials, field measurements, and field construction criteria related thereto, or will do so, and that he has checked and coordinated the information contained within such submittals with the requirements of the contract documents.
 - H. The inspection and approval by the Landscape Architect of shop drawings, product data, and samples is general and does not relieve the Contractor from responsibility for compliance with the requirements of the Contract or for proper dimensions, fitting, construction, and construction sequencing.
 - I. The Contractor or Subcontractors shall not be relieved of responsibility for any deviation from the Contract Drawings or Specifications unless the Contractor has specifically informed the Landscape Architect in writing of such deviation, and the Landscape Architect has given specific written approval thereof.
 - J. The Contractor shall submit to the Landscape Architect data relating to materials and equipment he proposes to furnish for the Work. Such data shall be in sufficient detail to enable the Landscape Architect to identify the particular product and to form an opinion as to its conformity to the Specifications. Submittals shall, at minimum, include the following:
 1. Name of Manufacturer.
 2. Dimensional requirements for the material.
 3. Class and/or type of material.
 4. Strength requirements for the material.
 5. Sieve analysis of fill materials.
 6. And any other information that is required in determining conformance of the

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submittal with the Specifications or the Contract Drawings.

1.04 LANDSCAPE ARCHITECT'S ACTION

- A. The Landscape Architect will review the Contractor's submittals and return them with one of the following actions recorded thereon by appropriate markings:
 - 1. Final Unrestricted Release: Where marked "Approved" the Work covered by the submittal may proceed provided it complies with the requirements of the Contract Documents.
 - 2. Final-But-Restricted Release: When marked "Approved as Noted" the Work may proceed provided it complies with the Landscape Architect's notations or corrections on the submittal and complies with the requirements of the Contract Documents. Acceptance of the Work will depend upon these compliances.
 - 3. Returned for Resubmittal: When marked "Revise & Resubmit" or "Disapproved", the Work covered by the submittal (purchasing, fabrication, delivery, or other activity) should not proceed. The submittal should be revised or a new submittal resubmitted without delay, in accordance with the Landscape Architect's notations stating the reasons for returning the submittal.

1.05 PROGRESS SCHEDULES

- A. At the Preconstruction Meeting, the Contractor shall submit a progress schedule in bar chart form. Indicate a time bar for each major category or unit of work to be performed, properly sequenced and coordinated with other elements of the work.
- B. With the progress schedule, submit a tabulation of all submittals which will clearly show: the submittal name and section, date to Landscape Architect for review, date required back to Contractor to maintain the orderly progress of the work, and those submittals required early because of long lead time for ordering, manufacture or fabrication. The Contractor shall submit shop drawings, data and samples or place his/her order sufficiently early to permit consideration and approval by the Landscape Architect before materials are necessary for incorporation into the Work. Any delay resulting from the Contractor's failure to do so shall not be used as a basis of a claim against the Owner.
- C. Monthly, as the job progresses, submit updates of the original progress schedule to show actual progress on the job and any revisions to the projected completion date.

1.06 SCHEDULE OF VALUES

- A. With the progress schedule, submit a schedule of values on an AIA "Request for Payment" form which breaks down the contract price by specification sections. This schedule of values shall be in reasonable correspondence with the Contractor's actual costs for each Subcontract or trade, and it shall serve as the basis for the evaluation and

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approval of monthly requests for Payment as they are submitted.

1.07 SHOP DRAWINGS

- A. Shop drawings shall be complete. Give all information necessary or requested in the individual section of the specifications. They shall also show adjoining Work and details of connection thereto.
- B. Shop drawings shall be for whole systems. Partial submissions will not be accepted.
- C. The Landscape Architect reserves the right to review and approve shop drawings only after approval of related product data and samples. Shop drawings for water, sewer, and drainage will require review by the City Engineer.
- D. Shop drawings shall be properly identified and contain the name of the project, name of the firm submitting the shop drawings, shop drawing number, date of shop drawings and revisions, Contractor's stamp of approval, and sufficient spaces near the title block for the Landscape Architect's stamp.
- E. The Contractor shall submit to the Landscape Architect one legible original and two copies of each shop drawing. Transparency and prints shall be mailed or delivered in roll form. Each submittal shall be accompanied by a transmittal notice.
- F. When the original is returned by the Landscape Architect with the stamp "Revise and Resubmit" or "Disapproved", the Contractor shall correct the original drawing or prepare a new drawing and resubmit the original and two copies thereof to the Landscape Architect for approval. This procedure shall be repeated until the Landscape Architect's approval is obtained.
- G. When the original is returned by the Landscape Architect with the stamp "Approved" or "Approved as Corrected", the Contractor shall provide and distribute the copies for all Contractor and Subcontractors use, and in addition submit, within 10 calendar days after approval, 3 prints to the Landscape Architect.
- H. The Contractor shall maintain one full set of approved shop drawings at the site.

1.08 SUBMISSION OF PRODUCT DATA

- A. The Contractor shall submit 6 copies of Product Data to the Landscape Architect. All such data shall be specific and identification of material or equipment submitted shall be clearly marked in ink. Data of general nature will not be accepted.
- B. Product Data shall be accompanied by a transmittal notice. The Contractor's stamp of approval shall appear on the printed information itself, in a location which will not mar legibility.
- C. Product Data returned by the Landscape Architect as "Disapproved" shall be resubmitted in 6 copies until the Landscape Architects approval is obtained.

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- D. When the Product Data are acceptable, the Landscape Architect will stamp them "Approved" or "Approved as Corrected," retain 3 copies, and return 4 copies to the Contractor. The Contractor shall provide and distribute additional copies as may be required to complete the Work.
- E. The Contractor shall maintain one full set of approved, original, Product Data at the site.

1.09 SUBMISSION OF SAMPLES

- A. Unless otherwise specified in the individual section, the Contractor shall submit two specimens of each sample.
- B. Samples shall be of adequate size to permit proper evaluation of materials. Where variations in color or in other characteristics are to be expected, samples shall show the maximum range of variation. Materials exceeding the variation of approved samples will not be approved in the Work.
- C. Samples which can be conveniently mailed shall be sent directly to the Landscape Architect, accompanied by a transmittal notice. All transmittals shall be stamped with the Contractor's approval stamp of the material submitted.
- D. All other samples shall be delivered to the project site with sample identification tag attached and properly filled in. Transmittal notice of samples so delivered with the Contractor's stamp of approval shall be mailed to the Landscape Architect.
- E. If a sample is rejected by the Landscape Architect, a new sample shall be resubmitted in a manner specified hereinabove. This procedure shall be repeated until the sample is approved by the Landscape Architect.
- F. Samples will not be returned unless return is requested at the time of submission. The right is reserved to require submission of samples whether or not particular mention is made in the Specifications.

END OF SECTION

SECTION 01400

QUALITY CONTROL

PART 1 - GENERAL

1.01 GENERAL PROVISIONS

- A. Attention is directed to the General Conditions of the Contract, all Divisions of the Specifications and the Drawings, all of which apply to this section.

1.02 SCOPE OF WORK

- A. The scope of the work under this Specification section, without limiting the generality thereof, includes the furnishing of all labor, materials, equipment, services, and incidentals necessary to complete all of the work in accordance with the Contract Documents, which are intended to describe and provide for a finished piece of work.
- B. The work includes the following, without limiting the generality thereof;
 - 1. The Contractor shall make available to the Owner's testing laboratory any samples or specimens which the laboratory may require to perform quality control testing on concrete, fill materials, or other material as the Owner may elect to provide additional testing for.
 - 2. The coordinating and scheduling of work and the giving of timely notice so as to afford the Owner's testing laboratory the opportunity to take samples and make observations or tests.

1.03 TESTING LABORATORY

- A. The Contractor is responsible for the costs of tests specifically required in the technical specifications.
- B. The Owner may select, engage, and pay for the services of an independent testing laboratory to provide additional testing as the Landscape Architect/Engineer may deem appropriate.
- C. Test and retesting of materials which fail the original test shall be paid for by the Contractor.

END OF SECTION

SECTION 01500

TEMPORARY FACILITIES & CONTROLS

PART 1- GENERAL

1.01 GENERAL PROVISIONS

- A. Attention is directed to the General Conditions of the Contract, all Divisions of the Specifications and the Contract Drawings, all of which apply to this section.

1.02 SCOPE OF WORK

- A. The scope of the work under this Specification section, without limiting the generality thereof, includes the furnishing of all labor, materials, equipment, services, and incidentals necessary to complete all of the work in accordance with the Contract Documents, which are intended to describe and provide for a finished piece of work.
- B. The work includes the following, without limiting the generality thereof;
 - 1. Temporary utilities.
 - 2. Field equipment.
 - 3. Barriers and enclosures.
 - 4. Safety and security.
 - 5. Signage.

1.03 TEMPORARY UTILITIES

- A. The Contractor is responsible for all temporary electrical distribution, lighting, and water distribution from existing sources.
- B. The Contractor shall provide and pay for his own temporary telephone service within the Contract Limit Line.
- C. The provision for temporary toilets is included under Section 01010 - Summary of Work.

1.04 FIELD EQUIPMENT

- A. The Contractor shall provide a transit, rod and level on site for checking layouts and installations.

1.05 TRAFFIC CONTROL

- A. Traffic police will be required for operations within City streets. Refer to Section 01040 - Control of the Work, Section 1.05 for police requirements and cost and Section 01020 - Allowances for allowance to be included in the bid price.

1.06 BARRIERS AND ENCLOSURES

- A. The Contractor shall provide and maintain sufficient fencing and warning signs around the work area to limit unauthorized entry within the Contract Limit Line.
- B. At the earliest practical time provide temporary enclosure of materials, equipment, work in progress and completed portions of the work to provide protection to the work and employees.
- C. The Contractor shall supply and install snow fencing around sodded lawn areas, as indicated on the Drawings.

1.07 SAFETY AND SECURITY

- A. The Contractor shall be responsible for the safety and security of the site within the Contract Limit Line, and for the safety of all persons who enter within the Contract Limit Line.
 - 1. Gates or other temporary openings in the fencing used to allow construction personnel or equipment access shall be maintained closed at all times to prevent access by the public.
- B. The Contractor shall be responsible for initiating, maintaining, and supervising all safety precautions and programs in connection with the work.
- C. 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 the Owner of particular hazards.
 - 1. Provide and install on the temporary fencing 2 signs indicating temporary closure of the park, as described in Section 1.08 below.
- D. The Contractor shall cooperate with and maintain a close liaison with the Police Department and Fire Departments, and he shall abide by safety-related requests from any of these agencies.

1.08 CLOSURE SIGNS

- A. The two signs indicating temporary closing of the park closing shall be 18" x 30" minimum and shall contain the words " The Park is Closed During Construction for Your Safety. Please Do Not Enter. Thank You for Your Cooperation. Waltham Parks and Recreation Department"

- B. Signs shall be of durable exterior grade painted plywood or metal securely mounted on posts or on fencing. Sign shall be professionally lettered and shall be produced by a professional sign shop or manufacturer.

1.09 DEP PROJECT SIGN

- A. The Contractor shall provide a DEP Project Sign at the site not less than two square feet or more than three square feet in size bearing the words:

Mass DEP
File Number 316-0690

END OF SECTION

SECTION 01571

ORDER OF CONDITIONS

PART I - GENERAL

1.01 SUMMARY

- A. The Work of this project lies within the 100 year flood zone the area of which is under the jurisdiction of the Waltham Conservation Commission and the Massachusetts Department of Environmental Protection. The Waltham Conservation Commission has issued an Order of Conditions, DEP File No. 316-60690 which conditions the work of this project, a copy of which is included as Appendix A, and is a Special Condition of the Contract.
1. The Contractor shall be responsible for reading the Order of Conditions and being familiar with each and every condition which has been set forth, and shall include in the Bid cost necessary to comply with the conditions.
 2. The Contractor shall be responsible for satisfying the provisions of the Order of Conditions including but not limited to the following:
 - (a) Signage requirements
 - (b) Erosion, drainage and sedimentation controls
 - (c) Cooperation with the Conservation Commission inspections.
 - (1) Designation of a person responsible for supervising and inspecting drainage and erosion controls available on a 24-hour basis to communicate with the Conservation Commission.
 3. Provide written notification to the Waltham Conservation Commission when construction is to start. Written notification is to be sent to: The Waltham Conservation Commission, 119 School Street, Lower Level, Waltham, MA 02451 or emailed to: conservation@city.waltham.ma.us. At the request of the Commission, arrange an on-site conference prior to proceeding with work.
- B. The Order of Conditions is included as part of the Contract Documents, in Appendix A.

PART II - PRODUCTS (Not Used)

PART III - EXECUTION (Not Used)

END OF SECTION

Order of Conditions
01571-1

SECTION 01700

PROJECT CLOSE-OUT

PART 1- GENERAL

1.01 GENERAL PROVISIONS

- A. Attention is directed to the General Conditions of the Contract, all Divisions of the Specifications and the Drawings, all of which apply to this section.
- B. Project close-out procedures are subject to the requirements of M.G.L. Chapter 30, Section 39G, excerpted in Division 0, Section 00830.

1.02 SCOPE OF WORK

- A. The scope of work under this Specification section, without limiting the generality thereof, includes the furnishing of all labor, materials, equipment, services, incidentals necessary to complete all of the work in accordance with the Contract Documents, which are intended to describe and provide for a finished piece of work.
- B. The type of work includes the following, without limiting the generality thereof:
 - 1. Final Cleaning.
 - 2. Substantial Completion
 - 3. Recording as-built information and coordination with others to produce final As-Built Drawings.
 - 4. As-built survey
 - 5. Warranties.
 - 6. Operating and Maintenance Manuals: Provide one copy to City of Waltham Recreation Department and one copy to City of Waltham Engineering Department, Water/Sewer Division.
 - 7. Final Completion.

1.03 FINAL CLEANING PRIOR TO OWNER'S OCCUPATION OF THE SITE & PLAYGROUND OPENING

- A. Immediately prior to Owners Occupation of the Site and Playground Opening, the Contractor shall perform cleanup work as follows:
 - 1. Remove all waste materials and rubbish from the site and legally dispose of it.
 - (a) Empty trash receptacles.
 - 2. Remove all tools, equipment, machinery, surplus material, temporary enclosures, and any other material belonging to the Contractor or his Subcontractors.
 - 3. Clean all surfaces, fixtures, and equipment within the work areas, and any

surfaces outside the work area which have been made dirty by the work of the contract. Leave the entire site clean and ready for use.

4. Sweep surfaces of paths, safety surface, and court surfaces of leaves and other debris. Wash as necessary to remove stains or dirt.
5. Blow leaves from lawn areas and mow grass.

1.04 SUBSTANTIAL COMPLETION

- A. Related Requirements: The Contractor's attention is directed to the General and Supplementary Conditions of the Contract and M.G.L. Chapter 30, Section 39G for additional information covering substantial completion procedures and payments.
 1. Substantial Completion is defined in MGL 149 Section 39G, excerpts of which are included in Attachment B, Section 00830 of Division 0.
- B. Upon Substantial Completion of the project, the Contractor shall present written certification that the work is substantially complete. The Landscape Architect will promptly, and in no case later than 21 days after the Contractor's certification, respond in writing declaring the work has reached Substantial Completion, or he shall provide an itemized list of incomplete or unsatisfactory items that must be completed to achieve Substantial Completion.
- C. Within 65 days after the effective date of a declaration of substantial completion, the Landscape Architect will send the Contractor a Substantial Completion estimate, which will be the balance of the Contract price minus a one percent retention for final completion, amounts to cover any outstanding claims, any amounts estimated to cover incomplete or unsatisfactory work, and the sum of all demands for direct payment made by Subcontractors.
 1. Refer to MGL 149 Section 39G for additional information concerning payment, excerpted in Division 0, Section 00830-B.

1.05 AS-BUILT SURVEY

- A. At the completion of construction the Contractor shall engage the services of a licensed surveyor to provide an as-built survey in both electronic (CAD file) and hard copy, stamped by a Professional Land Surveyor registered in the State of Massachusetts.
 1. The as-built survey shall include all major site features and shall incorporate as-built record drawings of utilities or other underground features.
 - (a) The provision by others of the final as-built electronic plans does not relieve in any way the responsibility of the Contractor to maintain record drawings as described in 1.05, throughout the progress of the project, with special attention to the locations of any underground elements not able to easily be located by above ground survey,

including locations of underground utilities installed or modified.

2. The as-built survey shall include elevation information for the area within the 100 foot flood area as follows:
 - (a) The survey of the 100 year flood area shall be performed using a laser operation survey instrument with a tolerance of $\pm \frac{1}{4}$ ". The survey shall be in the form of spot grades over the entire surface in the form of a grid at 25 foot spacing in two directions.

1.06 AS-BUILT RECORD DRAWINGS (Electronic and Hard-copy)

- A. General: The Contractor is responsible for providing As-Built record drawings in electronic format at the project close-out including the as-built survey. Do not use As-Built Record Drawings for construction purposes. Protect As-Built Record Drawings from deterioration and loss. Provide access to As-Built Record Drawings for Architect's and Owner's reference during normal working hours.
 1. As-Built Record Drawings: Maintain and submit one set of black-line white prints of As-Built Record Contract Drawings and Shop Drawings.
 - (a) Mark As-Built 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 As-Built Record Prints.
 - (1) Give particular attention to information on concealed elements that cannot be readily identified and recorded later.
 - (2) Accurately record information in an understandable drawing technique.
 - (3) Record data as soon as possible after obtaining it. Record and check the markup before enclosing concealed installations.
 - (4) Mark Contract Drawings or Shop Drawings, whichever is most capable of showing actual physical conditions, completely and accurately. Where Shop Drawings are marked, show cross-reference on Contract Drawings.
 - (b) Mark as-built record sets with erasable, red-colored pencil. Use other colors to distinguish between changes for different categories of the Work at the same location.
 - (c) Mark important additional information that was either shown schematically or omitted from original Drawings.

- (d) Note Construction Change Directive numbers, Change Order numbers, alternate numbers, and similar identification where applicable.
 - (e) Identify and date each As-Built Record Drawing; include the designation "PROJECT AS-BUILT RECORD DRAWING" in a prominent location. Organize into manageable sets; bind each set with durable paper cover sheets. Include identification on cover sheets.
2. Record Specifications: Submit one copy of Project's Specifications, including addenda and contract modifications. Mark copy to indicate the actual product installation where installation varies from that indicated in Specifications, addenda, and contract modifications.
- (a) Give particular attention to information on concealed products and installations that cannot be readily identified and recorded later.
 - (b) Mark copy with the proprietary name and model number of products, materials, and equipment furnished, including substitutions and product options selected.
 - (c) Note related Change Orders, As-Built Drawings, and Product Data, where applicable.
3. Record Product Data: Submit one copy of each Product Data submittal. Mark one set to indicate the actual product installation where installation varies substantially from that indicated in Product Data.
- (a) Give particular attention to information on concealed products and installations that cannot be readily identified and recorded later.
 - (b) Include significant changes in the product delivered to Project site and changes in manufacturer's written instructions for installation.
 - (c) Note related Change Orders, As-Built Drawings, and Record Specifications, where applicable.

1.01 WARRANTIES

- A. Submittal Time: Submit written warranties on request of the Landscape Architect for designated portions of the Work where commencement of warranties other than date of Substantial Completion is indicated.
1. Organize warranty documents into an orderly sequence based on the table of contents of the Project Manual.
- (a) Bind warranties and bonds in heavy-duty, 3-ring, vinyl-covered, loose-leaf binders, thickness as necessary to accommodate contents, and sized to receive 8-1/2-by-11-inch paper.
 - (b) Provide heavy paper dividers with plastic-covered tabs for each separate warranty. Mark tab to identify the product or installation. Provide a typed description of the product or installation, including the name of the product and the name, address, and telephone number of

- Installer.
- (c) Identify each binder on the front and spine with the typed or printed title "WARRANTIES," Project name, and name of Contractor.

- 2. Provide additional copies of each warranty to include in operation and maintenance manuals. At Substantial Completion of the project, the Contractor shall deliver to the Landscape Architect copies of all warranties for the various materials and pieces of equipment included in the project. These warranties shall be submitted in duplicate and shall be bound together with the operating and maintenance data called for above.

1.02 OPERATION AND MAINTENANCE MANUALS

- A. Assemble a complete set of operation and maintenance data indicating the operation and maintenance of each system, subsystem, and piece of equipment not part of a system. Include operation and maintenance data required in individual Specification Sections and as follows:

- 1. Operation Data:

- (a) Emergency instructions and procedures.
- (b) System, subsystem, and equipment descriptions, including operating standards.
- (c) Operating procedures, including startup, shutdown, seasonal, and weekend operations.
- (d) Description of controls and sequence of operations.
- (e) Piping diagrams.

- 2. Maintenance Data:

- (a) Manufacturer's information, including list of spare parts.
- (b) Name, address, and telephone number of Installer or supplier.
- (c) Maintenance procedures.
- (d) Maintenance and service schedules for preventive and routine maintenance.
- (e) Maintenance record forms.
- (f) Sources of spare parts and maintenance materials.
- (g) Copies of maintenance service agreements.
- (h) Copies of warranties and bonds.

- B. Organize operation and maintenance manuals into suitable sets of manageable size. Bind and index data in heavy-duty, 3-ring, vinyl-covered, loose-leaf binders, in thickness necessary to accommodate contents, with pocket inside the covers to receive folded oversized sheets. Identify each binder on front and spine with the printed title "OPERATION AND MAINTENANCE MANUAL," Project name, and subject matter of contents.

1.03 FINAL COMPLETION

Project Close-out
01700-5

- A. Related Requirements: The Contractor's attention is directed to the General and Supplementary Conditions of the Contract and M.G.L. Chapter 30, Section 39G covering closeout and final payment procedures.
- B. Final Completion:
1. Within fifteen (15) days of the effective declaration of Substantial Completion, the Landscape Architect will send the Contractor by certified mail, return receipt requested, a complete final punch list of all incomplete or unsatisfactory work items necessary to achieve Final Completion.
 - (a) If the Contractor fails to complete such work within forty-five (45) days after receipt of the list, or by the contractual completion date, whichever is later, the awarding authority may, subsequent to seven (7) days written notice to the Contractor, terminate the Contract and complete the incomplete or unsatisfactory work items and charge the cost of same to the Contractor.
 2. The Contractor shall notify the Landscape Architect when the work is completed. The Landscape Architect will promptly make an inspection, and in no case later than thirty (30) days after notification by the Contractor that the work is complete, send the Contractor a final estimate for the Contract balance due, holding back any amount estimated to cover work which is still incomplete or unsatisfactory.
 3. Upon completion of all remaining items, and after receipt of all appropriate Record Specifications, Record Product Data, Operating and Maintenance Manuals, Warranties, Guarantees and any Spare Parts as required by the Contract Documents, the Contractor shall provide a notarized Contractor's Certificate and Release and a final Application for Payment to the Owner to complete the close-out process.

END OF SECTION

DIVISION 2

SECTION 02100

SITE PREPARATION AND DEMOLITION

PART 1 - GENERAL

1.01 GENERAL PROVISIONS

- A. All of the Contract Documents, including the Contract Form, General Provisions, General Conditions, Supplemental Conditions, and all Attachments to the General Provisions, and Division 1 - General Requirements, apply to the work of this Section.
- B. Contact Dig-Safe (811) seventy-two hours prior to the start of any removals or excavation work, and obtain a Certificate verifying that marking the location of utilities has been completed. Contact the City of Waltham Engineer to verify the location of additional on-site utilities. Coordinate demolition work with utility companies. Dig-safe does not locate telephone and cable lines; contact the specific utilities involved for this information.
- C. The Work of this Project is subject to an Order of Conditions issued by the Waltham Conservation Commission, included in the Contract as Appendix A. After placing tree protection and erosion controls, contact the City of Waltham Conservation Commission in writing to arrange for a site visit to obtain Commission approval prior to proceeding with site preparation and demolition work.
 - 1. Written Notification shall be sent to: Waltham Conservation Commission, 119 School Street, Lower Level, Waltham, MA 02451
 - 2. Site visits can be scheduled Tuesdays between 7:00am-9:00am and Wednesdays between 4pm-6pm.

1.02 SCOPE OF WORK

- A. Provide all equipment and do all work necessary to prepare the site complete, as indicated on the Drawings and as specified.
- B. The work shall include, but is not limited to, the following:
 - 1. Marking the location of utilities within the Limit of Work Line.
 - 2. Demolition or salvage of items indicated on the Drawings.
 - 3. Removal of incidental site items not indicated on the site plan which will impede proposed construction.
 - 4. Protection of existing site elements to remain including existing trees to remain.

1.03 RELATED WORK

- A. Section 01050 - Field Engineering: Layout of site improvements.
- B. Section 01500 - Temporary Facilities and Controls.

Site Preparation
02100-1

- C. Section 02200 - Earthwork.

1.04 SUBMITTALS

- A. Copies of required permits.
- B. Provide certificate verifying marking of utilities thru Dig-safe.
- C. Submit shop drawing or description of temporary signs including text, for approval by the Landscape Architect, prior to their installation.
- D. Submit copy of written notification to the Conservation Commission.

1.05 REFERENCES

- A. All work shall comply with the minimum standards of the latest editions of the following codes and specifications, subject to modifications and amendments outlined herein.
 - 1. MHD: "Standard Specifications for Highways and Bridges", Department of Public Works, Commonwealth of Massachusetts, latest edition.
 - 2. Federal, State and/or Municipal Codes.
 - 3. Public Safety Codes.
 - 4. U.S. Public Health Service.
 - 5. National Electric Manufacturers Association.
 - 6. American National Standards Institute.
 - 7. American Society of Mechanical Engineers.
 - 8. Commercial Standards.
 - 9. Federal Specifications.
 - 10. Occupational Safety and Health Regulations.
 - 11. Americans with Disabilities Act Guidelines (ADAAG) for Building and Facilities, 36 CFR Part 1191.
 - 12. MAAB CMR 521 Regulations.
 - 13. National Arborist Association Standards, National Arborist Association, 124 Route 101, Bedford, NH 03102.
 - 14. OSHA Construction Regulations Title 29 CFR Part 1926.

1.06 EXAMINATION OF SITE AND DOCUMENTS

- A. The Contractor shall inform him/herself of existing conditions of the site before submitting his/her bid. No claim for extra compensation or extension of contract time will be allowed on account of conditions which are apparent from a thorough visual examination of the site.

1.07 MAINTENANCE OF ACCESS ON SIDEWALKS AND ROADS

- A. The Contractor shall not close or obstruct any portion of street or sidewalk without obtaining permits therefor from the proper municipal authorities. Streets and sidewalks shall be maintained passable by the Contractor at his own expense, and the Contractor shall assume full responsibility for the adequacy and safety of provisions made. He shall conduct construction operations such that interference with the flow of vehicular and

pedestrian traffic is held to a minimum.

- B. The Contractor shall coordinate with the City Fire and Police at all times. The Contractor shall notify the Waltham Fire Department and Waltham Police Department when any street or any portion of the traveled way is to be closed regardless of the length of time or day. No street shall be closed without the approval of the Consolidated Public Works Department of the City of Waltham.
- C. Keep all adjacent streets and sidewalks swept clean at all times. Cleanup operations not performed in a timely manner will be performed by the City of Waltham and back-charged to the Contractor.

1.08 PERMITS AND CODES

- A. All work shall be as shown in the Contract Drawings and Specifications and shall comply with applicable codes and regulations at the local, county, state, and federal levels. All labor, materials, equipment and services necessary to make the Work comply with such requirements shall be provided without additional cost to the Owner.
- B. The Contractor, under this Section, shall be responsible for providing and filing all Plans, Specifications and other documents, pay all requisite fees and secure all permits, inspections and approvals necessary for legal installation and operation of the systems and or equipment finished under this Section.

1.09 TRAFFIC POLICE

- A. Traffic police will be required for operations within City streets. Refer to Section 01040 - Control of the Work, Section 1.05 for police requirements.

1.10 CONDITIONS OF WORK

- A. The Work of this Project is subject to an Order of Conditions issued by the Waltham Conservation Commission, included in the Contract as Appendix A.
- B. The Work of this Project is subject to the restrictions of the City of Waltham Noise Ordinance. Refer to Section 01010 - Summary of Work, Section 1.07.
- C. Conduct the work giving consideration to protection of the public, protection of the existing work from weather; control of noise, shocks, and vibration; control of dirt and dust; orderly access and storage of materials; protection of existing buildings; protection of adjacent buildings and property. Coordinate work and cooperate with the Owner and Landscape Architect at all times.
- D. Schedule site preparation and removal work in connection with the progress schedule required by the General Conditions.
- E. The Site Preparation / Demolition Plan endeavors to describe the scope and intent of

Work. No guarantee is expressed or implied that the Site Preparation and Demolition Plan describes the full extent of objects to be removed in order to facilitate construction. Site Preparation operations not specifically identified on the Contract Drawings shall be considered as part of the basic lump sum contract and do not qualify as extra work.

- F. All other work requiring removal, such as fence, tree roots and former buried footings shall be removed and discarded as required for proper construction of new work without additional cost to the Owner.
- G. No extra demolition shall be performed without first notifying and obtaining written approval of the Landscape Architect.

1.12 DRAINAGE AND EROSION CONTROL

- A. Upon entry to the site, the Contractor shall assume responsibility for site and subsurface drainage. During the Contract period the Contractor shall maintain drainage in a manner satisfactory to the Landscape Architect. At all times, the adjacent areas shall be protected and maintained in their existing conditions.
- B. It shall be the responsibility of the Contractor to render the site erosion-free, at all times during the Contract period. The Contractor shall take special precautions to prevent erosion run-off from slopes, drainage trenches, granular bases, structures, and other improvements. Unless otherwise indicated on the Drawings, hay bales, jute mesh, catch basin insert filtration bags, and siltation fabrics shall be used, as determined by the Landscape Architect.

1.13 DELIVERY, STORAGE AND HANDLING

- A. Materials shall be stored in a dry location, off the ground and in such manner as to prevent damage, intrusion of foreign matter and weather. All materials which have become damaged or otherwise unfit for use during delivery or storage shall be replaced at the expense of the Contractor.

PART 2 - PRODUCTS

2.01 LAYOUT AND STAKING

- A. Refer to Section 01050 - Field Engineering for layout and staking requirements.

2.02 DUST CONTROL

- A. Water for dust control shall be free from contaminants hazardous to human health and plant growth. No calcium chloride may be used.

PART 3 - EXECUTION

3.01 LOCATING UTILITIES & SITE ITEMS AFFECTING THE WORK

- A. Prior to site preparation and removals operation, the Contractor shall locate and mark all site items such as utilities which could be affected by site preparation and removals.
- B. Contact Dig-Safe (1-888-344-7233) seventy-two hours prior to the start of any removals or excavation work, and obtain a Certificate verifying that marking the location of utilities has been completed. Contact the City of Waltham Engineering Department to verify the location of additional on-site utilities. Coordinate demolition work with utility companies. Dig-safe does not locate telephone and cable lines; contact the specific utilities involved for this information.

3.02 PROJECT CONDITIONS

- A. All apparatus, storage and the operation of work people in connection with activities under this Section shall be confined within the property lines of the park shall not encumber areas outside the site.
- B. Thoroughly wet down all work during demolition to prevent the spread of dust. Avoid flooding or contaminated run-off.
- C. All existing items to remain which are damaged by the Contractor will be repaired or replaced at the Contractor's expense. Replacement or repaired items shall be equal to new items as specified.
- D. The Contractor shall be responsible for the methods used in this work including properly protecting against damage to existing and proposed site improvements, structures, site features, utility lines, trees, lawns, etc. Check with municipality and local utility companies for locations of existing utilities which may be in use or abandoned. Investigate and ascertain that underground utilities are correctly located and that they have been shut off and/or abandoned before disturbing them.

3.03 PROTECTION

- A. The Contractor shall assume complete responsibility and liability for the safety and structural integrity of all work and utilities to remain during the performance of all work.
- B. The Contractor shall provide safeguards including, but not limited to, warning signs, barricades, temporary construction fences, warning lights and other items required for protection of personnel and the general public during the performance of all work.
- C. Protect existing trees to remain as detailed on the Drawings.
- D. The Contractor shall provide barricades for substantial construction in accordance with safety regulations of authorities having jurisdiction and insurance requirements.
- E. All features related to protection shall be maintained until that unit of work has been

completed to the point that the danger no longer exists.

3.04 CLEARING AND GRUBBING

- A. Remove obstructions, trees, shrubs, grass, and other vegetation to permit installation of new construction, and in areas indicated on the Drawings.
- B. Tree stumps shall be removed in their entirety including tap roots where applicable except:
 - 1. Where trees are to be cleared on slope between Hazel St. and new chain link fencing at park property line, remove roots to a depth of 6" minimum below grade.
- C. Fill depressions caused by clearing and grubbing operations with satisfactory soil material, unless further excavation or earthwork is indicated.

3.05 PAVING

- A. The line between existing pavement to be removed and existing pavement to remain shall be cut neatly saw-cut through full depth of pavement section so as to leave a smooth, straight and vertical edge. Cut to the dimensions given or directed. Remove the portion behind the cut with proper tools.
 - 1. Existing pavement which is damaged, disturbed or settled by construction operations shall be cut back by the same method and replaced as directed by the Landscape architect at no additional cost to the Owner.

3.06 LAWN AND FIELD AREAS

- A. Where paths or other improvements are scheduled at existing lawn areas, remove and dispose of existing grass sod. It shall be the Contractor's option to stockpile existing topsoil for re-use, or to provide new for re-spreading after re-grading of planting beds is accomplished. Topsoil for re-use shall be tested and amended as recommended by the soils testing agency.
- B. Remove and dispose of sod on existing ball field. Remove and dispose of existing soil to a depth of 8" below existing finished grade. It shall be the Contractor's option to stockpile removed top soil to re-spread in planting areas other than the baseball field.
- C. Dispose of all unused topsoil and other excavated soil legally off-site.

3.07 FOOTINGS & MISCELLANEOUS SITE ITEMS

- A. Footings & miscellaneous site items shall be removed in their entirety and legally disposed of. Holes resulting from demolition shall be backfilled and compacted in accordance with Section 02200 Earthwork.

3.08 CLEANUP

- A. Keep work areas free from accumulation of debris during the work under this Section and leave the premises in a clean condition after completion of the Work of this Section.
- B. At the completion of the work of this Section, properly and legally dispose of all items removed and not scheduled to remain, including surplus soil material, unsuitable topsoil, demolished materials, and waste materials including trash and debris, and any other waste materials in connection with the work under this Section and leave the premises in a clean condition.

END OF SECTION

SECTION 02200

EARTHWORK

PART 1 - GENERAL

1.01 GENERAL PROVISIONS

- A. All of the Contract Documents, including the Contract Form, General Provisions, General Conditions, Supplemental Conditions, and all Attachments to the General Provisions, and Division 1 - General Requirements, apply to the work of this Section.
- B. Contact Dig-Safe (811) seventy-two hours prior to the start of any removals or excavation work, and obtain a Certificate verifying that marking the location of utilities has been completed. Contact the City of Waltham Engineer to verify the location of additional on-site utilities. Coordinate earthwork with utility companies.

1.02 SCOPE OF WORK

- A. Work under this Section shall include all labor, materials, services, equipment, transportation and accessories and the performance of all operations necessary to complete the work of this Section, as indicated on the Contract Drawings and as specified herein.
- B. The work shall include, but is not limited to, the following:
 - 1. Furnishing and installing base course for bituminous concrete paving and concrete paving.
 - 2. Furnishing and installing base course for safety surfacing.
 - 3. Miscellaneous fill for footings and slabs.
 - 4. Excavation for infiltration chambers.
 - 5. Excavation of 8" of soil below proposed finish grade over ball field
 - 6. Site rough and fine grading.
 - 7. Protection of existing trees to remain.
- C. Finished grades within the 100' flood contour shall be verified using laser operation survey instruments with a tolerance of $\pm \frac{1}{4}$ ". See Project Closet, Section 01700 for as-built survey requirements of this area.

1.03 RELATED WORK

- A. Section 02100 - Site Preparation & Demolition
- B. Section 02510 - Bituminous Concrete Paving
- C. Section 02800 - Site Furnishings
- D. Section 02950 – Planting
- E. Section 02910 – Athletic Field Root Zone & Infield Mix

1.04 REFERENCES

Earthwork
02200-1

- A. All work shall comply with the minimum standards of the latest editions of the following codes and specifications, subject to modifications and amendments outlined herein.
 - 1. MHD: "Standard Specifications for Highways and Bridges", Department of Public Works, Commonwealth of Massachusetts, Latest Edition.
 - 2. ASTM: American Society of Testing Materials.
 - 3. AASHTO: American Association of State Highway and Transportation Officials.
 - 4. ANSINFPA: American National Standards Institute, National Fire Protection Act.
 - 5. Federal, State and/or Municipal Codes.
 - 6. Public Safety Codes.
 - 7. U.S. Public Health Service.
 - 8. National Electric Manufacturers Association.
 - 9. Commercial Standards.
 - 10. Occupational Safety and Health Regulations.
 - 11. OSHA Construction Regulations Title 29 CFR Part 1926.

1.05 EXAMINATION OF SITE AND DOCUMENTS

- A. By submitting a bid the Contractor affirms that he/she has carefully examined the site and conditions affecting Work under this Section. No claim for additional costs will be allowed because of lack of full knowledge of existing conditions which can be reasonably inferred from visual inspection of the site.

1.06 SUBMITTALS

- A. Submit to the Landscape Architect:
 - 1. A representative sample of approximately 5 pounds for each type of fill material, including infield mix and root zone mix.
 - 2. Supplier's or laboratory sieve analysis for each type of fill material demonstrating compliance with the Specifications.
 - 3. Manufacturer's requirements for graduation of the crushed stone base course for safety surfacing, listing the sieve graduations required.
 - 4. Name of soils testing laboratory for compaction tests.
 - 5. Results of the Modified Proctor laboratory test for crushed stone base course subgrade fill under safety surfacing.
 - 6. Results of field compaction tests for safety surfacing base course and subgrade.

1.07 COMPACTION TESTING

- A. The Contractor shall pay for an independent laboratory, subject to the approval of the Landscape Architect, to provide testing of compaction as follows:

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1. Maximum density and optimum water content determination by the ASTM D-1557-09 or AASHTO T-180 Modified Proctor laboratory test for "Suitable Backfill" for subgrade, at play area, and crushed stone base for safety surfacing at play area.
2. On-site: Provide one field density test of the subgrade, and one field density test of in each compacted layer of stone basecourse layer, in 4 separate locations within playground area. Locations shall be chosen by the Landscape Architect.

1.08 PERMITS AND CODES

- A. All work shall be as shown in the Contract Drawings and Specifications and shall comply with applicable codes and regulations at the local, county, state, and federal levels. All labor, materials, equipment and services necessary to make the Work comply with such requirements shall be provided without additional cost to the Owner.
 1. OSHA Construction Regulations Title 29 CFR Part 1926.
- B. The Contractor, under this Section, shall be responsible for providing and filing all Plans, Specifications and other documents, pay all requisite fees and secure all permits, inspections and approvals necessary for legal installation and operation of the systems and or equipment furnished under this Section.
- C. The Contractor shall include in his/her bid any charges by the Water Department, Utility Company, or other authorities for work done by them and charged to the Contractor.

1.09 CONDITIONS OF WORK

- A. Conduct the work giving consideration to protection of the public, protection of the existing work from weather; control of noise, shocks, and vibration; control of dirt and dust; orderly access and storage of materials; protection of existing buildings; protection of adjacent buildings and property. Coordinate work and cooperate with the Owner and Landscape Architect at all times.
- B. Schedule earthwork in connection with the progress schedule required by the General Conditions.

1.10 DISPOSITION OF EXISTING UTILITIES

- A. Site information: No representations are made indicating subsurface conditions. It is expressly understood that the Owner/Landscape Architect will not be responsible for interpretations or conclusions drawn therefrom by the Contractor.
- B. Existing Utilities
 1. Before starting earthwork, locate existing underground utilities in areas of work. If utilities are to remain in place, provide adequate means of support and

protection during earthwork operations.

2. Should uncharted, or incorrectly charted, piping or other utilities be encountered during excavation, notify the Landscape Architect and Owner, and consult utility Owner immediately for directions. Cooperate with Owner and utility companies in keeping respective services and facilities in operation. Repair damaged utilities to satisfaction of utility Owner.
3. Do not interrupt existing utilities serving facilities occupied or used by Owner and others, during occupied hours, except when permitted in writing by Owner and then only after acceptable temporary utility services have been provided. Provide minimum of 48 hour notice to Owner, and receive written notice to proceed before interrupting any utility.
4. Inactive utilities encountered or utilities abandoned during construction operations shall be removed, plugged or capped. The location of such utilities shall be noted on Record Drawings and reported in writing to the Landscape Architect.

1.11 DEFINITIONS

- A. Fill and backfill shall be, for the purpose of this Specification, considered interchangeable terms and shall mean material to be used to bring existing or construction grades up to finish subgrade levels.
- B. The words "finish grade" as used herein mean the required final grade elevations indicated on the Contract Drawings. Where not otherwise directed, areas outside buildings shall be given uniform slopes between points for which finish grades are shown, or between such point and existing grade, except that vertical curves or roundings shall be provided at abrupt changes in slope.
- C. The word "subgrade" as used herein, means the required surface of subsoil, borrow fill or compacted fill.
- D. "Trench shall be defined as an excavation of any length where the width is less than twice the depth. All other excavations shall be classified as open.
- E. "Unsuitable Materials" shall include the following:
 1. Pavements, utility structures, building foundations and other manmade structures.
 2. Peat, muck, organic silt and other organic materials subject to decomposition, consolidation or decay.
 3. Miscellaneous fill including cinders, ash, glass, wood, masonry and metal.
 4. Ledge and boulders except as specified herein for fills.

PART 2 - PRODUCTS

2.01 SOIL MATERIALS

A. Ordinary Borrow

1. Ordinary Borrow shall be used whenever fill or backfill is indicated on the Drawings, and to fill to achieve required subgrades.
2. Ordinary Borrow shall conform to Ordinary Borrow as defined by the Massachusetts Standard Specifications for Highways and Bridges, M1.01.0.
 - a. This material shall have the physical characteristics of soils designated as group A-1, A-2-4 or A-3 under AASHTO-M145.
 - b. Ordinary fill shall be a natural soil, well-graded and free from all organic weak, compressible, and frozen materials, and shall contain no stone larger than two (2) inches in maximum dimension. It shall be of such nature and character that it can be dried and compacted and shall be free of all expansive materials (such as high plastic clays) and of materials subject to decay, decomposition, or dissolution, and shall conform to the following gradations:

<u>U.S. Sieve No.</u>	<u>% Passing by Weight</u>
2 inch	100%
#4	20-75%
#40	0-25%
#200	0-5%

3. Material from excavation on the site meeting the above requirements as evidenced by testing may be used as "Suitable backfill" provided it has not been contaminated with unsuitable material.

B. Dense grade leveling course under bituminous concrete paving shall conform to "Dense Grade Leveling Course" M2.01.7 of the Mass Standard Specifications for Highways and Bridges with the following gradation:

<u>Sieve Designation</u>	<u>Percent Passing</u>
2 inch	100
1-½ inch	70-100
¾ inch	50-85
No. 4	30-55
No. 50	8-24
No. 200	3-10

C. Aggregate Base Course, Aggregate Backfill & Gravel:

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1. Where Aggregate Base Course, Aggregate Backfill or Gravel is indicated on the Drawings, this material shall conform to the requirements of M1.03.0 Gravel Borrow, Type C of the MHD Standard Specifications except that the largest stone dimension shall be one and one-half (1-1/2) inch. Gravel shall consist of inert material which is hard durable stone and coarse sand; free from loam, clay, organic material, surface coatings, trash, frozen materials and deleterious materials. Gradation requirements are as follows:

<u>Sieve Designation</u>	<u>Percent Passing</u>
1 inch	100
½ inch	50-85
No. 4	30-60
No. 50	8-28
No. 200	0-10

- D. Where dense-graded crushed stone is indicated on the Drawings, this material shall conform to the requirements for Dense-Graded Crushed Stone for Subbase, M2.01.7 of the MHD Standard Specifications, with the following gradation:
- E. Crushed stone for safety surface base shall be a homogenous mixture of the following gradation, with exact gradation adjusted to the specific written requirements of the surfacing manufacturer. Stone shall be uniformly mixed in a pug mill or mixing table or other mechanical means prior to placement and sieve analysis.
 1. Base course for interlocking recycled plastic pavers shall be equivalent to that used for rubber safety surfacing.

<u>Sieve Designation</u>	<u>Percent Passing</u>
1 inch	90-100
5/8 inch	50-80
1/4 inch	30-50
No. 4	15-35
No. 8	10-30
No. 30	3-5
No. 200	0-3

- F. Crushed Stone for all other uses shall conform to the requirements of M2.01.0 Crushed Stone of the MHD Standard Specifications, sized as indicated on the Drawings, with gradation for size as required by the Standard Specifications.

PART 3 - EXECUTION

3.01 LAYOUT

- A. Layout site improvements as required in Section 01050 - Field Engineering.
- B. The Contractor shall inform the Landscape Architect when the general layout is completed and shall not begin excavation until the various alignments are approved by the Landscape Architect. Any discrepancies encountered in field conditions shall be reported to the Landscape Architect immediately.
- C. The Contractor shall be responsible for maintaining the correct vertical and horizontal alignment of all elements, which responsibility shall not be waived by the Landscape Architect's approval of basic layout and stakeout.

3.02 PROTECTION

- A. The Contractor shall assume complete responsibility and liability for the safety and structural integrity of all work and utilities to remain during the performance of all work.
- B. The Contractor shall provide safeguards including, but not limited to, warning signs, barricades, temporary construction fences, warning lights and other items required for protection of personnel and the general public during the performance of all work.
- C. The Contractor shall provide barricades for substantial construction in accordance with safety regulations of authorities having jurisdiction and or insurance requirements.
- D. All features related to protection shall be maintained until that unit of work has been completed to the point that the danger no longer exists as approved by the Landscape Architect.

3.03 GRADING AT EXISTING TREES TO REMAIN

- A. Where grading work is required within the drip-line or canopy of existing trees to remain:
 - 1. Notify the Landscape Architect prior to excavating these areas.
 - 2. Excavate within these areas using hand excavation methods only.
 - 3. Cut roots cleanly and to a depth 3" below final grade.
 - 4. Where trees have been disturbed within the dripline, deep water trees on a schedule and quantity as determined by the Landscape Architect.

3.04 EXCAVATION

- A. Excavation is "Unclassified", and shall include excavation to subgrade elevations indicated on the Drawings, or required to accommodate new construction, regardless of the character of materials and obstructions encountered and shall be understood to include rock and boulders, shale, boulders, earth, hardpan, fill, foundations, pavements,

curbs, piping and debris, except as follows:

1. Notify the Landscape Architect prior to proceeding if materials greater than 1 cubic yard in size are encountered.
 2. Excavation of rock, stone, ledge, parts of stone, brick or cement concrete slabs greater in size than 1 cubic yard and which cannot be excavated without the use of hydraulic rippers, hammering or breaking, the size of which could not be determined from surface inspection, will be paid for at the Contract Unit Price per cubic yard for Rock Excavation due to unanticipated subsurface conditions, or adjustment may be made to the layout to avoid excavation of same.
- B. Unauthorized Excavation: When suitable bearing material is encountered at subgrade elevations shown and excavation is made to greater depth, bring grade back to elevation required by providing appropriate fill material at no additional cost.
- C. When excavation has reached required subgrade elevations, notify the Landscape Architect.
- D. If the “assumed” bearing materials are not encountered at the subgrade elevations indicated, additional excavation work may be authorized by the Owner. Do not perform additional excavation unless directed by the Landscape Architect in writing. Removal of unsuitable material and its replacement with proper backfill, if directed in writing by the Landscape Architect, will be paid for as an adjustment of the Contract price due to unanticipated subsurface conditions.
- E. During excavation, do not damage roots of trees which are to remain. When excavating or trenching within the branch spread of trees scheduled to remain, hand dig in a manner which will cause minimum damage to root systems. Do not cut tree roots over 2 inches in diameter. Do not leave surface roots exposed. Prune injured roots clean and backfill as soon as possible to the satisfaction of the Landscape Architect and Owner.
- F. Slope sides of excavations to comply with local codes and ordinances having jurisdiction. Shore and brace where sloping is not possible because of space restrictions, stability of material excavated, or depth of excavation.
- G. Dewatering: Prevent water and subsurface or ground water from flowing into excavations and from flooding project site and surrounding area. Under no circumstances lay pipe or install appurtenances in water. Keep all trenches free from water until they have been backfilled.
- H. Materials Storage: Stockpile satisfactory excavated materials where directed until required for backfill or fill. The Landscape Architect shall approve the location of all stockpiles prior to placement. Place, grade and shape stockpiles for proper drainage.
1. Locate and retain soil materials away from edge of excavations. Do not store within drip line of trees to remain.

2. Legally dispose of excess soil material and waste materials off-site.

I. Frost Protection

1. Make no excavations to fill depth indicated when freezing temperature may be expected unless intended improvements can be accomplished immediately after the excavations have been completed. Protect bottom so excavated from frost if progress is delayed. Should protection fail, remove frozen materials and replace with gravel as directed at no cost to the Owner.
2. Keep the site clear and free of accumulations of snow within the limit of the Contract lines as necessary to carry out the work of the Contract.
3. Fill materials containing frost shall not be utilized, nor shall filling be done over frozen materials.

3.05 BACKFILL AND FILL

A. Backfill excavations as promptly as work permits, but not until completion of the following:

1. Acceptance of construction below finish grade by Landscape Architect.
2. Inspection, testing, approval and recording locations of underground utilities to the satisfaction of the Landscape Architect.
3. Compaction testing of subgrade if required at that location.

3.06 PLACEMENT OF FILL

A. Placement: Place backfill and fill materials in uniform lifts of not more than 12 inches in loose depth for ordinary fill, 8 inches in loose depth for other materials compacted by heavy compaction equipment, not more than 6 inches in loose depth for material compacted by hand operated tampers, except that **compaction of base for safety surface shall be done in two (2) inch lifts, and for interlocking pavers shall be done in one (1) inch lifts.**

1. Coordinate backfilling with the installation of the work of all trades.
2. Before compaction, moisten or aerate each layer as necessary to provide optimum moisture content. Compact each layer to required percentage of maximum dry density or relative dry density for each area classification. Do not place backfill or fill material on surfaces that are muddy, frozen, or contain frost or ice.
3. Place backfill and fill materials evenly adjacent to structures, piping or conduit to required elevations. Take care to prevent wedging action of backfill against structures or displacement of piping or conduit by carrying material uniformly

around structure, piping or conduit to approximately the same elevation in each lift.

4. Backfill by hand around pipe and for a depth of one (1) foot above the pipe. Use earth without rock fragments or large stones and tamp firmly in layers not exceeding 6 inches in thickness, taking care not to disturb the pipe. Compact the remainder of the backfill thoroughly with a rammer of suitable weight or with an approved mechanical tamper, or if the soil is granular, by flooding, provided that under pavements, walks and other surfacing, the backfill shall be tamped solidly in layers not exceeding 6 inches in thickness.
5. Compact backfill to match adjacent areas as specified above. Correct settlement of fill by filling to subgrade levels in all areas where settlement occurs.

3.07 COMPACTION

- A. Refer to Paragraph 1.07 this Section, for Compaction Testing Requirements for subgrade and crushed stone base of playground area.
- B. Compact soil to not less than the following percentages of maximum density of soils in accordance with ASTM D1557, Method C or AASHTO T-180.
 1. Subgrade and base courses under all areas (with the exception of planting beds), utility trench backfill, fill at base and around footings, and curb subgrade: Compact each layer of backfill or fill material to 95 percent of maximum dry density.
 2. Planting beds: Compact to 85 percent of maximum dry density.
- C. Moisture Control: Where subgrade or layer of soil material must be moisture conditioned before compaction, uniformly apply water to surface of subgrade or layer of soil material, to prevent free water from appearing on surface during or subsequent to compaction operations. Remove and replace soil material that is too wet to permit compaction to specified density.

3.08 SUBGRADE PREPARATION AND GRAVEL PLACEMENT FOR PAVEMENTS

- A. Clean the rough subgrade of all loose, soft, foreign or other unsuitable material and reshape as required. Add suitable fill material to meet required grade.
- B. Compact to required grades and sections for paving. Tamp traces of trenches. Remove spongy or otherwise unsuitable material and replace with approved material. Loosen exceptionally hard spots and re-compact. Take every precaution to obtain a foundation of uniform bearing power. In absence of specific requirement, compact foundation by such means as will provide firm base and insurance against settlement of superimposed work.

- C. Roll longitudinally at sides, overlapping each pass by one-half of rear wheel. Fill all depressions or settlements which occur. Continue until all stones are firmly interlocked and surface is true and unyielding. After final rolling, surface is to be free of depressions or irregularities greater than 3/8 inch in ten (10) feet.
- D. Construct base course as detailed on the Contract Drawings for all areas of new paved surfaces in this Section. Placement of gravel base course shall conform to the requirements of MHD except as herein modified.
- E. Spread gravel from self-spreading vehicles, approved type of power grader or by hand upon prepared sub-grade. Spread evenly in layers so as to avoid separation of aggregates. Layers shall not exceed six (6) inches in depth after compaction. Remove stones larger than four (4) inches. When spread and rolled on the prepared surface, it shall form a stable surface. Compaction shall have a density of not less than 95% of maximum density determined in accordance with ASSHTO-T-180 Method D. All rolling shall be done with a roller weighing 8 to 10 tons. Compact any portion which is not accessible to a roller by mechanical or hand tamper.
- F. Final rolled surface shall be true to the lines and grades indicated on the Contact Drawings or as directed by the Landscape Architect. Fill any depression that may appear during and after rolling with gravel and re-roll until the surface is true and even. Tolerance shall be 3/8 inch maximum above or below the cross-section grades and 3/8 inch maximum under a 10 foot line longitudinally except that:
 - 1. Tolerance for grades of crushed stone base course shall be as required by the safety surface installer/manufacturer.
- G. Maintain the surface of any layer in its finished condition until succeeding layer is placed. Properly drain the sub-base at all times.

3.09 GRADING

- A. **Finished grades within the 100' flood contour shall be verified using laser operation survey instruments with a tolerance of $\pm 1/4"$. See Project Closeout, Section 01700 for as-built survey requirements of this area.**
- B. The Contact Drawings indicate, in general, alignment and finish grade elevations. The Landscape Architect, however, may make such adjustments in grades and alignments as are found necessary in order to avoid interference with any special conditions encountered.
- C. Uniformly grade areas within limits of grading under this section, including adjacent transition areas. Smooth finished surface within specified tolerances, compact with uniform levels or slopes between points where elevations are indicated, or between such points and existing grades.
- D. Grade areas to drain away from structures and to prevent ponding. Finish surfaces free from irregular surface changes, and as follows:

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- 1. Paved areas: Shape surface of areas under paved surfaces to line, grade and cross section to provide finished grades of pavements within tolerances specified.
- E. Compaction: After grading, compact subgrade surfaces to the depth and indicated percentage of maximum or relative density for each area classification.
- F. Complete grading operations after utilities have been installed, site improvements included under this Contract have been completed and all rubbish, materials and debris have been properly disposed of.
- G. Do all cutting, filling, reshaping, re-grading and re-compacting as necessary to meet the requirements of the Contract Drawings and this Section of the specifications. Maintain sub-grades at the levels specified until turned over to subsequent construction. Bring to required sub-grade levels any areas where settlement, erosion or other grade changes occur.

3.010 PROTECTION AND REPAIR

- A. Protect newly graded areas from traffic and erosion. Keep free of trash and debris.
- B. Where completed compacted areas are disturbed by subsequent construction operations or adverse weather, scarify surface, reshape and compact to required density prior to further construction.
- C. Whenever streets, lawns, sidewalks or improvements outside the Contract Limit of Work Line have been excavated in fulfilling the work required under this Contract, the Contractor shall furnish and install all material necessary to bring finish surfaces level with the existing conditions in accordance with the governing authority. Notify the proper authorities prior to restoring surfaces outside the Contract Limit of Work.
- D. Do all repairs and restoration to pavements, curbs, and other work inside and outside of the project site damaged by the work under this Contract and restore all existing work to a condition at least equal to the condition specified for this Contract for such improvements.

3.10 CLEANUP

- A. Keep all work areas free from accumulation of debris during the course of work under this Section.
- B. At the completion of the Work of this Section, properly and legally dispose of all excavated materials, all rubbish, debris, waste materials from, and about the site, building, and structures, including tools, scaffolds, apparatus and appliances used in connection with work under this Section and leave the premises in a clean condition.

END OF SECTION

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SECTION 02500

GRANITE CURB

PART 1- GENERAL

1.01 GENERAL PROVISIONS

- A. All of the Contract Documents, including the Contract Form, General Provisions, General Conditions, Supplemental Conditions, and all Attachments to the General Provisions, and Division 1 - General Requirements, apply to the work of this Section.

1.02 SCOPE OF WORK

- A. This item of work shall consist of furnishing and installing granite curb as detailed on the Drawings.

1.03 RELATED SECTIONS

- A. Section 02200 - Earthwork.
- B. Section 02510 - Bituminous Concrete Paving.
- C. Section 03300 - Cast-in-Place Concrete.
- D. Section 09614 - Detectable Warning Panels

1.04 SUBMITTALS

- A. Submit the following in accordance with the requirements of section 01300 - Submittals:
 - 1. Supplier's literature demonstrating compliance with the Specifications.

1.05 DELIVERY, STORAGE AND HANDLING

- A. Deliver, store, and handle granite curb to prevent damage.

1.06 REFERENCE STANDARDS

- A. All work shall comply with the minimum standards of the latest editions of the following codes and specifications, subject to modifications and amendments outlined herein:
 - 1. Massachusetts Standard Specifications for Highways and Bridges, latest edition.
 - 2. Americans with Disabilities Act Accessibility Guidelines (ADAAG)
 - 3. Massachusetts Architectural Access Board Regulations, CMR 521 (MAAB)

1.07 EXAMINATION OF SITE AND DOCUMENTS

- A. The Contractor shall inform him/herself of existing conditions of the site before submitting his/her bid and shall be fully responsible for carrying out all required site work to fully and properly execute the work of the Contract.

GRANITE CURB

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PART 2 - PRODUCTS

- 2.01 Materials shall conform to the Massachusetts Standard Specifications for Highways and Bridges, latest edition, requirements specified in the following subsection of Division III, Materials:
- A. Granite curb shall be Type VA-4, conforming to Section M9.04.01.
 - 1. Curbs shall be fabricated such that ends fit together to provide no greater than ½" visible joints.
 - B. Mortar M4.02.15
 - C. Gravel M1.03.0, Type C
- 2.02 Curb at curves shall conform to the requirements of M9.04.1 Curbs and Edging of the Mass Highway Standard Specifications.
- A. Curb set on radius of 100 feet or less shall be cut to the required curvature. The ends of all curved stones shall be cut on radial lines.
 - B. On curves with radii greater than 100 feet but less than 500 feet, curb stones may be 4 feet to not more than 6 feet in length.

PART 3 - EXECUTION

- 3.01 Excavation of Trench
- A. The trench for the curb shall be excavated as detailed on the Drawings.
- 3.02 Preparing the foundation
- A. The foundation for the curb shall consist of gravel spread upon the subgrade and after being thoroughly compacted by tamping, depth as shown on the Drawings.
- 3.03 Setting Curb and Edging.
- A. Curbing, curb corners or edging shall be set on additional gravel spread upon the foundation.
 - B. All spaces under the curb, curb corners or edging shall be filled with gravel thoroughly compacted so that the curb, curb corners or edging will be completely supported throughout their length.
 - C. Concrete fill shall be placed at the front and back of the curb, continuous as detailed on the Drawings.
 - D. The curb shall be set at the line and grade required as shown on the Plans unless otherwise directed.

E. Neatly mortar joints.

END OF SECTION

SECTION 02510

BITUMINOUS CONCRETE PAVING

PART 1 - GENERAL

1.01 GENERAL PROVISIONS

- A. Attention is directed to the General Conditions of the Contract, all Divisions of the Specifications and the Contract Drawings, all of which apply to this section.
- B. Examine and coordinate all Contract Drawings and other section of the specifications for requirements which affect work of this section whether or not such work is specifically mentioned in this section. Coordinate work with other trades to assure the steady progress of all work under the Contract. The Contractor shall refer to the Contract Documents for all new work and coordinate how it relates to the paving.

1.02 SCOPE OF WORK

- A. Work under this Section shall include all labor, materials, services, equipment, transportation and accessories and the performance of all operations necessary to complete the work of this Section, as indicated on the Contract Drawings and/or as specified herein.
- B. The work shall include, but is not limited to, the following:
 - 1. Furnish and install bituminous concrete pavement

1.03 RELATED WORK

- A. Section 02100 - Site Preparation and Demolition
- B. Section 02200 - Earthwork: Aggregate Base Course
- C. Section 02800 - Site Furnishings

1.04 REFERENCE STANDARDS

- A. Work shall comply with the minimum standards of the latest editions of the following codes and specifications, subject to modifications and amendments outlined herein.
 - 1. MHDSS: Standard Specifications: Commonwealth of Massachusetts, Department of Public Works, Standard Specifications for Highways and Bridges, latest edition.
 - 2. ASTM: American Society for Testing and Materials.
 - 3. AASHTO: American Association of State Highway and Transportation Officials.
 - 4. Federal, State and/or Municipal Codes
 - 5. Public Safety Codes
 - 6. U.S. Public Health Service
 - 7. National Electric Manufacturers Association

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8. American National Standards Institute
9. American Society of Mechanical Engineers
10. Commercial Standards
11. Federal Specifications
12. Occupational Safety and Health Regulations
13. ADA: Americans with Disabilities Act

1.05 QUALIFICATIONS

- A. Installer: Company specializing in performing the work of this section with documented experience on at least two similar projects.

1.06 EXAMINATION OF SITE AND DOCUMENTS

- A. By submitting a bid the Contractor affirms that he/she has carefully examined the site and all conditions affecting Work under this Section. No claim for additional costs will be allowed because of lack of full knowledge of existing conditions.
- B. Plans, surveys, measurements and dimensions under which the work is to be performed are believed to be correct, but the Contractor shall have to examine them for him/herself during the bidding period, as no additional compensation will be made for errors or inaccuracies that may be found therein.

1.07 SUBMITTALS

- A. The Contractor shall provide the following submittals for approval in conformance with requirements of SECTION 01300, SUBMITTALS. Do not order materials until Landscape Architect's approval of submittals, certifications or test results have been obtained. Delivered materials shall closely match the approved submittals.
 1. Submit the bituminous concrete design mix for each application, indicating aggregate sizes and proportions.
 2. Manufacturer's literature for tack coat demonstrating compliance with the specifications.

1.08 PERMITS AND CODES

- A. All work shall be as shown in the Contract Drawings and Specifications and shall comply with applicable codes and regulations at the local, county, state, and federal levels. All labor, materials, equipment and services necessary to make the Work comply with such requirements shall be provided without additional cost to the Owner.
- B. The Contractor, under this Section, shall be responsible for providing and filing all Plans, Specifications and other documents, pay all requisite fees and secure all permits, inspections and approvals necessary for legal installation and operation of the systems and or equipment finished under this Section.

1.09 CONDITIONS OF WORK

- A. Conduct the work giving consideration to protection of the public, protection of the existing work from weather; control of noise, shocks, and vibration; control of dirt and dust; orderly access and storage of materials; protection of existing buildings; protection of adjacent buildings and property. Coordinate work and cooperate with the Owner and Landscape Architect at all times.
- B. Schedule paving in connection with the progress schedule required by the General Conditions.

PART 2 - PRODUCTS

2.01 BITUMINOUS CONCRETE PAVEMENT

- A. Bituminous concrete shall be Class I, Type I-1, furnished and laid in accordance with Section 420 and 490 of the MHD Standard Specifications except as modified herein.
- B. Subbase for bituminous concrete shall be Dense-graded Crushed Stone for Subbase as specified in Section 02200 - Earthwork.
 - 1. Subgrade and subbase shall be installed and compacted as required in Section 02200 - Earthwork.
- C. Aggregate sizes and gradation for bituminous mixes shall be as follows:
 - 1. Binder course shall conform to MHD Standard Specifications, Section M3, Table A Job Mix Formula for "Binder Course."
 - 2. Wearing course for bituminous concrete walkways shall be equivalent to MHD Standard Specifications, Section M3, Table A Job Mix Formula for "Surface Treatment" with a maximum aggregate size of 3/8".

2.02 TACK COAT

- A. Tack Coat shall be bitumen Grade, AC-10, or AC-20 asphalt cement conforming to Section M3 of the Standard Specifications.

PART 3 - EXECUTION

3.01 PREPARATION

- A. Make any corrections necessary to base material furnished and placed under SECTION 02200, EARTHWORK, to bring base course materials to sections and elevations shown on the Contract Drawings.
- B. The contact surfaces of curbs, walls, manholes, catch basins or other appurtenant

structures in pavement shall be painted thoroughly with a thin uniform coating of tack coat just before any bituminous mixture is placed against them.

3.02 PATCHES AND NEW PAVING ABUTTING EXISTING

- A. Where the line of demarcation between new and existing paving occurs, the existing paving shall be saw-cut to provide a clean sharp joint. The pavement shall be sawn by an approved machine to a depth which will permit the cutting of the pavement without damage to the pavement left in place.
 - 1. Protect sawn edges of paving from damage until new paving is placed against it. Existing pavement which is damaged, disturbed or settled, shall be cut back by the same method and replaced as directed by the Landscape Architect without additional cost to the Owner.
- B. Where new bituminous paving meets existing paving the finish grades in the new work shall be adjusted if necessary, to blend smoothly with the existing pavement. Seal joint at saw-cut line with an approved bituminous emulsion. Notify the Landscape Architect of discrepancies before preceding with the work.

3.03 PLACEMENT

- A. The mixtures shall be placed and compacted only at such times which permit the proper inspection and checking by the Landscape Architect.
- B. The mixtures shall be placed only upon approved surfaces that are clean and dry, and when weather conditions are suitable. No bituminous material shall be applied when the temperature is below 32 F.
- C. The temperature of bituminous concrete mixture when delivered to the site shall conform to the following, with a tolerance of plus or minus 20 F.

<u>Air Temperature</u>	<u>Project Delivery Temperatures</u>
35F	300F
40F	290F
6SF	280F
90 F, or over	270F

- D. Place courses of bituminous concrete in conformance to application and depth requirements shown on the Contract Drawings and specified herein. Depths referenced shall be compacted thicknesses. Bituminous concrete for binder course and wearing or top course shall be furnished and laid in accordance with Section 460 of the Standard Specifications, and as directed herein and by the details.

3.04 SPREADING

- A. The equipment for spreading and finishing shall be mechanical, self-powered pavers, capable of spreading and finishing the mixture true to lines, grade, width and crown by

means of fully automated controls for both longitudinal and transverse slope.

- B. Mixtures shall be deposited in a mechanical spreader and immediately spread thereby, and then struck off in a uniform layer to the full width required and of such depth that each course, when compacted, shall have the required thickness and shall conform to the grade and cross section contour specified.
- C. Hand Spreading: Spreading by hand methods will be permitted only for particular locations in the work which because of irregularity, inaccessibility or other unavoidable obstacles do not allow mechanical spreading and finishing.
- D. Compaction:
 - 1. After the paving mixture has been properly spread, compaction shall be obtained by the use of power rollers of approved design and weight per inch of roller. The rollers shall be steel wheeled supplemented with pneumatic-tired rollers where required.
 - 2. Along curbs, structures and places not accessible with a roller, the mixture shall be thoroughly compacted with mechanical tamping devices. The surface of the mixture after compaction shall be smooth and true to the established line and grade.
 - 3. The densities of the completed pavement shall be not less than 95% of the density obtained from laboratory compaction of a mixture composed of the same materials in like proportions.
- E. All areas of finished paving on which water stands or which are found excessively uneven shall be promptly brought to the correct grade and line.
- F. When tested with a ten (10) foot straightedge there shall be no deviation from true surface planes represented by the grade elevations shown on the Contract Drawings in excess of one-quarter ($\frac{1}{4}$) inch.
- G. Do any repair or patching to pavements outside the project site damaged by work of the contract. All patching work required shall be in accordance with requirements for new construction.
- H. No vehicular traffic of any kind shall be allowed to pass over the newly finished surface until it has had time to set. Twenty-four (24) hours will be considered sufficient time for the pavement to set in most cases, but this period may be extended by the Landscape Architect/Engineer as required by weather or other reasons.
- I. Install frames and rims after installation of binder course for bituminous concrete pavement. Install wearing course after the installation of the frames and rims. Frames and rims shall have the same grade and slope as adjacent construction.

3.05 QUALITY ASSURANCE

- A. The Landscape Architect may require the Contractor to remove and replace at the Contractor's expense any defective mix not conforming to the specified job mix formula.
- B. If, at any time before the final acceptance of the work, any soft, imperfect places or spots shall develop in the surface, all such places shall be removed and replaced with new materials and then compacted until the edges at which the new work connects with the old become invisible, at no additional expense to the Owner.

3.06 CLEAN-UP

- A. Keep all work areas free from accumulation of debris during the course of work under this Section.
- B. At the completion of the paving, all rubbish, debris, waste materials from, and about the site, building, and structures, including tools, scaffolds, apparatus and appliances used in connection with work under this Section shall be legally disposed of and the premises shall be left in a clean condition.

END OF SECTION

SECTION 02540

SAFETY SURFACING

PART 1 - GENERAL

1.01 GENERAL PROVISIONS

- A. Attention is directed to the General Conditions of the Contract, all Divisions of the Specifications and the Contract Drawings, all of which apply to this section.

1.02 SCOPE OF WORK

- A. Furnish and install safety surfacing of type and in locations shown on the Drawings and specified herein.

1.03 RELATED WORK

- A. Section 02200 - Earthwork: Compacted crushed stone base
- B. Section 02860 - Play Equipment
- C. Section 03300 - Cast-in-Place Concrete: Walk at perimeter

1.04 WARRANTY

- A. The manufacturer shall provide to the Owner the manufacturer's standard warranty which shall be at a minimum for a 5 year period from the completion of the installation. The warranty shall guarantee the impact attenuation, color stability, and physical stability against cracking or separation of layers.

1.05 DEFINITIONS

- A. Critical Height: Standard measure of shock attenuation. According to CPSC No. 325, this means "the fall height below which a life-threatening head injury would not be expected to occur".
- B. EPDM - Ethylene propylene diene monomer
- C. Fall Height: According to ASTM 1487, this means "the vertical distance between a designated play surface and the protective surfacing beneath it." The fall height of the playground equipment should not exceed the Critical Height of the protective surfacing beneath it.
- D. SBR - Styrene butadiene rubber
- E. TPV - Thermoplastic vulcanizate
- F. Use Zone: According to ASTM F1487, this means "the area beneath and immediately adjacent to a play structure that is designated for unrestricted circulation around the

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equipment and on whose surface it is predicted that a user would land when falling from or exiting the equipment.

1.06 SUBMITTALS

A. Poured-in-Place Surfacing:

1. Submit manufacturer's certificate verifying that EPDM/TPV granules are manufactured from pre-consumer virgin rubber.
2. Submit manufacturers literature for top course (aliphatic primer) and base course primers demonstrating compliance with the specifications.
3. Submit manufacturer's literature demonstrating specification compliance for cushion course.
4. Submit manufacturer's literature documenting specification compliance with the following requirements:
 - (a) water permeability
 - (b) dry & wet coefficient of friction
 - (c) tensile strength
 - (d) tear resistance
 - (e) flammability
 - (f) UV stabilization method.
5. Submit depth of safety surfacing for different fall heights.
6. Provide a list of five (5) installations of rubber safety surfacing completed by proposed installer in the last five years using the same system, including project name, phone number, address, and contact.
7. Installer Certificates: Signed by manufacturer certifying that installers comply with requirements.
8. Manufacturer's Certificates: Signed by the manufacturer certifying that they comply with the requirements.
9. Product Test Reports: From IPEMA indicating that playground surface system complies with the requirements, based on comprehensive testing of the product as follows: ASTM F 1292 latest version, ASTM F 1951 latest version and CPS guidelines for impact attenuation for the fall height required by the equipment and the depth of safety surfacing. Product testing shall have been done within the last five (5) years.
10. Submit manufacturer's specifications for stone base course including required sieve gradation of stone, subgrade slope, and permissible tolerances in grade variation.

- 12. Maintenance Data: Submit manufacturer's printed installation and maintenance instructions.
 - 13. Submit Performance Warranty, signed and dated for poured-in-place surfacing.
- B. Samples:
- 1. Provide five (5) 4-inch diameter round samples of specific custom color blends requested by the Landscape Architect for final color selection by the Owner.

1.07 REFERENCES

- A. ASTM F 1292 - Standard Specification for Impact Attenuation of Surface Systems Under and Around Playground Equipment.
- B. ASTM F 1951 - Standard Specification for Determination of Accessibility of Surface Systems Under and around Playground Equipment.
- C. U.S. Consumer Product Safety Commission (CPSC), Public Playground Handbook for Safety.
- D. ASTM D2434- Standard Test Method for Permeability of Granular Soils (Constant Head)
- E. Americans with Disabilities Act Guidelines (ADAAG) for Building and Facilities, 36 CFR Part 1191
- F. MAAB CMR 521 Regulations

1.08 FALL HEIGHTS

- A. Refer to Sheet L.13 Playground Enlargement Plan for fall heights at different areas of the playground.

1.09 QUALITY ASSURANCE

- A. Surfacing manufacturer shall have marketed the surfacing system specified in the United States for at least five (5) years.
- B. Surfacing manufacturer shall have IPEMA Certification specific to poured in place safety surfacing of the system specified.
- C. Installer shall be trained and certified by the manufacturer as a qualified installer of their product. In addition, the installer shall have experience in installing at least three (3) installations of similar size and complexity.
- D. Rubber materials shall be supplied by an ISO9001 certified manufacturer.

1.10 REGULATORY REQUIREMENTS

- A. Installation of surfacing shall conform to applicable requirements of ADAAG - Americans with Disabilities Act Accessibility Guidelines, U.S. Architectural and Transportation Barriers Compliance Board, Washington, D.C. - latest edition, and regulations of the Commonwealth of Massachusetts Architectural Access Board (MAAB), 521 CMR.

1.11 JOB CONDITIONS

- A. At the time of application ambient air temperature shall be between 40 degrees and 90 degrees F and remain so for at least 72 hours after completion, unless otherwise specifically allowed by the manufacturer of the safety surface. There shall be no fluctuation in temperature greater than 15 degrees F during the installation period, or 25 degrees F during the curing time. Synthetic safety surfacing shall be installed on a dry subsurface, with no prospect of rain within the initial drying period.

1.12 COORDINATION

- A. Coordinate construction of playground surface systems with installation of playground equipment and perimeter curbing to verify accurate use zones and fall heights.
- B. The Contractor shall coordinate with the installer and manufacturer of the safety surfacing to ensure that all manufacturer's/installer's requirements for the base course are met including subgrade slope, drainage, maximum variation in grade of surface, and gradation of stone base.

1.13 DELIVERY STORAGE AND HANDLING

- A. All packaged materials shall be delivered to the site in original unopened containers clearly indicating manufacturer name, brand name, and other identifying information.
- B. All materials shall be protected from weather and other damage prior to application, during application and while curing. Materials shall be stored at a minimum temperature of 40 degrees and a maximum temperature of 90 degrees.
- C. Protect UV-light-sensitive materials from exposure to sunlight.

PART 2 - MATERIALS

2.01 MANUFACTURERS

- A. Subject to compliance with the Specifications, manufacturers offering the products that may be incorporated into the work include, but are not limited to, the following:
 - 1. Surface America, Playbound PIP, local representative M.E. O'Brien & Sons, Medfield, MA (508-359-4200)

2. Duraturf PIP, local representative Sport Surface Specialties, East Aurora, NY (716-652-2039)
3. No-Fault Safety Surfacing, No Fault Sport Group, LLC, (225-215-7760).
4. Or Equal. To be considered equal, a manufacturer must meet all requirements of the Specifications including but not limited to the requirements for current IPEMA certification for the poured in place surfacing to be used and the use of virgin rubber for EPDM/TPV granules.

2.02 POURED-IN-PLACE PLAYGROUND SURFACING

- A. Playground surfacing shall be a system formulated for site-mixing and application from rubber particles in a polyurethane binder, forming a water permeable, UV-light stable, impact-attenuating, seamless playground surface system with layered construction consisting of a lower-density formulation of SBR particles and polyurethane forming a cushion-base layer bonded to higher-density formulation of EPDM or TPV rubber particles and aliphatic polyurethane, forming a top-layer wearing surface. Surfacing system shall be porous.
- B. Surface Characteristics
 1. Impact Attenuation: HIC of no more than 1000; peak deceleration of no more than 200 g's.
 2. Dry static coefficient of friction (ASTM D2047) - Min. 0.9
 3. Wet static coefficient of friction (ASTM D2047) - Min. 0.7
 4. Accessibility of Surface System: ASTM F1951: Pass
 5. Permeability: .04 gal/square yard/sec
 6. Tensile strength, measured by ASTM D412 shall be not less than 25 psi.
 7. Tear resistance (ASTM D624) - 140%.
 8. Flammability: shall pass ASTM D2859.
- C. Top Course:
 1. The top wearing course shall be a minimum ½" thickness monolithic layer composed of EPDM or TPV particles bound with polyurethane binder. The urethane content shall be 18% minimum by weight of the entire mixture.
 - (a) Polyurethane Binder for top course

- (1) Binder for top course shall be an **aliphatic** weather resistant, UV-stabilized, flexible, non-hardening, 100 percent solids polyurethane complying with requirements of authorities having jurisdiction for nontoxic and low VOC content. The binder shall be HDI (1,6-hexamethylene diisocyanate) based. Aromatic isocyanates such as toluene diphenyl isocyanate (TDI) or methylene diphenyl diisocyanate (MDI) are not acceptable. No filler materials shall be used in the polyurethane such as plasticizers and the catalyzing agent shall contain no heavy metals.

- (b) **TPV and EPDM particles shall be manufactured from pre-consumer virgin rubber.** Particles from post-consumer rubber are not acceptable.
 - (1) Approved sources for EPDM or TPV particles:
 - a. Rosehill Polymers, England as distributed by American Recycling Center, Owoosi, Michigan.
 - b. Melos-GMBH
 - c. Granules manufactured in the US from virgin pre-consumer rubber by an ISO9001 certified company.

 - (2) TPV and EPDM particles shall remain consistent in gradation and size as follows:
 - a. TPV particles shall be sized 1 mm - 4 mm.
 - b. EPDM particles shall be sized 1 mm - 3 mm.
 - c. Strand, shaved, chipped or shredded rubber is not acceptable in the wearing course layer.

 - (3) Color of particles shall be an integral dye. Color from coating or colored primer is not acceptable.
 - a. Pricing shall be based on a top course of 50% Brown, 50% Light Grey with final selection by the Owner from colors of comparable price.

- D. Base Cushion Layer: The base impact layer shall be a monolithic layer composed of shredded 100% styrene butadiene rubber (SBR), or manufacturer's standard

formulation of pre-consumer recycled 5/8" chunk rubber, bound together with a polyurethane binder.

1. The dust content shall be no greater than 4%.
2. Binder shall be a single component polyurethane designed for use with rubber granule material for outdoor installations.
3. Urethane in the base layer shall be a minimum of 14% by weight of the entire mix.

2.02 BASE COURSE FOR POURED-IN-PLACE SURFACING

- A. Base course shall be crushed stone as specified in Section 02200 - Earthwork, with gradation adjusted to manufacturer's recommendations. Bid shall include any additional costs necessary to adjust specified crushed stone base to the gradation and requirements of the specific manufacturer of the surfacing.

PART 3 - INSTALLATION

3.01 BASE PREPARATION

- A. Subgrade under base course shall be installed and compacted as specified in Section 02200-Earthwork. Subgrade shall be tested as specified in Section 02200 - Earthwork.
 1. Slope subgrade of base course parallel to finished grade of safety surfacing.
- B. Provide subsurface drain at downslope ends of subgrade, as shown on L.5 - Drainage & Utility Plan.
- C. Aggregate base course shall be installed and compacted in Section 02200 - Earthwork, fully compacted in 2" lifts to 95% compaction. Contractor shall perform compaction testing specified in Section 02200 - Earthwork on first lift and last lift.
- D. Variation in grade of aggregate surface shall be as required by the manufacturer/installer.

3.02 INSPECTION OF BASE

- A. Verify that base is installed to correct slopes, grades and tolerances prior to installation of poured in place surfacing. Prior to application of the poured in place system, the applicator shall evaluate the substrate's structural

performance, and notify all contractors and the landscape architect of any deficiencies. Work shall not proceed until unsatisfactory conditions are corrected.

- B. Prior to installation, verify that cast-in-place perimeter curbing has been set to correct lines and grades to ensure adequate safety zones and grades not exceeding 2%.
 - 1. Perimeter walk shall be flush with safety surfacing with no deviation greater than 1/8".

- C. Refer to Paragraph 1.11 Job Conditions for environmental requirements. Temperature of all components shall be checked to ensure that their temperature is equal to or greater than 40 degrees F. Components that are below the required application temperature shall not be used until the temperature is elevated to the specified application temperature.
 - 1. Install safety surfacing to the dimensions and limits shown on the Drawings.
 - 2. Surfacing shall be installed in strict accordance with the submitted manufacturer's printed installation instructions and as detailed on the Drawings.

3.03 PROTECTION

- A. Provide protection of surface during curing process.

END OF SECTION

SECTION 02545

PRECAST CONCRETE CURBING

PART 1 - GENERAL

1.01 GENERAL PROVISIONS

- A. Attention is directed to the General Conditions of the Contract, all Divisions of the Specifications and the Contract Drawings, all of which apply to this section.

1.02 SCOPE OF WORK

- A. Provide precast concrete curbing as indicated on the Drawings.

1.03 RELATED WORK

- A. Section 02200 - Earthwork: Compacted gravel base

1.04 SUBMITTALS

- A. Precast Concrete Curbing
 - 1. Submit manufacturer's literature for precast concrete curbing, demonstrating compliance with the Specifications.

1.10 DELIVERY STORAGE AND HANDLING

- A. All packaged materials shall be delivered to the site in original unopened containers clearly indicating manufacturer name, brand name, and other identifying information.
- B. All materials shall be protected from weather and other damage prior to application, during application and while curing.

PART 2 - MATERIALS

2.01 PRECAST CONCRETE CURBING

- A. Provide precast concrete curbs with a minimum compressive strength of 5000 pounds per square inch. Castings shall have plane smooth surfaces, true to line and face, free from defects, sharp arise, and with curved surfaces accurately reproduced. Edges of curbing shall have a radius or be mitered. Overall dimensions for each casting shall not vary more than 1/16 inch from those indicated.
- B. Concrete curbing shall be 135 lbs. per linear foot, with 5 - 7% air entrainment, manufactured to Massachusetts Highway specification.

- C. Curb units shall be cast at the manufacturer's plant. Job site castings will not be permitted.
- D. Dowels shall be #5 rebar, minimum 4 inches long.
- E. Provide radius where shown on the Drawings. Otherwise, field cut to provide dimensions and angles shown on the Drawings.

2.02 AGGREGATE BASE COURSE FOR CURBING & SAFETY SURFACING

- A. Aggregate base course shall conform to the requirements for base course specified in Section 02200 - Earthwork.

PART 3 - INSTALLATION

3.01 BASE PREPARATION

- A. Base course shall be installed and compacted as specified in Section 02200-Earthwork.

3.02 INSTALLATION

A. Precast Concrete Curbing

1. Verify that aggregate base course has been correctly installed and compacted.
2. Set curb true to line and grade on a foundation of one cubic foot of dry concrete for each linear foot of curb installed. Ram all spaces under the curb so that it is completely supported throughout the entire length.
3. Top line of curbing shall be a smooth line.
4. Install dowels to tie curb sections together.
5. Butt joint curb sections together.

END OF SECTION

SECTION 02590

COLOR COATING & CRACK SEALING

PART 1 - GENERAL

1.01 GENERAL PROVISIONS

- A. Attention is directed to the General Conditions of the Contract, all Divisions of the Specifications and the Contract Drawings, all of which apply to this section.
- B. Examine and coordinate all Contract Drawings and other section of the specifications for requirements which affect work of this section whether or not such work is specifically mentioned in this section. Coordinate work with other trades to assure the steady progress of all work under the Contract. The Contractor shall refer to the Contract Documents for all new work and coordinate how it relates to this Section.

1.02 SCOPE OF WORK

- A. Work under this Section shall include all labor, materials, services, equipment, transportation and accessories and the performance of all operations necessary to complete the work of this Section, as indicated on the Contract Drawings and/or as specified herein.
- B. The work shall include, but is not limited to, the following:
 - 1. Crack-sealing and color coating existing basketball court
 - 2. Color coating of existing spray park over existing color-coating, with new colors and pattern.

1.03 SUBMITTALS

- A. Submit the following in accordance with the requirements of the General Conditions:
 - 1. Submit manufacturer's product data demonstrating specification compliance for line paint, fortified and non-fortified paint for area painting, and crack-sealing system.
 - (a) Submit paint color samples of manufacturer's standard colors for final selection by the Owner.
 - (b) Submit manufacturer's directions for paint and crack-sealer application, including permissible temperature for application and storage, drying time, coating thickness and application rates, and period of curing time prior to application to new bituminous concrete.
 - 2. Submit installer name and evidence of qualifications
 - 3.

1.04 REFERENCES

- A. Massachusetts Highway Department Standard Specifications for Highways and Bridges, 1988 edition.

1.05 QUALIFICATIONS

- A. Installer shall be from a company with at least 5 years experience in commercial painting.

1.06 REGULATORY REQUIREMENTS

- A. Materials and handling of paint shall conform to all environmental and OSHA regulations.

1.07 DELIVERY STORAGE AND HANDLING

- A. All packaged materials shall be delivered to the site in original unopened containers clearly indicating manufacturer name, brand name, and other identifying information. Paint shall be stored within the temperature ranges indicated by the manufacturer.

1.08 ENVIRONMENTAL REQUIREMENTS

- A. Paint shall be applied within the temperature ranges recommended by the paint manufacturer.

PART 2 - MATERIALS

2.01 CRACK SEALING SYSTEM

- A. Crack sealing system shall be Armor Crack Repair system or approved equal utilizing a knitted flexible expandable fabric providing a final thickness of no more than .035".
- B. The system shall allow thermal expansion and contraction of the crack without damage to the crack repair material.

2.02 PAINT

- a. Paint for marking lines and shall be factory-mixed non-bleeding paint specifically formulated for marking asphaltic concrete surfaces for line painting.
 - 1. Paint shall be 100 percent acrylic latex emulsion type, containing no alkyds, butadiene styrene, or vinyls and shall be thinned with water only. The paint shall be suitable for use over all types of bituminous surfaces, including weathered bituminous. When applied over bituminous concrete it shall not cause lifting, cracking, peeling, or other damage to the pavement. Thicknesses of coats shall be in accordance with manufacturer's recommendations. Acceptable manufacturers California Paints, Neyra Industries, The Glidden Co., or equal.

- a) Color shall be white.
 - 2. Paint for area color coating shall be a fortified 100% acrylic latex emulsion with silica additive. Acceptable manufacturers California Paints, Nova Sport, Dalton Enterprises, Inc., or equal. Paint shall contain no alkyds, butadiene styrene or vinyls and shall be thinned with water.
 - a) Fortification shall be by addition of silica sand, pre-mixed at manufacturer's plant. No sand or silica shall be added to the emulsion in the field.
 - 3. Finish coat shall be as described above except that it shall be a non-fortified acrylic latex emulsion.
 - 4. Color: Pigment dispersions in the color coating are to be of the best quality chrome oxides so as to obtain a permanent true color. Colors for area color coating shall be:
 - a) Water Spray Area: Color shall be as noted on the Drawings.
- B. Paint for water play area shall be slip resistant.

PART 3 - EXECUTION

3.01 CRACK SEALING

- A. Preparation
- 1. Follow manufacturer's instructions for preparation.
 - 2. Clean the existing color coated surface to provide a clean and contaminate free surface without surface dirt, mildew, pollen, dust, leaves or loose paint.
 - 3. If power-washing is required in order to remove contaminants, fill cracks first to prevent water from going into the cracks during pressure washing.
 - 4. Remove any previous crack repair materials that are loose and not bonded to the court including rubberized crack filling material.
- B. Application
- 1. Strictly follow manufacturer's instructions for installation.
 - a. Do not install crack system if the temperature is below 70 degrees fahrenheit or when the temperature will fall below 60 degrees at night.
 - b. Do not install on overcast days.

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- c. Do not install after rain or when rain is predicted or likely. Wait until cracks are dry.
- d. Do not install on cracks that emit moisture.
- e. Do not install over old or peeling Asphalt emulsion.
- f. Do not use a rubber squeegee or broom to apply the glue or fabric.

3.02 PAINTING - GENERAL

- A. Color coating is to be applied over existing color coating. Prepare as necessary to remove loose paint and to provide tight bond. Apply paint in sufficient number of layers to cover previous colors and design.
- B. Paint shall be applied according to manufacturer's instructions. **Adhere to manufacturer's recommended curing period for new bituminous pavement prior to paint application which is generally a minimum of 28 days.**
- B. Pavement surface should be dry and free of sand, grease, oil and other foreign substances prior to the application. The ambient air temperature is to be a minimum of 45 degrees Fahrenheit and rising at the start of paint application. Do not apply paint when rain is imminent.
- C. Thickness of each coat shall be as recommended by the manufacturer
- D. Paint shall be applied by brush, spray or roller, free of any fogging or overspray.

3.03 AREA PAINTING

- A. Sweep and air clean area to be surfaced.
- B. Apply two coats of fortified surface paint at a rate of approximately .05 gallon per square yard per coat, minimum, with additional coats as necessary to cover previous design.
- C. Apply one coat of non-fortified finish paint at a rate of approximately .05 gallon per square yard.
- D. Apply line paint as described below.

3.04 LINE PAINTING

- A. Width of lines shall be 2".
- B. Lines shall be accurately located and marked by snapping a chalked line. All surfaces

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shall be thoroughly cleaned before the lines are painted thereon. The paint shall be applied accurately within the limits shown on the plans. All lines shall be clear and distinct with sharply defined edges. At least two (2) hours shall elapse between the painting of the first and second coats. Protect painted lines until cured.

- C. Edges of lines to be painted shall be masked prior to painting to insure sharp edges. Ragged lines will not be acceptable.
- D. Apply two coats of line paints in specified color.
- E. Remove masking tape and clean up work area.

3.05 GUARANTEE AND ACCEPTANCE

- A. Painted lines and surfaces shall be guaranteed for a period of one year from final acceptance against cracking, peeling, checking, or other defect. The Contractor will repair, re-coat or otherwise make satisfactory, any failed lines or areas, at no cost to the Owner.

END OF SECTION

SECTION 02622

FIELD DRAINAGE SYSTEM

PART 1 - GENERAL

1.01 GENERAL PROVISIONS

- A. The General provisions of the Contract, including General and Supplementary General Conditions, and Division 1 General Requirements, apply to work specified in this section.

1.02 DESCRIPTION OF WORK

- A. Provide equipment and materials, and do work necessary to construct the athletic field drainage system as indicated on the Drawings and as specified. Work shall include but shall not be limited to:

- 1. Installation of panel drainage system and collection piping.

- B. Related Work Specified in Other Sections:

- 1. Section 02100- Site Preparation
- 2. Section 02200 - Earthwork: Root Zone Mix
- 3. Section 02810 - Irrigation System
- 4. Section 02930 - Sodded Athletic Field

1.03 REFERENCES

- A. Comply with applicable requirements of the following standards. Where these standards conflict with other specified requirements, the most restrictive requirement shall govern.
- B. American Society for Testing and Materials (ASTM):
- C. Massachusetts Department of Transportation Standard Specifications for Road and Bridge Construction.

1.04 SUBMITTALS

- A. Manufacturer's literature for drain panels demonstrating compliance with the Specifications.
- B. Samples: Panel Drain - 1 Sample

1.05 QUALITY ASSURANCE

- A. The Contractor shall coordinate the installation of the athletic field subsurface drainage system with the irrigation system.

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1.06 PRODUCT DELIVERY, STORAGE, AND HANDLING

A. Delivery and Storage:

1. Pipe, fittings, specials, appurtenances and accessories shall be delivered to and stored within the Contractor’s work limits as shown on the Drawings.
2. Special care shall be exercised during delivery and storage to avoid damage to the products.
3. Products shall be stored so as to avoid unnecessary handling and in locations where they will not interfere with the Owner’s operations or public travel.

B. Handling:

1. Pipe, fittings, special appurtenances and accessories shall be handled carefully with approved handling devices in strict conformance with the manufacturer’s recommendations.
2. Products shall not be dropped nor shall products be otherwise dragged, rolled or skidded.

C. Products cracked, gouged, chipped, dented or otherwise damaged will not be approved and shall be removed and replaced at the Contractor’s expense, unless the product can be repaired in a manner acceptable to the manufacturer and Engineer. All repairs shall be at the Contractor’s expense.

PART 2 - PRODUCTS

2.01 DRAINAGE SYSTEM

A. The panel drainage system shall be geocomposite panel drain Sportsedge HQ6 Panel Drain (800-334-6057) or equal with the following properties:

1. The drain shall consist of a solid formed polystyrene perforated core fully wrapped with a non-woven spun-bound polypropylene filter fabric. Height shall be 6", width 1" minimum.
2. Fabric shall be glue bonded to the core.
3. Couplers, outlets, and geotextile endcaps shall be supplied by the Contractor as required and recommended by the manufacturer.
4. The subsurface drain system shall meet the following ASTM standards as a minimum: D 3350.

Physical Property	Unit of Measure	Typical Value	ASTM Test Method
FABRIC			

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Grab Tensile	lbs	145	D-4632
Grab Elongation	%	60	D-4632
Puncture Resistance	lbs	50	D-4833
EOS(AOS)	US Std Sieve	70	D-4751
Flow Rate	gpm/ft ³	80	D-4491
CORE			
Thickness	in	1	D-1777
Compressive Strength	psf	9,000	D-1621
Flow Capacity per Unit Width	gpm/ft	21	D-4716

- B. Sand for trenches shall be as specified in Section 02200-Earthwork.

PART 3 - EXECUTION

3.01 INSTALLATION OF THE DRAINAGE SYSTEM

- A. Install in accordance with manufacturer's recommendations.
- B. The Contractor shall install the panel drainage system in the vertical orientation in accordance with the locations depicted on the drawings. Connections shall be made with manufacturer specific adaptors and connectors. The panel drain must have a physical connection to the collector pipe and existing drainage structures at locations indicated on the Drawings. All exposed ends shall be capped with manufacturer specific end caps to prevent migration of fines into the drainage system.
- C. Install the edge collector pipes true to line and grade and as indicated on the Drawings.
- D. The Landscape Architect will inspect and accept all buried piping prior to backfilling.

3.02 INSTALLATION OF THE DRAINAGE BACKFILL FOR PANEL DRAINS

- A. Install the sand drainage soil compacted to 82% +/- 2 of maximum standard proctor.
- B. Drainage sand shall be installed in trenches by use of a small rubber-turf tired tractor for handling and shall be shoveled into the trenches by hand shoveling. Protect drainage trenches and lines from caving and/or crushing by the use of wood planking over the top of trenches where it is necessary for the loader to cross drainage trenches.

END OF SECTION

Field Drainage System
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SECTION 02667

WATER SERVICE SYSTEMS

PART 1 - GENERAL

1.01 GENERAL PROVISIONS

- A. All of the Contract Documents, including the Contract Form, General Provisions, General Conditions, Supplemental Conditions, and all Attachments to the General Provisions, and Division 1 - General Requirements, apply to the work of this Section.
- B. Examine and coordinate all Contract Drawings and other sections of the specifications for requirements which affect work of this section whether or not such work is specifically mentioned in this section. Coordinate work with other trades to assure the steady progress of all work under the Contract. The Contractor shall refer to the Contract Documents for all new work and coordinate how it relates to the installation of water service systems.

1.02 SCOPE OF WORK

- A. Work under this section shall include (1) connecting to the existing water service at the existing meter pit on Farnsworth Street for irrigation, (2) connecting to existing water shut-off manhole adjacent to the existing spray deck for drinking fountain, (3) the installation of a new 2" water service to support the new irrigation system and (4) installation of a 1" water service to support the new drinking fountain, as indicated on the Drawings.
- B. Responsibilities will include furnishing and installing of two (2) inch type "K" copper piping, tapping sleeves, corporation stops and boxes, curb stops and boxes, thrust blocks, straps and clamps for pipe restraints, strainers, backflow preventer, testing and disinfection (sterilization) of mains, installation of 1-1/2" and 5/8" water meters, and two (2") inch backflow preventer, and all other specified work and connections as shown on the plans and details. The work by the Contractor shall be performed in accordance with the recognized plumbing standards and all applicable standards. The work shall include all fittings and piping and other appurtenances necessary for complete and proper installation of the work, including connections to the existing work. All lines shown are approximate and must be coordinated with other utilities or site improvements to be installed.
- C. All work herein described and/or shown on the Plans shall be in strict accordance with the best-recognized practices for water service installations. The standards set forth in the selection of materials and supplies are intended to conform to those adopted by the City of Waltham, and the Contractor shall further familiarize himself with the Municipality's requirements when the occasion or choice of materials or supplies so demand.
- D. Per Municipality regulations and requirements, the Contractor performing the work of this section shall be a MA licensed master plumber.

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- E. The Municipality, through their authorized agents, reserves the right to make inspections of the work during its manufacture or progress.
- F. Sheeting, shoring and bracing, excavation and backfill shall be accomplished in accordance with Section 02200 - Earthwork, the applicable provisions of the Standard Specifications, and OSHA Construction Regulations Title 29 CFR Part 1926. The cost of the sheeting, shoring and bracing, unclassified excavation and backfill shall be included under the Lump Sum Bid.

1.03 RELATED WORK

- A. Section 02100 - Site Preparation and Demolition.
- B. Section 02200 - Earthwork: Refer to Earthwork for excavation, backfill, and fill materials.
- C. Section 02810 - Irrigation System.
- D. Section 03300 - Cast-in-Place Concrete.

1.04 REFERENCES

- A. The following standards and definitions are applicable to the work of this Section to the extent referenced herein:
 - 1. Standard Specifications: Commonwealth of Massachusetts Standard Specifications for Highways and Bridges, latest edition.
 - 2. OSHA Construction Regulations Title 29 CFR Part 1926.
 - 3. ASME B16.1 Cast Copper Alloy Solder Joint Pressure Fittings.
 - 4. ASTM B88 Seamless Copper Water Tube.
 - 5. ASTM D1557 Test Methods for Moisture-Density Relations of Soils and Soil-Aggregate Mixtures Using 10 lb (4.54 Kg) Rammer and 18 inch (457 mm) Drop.
 - 6. AWWA C500 Gate Valves, 3 through 48 in NPS, for Water and Sewage Systems.
 - 7. AWWA C504 Rubber Seated Butterfly Valves.
 - 8. AWWA C507 Ball Valves
 - 9. AWWA C508 Swing-Check Valves for Waterworks Service, 2 in through 24 in NPS.
 - 10. AWWA C509 Resilient Seated Gate Valves 3 in through 12 in NPS, for Water and Sewage Systems.
 - 11. AWWA C800 Ball Valve Curb Stops and Corporation Stops
 - 12. ASTM B-62 Ball Valve Curb Stops
 - 13. ASTM D2241 Poly (VinylChloride) (PVC) Plastic Pipe(SDR-PR).
 - 14. ASTM D2466 Poly (VinylChloride) (PVC) Plastic Pipe Fittings, Schedule 40.
 - 15. ASTM D2855 Making Solvent-Cemented Joints with Poly (Vinyl Chloride) (PVC) Pipe and Fittings.

1.05 SUBMITTALS FOR REVIEW

- A. Product Data: Provide data on pipe materials, pipe fittings, valves, hydrants and accessories.

1.06 SUBMITTALS AT PROJECT CLOSEOUT

- A. Record actual locations of piping mains, valves, connections, thrust restraints, and invert elevations.
- B. Identify and describe unexpected variations to subsoil conditions or discovery of uncharted utilities.

PART 2 - MATERIALS

2.01 MATERIALS

- A. Gate Valve: Gate valves for water lines shall be New York Pattern Metropolitan Type or AWWA C500-71, in accordance with requirements of the City of Waltham Water Department. Gate valves shall turn right to open and be rated at 200 psi working pressure; 350 psi hydrostatic test pressure. Gate valve outlet and connection shall be furnished with threaded joints.
 - 1. Gate valve stems shall be manganese bronze having tensile strength of not less than 35,000 psi, and an elongation of not less than 15% in 2 inches.
 - 2. Gate valves shall be furnished with O-ring stem seat that utilizes two O-rings. The upper O-ring shall serve as the pressure seal. The design of the valve and seal plate shall be such that the seal plate can be fitted with new O-rings when the valve is under pressure in the fully open position. Housing for the valve stem thrust collar shall be carefully machined and fully bronze lined.
 - 3. Gate valve disc shall be cast iron and shall be accurately machined to receive bronze disc seat ring. The disc seat ring surface in contact with the iron disc and the conetail projections shall be rolled, peened or pressed into the machine grooves on the iron discs and when secured in place, a rough and finish cut shall be taken over the disc seat ring bearing surfaces.
 - 4. Gate valve wedges shall be made of bronze.
- B. Ball Valve Curb Stop: Ball valve curb stops for water lines shall be Everett J. Prescott, Inc, 159 Manley Street, Brockton, MA 02301, p 508-586-3875, f 508-586-4694 Type CPPJ X, CPPJ, or approved equal, cast bronze stop and waste, in accordance with requirements of the City of Waltham Water Department. Ball valves shall turn right to open and be rated at 300 psi working pressure; 350 psi hydrostatic test pressure. Ball valve outlet and connection shall be furnished with quick style compression connections.
 - 1. Ball valve shall be furnished with integral checks to allow for 90° rotation only.
 - 2. Ball valve shall be furnished with one piece cap and stem.
 - 3. Ball valves shall be furnished with double Buna-N Stem O-Rings and seals.
 - 4. Ball valves shall be furnished with TFE or Fluorocarbon Coated Brass Ball.

- C. Service Clamps and Corporation Stops: Complete assembly, including service clamp, corporation stop, and bolts and nuts. Include service clamp and stop compatible with drilling machine.
1. Service Clamp: Cast iron or ductile iron with gasket and AWWA C800 threaded outlet for corporation stop, and threaded end straps
 2. Corporation Stop connection for water lines shall be Everett J. Prescott, Inc, 159 Manley Street, Brockton, MA 02301, p 508-586-3875, f 508-586-4694 Type CC X, CPPJ, or approved equal, cast bronze in accordance with requirements of the City of Waltham Water Department. Ball valves shall turn right to open and be rated at 300 psi working pressure; 350 psi hydrostatic test pressure. Ball valve outlet shall be furnished with quick style compression connection.
 3. Corporation stop shall be furnished with molded nitrile (Buna-N) seals, 80 Durometer, sealed in place with adhesive.
 4. Corporation stop shall be furnished with nitrile (Buna-N) O-Ring, 70 Durometer.
 5. Corporation stop shall be furnished with flared copper service fitting threads.
 6. Corporation stop shall be furnished with TFE or Fluorocarbon Coated 85-5-5-5 Red Brass Ball.
- D. Tapping Sleeve and Tapping Valve: Complete assembly, including tapping sleeve, tapping valve, and bolts and nuts. Use sleeve and valve compatible with tapping machine.
1. Tapping Sleeve: Cast- or ductile-iron, 2-piece bolted sleeve with flanged outlet for new branch connection. Sleeve may have mechanical-joint ends with rubber gaskets or sealing rings in sleeve body. Include sleeve matching size and type of pipe material being tapped and of outlet flange required for branch connection
- E. Copper Tubing
1. Copper pipe for buried service two (2) inch diameter and smaller, as required, shall be soft, annealed, seamless copper tubing conforming to Federal Specification WW-T-799E or ASTM Standard B88-76, Type "K".
 2. Copper service pipe for installation in meter pits, valves, manholes, and backflow preventer cabinets, 2 inch diameter and smaller, shall be ASTM B88, Type "K", hard copper tubing.
 3. The Contractor shall furnish the Owner with satisfactory evidence that the copper tubing meets the requirements of these Specifications.
 4. Joints in the copper service shall be kept to a minimum.

- a) For buried application, joints shall be made with cast brass three-part compression couplings or flared tube fittings conforming to ANSI Standard Specifications B 16.26, latest issue. Bends in copper service pipe, particularly gooseneck bends, shall be made with a tool especially designed for the purpose.
- b) Pipe joints inside meter vaults and backflow preventer cabinets shall be fittings conforming to ANSI B 16.18 cast bronze solder fittings, or ANSI B 16.22 wrought copper solder fittings and couplings. Solder shall be ASTM B32, Grade 95 TA, up to 250 degrees. Solder threaded bronze fittings will be used for connections of pipe to meters, strainers, valves, backflow preventers and pipe nipples.

5. PVC Piping

- a) PVC pipe shall be as sized on the drawings and details, Class 200, SDR 21, solvent weld PVC, ASTM No. D1784 as manufactured by Cresline or approved equal.
- b) Fittings for all PVC piping shall be Schedule 40 solvent weld PVC as manufactured by Dura, Lasco, or approved equal.
- c) PVC solvent shall conform to ASTM and be NSF approved. Solvent shall be appropriate for gluing of pipes and fittings up to 6 inches in size. Solvent shall be as manufactured by IPS, Rectorseal, Uni Weld, or approved equal and shall be used in conjunction with an appropriate primer.

6. Water Meters

- a) Water meters shall be furnished and installed by the Contractor within the designated backflow preventer above ground cabinet. The water meters shall be a 1-½ inch for irrigation and 5/8" for drinking fountain, Neptune T-10, or approved equal, with provisions for a remote ARB reading device to be mounted to the backflow preventer cabinet.
- b) Water meters will be furnished by utility company.

7. Backflow Preventer

- a) Backflow preventer shall be a 2" Reverse Principle Backflow Prevention Device (or Assembly), Watts #009-M2Q2, or approved equal and shall come complete with strainers, ball valves, and threaded couplings.. Final approval of device selection will be based on submittal of design data sheet to Waltham Water Department, Cross Connection Program.
- b) Supply one complete rubber parts kit, item number RK009RT 009 which shall include diaphragm, two disc assemblies, stem O-rings, cover O-ring, two seat O-rings and RV seat O-ring, and shall be stored in the backflow assembly cabinet.

8. Concrete for Thrust Restraints: Concrete type specified in Section 03300.

PART 3 - EXECUTION

3.01 INSTALLATION

- A. Refer to Section 02200 - Earthwork and the Drawings for excavation, backfill, compaction, and other trenching requirements.

3.02 PIPE AND FITTINGS

- A. All pipe, fittings and such other items shall be carefully examined for defects immediately before lowering into the trench and no pipe or fittings shall be laid which is known to be defective in anyway. Any pipe or fitting discovered as defective after laying shall be promptly removed and replaced. Proper and suitable tools and appliances for the safe and convenient handling and laying of the pipe, fittings and appurtenances shall be used, and great care shall be taken to prevent damage to the pipe coating and lining. Pipe and fittings shall be thoroughly cleaned before being lowered into the trench and shall be kept clean until accepted in the completed work. Open ends shall be closed with wooden or other suitable bulkheads at all times when pipe laying is not actually in progress. Pipes shall be carefully lowered into trenches with rope slings or other mechanical means. Rolling or dropping the pipe into trenches will not be permitted. Whenever the pipe requires cutting to fit the line, the work shall be done only by experienced persons and in such a manner as to leave a smooth end at right angles to the axis of the pipe.
- B. Each length of pipe, fitting or valve shall be firmly supported for its entire length upon original undisturbed trench bottom. Permanent blocking will not be permitted. Where temporary blocking is used, it shall be removed. The underside of the pipe, fittings or valve shall be completely filled and thoroughly compacted with bank gravel before refilling trenches. Fittings and valves shall be carefully set in the line, plumb and true to grade and thoroughly compacted to a firm and uniform bearing.

3.03 JOINTING

- A. Jointing shall be in strict accordance with the manufacturer's recommendation for the type of joint being made. Jointing of pipe or fittings shall be made only by persons thoroughly skilled in this work.

3.04 ROUGHING-IN FOR WATER METERS

- A. Rough-in piping and specialties for water-meter installation according to utility company's written instructions and requirements.

3.05 BACKFLOW PREVENTER, METERS AND RELATED APPURTENANCES

- A. The installation of all new backflow preventer and meter and related valves, strainers, hangers, straps, clamps and other appurtenances shall be accomplished in a safe, and complete manner by licensed plumbers.

- B. All work in this regard shall be completed in compliance with City of Waltham standards and industry requirements and to the satisfaction of the project representatives.

3.06 CONDUCTING TEST FOR LEAKAGE

A. Description

1. Test for leakage shall be conducted on all portions of completed water work. In trenches, the testing shall be conducted with partial backfilling over the barrel of the pipe, but all joints between the pipe, fittings and valves shall be left exposed for the duration of the tests. At the Engineer's direction, temporary backfilling of certain portions of the completed work may be required prior to conducting leakage tests.
2. All air shall be released and the mains completely filled with water, and after allowing twenty-four (24) hours for absorption, the internal pressure shall be built up to an equivalent hydrostatic head of three hundred-fifty (350) feet of water of one hundred-fifty (150) pounds per square inch, and so maintained for the full period of tests.
3. All visible leaks in the joints shall be stopped, and any cracks or defective pipe, fitting or valve shall be removed and replaced.
4. The test shall be conducted for a period of at least sixty (60) minutes after all visible leaks have been stopped, and the inflow of water from a force pump to maintain the required pressure shall not exceed seventy (70) gallons per inch of internal diameter per mile of pipe per day.
5. In case the specified rate of leakage is exceeded, the leaks shall be found and repaired, and the mains shall be re-tested until the required conditions are met.

3.07 DISINFECTION OF NEW MAINS

A. Upon completion, all water mains shall be disinfected as follows:

1. Pipes shall be completely filled with water; all air released, and then thoroughly flushed out in the amount twice the capacity of the section to be treated. A disinfecting solution of sodium hypochlorite shall be introduced into the main near the point of water supply, in the concentration of one hundred (100) parts of available chlorine per million parts of water. The main shall then be washed or bled from the extreme end opposite to the point of application of the disinfecting supply, and the washing continued until tests indicate the disinfecting solution has reached the end opposite to the point of application in the concentration of not less than fifty (50) parts available chlorine.
2. All gates shall then be closed, and the disinfecting solution left in the mains under full pressure for a period of not less than forty-eight (48) hours. The entire section shall then be repeatedly and thoroughly flushed out until all traces of chemicals are removed.

3. Samples of water shall then be taken by the Contractor and laboratory analysis made by him to determine the effectiveness of treatment.
4. Any main or section of pipe failing to meet laboratory standards for disinfecting shall be repeatedly treated until the desired results are obtained. A COPY OF LABORATORY REPORTS SHALL BE PROVIDED TO THE OWNER BY THE CONTRACTOR WITHIN FIVE (5) DAYS AFTER TESTING IS COMPLETED.
5. Particular attention is directed to the requirement that a double check valve installation shall be made in the water supply to the main under treatment, to prevent possible backflow or siphonage of treated solution into the distribution system in service.

3.08 OTHER DATA

- A. All iron castings shall conform to the latest revisions of ASTM Designation A126 for physical and chemical requirements.
- B. All ironwork shall be thoroughly cleaned and painted with two coats of asphaltum or other varnish or paint that the Engineer may approve. After the valves are assembled and tested, a third coat shall be applied to the exterior. All composition tool-finished work shall be left bright and unpainted.
- C. All connections shall be made permanently watertight.
- D. All other work required to complete the improvements listed in the Contract Documents shall be accomplished in accordance with the requirements of the City of Waltham.

END OF SECTION

SECTION 02670

BACKFLOW PREVENTER CABINET

PART 1 - GENERAL

1.01 GENERAL PROVISIONS

- A. All of the Contract Documents, including the Contract Form, General Provisions, General Conditions, Supplemental Conditions, and all Attachments to the General Provisions, and Division 1 - General Requirements, apply to the work of this Section.
- B. Examine and coordinate all Contract Drawings and other sections of the specifications for requirements which affect work of this section whether or not such work is specifically mentioned in this section. Coordinate work with other trades to assure the steady progress of all work under the Contract. The Contractor shall refer to the Contract Documents for all new work and coordinate how it relates to the installation of backflow preventer cabinets

1.02 SCOPE OF WORK

- A. Provide equipment and materials, and do all work necessary to furnish and install one (1) Backflow Preventer Cabinet complete in place on a concrete pad as indicated on the Drawings and as specified.
- B. Service lines, internal cabinet features and other related water work shall be accomplished in accordance with the applicable sections of these Specifications.

1.03 RELATED WORK

- A. Section 02100 - Site Preparation and Demolition.
- B. Section 02200 - Earthwork.
- C. Section 02667 - Water Service Systems.
- D. Section 02810 - Irrigation System.

1.04 REFERENCE STANDARDS AND SPECIFICATIONS

- A. Reference to specific standards, specifications and tests of the following technical societies, organizations, and governmental bodies may be made in the contract documents.
- B. AASHTO - American Association of State Highway and Transportation Officials (tests or specifications). AASHTO or AASHO
- C. ASTM - American Society for Testing and Materials.
- D. Mass. Standard Specs. - Latest edition of the Standard Specifications for Highways, Bridges and Waterways, 1988 Edition, the Commonwealth of Massachusetts,

Backflow Preventer Cabinet
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Department of Public Works, hereinafter referred to as "the Massachusetts Standard Specifications."

- E. AWWA - American Waterworks Association.

1.05 SHOP DRAWINGS/MANUFACTURER'S CUTS AND SPECIFICATIONS

- A. The Contractor shall submit to the Landscape Architect for approval six (6) copies of all materials and equipment proposed for use indicating manufacturers' names and addresses, identifying data and expected delivery dates. No consideration will be given to partial lists submitted from time to time. Intention of using specified materials and equipment shall not relieve the Contractor from submitting the above list, nor shall submission of the list relieve him from submission of shop drawings. Any item of material or of equipment not submitted for approval on the list will not be approved unless of the exact make and characteristics specified.
- B. If the material or equipment is installed before it is approved, the Contractor shall be liable for the removal and replacement at no extra charge to the Owner, if, in the opinion of the Landscape Architect, the material or equipment does not meet the intent of the Contract Documents.
- C. The Contractor shall submit the following information with all equipment shop drawings:
 - 1. Manufacturer's certified scale drawings, cuts or catalogs, including installation details.
 - 2. Manufacturer's specifications, including certified performance characteristics and capacity ratings, if applicable.

PART 2 - MATERIALS

2.01 BACKFLOW PREVENTER CABINET

- A. The backflow preventer cabinet shall be a standard manufactured item or custom built, conforming to the Contract details and requirements herein. Local sources manufacturers of cabinets are Mass Electrical Apparatus, 42 Oakville Street, Lynn, MA 01905, phone 781-592-0410, fax 781-592-0986 or approved equal.
 - 1. Material: 0.125 5052-H32 Aluminum.
 - 2. Subpanel: 12 gauge steel painted white.
 - 3. Hinge: Stainless steel continuous.
 - 4. Main Door: Stainless steel drop handle with 3 point latching and padlock ready.
 - 5. Welding: All seams are continuous weld ground smooth.
 - 6. Door: Gasketed with 1/4" x 1" closed cell neoprene gasket PSA one side to obtain a weather tight seal.
 - 7. Finish: Smooth black powder coat inside and out.

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2.02 CEMENT CONCRETE

- A. Forms, reinforcing, and cement concrete cast in place for the backflow preventer cabinet shall conform to Section 03300 - Cast-in-Place Concrete of these Specifications.

PART 3 - EXECUTION

3.01 INSTALLATION

- A. Include all necessary transportation, shipping and handling as necessary to properly and completely install the specified cabinets.

3.02 CONCRETE BASE

- A. Install concrete base as indicated on the Drawings. The concrete base shall be six inches larger than the specified cabinet, all around, and pitched at edges for positive drainage.

3.03 TOUCH-UP

- A. Any surfaces of the specified cabinets that are chipped or scratched shall be wire brushed, primed and painted or otherwise restored to a flawless condition in a manner that is acceptable to the City Representative.

END OF SECTION

SECTION 02725

DRAINAGE PIPE

PART I - GENERAL

1.01 GENERAL PROVISIONS

- A. All of the Contract Documents, including the Contract Form, General Provisions, General Conditions, Supplemental Conditions, and all Attachments to the General Provisions, and Division 1 - General Requirements, apply to the work of this Section.
- B. Examine and coordinate all Contract Drawings and other sections of the specifications for requirements which affect work of this section whether or not such work is specifically mentioned in this section. Coordinate work with other trades to assure the steady progress of all work under the Contract. The Contractor shall refer to the Contract Documents for all new work and coordinate how it relates to the installation of drainage pipe.

1.02 SCOPE OF WORK

- A. Under this Section the Contractor shall furnish all materials, equipment, labor, transportation, facilities and all operations and adjustments required for the installation of drainage pipe and all incidentals thereto.
- B. Drainage pipe shall be placed in the sizes and lengths indicated on the plans.

1.03 RELATED WORK

- A. Section 01050 - Field Engineering.
- B. Section 01700 - Project Closeout.
- C. Section 02100 - Site Preparation and Demolition.
- D. Section 02200 - Earthwork.
- E. Section 02622 - Field Drainage System.
- F. Section 02728 - Drainage Structures.

1.04 REFERENCES

- A. The following standards and definitions are applicable to the work of this Section to the extent referenced herein:
 - 1. ASTM A74 Cast Iron Soil Pipe and Fittings.
 - 2. ASTM C76 Reinforced Concrete Culvert, Storm Drain, and Sewer Pipe
 - 3. ASTM C443 Joints for Circular Concrete Sewer and Culvert Pipe, using Rubber Gaskets.
 - 4. STM D1557 Test Methods for Moisture-Density Relations of Soils and Soil-Aggregate Mixtures using 10 lb. (4.54 kg) Rammer and 18 inch (457 mm) Drop.

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5. ASTM D2729 Poly(Vinyl Chloride) (PVC) Pipe and Fittings.
6. ASTM D1248 HDPE(High Density Polyethylene)(HDPE) Pipe and Fittings.
7. ASTM F2648 Test Methods for Non-Pressure (gravity flow) polyethylene (PE) pipes and fittings.

1.05 SHOP DRAWINGS/MANUFACTURER'S CUTS AND SPECIFICATIONS

- A. The Contractor shall submit to the Landscape Architect for approval six (6) copies of all materials and equipment proposed for use indicating manufacturers' names and addresses, identifying data and expected delivery dates. No consideration will be given to partial lists submitted from time to time. Intention of using specified materials and equipment shall not relieve the Contractor from submitting the above list, nor shall submission of the list relieve him from submission of shop drawings. Any item of material or of equipment not submitted for approval on the list will not be approved unless of the exact make and characteristics specified.
- B. If the material or equipment is installed before it is approved, the Contractor shall be liable for the removal and replacement at no extra charge to the Owner, if, in the opinion of the Landscape Architect, the material or equipment does not meet the intent of the Contract Documents.
- C. The Contractor shall submit the following information with all equipment shop drawings:
 1. Manufacturer's certified scale drawings, cuts or catalogs, including installation details.
 2. Manufacturer's specifications, including certified performance characteristics and capacity ratings.
- D. Product Data: The Contractor shall provide data indicating pipe and pipe accessories, connections, etc.

1.06 SAMPLES

- A. The Contractor shall submit all samples as requested in accordance with the provisions of the General Conditions. Samples accepted will be returned to the Contractor within five (5) days and may be incorporated into the work. Samples not accepted will be returned for disposition by the Contractor.
- B. One (1) square foot of filter fabric.

1.07 CODES, ORDINANCES AND PERMITS

- A. All work shall be performed in strict accordance with local and state codes and regulations including OSHA Construction Regulations Title 29 CFR Part 1926.
- B. Site utilities work shall be done in strict accordance with the Commonwealth of

Massachusetts State Plumbing Code, latest edition, and all revisions thereto, and City of Waltham Engineering Department and Department of Public Works standards.

- C. Any material or workmanship called for in the above-mentioned requirements, which are not specified or shown on the drawings, shall be furnished and installed by the Contractor as though same has been specifically mentioned or indicated. If the drawings and specifications are at variance with any regulations, the bidder shall notify the Landscape Architect ten (10) days before the date for submitting his bid. In many cases the drawings are in excess of the requirements in the codes and these shall be followed to the fullest. If the Contractor fails to notify the Landscape Architect at this time and installs work in variance with the above-mentioned codes and regulations, he shall assume the responsibility and the expense to rectify the installation.
- D. Before commencing work, the Contractor shall obtain all permits necessary in connection with the installation of this equipment and pay fees required for same. He shall include the cost and back charge of installing any portion of the work where performed by municipal departments or utility companies.

1.08 SUBSTITUTIONS

- A. Any reference to a particular device, product, material, article or system shall be interpreted as establishing a standard of quality, design, performance, or function, and shall not be construed as limiting competition.

1.09 RECORD DRAWINGS

- A. The Contractor shall submit record drawings as specified in Section 01700 - Project Closeout.

1.10 SITE VISITATION

- A. It is recommended that all prospective bidders visit the job site to acquaint themselves with the general and special conditions that may be encountered which will have a bearing on labor, transportation, cutting and patching, material handling and storage, and similar items, during the prosecution of the work. Failure to do so shall not relieve him of his responsibility for properly estimating the difficulties involved in the work to be performed under this section.

1.11 REFERENCE STANDARDS

- A. References herein to any technical society, organization, group or body is made in accordance with the following abbreviations.
- B. ASTM - American Society for Testing Materials.
- C. AASHTO - American Association of State Highway and Transportation Officials.
- D. AWWA - American Water Works Association.

- E. ANSI - American National Standards Institute.
- F. MHD Standard Specifications: The Commonwealth of Massachusetts Highway Department, Standard Specifications for Highways and Bridges, 1988.
- G. Requirements of the City of Waltham Engineering Department and Department of Public Works.

1.12 MATERIALS AND WORKMANSHIP

- A. It is the intent of these specifications to establish quality standards for all material and equipment incorporated in the work of this section. All material and equipment installed hereunder shall be new and shall be the best of each respective kind and type. Proper care shall be exercised in handling all equipment and materials herein specified.
- B. The installation shall be as indicated on the drawings and in accordance with the manufacturer's recommendations as approved by the Landscape Architect. The installation shall be accomplished by workmen skilled in this type of work.
- C. All conduits, pipes, structures, etc. in use and which are damaged during excavation, whether uncovered or not and whether or not they are shown on the plans, shall be repaired at the expense of the Contractor.
- D. Storage of materials by the Contractor for incorporation into the work shall be off the site for other than material that is scheduled to be installed in the time span of two (2) working days. The storage site selected by the Contractor shall be made accessible to the City inspection forces at all times during normal working hours.

PART 2 - MATERIALS

2.01 GENERAL

- A. Drawings and specifications are intended to supplement and explain each other. Materials not specifically mentioned in the specifications shall be as indicated on the drawings. Where conflicts occur between the drawings or specifications, or within either document itself, the item or arrangement of better quality, greater quantity or higher cost shall be included in the Contractor's bid. Where no specific kind or quality of material is given, a first-class standard article, shall be furnished.

2.02 DRAINAGE PIPE

- A. PVC Pipe for use as storm drainage lines shall contain integrally belled and spigot type rubber gasketed joints conforming to ASTM 3034. Gaskets shall conform to ASTM F-477 and shall be marked to indicate nominal pipe size and proper insertion direction. The standard dimension ratio (SDR) of all pipe and fittings shall not exceed 35. Standard pipe lengths shall be twenty (20) feet unless otherwise approved. All necessary glues, gaskets and fittings shall be furnished in order to make the work complete and

Drainage Pipe
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acceptable to the Engineer.

B. HDPE Pipe shall be ADS N-12 high density polyethylene pipe (HDPE) as manufactured by Advanced Drainage Systems (ADS), or approved equal, and shall conform to the requirements of AASHTO M-294, and ASTM F2648.

1. HDPE pipe shall be smooth wall perforated where indicated.
2. Pipe and fittings shall be made of polyethylene compounds which conform to the physical requirements of Type III, Category 3, 4 or 5, P23, P33, or P34, Class C per ASTM D-1248 with the applicable requirements defined in ASTM D-1248. Clean reworked material may be used.
3. Pipe shall be of the diameters shown on the Drawings.

C. HDPE Fittings shall conform to:

1. Fittings shall conform to ASTM F 2306. Bell and spigot connections shall utilize a spun-on or welded bell and valley or saddle gasket meeting the watertight performance of requirements of ASTM F 2306.
2. Couplers and pipe shall be from the same manufacturer.
3. Couplers shall be corrugated to match the pipe corrugations and the width shall not be less than one-half the nominal diameter of the pipe. Split couplers shall be manufactured to engage an equal number of corrugations on each side of the pipe joint.
4. One half inch diameter galvanized steel bolts and nuts or nylon ties as supplied by manufacturer shall be used on coupling bands.

D. Furnish pipe in the sizes indicated on the plans and/or details.

2.03 FILTER FABRIC

A. SUPAC 8NP by Phillips Fibers Corporation, AMOCO 4508, Trevira 1125, Mirafi 180N, or equal.

2.04 BEDDING AND COVER MATERIALS

A. Crushed Stone Bedding: Crushed stone as specified in Section 02200 - Earthwork.

B. Cover: Gravel as specified in Section 02200 - Earthwork.

2.05 APPURTENANCES

A. Provide all appurtenance and incidentals necessary to make the drainage pipe installation and connection complete and acceptable, including all materials necessary for the excavation, backfill, and compaction.

PART 3 - EXECUTION

Drainage Pipe
02725-5

3.01 PIPE INSTALLATION

- A. Layout out utilities as required in Section 01050 - Field Engineering. Prior to excavating trenches the Contractor shall field verify all existing inverts and inform the Landscape Architect of any discrepancies. Record these inverts on Record Drawings.
- B. The trench for the pipe shall be excavated to the required line and grade and be of sufficient width to permit thorough tamping of the fill material under the haunches and around the pipe. Soft or unsuitable material encountered below the normal bedding line of the pipe shall be removed as directed, replaced with selected material, gravel or crushed stone and thoroughly compacted. The bottom of the trench shall be shaped to conform to the curvature of the pipe. This bed shall also be excavated to accommodate the bells of pipes.
- C. The pipe shall be laid true to the specified lines and grades where shown on the Plans and as directed. The bell end shall be toward rising grade and each section of pipe shall have a firm bearing throughout its length. Material placed around and under the pipe shall be free of stones larger than three (3) inches in diameter.
- D. No load greater than three (3) tons shall be moved over any pipe until a fully-compacted backfill of at least two (2) feet has been placed over the top of the pipe. This minimum will be increased to three and one-half (3-1/2) feet for a forty thousand (40,000) pound single wheel load and to four (4) feet for a sixty thousand (60,000) pound single wheel load. However, compliance with these requirements is not to be construed as relieving the Contractor of any responsibility concerning damage to the pipe.
- E. Bedding material for pipes shall conform to the requirements of Section 02200 - Earthwork and shall be placed between the pipe and the walls of the trench in layers not exceeding six (6) inches in depth and thoroughly compacted. Each layer, if dry, shall be moistened and then compacted by rolling or by tamping with mechanical rammers. Compaction with iron hand tampers having a tamping face not exceeding twenty-five (25) square inches in area may be allowed only after permission has been given by the Landscape Architect. Special care shall be taken to thoroughly compact the fill under the haunches of the pipe. This method of filling and compacting shall be continued until the material is level with the centerline of the pipe. The remainder of the filling shall consist of suitable backfill material, as defined in Section 02200 - Earthwork, placed in successive layers not more than six (6) inches in depth. Each layer shall be thoroughly compacted in accordance with AASHTO-T99 Standard Proctor Test.

3.02 DRAINAGE PIPE

- A. Any pipe showing settlement after laying or which is not in true alignment or is otherwise unsatisfactory before final acceptance of the work shall be taken up and replaced or relayed by the Contractor without additional compensation..

3.03 WATER REMOVAL

- A. If water is encountered during construction, provisions must be made to remove the
Drainage Pipe

02725-6

water by sheeting and pumping as required, or laying the pipe with a crushed stone bed so that the laying of pipe and other work can be done under stable conditions, all in accordance with Section 2.04 of these Specifications.

END OF SECTION

SECTION 02728

DRAINAGE STRUCTURES

PART 1 - GENERAL

1.01 GENERAL PROVISIONS

- A. All of the Contract Documents, including the Contract Form, General Provisions, General Conditions, Supplemental Conditions, and all Attachments to the General Provisions, and Division 1 - General Requirements, apply to the work of this Section.
- B. Specifications for requirements which affect work of this section whether or not such work is specifically mentioned in this section. Coordinate work with other trades to assure the steady progress of all work under the Contract. The Contractor shall refer to the Contract Documents for all new work and coordinate how it relates to the installation of drainage and sewer pipe.

1.02 SCOPE OF WORK

- A. The work to be done under this Section shall include the furnishing and installation of a drainage system consisting of catchbasins, manholes, and storm water recharge chambers as indicated on the Drawings and as specified. The Contractor shall provide all material, labor, tools, equipment and transportation to complete these items.

1.03 RELATED WORK

- A. Section 02100 - Site Preparation and Demolition.
- B. Section 02200 - Earthwork.
- C. Section 02725 - Drainage Pipe.
- D. Section 03300 - Cast-in-Place Concrete.

1.04 REFERENCE STANDARDS AND SPECIFICATIONS

- A. Reference to the standards, specifications and tests of technical societies, organizations and governmental bodies is made in the Contract Documents.
- B. AASHTO - American Association of State Highway and Transportation Officials (tests or specifications).
- C. ASTM - American Society for Testing and Materials.
- D. MHD Standard Specifications: Mass. Standard Specs. - Standard Specifications for Highways, Bridges and Waterways, 1988 Edition, the Commonwealth of Massachusetts, Department of Public Works.
- E. Commonwealth of Massachusetts, Department of Public Works, Construction Standards, 1977.

- F. Municipal Standard Specifications and Procedures, as applicable.
- G. OSHA Construction Regulations Title 29 CFR Part 1926.
- H. Americans with Disabilities Act Accessibility Guidelines (ADAAG).

1.05 CODES, ORDINANCES AND PERMITS

- A. All work shall be performed in strict accordance with local and state codes and regulations.
- B. Site utilities work shall be done in strict accordance with the Commonwealth of Massachusetts State Plumbing Code, dated September 1976, and all revisions thereto.
- C. The Contractor shall secure all permits deemed necessary in connection with the installation of this equipment and pay fees required for same. He shall include the cost and back-charge of installing any portion of the work where performed by municipal departments or utility companies.

1.06 SUBMITTALS / SHOP DRAWINGS

- A. Shop drawings shall be submitted to the Engineer for all equipment. Six (6) copies shall be submitted and shall include cuts, scale drawings, installation details, manufacturer's specifications, certified performance characteristics and capacity ratings.
- B. No material or equipment may be purchased or installed prior to the submission and written approval of the shop drawings.
- C. Product Data: Provide data indicating, catch basins, frames and grates, etc.
- D. One (1) square foot of filter fabric.

PART 2 - MATERIALS

2.01 CEMENT CONCRETE

- A. Material shall comply with Section 03300 of these Specifications.

2.02 PRECAST CONCRETE DRAINAGE STRUCTURES

- A. All precast concrete units shall conform to Section M4.02.14 of the Standard Specifications in all aspects, and to the City of Waltham Standard Details for Drainage Structures as applicable.
- B. Refer to the Details in the Contract Drawings.

2.03 CASTINGS

- A. Iron castings for Catch Basins & Manholes (frames, grates and covers) shall conform to Mass Highway Construction Manual standard designs and to the requirements of AASHTO Designation M105, Class No. 30, Gray Iron Castings, unless otherwise specified. Test Bar B, 1.20 inches in diameter.
 - 1. Catch basin frame and grate casting(s) shall be 24" round grate conforming to ADA requirements.
 - 2. Manhole Frames and Covers: Cover shall be of minimum weight of 150 pounds, HD20 loading, solid cover, with a pick-hole, with water tight top flange complying with the requirements of the City of Waltham Engineering Department.

2.04 STORM WATER RECHARGE CHAMBERS

- A. Recharge units and accessories shall consist of high molecular weight/high density polyethylene material. The chambers and all accessories shall be suitable for AASHTO HS20-44 loading. The units shall be manufactured in accordance with AASHTO M-294. Joints and fittings shall conform to AASHTO M-252. Shop Drawings and Design Details shall be submitted to the Engineer for review.
- B. Stormwater Retention System Filter Aggregate (Bedding): Shall consist of crushed stone that is hard, durable stone, free from clay, loam, or deleterious material. The material shall consist of 1-1/2" stone. Gradation shall conform to Section M2.01.1 of the "Standard Specification".
- C. Provide clean-out structures as shown on the Drawings.

2.05 FILTER FABRIC

- A. SUPAC 8NP by Phillips Fibers Corporation, AMOCO 4508, Trevira 1125, Mirafi 180N, or equal

PART 3 - EXECUTION

- 3.01 Structures of various types and depths shall be constructed to the line and grades, dimensions and design shown on the plans and as directed with the necessary frames, gratings, covers, aluminum steps, etc., and in accordance with these Specifications after verification of inverts of utilities to remain.
- 3.02 The bricks and blocks (if required) shall be wetted as necessary before laying. All joints in brick masonry shall be thoroughly flushed full of mortar and no joints on the inside face shall be greater than one-quarter (1/4) inch. After the bricks and blocks are laid up, the outside of the structure shall be plastered with one-half (1/2) inch thick mortar coat.
- 3.03 Connections will be carefully made to all existing and proposed lines to the grades and

elevations shown on the contract drawing.

- 3.04 All catch basins shall have a cast iron hinged metal hood trap installed over the outlet pipe or an oil trap outlet as detailed in the drawings. Use twelve (12) inch hoods, unless sizes equal to the specified pipe sizes are available.
- 3.05 Unless otherwise directed or specified, two (2) weep holes shall be built into the walls of all new structures. Each weep hole shall consist of a section of four (4) inch pipe or equivalent opening to carry water through the wall of the structure. The outside end of the pipe or opening shall be covered with a one-quarter (1/4) inch mesh galvanized wire screen 23 gauge satisfactorily fastened against the wall. The drain to the weep hole shall be excavated and back-filled with two (2) cubic feet of broken rock or crushed stone. The crushed stone shall be placed against and over the end of the pipe or opening with a section of filter cloth to prevent the entrance of fine material. Only one (1) type of weep hole shall be used consistently throughout the project.
- 3.06 Suitable materials obtained from the excavation or from borrow shall be placed between the outside of the structure and the limits of the excavation, uniformly distributed in successive layers not exceeding six (6) inches in depth and thoroughly compacted by tamping with mechanical rammers or tampers. When required, the backfill material shall be moistened during the compacting. Compaction with iron hand tampers having a tamping face not exceeding twenty-five (25) square inches may be allowed, but only after permission has been given by the Engineer.
- 3.07 All materials removed in the excavation for catch basins, manholes, or storm water recharge units and remaining after the filling about the finished structure has been made shall be used wherever possible within the project or removed and satisfactorily disposed of outside of the project limits without additional compensation.
- 3.08 The embedded ends of the aluminum ladder steps shall be painted with zinc chromate or bitumastic, and allowed to completely dry before they are installed. Installation shall be as shown on the plans.
- 3.09 Frame castings for structures shall be set in full mortar beds true to the lines and grades as directed.
- 3.10 Where directed, the castings shall be temporarily set at such grades as to provide drainage during the construction.
- 3.11 In general, all methods for installation of the catch basin and manhole units, brick adjustments and mortaring, and installation of frames, grates and covers, shall conform to Section 201 of the "Standard Specifications".
- 3.12 Installation of Storm Water Recharge Units:
 - A. Form bottom of excavation clean and smooth to correct elevation.
 - B. Stormwater recharge chambers shall be installed as per manufacturers requirements and guidelines, and as shown on drawings.

- C. Establish elevations and pipe inverts for inlets and outlets as indicated.

END OF SECTION

SECTION 02800

SITE FURNISHINGS

PART 1- GENERAL

1.01 GENERAL PROVISIONS

- A. All of the Contract Documents, including the Contract Form, General Provisions, General Conditions, Supplemental Conditions, and all Attachments to the General Provisions, and Division 1 - General Requirements, apply to the work of this Section.

1.02 SCOPE OF WORK

- A. The Owner will furnish certain of the site furnishing for installation by the Contractor. See Section 01040 - Control of the Work, Section 1.13 for a description of the Contractor's responsibilities in checking, receiving, storing and coordinating with the manufacturer to receive a complete and satisfactory order of these items. For those items supplied by the Owner, the Contractor shall provide any incidental hardware and all footings and other materials not supplied by the manufacturer, but required for installation of these items.
- B. Owner supplied items for work within this Section:
1. 4 Benches with backs (Wabash Valley Bench Model CN 430(P) 6' length), to be installed by the Contractor
 2. 2 Wabash Valley Benches without backs (Wabash Valley Bench Model CN435(P) 6' length), to be installed by the Contractor
 3. 3 Shade Systems shade shelters with steel frame and polyethylene top, sized 10' x 20', to be installed by the Contractor
- C. Contractor furnished and installed items for work within this Section
1. Big Belly Kiosk
 2. All other materials and items not specifically indicated to be supplied by the Owner shall be furnished by the Contractor.
- D. Salvaged Items for Reinstallation at Prospect Hill Park, Waltham
1. Two Wabash Valley Benches salvaged from Spray Deck
 2. One 10' x 20' Canvas Shade Structure salvaged from Spray Deck

1.03 RELATED SECTIONS

- A. Section 02200 - Earthwork.
- B. Section 02510 - Bituminous Concrete Paving.
- C. Section 03300 - Cast-in-Place Concrete.

1.04 SUBMITTALS

- A. Concrete mix for footings.
- B. Manufacturer's installation instructions for items to be supplied by the Contractor or by the Owner.
- C. Manufacturer's literature demonstrating specification compliance for all items to be supplied by the Contractor.

1.04 DELIVERY, STORAGE AND HANDLING

- A. Deliver, store, and handle metal fabrication items to prevent damage and deterioration. Store assembled items off the ground.

1.05 REFERENCE STANDARDS

- A. All work shall comply with the minimum standards of the latest editions of the following codes and specifications, subject to modifications and amendments outlined herein:
 - 1. Americans with Disabilities Act Accessibility Guidelines (ADAAG)
 - 2. Massachusetts Architectural Access Board Regulations, CMR 521 (MAAB)

1.06 EXAMINATION OF SITE AND DOCUMENTS

- A. The Contractor shall inform him/herself of existing conditions of the site before submitting his/her bid and shall be fully responsible for carrying out all required site work to fully and properly execute the work of the Contract.

PART 2 - PRODUCTS

2.01 Benches will be furnished by the Owner. Refer to Paragraph 1.02 B this Section, and the Drawings for Model numbers and dimensions.

2.02 BIG BELLY KIOSK (3 Total - Furnished and Installed by the Contractor)

- A. The Contractor furnish and install provide 1 Big Belly Solar "Kiosk" as manufactured by BigBelly Solar, Inc., 85 Wells Avenue, Suite 305 Newton, MA

1-888-820-0300, or equal, Model #BigBKiosk1" consisting of a Big Belly Trash Compactor, and a SmartBelly Recycling Collector.

1. Each unit shall be approximately 50.4" in height, 25" in width, and 27" in depth.
 - a. Compactor shall have a 33 gallon bin volume.
 - b. Recycling Collector shall have a 50 gallon bin volume.
2. Units shall have a fully automated IC processor controlled system which senses trash level, fullness, and machine status, with LED status indicator. System voltage shall be a low voltage system, 12 Volts DC, with a spill-proof maintenance free 12 V battery. Units shall be cordless, self-powered requiring no wiring.
3. Materials shall be RoHS compliant, galvanized sheet metal steel interior and exterior construction, with a TGIC powder-coat exterior finish. Interior bins shall be leak proof.
4. Units shall have locked front trash removal door, and fully interlocked access doors, with separately keyed service access.
5. Units shall be designed to prevent access to compaction area.
6. The Big Belly trash compactor
 - a. Compaction force shall be 1250 lbs max.
 - b. Gear motor shall be heavy duty chain drive (non-hydraulic).
 - c. Users shall be able to deposit trash even during cycle time.

PART 3 - EXECUTION

3.01 GENERAL REQUIREMENTS

- A. Site improvements shall be installed in accordance with the Drawings and approved Shop Drawings. Site improvements shall be installed in a level, plumb condition, true to the lines and grades shown on plans.
- B. For those items furnished by the Contractor, the Contractor shall coordinate delivery time with the manufacturer for timing the delivery of items so as to minimize on-site storage time prior to installation. The Contractor shall handle all site improvement materials and products in such a manner as to minimize any damage to the products' finish. Stored materials and items must be protected from weather, careless handling

and vandalism. Suitable touch-up material shall be readily available to repair any damage immediately.

1. The Contractor is responsible for storage of all site improvements, including those furnished by the Owner. For specific and additional Contractor responsibilities regarding Owner purchased materials, refer to Section 01040 Control of the Work, paragraph 1.13.
- C. Shim bolt connections as necessary and secure bolts. Exposed bolts shall be fastened with an approved semi-permanent adhesive to protect against vandalism.
- D. Install site furniture level and plumb, true to line and grade, and at height shown on the Drawings and recommended by the manufacturer. Where necessary provide shims to level.
- E. Field touch-up all abraded or scratched surfaces with manufacturer's recommended paint and/or cold galvanizing materials.

3.02 SHADE SHELTERS

- A. Carefully lay out footings according to manufacturer's dimensions.
- B. Construct steel reinforced footings in accordance with Section 03 30 00 Cast-in-Place Concrete. Footings shall be 4,000 PSI concrete.
- C. The shelter shall be erected in a workman-like manner with framing and fabric installed according to the manufacturer's installation instructions.
- D. Care shall be taken to avoid damaging the shelter during installation.
- E. Touch-up any damage to finish with manufacturer supplied touch-up paint.

3.03 CONCRETE FOOTINGS

- F. Cast-in-place concrete footings for site improvements shall conform to the requirements of Section 03300 - Cast-in-place Concrete and shall be 4,000 psi minimum strength at 28 days.
- G. Compacted gravel backfill shall conform to the requirements of Section 02200 - Earthwork.

END OF SECTION

Site Furnishings
02800-4

SECTION 02810

IRRIGATION SYSTEM

PART 1 - GENERAL

1.01 GENERAL REQUIREMENTS

- A. All of the Contract Documents, including the Contract Form, General Provisions, General Conditions, Supplemental Conditions, and all Attachments to the General Provisions, and Division 1 - General Requirements, apply to the work of this Section.
- B. Coordinate work of this Section with other underground utilities and with trades responsible for their installation. Refer to respective Drawings pertaining to other work.

1.02 SCOPE OF WORK

- A. The irrigation system shown on the Drawings and described within these Specifications represents an addition/modification to a single controller, turf and landscape irrigation system supplied from municipal water. The system is designed for 50 gallons per minute. Minimum 55-psi dynamic pressure at full system flow is required from the irrigation contractor's point of connection.
- B. Work to be done includes furnishing all labor, materials, equipment and services required to complete all irrigation work indicated on the Drawings, as specified herein, or both.
- C. The mechanical point of connection for the irrigation system piping, generally where shown on the drawings.
- D. The electrical point of connection for the irrigation system shall be to a new controller to be located in the existing stainless steel pedestal which has existing electrical service from Plympton School.
- E. The Drawings and Specifications must be interpreted and are intended to complement each other. The Contractor shall furnish and install all parts, which may be required by the Drawings and omitted by the Specifications, or vice versa, just as though required by both. Should there appear to be discrepancies or question of intent, the Contractor shall refer the matter to the Owner's Representative for decision, and his interpretation shall be final, conclusive and binding.

- F. Changes to the Drawings necessary to avoid any obstacles shall be made by the Contractor with the approval of the Owner's Representative.
- G. Trench excavation, back filling and bedding materials, together with the testing of the completed installation shall be included in this work.
- H. The work shall be constructed and finished in every workmanlike and substantial manner, to the full intent Drawings and Specifications. All parts necessary for the respect in a good and meaning of the proper and complete execution of the work, whether the same may have been specifically mentioned or not, or indicated on the Drawings, shall be done or furnished in a manner corresponding with the rest of the work as if the same were specifically herein described.
- I. Record Drawing as well as Operating & Maintenance Manual generation, in accordance to these specifications shall also be included in this work.

1.03 RELATED WORK

- A. Carefully examine all of the Contract Documents for requirements that affect the Work of this Section.
 - 1. Section 02200 - Earthwork: Root Zone Mix for Athletic Field.
 - 2. Section 02622 - Field Drainage System.
 - 3. Section 02930 - Sodded Athletic Field
 - 4. Section 03300 - Cast-In-Place Concrete

1.04 ORDINANCES, PERMITS AND FEES

- A. The Work under this Section shall comply with all ordinances and regulations of authorities having jurisdiction.
- B. The Contractor shall obtain and pay for any and all permits, tests and certifications required for the execution of Work under this Section.
- C. Furnish copies of Permits, Certifications and Approval Notices to the Owner's Representative prior to requesting payment.
- D. The Contractor shall include in their bid any charges by the Water Department, Utility Company, or other authorities for work done by them and charged to the Contractor.

1.05 EXAMINATION OF CONDITIONS

- A. The Contractor shall fully inform himself of existing conditions on the site before submitting his bid, and shall be fully responsible for carrying out all work required to fully and properly execute the work of the Contract, regardless of the conditions encountered in the actual Work. No claim for extra compensation or extension of time will be allowed on account of actual conditions inconsistent with those assumed, except those conditions described in the GENERAL CONDITIONS.

1.06 QUALITY ASSURANCE

- A. Installer: A firm which has at least five (5) years experience in work of the type and size 'required by this Section and which is acceptable to the Owner's Representative.
- B. References: The Contractor must supply three references for work of this type and size with their bid including names and phone numbers of contact person(s).
- C. Applicable requirements of accepted Standards and Codes shall apply to the Work of this Section and shall be so labeled or listed:

- 1. ASTM D P1784 Rigid Poly (Vinyl Chloride) (PVC) Compounds and Chlorinated Poly (Vinyl Chloride) (CPVC) Compounds.
- 2. ASTM D 1785 Poly (Vinyl Chloride) (PVC) Plastic Pipe, Schedules 40, 80, and C1200.
- 3. ASTM D P2464 Threaded Poly (Vinyl Chloride) (PVC) Plastic Pipe Fittings, Schedule 80.
- 4. ASTM D 2466 Poly (Vinyl Chloride) (PVC) Plastic Pipe Fittings, Schedule 40.
- 5. ASTM D 2564 Solvent Cements for Poly (Vinyl Chloride) (PVC) Plastic Piping Systems..
- 6. ASTM D P2737-99 Polyethylene (PE) Pressure rated tube.
- 7. National Plumbing Code (NPC)
- 8. National Electric Code (NEC)
- 9. National Sanitary Foundation (NSF)
- 10. American Society of Agricultural Engineers (ASAE)
- 11. Underwriters Laboratories, Inc. (UL)

12. Occupational Safety and Health Regulations (OSHA)

1.07 TESTS

- A. Observation: The Owner's Representative will be on site at various times to insure the system is being installed according to the Specifications and Drawings.
- B. Coverage Test: After completion of the system, test the operation of entire system and adjust sprinklers as directed by the Owner's Representative. Demonstrate to the Owner's Representative that all irrigated areas are being adequately covered. Furnish and install materials required to correct inadequacies of coverage due to deviations from the Drawings or where the system has been willfully installed when it is obviously inadequate or inappropriate without bringing it to the attention of the Owner. See Part 3 - Execution.
- C. The Owner's Representative shall be notified 48 hours in advance for observations.
- D. During final observation, the contractor shall be responsible for having two-way communication and sufficient personnel to provide instantaneous communication between the observation area and the controller for the system.

1.08 SHOP DRAWINGS

- A. The Contractor shall provide copies of product specification sheets on all proposed equipment to be installed to the Owner's Representative for approval prior to the start of work, in accordance with the parameters of Division-i. Work on the irrigation system may not commence until product sheets are submitted and approved. Submittals shall be marked up to show proper nozzles, sizes, flows, etc. Equipment to be included:
 - 1. Sprinkler Heads.
 - 2. Valves: Manual and Automatic.
 - 3. Valve Boxes.
 - 4. Pipe and Fittings.
 - 5. Wire and Connectors.
 - 6. Automatic Controller.
 - 7. Quick Coupling Valves.
 - 8. Miscellaneous Materials.
- B. Project Record Documents:

1. The Contractor shall provide and keep up-to-date a complete redlined Record Set of Drawings of the system as the project proceeds. Drawings shall be corrected daily, showing every change from the original Drawings and Specifications. Record Drawings shall specify and exactly locate sprinkler type; pop up height and nozzle for each sprinkler installed. Each valve box location to be referenced by distance from a minimum of two permanent locations. Controller(s), rain sensor(s), quick coupling valves, water meters, back flow prevention device and all other equipment shall be indicated on the drawings. All wire routing, wire size and splices shall be indicated. Main line pipe and wire route shall have two (2) distinctly different graphic symbols (line types). Prints for this purpose may be obtained from Owner's Representative at cost. This redlined record set of drawings shall be kept at job site and shall be used only as a record set.
2. This redlined set of documents shall also serve as work progress sheets and shall be the basis for measurement and payment for work completed. This record set of drawings shall be available at all times for observation and shall be kept in a location designated by Owner's Representative. Should this record set of drawings not be available for review or not be up-to-date at the time of the observation, it will be assumed no work has been completed. Provide copies of the redlined record set of drawings for Owner's Representative review on a monthly basis.
3. Make neat and legible notations on this record set of drawings daily as the work proceeds, showing the work as actually installed. For example, should a piece of equipment be installed in a location that does not match the plan, indicate that equipment in a graphic manner in the location of installation and so as to match the original symbols as indicated in the irrigation legend. Should the equipment be different from that specified, indicate with a new graphic symbol both on the drawings and the irrigation legend. The relocated equipment dimensions and northing and easting coordinates should then be transferred to the appropriate drawing in this record set of drawings at the proper time.
4. On or before the date of final field observation, deliver corrected and completed AutoCAD computer plots of "record drawings" on vellum and AutoCAD electronic files on disk to Owner's Representative as part of contract closeout. Delivery of plots will not relieve Contractor of the responsibility of furnishing required information that may have been omitted from the prints.

C. At the end of each segment of the project the contractor shall submit the

following to the Owner's Representative.

1. Plumbing permits: If none required, so state.
2. Material approvals.
3. Pressure line tests: By whom approved and date.
4. Materials furnished: Recipient and date.

1.09 DELIVERY, STORAGE AND HANDLING

- A. Store and handle all materials in compliance with manufacturer instructions and recommendations. Protect from all possible damage. Minimize on-site storage.

1.10 GUARANTEE

- A. The Contractor shall obtain in the Owner's name the standard written manufacturer's guarantee of all materials furnished under this Section where such guarantees are offered in the manufacturer's published product data. All these guarantees shall be in addition to, and not in lieu of, other liabilities that the Contractor may have by law.
- B. In addition to the manufacturers guarantees the Contractor shall warrant the entire irrigation system, both parts and labor for a period of one (1) year from the date of acceptance by the Owner.
- C. As part of the one-year warranty the Contractor shall perform the first year-end winterization and spring start-up for the irrigation system.
- D. Should any problems develop within the warranty period because of inferior or faulty materials or workmanship, they shall be corrected to the satisfaction of the Owner's Representative at no additional expense to the Owner.
- E. A written warranty showing date of completion and period of warranty shall be supplied upon completion of each segment of the project.

1.11 COORDINATION

- A. The Contractor shall at all times coordinate his work closely with the Owner's Representative to avoid misunderstandings and to efficiently bring the project to completion. The Owner's Representative shall be notified as to the start of work, progression and completion, as well as any changes to the drawings before the change is made. The Contractor shall also coordinate his work with that of his sub-contractors.
- B. The Contractor shall be held responsible for and shall pay for all damage to

other work caused by his work, workmen or sub-contractors. Repairing of such damage shall be done by the Contractor who installed the work, as directed by the Owner's Representative.

1.12 MAINTENANCE AND OPERATING INSTRUCTIONS

- A. Contractor shall include in their Bid an allowance for four (4) hours of instruction of Owner and/or Owner's personnel upon completion of check/test/start-up/adjust operations by a competent operator (The Owner's Representative office shall be notified at least one (1) week in advance of check/test/start-up/adjust operations).
- B. Upon completion of work and prior to application for acceptance and final payment, a minimum of three (3) three ring, hard cover binders titled "MAINTENANCE AND OPERATING INSTRUCTIONS FOR THE CEDARWOOD PLAYGROUND IRRIGATION SYSTEM", shall be submitted to the Owner's Representative office. After review and approval, the copies will be forwarded to the Owner. Included in the Maintenance and Operating binders shall be:
 - 1. Table of Contents
 - 2. Written description of Irrigation System.
 - 3. System drawings:
 - a. One (1) copy of the original irrigation plan;
 - b. One (1) copy of the Record Drawing;
 - c. One (1) reproducible of the Record Drawing;
 - d. One (1) copy of the controller valve system wiring diagram
 - 4. Listing of Manufacturers.
 - 5. Manufacturers' data where multiple model, type and size listings are included; clearly and conspicuously indicating those that are pertinent to this installation.
 - a. "APPROVED" submittals of all irrigation equipment.
 - b. Operation.
 - c. Maintenance: including complete troubleshooting charts.
 - d. Parts list.
 - e. Names, addresses and telephone numbers of recommended repair and service companies. A copy of the suggested "System Operating Schedule" which shall call out the controller program required (zone run time in minutes per day and days per week) in order to provide the desired amount of water to each area under "no-rain" conditions.
 - 6. Winterization and spring start-up procedures.
 - 7. Guarantee data.

1.13 PROCEDURE

Irrigation System
02810-7

- A. Notify all city departments and/or public utility owners concerned, of the time and location of any work that may affect them. Cooperate and coordinate with them in the protection and/or repairs of any utilities.
- B. Provide and install temporary support, adequate protection and maintenance of all structures, drains, sewers, and other obstructions encountered. Where grade or alignment is obstructed, the obstruction shall be permanently supported, relocated, removed or reconstructed as directed by the Architect.

PART 2 - PRODUCTS

2.01 GENERAL

- A. All materials to be incorporated in this system shall be new and without flaws or defects and of quality and performance as specified and meeting the requirements of the system. All material overages at the completion of the installation are the property of the Contractor and shall be removed from the site.
- B. No material substitutions from the irrigation products described in these specifications and shown on the drawings shall be made without prior approval and acceptance from the Owner's Representative.

2.02 PE IRRIGATION PIPE

- A. Irrigation pipes shall be polyethylene (PE3408) pipe, SDR 15, Class 100, Type III, Grade 3, Class C conforming to ASTM P2239, with a minimum pressure rating of 100 psi as manufactured by Oil Creek or equal. Polyethylene pipe shall only be used in landscape areas.

2.03 POLYETHYLENE IRRIGATION FITTINGS

- A. Fittings for polyethylene pipe shall be insert PVC or Nylon type fittings. Fittings shall conform to NSF standards and be attached with two (2) dog-eared stainless steel clamps. Clamps shall be as manufactured by Oetiker or approved equal.
- B. Supply only pipes and fittings that are marked by the manufacturer with the appropriate ASTM designations and pressure ratings and are free from cracks, wrinkles, blisters, dents or other damage. Fittings shall be per ASTM P2609 as manufactured by Dura, Lasco or approved equal.

2.04 PVC PIPE FOR SLEEVES

- A. All pipe shall bear the following markings: Manufacturer's name, nominal pipe size, schedule or class, pressure rating in psi, and date of extrusion.

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- B. All pipe in sizes 4 inches and smaller shall be PVC, Class 200, Type 1120, SDR 21, Solvent-Weld PVC, conforming to ASTM No. P2241 as manufactured by Certainteed, Cresline, JM or equal.

2.05 GEAR DRIVEN SPRINKLERS

- A. The sprinkler shall be of the gear-driven, rotary type, capable of covering a 45 foot radius at 60 PSI with a discharge rate of 12.3 GPM. The sprinkler shall be available with twelve (12) nozzles discharging 3.8 GPM to 31.5 GPM. The sprinkler shall have radius adjustment capabilities by means of a stainless-steel nozzle retainer/radius adjustment screw.
- B. The sprinkler shall be both full-circle and adjustable part-circle operation in a single unit. The sprinkler shall be minutely adjustable from 50° to 360°. It shall be adjustable in all phases of installation (i.e., before installation, after installation while static, and after installation while in operation). The sprinkler shall be equipped with a self-adjusting stator to ensure constant rotation speed regardless of nozzle installed.
- C. The sprinkler shall have a non-strippable drive mechanism that allows the nozzle turret to be turned during operation, without damage. It shall also have an automatic arc return feature that returns the nozzle turret to its proper orientation if it is turned outside its intended arc of coverage.
- D. The sprinkler shall be equipped with a drain check valve to prevent low head drainage, and be capable of checking up to 15 feet (4.5 m) in elevation change. The sprinkler shall have a minimum of 4 inch (10.16 cm) pop-up stroke to bring the rotating nozzle turret into a clean environment. The sprinkler shall have a rubber cover firmly attached to the top of the riser. When specified, the sprinkler shall have a cover molded of purple Alcryn rubber to indicate the use of reclaimed water. The rubber cover shall be surrounded by a protective rubber boot when sprinkler is in the retracted position.
- E. The sprinkler shall have an exposed surface diameter after installation of 2 inches (5 cm) and have an overall height of 7-7/8 inches (20 cm). The unit shall have a 1-inch Female National Pipe Thread (FNPT) inlet. When specified, the unit shall have a 1-inch Female British Standard Pipe Thread inlet.
- F. The sprinkler shall be serviceable after installation by unscrewing the body cap, removing the riser assembly, and extracting the inlet filter screen. The sprinkler shall have an optional turf-cup kit that, once installed, provides the means to grow living turf on top of the sprinkler riser.
- G. The body of the sprinkler shall be constructed of corrosion resistant, impact resistant, heavy-duty A.B.S. It shall have a stainless steel riser and spring for positive retraction of the riser when irrigation is complete. The riser and nozzle-turret assembly shall be encased in stainless steel. The sprinkler shall carry a five-year, exchange warranty (not prorated).

2.06 ELECTRIC CONTROL VALVES

- A. Electric control valves shall be one-inch remote control, diaphragm type, fiberglass or reinforced nylon body plastic valves with manual flow control, manual bleed screw and 200 psi pressure rating.
- B. Valves shall be manufactured by Rain Bird model PEB, Hunter Industries model ICV or approved equal.

2.07 VALVE BOXES

- A. All valve boxes shall be manufactured from unformed resin with a tensile strength of 3,100-5,500 psi conforming to ASTM P63 8. All boxes shall be green in color. Covers shall be green in color unless otherwise specified.
- B. Valve boxes for single valves, isolation valves and quick coupling valves shall be 10-inch round valve boxes with metal detection and bolt down covers.
- C. Valve boxes for dual electric valves shall be 12-inch standard valve boxes with metal detection and bolt down covers. When multiple electric valves are installed in the same area, they are to be installed two (2) valves per box in a 12-inch standard box.
- D. Valve box extensions shall be provided and installed as required for proper box depth. Valve box extensions shall be made by the same manufacturer.
- E. Valve boxes shall be manufactured by Armor, Carson Specification Grade or approved equal.

2.10 QUICK COUPLING VALVES

- A. The valve body shall be of cast brass construction with a working pressure of 125 psi. The valve seat disc plunger body shall be spring loaded so that the valve is normally closed under all conditions when the key is not inserted.
- B. The top of the valve body receiving the key shall be equipped with ACME threads and smooth face to allow the key to open and close the valve slowly. The quick coupling valve shall be equipped with a vinyl cover.
- C. The valve body construction shall be such that the coupler seal washer may be removed from the top for cleaning or replacement without disassembling any other parts of the valve.
- D. Keys shall be ACME with 1-inch male thread and 3/4-inch female thread at the top.
- E. Contractor shall provide two (3) keys for quick couplers and two (3) 1-inch x 3/4-inch swivel hose ends.
- F. Quick coupling valves, keys and swivels shall be manufactured by Hunter Industries,

model HQ-44RC-AW, HK-44 and HS-1 or approved equal.

2.11 AUTOMATIC CONTROL SYSTEM

A. I-CORE Controller:

1. The controller shall be of a modular design with a standard 6-station model. The controller shall be expandable with either 6-station modules or a 48 station decoder output module.
2. The decoder output module shall occupy no more than 3 expansion slots, and may coexist with up to (2) 6-station modules in the plastic enclosure, or (4) 6-station modules in the metal enclosure.
3. The removable station modules shall allow servicing of, and removing of the module(s) without removing field wires from the controller.
4. The controller shall have four independent programs (A, B, C, and D) with 8 start times per program for programs A, B, and C; and 16 start times for program D for a total of up to 40 daily start times. Any two programs shall have the capability of running concurrently. Watering times shall be available from 1 minute to 12 hours in 1-minute increments per station. There shall be a programmable delay between stations available of up to 9 hours. The controller shall have 4 weekly schedule options to choose from: 7-day calendar, 31-day calendar, odd day programming and even day programming. It shall also have a 365-day calendar clock to accommodate true odd-even watering. Operation shall be available in automatic, semi-automatic and manual modes. All programming shall be accomplished by use of a programming dial and selection buttons with user feedback provided by a backlit LCD display. The front panel of the controller shall be removable and capable of being programmed when not attached to the controller cabinet.
5. The controller shall be equipped with a rain sensor on-off switch that allows the user to override a sensor that has suspended watering. The controller shall have a programmable rain delay that turns off the controller for a predetermined period of time, from 1 to 180 days.
6. The controller shall have a cycle and soak scheduling capability by station that allows a cycle to be programmed for up to 60 minutes and a soak period to be programmed for up to 120 minutes.
7. The controller shall have a seasonal adjustment feature with 3 different modes that allows station run times to be altered from 0% to 300% by program to compensate for weather changes. The modes shall include a Global Adjust, Monthly Adjust, and a Solar Sync Adjust. The Global Adjust shall increase the station run times in a given program by a fixed percentage. The Monthly Adjust shall allow all the seasonal adjustment values for the full year to be programmed into the controller, for each program. The Solar Sync Adjust shall allow the seasonal adjustment values to occur on a daily basis when a Hunter Solar sync is connected to the controller.
8. The controller shall be capable of monitoring up to two Klik-type sensors or flow sensors in the plastic configuration, and up to three Klik-type sensors or flow sensors in the metal configuration.
9. The controller shall permit connection of a flow meter which is calibrated by

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the operator for the pipe diameter in which it is installed. The flow meter shall measure actual flow in gallons or liters. The controller shall have a learning mode in which the controller operates each single station for a short period, learns the actual flow for each station, and stores the information internally by station.

10. When the learned flow is exceeded during normal operations the controller shall record a flow alarm event, cease irrigating the station or stations contributing to the high or low flow readings, and resume irrigation with any stations which do not cause alarms. The controller shall have the ability to determine high or low flow conditions when multiple stations are operating, and shall perform diagnostics to identify stations which contribute to the problem flow. Allowable limits and duration of incorrect flow shall be preset, but reprogrammable by the operator for unique local conditions. The flow meter shall be a Hunter Industries HFS in an appropriately sized FCT fitting. . It shall also be possible to except certain stations from flow monitoring devices. The controller shall also be equipped with a flow-totalizing function that will provide a running total of all the gallons or liters of water used between two reference dates.
11. Automatic programs shall have user-programmed Non-Water windows to except certain time windows from watering, regardless of the water day schedule.
12. Automatic programs shall also permit the designation of non-water days, even when Odd/Even or Interval Day patterns have been set. Non-water window violations shall be detected and the operator shall be alerted when an irrigation program would have run during a non-water window.
13. The controller shall also save an Easy Retrieve Program which stores all original programming settings. The installing contractor shall be able to restore the system to this saved state at any time after initial installation. The stored Easy Retrieve settings may also be updated at any time by the operator.
14. The controller shall have a one-button manual station advance in Test mode for quick diagnostics checks.
15. The controller shall be equipped with a programmable pump start/master valve circuit that can activate the pump start relay by zone. It shall also have a programmable delay between valve stations. Delays between stations shall be programmable up to a maximum of 10 hours.
16. Transformer input shall be 120/240 VAC, 50/60Hz. Transformer output shall be 24 VAC, 1.5A (40VA). All AC power wiring connections shall be made in an internal junction box. Maximum output per conventional station shall be 24 VAC, 0.56A. Program backup shall be provided by a non-volatile memory circuit that will hold the program information indefinitely. The controller shall have Metal Oxide Varistors (MOVs) on the AC power input portion and the secondary output portion to help protect the micro-circuitry from power surges. The secondary MOVs shall be enclosed in the station modules for easy servicing. There shall be self-diagnostic, electronic short circuit protection that detects a faulty circuit, continues watering the remainder of the program, and reports the faulty station on the display. The diagnostic procedure shall also be capable of being initiated by the user manually. The controller shall provide backup timekeeping in the event of a power outage with the use of an internal long-life

- lithium battery.
17. The controller shall have a diagnostic feature that provides a visual indication via LED lights that show the current status of sensor activity, station activity and flow activity. Any station or flow alarms shall be report on the LCD display.
 18. The controller shall have the option of 3 different enclosures; wall-mounted plastic cabinet, powder coated steel wall-mounted cabinet, and a full plastic pedestal. The steel cabinet shall also be available with a matching pedestal. The pedestal versions shall have the option of a Pedestal Wiring Board (PWB) that allows connection of the field wiring in the pedestal. Additionally, the PWB shall be equipped with MOVs that help protect the secondary output portion of the controller.
 19. The controller shall have as an option, the ROAM or ICR remote control package that enables remote operation of the controller. Connection of remotes to the controller shall be provided through factory-installed SmartPort® outlet.
 20. The controller shall have a multi-language capability that allows programming of the display in 6 different languages: English, French, Spanish, German, Italian, and Portuguese. It shall also be capable of setting the units of measure to either English (GPM) or Metric (LPM).
 21. The controller shall be installed in accordance with the manufacturer's published instructions. The controller shall carry a conditional five year exchange warranty. The automatic controller(s) shall be the IC series controller as manufactured for Hunter Industries Incorporated, San Marcos, California or approved equal.

2.02 I-Core Decoder Specifications:

A. Decoder Output Module:

1. The decoder output module shall include its own user interface dedicated to decoder programming and diagnostics, including a backlit LCD display and navigational buttons. The decoder output module shall fit into 3 of the slots that accommodate conventional station output modules. The decoder output module shall co-exist with conventional station output modules, so that a hybrid system of conventional solenoid wiring and two-wire decoder wiring is possible in the same controller.
2. The decoder output module shall include a Programming Port for field programming of decoder station addresses via the decoder wires. Decoder programming shall not require the use of serial numbers or external devices.
3. The decoder output module shall offer 3 separate two-wire paths to the field. Up to 48 decoder stations may be on any one path, or dispersed over 2 or 3 paths.
4. The decoder output module shall display active stations by number, and shall also be able to display current draw in milliamps on the two-wire paths at any time, without disruption to running irrigation. The decoder output module shall detect and display Line Open and Line Fault conditions on the two wire path.
5. The decoder output module shall use a current sensing logic to determine whether active stations are drawing sufficient current and shall provide alarm notification when either an underdraw or overdraw situation is detected.

6. The decoder output module shall provide a solenoid finder feature, which chatters a solenoid loudly, for location purposes.

B. Decoders:

1. The decoders shall be completely waterproof. Each decoder shall have a single red and a single blue wire, for connection to the color-coded two-wire path. Each decoder shall include 2 waterproof connectors, UL listed to 600V direct burial, to insure proper connection.
2. The decoders shall be available in a single-station configuration, and a two-station configuration. The individual station outputs shall also be color-coded to insure proper connection.
3. Each decoder station output shall be capable of activating a minimum of 2 typical 24VAC irrigation solenoids. Individual solenoid specifications should be referenced for any difficulties with decoder operations (such as solenoids containing extra components for surge protection).
4. Decoders shall be installed within 100 ft/30 m of the solenoids they are intended to operate. In high lightning areas, the use of webbed wire pairs for decoder-to-solenoid connections is highly recommended.
5. All decoder installations shall be made in appropriately sized valve boxes. At each decoder splice, approximately 5 ft/1.5 m of wire slack shall be provided, looped inside each valve box, to prevent strain on the connection over time.
6. The system shall accommodate up to 48 decoder stations in any combination of single or two-station decoders.
7. All decoder stations shall be compatible with license-free wireless remote control.

C. Surge Protection:

1. Surge suppression devices designed for use with the decoder system shall be installed at a minimum of every 1000 ft/300 m or every 12 decoder modules, whichever is first. A surge suppression module must be installed at the end of each two-wire path.
2. The surge suppression device shall be completely waterproof, and shall include two of each color-coded wire leads, to match the two-wire path.
3. When the surge suppression device is installed in-line, one red/blue pair shall be connected to the wire path on the controller side of the device, and another red/blue pair shall be connected on the field side, continuing the decoder wiring path. When the surge suppression device is installed at the end of the two-wire path, the two red leads shall be joined together with the red wire on the path. The two blue leads shall also be joined together with the blue wire on the two-wire path, so that no leads are left un-terminated.
4. All surge suppression device installations shall be made in appropriately sized valve boxes. At each decoder splice, approximately 5 ft/1.5 m of wire slack shall be provided, looped inside each valve box, to prevent strain on the connection over time.
5. Earth ground hardware shall not be located in the same valve box as the surge suppression devices.

6. Each surge suppression device shall have a single bare copper earth ground lead, for connection to earth grounding hardware. The lead shall be routed at right angles to the two wire path, a minimum of 8 ft/2.5 m away from the two-wire path, and connected to a copper-clad steel ground rod or copper plate of 4"/100 mm width and 36"/1 m length. Nominal resistance of this earth ground connection shall be approximately 10 Ohms or less, and ground-enhancement materials may be required to achieve this.

D. Decoder Wiring:

1. Each two-wire path shall consist of approved decoder cable for this specific system. The wire shall consist of two twisted solid-core copper wires, color-coded red and blue, within a polyethylene jacket for solar and cut protection. Wire conductors shall be 14AWG /2mm² for distances up to 5000 ft/1500 m, or 12AWG/3.3mm² for distances up to 7500 ft/2300 m.
2. All splices made within the two-wire path shall be made with UL-listed waterproof connections rated to 600V direct burial with a robust strain relief. All splices in the wire path shall be made in valve boxes, with a minimum of 5 ft/1.5 m slack in each valve box. All decoders and surge suppression devices shall include the minimum number of such connectors in the box from the manufacturer to insure proper connection.
3. The controller shall be of a fixed-station design that is provided and shall have 12 stations. It shall have a UL listed, NEMA 3R rated cabinet for use in the outdoor models. The front panel of the controller shall be removable to allow for remote programming.

2.12 CONTROLLER GROUNDING EQUIPMENT

- A. Grounding shall be as shown on the drawings, and as Specified in Section 16100 Electrical Service Systems.

2.13 RAIN SHUT OFF-WIRELESS RAIN-CLICK

- A. Rain shut-off shall be plastic in construction with adjustable interruption point and attached mounting bracket. Rain shut-off shall be wireless Rain-Click as manufactured by Hunter Industries or equal.
- B. One rain sensor shall be supplied for each controller. Install the receiver unit next to the irrigation controller, with the transmitter anywhere that the device can receive representative rainfall.
- C. Mount unit within 300' from the receiver unit with built in bypass switch on received panel.
- D. Sensor Dimensions: 3.25" diameter x 4" high; Wiring: normally closed or normally open; Operational Temperature: 32°F - 130°F; Receiver Power: 22-28 VAC/VDC, 100 mA (from timer transformer); Switching capabilities: Single Pole Double throw - 24 volts 3 amps.

2.14 WIRE

- A. All valve control wire shall be minimum #14-awg, common #12-awg, single strand, solid copper, UL- approved direct burial AWG-U.F. 600V and shall meet all state and local codes for this service. Individual wires must be used for each zone valve. Common wire shall be white in color, control wire shall be red in color. White color shall be used for common wire only.
- B. In ground wire connections shall be UL listed, manufactured by 3M, model DBY6 splice kits. All wire splices shall be made in valve boxes, at controller, or at valves.
- C. Wire type and method of installation shall be in accordance with local codes for NEC Class II circuits of 30-volt A.C. or less.

2.15 ISOLATION VALVES

- A. Isolation valves 2-1/2 inches and smaller in size shall be gate type, of bronze construction, US Manufacture, 200 WOG with steel cross handle and 200 psi rating. Gate valves to be as manufactured by Nibco, model T- 113-K, or approved equal.

2.16 SWING JOINTS

- A. Gear driven rotary sprinklers shall be installed on pre-assembled swing joints, minimum length 12 inches, maximum 18 inches.
- B. Standard configuration has swivel ells on both ends for maximum versatility.
- C. Pressure rated to 150 PSI.
- D. Quick coupling valves to be installed on 1-inch prefabricated PVC unitized swing joint assemblies with double O-ring seals, minimum 315 psi rating and minimum length of 12 inches with brass insert and stabilizer (unless stabilizer is an integral part of the quick coupling valve).

2.17 CRUSHED STONE

- A. Crushed stone shall be as specified in Section - 02200 Earthwork. Crushed stone shall be used under valve boxes.

2.18 SAND

- A. Sand used for backfilling of trenches; under, around and over PVC lines shall be as specified in Section 02200 - Earthwork.

2.19 SPARE PARTS

- A. Contractor shall supply the following tools and equipment to the Owner's Representative before final observation:

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1. Two (2) wrenches for disassembling and adjusting each type of sprinkler head provided.
 2. Four (4) quick coupler key assemblies with HS-O Hose Swivel Adaptor.
 3. One (1) of each type of gate valve used in the project.
 4. Two (2) of each type sprinkler head and pattern (PC & FC) used in the project.
 5. Two (2) of each type nozzle used in the project.
- B. Before final observation can occur, written evidence that the Owner's Representative has received the tools and equipment must be shown to the Owner.

PART 3 - EXECUTION

3.01 GENERAL

- A. Before work is commenced, hold a conference with the Owner's Representative to discuss general details of the work.
- B. Examine all contract documents applying to this Section noting any discrepancies and bringing the same to the attention of the Owner's Representative for timely resolution.
- C. All work indicated on Drawings shall be provided whether or not specifically mentioned in the Specifications.
- D. If there are ambiguities between Drawings and Specifications, and specific interpretation or clarification is not issued prior to bidding, the interpretation or clarification will be made only by Owner's Representative, and Contractor shall comply with the decisions. In the event the installation contradicts the directions given, the installation shall be corrected by Contractor at no additional cost to Owner.
- E. Verify dimensions and grades at job site before work is commenced. Do not proceed with installation of the landscape irrigation system when it is apparent that obstructions or grade differences exist or if conflicts in construction details. Legend or specific notes are discovered. All such obstructions, conflicts, or discrepancies shall be brought to the attention of the Owner's Representative.
- F. Make all field measurements necessary for the work noting the relationship of the irrigation work to the other trades. Coordinate with other trades (landscaping and other site work trades). Project shall be laid out essentially as indicated on the Irrigation Plans, making minor adjustments for variations in the planting arrangement. Major changes shall be reviewed with the Owner's Representative prior to proceeding.
- G. Layout of sprinkler lines indicated on Drawings is diagrammatic only. Location of sprinkler equipment is contingent upon and subject to integration with all other underground utilities. Contractor shall employ all data contained in the Contract Documents and shall verify this information at the construction site to confirm the manner by which it relates to the installation.
- H. Coordinate installation of all sprinkler materials, including pipe, to avoid conflict with

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the trees, shrubs, or other plantings.

- I. During progress of work, a competent superintendent and all assistants necessary shall be on site. All shall be satisfactory to the Owner's Representative. The superintendent shall not be changed, except with the consent of the Owner's Representative, unless that person proves unsatisfactory and ceases to be employed. The superintendent shall represent the Contractor in his absence and all directions given to the superintendent shall be as binding as if given to the Contractor.
- J. At all times, protect existing irrigation, landscaping, paving, structures, walls, footings, etc. from damage. Any inadvertent damage to the work of another trade shall be reported at once.
- K. Replace, or repair to the satisfaction of the Owner, all existing paving disturbed during course of work. New paving shall be the same type, strength, texture, finish, and be equal in every way to removed paving.

3.02 PIPE AND FITTINGS INSTALLATION

- A. Using proper width trencher chain, excavate a straight (vertical) and true trench to a depth of 2-inch of pipe invert elevation.
- B. Loam or topsoil encountered within the limits of trench excavation for irrigation mains and branch lines shall be carefully removed to the lines and depths as shown on the Drawings and stockpiled for subsequent replacement in the upper 6 inches of the trench from which it is excavated. Such removal and replacement of the quantities of loam shall be considered incidental to the irrigation system and no additional compensation will be allowed therefore.
- C. Pipe shall be laid on undisturbed trench bottom provided suitable base is available - no rock larger than 1-inch or sharp edges; if not, excavate to 2-inch below pipe invert and provide and install sand base or crushed stone upon which to lay pipe.
- D. Back filling shall be accomplished as follows: the first 10-inch of backfill material shall contain no foreign matter and no rock larger than 1-inch in diameter. Carefully place material around pipe and wire and tamp in place. Remainder of backfill shall be laid-up in 6-inch (maximum) lifts and tamped to compaction with mechanical equipment. Compact backfill in trenches to dry density equal to the adjacent undisturbed soil, and conform to adjacent grades without dips, sunken area, humps, or other irregularities. Frozen material shall not be used for backfill
- E. Do backfilling when pipe is cool. During hot weather cool pipe by operating the system for a short period, or by backfilling in the early part of the morning before the heat of the day.
- F. Do not, under any circumstances, use truck wheels for compacting soil.
- G. Where feasible, Owner's Representative may authorize the use of flooding in lieu of

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tamping.

- H. Restore grades and repair damage where settling occurs.
- I. Make all solvent-weld joints in strict accordance with manufacturer's recommendations, making certain not to apply an excess of primer or solvent, and wiping off excess solvent from each connection. Allow welded joints at least 15 minutes set-up/curing time before moving or handling. When the temperature is above 80° F, allow connections to set minimum 24 hours before pulling or pressure is applied to the system. When temperature is below 80° F, follow manufacturer's recommendations. Provide and install for expansion and contraction as recommended. Wire shall be laid in same trench as mainline and at pipe invert (see Wire Installation).
- J. Mainline pipe shall have minimum 18 inches of COVER (excavate to invert as required by pipe size). Lateral pipe shall have minimum 16 inches of COVER for PVC and 12 inches of cover for Polyethylene (excavate to invert as required by pipe size).
- K. Cut plastic pipe with handsaw or pipe-cutting tool, removing all burrs at cut ends. All pipe cuts are to be square and true. Bevel cut end as required to conform to Manufacturer's Specifications.
- L. Every precaution shall be taken to prevent foreign material from entering the pipe while it is being placed in the trench. At times, when installation of the piping is not in progress, the open end(s) of the pipe shall be closed by a watertight plug or other means. All piping, which cannot temporarily be joined, shall be sealed to make as watertight as possible. This provision shall apply during the lunch hour as well as overnight. Pipe not to be installed that day shall not be laid out. Should water enter the trench during or after installation of the piping, no additional piping may be installed or back filled until all water is removed from the trench. Pipe shall not be installed when water is in the trench, when precipitation is occurring, or when the ambient temperature is at 40° F or below. Pipe installed at temperatures below 40° F shall be removed and replaced at no cost to the Owner. PVC pipe shall be snaked in the trench to accommodate for expansion and contraction due to changes in temperature.
- M. In installing irrigation pipe the Contractor shall route the pipe as necessary to prevent damage to tree roots. Where trenching must occur near trees, the Contractor shall provide proper root pruning and sealing methods to all roots 1-inch and larger.
- N. Maintain 6-inch minimum clearance between sprinkler lines and lines of other trades. Do not install sprinkler lines directly above another line of any kind.
- O. Maintain 1-inch minimum between lines which cross at angles of 45 to 90 degrees.
- P. Exercise care when excavating, trenching and working near existing utilities.
- Q. Throughout the guarantee period it will be the responsibility of the Contractor to refill any trenches that have settled due to incomplete compaction.
- R. Pulling of pipe will be allowed provided soil is suitable and specified depth of bury can

be maintained.

3.03 ISOLATION VALVE INSTALLATION

- A. Install isolation valves per detail where indicated on the Drawings. Install all isolation valves on a level crushed stone base so that they can be easily opened or closed with the appropriate valve wrench. Install specified valve box over each isolation valve.
- B. Check and tighten valve bonnet packing before valve box and backfill installation.

3.04 VALVE BOX INSTALLATION

- A. Furnish and install a valve access box for each electric valve, quick coupling valve, isolation valve and wire splice.
- B. All valve access boxes shall be installed on a minimum 4-inch crushed stone base. Finish elevation of all boxes shall be at grade. All crushed stone to be supplied by the Contractor and installed before valve box. Crushed stone shall not be poured into previously installed valve boxes.

3.05 24 VOLT CONTROL VALVE INSTALLATION

- A. Control valves shall be installed on a level crushed stone base. Grade of bases shall be consistent throughout the project so that finish grades fall within the limits of work. Valves shall be set plumb with adjusting handle and all bolts, screws and wiring accessible through the valve box opening. Valves shall be set in a plumb position with 24-inch minimum maintenance clearance from other equipment.
- B. Install at sufficient depth to provide more than 6-inch, nor less than 4-inch cover from top of valve to finish grade.
- C. Adjust zone valve operation after installation using flow control device on valve.

3.06 AUTOMATIC CONTROL SYSTEM INSTALLATION

- A. Controller Installation:
 - 1. Contractor to install controller in enclosure. Contractor to wire valves into controller and set proper program. Controller to be mounted on panelboard in enclosure.
 - 2. Wire controller to 120-volt electrical supply provided for the controller as indicated on the Drawings.
 - 3. Contractor to install controller in specified enclosure, as shown on the drawings. Contractor to wire valves into controller and set proper program.
 - 4. Keys shall be turned over to the City of Waltham.

B. Control Wiring:

1. Wiring shall be installed along with the main line. Multiple wire bundles shall be cinched together at maximum 12-foot centers using plastic cable cinches and shall be laid beside, and at the same invert as, the irrigation lines. Sufficient slack for expansion and contraction shall be maintained and wiring shall at no point be installed tightly. Provide an additional 8 inches to 12 inches slack at all changes of direction. Wiring in valve boxes shall be a sufficient length to allow the valve solenoid, splice, and all connections to be brought above grade for servicing. This additional slack shall be coiled for neatness in the valve box. Each valve shall have a separate wire back to the controller.
2. Power wire shall be installed in 1000 foot lengths. No splicing shall be allowed on circuits from power source to controller and from controller to controller below 1000 feet of power wire laid. Minimum burial depth shall be 14 inches.
3. Wire shall not be installed directly off the roll. Wire must be first laid out and then installed. Specified depth of burial is to be maintained.
4. All in-ground wire connections shall be waterproofed with 3M DBY-6, DBR-6 or 82-A Scotch Pak splice kits of the appropriate size for the voltage being carried and the wire sizes involved. All splices shall be made in valve boxes (wire runs requiring splices between valve locations shall be provided in splice box--valve box shall be used). Splice locations shall be shown on the Record Drawings.
5. All power wire (1 20v) shall be installed with no in-ground splices. All splices shall be in valve boxes (black covers) or field controllers. Wire splices shall not be in the same valve box with isolation valves and valve covers to be marked "Electrical".
6. All wire shall be laid in trenches and shall be carefully back-filled to avoid any damage to the wire insulation or wire conductors themselves. In areas of unsuitable material, the trench shall have a 2 inches layer of sand or stone dust on the bottom before the wires are laid into the trench and back-filled. The wires shall have a minimum of 12 inches of cover. Wire not to be installed that day shall not be laid out.
7. Control wiring located beneath paved areas shall be installed in a separate schedule 80 PVC sleeve.
8. Wiring shall occupy the same trench and shall be installed along the same route as pressure supply or lateral lines wherever possible to the side of pipeline. Control wires shall be laid loosely in trench without stress or stretching to allow for contraction of wires. Where more than one (1) wire is placed in a trench, the wiring shall be taped together at intervals of ten(10) feet.
9. An expansion curl shall be provided within three(3) feet of each wire connection. Expansion curl shall be of sufficient length at each splice connection at each electric control valve, so that in case of repair, the valve bonnet may be

brought to the surface without disconnecting the control wires. An expansion curl shall be provided every 100 feet on runs of more than 100 feet in length. Provide looped slack at valves and changes in direction of 90 degrees.

3.07 CONNECTIONS

- A. Connect piping to sprinklers, devices, valves, control valves, specialties, and accessories to provide a fully operational irrigation system as part of this work.
- B. Connect water supply to irrigation system.
- C. Electrical Connections: Connect to power source, controllers, rain sensor, and automatic control valves to provide a fully operational irrigation system as part of this work.
- D. Ground systems according to Section 16100 - Electrical Service Improvements.

3.08 CONTROLLER GROUNDING INSTALLATION

- A. Ground controller to bare copper ground wire and grounding rods.

3.09 WIRING INSTALLATION

- A. Wiring shall be installed along with the main line. Multiple wire bundles shall be cinched together at maximum 12-foot centers using plastic cable cinches and shall be laid beside, and at the same invert as, the irrigation lines. Sufficient slack for expansion and contraction shall be maintained and wiring shall at no point be installed tightly. Provide and install an additional 8 inches to 12 inches slack at all changes of direction. Wiring in valve boxes shall be a sufficient length to allow the valve solenoid, splice, and all connections to be brought above grade for servicing. This additional slack shall be coiled for neatness in the valve box. Each valve shall have a separate wire back to the controller.
- B. All wire shall be laid in trenches and shall be carefully back-filled to avoid any damage to the wire insulation or wire conductors themselves. In areas of unsuitable material, the trench shall have a 2 inches layer of sand or stone dust on the bottom before the wires are laid into the trench and back-filled. The wires shall have a minimum of 12 inches of cover. Wire not to be installed that day shall not be laid out.
- C. An expansion curl shall be provided and installed within 6 inches of each wire connection to a solenoid and at least every 100 feet of wire length on runs more than 100 feet in length. Expansion curls can be formed by wrapping five (5) turns of wire around a 1-inch diameter or larger pipe and then withdrawing the pipe.
- D. Provide and install a common ground wire of white color. No white color shall be used for power wire. Control wire shall be red.
- E. Service wiring in connection with Drawings and local codes for 24-volt service. All in-ground wire connections shall be waterproofed with 3M DBY-6 splice kits. All splices

shall be made in valve boxes (wire runs requiring splices between valve locations shall be provided and installed in splice box-valve box shall be used). Splice locations shall be shown on the Record Drawings.

- F. Contractor shall provide a complete wiring diagram showing wire routing for the connections between the controller and valves. See section one for the inclusion of wiring diagram in operation and maintenance manuals.

3.10 SPRINKLER INSTALLATION

- A. Spray sprinklers, small rotary sprinklers and medium rotary sprinklers shall be installed flush (perpendicular) to grade on swing pipe assemblies, minimum length 6 inches, maximum 18 inches.
- B. Sprinklers shall not exceed maximum spacing indicated.
- C. Adjust sprinkler zone after installation using flow control device on valve.

3.11 QUICK COUPLING VALVE INSTALLATION

- A. Provide and install quick coupling valves where indicated on the Drawings.
- B. Quick coupling valves to be mounted on 1-inch prefabricated PVC unitized swing joint assemblies with integral o-rings, minimum length 12 inches with brass insert and stabilizer as per details.

3.12 CHECK/TEST/START-UP/ADJUST

- A. Flushing:
 - 1. After all piping, valves, sprinkler bodies, pipe lines and risers are in place and connected, but prior to installation of sprinkler internals, open the control valves and flush out the system under a full head of water.
 - 2. Sprinkler internals, flush caps and riser nozzles shall be installed only after flushing of the system has been accomplished to the full satisfaction of the Owner's Representative.
 - 3. Contractor shall be responsible for flushing the entire system after installation is complete and will be responsible for any clogged nozzles for thirty (30) days after substantial completion of this portion of the landscape irrigation system.
- B. Testing:
 - 1. Leakage test: test all lines for leaks under operating pressure. Repair all leaks and re-test.
 - 2. Coverage test: perform a coverage test in the presence of the Owner's Representative (notify Architect at least seven (7) days in advance of scheduled

coverage test). Representative will determine if the water coverage is complete and adequate. Readjust heads and/or head locations as necessary or directed to achieve proper coverage.

3. All testing shall be at the expense of the Contractor.

3.13 CLEANING AND ADJUSTING

- A. At the completion of the work, all parts of the installation shall be thoroughly cleaned. All equipment, pipe, valves and fittings shall be cleaned of grease, metal cuttings and sludge which may have accumulated by the operation of the system for testing.
- B. Adjust sprinkler heads, valve boxes, and quick coupling valves to grade as required, so that they will not be damaged by mowing operations.
- C. Continue sprinkler coverage adjustment as required by settlement, etc., throughout the guarantee period.
- D. Each control zone shall be operated for a minimum of 5 minutes and all heads checked for consistency of delivering water. Adjustments shall be made to sprinklers that are not consistent to the point that they match the manufacturer's standards. All sprinklers, valves, timing devices or other mechanical or electrical components, which fail to meet these standards, shall be rejected, replaced and tested until they meet the manufacturer's standards.

3.14 ACCEPTANCE AND OPERATION BY OWNER

- A. Upon completion of the work and acceptance by the Owner, the Contractor shall be responsible for the training of the Owner's Representative(s) in the operation of the system (provide minimum 48 hours written notice in advance of test). The Contractor shall furnish, in addition to the Record Drawings and operational manuals, copies of all available specification sheets and catalog sheets to the Owner's personnel responsible for the operation of the irrigation system. The Contractor shall guarantee all parts and labor for a minimum period of one (1) year from date of acceptance.
- B. Conditions for acceptability of work for start of maintenance by Owner issued by Owner or Owner's Representative shall include but not be limited to:
 1. Punch list items complete and approved by Owner or Owner's Representative.
 2. Landscape irrigation system complete and in place.
 3. Record drawings complete.
 4. Maintain installation and watering schedules until all conditions noted above have been completed.

3.15 CLEANUP

- A. Upon completion of all installation work, Contractor shall remove all leftover materials and equipment from the site in a safe and legal manner.

- B. Contractor shall remove all debris resulting from work of this section.
- C. Contractor shall regrade, lightly compact, and replant around sprinkler heads where necessary to maintain proper vertical positioning in relation to established grade.
- D. Contractor shall fill all depressions and eroded channels with sufficient soil mix to adjust grade to ensure proper drainage. Compact lightly, and replant filled areas in accord with Drawings requirements.

END OF SECTION

SECTION 02825

CHAIN LINK FENCING

PART 1 - GENERAL

1.01 GENERAL PROVISIONS

- A. Attention is directed to the General Conditions of the Contract, all Divisions of the Specifications and the Contract Drawings, all of which apply to this section.
- B. Examine and coordinate all Contract Drawings and other sections of the specifications for requirements which affect work of this section whether or not such work is specifically mentioned in this section. Coordinate work with other trades to assure the steady progress of all work under the Contract.

1.02 SCOPE OF WORK

- A. Work under this Section includes furnishing and installing vinyl-clad chain link fence in the heights and locations shown on the drawings.

1.03 RELATED WORK

- A. Section 02100 - Site Preparation and Demolition
- B. Section 02200 - Earthwork
- C. Section 03300 - Cast-in-Place Concrete

1.04 REFERENCE STANDARDS

- A. Comply with standards of the Chain Link Fence Manufacturer's Institute.

1.05 SUBMITTALS

- A. Submit manufacturer's product literature for all new items demonstrating compliance with the Specifications.

1.06 DELIVERY, STORAGE AND HANDLING

- A. Packaged materials shall be delivered to the site in original, unopened and unaltered containers clearly indicating the manufacture, brand name, lot or serial number and other identifying information.
- B. Materials shall be stored in a dry location, off the ground and in such manner as to prevent damage, intrusion of foreign matter and weather. All materials which have become damaged or otherwise unfit for use during delivery or storage shall be replaced at the expense of the Contractor.
- C. The Contractor shall be responsible for timing the delivery of items so as to minimize

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onsite storage time prior to installation. Stored materials and items must be protected from the weather, careless handling and vandalism.

- D. Contractor shall handle, pack and transport in a manner to minimize damage to the finish of materials. Upon arrival at the job site, it is the responsibility of the contractor to take equal precautions. Should minor damage occur to the finish the contractor shall restore damaged finishes and test for proper function. Clean and protect work from further damage.
- E. Handle and store salvaged chain link fence components in a way to prevent damage and deterioration.

PART 2 - PRODUCTS

2.01 Vinyl Coated Chain Link Fence

- A. Fabric shall meet the following requirements as a minimum:
 - 1. Wire gauge for chain link fences shall be 9 gauge prior to PVC coating.
 - 2. Wire finish: Wire shall have a polyvinyl chloride (PVC), plastic resin finish, factory applied over galvanizing prior to fabrication of fabric. Thickness of PVC coating shall be not less than 7 nor more than 20 mils thick. PVC coating shall be applied by the thermal fusion method over a thermoset plastic bonding agent. The bond shall exhibit equal or greater strength than the cohesive strength of the vinyl. All cut ends shall be coated with vinyl at the factory. PVC coated wire shall be capable of being woven into fabric without the PVC coating cracking, crazing, or peeling. Color shall be black.
 - 3. Top and bottom selvages shall be knuckled on all fencing.
- B. Framework (Posts, Rails, and Gate Frame)
 - 1. Steel parts shall be hot-dipped galvanized inside and out prior to vinyl coating.
 - a) Round pipe shall be Type 1, ASTM F 1083 round cold-formed steel standard weight Schedule 40, Minimum yield strength shall be 25,000 psi. Galvanizing shall conform with ASTM A-120 standard weight Schedule 40 except the hydrostatic testing requirement is waived.
 - 2) Square gate posts and frames shall meet ASTM A500 Grade B with a minimum yield strength of 40,000 psi, sized as indicated.
 - 2. Galvanized steel parts shall be coated with a polyvinyl chloride (PVC) plastic resin finish. PVC coating for framework shall meet the above specifications for fabric coating. Frame color shall match fabric color.
 - 3. Sizes for fence posts, gate frames and other framework members shall be as

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shown on the Drawings.

a) Weights for posts shall be as follows:

Outside Diameter (Inches)	Minimum Pounds per Foot Tolerance $\pm 5\%$
1.66	2.27
2.375	3.65
2.875	5.79
4.00	9.11

4. Provide continuous top rails in manufacturer's longest lengths, with expansion type couplings for each joint. Provide necessary fittings for attaching top rail to each gate, corner, pull and end post.

C. Hardware and accessories: Provide galvanized (ASTM A153) PVC-coated accessories. PVC coating for accessories shall meet the above specifications for fabric coating. Nuts and bolts shall be galvanized but not vinyl coated. Nuts and bolt heads shall be coated with PVC touch-up paint after installation to match fabric color.

1. Post Tops: Galvanized, pressed steel or malleable iron, weather tight closure caps, 1 top for each post. Where top rail is used, provide tops with openings to accommodate top rails. Provide one (1) rounded cap for each end, corner or gate post.
2. Stretcher Bars - One piece lengths with minimum cross section of 3/16" x 3/4". Provide one (1) cross stretcher bar for each end post and two (2) for each corner and pull post.
3. Stretcher Bar Bands - Heavy pressed steel or malleable iron of 1/8" x 3/4" minimum cross section and be of sufficient size to secure stretcher bars to end, corner and pull posts.
4. Rail clamps to be standard clamps (boulevard clamps) furnished complete with fasteners with ASTM Designation A153.
5. Rail brace ends: Formed steel, malleable or cast iron, for connection of rail and brace to posts.
6. Ties - Fabric shall be attached using self-locking fabric ties by L&C Enterprises, 6652 N. 75 Drive, Escanaba, MI 49829, www.lcenterprises-usa.com. (Tel 1-866-786-1009), or approved equal. Self-locking fabric ties shall match color of fence fabric.

- D. Concrete for footings shall conform to the requirements of Section 03300-Cast-in-Place Concrete. Compressive strength shall be 4,000 psi minimum.

PART 3 - EXECUTION

3.01 GENERAL

- A. Install and fasten materials and systems in proper relation with adjacent construction and with uniform appearance. Items shall be installed in a level, plumb condition, true to the lines and grades shown on the Contract Drawings. Coordinate with work of other sections or trades.

3.02 FENCE INSTALLATION

- A. Rails - All rails, top, bottom, middle (where required) shall form a continuous brace from end to end of each fence run. Couplings shall be located a maximum of 12" from line posts. All end and corner posts shall be braced to the nearest line post with center brace rails.
- B. Fabric - Dimension between finish grade and bottom selvage varies. Refer to drawings. Pull fabric taut and tie to posts and rails.
- C. Stretcher Bars - Thread through fabric and secure to posts with tension bands spaced as shown on the Drawings.
- D. Tie Wires - Wire shall be spaced as shown on the drawings and securely fastened by twisting around pipe to which attached, clasping and fasten firmly. Bend twisted ends of wire to minimize hazard to persons or clothing.
- E. Fasteners - Install nuts for tension band and hardware bolts on side of fence opposite fabric side.

3.03 GUARANTEE

- A. The Contractor shall cover the replacement of any damaged items or components, at no extra charge for the period of one year.

END OF SECTION

SECTION 02845

WOOD GUARDRAIL

PART 1 - GENERAL

1.01 GENERAL PROVISIONS

- A. Attention is directed to the General Conditions of the Contract, all Divisions of the Specifications and the Contract Drawings, all of which apply to this section.
- B. Examine and coordinate all Contract Drawings and other sections of the specifications for requirements which affect work of this section whether or not such work is specifically mentioned in this section. Coordinate work with other trades to assure the steady progress of all work under the Contract.

1.02 SCOPE OF WORK

- A. Work under this Section includes furnishing and installing wood guardrail in the location shown on the Drawings.

1.03 RELATED WORK

- A. Section 02100 - Site Preparation and Demolition
- B. Section 02200 - Earthwork

1.04 SUBMITTALS

- A. Submit shop drawings for wood guardrail, demonstrating compliance with the Specifications.
- B. Submit certification of wood type and grade.

1.05 DELIVERY, STORAGE AND HANDLING

- A. Materials shall be stored in a dry location, off the ground and in such manner as to prevent damage, intrusion of foreign matter and weather. All materials which have become damaged or otherwise unfit for use during delivery or storage shall be replaced at the expense of the Contractor.
- B. The Contractor shall be responsible for timing the delivery of items so as to minimize onsite storage time prior to installation. Stored materials and items must be protected from the weather, careless handling and vandalism.
- C. Contractor shall handle, pack and transport in a manner to minimize damage to the finish of materials. Upon arrival at the job site, it is the responsibility of the contractor

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to take equal precautions. Should minor damage occur to the finish the contractor shall restore damaged finishes and test for proper function. Clean and protect work from further damage.

PART 2 - PRODUCTS

2.01 Wood Guardrail

- A. Wood guardrail shall be a dimensioned as shown on the Drawings.
 - 1. Guardrail shall be constructed of solid pressure treated Southern Yellow Pine, planed to a smooth splinterless surface.
- B. All hardware shall be galvanized steel.
- C. Top beam of guardrail shall be fabricated to allow racking if necessary to smoothly align top rail with finished grade. End of rails shall be cut and angled to fit tightly together at posts.

PART 3 - EXECUTION

3.01 GENERAL

- A. Install and fasten materials and systems in proper relation with adjacent construction and with uniform appearance. Items shall be installed in a level, plumb condition, true to the lines and grades shown on the Contract Drawings. Coordinate with work of other sections or trades.
 - 1. Wood guardrail shall be installed to smoothly align with level or sloping finished grade. Posts shall be plumb.
- B. Align posts and rails in consistent alignment, plumb and true.

END OF SECTION

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SECTION 02850

ATHLETIC EQUIPMENT

PART 1 - GENERAL

1.01 GENERAL PROVISIONS

- A. Attention is directed to the General Conditions of the Contract, all Divisions of the Specifications and the Contract Drawings, all of which apply to this section.

1.02 SCOPE OF WORK

- A. Furnish and install two (2) 6' offset basketball standards with backboards and goals with padding.

1.03 RELATED WORK

- A. Section 03300 - Cast-in-Place Concrete

1.04 SUBMITTALS

- A. Submit manufacturer's literature demonstrating compliance with the specifications.
- B. Submit manufacturer's recommended installation details and instructions.
- C. Where applicable, submit standard color choices.

1.05 DELIVERY STORAGE AND HANDLING

- A. All materials shall be protected from weather and other damage prior to installation.

PART 2 - MATERIALS

2.01 BASKETBALL STANDARDS, BACKBOARDS AND GOALS

- A. Basketball standards shall be a 6' offset, 5-1/2" O.D. Schedule 40 steel pipe vertical support, with 6 layer galvanized finish, True-Fix Pole system as manufactured by TrueBounce or equal.
- B. Basketball backboards shall be a sound deadening backboard, True Bounce XL7042 with low profile safety padding or equal.
 - 1. Backboard shall be 42" x 72" constructed of 1/2" thick resistant polycarbonate. Backboard shall have 1/2" hole pattern to allow for sound reduction.
 - 2. The shot box and perimeter shall be striped with enamel paint.
 - 3. Board shall have heavy duty "E" channeled aluminum with stainless steel

- fasteners.
- 4. Padding for bottom edge of backboard shall be a durable polyurethane foam designed for resistance to weather.
- C. Basketball goals shall have regulation size (18" diameter) 5/8" diameter double rim of high tensile steel powder coated orange official size goal, with nylon net, and all required attaching hardware. Rim shall have 7/16" round steel braces, and 12 net-tie net holders.
 - 1. Hardware shall be zinc-galvanized or stainless steel.

PART 3 - INSTALLATION

3.01 New Backboards and Goals

- A. Install according to manufacturer's directions.
- B. Install level and plumb.
- C. Install padding on bottom of backboard.

END OF SECTION

SECTION 02860

PLAYGROUND EQUIPMENT

PART 1- GENERAL

1.01 GENERAL PROVISIONS

- A. All of the Contract Documents, including the Contract Form, General Provisions, General Conditions, Supplemental Conditions, and all Attachments to the General Provisions, and Division 1 - General Requirements, apply to the work of this Section.

1.02 SCOPE OF WORK

- A. The Owner will furnish all play equipment (Landscape Structures and Berliner) for installation by the Contractor. See Section 01040 - Control of the Work, Section 1.13 for a description of the Contractor's responsibilities in checking, receiving, storing and coordinating with the manufacturer to receive a complete and satisfactory order.
 - 1. For those items to be supplied by the Owner, the Contractor shall provide any incidental hardware and all footings and other materials not supplied by the manufacturer, but required for installation of these items.
- B. The work shall include, but is not limited to installing of the following equipment play equipment:
 - 1. Landscape Structures
 - a. Two single post swing seats, with 4 seats each
 - b. Multi-component "EVOS" play structure for 5-12 yr old children
 - c. Multi-component "WEEVOS" play structure for 2-5 yr old children
 - 2. Berliner
 - a. One "Speedway" (zipline) with launch platform.
- C. PLAYGROUND AUDIT: At the completion of the work of this section, the Contractor shall arrange and pay for an Audit of the completed playground by a Certified Playground Safety Inspector. The Audit shall be a comprehensive evaluation of the playground including compliance and accessibility. Audit shall be based on the current ASTM and CPSG standards for playgrounds.
- D. Footing and installation details are included on the Drawings for purposes of bidding. It shall be the Contractor's responsibility to obtain complete installation instructions from the manufacturer. Where the Drawings and Manufacturer's instructions differ, notify the Landscape Architect prior to proceeding.

1.03 RELATED SECTIONS

- A. Section 02200 – Earthwork
- B. Section 03300 – Cast-in-Place Concrete
- C. Section 02540 – Safety Surfacing.

1.04 SUBMITTALS

- A. Submit concrete mix, as required under Section 03300 - Cast-in-Place Concrete.
- B. Submit manufacturer's installation instructions for each piece of play equipment.
- C. The Contractor shall engage the services of the Equipment manufacturer to review the installation and to provide a written statement asserting that the supplied material and equipment and installation meets manufacturer's standards.

1.05 DELIVERY, STORAGE AND HANDLING

- A. Deliver, store and handle metal fabrication items to prevent damage and deterioration. Store assembled items off the ground.

1.06 REFERENCE STANDARDS

- A. Materials, layout and installation of play equipment shall comply with the following guidelines and standards:
 - 1. ASTM F 1487 - American Society for Testing Materials Standard Consumer Safety Performance Specification for Playground Equipment for Public Use, latest edition.
 - 2. ASTM F2373-08 - Standard Consumer Safety Performance Specification for Public Use Play Equipment for Children 6 months through 23 months
 - 3. National Bureau of Standards, U.S. Consumer Product Safety Commission (CPSC), Public Playground Safety Handbook, 2008
 - 4. IPEMA - International Play Equipment Manufacturers Association

1.07 QUALITY ASSURANCE/WARRANTY

- A. Installer Qualifications: An experienced installer who has specialized in installing work similar in material, design, and extent to that indicated for this project and who is acceptable to the manufacturer of playground equipment.
- B. Provide the Owner with a two year warranty against failure of the installation.

- C. A manufacturer's representative from Landscape Structures and from Berliner shall be engaged to provide on-site checking of the progress and process of installation of their respective equipment. The representative shall supervise the installation and adjustment of the playground equipment to ensure that equipment meets the requirements of CPSC and ASTM F1487.

1.08 COORDINATION

- A. Coordinate construction of equipment use zones and fall heights during installation of playground equipment with installation of protective surfacing specified in Section 02540 Playground Surfacing. Sequence work so that protective surfacing can be installed as soon as possible after concrete footings have set.

PART 2 - PRODUCTS

2.01 CONCRETE FOOTINGS

- A. Cast-in-place concrete footings for site improvements shall conform to the requirements of Section 03300 - Cast-in-place Concrete and shall be 4,000 psi minimum strength at 28 days.
- B. Compacted gravel backfill and crushed stone shall conform to the requirements of Section 02200 - Earthwork.

2.02 PLAY EQUIPMENT

- A. Play equipment furnished by the Owner and to be installed by the Contractor is shown on the Drawings.

PART 3 - INSTALLATION

3.01 General

- A. Do not begin installation before final grading required for placing protective surfacing is completed.
- B. Comply with manufacturer's written installation instructions, unless more stringent requirements are indicated. Anchor playground equipment securely, positioned at locations and elevations indicated on Shop Drawings.
 - 1. **Maximum Equipment Height:** Coordinate installed heights of equipment and components with installation of protective surfacing. Set equipment so fall heights and elevation requirements for age group use and accessibility are within required limits. Verify that playground equipment elevations comply with requirements for each type and component of equipment.

- C. The Contractor shall arrange and pay any fees necessary for playground equipment manufacturer's technical personnel to inspect playground layout and playground equipment during installation and at final completion to certify compliance with ASTM F 1487 and CPSC guidelines.
 - 1. Notify the Landscape Architect 48 hours in advance of date and time of final inspection.

3.02 Verification of Use Zones

- A. Contractor shall layout all playground equipment as per the Drawings.
- B. The Contractor shall be aware of all clear Use Zones around the play equipment, as indicated on the drawings, and shall ensure that all minimum Use Zones are complied with. Verify locations of playground perimeter.
- C. Use Zones are the areas around all play equipment that shall be clear of any obstacles, including, but not limited to, curbs, trees, and fencing. Contractor shall bring to the attention of the Landscape Architect any discrepancies between plans and actual site conditions, where there is a conflict with the required use zone.
 - 1. The Contractor shall notify the Landscape Architect for review of the layout prior to installation of play equipment and pouring of footings.

3.03 FOOTINGS

- A. Provide concrete footings dimensioned and spaced as shown on the Drawings, and as required by the play equipment manufacturer. Top of footing shall be flush with and shall not protrude above aggregate base course in order to provide adequate depth of safety surfacing.
- B. Post and Footing Excavation: Hand-excavate holes for posts and footings to dimensions, profile, spacings, and in locations indicated on Drawings, in firm, undisturbed or compacted subgrade soil. Level bearing surfaces with drainage fill to required elevation.
- C. Post Setting: Set main-frame equipment posts in concrete footing. Protect portion of posts above footing from concrete splatter. Place concrete around posts and vibrate or tamp for consolidation. Verify that posts are set plumb or at the correct angle and are aligned and at the correct height and spacing. Hold posts in position during placement and finishing operations until concrete is sufficiently cured.
 - 1. Concrete Footings: Smooth top, and shape to shed water.
- D. Assemble play components according to manufacturer's instructions.
- E. Pour concrete footings and let set a minimum of 24 hours before proceeding.

F. Place assembly in footings, block up, plumb and level.

3.05 ADJUSTING

A. Adjust movable playground equipment components to operate smoothly, easily, and quietly, free from binding, warp, distortion, nonalignment, misplacement, disruption, or malfunction, throughout entire operational range.

3.06 CLEANING

A. After completing playground equipment installation, inspect components. Remove spots, dirt, and debris. Repair damaged finishes to match original finish or replace component.

3.07 PLAYGROUND AUDIT

A. At the completion of the work of this Section, pay for and schedule a complete Playground Audit by a Certified Playground Safety Inspector . The audit shall be a detailed comprehensive playground safety report, including photographs of any non-compliant areas. Any violations of ASTM 1487-11, current CPSC or ADA regulations, or other playground hazards shall be identified. Final Acceptance shall not be granted until the Contractor's work is certified to be compliant.

END OF SECTION

SECTION 02901

PLANTING SOILS

PART 1 - GENERAL

1.01 RELATED DOCUMENTS

- A. All of the Contract Documents, including the Contract Form, General Provisions, General Conditions, Supplemental Conditions, and all Attachments to the General Provisions, and Division 1 - General Requirements, apply to the work of this Section.
- B. Examine all Contract Documents and all other Sections of the Specifications for requirements therein affecting the work of this trade.

1.02 SUMMARY

- A. The work of this Section consists of providing equipment and materials and work necessary to supply and place planting soils as indicated on the Drawings and as specified.
 - 1. For areas other than the ballfield, topsoil stockpiled during site preparation operations may be re-spread if it meets the Specifications for loam and is amended per soils testing agency recommendations.
 - a. Root zone mix for ball field shall be as specified in Section 02910 Athletic Field Root Zone and Infield Mix.
 - 2. Supply, spread and grade additional off-site loam as necessary to provide the required depth of topsoil in planting beds and lawns.

1.03 RELATED WORK UNDER OTHER SECTIONS

- A. The following items of related work are specified and included in other Sections of the Specifications:
 - 1. Section 02100 - Site Preparation
 - 2. Section 02910 - Athletic Field Root Zone and Infield Mix.
 - 3. Section 02902 - Fertilizers.
 - 4. Section 02950 - Planting.

1.04 REFERENCES

- A. Commonwealth of Massachusetts Highway Department (MHD):
Standard Specifications for Highways and Bridges

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1.05 SUBMITTALS

- A. The Contractor shall submit to the Landscape Architect manufacturer's product data and certified test results for materials as specified below. No materials shall be ordered or delivered until the required submittals have been reviewed and approved by the Owner's Representative. Delivered materials shall closely match the approved samples. Approval shall not constitute final acceptance. The Owners Representative reserves the right to reject, on or after delivery, any material that does not meet these Specifications.
- B. Submit test results for on-site topsoil and off-site loam borrow. Testing will be at the Contractor's expense. Perform tests for organic content, and pH by UMASS Soil and Plant Tissue Laboratory, West Experiment Station, North Pleasant Street, University of Massachusetts, Amherst, MA 01003, (413) 545-2311 or by a private testing laboratory. Provide testing laboratory with plant list to obtain recommendations for soil additives for species being planted. Testing reports shall include the following:
 - 1. Percent of organic matter.
 - 2. Chemical analysis for Nitrate Nitrogen, Ammonium, Nitrogen, Phosphorus, Potassium, Calcium, Manganese, extractable Aluminum, Lead, Zinc, Cadmium, Copper, Soluble Salts, and acidity (pH) and buffer (pH). A Conductivity Meter shall be used to measure Soluble Salts in 1:2 soil/water (v/v).
 - 3. Recommendations for soil additives to correct soils deficiencies as necessary to accomplish planting work for the species of trees, grasses and perennials specified.
- C. Fertilizer: Submit product manufacturer's data for tree planting fertilizer. Submit fertilization rates for fertilizer product based upon soil testing analysis.
- D. Submit recommended rates and type of Nitrogen and Phosphorus fertilizers recommended by the soils testing agency. Rates of nitrogen and phosphorus fertiilzers utilized at the site shall not exceed soils testing recommendations.

PART 2 - PRODUCTS

2.01 LOAM BORROW

- A. Loam borrow and on-site topsoil for re-use shall conform to the requirements of MHD Standard Specifications for Loam Borrow, M1.05.0.

2.02 SOIL ADDITIVES

- A. Acidulant for adjustment of loam borrow pH shall be commercial grade flours of sulfite, ferrous sulfate, or aluminum sulfate that are unadulterated. Acidulants shall be delivered in unopened containers with the name of the manufacturer, material, analysis

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and net weight appearing on each container.

- B. Ground limestone for adjustment of loam borrow pH shall contain not less than eighty five percent (85%) of total carbonates and shall be ground to such fineness that forty percent (40%) will pass through 100 mesh sieve and ninety five percent (95%) will pass through a 20 mesh sieve. Contractor shall be aware of loam borrow pH and the amount of lime needed to adjust pH to specification in accordance with testing lab recommendations.
- C. Peat moss shall be composed of the partly decomposed stems and leaves of any of several species of sphagnum moss. It shall be free from wood, decomposed colloidal residue and other foreign matter. It shall have an acidity range of 3.3 pH to 5.5 pH as determined in accordance with the methods of testing of A.O.A.C., latest edition. Its water absorbing ability shall be a minimum of 1,100% by weight on an oven-dry basis.
- D. Gypsum ($\text{CaSO}_4 \cdot 2\text{H}_2\text{O}$) shall be agricultural grade, granular form.
- E. Provide fertilizer as specified in Section 02902 - Fertilizers.

PART 3 - EXECUTION

3.01 FILLING AND COMPACTION

- A. Confirm that the subgrade is at the proper elevation and that no further earthwork is required to bring the subgrade to proper elevations. Subgrade elevations shall slope parallel to the finished grade and or toward the subsurface drain lines as shown on the Contract Documents. Fill any over excavation with approved fill and compact to the required subgrade compaction levels. Perform no work of placing and spreading loam until elevations have been accepted by the Owner's Representative.
- B. Protect adjacent walls, walks and utilities from damage or staining by the loam borrow.

3.02 FINE GRADING

- A. Immediately prior to dumping and spreading the loam borrow, the subgrade shall be cleaned of all stones greater than 2 inches and all debris or rubbish. Such material shall be removed from the site, not raked to the edges and buried.
- B. Stockpiled loam borrow shall be protected from erosion at all times. Materials shall be spread immediately upon delivery. Otherwise, materials that set on site for more than 24 hours shall be covered with tarpaulin or other soil erosion system acceptable to the Owner's Representative.
- C. No loam borrow shall be handled, planted, or seeded in any way if it is in a wet or frozen condition. A moist loam borrow is desirable.

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- D. Soil additives per testing recommendations shall be spread and thoroughly incorporated into the layer of loam borrow by harrowing, tilling, or other methods reviewed by the Owner's Representative.
- E. After loam borrow and required additives have been spread, carefully prepare the loam borrow by scarifying, harrowing, or tilling the loam to integrate soil additives into the top six (6) inches of the loam. Remove all large stiff clods, lumps, brush, roots, stumps, litter and other foreign matter.
- F. The Contractor shall install loam borrow in successive horizontal lifts no thicker than 6 inches each lift prior to compaction, and shall compact each lift to the equivalent of 85% of maximum dry density. Final depth of compacted loam in planting beds shall be six (6") inches.
- G. Compact each lift of loam sufficiently to reduce settling but not enough to prevent the movement of water and feeder roots through the soil. The loam borrow in each lift should feel firm to the foot in all areas and make only slight heel prints. At completion of the loam borrow installation, the soil should offer a firm, even resistance when a soil sampling tube is inserted from lift to lift.
- H. Select equipment and otherwise phase the installation of the loam borrow to ensure that wheeled equipment does not travel over subsoil, placed fills or ordinary borrow or already installed soil.

3.03 ACCEPTANCE

- A. Confirm that the final grade of loam borrow is at the proper finish grade elevations. Adjust grade as required to meet the contours and spot elevations noted on the Plans. Request the presence of the Owner's Representative to inspect final grade. Do not proceed with the remaining work of this Contract until the Owner's Representative has given his/her written approval of the final grade.

END OF SECTION

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SECTION 02902

FERTILIZERS

PART 1 - GENERAL

1.01 SUMMARY

- A. The Contractor shall provide all labor, materials, equipment and services necessary for, and incidental to, preparation of ground surfaces, fertilizing, liming, seeding, mulching, and maintenance of seeded areas as shown on the Drawings or as specified herein.

1.02 SPECIAL CONDITIONS

- A. The ballfield and other portions of the site are classified as “Isolated Areas Subject to Flooding” and are subject to the jurisdiction of the Waltham Conservation Commission, and the Order of Conditions included in Appendix A of these specifications.
 - 1. In order to protect the quality of ground water, the Order of Conditions provides special conditions and best management practices for the use of phosphate and nitrogen fertilizers on this site. These requirements are included in this Specifications section.
 - 2. Per the Order of Conditions, the use of a fertilizer that is controlled release is mandatory.

1.03 RELATED SECTIONS

- A. Section 02200 - Earthwork
- B. Section 02901 - Planting Soils: Loam for seeded areas.
- C. Section 02910 - Athletic Field Root Zone and Infield Mix
- D. Section 02930 - Sodded Athletic Field

1.03 SUBMITTALS

- A. Submit manufacturer’s certification and/or literature for the following:
 - 1. Fertilizers
 - 2. Results of soils analysis stating recommended quantity of fertilizers and other soil amendments.

1.04 DELIVERY, STORAGE, AND HANDLING

- A. Deliver fertilizer materials in original unopened containers, showing weight, analysis, and name of manufacturer. Store in a manner to prevent wetting and deterioration.
- B. Deliver packaged materials in containers showing weight, analysis and name of manufacturer. Protect materials from deterioration during delivery, and while stored at

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the site.

1.08 FERTILIZER PRACTICES PER ORDER OF CONDITIONS

- A. Phosphate fertilizers shall not be used without testing soils and obtaining recommendations from testing agencies stating the need for and quantity of phosphate to be applied for grass areas based on the soils test result.
- B. Refer to paragraph 2.01.A.1 for requirements for slow release nitrogen fertilizers.
- C. Fertilizer shall not be applied outside the growing season, defined as April 15th to October 31st. No late season fertilization is allowed.
- D. No fertilizer shall be applied during rainfall or before prediction of rain.
- E. Fertilizer inadvertently applied to impervious surfaces shall be swept or blown back into the target area or returned to its original container.

PART 2 - PRODUCTS

2.01 MATERIALS

- A. Fertilizer for sodding:
 - 1. Starter Fertilizer: The phosphate content of the starter fertilizer shall be based on recommendations by the Soils Testing Laboratory for the specific application of turf seeding.
 - a. At least 50% of the nitrogen in the fertilizer shall be polymer-coated time-release nitrogen such as Polyon 50% 20-10-10 (local distributor Harrell's Turf Specialties, 508-832-5008) or equal.
- B. Maintenance Fertilizer, if required, shall be a non-phosphate fertilizer with at least 80% of the nitrogen as controlled release polymer coated nitrogen, as manufactured by Polyon or equal.

PART 3 - EXECUTION

3.01 INITIAL FERTILIZATION

- A. Apply fertilizer according to manufacturer's directions and in quantities recommended by the soils testing laboratory.
 - 1. Do not fertilize when weather is rainy, or when rain is forecast.
 - 2. Do not allow fertilizer to spill onto pavements or hard surfaces.

END OF SECTION

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SECTION 02910

ATHLETIC FIELD ROOT ZONE & INFIELD MIX

PART 1 - GENERAL

1.01 GENERAL PROVISIONS

- A. All of the Contract Documents, including the Contract Form, General Provisions, General Conditions, Supplemental Conditions, and all Attachments to the General Provisions, and Division 1 - General Requirements, apply to the work of this Section.
- B. Contact Dig-Safe (811) seventy-two hours prior to the start of any removals or excavation work, and obtain a Certificate verifying that marking the location of utilities has been completed. Contact the City of Waltham Engineer to verify the location of additional on-site utilities. Coordinate earthwork with utility companies.

1.02 SCOPE OF WORK

- A. Work under this Section shall include all labor, materials, services, equipment, transportation and accessories and the performance of all operations necessary to complete the work of this Section, as indicated on the Contract Drawings and as specified herein.
- B. The work shall include, but is not limited to, the following:
 - 1. Furnishing and installing infield mix.
 - 2. Furnishing and installing root zone mix
- C. Finished grades within the athletic field and within the 100' flood contour shall be verified using laser operation survey instruments with a tolerance of $\pm \frac{1}{4}$ ". See Project Closet, Section 01700 for as-built survey requirements of this area.

1.03 TESTING

- A. Root zone mix shall be tested by a soils diagnostic laboratory to demonstrate compliance with the specifications.

1.04 RELATED WORK

- A. Section 02100 - Site Preparation & Demolition
- B. Section 02810 – Irrigation System
- C. Section 02910 – Athletic Field Root Zone and Infield Mix
- D. Section 02950 - Planting

1.05 REFERENCES

- A. All work shall comply with the minimum standards of the latest editions of the following codes and specifications, subject to modifications and amendments outlined herein.

Athletic Field Root Zone & Infield Mix
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1. ASTM: American Society of Testing Materials.

1.06 SUBMITTALS

A. Submit to the Landscape Architect:

1. A representative sample of approximately 5 pounds for infield mix and root zone mix.
2. Supplier's or laboratory sieve analysis for each type of fill material demonstrating compliance with the Specifications, including infield mix and root zone mix.
 - (a) Root zone mix shall be tested by an independent soil diagnostics laboratory according to ASTM F1632 for particle sizes specified, pH, uniformity coefficient, and ASTM F-1815 for particle density, bulk density, infiltration rate, total porosity, aeration porosity, capillary porosity, and organic matter. Submit results.

PART 2 - PRODUCTS

2.01 SOIL MATERIALS

- A. Sand for root zone mix shall be uniform coarse sand screened and washed according to the following criteria:

Fraction Size/Name	US Standard Sieve	Diameter of Sieve (mm)	Allowable Range % Retained on Sieve
Gravel	10	2.00	3%
Very Coarse	18	1.00	7%-10%
Coarse	35	0.50	At least 60%
Medium	60	0.25	
Fine	100	0.15	20% Maximum
Very Fine	270	0.05	5% Maximum
Silt		0.002	5% Maximum
Clay		<0.002	3% Maximum

*Gravel plus Very Coarse Sand is not to exceed 10% total sand.
 Sieves 35, 60 and 100 combined is to be a minimum of 80% of the total sand.
 Combined particles 0.05 mm or smaller shall not be more than 10% of total sand.

- B. Peat moss shall be free of sticks, stones, hay, or any other deleterious material and meet the following requirements:

Parameter	Specification
Total Ash	15% or less
pH	6.5 to 7.5
% Moisture	30% to 50%
Sieve Criteria	
2.0 mm sieve	0 to 5% retained
1.0 mm sieve	Less than 20% retained

2.02 INFIELD MIX

A. Infield Mix shall be a custom engineered soil product that is mechanically mixed offsite in a controlled environment using a pugmill-type mixer. Infield mix shall be specifically recommended for infield use and shall be equal to Dura-edge “Classic Infield” mix (local distributor: Read Custom Soils 781-828-6300) as follows:

1. Infield mix shall be clean, dry clay mixed with washed mason-type sand resulting in a weed-free mixture that is reddish brown in color having a yield of 1.35 tons per cubic yard when placed loose or 1.5 tons per cubic yard when compacted 85%-90% on a Standard Proctor Test (ASTM D 689-07). The material shall possess the following particle size analysis:

Sand 70-75%

Silt/Clay: 25-30%

Medium Sand: greater than 50%

Silt/Clay ratio: 0.5-1.0

No particles greater than 3 mm.

No more than 5% of the particles shall be retained on the 2 mm sieve.

2.03 ROOT ZONE MIX

A. Root zone mix shall be a custom engineered soil product that is mechanically mixed offsite in a controlled environment using a pugmill-type mixer. The mixture shall be the “Sand/Soil/Superpeat” mix as provided by Read Custom Soils (781-828-6300) or equal with the following approximate analysis:

B.

Physical Properties (ASTM F-1815)

Particle Density g/cc	Bulk Density g/cc	Infiltration Rate In/hr	Total Porosity %	Aeration Porosity %	Capillary Porosity %	Organic Matter % Dry Wt.
2.64	1.2-1.6	10.2	40-55%	18	18	3

Particle Size (ASTM F1632)

Silt	Clay	4 mm Gravel 4 mm	No. 10 Gravel 2 mm	No. 18 V Coarse 1 mm	No. 35 Coarse 0.5 mm	No. 60 Medium 0.25 mm	No. 100 Fine 0.15 mm	No. 270 V. Fine 0.05 mm
<=5%	<=3%	0%	<=5% Gravel <=20% Combined		>=60% Combined		<=15%	<=5%

PH and Uniformity Coefficient

pH 1:1	Uniformity Coefficient
6.5-7.0	2.5-3.5

PART 3 - EXECUTION

3.01 ATHLETIC FIELD FINE GRADING

- A. **Using laser operation survey instruments, the Contractor shall verify that subgrade has been prepared according to the specifications with regard to compaction, grade tolerances prior to beginning work.**
- B. The Contact Drawings indicate, in general, alignment and finish grade elevations. The Landscape Architect, however, may make such adjustments in grades and alignments as are found necessary in order to avoid interference with any special conditions encountered.
- C. Uniformly grade areas within limits of grading under this section, including adjacent transition areas. Smooth finished surface within specified tolerances, compact with uniform levels or slopes between points where elevations are indicated, or between such points and existing grades.
- D. Grade areas to drain away from structures and to prevent ponding. Finish surfaces free

from irregular surface changes, and as follows:

- E. Compaction: After grading, compact subgrade surfaces to the depth and indicated percentage of maximum or relative density for each area classification.
- F. Complete grading operations after utilities have been installed, site improvements included under this Contract have been completed and all rubbish, materials and debris have been properly disposed of.
- G. Do cutting, filling, reshaping, re-grading and re-compacting as necessary to meet the requirements of the Drawings and this Section of the specifications. Maintain subgrades at levels specified until subsequent construction. Bring to required sub-grade levels areas where settlement, erosion or other grade changes occur.

3.02 PLACING ROOT ZONE MIX

- A. The root zone material shall be dumped at the edge of the field and pushed to the center with a small dozer. Under no circumstances will loaded rubber tired vehicles in excess of 1 ton be allowed on the subgrade prior to or during the spreading of the root zone mix.
- B. The material shall be spread onto the field in an even layer, prior to compaction. The finish grade shall conform exactly to the subgrade elevations. When the root zone mix has been spread uniformly over the field, operate the irrigation system as necessary to settle and compact the mix to a final uniform 8" depth. Compaction shall be 82 to 85 percent.
- C. Finished grades shall be verified using laser operation athletic field and within the 100' flood contour shall be verified using laser operation survey instruments with a tolerance of + 1/4". A survey of the finished spot grades shall be developed by a licensed surveyor over the entire surface in the form of a grid at 25 foot spacing intervals.

3.03 INSTALLTION OF INFIELD MIX

- A. Compact subbase material to 90%. The compacted subgrade shall be installed in accordance with the final slope and shall mirror finish grade in order to ensure an even depth of material once placement has occurred.
- B. Place the infield mix in lifts of 2 to 3 inches and lightly compact until an optimum compaction between 85 and 90 percent is achieved on a standard proctor test (ASTM D689-07). Scarify the surface to facilitate bonding of the next lift and repeat until finish grade elevation is achieved. If unable to achieve optimum compaction, a light application of water may be needed.
- C. Compacted depth of the material shall be as shown on the Drawings.
- D. Finish grade to slope as shown on the Drawings.

- E. The finished surface of the infield shall be smooth and free from any visible dips, humps, bumps or other blemishes which would hinder removal of water through positive surface drainage. Finished grades within the 100' flood contour which includes the athletic field shall be verified using laser operation survey instruments with a tolerance of $\pm \frac{1}{4}$ ". See Project Closet, Section 01700 for as-built survey requirements of this area.

3.04 PROTECTION AND REPAIR

- A. Protect newly graded areas from traffic and erosion. Keep free of trash and debris.
- B. Where completed compacted areas are disturbed by subsequent construction operations or adverse weather, scarify surface, reshape and compact to required density prior to further construction.

3.10 CLEANUP

- A. Keep all work areas free from accumulation of debris.
- B. Properly and legally dispose of excavated materials, rubbish, debris, waste materials from, and about the site, including tools, scaffolds, apparatus and appliances used in connection with work under this Section and leave the premises in a clean condition.

3.11 SODDING

- A. Immediately upon acceptance by the Landscape Architect of the work of this Section, install sod per section 02930, "SODDED ATHLETIC FIELD".

3.12 TOPDRESSING

- A. The contractor shall fill or top dress any areas of observed settlement that occur in the first year of the installation.

END OF SECTION

SECTION 02930

SODDED ATHLETIC FIELD

PART 1 - GENERAL

1.01 RELATED DOCUMENTS

- A. All of the Contract Documents, including the Contract Form, General Provisions, General Conditions, Supplemental Conditions, and all Attachments to the General Provisions, and Division 1 - General Requirements, apply to the work of this Section

1.02 REQUIREMENTS INCLUDED

- A. Provide all equipment and materials, and do all work necessary to complete the final grading of root zone mix, application of soil amendments and fertilizers, sodding; and maintenance of sodded lawn areas as indicated on the Drawings and as specified.
- B. The work shall include, but is not limited to, the following:
 - 1. Finish grading of sports field root zone mix..
 - 2. Incorporation of soil amendments and fertilizer.
 - 3. Sodding.
 - 4. Temporary fencing in the form of snow fencing.
 - 5. Maintenance of sodded areas from substantial completion of the project thru a 60 day establishment period, or until final acceptance of entire project, whichever is longer.

1.03 SPECIAL CONDITIONS

- A. The McKenna Playground Improvements Project is subject to the jurisdiction of the Waltham Conservation Commission, and the Order of Conditions included in Appendix A of these specifications. A significant portion of the site is within the 100 year floodplain.
 - 1. In order to protect the quality of ground water, the Order of Conditions provides special conditions and best management practices for the use of phosphate and nitrogen fertilizers on this site. These requirements are included in Section 02902 - Fertilizers. Per the Order of Conditions, the use of a fertilizer that is controlled release nitrogen is mandatory.

1.04 RELATED WORK

- C. Examine Contract Documents for requirements which affect the work of this Section. Other specification sections which directly relate to the work of this Section include, but are not limited to:

1. Section 02100 - Site Preparation.
2. Section 02200 - Earthwork: Root Zone Mix
3. Section 02622 - Field Drainage System
4. Section 02810 - Irrigation System
5. Section 02902 - Fertilizers
6. Section 02910 - Athletic Field Root Zone and Infield Mix

1.03 REFERENCES

- A. Soils Testing: Method of Analysis to conform to ASTM D 422-63 Standard Test Method for Particle Size Analysis of Soils. Sand sized to be determined by wet sieving. Silt and clay content determined by hydrometer method.

1.04 QUALIFICATIONS

- A. Installer of sod shall have had experience successfully installing at least 3 projects of similar size within the last 5 years.

1.05 SUBMITTALS

- A. Sod:
 1. Do not order sod until final approval is given by the Landscape Architect, based on the following information to be submitted by the Contractor:
 - a. Certification of grass seed mix for sod, identify sod source, including names and telephone number of supplier.
 - b. Two (2) samples of sod, 3' long x 18" wide.
- B. Soils analysis indicating existing nutrients and recommendations for amendments for optimal growth of specified sod species for the root zone mix.
- C. Listing of proposed amendments based on soil analysis and product data (manufacturer's product literature) for same.

1.06 DEFINITIONS

- A. Weeds shall include but not be necessarily limited to the following: Dandelion, Jimsonweed, Quackgrass, Morning Glory, Rush Grass, Mustard, Lambs quarter, Chickweed, Cress, Crabgrass, Canadian Thistle, Nutgrass, Poison Oak, Bermuda Grass, Johnson Grass, Poison Ivy, Nutsedge, Nimble Will, Bindweed, Bent Grass, Wild Garlic, Perennial Sorrel, and Brome Grass.

1.07 DELIVERY, STORAGE AND HANDLING

- A. Sod: Harvest, store and handle sod according to the requirements of the American Sod Producers Association's (ASPA), "Specifications for Turfgrass Sod Materials and

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Transplanting/Installing.

PART 2 - PRODUCTS

2.02 SOD

- A. Sod shall be nursery grown on agricultural land cultivated specifically for sod; free of objectionable grassy or broadleaf weeds (less than five such plants per 100 square feet); cut at a uniform minimum thickness of 3/4" inch (excluding top growth and thatch) at time of cutting; individual pieces cut to supplier's standard width and length with maximum allowable deviation of five percent; composed of grass mixtures recommended by the New England Sod Producers Association, as follows.
- B. Sod shall be "Versaturf" as grown Tuckahoe Turf farm, or equal with the following approximate percentages of grass species and patented varieties:

- 20% America Kentucky Bluegrass
- 15% Award Kentucky Bluegrass
- 15% Hampton Kentucky Bluegrass
- 15% Victory Chewings Fescue
- 15% Jasper Creeping Red Fescue
- 20% Manhattan Perennial Ryegrass

- 1. Sod with broken pad and torn or uneven edges will not be acceptable.
- 2. Sod shall be harvested in big rolls equal to 250 square feet per roll, 4'-0" in width and 62'-6" in length for sodding the athletic field surface. Small rolls measuring 1'-6" in width shall only be used for detail and cut in work around existing site features and for repair work as required, unless large areas of repair are required which warrant the use of 4'-0" big rolls. Use of 1'-6" wide rolls shall be kept to a minimum.

C. SOIL CONDITIONERS

- 1. Gypsum, if required shall be unadulterated commercial grade calcium sulfate, delivered in original unopened containers showing weights, analysis and all labels including the name of manufacturer.
- 2. Limestone, if required, shall be free flowing Agricultural Grade Dolomitic Limestone. Limestone shall contain not less than 85% total carbonates. Caked or otherwise damaged limestone will be rejected.
- 3. Aluminum Sulfate, if required shall be unadulterated commercial grade, delivered in original unopened containers showing weight, analysis and name of manufacturer.

4. Fertilizer shall be as specified in Section 02902 - Fertilizer.

2.03 WATER

- A. Water shall be supplied through use of the new irrigation system. Irrigation water used for sodding operations will be paid for by the Owner.

2.09 PROTECTIVE FENCING

- A. Temporary protective fencing shall be snow fencing.

PART 3 - EXECUTION

3.01 PREPARATION

- A. Do not begin sod installation until Landscape Architect's written approval of the grading and placement of root zone mix, as described in Section 02910 - Athletic Field Root Zone and Infield Mix.
- B. Do not begin sodding until the Irrigation System is fully operational.

3.02 SODDING

- A. Provide and mix soil amendments and fertilizers with root zone mix at rates indicated by manufacturer or by soils analysis for optimal growth of specified grasses. Delay mixing fertilizer if planting does not follow within a few days. Apply soil amendments on surface of spread soil mix, and mix thoroughly into to top 4 inches of soil mix before placement and planting of sod.
- C. Bring sub-grade to proper finished grade for application of sod, allowing for sod thickness. Finish grade shall meet flush with all adjacent finished grades, paved surfaces, and meet flush with existing skinned clay infield at softball field.
- D. Compact the material equivalent to that produced by a hand roller weighing 75 - 100 pounds per square foot of width. Fill depressions caused by a settlement or compaction, and re-grade and compact until the surface is smooth, uniform, and at the required grades.
- E. Laying Sod: Lay sod within 24 hours of stripping. Do not lay sod if dormant or if ground is frozen.
- F. Lay sod edge to edge with tightly fitted staggered joints. Stagger joints by a minimum of 3'-0". Handle sod in a manner to prevent loosening and separation of the loam from the roots. Do not stretch or overlap. Do not use broken pads or uneven ends. Roll freshly installed sod lightly to ensure contact with sub-grade, eliminate air pockets forming a smooth, uniform contiguous surface. Work sifted soil or fine sand into minor cracks between pieces of sod; remove excess to avoid smothering sod and adjacent grass. Settle the sod by watering and light rolling.

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- G. Saturate sod with a fine water spray within 30 minutes of planting. During the first week, water daily or more frequently as necessary to maintain moist soil to a minimum depth of 1-1/2 inches below the sod.

3.03 FENCING

- A. Fence off sodded areas and maintain barriers until final acceptance of sod.

3.03 MAINTENANCE OF SODDED AREAS

- A. Begin maintenance of turf immediately after each area is planted.
- B. Sod must be maintained for an establishment period of at least 60 days prior to final acceptance. In addition, lawns shall be maintained until the date of final acceptance of the entire project by the Owner, if this occurs at a later date. The establishment period for sod shall commence only when all sod of the entire contract has been laid. At that time, the Contractor shall notify the Landscape Architect in writing to request his verification of this completion and to establish in writing the beginning of the 60 day maintenance period. In the event that sodding operations are completed too late in the Fall for adequate growth and establishment of the sod, then maintenance shall continue into the following Spring for the minimum 60 day period.
- C. Maintain lawns by watering, fertilizing, weeding, mowing, trimming, replanting, and other operations.
- D. Replant bare areas with same materials as specified herein.
- E. Watering: Watering shall be provided by the existing irrigation system. Keep lawns uniformly moist to a depth of 4 inches.
- F. Water lawn at the minimum rate of 1 inch per week. Increase watering duration during hot and extremely dry periods. Water sod in a manner to produce uniform coverage without causing erosion.
- G. First mowing shall be within 6-7 days after installation. Successive mowings shall not remove more than 40 percent of grass-leaf blade during a single mowing. Do not delay mowing until grass blades bend over and become matted. Do not mow when grass is wet. Schedule initial mowing to maintain following grass height:
 - 1. Mow when grass height is from 2-1/2 to 3 inches high.
 - 2. Set mower at a cutting height of 2 inches.
 - 3. Mow with sharp mower blades to produce cleanly cut grass.
 - 4. Collect and remove all grass clipping from mowings and dispose of off-site.
- I. Postfertilization: Apply fertilizer to lawn after first mowing and when grass is dry.
- J. Use fertilizer in the amounts recommended by the soils testing laboratory and type as

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specified in Section 02902 - Fertilizers.

3.04 FINAL ACCEPTANCE OF LAWNS

- A. The 60 day establishment period is a minimum criteria for final acceptance. The following criteria must also be met:
 - 1. Sodded area of lawns will be satisfactory provided requirements including maintenance have been met and healthy, well-rooted viable lawn is established free of weeds, bare areas and surface irregularities.
- B. Re-sod lawn areas that do not meet requirements and continue maintenance until the sod meets these requirements.

3.05 GUARANTEE

- A. The Contractor shall fill or top dress any areas of observed settlement that occur in the first year of installation.
- B. The Contractor shall replace any areas of sod that die within one year of the date of final acceptance.

END OF SECTION

SECTION 02950

PLANTING

PART I - GENERAL

1.01 RELATED DOCUMENTS

- A. All of the Contract Documents, including the Contract Form, General Provisions, General Conditions, Supplemental Conditions, and all Attachments to the General Provisions, and Division 1 - General Requirements, apply to the work of this Section.
- B. Examine all Contract Documents and all other Sections of the Specifications for requirements therein affecting the work of this trade.

1.02 REQUIREMENTS INCLUDED

- A. The work of this Section consists of providing all labor, equipment, materials, incidental work, and construction methods necessary to perform all planting work and related items as indicated on the Drawings and as specified.
- B. The work shall include, but is not limited to, the following:
 - 1. Planting trees, shrubs, perennials and grasses including provision of backfill mix.
 - 2. Mulching planting beds.
 - 3. Planting maintenance.
 - 4. One year guarantee period for all plants.

1.03 RELATED WORK UNDER OTHER SECTIONS

- A. The following items of related work are specified and included in other Sections of the Specifications:
 - 1. Section 02901 - Planting Soils: Placing and amending loam for planting beds.
 - 2. Section 02902 - Fertilizers

1.04 REFERENCES

- A. The following standards shall apply to the work of this Section.
 - 1. MHD Standard Specifications: Massachusetts Highway Department Standard Specifications for Highways and Bridges, 1988 Edition.
 - 2. Hortus III, 1976, L. H. Bailey Hortorium.
 - 3. American National Standards Institute (ANSI):
Z60.1 American Standard for Nursery Stock,, latest edition, published by American Association of Nurserymen, (AAN).

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1.05 SUBMITTALS

- A. Submit proof of landscape contractor's experience to the Owner's Representative in accordance with Quality Assurance paragraph of this Section 02950 - Planting.
- B. Submit to the Owner's Representative representative samples, certifications, manufacturer's product data and certified test results for materials specified below. Materials shall not be ordered or delivered until the required submittals have been reviewed and approved by the Owner's Representative. Delivered materials shall closely match the approved samples. Approval shall not constitute final acceptance. The Owner's Representative reserves the right to reject, on or after delivery, any material which does not meet these Specifications.
- C. Material Sampling and Testing:
 - 1. Material Sampling and Testing of Loam Borrow from Off-Site Sources shall be as specified in Section 02901 - Planting Soils, of this Specification.
 - 2. Planting Mulch: Submit a one cubic foot sample.
 - 3. Antidesiccant: Submit manufacturer's product data.
 - 4. Peat: Submit manufacturer's product data.
 - 5. Mycorrhizal Fungal Inoculant:
 - a. Submit manufacturer's product data certifying that inoculant being supplied conforms to these Specifications.
 - 6. Soil Additives: Submit manufacturer's product data for all soil additives needed to amend a specific soil in order to meet the requirements of this Section 02950 - Planting.

1.06 EXAMINATION OF CONDITIONS

- A. All areas to be planted shall be inspected by the Contractor before starting work and any defects such as incorrect grading or inadequate drainage shall be reported to the Owner's Representative prior to beginning this work.
- B. The Contractor shall be solely responsible for judging the full extent of work requirements involved, including but not limited to the potential need for storing and maintaining plants temporarily and/or rehandling plants prior to final installation.
- C. Protection of plants is the full responsibility of the Contractor between the time of digging at the nursery and final acceptance.

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1.07 QUALITY ASSURANCE

- A. The Contractor shall locate plant material sources and ensure that plants are shipped in timely fashion for installation. No substitutions are allowed without the written permission of the Landscape Architect.
- B. Qualification of Landscape Contractor: The work of this Section 02950 - Planting, shall be performed by a landscape contracting firm which has successfully installed work of a similar quality, schedule requirement, and construction detailing with a minimum of five years experience.
- C. Qualification of Foreman or Crew Leader: All work of unloading, stockpiling, storing, transporting on-site - Planting, staking and guying, fertilizing, and maintenance of trees, shrubs, vines, groundcover, and perennials shall be supervised by a foreman or crew leader who is a certified landscape professional or a certified horticulturist.
 - 1. Landscape professional shall mean a Massachusetts Certified Landscape Professional certified by the Associated Landscape Contractors of Massachusetts.
 - 2. Horticulturist means a Massachusetts Certified Horticulturist as certified by the Massachusetts Nursery and Landscape Association.
 - 3. Certification shall be current. Proof of certification shall be submitted per Submittals paragraph of this Section 02950 - Planting.
- D. Qualification of Arborist: All work of pruning shall be performed by an arborist certified by the Massachusetts Arborist Association or the International Society of Arboriculture.

PART 2 - PRODUCTS

2.01 LOAM BORROW

- A. Loam borrow for planting backfill shall be as specified in Section 02901 - Planting Soils, of this Specification.

2.02 SOIL ADDITIVES

- A. Soil additives shall be as specified in Section 02901 - Planting Soils, of this Specification.

2.03 FERTILIZERS

- A. Fertilizer shall be as specified in Section 02902 - Fertilizers.

2.04 PLANT MATERIAL INSPECTION

- A. At least one month prior to the expected planting date, the Contractor shall request that the Owner's Representative provide a representative to select and tag stock to be

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planted under this Section 02950 - Planting.

- B. Plants to be inspected shall be in locations and conditions that allow direct and unobscured inspection by the Owner's Representative. Container grown or balled and burlapped shrubs shall be pulled from holding blocks by the nurseryman for scrutiny by the Owner's Representative at no additional cost to the Owner. Harvested trees held in storage shall not have branches tied up. Harvested trees shall not have trunks obscured by burlap, cardboard trunk protection, or other devices that would otherwise obscure inspection. In the event that branches are tied up, trunks are obscured by burlap or cardboard trunk protection, or root flares hidden by burlap and twine and the Owner's Representative cannot inspect root flares, trunks or branching habit, the Contractor shall bear all responsibility and costs associated with tree rejection at a later date during the course of the Contract.
- C. Inspection and approval of plants at the source shall not impair the right of subsequent inspection and rejection upon delivery to the site, or during the progress of the work if the Owner's Representative finds that plants do not meet the requirements of the Plant List or this Contract, have declined noticeably due to handling abuse, lack of maintenance, or other causes. Cost of replacements, as required, shall be borne by the Contractor.

2.05 GRADES AND STANDARDS OF PLANTS

- A. The Contractor shall furnish all plants shown on the Contract Documents, as specified, and in quantities listed on the Plant List. No substitutions will be permitted, without written approval by the Owner's Representative. All plants shall be nursery grown unless specifically authorized to be collected as noted on the Plant List.
- B. All plants shall be typical of their species or variety and shall have a normal habit of growth and be legibly tagged with the proper name. Only plant stock grown within Hardiness Zones 1 through 6b, as established by the USDA Plant Hardiness Zone Map, latest edition, will be accepted.
- C. Plants shall be in accordance with ASNI Standards of the American Association of Nurserymen except as noted in this Section - Planting. Botanical plant names shall be in accordance with plant designations included in Hortus III.
- D. All deciduous trees shall meet the following standards:
 - 1. Trees shall have a single, straight trunk, well formed, and sturdy. No part of the trunk shall be conspicuously crooked as compared with normal trees of the same variety.
 - 2. All pruning wounds shall show vigorous bark on all edges at the time of harvest. Pruning scars within the crown of any tree shall be clean cut and shall leave no protrusion beyond the branch collar.

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3. Trees shall be free from signs of pest and disease damage. The trunk shall be free from sun scald, frost cracks, and wounds resulting from abrasions, fire, animal damage, or other causes.
4. All trees shall have healthy, vigorous leaves or needles of normal size, color, shape, and texture for the particular species and variety.
5. Unless otherwise indicated on the Plant List, the height and spread of deciduous shade trees shall be the minimum requirements.
6. Take caliper measurements for deciduous trees 6 inches above ground level up to and including 4 inches caliper size and 12 inches above ground for larger sizes.
7. No deciduous tree shall be pruned after the Owner's Representative has tagged the plant in the nursery except as directed by the Owner's Representative.
8. Unless otherwise noted on the Plant List, the height to the first branch shall be not less than 6.5 from finish grade to comply with ADA requirements.

2.06 ROOT SYSTEMS

- A. Each plant shall have an extensive, symmetrically balanced fibrous root system. Any root ball which shows signs of asymmetry, girdling, injury, or damage to the root system shall be rejected. All parts of the fibrous root system of all plants shall be moist and fresh with a white color when washed of soil. When the plant is removed from the container, the visible root mass shall be healthy with white root tips. The root systems of all plants shall be free of disease, insect pests, eggs, or larvae.
- B. Minimum root ball diameters and depths shall be in accordance with ANSI standards.
- C. No plants shall be loose in the container.
- D. Curling or spiraling of the roots along the walls of rigid containers will not be accepted. Curling, spiraling or girdling roots within balled and burlapped material will not be accepted. Container grown plants which have roots growing out of the container will be rejected.

2.07 MYCORRHIZAL FUNGAL INOCULANT

- A. Mycorrhizal fungal inoculant shall be live spores packaged in plastic packets. At minimum each packet of inoculant shall contain the following:
 1. Live spores of VA Endomycorrhizal fungi: Vesicular-Arbuscular mycorrhizae fungi, minimum of 8 species.

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2. Live spores of Ectomycorrhizal fungi: including *Pisolithus tinctorius*.

B. Mycorrhizal fungal inoculant shall be manufactured by Plant Health Care Incorporated, 440 William Pitt Way, Pittsburgh, PA 15238, telephone, (800) 421-9051; Horticultural Alliance, 2946 Louise Street, Sarasota, FL 34237, (800) 628-6373; BioPlex Organics, 2213 Huber Drive, Manheim, PA 17545 (800) 441-3573, or approved equal.

2.08 PLANTING BACKFILL MIX

A. Planting soil mix shall be an approved loam borrow as specified in Section 02910 - Planting Soils, of this Specification and that has been pH adjusted according to particular planting applications and improved through the addition of organic matter or fertilizer as recommended by testing results for the particular species being planted.

2.09 MULCH

A. Mulch shall be aged pine-bark mulch meeting the Specifications of the MHD Standard specifications for Aged Pine Bark Mulch, M6.04.5.

2.10 WATER

A. The Contractor shall provide labor and water required to establish plants. During the maintenance period the Contractor shall water as required to insure that soil moisture is maintained to a depth of six inches or greater at all times.

1. Watering shall be done in a manner that will provide uniform coverage, prevent erosion due to application of excessive quantities over small areas, and prevent damage to the finished surface by the watering equipment. The Contractor shall furnish sufficient watering equipment to maintain required water levels in the soil.

PART 3- EXECUTION

3.01 PLANTING - GENERAL

A. Furnishing and planting of plant material shall include, but is not limited to placing of weed barrier, digging of planting pits, furnishing the plants as specified as well as the labor of planting, fertilizing, and maintenance.

1. Loam for planting beds is placed and amended under Section 02901 - Planting soils.

B. Tree Planting

1. Contractor shall locate all existing underground utilities that are within 10 feet of the proposed planting pits and notify the Owner's Representative of any

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conflicts prior to digging plant pits.

2. It shall be the Contractor's option to place the weed barrier before or after tree planting.

C. Seasons for Planting:

1. Deciduous Plants - March 15 to May 15; October 10 to December 15
2. Evergreen Plants - September 1 to November 15; March 15 to May 1

- D. Notify the Owner's Representative three working days prior to the proposed arrival of plant material on the site. Plants delivered to the site and not planted within 24 hours of delivery shall have their root balls covered with mulch and shall be watered on a daily basis such that root balls are kept moist throughout.

3.02 PLANTING OF TREES

- A. Locations for trees shall be staked on the ground by the Contractor for approval by the Owner's Representative before any plant pits are dug. Notify the Owner's Representative no less than 3 days prior to desired date of inspection of staking to schedule site visit.

1. Circular plant pits shall not be required provided that the minimum dimension between the edge of the pit and the face of the rootball is not less than required by this Section 02950 - Planting.
2. All plant pits dug with a machine shall have the sides of the holes scraped with hand shovels to prevent glazing on compaction of the sides of the hole. Remove and stockpile excavated loam for reuse as backfill for plant pit. All subsoil excavated from the bottoms of planting pits shall be removed from the site.
3. Plant pits shall be dug to the dimensions shown on the Contract Documents.
4. Remove all soil from around the root flare of the stem of the plant and from the top of the rootball to determine the true depth of the rootball. Plants that have been planted such that root flares are buried will be rejected.
5. Plant rootballs must be damp and thoroughly protected from sun and wind from the beginning of the digging operation, during transportation, and at the site until the final planting.
6. Trees shall be placed in the center of plant pits, plumb, with the crown of their roots exposed and located above the surrounding finish grade.
7. Prior to completion of planting installations, remove rope and cut wire baskets

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from the top 1/3 of the root balls. Pull burlap away from the trunk or stem of the plant and cut burlap from the top 1/3 of the root balls.

8. Planting soil shall be backfilled with approved planting soil to the full depth of the planting pit. Eliminate air pockets and compact the soil by flooding the tree pit within 2 hours of planting installation. After water has drained from the planting pit and planting backfill has dried enough additional planting soil shall be spread in pit or bed to bring the finished surface of the planting pit or bed to grades shown on the Contract Documents. A saucer shall be formed around each plant at a depth of 3 inches for trees.
9. All trees shall be inoculated with mycorrhizal fungi. Inoculant shall be added after the trees have been placed in their holes. Open the required number of packets for each plant and thoroughly mix the inoculant powder into the upper 10 inches (250 mm) of backfill soil.
 - a. The application rates for mycorrhizal fungal packets shall be in accordance with the manufacturers recommendations.
- B. Contractor shall keep trees plumb and upright at all times.
- C. Pruning:
 1. As directed by the Owner's Representative, each plant shall be pruned in accordance with the workmanship requirements of "Pruning Standards" for Class I, fine pruning, to preserve the natural character of the plant.
 2. Tree pruning, as required, shall be undertaken to the full height of affected trees.
 3. All dead wood or suckers and all broken or badly bruised branches shall be removed. Never cut a leader.
- D. In the event that rock or underground construction work or obstructions are encountered in any plant pit or bed excavation work, alternate locations will be selected by the Owner's Representative. Relocation of plant pits or beds shall be provided at no additional cost to the Owner. Provide the Owner's Representative with no less than 48 hours notice of obstruction so that a site visit can be scheduled to establish new locations for plants.
- E. Absolutely no debris may be left on the site. Repair any damage to site as directed by the Owner's Representative, at no additional cost..

3.03 MULCH

- A. Provide 3" of mulch continuous on planting beds.

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3.04 WATERING

- A. Plants shall be watered immediately following planting as necessary to thoroughly moisten rootball and plant pit loam and thereafter shall be inspected frequently for watering needs and watered, as required, to provide adequate moisture in the planting pit. The Contractor shall inspect tree pits 24 hours after initial watering to confirm that they are draining properly. If surface water or excessively saturated plant pit soils exist the Contractor shall immediately notify the Owner's Representative. The Owner's Representative will recommend remedial measures based upon site conditions.

3.05 MAINTENANCE

- A. Maintenance shall begin immediately after each plant is planted and shall continue until final acceptance of the project for a minimum 30-day period whichever is longer, and afterwards as necessary to ensure establishment through the one-year guarantee period. The intention of maintenance is not to provide merely for survival of the plant, but to ensure healthy plants. Plants which show signs of stress such as wilting, die back, and thinning foliage, due to lack of watering in the establishment period will not be accepted.
- B. Maintenance shall consist of keeping the plants in a healthy growing condition and shall include but is not limited to watering, weeding, cultivating, pruning, re-mulching, tightening and repairing of guys, straightening of trees to a plumb position, removal of dead material, resetting plants to proper grades or upright position, and maintaining the planting saucer.
 - 1. Plants shall be inspected for watering needs at least twice each week and watered to promote plant growth and vitality.
 - 2. For trees in lawn or mulched beds, apply water to the ground surface directly under the canopy. Water shall be applied at a sufficiently slow rate to prevent run off from the soil surface but great enough to equal 0.2 inches of water per square foot of canopy area per hour for 5 hours per week.
 - 3. Planting beds and individual plant pits shall be kept free of weeds, and mulch shall be replaced as required to maintain the specified layer of mulch. Beds and individual pits shall be neat in appearance and maintained to the designed layout.
 - 4. Plants that die during the maintenance period shall be removed and replaced by the Contractor during that growing season, unless directed otherwise by the Owner's Representative.
 - 5. Spraying of insecticides or herbicides shall be done by State-licensed professionals. Spraying for insects, pests and diseases shall conform to the

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National Arborist Association Standards under the section entitled "Standards for Pesticide Application Operations", as currently adopted and as approved by the Landscape Architect. All insecticides, pesticides, and herbicides shall be EPA-approved and shall conform to the requirements MCRG: Massachusetts Control Recommendation Guide for Insect, Disease, and Weed Pests of Shade Trees and Woody Ornamentals, latest edition, University of Massachusetts, Amherst, College of Food and Natural Resources.

- C. During the maintenance period, any decline in the condition of plantings shall require the Contractor to take immediate action to identify potential problems and undertake corrective measures.

3.06 ACCEPTANCE

- A. Upon completion of all planting work, the Contractor shall request in writing that the Owner's Representative inspect the planting work.
- B. Acceptance Standards: If plant material is reviewed when it is in full leaf, leaves shall be plump with water with a shape indicative of the species and shall be free of insect, pest and disease damage. Twigs shall have living cambium for their full length. Twigs and branches shall have a full bud set for their full length, including terminal buds. Trunks and branches shall be free of frost cracks; sun scald; damage due to insects, pests, and disease; structural defects; and damage resulting from machinery or tools. Plant material inspected and reviewed when the plants are not in full leaf shall have twigs, branches and trunks meeting the above requirements. All plants regardless of the season of review shall have a minimum of 75 percent healthy, balanced branching structure with a healthy terminal leader(s) with viable terminal bud(s).
- C. If any number of plants do not meet these Acceptance Standards at the time of inspection, or if in the Owner's Representative's opinion, workmanship is unacceptable, written notice will be given by the Owner's Representative to the Contractor in the form of a punch list which itemizes necessary planting replacements and/or other deficiencies to be remedied. All plants that do not meet these Acceptance Standards shall be removed from the project within seven days of receipt of the punch list. Replacements shall conform in all respects to the Specifications for new plants and shall be planted in the same manner.

3.07 GUARANTEE

- A. Trees and shrubs shall be guaranteed for one year from the date of Substantial Completion of the entire project.
- B. At the end of the guarantee period, a final inspection will be held to determine whether any replacements are required. Each plant shall be plumb, shall have a character that is natural for its species as determined by the Owners Representative, and shall conform to the Acceptance Standards described in this Section 02950 - Planting. Plants found to

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be unacceptable shall be removed promptly from the site and replaced according to this Section 02950 - Planting. Replacements plants shall be guaranteed for an additional year.

- C. All replacements shall be plants of the same kind and size specified in the Plant List. The cost shall be borne by the Contractor, except for replacements due to vandalism.

END OF SECTION

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SECTION 03300

CAST IN PLACE CONCRETE

PART 1 - GENERAL

1.00 GENERAL PROVISIONS

- A. Attention is directed to the Contract and General Conditions and all Sections within Division I which are hereby made a part of this Section of the Specifications.

1.02 DESCRIPTION OF WORK

- A. Work Included: Provide labor, materials and equipment necessary to complete the work of this Section, including but not limited to the following site improvements:

1. Cast-in-place retaining walls, steps and seat wall
2. Concrete Paving
3. Footings
4. Anti-skateboard hardware attached to walls.

- B. Related Work:

1. Section 02200 - Earthwork
2. Section 02510 - Bituminous Concrete Paving
3. Section 02540 - Safety Surfacing
4. Section 02830 - Chain Link Fence
5. Section 02800 - Site Improvements
6. Section 02860 - Play Equipment

1.03 SUBMITTALS

- A. Submit the following in accordance with Section 01300 - Submittals.

1. Concrete mix designs. Concrete mix design submittal shall include the following information:
 - (a) Proportions of cement, fine and coarse aggregate, and water.
 - (b) Water cement ratio, design strength, slump and air content.
 - (c) Type of cement and aggregates.
 - (d) Type and dosage of all admixtures.
 - (e) Percent of polypropylene fiber
 - (f) Range of ambient temperature and humidity for which the design is valid..
 - (g) Certification by ready-mix plant of psi of concrete mix design.
2. Submit Product data for the following:

Cast-In-Place Concrete

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- (a) Curing materials.
 - (b) Joint fillers, Sealants, and Sealant Primers: Provide manufacturer's product data and manufacturer's installation instructions. Provide manufacturer's color choices for sealant.
 - (c) Form materials and form-release agents.
 - (d) Steel reinforcement and reinforcement accessories.
 - (e) Expansion Joint filler and sealant.
- B. Steel Reinforcement Shop Drawings: Details of fabrication, bending, and placement, prepared according to ACI 315, "Details and Detailing of Concrete Reinforcement." Include material, grade, bar schedules, stirrup spacing, bent bar diagrams, arrangement, and supports of concrete reinforcement.
- C. Submit results of concrete cylinder tests

1.04 TESTING

- A. The Contractor shall engage an independent laboratory acceptable to the Owner shall pay for testing of concrete as follows:
1. 4 (2 each) cylinders of concrete for strength testing of concrete utilized in concrete retaining walls.

1.05 REFERENCE STANDARDS

- A. Comply with applicable requirements of the following standards. Where these standards conflict with other specified requirements, after notifying the Architect the most restrictive requirement shall govern.
1. American Concrete Institute (ACI)
 - 212 Guide for Use of Admixtures in Concrete
 - 301 Specifications for Structural Concrete for Buildings
 - 305 Hot Weather Concreting
 - 306 Cold Weather Concreting
 - 316 Recommended Practice for Construction of Concrete Pavements and Concrete Bases
 - 347 Recommended Practice for Concrete Formwork
 2. American Society for Testing and Materials (ASTM):
 - A615 Deformed and Plain Billet-Steel Bars for Concrete Reinforcement
 - C33 Concrete Aggregates
 - C94 Ready-Mixed Concrete
 - C143 Slump of Portland Cement Concrete
 - C150 Portland Cement
 - C171 Sheet Materials for Curing Concrete
 - C260 Air-Entraining Admixtures for Concrete

- C309 Liquid Membrane-Forming Compounds for Curing Concrete
- C494 Chemical Admixtures for Concrete
- C920 Elastomeric Joint Sealants
- C920 Use of Elastomeric Joint Sealants
- D1557 Moisture - Density Relations of Soils and Soil-Aggregate Mixtures Using 10-lb. (4.5-kg) Rammer and 18-in. (457-mm) Drop

- 3. Commonwealth of Massachusetts Highway Department, Standard Specifications for Highways and Bridges, latest edition, Construction and Materials specifications for Concrete.

1.06 QUALITY ASSURANCE

- A. Installer Qualifications: An experienced installer who has completed concrete Work similar in material, design, and extent to that indicated for this Project and whose work has resulted in construction with a record of successful in-service performance.
- B. Maintain field records of time, date of placing, curing, and removal of forms of concrete in each portion of the work.

1.07 PROJECT CONDITIONS

- A. Establish and maintain required lines, surfaces, and elevations.
- B. Do not install concrete work over wet, saturated, muddy, or frozen subgrade.
- C. Do not install concrete when air temperature is below 40 degrees F. Use of calcium chloride, salt, or any other admixture to prevent concrete from freezing is prohibited.
- D. Protect adjacent work. Provide temporary barricades and warning lights as required for protection of project work and public safety.
- E. Calcium chloride, salt, or any other admixture to prevent concrete from freezing is prohibited.

1.08 DELIVERY, STORAGE AND HANDLING

- A. Deliver, store, and handle steel reinforcement to prevent bending and damage.

PART 2 - PRODUCTS

2.01 2.01 BASE COURSES

- A. Base material under footings, steps and walls shall be as specified under Section 02200, Earthwork.

2.02 CONCRETE MIX

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

301 Method 1 or Method 2 to determine mix proportions.

- B. Concrete shall conform to ASTM C94. One copy of the certificate of delivery shall be submitted immediately upon arrival of each load of concrete at the site.
 - 1. Indicate water added to mix at job site on each delivery ticket. Show quantity of water added. Site water tempered mixes exceeding specified slump range will be rejected as not complying with specification requirements.
- C. Unless other indicated on the Drawings, minimum 28 day compressive strength shall be 4,000 psi.
- D. Concrete Aggregate: Provide ASTM C33 normal weight aggregates, 3/4" maximum size, clean, uncoated crushed stone or gravel coarse aggregate free of materials which cause staining or rust spots; fine aggregate shall be clean natural sand.
- E. Polypropylene reinforcement fibers shall be added at the rate of 1.0 lb/cubic yard of concrete.
 - 1. Provide polypropylene fibrillated fibers of multi-design ASTM C1116C/116M, Section 4.1.3 Type III. Fibers must be made of 100% virgin polypropylene fibrillated fibers of multi-design gradation as manufactured by Fibermesh, Synthetic Industries, 4019 Industry Drive, Chattanooga, Tennessee 37416; Masterfiber M70 by BASF, or an approved equal.
- F. Concrete slump shall be no less than 2" nor greater than 4" determined in accordance with ASTM C143.
- G. Concrete shall be air entrained type. Air content by volume shall be 4 to 6%.
- H. Concrete shall contain a water reducing agent to minimize the water cement ratio of the mix, at the specified slump.
- I. No calcium chloride or admixtures containing calcium chloride shall be added to the concrete. No admixtures other than those specified shall be used in the concrete without the specific written permission of the Engineer.
- J. No concrete shall be placed by pumping methods.

2.03 CEMENT

- A. Cement shall be Portland Cement conforming to ASTM C150, Type 2.

2.04 ADMIXTURES

- A. Except as otherwise specified, use of concrete admixtures shall conform to ACI 212.
 - 1. Air entraining agent shall conform to ASTM C260.

2. Water reducing agent shall conform to ASTM C494, Type A.
3. Water reducing agent-retarder shall conform to ASTM C494, Type D.

2.05 WATER

- A. Water shall conform to ASTM C94, Section 4.1.3.

2.06 STEEL REINFORCEMENT

- A. Steel reinforcing bars shall conform to ASTM A615, Grade 60.

2.07 FORMWORK

- A. All concrete work shall be formed.
- B. The form facing materials shall produce a smooth, hard, uniform texture on the concrete to match finish of existing wall to remain.
- C. Form material for walls shall be plywood, tempered concrete-form grade hardboard, or metal, capable of producing the required finish.
- D. Forms shall be true to line and free of warp and shall be of sufficient strength when braced to resist the pressure of concrete during placement within the allowable tolerances.
- E. Surfaces of the forms to be in contact with concrete shall be coated with non-staining form release compound, free of kerosene, oil and wax. Wetting or coating with grease or oil will not be accepted as a substitute.
- F. Exposed concrete arises shall be chamfered. Chamfer shall be mitered at changes of direction.
- G. Formwork for footings shall be metal, glass-fiber-reinforced plastic, paper, or fiber tubes that will produce surfaces with gradual or abrupt irregularities not exceeding specified formwork surface class. Provide units with sufficient wall thickness to resist plastic concrete loads without detrimental deformation

2.08 FORM RELEASE AGENT

- A. Form-Release Agent: Commercially formulated form-release agent that will not bond with, stain, or adversely affect concrete surfaces and will not impair subsequent treatments of concrete surfaces.

2.10 FORM TIES

- A. Form Ties: Factory-fabricated, removable or snap-off metal or glass-fiber-reinforced plastic form ties designed to resist lateral pressure of fresh concrete on forms and to prevent spalling of concrete on removal.
- B. Furnish units that will leave no corrodible metal closer than 1 inch to the plane of the exposed

concrete surface or that, when removed, will leave holes not larger than 1 inch in diameter in concrete surface.

2.10 CURING MATERIALS

A. Curing materials shall be burlap, impervious liquid membrane or curing paper conforming to Mass Highway Standards for Highways and Bridges, M9.063 or M9.065.

(1) Type 2 Liquid Membrane-Forming Compounds for Curing Concrete shall be used in accordance with ASTM Designation C-309-58 or AASHTO Designation M140-57 or the latest revisions thereof.

2.11 EXPANSION JOINTS

A. Expansion joints

1. Joint filler shall be preformed filler conforming to ASTM D 1751 or AASHTO M 213. Joint filler shall be recessed ½" to receive sealant, and shall be one piece, extending to the full depth and width of the joint.

a. Provide W.R. Meadows "Snap-cap" or equal to provide ½" recess.

2. Seal joints horizontal joints with a non-staining, two component polyurethane based sealant conforming to Fed. Spec. TT-S-00227, Class A, and ASTM C920, Type M, Grade P, Class 25, Use T, with a Shore A Hardness of 30±5 or better.

3. Colors of sealant shall be selected from manufacturer's standard colors to match concrete color as closely as possible.

2.13 ANTI-SKATEBOARD HARDWARE

A. Hardware shall be clear anodized silver grey aluminum, specifically recommended by the manufacturer for 3/4" chamfered edges, as supplied by Barrett Robinson (1-80-848-6666) or equal.

B. Hardware shall be attached with epoxy and vandal resistant anchors, as recommended by the hardware manufacturer.

PART 3 - EXECUTION

3.01 GRADING

A. Make any corrections necessary to base course material furnished and installed under SECTION 02200, Earthwork, to bring base material to the sections and elevations shown on the Contract Drawings.

B. Existing subgrade material which will not readily compact as required shall be removed and replaced with satisfactory materials. Additional materials needed to bring subgrade to required line and grade and to replace unsuitable material shall be material conforming to Section 02200

Earthwork.

3.02 FORMWORK

- A. Formwork shall be constructed, braced and tied so that the formed surfaces of the concrete will be perfectly true, smooth and to the dimensions shown on the Drawings, within the tolerances for formed surfaces as specified in ACI 301.
- B. Forms shall not be moved for seventy-two (72) hours after the Cement concrete has been placed, or for a longer period if directed by the Landscape Architect/Engineer. Extreme care shall be taken in removing forms in order that no damage will be done to the Cement concrete. Under no condition shall any bar, pick or other tool be used which depends upon leverage on the Cement concrete for removal of the forms.

3.03 EXPANSION JOINTS

- A. Unless otherwise indicated on the Drawings, expansion joints shall be located at 30 feet o.c. maximum and at all curbs and walls.
- B. Reinforcing shall be discontinuous at expansion joints.

3.04 CONTROL JOINTS

- A. Tool control joints to not less than 25% of slab depth.
- B. Unless otherwise indicated on the Drawings, control joints shall be located at 10 feet o.c. maximum in pavements and walls.
- C. Reinforcing shall continue through control joints.

3.04 REINFORCEMENT

- A. Reinforcing bars showing cracks after bending shall be discarded and replaced with new material conforming to this Section at no additional cost to the Owner.
- B. Reinforcing shall be thoroughly cleaned of loose mill and rust scale, dirt, ice, and other foreign material which may reduce the bond between concrete and reinforcing. Where there is a delay in placing concrete after reinforcement is in place, bars shall be reinspected and cleaned when necessary.
- C. After forms have been coated with form release agent, but before concrete is placed, reinforcing steel shall be securely wired in exact position called for, and shall be maintained in that position until concrete is placed and compacted.
- D. Except as otherwise noted, laps at joints in welded wire fabric reinforcement shall be at least 6 inches and shall be securely tied with wire.
- E. Except as otherwise specified, reinforcing steel shall be spliced by lapping bar ends, placing bars in

contact, and tightly wiring. Minimum lap of spliced bars shall conform to ACI 318.

- H. Unless otherwise indicated on the Drawings, reinforcing shall extend within 2 inches of formwork and expansion joints. Reinforcement shall continue through construction joints, but not through expansion joints.

3.05 COLD WEATHER CONCRETING

- A. Procedures shall be in accordance with provisions of ACI 306.

3.06 HOT WEATHER CONCRETING

- A. Procedures shall be accordance with the provision of ACI 305.
- A. Concrete just placed shall be protected from the direct rays of the sun and the forms and reinforcement just prior to placing shall be sprinkled with cold water. Every effort shall be made to minimize delays which will result in excessive mixing of the concrete after arrival on the job.
- B. During periods of excessively hot weather (95 degrees or above) ingredients in the concrete shall be cooled insofar as possible and cold mixing water shall be used to maintain the temperature of the concrete at permissible levels all in accordance with the provisions of ACI 305. Any concrete with a temperature above 95 degrees F., when ready for placement will not be acceptable and will be rejected.
- C. Temperature records shall be maintained throughout the period of hot weather giving air temperature, general weather conditions (calm, windy, clear, cloudy, etc.) and relative humidity. Records shall include checks on temperature of concrete as delivered and after placing in forms. Data should be correlated with the progress of the work so that conditions surrounding the construction of any part of the structure can be ascertained.

3.07 CONCRETE PLACEMENT

- A. Before placing concrete, forms and space to be occupied by concrete shall be thoroughly cleaned, and reinforcing steel and embedded metal shall be free from dirt, oil, mill scale, loose rust, paint and other material which might tend to reduce bond.
- B. Existing concrete, earth and other water permeable material against which new concrete is to be placed shall be thoroughly damp when concrete is placed. There shall be no free water on the surface.
- C. Concrete which has set or partially set before placing shall not be employed. Retempering of concrete will not be permitted.
- D. Segregation of the concrete shall be prevented during handling; should any segregation occur, the concrete shall be remixed before it is placed. Concrete shall not be allowed to drop freely more than 4 feet. If the free drop to the point of placement must exceed 4 feet, the Contractor shall obtain the approval of the Engineer for the proposed method of depositing the concrete. The concrete shall not be required to flow over distances greater than 3 feet in any direction in the forms or on the ground, unless otherwise permitted by the Engineer.

- E. Concrete shall be thoroughly spaded, and tamped, and vibrated to secure a solid homogeneous mass, thoroughly worked around reinforcement and into corners of forms.

3.08 FINISHING

- A. Paving and Stair Treads: Broom Finish.
- B. Exposed tops of footings: Smooth trowel exposed surface. Provide light broom finish.
- C. Exposed surfaces of concrete walls: Hand-rubbed smooth finish.
 - 1. It is the intention that all concrete be sound and dense. Concrete exhibiting defects on surfaces exposed to public view shall be removed and replaced or repaired in accordance with method that achieves a surface which is acceptable to the Landscape Architect. All such removal or repairs shall be at the Contractor's expense.
 - 2. Formed concrete surfaces which will be visible after completion of the structure shall have a "smooth form hand-rubbed" finish, as defined by ACI 301.
 - (a) At formed surfaces exposed to view, chip off fins and other projections and trowel patch all voids, honeycombs and air pockets exceeding ½" in any dimension.
 - (b) Pull tie-rods and patch voids formed by tie-rod cones flush with adjacent surfaces.

3.09 CURING AND PROTECTION

- A. It is essential that concrete be kept continuously damp from time of placement until end of specified curing period. It is equally essential that water not be added to surface during finishing operations, and not earlier than 24 hours after concrete placement. Between finishing operations, surface shall be protected from rapid drying by a covering of waterproofing paper. Surface shall be damp when the covering is placed over it, and shall be kept damp by means of a fog spray of water, applied as often as necessary to prevent drying, but not sooner than 24 hours after placing concrete. None of the water so applied shall be troweled or floated into surface.
- B. Walls and vertical surfaces shall be cured by maintaining wood forms continuously wet during curing period, or by wrapping with continuous .006" polyethylene with taped joints.
- C. Concrete pavement surfaces shall be cured by completely covering with curing paper, water curing with burlap or by use of a curing compound.
 - 1. Concrete cured using curing paper shall be completely covered with paper with seams lapped at least 2" and sealed with tape. During curing period, surface shall be checked frequently, and sprayed with water or curing compound as applicable, as often as necessary to prevent drying, but not earlier than 24 hours after placing concrete.
 - 2. Concrete cured with a curing compound shall have curing compound applied at a rate of at least one gallon per 150 square feet in two applications perpendicular to each other. Apply immediately after the free water has disappeared from surfaces not protected by forms, and immediately after removal of forms if such are removed before the end of the

required curing period.

3. Concrete cured by water process shall begin by fog spray immediately after the initial set. Fog spray shall continue until burlap is placed. Burlap shall be placed in no case later than 5 hours after placing of concrete. Fog spray or covers shall be used continuously during this period. Wooden forms if left in place longer than 2 days after the placing of concrete shall be thoroughly wet down at least once each day for the remainder of the curing period. Formed surfaces shall, after the removal of forms, be cured in like manner for the remainder of the required period, the surface of the concrete being thoroughly drenched with water and covered immediately after the forms are removed.

D. Curing period shall be 7 days, minimum.

3.10 PROTECTION OF CONCRETE SURFACES

- A. Concrete surface shall be protected from traffic or damage. If necessary 1/2 inch thick plywood sheets shall be used to protect the exposed surface.

3.11 ANTI-SKATEBOARD HARDWARE

- A. Install anti-skateboard hardware on all concrete walls, except stair cheek walls, spaced as shown on the Drawings, using manufacturer supplied adhesive and anchors, and according to manufacturer's instructions.

END OF SECTION

METAL RAILINGS

SECTION 05500

PART 1 - GENERAL

1.01 GENERAL PROVISIONS

- A. Attention is directed to the General Conditions of the Contract, all Divisions of the Specifications and the Contract Drawings, all of which apply to this Section.

1.02 DESCRIPTION OF WORK

- A. This section specifies furnishing, fabrication, and installation of:

- 1. Handrails

1.03 RELATED WORK

- A. Section 03300 - Cast-In-Place Concrete

1.04 INSTALLER/FABRICATOR QUALIFICATIONS

- A. Installer Qualifications: An experienced installer and fabricator who has completed metal work similar in material, design, and extent to that indicated for this Project and whose work has resulted in construction with a record of successful in-service performance.

1.05 QUALITY ASSURANCE

- A. Provide shop-drawings stamped by a registered Engineer verifying that rails comply with all statutory load requirements.
- B. Handrail fabrication and installation shall comply with ADA Accessibility Guidelines (ADAAG) and Massachusetts Architectural Access Board Regulations (MAAB).

1.06 SUBMITTALS

- A. Submit the following in accordance with the requirements of Division 1, Section 01300 Submittals.
- B. Shop Drawings: Submit shop drawings of work showing size and thickness of each member, type of material, method of connection and assembly. Show dimensions, clearances, anchorages, relationships to surrounding work, coatings, and other

Metal Railings
05500-1

pertinent details of fabrication and installation.

1. Show profiles, reinforcing, fasteners, and any accessories.
 2. Indicate welded connections using standard AWS welding symbols. Indicate net weld lengths.
 3. Where feasible, take field measurements prior to preparation of shop drawings and fabrication. Do not delay job progress; allow for trimming and fitting where field measurements before fabrication will delay work.
- C. For railings provide shop drawings stamped by a registered Engineer in the State of Massachusetts and structural calculations demonstrating compliance with loading requirements of all applicable codes.
- D. Product Data: Provide manufacturer's product data, installation instructions, use limitations, and recommendations for each material used. Provide certifications that materials comply with requirements.
- E. Welder's Certification: Provide certification, signed by Contractor, certifying that welders employed at project comply with requirements specified under AWS D1.1 and AWS D1.2.

1.07 QUALITY ASSURANCE

- A. Engineering: Provide services of a professional engineer, registered in the Commonwealth of Massachusetts to design and certify that the work of this Section meets or exceeds performance requirements specified.
- B. Shop fabricate work to greatest extent possible. Label each piece in shop to facilitate field assembly.
- C. Welding: Perform welding in conformance with AWS D1.1 and D1.3 as applicable.

1.08 PROJECT DELIVERY, STORAGE, AND HANDLING

- A. Store work off ground and under cover. Protect from damage. Repair and clean work before erection.

PART 2 - PRODUCTS

2.01 MATERIALS

Metal Railings
05500-2

- A. General: Provide products and materials of new stock, free from defects, and of best commercial quality for each intended purpose.
- B. Steel Plates, Shapes, and Bars: ASTM A 36.
- C. Steel Pipe: ASTM A 53, Schedule 40, Type S (seamless), galvanized steel, Grade A for cold-bending.
- D. Welding Rods: Conform to AWS Standards and recommendations of welding rod manufacturer.
- E. Grout for Exterior applications: Provide factory packaged, non-shrink, latex-modified, non-staining, hydraulic controlled expansion cement formulation for mixing with water at project site. Provide formulation that is resistant to erosion from water exposure without need for protection by a sealer or waterproof coating.

2.02 FABRICATION - GENERAL

- A. Fabricate work of this Section to be straight, plumb, level and square, and to sizes, shapes and profiles indicated on approved shop drawings. Ease exposed edges. Cut, reinforce, drill and tap metal work as required for proper assembly.
 - 1. Fabricate miscellaneous supports, brackets, braces and the like required to fully complete the work.
 - 2. Obtain loading requirements from suppliers of work to be supported. Design and support systems with a safety factor of at least 6 unless otherwise indicated.
 - 3. Allow for thermal movement resulting from 100 degree F change in ambient temperature.
 - 4. Shear and punch metals accurately. Remove burrs.
 - 5. Ease exposed edges to a radius of approximately 1/32 inch unless indicated otherwise. Form bent corners to smallest radius possible without causing grain separation or impairing work.
 - 6. Remove sharp or rough areas on exposed traffic surfaces.
 - 7. Weld seams continuously. Spot welding is permitted for temporary welding only.

Metal Railings
05500-3

- B. Work Exposed to View: For work exposed to view, select materials with special care. Provide materials which are smooth and free of blemishes such as pits, roller marks, trade names, scale and roughness. Fabricate work with uniform hairline joints. Form welded joints and seams continuously. Grind welds flush and smooth. For exposed fasteners, use hex head bolts or Phillips head machine screws.
- C. Ramp rails: Conform to ASTM E 985 for design and engineering for structural performance based on testing performed in accordance with ASTM E 894 and ASTM E 935, using load and deflection values specified below.
 - (1) 50 pounds per lineal foot applied in any direction at the top and to transfer this load through the supports to the structure
 - (2) 200 lb concentrated load applied in any direction at any point along the top and to transfer this load through the supports to the structure,
 - (3) Intermediate rails and components to withstand a 50 lbs/square foot horizontal load.
- E. Provide members of type, size, style and profile indicated, unless otherwise required to support loads.
- F. Provide fully welded construction, using internal slip connectors. Grind joints smooth and flush.
- G. Provide coped joints at member intersections, fully welded all around. Provide mitered connections at square turns unless radius turns are indicated.

2.03 FINISH

- A. Railings shall be shop primed and painted with a polyurethane coating as specified below.
 - 1. Touch-up all breaks on hot-dip surfaces caused by cutting, welding, drilling or undue abrasion with liquid zinc coating.
 - 2. One Coat Primer (dry film thickness 3.0 to 4.0 mils) of Tnemec No. 66 Hi-Build Epoxoline" Epoxy; Porter No. 4361 MCR-43 High Build Epoxy, Dupont "Corlar epoxy primer, or equal.
 - 3. Apply one finish coat (dry film thickness 1.5 to 2.0 mils per coat) as follows: Tnemec No. 74 Endura-Shield IV Acrylic Polyurethane, Porter No. 8731 Hythane Ultra Acrylic Polyurethane, DuPont Imron Polyurethane, or equal.

Metal Railings
05500-4

4. Field touch up damaged or abraded galvanized surfaces with ZRC Cold Galvanizing Compound, PPG Speedhide Galvanized Steel Paint, or Tnemec 90-93 Zinc rich primer or approved equal, and touch up with above finish paint.
- B. Color of finish paint shall be chosen by the Owner from the manufacturer's standard color choices.

Part 3 - EXECUTION

3.01 PREPARATION

- A. Coordinate and furnish anchorage devices, setting drawings, diagrams, templates, instructions, and directions for installation of concrete inserts, sleeves, anchors, bolts and miscellaneous items to be embedded or attached to concrete work, masonry work, or structural steel work.

3.02 INSTALLATION- GENERAL

- A. Fastening to In-Place Construction: Provide anchorage devices and fasteners necessary for securing work of this Section to in-place construction.
- B. Cutting, Fitting and Placement: Perform cutting, drilling, and fitting required for installation work of this Section.
- C. Erect work square, plumb and true, accurately fitted, and with tight joints and intersections. Avoid field cutting and drilling to the greatest extent possible.
- D. Fit exposed connections accurately together to form hairline joints. Shop weld connections, except when work cannot be shop welded due to shipping size or galvanizing limitations.
- E. Field Welding: Comply with AWS D1.1 and D1.2 for procedures of manual metal-arc welding, appearance and quality of welds, and correction methods for defective welds.
- F. Where posts are fastened into concrete, set such members in proprietary type expanding grout manufactured specifically for such purposes. Use grouts strictly in accordance with manufacturer's directions.

3.03 INSTALLATION

- A. Install handrails as indicated on approved shop drawings. Adjust handrails prior to final anchoring and grouting. Plumb posts in all directions. Provide 1-1/2" clearance

Metal Railings
05500-5

between walls and hand rails unless otherwise indicated.

END OF SECTION

Metal Railings
05500-6

SECTION 10430

EXTERIOR SIGNS

PART 1 - GENERAL

1.01 RELATED DOCUMENTS

- A. All of the Contract Documents, including the Contract Form, General Provisions, General Conditions, Supplemental Conditions, and all Attachments to the General Provisions, and Division 1 - General Requirements, apply to the work of this Section.

1.02 REQUIREMENTS INCLUDED

- A. Provide all equipment and materials, and do all work necessary to complete the installation of exterior signs as indicated on the Drawings and as specified.
- B. The work of this Section includes, but is not limited to:
 - 1. Furnishing and installing one (1) exterior park identification sign on new granite posts. Sign and sign posts shall both be installed by the sign vendor.
 - 2. Furnishing and installing two (2) park "Welcome" signs and posts.
 - 3. Furnishing and installing five (5) ADA accessibility signs.
- C. **The exact location of signs must be staked in the field by the Contractor and approved by the Landscape Architect prior to installation.**

1.03 RELATED REQUIREMENTS

- A. Examine Contract Documents for requirements that affect Work of this Section. Other Specification Sections that directly relate to Work of this Section include, but are not limited to:
 - 1. Section 01500 - Temporary Facilities: Required DEP Project Sign & Temporary Park Closure Signs.
 - 2. Section 02200 - Earthwork.
 - 3. Section 03300 - Cast-in-Place Concrete.

1.04 REFERENCES

- A. Comply with applicable requirements of the following standards. Where these standards conflict with other specified requirements, the most restrictive requirements shall govern.
- B. American Society for Testing and Materials (ASTM):

1. B 209 Aluminum and Aluminum Alloy Sheet and Plate.
2. B 221 Aluminum-Alloy Extruded Bars, Rods, Wire, Shapes, and Tubes.
3. B 308 Aluminum-Alloy 6061 T6 Standard Structural Shapes Rolled or Extruded.
4. B 429 Aluminum-Alloy Extruded Structural Pipe and Tubing.

1.05 SUBMITTALS

- A. Shop Drawings: Submit complete shop drawings of work of this Section. Show all details of construction and installation of each sign and type.
- B. Product Data: Submit manufacturer's product data of work of this Section. Provide complete product description and specifications, catalog cuts, and other descriptive data.
- C. Field Measurements: Take all necessary field measurements before preparation of shop drawings and fabrication. Do not delay progress of the job. If field measurements are not possible prior to fabrication, allow for field cutting and fitting.
- D. Verification Samples: Submit representative samples of the following materials for approval prior to construction. Show full color ranges and finish variations expected. Provide samples having minimum size of 144 sq. in.
 1. Paint color and finish sample on 1/8 in. thick aluminum for each color and finish required.
 2. Paint color and finish sample on 1/8 in. thick structural steel, for each color and finish required.
 3. Vinyl samples, in specified type style, size and graphic, for each color and finish designated on Drawings.
 4. Full size representative plotted templates for designated lettering, for each style, size, color, and finish designated on the Drawings. Include character and word spacing.

1.06 QUALITY ASSURANCE

- A. Source: For each material type required for the work of this Section, provide primary materials which are the product of one manufacturer. Provide secondary or accessory materials which are acceptable to the manufacturers of primary materials.
- B. Installer: A firm with a minimum of three years experience in type of work required by this Section and which is acceptable to manufacturers of primary materials.
 1. If installer is different company than sign manufacturer, notify Architect in advance providing installer's name, address, telephone number, and name of contact person.

- C. All work and material shall be in accordance with all applicable codes and standards and shall be acceptable to all authorities having jurisdiction. Work shall meet or exceed the requirements of the Massachusetts State Building Code.
- D. Design Criteria: The Drawings indicate size, profiles, and dimensional requirements of signs and graphics. Other manufacturing methods may be considered provided the deviations in dimensions and profiles are minor and do not, in the opinion of the Architect, change the design concept.

1.07 DELIVERY, STORAGE, AND HANDLING

- A. Deliver materials and products unopened. Store and handle in strict compliance with manufacturer's instructions and recommendations. Store under cover and protect from weather damage.
- B. Sequence deliveries to avoid delays, but minimize on-site storage.

PART 2 - PRODUCTS

2.01 FABRICATORS:

- A. Possible sign fabricators:
 1. Express Sign & Graphics, 301 Littleton Road, Chelmsford, MA 01824, p 978-250-9890, f 978-250-0975
 2. Ready to Run Graphics & Signs, 240 Barber Avenue, Worcester, MA 01606 (508-459-9977).
 3. Or approved equal fabricator.

2.02 MISCELLANEOUS MATERIALS

1. Vinyl letters: 3M (Vinyls) or approved equal.
2. Acrylic Polyurethane Paint: Matthews (Acrylic polyurethane paint) or approved equal.

2.03 ALUMINUM MATERIALS

- A. General: Provide manufacturer's standard extrusions, sections, sheet, and plate, of alloy and temper recommended by aluminum manufacturer or finisher for type, use, and finish indicated, but not less than strength and durability properties specified below:

1. Structural Aluminum Shapes: ASTM B 308, 6061 alloy.
2. Extruded Aluminum Bars, Rods, Shapes, and Tubes: ASTM B 221, 6063 alloy.
3. Aluminum Sheet and Plate: ASTTv1 B 209, alloy 1100, 3003, or 5052.

- B. VINYL MATERIALS

1. Applied Vinyl Graphics: Provide opaque non-reflective vinyl film, 0.0035-inch minimum thickness, with pressure-sensitive adhesive backing, suitable for exterior applications. Color shall be as indicated.

2.04 GRANITE POSTS

- A. Granite shall be furnished by the sign vendor.
- B. Granite shall be “Woodbury Grey” as supplied by Swenson Granite Works, 10 Main Street Route 109, Medway, Massachusetts 02053, (508)-533-2882 (Fax 508-533-344), or “Chelmsford Gray” as supplied by Fletcher Granite Company, 534 Groton Road, Westford, MA 01886, (978)-251-4031 (Fax 978-251-8773), or approved equal. Granite shall be supplied by a source approved by the Architect.
- C. Granite shall conform to the requirements of ASTM C 515, Architectural Grade and NBGA Specifications except as modified herein.
- D. Granite shall be standard grade, free of cracks, seams, starts, or other defects which may impair its strength, durability, or appearance. Exposed surfaces shall be free from spots, spalls, chips, stains, discoloration, or other defects which would affect its appearance. Color, texture, and finish shall be within the range of samples approved by the Architect.

2.05 MISCELLANEOUS MATERIALS

- A. Fasteners: Unless otherwise indicated, use concealed fasteners in all work of this Section. Fabricate fasteners from metals that are non-corrosive to sign surface materials and mounting substrates.
 1. Fasteners shall be roundhead or countersunk, and tamperproof.
 2. Spacers and washers shall be neoprene.
- B. Anchors and Inserts: Provide non-ferrous metal or stainless steel anchors and inserts for exterior installations. Provide toothed steel or lead expansion bolt devices for drilled-in place anchors. Furnish inserts to other trades when required to be cast into concrete.
- C. Permanent Bond Adhesive: Provide structural adhesive suitable for bonding a variety of dissimilar industrial surfaces over a wide temperature range, similar to “PR-943”, manufactured by Products Research and Chemical Corporation, Gloucester City, NJ 08030, or approved equal.

2.06 FABRICATION

- A. General: Fabricate work of this Section in conformance with requirements indicated for materials, thicknesses, finishes, colors, designs, shapes, and sizes. Owner and/or

Architect will provide name of complex.

- B. All Sign Types: Fabricate flat and curved signs using metals and shapes of sufficient thickness, with reinforcing when necessary, to produce sufficient flatness, free of “oil canning”, and to impart sufficient strength for size, design, and application indicated.
 - 1. Fabricate brackets, and fittings from extruded aluminum to suit sign for panel construction and mounting conditions indicated; all seams welded and ground smooth prior to painting.
 - 2. Colors: Where applied graphics require color selection, provide colors as indicated and as approved by the Owner and Landscape Architect.
 - 3. Graphic Content and Style: Provide graphics for signs in letter style, size, spacing, and arrangement indicated.

2.07 FINISHES

- A. Acrylic Polyurethane Finish: Painted surfaces shall be painted with Matthews Acrylic Polyurethane, manufactured by Matthews Paint Company, Wheeling, IL 60090, or approved equal, in strict compliance with coating system manufacturer’s instructions and recommendations for surface preparation, mil thickness, curing and other requirements.
- B. Colors and Surface Textures: For exposed sign material that requires selection of materials with integral or applied colors, surface textures. or other characteristics related to appearance, provide color matches as selected by the Owner and Landscape Architect.

PART 3 - EXECUTION

3.01 GENERAL

- A. Locate sign units and accessories where shown and scheduled. Use mounting methods indicated.
- B. Fastening to In-Place Construction: Provide anchorage devices and fasteners necessary for securing work of this Section to in-place construction. Include threaded fasteners for concrete and masonry inserts, toggle bolts, through bolts, lag bolts, wood screws, and other connectors required.
- C. Cutting, Fitting, and Placement: Perform cutting, drilling, and fitting required for installation of work of this Section.
- D. Erect work square, plumb and true, accurately fitted, and with tight joints and intersections. All anchors, inserts and other members to be set in concrete shall be furnished loose by this trade to be built-into concrete and granite by those trades. Avoid field cutting or drilling to greatest extent possible.

- E. Brace work rigid and secure to surrounding construction. Provide temporary bracing or anchors where required.
- F. Fit exposed connections accurately together to form hairline joints, except where invisible joints are indicated. Shop weld connections.
- G. Electrolytic Isolation: Where dissimilar metals are to come into contact with one another, or in contact with concrete, isolate by application of a heavy coating of bituminous paint on contact surfaces in addition to shop coat specified above. Do not permit the bituminous paint in any way to remain on surfaces to be exposed or to receive sealant.

3.02 PROTECTION OF WORK

- A. Adjacent work, etc., shall be protected from stain and damage during entire operation. Damaged and stained areas shall be replaced or repaired to equal their original conditions.
- B. Completed walkways shall be adequately protected from damage or stain until acceptance by the Owner.

3.03 INSPECTION

- A. The Installer shall examine substrates, supports, and conditions detrimental to the proper completion of work. Do not proceed with work until unsatisfactory conditions are corrected. Beginning of installation will be construed as installer accepting substrates and conditions.

3.04 SIGN INSTALLATION

- A. Sign and granite sign posts shall both be installed by sign vendor.
- B. General Installation Requirements: Strictly comply with manufacturer's instructions and recommendations, except where more restrictive requirements are specified in this section.
- C. Installation: Install units plumb, level, in alignment and plane without warp or rack. Anchor securely in place.

3.05 TOLERANCES

- A. The following allowable installed tolerances are allowable variations from locations and dimensions indicated by the Contract Documents. Do not add these tolerances to any allowable tolerances indicated for other work.
 - 1. Allowable Variation from True Plumb: $\pm 1/8$ in. in 10 ft. - 0 in.
 - 2. Allowable Variation from True Line: $\pm 1/8$ in. in 10 ft. - 0 in.

3. Allowable Variation from True Level: $\pm 1/16$ in. in 10 ft. - 0 in.

3.06 ADJUSTING, CLEANING, TOUCH-UP. AND PROTECTION

- A. Clean exposed surfaces using manufacturer's printed instructions recommending materials and methods to be used. Remove and replace work which cannot be successfully cleaned.
- B. Touch-up damaged coatings and finishes. Eliminate visible evidence of repair.
- C. Provide temporary protection during the course of work, and immediately after completion to ensure work is not damaged or deteriorated in any way at time of final acceptance. Remove temporary protections and re-clean as necessary immediately prior to final acceptance.

END OF SECTION

SECTION 15400

DRINKING FOUNTAIN

PART I - GENERAL

1.01 GENERAL PROVISIONS

- A. Attention is directed to the General Conditions of the Contract, all Divisions of the Specifications and the Contract Drawings, all of which apply to this section.
- B. Examine and coordinate all Drawings and other section of the specifications for requirements which affect work of this section whether or not such work is specifically mentioned in this Section. Coordinate work with other trades to assure the steady progress of all work under the Contract.

1.02 SCOPE OF WORK

- A. Work under this Section shall include all labor, materials, services, equipment, transportation and accessories and the performance of all operations necessary to complete the work of this Section, as indicated on the Contract Drawings and/or as specified herein and includes:
 - 1. Furnishing and installation one (1) drinking fountain

1.03 RELATED SECTIONS

- A. Section 02200 - Earthwork
- B. Section 02667 - Water Service Systems
- C. Section 03300 - Cast-in-Place Concrete

1.04 SUBMITTALS

- A. Submit the following in accordance with the requirements of section 01300-SUBMITTALS:
 - 1. Manufacturer's certified scale drawings, cuts or catalogs, and installation details.
 - 2. Manufacturer's specifications, including certified performance characteristics and capacity ratings.

1.05 CODES. ORDINANCES AND PERMITS

- A. All work shall be performed in strict accordance with local and state codes and regulations.
 - 1. Site utilities work shall be done in strict accordance with the of Commonwealth of Massachusetts State Plumbing Code, 248 CMR 2.00.

2. Any material or workmanship called for in the above-mentioned requirements, which is not specified or shown on the drawings, shall be furnished and installed by the Contractor as though same has been specifically mentioned or indicated. If the drawings and specification. are at variance with any regulations, the bidder shall notify the Landscape Architect ten days before the date for submitting his bid. In many cases the drawings are in excess of the requirements in the codes and these shall be followed to the fullest. If the Contractor fails to notify the Landscape Architect at this time and installs work in variance with the above-mentioned codes and regulations, he shall assume the responsibility and the expense to rectify the installation.
3. Before commencing work, the Contractor shall obtain all permits deemed necessary in. connection with the installation of this equipment and pay fees required for same.

1.06 REFERENCE STANDARDS

- A. References herein to any technical society, organization, group or body are made in accordance with the following abbreviations.
 1. ANSI - American National Standards Institute
 2. ASTM - American Society for Testing Materials
 3. AWWA - American Water Works Association
 4. Standard Specifications for Highways and Bridges,1988 Edition
 5. Commonwealth of Massachusetts Regulation 523, as published by the Architectural Barriers Board.

1.07 MATERIALS AND WORKMANSHIP

- A. It is the intent of these specifications to establish quality standards for all material and equipment incorporated In the work of this section. All material and equipment installed hereunder shall be new and shall be the best of each respective kind and type. Proper care shall be exercised in handling all equipment and materials herein specified.
- B. The Installation shall be as indicated on the drawings and in accordance with the manufacturer's recommendations as approved by the Landscape Architect. All of the plumbing related work of this Section shall be a done by a MA Licensed Master Plumber. The installation of all valves and other water carrying equipment shall be done by a MA Licensed Master Plumber. The installation of all water pipe shall be under the direct full time supervision of a licensed plumber.
- C. All conduits, pipes, structures, etc. in use and which are damaged during excavation, whether uncovered or not and whether or not they are shown on the plans, shall be repaired at the expense of the Contractor.

PART II - MATERIALS

2.01 DRINKING FOUNTAIN

Drinking Fountain
15400-2

- A. Drinking fountain shall be Model 410 SM FR (freeze proof) with 10" stainless steel surface carrier as manufactured by Most Dependable Fountains, Inc., 5705 Commander Drive, P.O. Box 587, Arlington, Tennessee 38002-0587 (1-800-552-6331) or equal.
 - 1. Color shall be green; model shall be ADA compliant.
 - 2. Model shall have two nozzles: One for standing height and one for wheelchair use.

PART III - EXECUTION

3.01 DRINKING FOUNTAIN BODY INSTALLATION

- A. The Contractor shall install the manufactured body that he is providing, as shown on the plans and as specified herein.
 - 1. Connect to new 1" water service.
 - 2. Connect to new 4" sewer line with p-trap and check valve to prevent migration of sewer gases.
- B. Dimensions and placement shall conform to Commonwealth of Massachusetts Regulation 521 for Barrier Free Access.

3.02 TESTING

- A. Upon completion of piping and appurtenances, the Contractor shall test the system under normal City water pressures.
- B. Any defective joints, and any defects in new pipe fittings, valves or hydrants revealed during the leakage test or before final acceptance of the project shall be removed and replaced with other new material and again tested until the work is satisfactory with no additional compensation.

3.03 WARRANTY

- A. Drinking fountain shall be warrantied for one year.

END OF SECTION

APPENDIX A



Massachusetts Department of Environmental Protection
 Bureau of Resource Protection - Wetlands
WPA Form 5 - Order of Conditions
 Massachusetts Wetlands Protection Act M.G.L. c. 131, §40

Provided by MassDEP:
 MassDEP File #:316-0690
 eDEP Transaction #:738108
 City/Town:WALTHAM

A. General Information

1. Conservation Commission WALTHAM

2. Issuance a. OOC b. Amended OOC

3. Applicant Details

a. First Name SANDRA b. Last Name TOMASELIO

c. Organization WALTHAM DEPARTMENT OF RECREATION

d. Mailing Address 510 MOODY STREET

e. City/Town WALTHAM f. State MA g. Zip Code 02453

4. Property Owner

a. First Name b. Last Name

c. Organization

d. Mailing Address

e. City/Town f. State g. Zip Code

5. Project Location

a. Street Address 3 HAZEL STREET

b. City/Town WALTHAM c. Zip Code 02451

d. Assessors Map/Plat# 50 e. Parcel/Lot# 8/8

f. Latitude 42.38335N g. Longitude 71.243101W

6. Property recorded at the Registry of Deed for:

a. County	b. Certificate	c. Book	d. Page
SOUTHERN MIDDLESEX		158.185	122,12

7. Dates

a. Date NOI Filed : 3/26/2015 b. Date Public Hearing Closed: 4/9/2015 c. Date Of Issuance: 4/29/2015

8. Final Approved Plans and Other Documents

a. Plan Title: b. Plan Prepared by: c. Plan Signed/Stamped by: d. Revised Final Date: e. Scale:

CITY OF
 WALTHAM DRAKE
 PLAYGROUND
 IMPROVEMENTS CAROLYN COONEY 3/17/2015

B. Findings



Massachusetts Department of Environmental Protection
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Provided by MassDEP:
 MassDEP File #:316-0690
 eDEP Transaction #:738108
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1. Findings pursuant to the Massachusetts Wetlands Protection Act

Following the review of the the above-referenced Notice of Intent and based on the information provided in this application and presented at the public hearing, this Commission finds that the areas in which work is proposed is significant to the following interests of the Wetlands Protection Act.

Check all that apply:

- a. Public Water Supply
- b. Land Containing Shellfish
- c. Prevention of Pollution
- d. Private Water Supply
- e. Fisheries
- f. Protection of Wildlife Habitat
- g. Ground Water Supply
- h. Storm Damage Prevention
- i. Flood Control

2. Commission hereby finds the project, as proposed, is:

Approved subject to:

- a. The following conditions which are necessary in accordance with the performance standards set forth in the wetlands regulations. This Commission orders that all work shall be performed in accordance with the Notice of Intent referenced above, the following General Conditions, and any other special conditions attached to this Order. To the extent that the following conditions modify or differ from the plans, specifications, or other proposals submitted with the Notice of Intent, these conditions shall control.

Denied because:

- b. The proposed work cannot be conditioned to meet the performance standards set forth in the wetland regulations. Therefore, work on this project may not go forward unless and until a new Notice of Intent is submitted which provides measures which are adequate to protect interests of the Act, and a final Order of Conditions is issued. **A description of the performance standards which the proposed work cannot meet is attached to this Order.**
- c. The information submitted by the applicant is not sufficient to describe the site, the work or the effect of the work on the interests identified in the Wetlands Protection Act. Therefore, work on this project may not go forward unless and until a revised Notice of Intent is submitted which provides sufficient information and includes measures which are adequate to protect the interests of the Act, and a final Order of Conditions is issued. **A description of the specific information which is lacking and why it is necessary is attached to this Order as per 310 CMR 10.05(6)(c).**

- 3. Buffer Zone Impacts: Shortest distance between limit of project disturbance and the wetland resource area specified in 310CMR10.02(1)(a). _____ a. linear feet

Inland Resource Area Impacts:(For Approvals Only):

Resource Area	Proposed Alteration	Permitted Alteration	Proposed Replacement	Permitted Replacement
4. <input type="checkbox"/> Bank	_____ a. linear feet	_____ b. linear feet	_____ c. linear feet	_____ d. linear feet
5. <input type="checkbox"/> Bordering Vegetated Wetland	_____ a. square feet	_____ b. square feet	_____ c. square feet	_____ d. square feet
6. <input type="checkbox"/> Land under Waterbodies and Waterways	_____ a. square feet	_____ b. square feet	_____ c. square feet	_____ d. square feet
	_____ e. c/y dredged	_____ f. c/y dredged		



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7. <input checked="" type="checkbox"/> Bordering Land Subject to Flooding	<u>5900</u>	<u> </u>	<u>0</u>	<u> </u>
	a. square feet	b. square feet	c. square feet	d. square feet
Cubic Feet Flood Storage	<u>1475</u>	<u> </u>	<u>0</u>	<u> </u>
	e. cubic feet	f. cubic feet	g. cubic feet	h. cubic feet
8. <input checked="" type="checkbox"/> Isolated Land Subject to Flooding	<u>40000</u>	<u> </u>	<u> </u>	<u> </u>
	a. square feet	b. square feet	<u> </u>	<u> </u>
Cubic Feet Flood Storage	<u>1999.5</u>	<u> </u>	<u>3918.80005</u>	<u> </u>
	c. cubic feet	d. cubic feet	e. cubic feet	f. cubic feet
9. <input type="checkbox"/> Riverfront Area	<u> </u>	<u> </u>	<u> </u>	<u> </u>
	a. total sq. feet	b. total sq. feet	<u> </u>	<u> </u>
Sq ft within 100 ft	<u> </u>	<u> </u>	<u> </u>	<u> </u>
	c. square feet	d. square feet	e. square feet	f. square feet
Sq ft between 100-200 ft	<u> </u>	<u> </u>	<u> </u>	<u> </u>
	g. square feet	h. square feet	i. square feet	j. square feet

Coastal Resource Area Impacts:

Resource Area	Proposed Alteration	Permitted Alteration	Proposed Replacement	Permitted Replacement
10. <input type="checkbox"/> Designated Port Areas	Indicate size under Land Under the Ocean, below			
11. <input type="checkbox"/> Land Under the Ocean	<u> </u>	<u> </u>	<u> </u>	<u> </u>
	a. square feet	b. square feet	<u> </u>	<u> </u>
	<u> </u>	<u> </u>	<u> </u>	<u> </u>
	c. c/y dredged	d. c/y dredged	<u> </u>	<u> </u>
12. <input type="checkbox"/> Barrier Beaches	Indicate size under Coastal Beaches and/or Coastal Dunes below			
13. <input type="checkbox"/> Coastal Beaches	<u> </u>	<u> </u>	<u> </u>	<u> </u>
	a. square feet	b. square feet	c. c/y nourishment	d. c/y nourishment
14. <input type="checkbox"/> Coastal Dunes	<u> </u>	<u> </u>	<u> </u>	<u> </u>
	a. square feet	b. square feet	c. c/y nourishment	d. c/y nourishment
15. <input type="checkbox"/> Coastal Banks	<u> </u>	<u> </u>	<u> </u>	<u> </u>
	a. linear feet	b. linear feet	<u> </u>	<u> </u>
16. <input type="checkbox"/> Rocky Intertidal Shores	<u> </u>	<u> </u>	<u> </u>	<u> </u>
	a. square feet	b. square feet	<u> </u>	<u> </u>
17. <input type="checkbox"/> Salt Marshes	<u> </u>	<u> </u>	<u> </u>	<u> </u>
	a. square feet	b. square feet	c. square feet	d. square feet
18. <input type="checkbox"/> Land Under Salt Ponds	<u> </u>	<u> </u>	<u> </u>	<u> </u>
	a. square feet	b. square feet	<u> </u>	<u> </u>
	<u> </u>	<u> </u>	<u> </u>	<u> </u>
	c. c/y dredged	d. c/y dredged	<u> </u>	<u> </u>
19. <input type="checkbox"/> Land Containing Shellfish	<u> </u>	<u> </u>	<u> </u>	<u> </u>



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20. Fish Runs
 a. square feet b. square feet c. square feet d. square feet
 Indicate size under Coastal Banks, inland Bank, Land Under the Ocean, and/or inland Land Under Waterbodies and Waterways, above

21. Land Subject to Coastal Storm Flowage
 c. c/y dredged d. c/y dredged

a. square feet b. square feet

22. Restoration/Enhancement (For Approvals Only)

If the project is for the purpose of restoring or enhancing a wetland resource area in addition to the square footage that has been entered in Section B.5.c & d or B.17.c & d above, please entered the additional amount here.

a. square feet of BVW b. square feet of Salt Marsh

23. Streams Crossing(s)

If the project involves Stream Crossings, please enter the number of new stream crossings/number of replacement stream crossings.

a. number of new stream crossings b. number of replacement stream crossings

C. General Conditions Under Massachusetts Wetlands Protection Act

The following conditions are only applicable to Approved projects

1. Failure to comply with all conditions stated herein, and with all related statutes and other regulatory measures, shall be deemed cause to revoke or modify this Order.
2. The Order does not grant any property rights or any exclusive privileges; it does not authorize any injury to private property or invasion of private rights.
3. This Order does not relieve the permittee or any other person of the necessity of complying with all other applicable federal, state, or local statutes, ordinances, bylaws, or regulations.
4. The work authorized hereunder shall be completed within three years from the date of this Order unless either of the following apply:
 - a. the work is a maintenance dredging project as provided for in the Act; or
 - b. the time for completion has been extended to a specified date more than three years, but less than five years, from the date of issuance. If this Order is intended to be valid for more than three years, the extension date and the special circumstances warranting the extended time period are set forth as a special condition in this Order.
5. This Order may be extended by the issuing authority for one or more periods of up to three years each upon application to the issuing authority at least 30 days prior to the expiration date of the Order.
6. If this Order constitutes an Amended Order of Conditions, this Amended Order of Conditions does not exceed the issuance date of the original Final Order of Conditions.
7. Any fill used in connection with this project shall be clean fill. Any fill shall contain no trash, refuse, rubbish, or debris, including but not limited to lumber, bricks, plaster, wire, lath, paper, cardboard, pipe, tires, ashes, refrigerators, motor vehicles, or parts of any of the foregoing.
8. This Order is not final until all administrative appeal periods from this Order have elapsed, or if such an appeal has been taken, until all proceedings before the Department have been completed.



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9. No work shall be undertaken until the Order has become final and then has been recorded in the Registry of Deeds or the Land Court for the district in which the land is located, within the chain of title of the affected property. In the case of recorded land, the Final Order shall also be noted in the Registry's Grantor Index under the name of the owner of the land upon which the proposed work is to be done. In the case of the registered land, the Final Order shall also be noted on the Land Court Certificate of Title of the owner of the land upon which the proposed work is done. The recording information shall be submitted to the Conservation Commission on the form at the end of this Order, which form must be stamped by the Registry of Deeds, prior to the commencement of work..
10. A sign shall be displayed at the site not less than two square feet or more than three square feet in size bearing the words,
"Massachusetts Department of Environmental Protection"
[or 'MassDEP']
File Number : "316-0690"
11. Where the Department of Environmental Protection is requested to issue a Superseding Order, the Conservation Commission shall be a party to all agency proceedings and hearings before Mass DEP.
12. Upon completion of the work described herein, the applicant shall submit a Request for Certificate of Compliance (WPA Form 8A) to the Conservation Commission.
13. The work shall conform to the plans and special conditions referenced in this order.
14. Any change to the plans identified in Condition #13 above shall require the applicant to inquire of the Conservation Commission in writing whether the change is significant enough to require the filing of a new Notice of Intent.
15. The Agent or members of the Conservation Commission and the Department of Environmental Protection shall have the right to enter and inspect the area subject to this Order at reasonable hours to evaluate compliance with the conditions stated in this Order, and may require the submittal of any data deemed necessary by the Conservation Commission or Department for that evaluation.
16. This Order of Conditions shall apply to any successor in interest or successor in control of the property subject to this Order and to any contractor or other person performing work conditioned by this Order.
17. Prior to the start of work, and if the project involves work adjacent to a Bordering Vegetated Wetland, the boundary of the wetland in the vicinity of the proposed work area shall be marked by wooden stakes or flagging. Once in place, the wetland boundary markers shall be maintained until a Certificate of Compliance has been issued by the Conservation Commission.
18. All sedimentation barriers shall be maintained in good repair until all disturbed areas have been fully stabilized with vegetation or other means. At no time shall sediments be deposited in a wetland or water body. During construction, the applicant or his/her designee shall inspect the erosion controls on a daily basis and shall remove accumulated sediments as needed. The applicant shall immediately control any erosion problems that occur at the site and shall also immediately notify the Conservation Commission, which reserves the right to require additional erosion and/or damage prevention controls it may deem necessary. Sedimentation barriers shall serve as the limit of work unless another limit of work line has been approved by this Order.

NOTICE OF STORMWATER CONTROL AND MAINTENANCE REQUIREMENTS

19. The work associated with this Order (the "Project") is (1) is not (2) subject to the Massachusetts Stormwater Standards. If the work is subject to Stormwater Standards, then the project is subject to the following conditions:
 - a) All work, including site preparation, land disturbance, construction and redevelopment, shall be implemented in accordance with the construction period pollution prevention and erosion and sedimentation control plan and, if applicable, the Stormwater Pollution Prevention Plan required by the National Pollutant Discharge Elimination System Construction General Permit as required by Stormwater Standard 8. Construction period erosion, sedimentation and pollution control measures and best management practices (BMPs) shall remain in place until the site is fully stabilized.
 - b) No stormwater runoff may be discharged to the post-construction stormwater BMPs unless and until a Registered Professional Engineer provides a Certification that: *i.* all construction period BMPs have been removed or will be removed by a date certain specified in the Certification. For any construction period BMPs intended to be converted to post construction operation for stormwater attenuation, recharge, and/or treatment, the conversion is allowed by the MassDEP Stormwater Handbook BMP specifications and that the BMP has been properly cleaned or prepared for post construction operation, including removal of all construction period sediment trapped in inlet and outlet control structures; *ii.* as-built final construction

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BMP plans are included, signed and stamped by a Registered Professional Engineer, certifying the site is fully stabilized; *iii.* any illicit discharges to the stormwater management system have been removed, as per the requirements of Stormwater Standard 10; *iv.* all post-construction stormwater BMPs are installed in accordance with the plans (including all planting plans) approved by the issuing authority, and have been inspected to ensure that they are not damaged and that they are in proper working condition; *v.* any vegetation associated with post-construction BMPs is suitably established to withstand erosion.

- c) The landowner is responsible for BMP maintenance until the issuing authority is notified that another party has legally assumed responsibility for BMP maintenance. Prior to requesting a Certificate of Compliance, or Partial Certificate of Compliance, the responsible party (defined in General Condition 19(e)) shall execute and submit to the issuing authority an Operation and Maintenance Compliance Statement ("O&M Statement") for the Stormwater BMPs identifying the party responsible for implementing the stormwater BMP Operation and Maintenance Plan ("O&M Plan") and certifying the following: i.) the O&M Plan is complete and will be implemented upon receipt of the Certificate of Compliance, and ii.) the future responsible parties shall be notified in writing of their ongoing legal responsibility to operate and maintain the stormwater management BMPs and implement the Stormwater Pollution Prevention Plan.
- d) Post-construction pollution prevention and source control shall be implemented in accordance with the long-term pollution prevention plan section of the approved Stormwater Report and, if applicable, the Stormwater Pollution Prevention Plan required by the National Pollutant Discharge Elimination System Multi-Sector General Permit.
- e) Unless and until another party accepts responsibility, the landowner, or owner of any drainage easement, assumes responsibility for maintaining each BMP. To overcome this presumption, the landowner of the property must submit to the issuing authority a legally binding agreement of record, acceptable to the issuing authority, evidencing that another entity has accepted responsibility for maintaining the BMP, and that the proposed responsible party shall be treated as a permittee for purposes of implementing the requirements of Conditions 19(f) through 19(k) with respect to that BMP. Any failure of the proposed responsible party to implement the requirements of Conditions 19(f) through 19(k) with respect to that BMP shall be a violation of the Order of Conditions or Certificate of Compliance. In the case of stormwater BMPs that are serving more than one lot, the legally binding agreement shall also identify the lots that will be serviced by the stormwater BMPs. A plan and easement deed that grants the responsible party access to perform the required operation and maintenance must be submitted along with the legally binding agreement.
- f) The responsible party shall operate and maintain all stormwater BMPs in accordance with the design plans, the O&M Plan, and the requirements of the Massachusetts Stormwater Handbook.
- g) The responsible party shall:
 - 1. Maintain an operation and maintenance log for the last three (3) consecutive calendar years of inspections, repairs, maintenance and/or replacement of the stormwater management system or any part thereof, and disposal (for disposal the log shall indicate the type of material and the disposal location);
 - 2. Make the maintenance log available to MassDEP and the Conservation Commission ("Commission") upon request; and
 - 3. Allow members and agents of the MassDEP and the Commission to enter and inspect the site to evaluate and ensure that the responsible party is in compliance with the requirements for each BMP established in the O&M Plan approved by the issuing authority.
- h) All sediment or other contaminants removed from stormwater BMPs shall be disposed of in accordance with all applicable federal, state, and local laws and regulations.
- i) Illicit discharges to the stormwater management system as defined in 310 CMR 10.04 are prohibited.
- j) The stormwater management system approved in the Order of Conditions shall not be changed without the prior written approval of the issuing authority.
- k) Areas designated as qualifying pervious areas for the purpose of the Low Impact Site Design Credit (as defined in the MassDEP Stormwater Handbook, Volume 3, Chapter 1, Low Impact Development Site Design Credits) shall not be altered without the prior written approval of the issuing authority.
- l) Access for maintenance, repair, and/or replacement of BMPs shall not be withheld. Any fencing constructed around stormwater BMPs shall include access gates and shall be at least six inches above grade to allow for wildlife passage.



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Special Conditions:

SPECIAL ORDERS OF CONDITIONS (V1.2) AS ISSUED BY THE WALTHAM CONSERVATION COMMISSION
DEP FILE NUMBER: 316-0690 APPLICANT: CITY OF WALTHAM RECREATION DEPARTMENT LOCATION: 3
HAZEL STREET DATE OF ISSUANCE: APRIL 29, 2015 19. RECORDING AND ADMINISTRATION A. PRIOR TO
ANY WORK ON THE SITE, OR WITHIN SIX (6) WEEKS OF THE DATE OF THIS ORDER, WHICHEVER COMES
FIRST, THIS ORDER OF CONDITIONS SHALL BE RECORDED AT THE MIDDLESEX REGISTRY OF DEEDS OR
LAND COURT AND NOTICE FILED WITH THE COMMISSION PURSUANT TO CONDITION 8. FAILURE TO DO
SO SHALL BE DEEMED CAUSE TO REVOKE THIS ORDER. B. IN ADVANCE OF ANY WORK ON THIS
PROJECT THE APPLICANT SHALL NOTIFY THE COMMISSION, AND AT THE REQUEST OF THE
COMMISSION, SHALL ARRANGE AN ON-SITE CONFERENCE AMONG THE COMMISSION, THE
CONTRACTOR AND THE APPLICANT TO ENSURE THAT ALL OF THE CONDITIONS OF THIS ORDER ARE
UNDERSTOOD. C. THIS ORDER SHALL BE MADE A PART OF ALL CONTRACTS AND SUBCONTRACTS
DEALING WITH THE WORK PROPOSED, AND SHALL SUPERSEDE ALL OTHER CONFLICTING CONTRACT
REQUIREMENTS. D. THIS ORDER SHALL APPLY TO AND BE BINDING UPON THE APPLICANT, ITS
EMPLOYEES AND ALL SUCCESSORS AND ASSIGNS IN INTEREST OR CONTROL. E. PRIOR TO ANY WORK
BEING DONE ON THE PROJECT SITE, THE APPLICANT SHALL INFORM THE WALTHAM CONSERVATION
COMMISSION IN WRITING OF THE NAMES, ADDRESSES, BUSINESS AND HOME PHONE NUMBERS OF
BOTH THE PROJECT SUPERVISOR WHO WILL BE RESPONSIBLE FOR ENSURING ON-SITE COMPLIANCE
WITH THIS ORDER AND HIS/HER ALTERNATE. THE APPLICANT SHALL ALSO NOTIFY THE COMMISSION IN
WRITING OF ANY CHANGES IN THIS INFORMATION. F. MEMBERS OF THE COMMISSION OR THEIR
AGENTS SHALL HAVE THE RIGHT TO ENTER UPON AND INSPECT THE PREMISES TO EVALUATE
COMPLIANCE WITH THIS ORDER OF CONDITIONS. G. ANY CHANGES DIFFERING FROM THE
AFOREMENTIONED CONDITIONS MUST BE SUBMITTED TO THE COMMISSION FOR APPROVAL PRIOR TO
THEIR IMPLEMENTATION. IF THE COMMISSION FINDS, BY MAJORITY VOTE, SAID CHANGES TO BE
SIGNIFICANT AND/OR DEVIATE FROM THE ORIGINAL PLANS, NOTICE OF INTENT, OR THE ORDER OF
CONDITIONS, THEN THE COMMISSION MAY REQUIRE A NEW NOTICE OF INTENT OR CALL FOR
ANOTHER PUBLIC HEARING WITHIN 21 DAYS, AT THE EXPENSE OF THE APPLICANT, IN ORDER TO TAKE
TESTIMONY FROM ALL INTERESTED PARTIES. WITHIN 21 DAYS OF THE CLOSE OF SAID PUBLIC
HEARING, THE COMMISSION WILL ISSUE AN AMENDED OR NEW ORDER OF CONDITIONS. H. ANY
ERRORS FOUND IN THE PLANS OR INFORMATION SUBMITTED BY THE APPLICANT SHALL BE
CONSIDERED AS CHANGES, AND THE PROCEDURES OUTLINED IN CONDITION 9 ABOVE SHALL BE
FOLLOWED. I. IN CONJUNCTION WITH THE SALE OF ANY PORTION OF THE SITE COVERED BY THIS
ORDER OF CONDITIONS, THE APPLICANT SHALL SUBMIT TO THE COMMISSION A SIGNED STATEMENT
BY THE BUYER THAT HE/SHE IS AWARE OF OUTSTANDING ORDERS OF CONDITIONS. J. THE
COMMISSION MAY AUTHORIZE ITS DESIGNATED AGENT TO ACT ON ITS BEHALF IN DETERMINING
PRECONSTRUCTION COMPLIANCE. K. SPECIAL CONDITIONS 21B, 22G, 23A, 23B, 23C, 23D, AND 23E
SHALL APPLY IN PERPETUITY AND SHALL NOT EXPIRE WITH THE ISSUANCE OF A CERTIFICATE OF
COMPLIANCE FOR THIS PROJECT. 20. PRIOR TO COMMENCEMENT OF WORK A. PRIOR TO ANY WORK
ON THE PROJECT SITE, THE PROPOSED LIMIT OF WORK SHALL BE CLEARLY MARKED WITH STAKES,
FLAGS OR FENCING AND SHALL BE APPROVED IN WRITING BY THE COMMISSION. SUCH MARKERS WILL
BE MAINTAINED UNTIL ALL CONSTRUCTION ON THE SITE'S PERIMETER IS COMPLETE. ALL WORKERS
SHALL BE INFORMED THAT NO CONSTRUCTION ACTIVITY IS TO OCCUR BEYOND THIS LINE AT ANY
TIME. B. PRIOR TO ANY WORK ON THE PROJECT SITE, ALL TREES GREATER THAN SIX (6) INCHES IN
DIAMETER THAT ARE TO BE SAVED SHALL BE PROTECTED FROM INADVERTENT DAMAGE BY STRAPPING
BOARDS AROUND THE TRUNK FROM GROUND LEVEL TO A HEIGHT OF AT LEAST EIGHT (8) FEET.
COMPLETION OF THIS PROJECT MEASURE SHALL BE APPROVED IN WRITING BY THE COMMISSION.
SUCH MEASURES SHALL BE MAINTAINED UNTIL ALL EARTHWORK AND GRADING IS COMPLETE AND
THEN SHALL BE REMOVED. TREES THAT ARE NOT TO BE SAVED SHALL BE CUT AND STUMPS REMOVED.
C. PRIOR TO ANY CONSTRUCTION ON THE SITE, AN EROSION CONTROL BARRIER OF A FILTER FABRIC
FENCE BACKED BY A ROW OF DOUBLE-STAKED STRAW BALES SHALL BE PLACED BETWEEN ALL

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eDEP Transaction #:738108
City/Town:WALTHAM

CONSTRUCTION ACTIVITIES AND WETLAND AREAS, IN ACCORDANCE WITH EROSION AND SEDIMENTATION GUIDELINES FOR URBAN AND SUBURBAN AREAS, MASS. DEP, MARCH 1997. THIS BARRIER SHALL BE INSPECTED AND APPROVED IN WRITING BY THE COMMISSION. UPON COMPLETION OF THE PROJECT THE APPLICANT SHALL REMOVE AND DISCARD TO A SUITABLE AREA, ALL STRAW BALES AND OTHER MATERIALS DETERMINED TO BE DETRIMENTAL TO THE RESOURCE AREAS. D. THE APPLICANT SHALL HAVE ON HAND AT THE START OF ANY SOIL DISTURBANCE, REMOVAL OR STOCKPILING, A MINIMUM OF 20% ADDITIONAL STRAW BALES, IN GOOD CONDITION AND SUFFICIENT STAKES FOR DOUBLE STAKING THESE BALES. SAID BALES SHALL BE USED ONLY FOR THE CONTROL OF EMERGENCY EROSION PROBLEMS AND SHALL NOT BE USED FOR THE NORMAL CONTROL OF EROSION, AS DESCRIBED IN CONDITION 20. 21. LIMITS OF WORK/EROSION CONTROL. A. THERE SHALL BE NO ACTIVITY (I.E. FILLING, ALTERATION, REGRADING, REMOVAL OF VEGETATION, ETC.) RELATED TO THIS PROJECT WITHIN 50 FEET OF ANY RESOURCE AREA UNLESS OTHERWISE DESCRIBED IN THESE ORDERS AND ON THE REFERENCED PLANS. B. AS SOON AS POSSIBLE DURING CONSTRUCTION, ALL DISTURBED UPLAND AREAS IN THE RESOURCE AREA OR BUFFER ZONE SHALL BE BROUGHT TO FINAL FINISHED GRADE AND STABILIZED PERMANENTLY AGAINST EROSION. THIS SHALL BE DONE EITHER BY SODDING, OR BY LOAMING, SEEDING, AND MULCHING ACCORDING TO NATURAL RESOURCES CONSERVATION SERVICE (FORMERLY UDA) SOIL CONSERVATION SERVICE GUIDELINES. IF THE LATTER COURSE IS CHOSEN, STABILIZATION WILL BE CONSIDERED COMPLETED ONCE THE SURFACE SHOWS COMPLETE VEGETATIVE COVER. BARE GROUND THAT CAN NOT BE PERMANENTLY STABILIZED WITHIN THIRTY (30) DAYS SHALL BE STABILIZED BY TEMPORARY MEASURES. 22. DURING WORK A. ACCEPTED ENGINEERING AND CONSTRUCTION STANDARDS AND PROCEDURES SHALL BE FOLLOWED IN THE COMPLETION OF THIS PROJECT. B. A COPY OF THIS ORDER OF CONDITIONS, AS WELL AS ALL CONSTRUCTION AND WETLAND REPLICATION PLANS, SHALL BE ON SITE UPON COMMENCEMENT OF ANY SITE WORK AND MADE AVAILABLE TO ANY PERSON DOING WORK ON THE SITE. C. SITE GRADING AND CONSTRUCTION SHALL BE SCHEDULED TO AVOID PERIODS OF HIGH WATER. ONCE BEGUN, GRADING AND CONSTRUCTION SHALL MOVE UNINTERRUPTED TO COMPLETION TO AVOID EROSION AND SEDIMENTATION OF WETLANDS. D. ANY DEWATERING OR DRAWDOWN ACTIVITIES ON THE PROJECT IN WHICH WATER WILL BE RELEASED INTO A RESOURCE AREA OR STORM DRAIN SHALL MAKE USE OF A SEDIMENTATION TANK OR SIMILAR DEVICE TO REMOVE SEDIMENT BEFORE THE WATER IS RELEASED. E. NO EARTHEN EMBANKMENT IN THE BUFFER ZONE SHALL HAVE A POST CONSTRUCTION SLOPE STEEPER THAN 2:1. F. THERE SHALL BE NO STOCKPILING OF SOIL OR OTHER MATERIALS WITHIN FIFTY (50) FEET OF ANY RESOURCE AREA, EXCEPT AS DESCRIBED IN THE NOI AND SHOWN ON THE REFERENCED PLAN. G. DURING AND AFTER WORK ON THIS PROJECT, THERE SHALL BE NO DISCHARGE OR SPILLAGE OF FUEL, OIL, OR OTHER POLLUTANTS INTO ANY RESOURCE AREA OR BUFFER ZONE. THE APPLICANT SHALL TAKE ALL REASONABLE PRECAUTIONS TO PREVENT THE RELEASE OF POLLUTANTS BY IGNORANCE, ACCIDENT, OR VANDALISM. 23. UPON COMPLETION OF WORK A. STORAGE OF PETROLEUM PRODUCTS I. NO UNDERGROUND STORAGE OF FUEL OILS SHALL BE ALLOWED WITHIN THE RESOURCE AREA OR BUFFER ZONE. II. THERE SHALL BE NO STORAGE OF PETROLEUM PRODUCTS (E.G. MOTOR OIL, GASOLINE, DIESEL FUEL, ETC.) WITHIN THE RESOURCE AREA OR BUFFER ZONE ON THE SITE AT ANY TIME, EXCEPT FOR QUANTITIES COMMENSURATE WITH MAINTAINING A SINGLE FAMILY HOME. B. FERTILIZER, PESTICIDES AND HERBICIDES I. FERTILIZERS SHALL NOT BE USED WITHIN A RESOURCE AREA OR FIFTY (50) FEET FROM A RESOURCE AREA. II. PESTICIDES AND HERBICIDES SHALL NOT BE USED WITHIN A RESOURCE AREA OR BUFFER ZONE. C. SODIUM CHLORIDE SHALL NOT BE USED FOR DE-ICING ON THE SITE. SIGNS OF A MINIMUM OF TWO SQUARE FEET STATING SUCH RESTRICTION SHALL BE POSTED AT ALL VEHICLE ENTRANCES. D. SAND USED IN DEICING SHALL BE REMOVED PERIODICALLY DURING THE WINTER AND BY MAY 1ST OF EACH YEAR. RECORDS OF CLEANING SHALL BE MAINTAINED ON SITE AND MAILED ANNUALLY TO THE COMMISSION BY MAY 1ST. E. THE STORM DRAINAGE SYSTEM SHALL BE EQUIPPED WITH GAS AND OIL TRAPS. CATCH BASINS SHALL BE CLEANED AND MAINTAINED BY THE APPLICANT EVERY 3 MONTHS. RECORDS OF SAID CLEANING SHALL BE MAINTAINED ON SITE AND MAILED ANNUALLY TO THE COMMISSION BY MAY 1ST. SITE SPECIFIC

Page 8 of 12 * ELECTRONIC COPY



Massachusetts Department of Environmental Protection
Bureau of Resource Protection - Wetlands
WPA Form 5 - Order of Conditions
Massachusetts Wetlands Protection Act M.G.L. c. 131, §40

Provided by MassDEP:
MassDEP File #:316-0690
eDEP Transaction #:738108
City/Town:WALTHAM

CONDITIONS A. INCORPORATE THE O & M PLAN AS DISCUSSED, MAKING THE CITY OF WALTHAM RESPONSIBLE FOR THE O & M PLAN. B. SOILS TESTING I. PHOSPHATE AMENDMENTS WILL NOT BE INCLUDED UNLESS A SOILS TEST DEMONSTRATES A DEFICIENCY. C. TYPE OF FERTILIZER I. NITROGEN FERTILIZERS FOR MAINTENANCE WILL BE COMPOSED OF 80% POLYMERCOATED TEMPERATURE ACTIVATED CONTROLLED RELEASE NITROGEN. INITIAL STARTER FERTILIZER FOR SEEDING SHALL CONTAIN A MINIMUM OF 50% POLYMER-COATED CONTROLLED RELEASE NITROGEN. D. TIMING OF FERTILIZATION I. FERTILIZER WILL NOT BE APPLIED OUTSIDE OF THE GROWING SEASON DEFINED AS APRIL 15TH TO OCTOBER 31ST. THERE WILL BE NO LATE SEASON FERTILIZATION. E. APPLICATION OF FERTILIZER I. NO NITROGEN OR PHOSPHATES WILL BE APPLIED DURING RAINFALL OR BEFORE A PREDICTION OF RAIN. II. FERTILIZER INADVERTENTLY APPLIED TO AN IMPERVIOUS SURFACE SHALL BE SWEEPED OR BLOWN BACK INTO THE TARGET AREA OR RETURNED TO EITHER ITS ORIGINAL CONTAINER OR ANOTHER APPROPRIATE CONTAINER FOR REUSE.



D. Findings Under Municipal Wetlands Bylaw or Ordinance

1. Is a municipal wetlands bylaw or ordinance applicable? Yes No

2. The Conservation Commission hereby (check one that applies):

a. DENIES the proposed work which cannot be conditioned to meet the standards set forth in a municipal ordinance or bylaw specifically:

1. Municipal Ordinance or Bylaw _____ 2. Citation _____

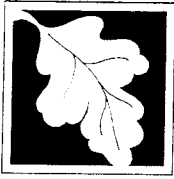
Therefore, work on this project may not go forward unless and until a revised Notice of Intent is submitted which provides measures which are adequate to meet these standards, and a final Order or Conditions is issued. Which are necessary to comply with a municipal ordinance or bylaw:

b. APPROVES the proposed work, subject to the following additional conditions.

1. Municipal Ordinance or Bylaw _____ 2. Citation _____

3. The Commission orders that all work shall be performed in accordance with the following conditions and with the Notice of Intent referenced above. To the extent that the following conditions modify or differ from the plans, specifications, or other proposals submitted with the Notice of Intent, the conditions shall control.

The special conditions relating to municipal ordinance or bylaw are as follows:



Massachusetts Department of Environmental Protection
 Bureau of Resource Protection - Wetlands
WPA Form 5 – Order of Conditions
 Massachusetts Wetlands Protection Act M.G.L. c. 131, §40

Provided by MassDEP:
316-690
 MassDEP File #

eDEP Transaction #
Waltham
 City/Town

E. Signatures

This Order is valid for three years, unless otherwise specified as a special condition pursuant to General Conditions #4, from the date of issuance.

Please indicate the number of members who will sign this form.

This Order must be signed by a majority of the Conservation Commission.

The Order must be mailed by certified mail (return receipt requested) or hand delivered to the applicant. A copy also must be mailed or hand delivered at the same time to the appropriate Department of Environmental Protection Regional Office, if not filing electronically, and the property owner, if different from applicant.

4-29-2015

1. Date of Issuance

4

2. Number of Signers

Signatures:

[Handwritten Signature]
[Handwritten Signature]
[Handwritten Signature]

by hand delivery on

by certified mail, return receipt requested, on

Date

Date

4-30-2015

F. Appeals

The applicant, the owner, any person aggrieved by this Order, any owner of land abutting the land subject to this Order, or any ten residents of the city or town in which such land is located, are hereby notified of their right to request the appropriate MassDEP Regional Office to issue a Superseding Order of Conditions. The request must be made by certified mail or hand delivery to the Department, with the appropriate filing fee and a completed Request for Departmental Action Fee Transmittal Form, as provided in 310 CMR 10.03(7) within ten business days from the date of issuance of this Order. A copy of the request shall at the same time be sent by certified mail or hand delivery to the Conservation Commission and to the applicant, if he/she is not the appellant.

Any appellants seeking to appeal the Department's Superseding Order associated with this appeal will be required to demonstrate prior participation in the review of this project. Previous participation in the permit proceeding means the submission of written information to the Conservation Commission prior to the close of the public hearing, requesting a Superseding Order, or providing written information to the Department prior to issuance of a Superseding Order.

The request shall state clearly and concisely the objections to the Order which is being appealed and how the Order does not contribute to the protection of the interests identified in the Massachusetts Wetlands Protection Act (M.G.L. c. 131, § 40), and is inconsistent with the wetlands regulations (310 CMR 10.00). To the extent that the Order is based on a municipal ordinance or bylaw, and not on the Massachusetts Wetlands Protection Act or regulations, the Department has no appellate jurisdiction.



G. Recording Information

This Order of Conditions must be recorded in the Registry of Deeds or the Land Court for the district in which the land is located, within the chain of title of the affected property. In the case of recorded land, the Final Order shall also be noted in the Registry's Grantor Index under the name of the owner of the land subject to the Order. In the case of registered land, this Order shall also be noted on the Land Court Certificate of Title of the owner of the land subject to the Order of Conditions. The recording information on this page shall be submitted to the Conservation Commission listed below.

WALTHAM
 Conservation Commission

Detach on dotted line, have stamped by the Registry of Deeds and submit to the Conservation Commission.

To:
WALTHAM
 Conservation Commission

Please be advised that the Order of Conditions for the Project at:

3 HAZEL STREET 316-0690
 Project Location MassDEP File Number

Has been recorded at the Registry of Deeds of:

County	Book	Page
_____	_____	_____

for:
Property Owner

and has been noted in the chain of title of the affected property in:

Book Page

In accordance with the Order of Conditions issued on:

Date

If recorded land, the instrument number identifying this transaction is:

Instrument Number

If registered land, the document number identifying this transaction is:

Document Number

Signature of Applicant

Rev 4/1/2010

DRAWINGS

Waltham Park Improvements Project

IMPROVEMENTS TO DRAKE PLAYGROUND

3 HAZEL STREET
WALTHAM, MASSACHUSETTS 02451

Locus Plan

DRAKE PLAYGROUND



MAYOR JEANNETTE A. McCARTHY
CITY OF WALTHAM

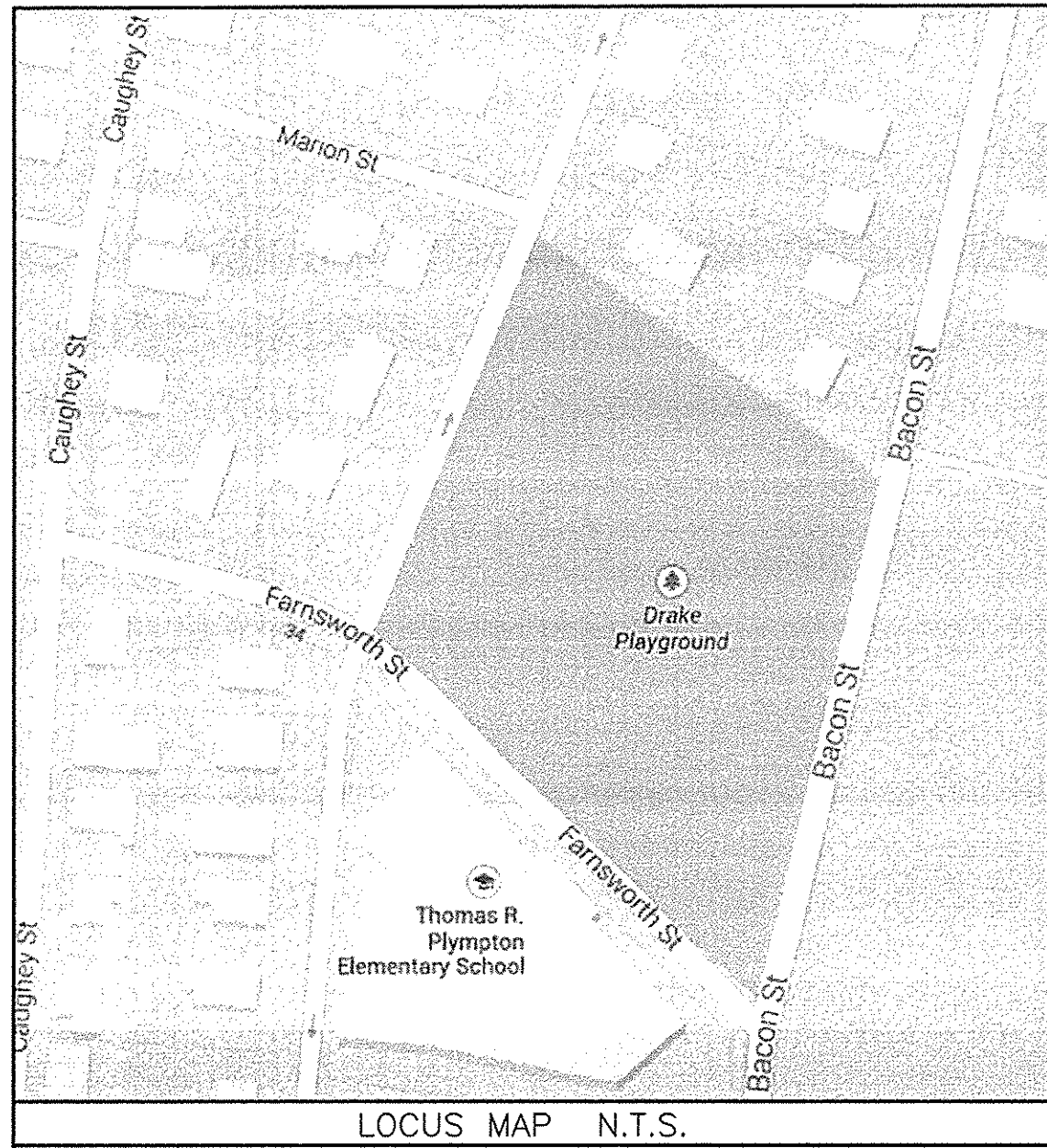
CITY OF WALTHAM RECREATION DEPARTMENT
510 MOODY STREET
WALTHAM, MASSACHUSETTS 02453

NOVEMBER 10, 2015

LANDSCAPE ARCHITECT:
CAROLYN COONEY & ASSOCIATES
13 ELM STREET
MILFORD, MASSACHUSETTS 01757
TEL: (508) 478-8426
FAX: (508) 478-8607

Index of Drawings

SHT 1 OF 1	EXISTING CONDITIONS PLAN
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L-1B	SITE PREPARATION PLAN 2
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L-3	LAYOUT PLAN
L-4	GRADING PLAN
L-5	DRAINAGE & UTILITY PLAN
L-6	PLANTING PLAN
L-7	IRRIGATION PLAN
L-8	PAVING & CURBING DETAILS
L-9	FENCING & WALL DETAILS
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L-11	STAIR DETAILS
L-12	GRADING SECTIONS
L-13	PLAYGROUND ENLARGEMENT PLAN
L-14	PLAY EQUIPMENT DETAILS
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LEGEND

TREES:	
FIRE HYDRANT:	
SIGN POST:	
IRRIGATION CONTROL VALVE:	
WATER GATE:	
SEWER MANHOLE:	
DRAIN MANHOLE:	
UTILITY POLE:	
CATCH BASIN:	
BOLLARD:	
WATER LINE:	— W —
SEWER LINE:	— S —
DRAIN LINE:	— D —
FENCE:	— X — X — X —
TREE LINE:	
BITUMINOUS:	BIT.
CONCRETE:	CONC.
RECORD LOCATION:	(R)

PLAN AND DEED REFERENCES:

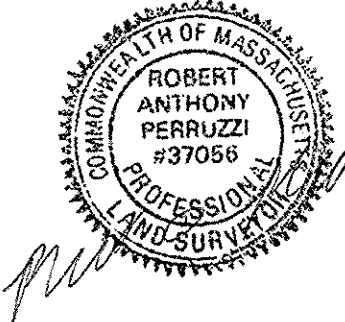
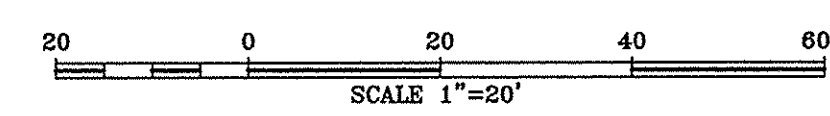
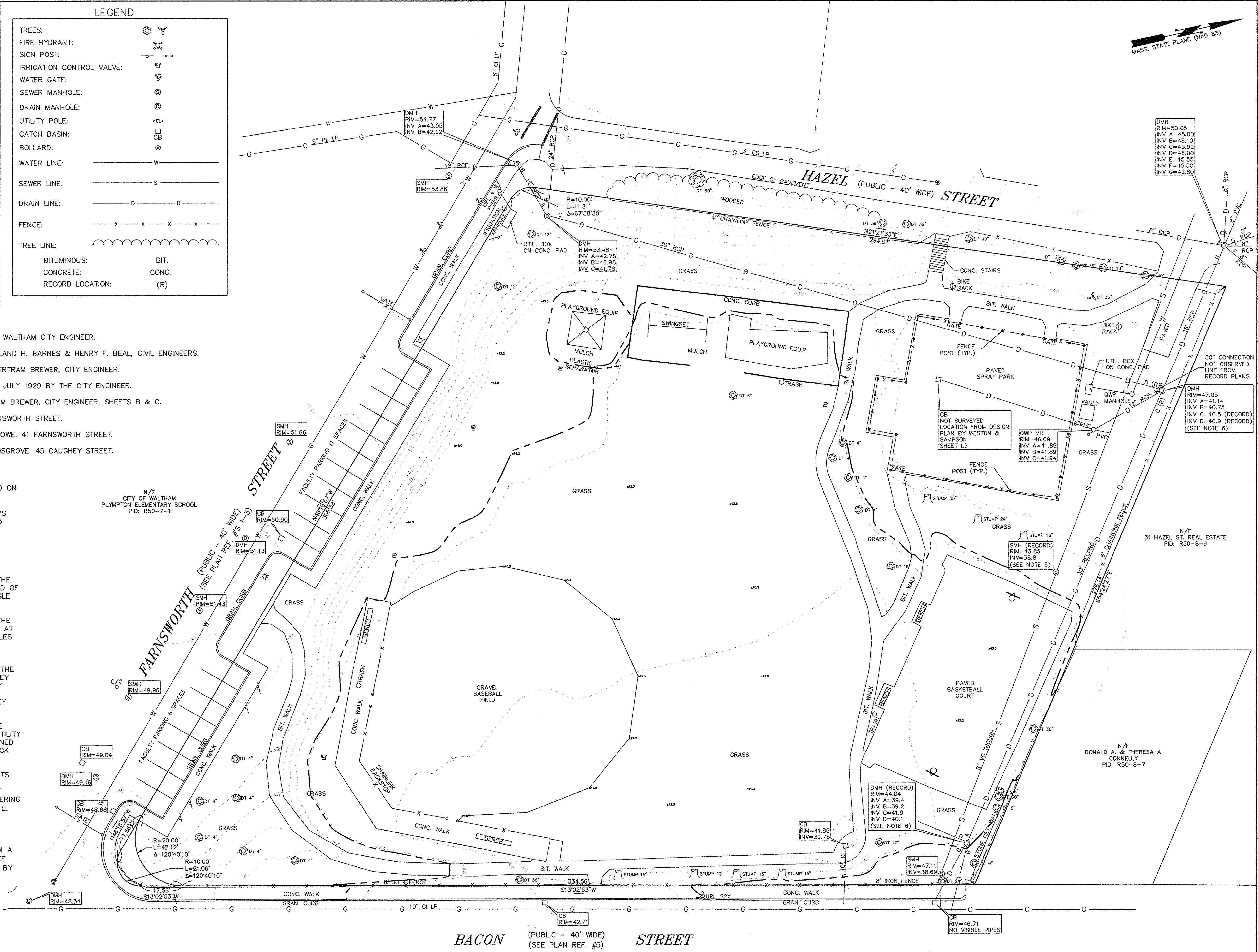
1. PLAN AND PROFILE OF FARNSWORTH STREET DATED JUNE 1927 BY THE WALTHAM CITY ENGINEER.
2. PLAN AND PROFILE OF FARNSWORTH STREET DATED MAY 1925 BY ROWLAND H. BARNES & HENRY F. BEAL, CIVIL ENGINEERS.
3. PLAN AND PROFILE OF FARNSWORTH STREET DATED MARCH 1904 BY BERTRAM BREWER, CITY ENGINEER.
4. PLAN OF THE BRADFORD W. DRAKE PLAYGROUND, WALTHAM, MA DATED JULY 1929 BY THE CITY ENGINEER.
5. PLAN AND PROFILE OF BACON STREET DATED JUNE 1, 1899 BY BERTRAM BREWER, CITY ENGINEER, SHEETS B & C.
6. DEED BOOK 58004 PAGE 313 GRANTED TO HARI ARSETTY. 37-39 FARNSWORTH STREET.
7. DEED BOOK 32081 PG 511 GRANTED TO CHRISTOPHER G. & EILEEN F. LOWE. 41 FARNSWORTH STREET.
8. DEED BOOK 9636 PAGE 196 GRANTED TO WILLIAM M. & THERESA A. COSGROVE. 45 CAUGHEY STREET.

NOTES:

1. THE BEARINGS AND DISTANCES AND THE COORDINATES THEY ARE BASED ON SHOWN ON THIS PLAN ARE IN U.S. SURVEY FEET IN THE MASSACHUSETTS STATE PLANE COORDINATE SYSTEM REFERENCED TO THE NORTH AMERICAN DATUM OF 1983, CORRS ADJUSTMENT (NAD83/CORS) AS DETERMINED BY GPS OBSERVATIONS MADE BETWEEN THE DATES OF OCT. 9, AND OCT. 16, 2013 USING THE KEYNET GPS VIRTUAL REFERENCE SYSTEM (VRS)
2. ELEVATIONS, IN U.S. SURVEY FEET, ARE REFERENCED TO THE NORTH AMERICAN VERTICAL DATUM OF 1988 (NAVD88) UTILIZING THE FOLLOWING BENCHMARKS:
 MASSDOT POINT ID 16614, STATION CR 62, A CHISELED SQUARE IN THE SOUTHEASTERN PART OF WALTHAM IN THE TOP OF THE NORTH END OF THE EAST PARAPET OF NORTH ABUTMENT AT THE FARWELL STREET SINGLE ARCH BRIDGE OVER THE CHARLES RIVER. ELEV.=34.05 NAVD88
 MASSDOT POINT ID 16617, STATION CR 66, A CHISELED SQUARE IN THE CENTRAL PART OF WALTHAM IN THE CURVED GRANITE PARAPET AT THE SOUTHEAST CORNER OF THE NEWTON STREET BRIDGE OVER THE CHARLES RIVER. ELEV.=28.00 NAVD88.
3. THE PROPERTY LINES SHOWN HEREON ARE BASED ON BOUNDS FOUND OFF-LOCUS, AS THERE WERE NO STREET LINE MONUMENTS RECOVERED IN THE PROJECT AREA. BOUNDS WERE RECOVERED AND FIELD LOCATED ON CAUGHEY AND GUINAN STREETS AND COMPARED WITH R.O.W. AND RECORD PROPERTY MONUMENTS ON FARNSWORTH AND BACON STREETS SOUTH OF THE PLAYGROUND. A BEST FIT WAS OBTAINED BY HOLDING BOUNDS ON CAUGHEY AND GUINAN STREETS.
4. ALL UNDERGROUND UTILITIES SHOWN ARE APPROXIMATE ONLY AND WERE COMPILED ACCORDING TO AVAILABLE RECORD PLANS FROM THE VARIOUS UTILITY COMPANIES AND PUBLIC AGENCIES. ACTUAL LOCATIONS MUST BE DETERMINED IN THE FIELD. BEFORE DESIGNING, EXCAVATING, BLASTING, INSTALLING, BACK FILLING, GRADING, PAVEMENT RESTORATION OR REPAIRING, ALL UTILITY COMPANIES, PUBLIC & PRIVATE, MUST BE NOTIFIED INCLUDING THOSE IN CONTROL OF UTILITIES NOT SHOWN ON THIS PLAN. SEE CHAPTER 370, ACTS OF 1963, MASSACHUSETTS. ALPHA LS ASSUMES NO RESPONSIBILITY FOR DAMAGES INCURRED AS A RESULT OF UTILITIES OMITTED OR INACCURATELY SHOWN. BEFORE FUTURE CONNECTIONS, THE APPROPRIATE UTILITY ENGINEERING DEPARTMENTS MUST BE CONSULTED. CALL "DIG SAFE" AT 1-888-DIG SAFE.
5. PER WALTHAM WIRES DEPARTMENT, NO INFORMATION IS AVAILABLE REGARDING UNDERGROUND ELECTRIC LINES.
6. STRUCTURE LOCATIONS AND INVERTS, NOTED AS (RECORD), TAKEN FROM A PLAN ENTITLED "EXISTING CONDITIONS SURVEY "PLYMPTON SCHOOL" "DRAKE PLAYGROUND" WALTHAM, MASSACHUSETTS (MIDDLESEX COUNTY) PREPARED BY WELCH ASSOCIATES, LAND SURVEYORS, INC. DATED AUGUST 9, 2000.

OWNER OF RECORD:

CITY OF WALTHAM
 PID: R50-8-8
 17 HAZEL STREET
 AREA=95,247± Sq. Ft.
 2.186± ACRES



I CERTIFY THE LOCATIONS ON THIS PLAN RESULT FROM AN ACTUAL SURVEY MADE ON THE GROUND.

Robert A. Perruzzi
 REGISTERED PROFESSIONAL LAND SURVEYOR
 FOR ALPHA SURVEYING & ENGINEERING, INC.
 DATE 9-28-2015

PREPARED FOR
CAROLYN COONEY & ASSOCIATES
 13 ELM STREET
 MILFORD, MA 01757

DATE 12/3/2013
 SCALE 1"=20'
 DRAWN AMC
 CHECKED JEF

REVISION
 DATE 9/28/15
 ADDED RECORD UTILITY INFO

**EXISTING CONDITIONS PLAN
 DRAKE PLAYGROUND
 17 HAZEL STREET
 WALTHAM, MASSACHUSETTS**

JOB NO. 13172
 SHEET NO. 1 of 1
 DWN. NO. 13172

DEMOLITION LEGEND

- REMOVE & DISPOSE OF BITUMINOUS CONCRETE PAVING
- REMOVE & DISPOSE OF EXIST PLAY AREA: EQUIPMENT, FOOTINGS AND SURFACING
- REMOVE & DISPOSE OF CONCRETE PAVING
- EXISTING WOODS. CLEAR AND GRUB AS NECESSARY TO INSTALL NEW IMPROVEMENTS. REFER TO SECTIONS 1,2/L-12
- REMOVE & DISPOSE OF SOIL IN OUTFIELD TO A DEPTH OF 8" BELOW PROPOSED FINISHED GRADE
- REMOVE & DISPOSE OF 4" DEPTH OF EXISTING INFIELD MIX OR SOIL
- REMOVE & DISPOSE OF CHAIN LINK FENCE & FOOTINGS
- REMOVE & DISPOSE OF EXISTING TREE AND STUMP
- REMOVE & DISPOSE OF EXISTING STUMP
- STRAW WATTLE EROSION CONTROL
- EXISTING TREE TO REMAIN
- EXISTING TREE TO REMAIN WITH TRUNK PROTECTION

REFER TO SITE PREPARATION PLAN 1B FOR GENERAL & SPECIAL NOTES, AND TEMPORARY SITE FENCING.

REMOVE & DISPOSE OF BITUMINOUS CONCRETE PAVING

REMOVE & DISPOSE OF CONCRETE SIDEWALK PAVING TO NEAREST JOINT EAST OF ELECTRIC POLE. REMOVE & DISPOSE OF GRANITE CURBING & ROADWAY PAVING AS NECESSARY TO INSTALL NEW CURB TO NEAREST JOINT BEYOND EASTERN EDGE OF HC RAMP,

APPROX. LOCATION OF EX. ELECTRICAL LINE FROM NSTAR UTILITY POLE #4 ON FARNSWORTH STREET TO SPRAY PARK ELECTRICAL CABINET. EXACT LOCATION UNKNOWN.

REMOVE & DISPOSE OF CHAIN LINK FENCE & FOOTINGS

APPROX. AREA OF EXISTING WOODS. CLEAR & GRUB AS NECESSARY TO INSTALL NEW CHAIN LINK FENCE, INCLUDING STUMPS OF ANY REMOVED TREES. REMOVE UNDERGROWTH & SAPLING TREES AS DESCRIBED IN DETAILS 1,2/L-12.

EX. CHAIN LINK FENCING TO REMAIN & BE PROTECTED

REMOVE & DISPOSE OF EXISTING CABINET, BACKFLOW PREVENTER AND APPURTENANCES. CONCRETE SLAB AND IRRIGATION CONTROLLER. SALVAGE SS CONTROLLER PEDESTAL FOR REUSE. MAINTAIN EXISTING ELECTRICAL SERVICE AND WATER SERVICE FOR CONNECTION TO NEW IRRIGATION SYSTEM

EXISTING TREES TO REMAIN AND BE PROTECTED, TYP. 3 L.18

REMOVE & DISPOSE OF NET CLIMBER & FOOTINGS, MULCH & CURBING.

OUTLINE OF AREA OF NEW PAVING

REMOVE & DISPOSE OF PLAY EQUIPMENT, FOOTINGS, MULCH & CURBING

REMOVE & DISPOSE OF CONCRETE SIDEWALK PAVING - GRANITE CURB TO REMAIN & BE PROTECTED

EXCAVATE & DISPOSE OF SOIL FROM OUTFIELD TO A DEPTH OF 8" BELOW PROPOSED FINISHED GRADE, AND R&D EXISTING IRRIGATION SYSTEM

SAWCUT OR REMOVE TO NEAREST JOINT, TYP.

IN INFIELD, EXCAVATE AND DISPOSE OF 8" BELOW PROP. FIN. GRADE

4 L.23 STRAW WATTLE CONTINUOUS AT LIMIT OF GRADING

REMOVE & DISPOSE OF BITUMINOUS CONCRETE PAVING, TYPICAL, SAWCUT AT LIMIT OF REMOVAL

REMOVE & SALVAGE EXISTING 10 X 20 SHADE SHELTER, AND 2 BENCHES, FOR REINSTALLATION AT PROSPECT HILL PARK. R&D FOOTINGS. REFER TO SECTION 02800, SITE FURNISHINGS.

REMOVE & DISPOSE OF PORTION OF BITUMINOUS CONCRETE PAVING, SAW-CUT AT LIMIT OF REMOVAL

REMOVE & DISPOSE OF PORTION OF CHAIN LINK FENCING & FOOTINGS

REMOVE & DISPOSE OF ALL EXISTING STUMPS, TYP.

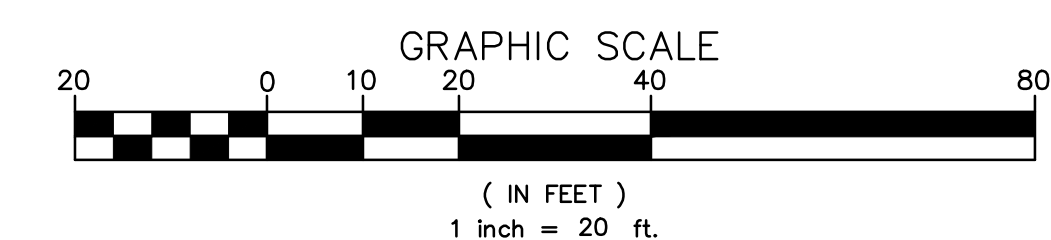
REMOVE & DISPOSE OF EXISTING TREE & STUMP, TYP.

3 L.18 EXISTING TREE TO REMAIN AND BE PROTECTED

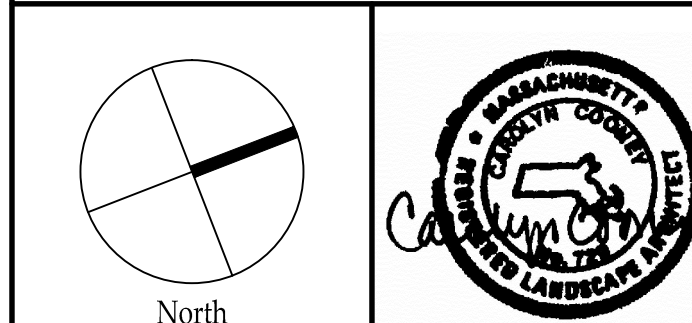
REMOVE & DISPOSE OF TWO BASKETBALL STANDARDS, BACKBOARDS & GOALS. SAW-CUT EXISTING PAVING TO DIMENSION NECESSARY AND REMOVE FOOTINGS IN THEIR ENTIRETY.

5 L.23 INSTALL CATCH BASIN SILT BAG AT EXISTING CATCH BASIN TO BE REPLACED. DO NOT DEMOLISH EX. CB. UNTIL NEW CB. UNIT IS ONSITE AND INSTALLATION CAN PROCEED IMMEDIATELY.

REFER TO SHEET L.1B FOR ADDITIONAL TREE & SHRUB REMOVAL



No.	Description	Date
REVISIONS		



Project:
**CITY OF WALTHAM
DRAKE PLAYGROUND
3 HAZEL STREET
WALTHAM, MA 02451**

Prepared For:
**CITY OF WALTHAM
DEPARTMENT OF RECREATION
510 MOODY STREET
WALTHAM, MA 02453**

TITLE:
**SITE PREPARATION
PLAN 1**

Scale 1" = 20' Date NOV 10, 2015
Drawn By CCC
Checked By DRB
Approved By CCC
Project No. 1313.00

DWG No. **L-1A**

SPECIAL NOTES

1. THE WORK OF THIS CONTRACT IS SUBJECT TO AN ORDER OF CONDITIONS ISSUED BY THE WALTHAM CONSERVATION COMMISSION. SEE SPEC SECTION 01571 AND APPENDIX A, ORDER OF CONDITIONS. THE CONTRACTOR SHALL NOTIFY THE WALTHAM CONSERVATION COMMISSION IN WRITING IN ADVANCE OF ANY WORK ON THE PROJECT. THE CONSERVATION COMMISSION MAY REQUIRE AN ON-SITE MEETING PRIOR TO THE START OF CONSTRUCTION.
2. PRIOR TO ANY CONSTRUCTION, PROVIDE EROSION CONTROLS, PROJECT SIGN AND DEP WETLANDS SIGN AS REQUIRED BY THE ORDER OF CONDITIONS. DO NOT BEGIN WORK UNTIL APPROVAL FROM THE CONSERVATION COMMISSION.
3. WHERE SOD IS SCHEDULED, STRIP EXISTING TURF AND LOAM.

GENERAL NOTES:

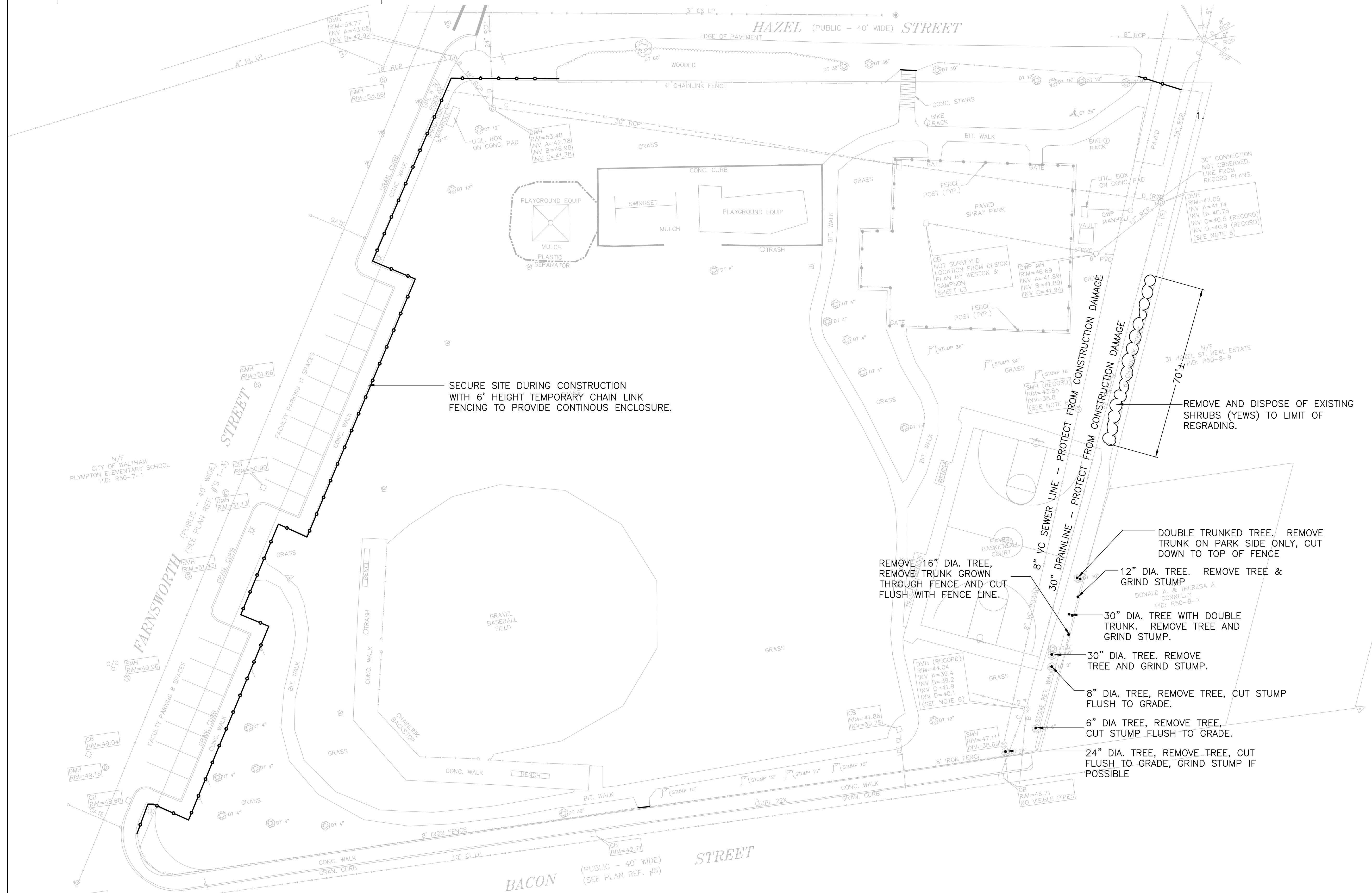
1. SITE INSPECTION: BIDDERS ARE REQUIRED TO INSPECT THE SITE TO VERIFY EXISTING CONDITIONS AND WILL BE HELD RESPONSIBLE FOR THE FULL EXTENT OF WORK REQUIRED.
2. THE CONTRACTOR SHALL REPORT ALL DEVIATIONS IN EXISTING CONDITIONS TO THE LANDSCAPE ARCHITECT (508) 478-8426, PRIOR TO STARTING WORK.
3. SAW CUT AT THE LIMIT OF DEMOLITION OF PAVING.
4. UTILITY LOCATIONS HAVE BEEN TAKEN FROM EXISTING CONDITIONS DRAWINGS AS AVAILABLE. LOCATION AND DEPTH OF UTILITIES ARE APPROXIMATE. NO GUARANTEE IS EXPRESSED OR IMPLIED THAT UTILITY LINES ARE AT THE LOCATIONS OR DEPTH SHOWN. PRIOR TO ANY EXCAVATION, CONFIRM IN WRITING TO THE LANDSCAPE ARCHITECT

AND CITY THAT YOU HAVE CONTACTED: (1) "DIG SAFE" (811) TO MARK THE LOCATION OF RECORDED UTILITIES, AND (2) THE CITY ENGINEERING DEPARTMENT FOR SITE INFORMATION. THE CONTRACTOR SHALL PROVIDE THE "DIG SAFE" NUMBER INDICATING THAT ALL EXISTING UTILITIES HAVE BEEN LOCATED AND MARKED BOTH ON AND OFF THE PROJECT SITE.

5. SPRAY PAINT: DO NOT LEAVE PAINT CANS UNATTENDED AT ANY TIME. THE CONTRACTOR SHALL BE RESPONSIBLE FOR CLEAN-UP AND REMOVAL OF ALL GRAFFITI RESULTING FROM UNATTENDED OR CARELESSLY DISCARDED PAINT OR OTHER MATERIAL.

6. THE CONTRACTOR SHALL PROTECT ABUTTING PROPERTIES AND EXISTING SITE ELEMENTS TO REMAIN. ANY DAMAGE INCURRED SHALL BE REPAIRED BY THE CONTRACTOR AT NO ADDITIONAL COST TO THE CITY OF WALTHAM.

7. STRIP TOPSOIL FROM EXISTING LAWN AREAS THAT ARE SCHEDULED FOR REGRADING OR REPAVING. IT SHALL BE THE CONTRACTORS OPTION TO STOCKPILE AND REUSE UNADULTERATED TOPSOIL IF IT MEETS THE SPECIFICATIONS FOR LOAM AND IS AMENDED PER SOIL TESTING RECOMMENDATIONS.



SECURE SITE DURING CONSTRUCTION WITH 6' HEIGHT TEMPORARY CHAIN LINK FENCING TO PROVIDE CONTINUOUS ENCLOSURE.

REMOVE AND DISPOSE OF EXISTING SHRUBS (YEWS) TO LIMIT OF REGRADING.

- REMOVE 16" DIA. TREE, REMOVE TRUNK GROWN THROUGH FENCE AND CUT FLUSH WITH FENCE LINE.
- REMOVE 12" DIA. TREE. REMOVE TREE & GRIND STUMP
- 30" DIA. TREE WITH DOUBLE TRUNK. REMOVE TREE AND GRIND STUMP.
- 30" DIA. TREE. REMOVE TREE AND GRIND STUMP.
- 8" DIA. TREE, REMOVE TREE, CUT STUMP FLUSH TO GRADE.
- 6" DIA TREE, REMOVE TREE, CUT STUMP FLUSH TO GRADE.
- 24" DIA. TREE, REMOVE TREE, CUT FLUSH TO GRADE, GRIND STUMP IF POSSIBLE

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 Sharon, Massachusetts 02067
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 FAX: (781) 784-0492
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No.	Description	Date
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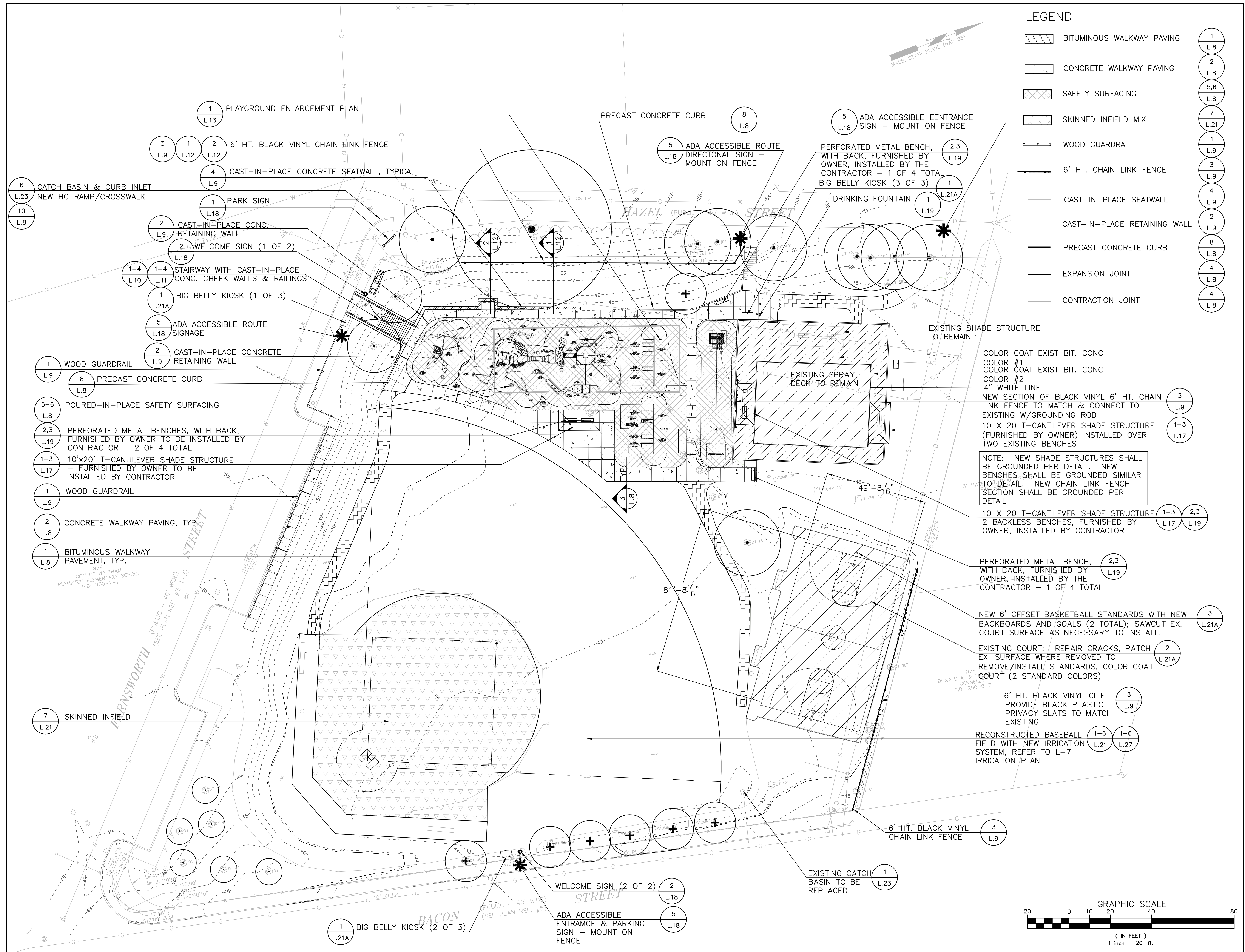
Project:
**CITY OF WALTHAM
 DRAKE PLAYGROUND
 3 HAZEL STREET
 WALTHAM, MA 02451**

Prepared For:
**CITY OF WALTHAM
 DEPARTMENT OF RECREATION
 510 MOODY STREET
 WALTHAM, MA 02453**

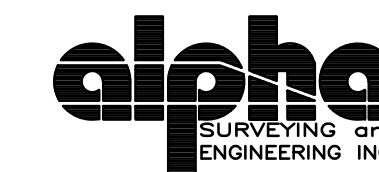
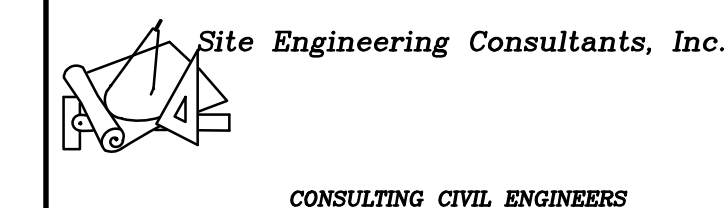
TITLE:
**SITE PREPARATION
 PLAN 2**

Scale 1" = 20' Date NOV 10, 2015
 Drawn By CCC
 Checked By DRB
 Approved By CCC
 Project No. 1313.00

DWG No. **L-1B**



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[North Arrow]	[Professional Seal]
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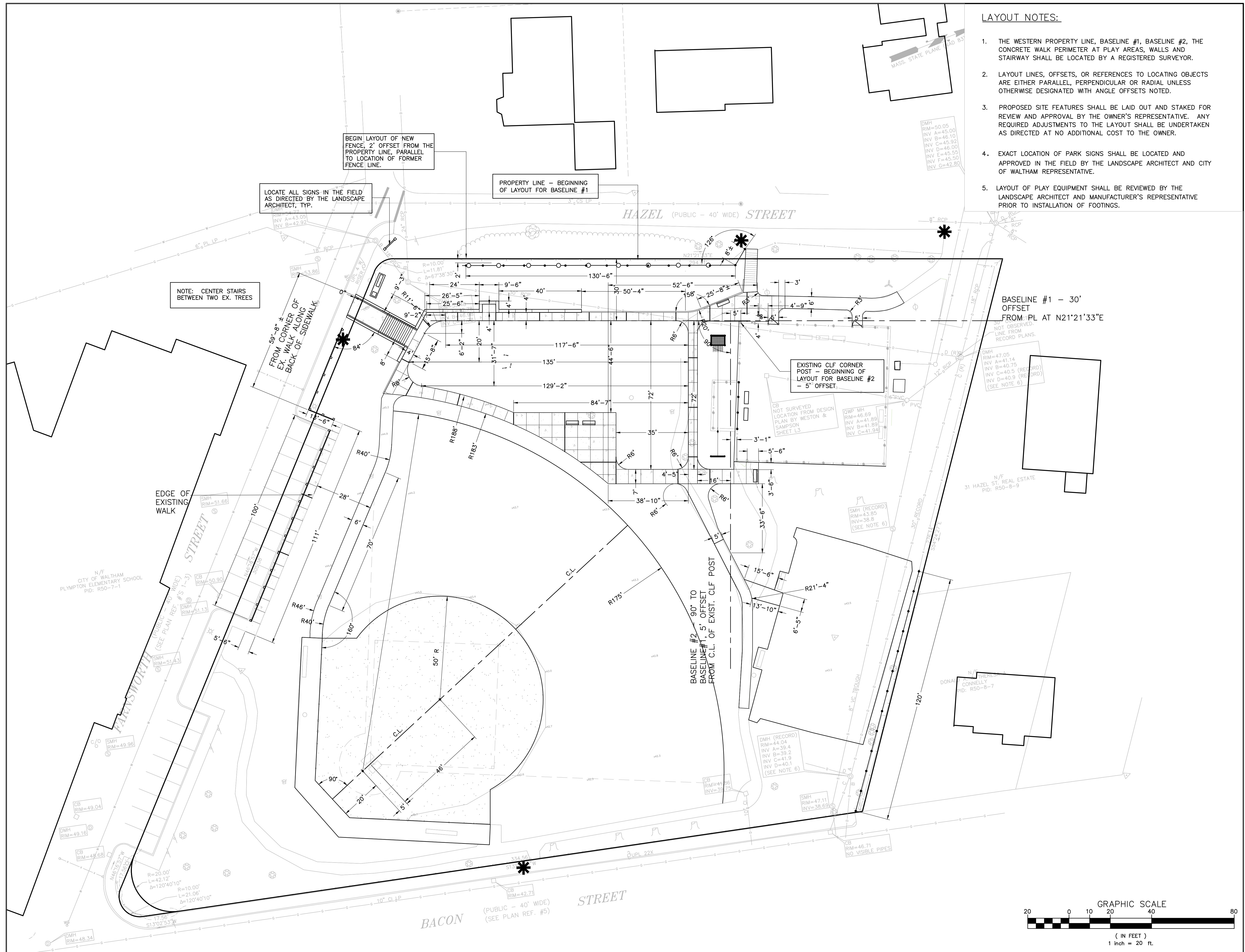
Project:
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 WALTHAM, MA 02451**

Prepared For:
**CITY OF WALTHAM
 DEPARTMENT OF RECREATION
 510 MOODY STREET
 WALTHAM, MA 02453**

TITLE:
MATERIALS PLAN

Scale 1" = 20' Date NOV 10, 2015
 Drawn By CCC
 Checked By DRB
 Approved By CCC
 Project No. 1313.00

DWG No. **L-2**



LAYOUT NOTES:

1. THE WESTERN PROPERTY LINE, BASELINE #1, BASELINE #2, THE CONCRETE WALK PERIMETER AT PLAY AREAS, WALLS AND STAIRWAY SHALL BE LOCATED BY A REGISTERED SURVEYOR.
2. LAYOUT LINES, OFFSETS, OR REFERENCES TO LOCATING OBJECTS ARE EITHER PARALLEL, PERPENDICULAR OR RADIAL UNLESS OTHERWISE DESIGNATED WITH ANGLE OFFSETS NOTED.
3. PROPOSED SITE FEATURES SHALL BE LAID OUT AND STAKED FOR REVIEW AND APPROVAL BY THE OWNER'S REPRESENTATIVE. ANY REQUIRED ADJUSTMENTS TO THE LAYOUT SHALL BE UNDERTAKEN AS DIRECTED AT NO ADDITIONAL COST TO THE OWNER.
4. EXACT LOCATION OF PARK SIGNS SHALL BE LOCATED AND APPROVED IN THE FIELD BY THE LANDSCAPE ARCHITECT AND CITY OF WALTHAM REPRESENTATIVE.
5. LAYOUT OF PLAY EQUIPMENT SHALL BE REVIEWED BY THE LANDSCAPE ARCHITECT AND MANUFACTURER'S REPRESENTATIVE PRIOR TO INSTALLATION OF FOOTINGS.

BEGIN LAYOUT OF NEW FENCE, 2' OFFSET FROM THE PROPERTY LINE, PARALLEL TO LOCATION OF FORMER FENCE LINE.

PROPERTY LINE - BEGINNING OF LAYOUT FOR BASELINE #1

LOCATE ALL SIGNS IN THE FIELD AS DIRECTED BY THE LANDSCAPE ARCHITECT, TYP.

NOTE: CENTER STAIRS BETWEEN TWO EX. TREES

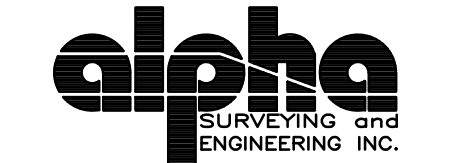
EXISTING CLF CORNER POST - BEGINNING OF LAYOUT FOR BASELINE #2 - 5' OFFSET.

BASELINE #1 - 30' OFFSET FROM PL AT N21°21'33"E

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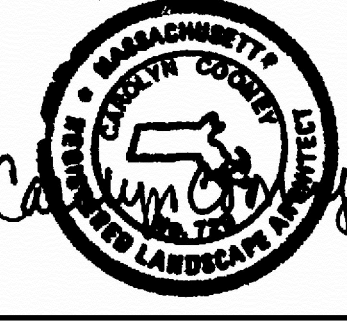
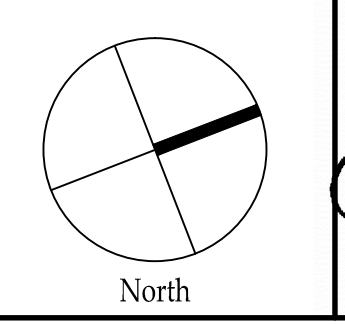
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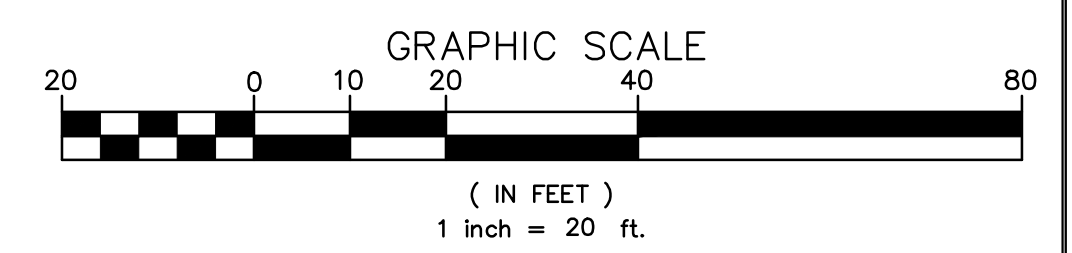
Project:
**CITY OF WALTHAM
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Prepared For:
**CITY OF WALTHAM
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510 MOODY STREET
WALTHAM, MA 02453**

TITLE:
LAYOUT PLAN

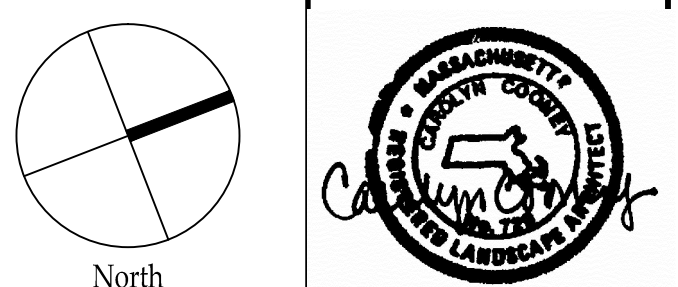
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DWG No. **L-3**



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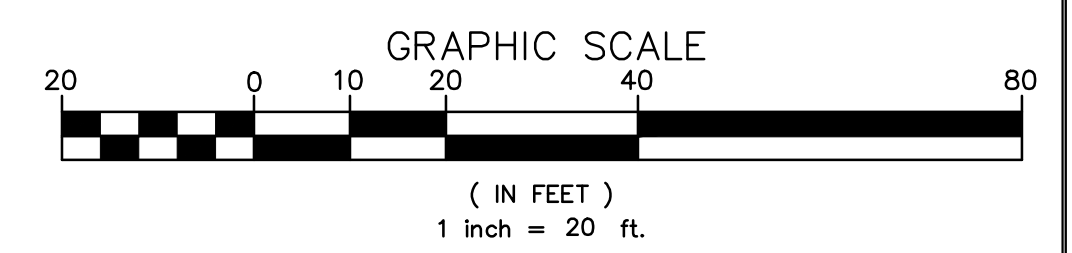
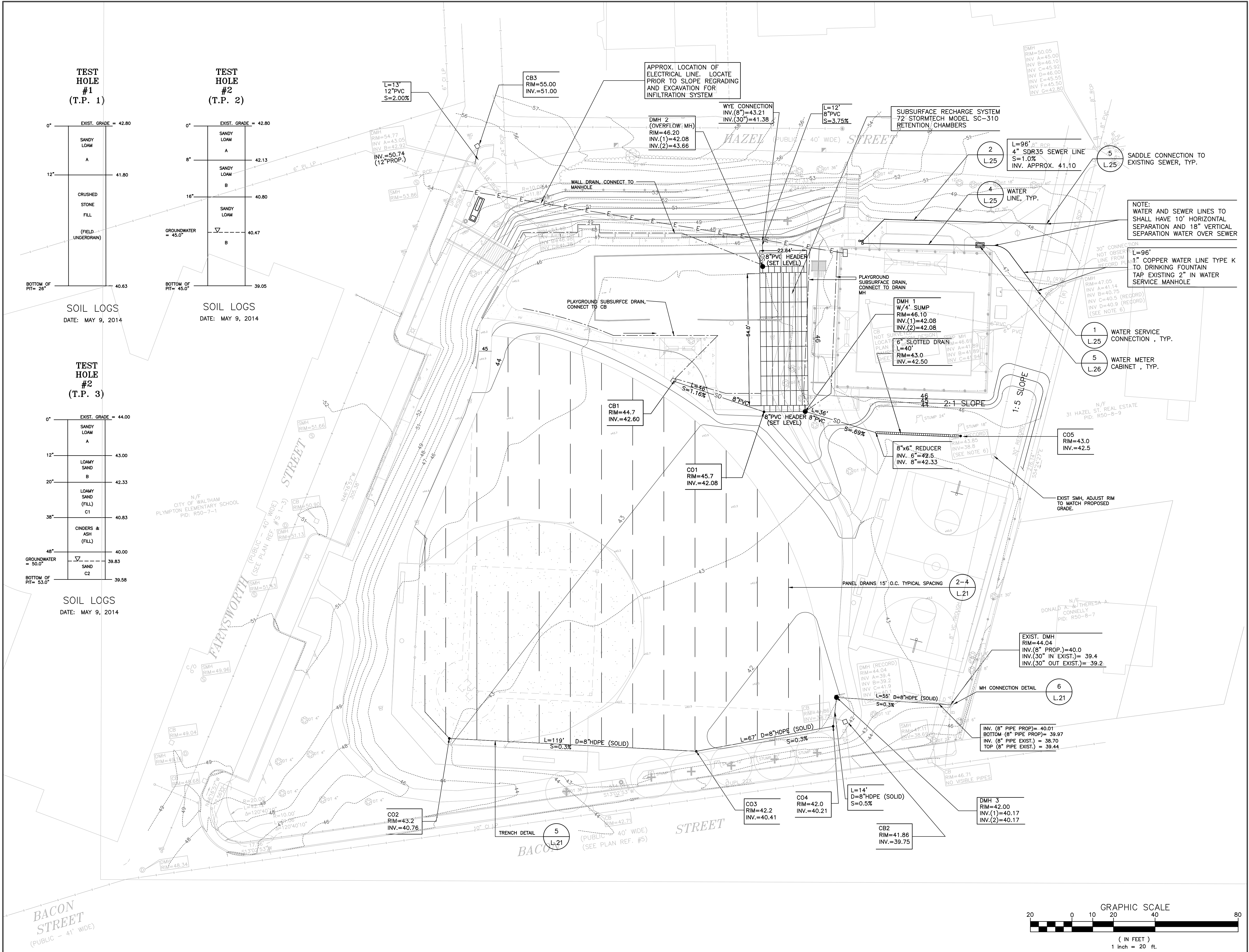
Project:
**CITY OF WALTHAM
DRAKE PLAYGROUND
3 HAZEL STREET
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Prepared For:
**CITY OF WALTHAM
DEPARTMENT OF RECREATION
510 MOODY STREET
WALTHAM, MA 02453**

TITLE:
DRAINAGE & UTILITY PLAN

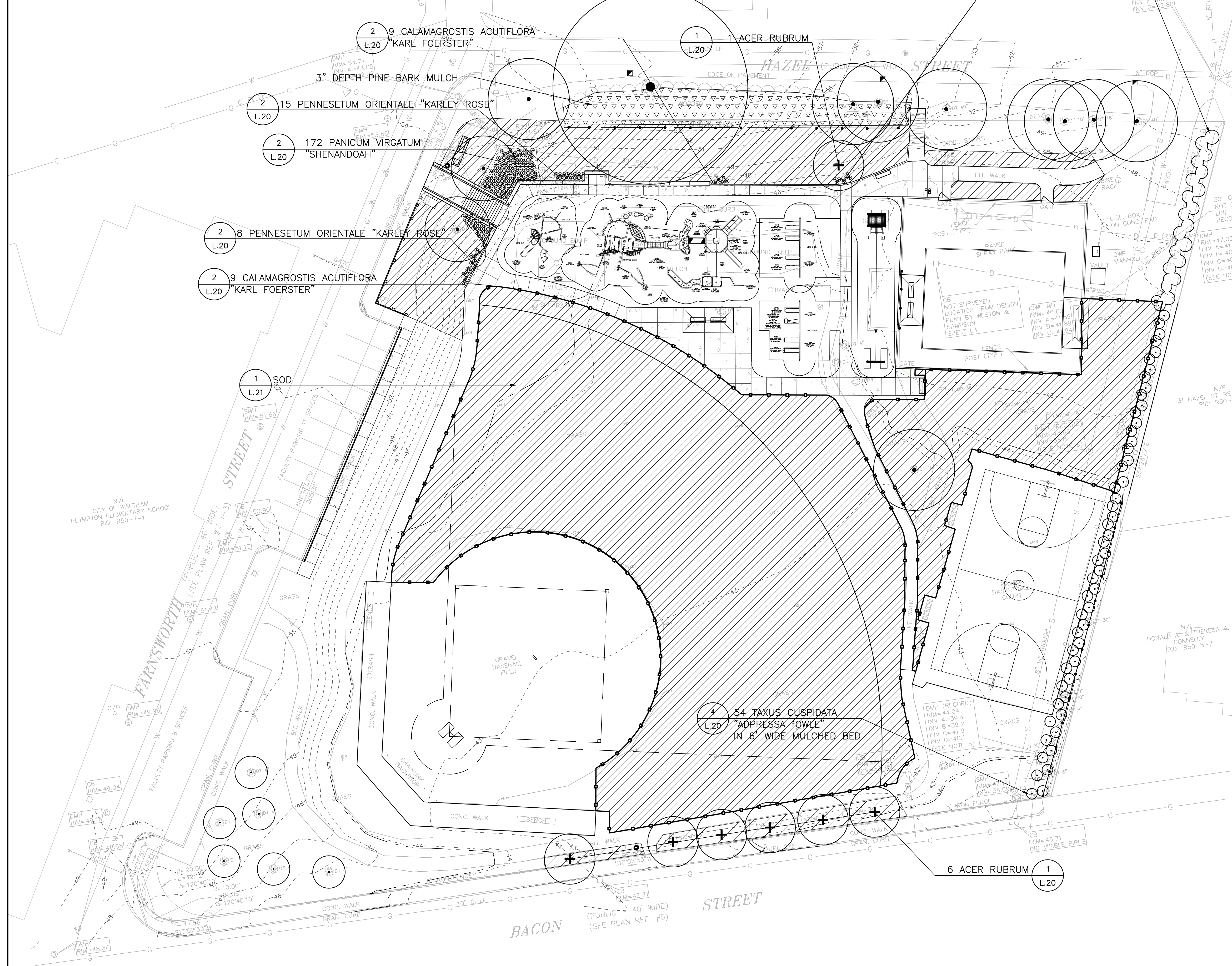
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DWG No. **L-5**



PLANT SCHEDULE

SCIENTIFIC NAME	COMMON NAME	SIZE	SPACING	QUANTITY	COMMENTS
SHADE TREES					
Acer rubrum	Red Maple "Autumn Glory"	3-1/2 to 4" Caliper	As Shown	7	
SHRUBS					
Taxus baccata adpressa Fowle	Midet Boxleaf Yew	18"24"	4-6" O.C.	54	Container
GRASSES					
Calamagrostis acutiflora "Karl Foerster"	Karl Foerster Feather Reed Grass	2 gallon	18" O.C.	18	
Panicum virgatum "Shenandoah"	Red Switch Grass	1 gallon	18" O.C.	172	
Pennisetum Orientale "Karley Rose"	Karley Rose Fountain Grass	1 gallon	18" O.C.	31	
SOD					
See specifications					



LEGEND

- 1 L.21 [Hatched Box] SOD
- [Triangle Box] MULCH AREA OF CLEARING, 3" DEPTH.
- 1 L.20 [Circle with +] NEW TREE
- [Circle with dot] EXISTING TREE
- [Line with square] TEMPORARY SNOW FENCE

PLANTING NOTES

GENERAL NOTES:

- RESTORE ALL LAWN AREAS DISTURBED BY CONSTRUCTION.

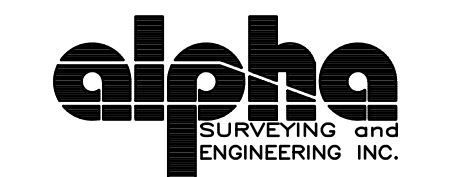
SPECIAL NOTES:

- THIS PROJECT IS SUBJECT TO THE ORDER OF CONDITIONS INCLUDED IN APPENDIX A OF THE SPECIFICATIONS. THE ORDER OF CONDITIONS PROVIDES SPECIAL CONDITIONS AND BEST MANAGEMENT PRACTICES FOR THE USE OF FERTILIZERS ON THE SITE. THESE REQUIREMENTS ARE INCLUDED IN SECTION 02902 - FERTILIZERS. PER THE ORDER OF CONDITIONS, THE USE OF A FERTILIZER THAT IS CONTROLLED RELEASE NITROGEN IS MANDATORY.
- THE CONTRACTOR SHALL INCLUDE IN THE COST OF HIS/HER BID PROVISION OF TEMPORARY WOOD OR PLASTIC SNOW FENCING IN LOCATIONS SHOWN TO PROTECT SOD AND GRASS AREAS. AFTER SEEDING OR SODDING, TO BE LEFT IN PLACE AT THE DISCRETION OF THE OWNER, AFTER FINAL ACCEPTANCE OF THE PROJECT.
- PROVIDE 3" DEPTH OF MULCH OVER AREA OF ORNAMENTAL GRASS PLANTING, SHRUB BED, TREE SAUCERS, AND AREA OF CLEARING INDICATED ON THE DRAWINGS.
- IT MAY BE NECESSARY TO PURCHASE PLANT MATERIAL FROM MORE THAN ONE VENDOR. NO SUBSTITUTIONS WILL BE APPROVED IF PLANT MATERIAL IS AVAILABLE FROM ANY COMMERCIAL NURSERY WITHIN A 50 MILE RADIUS OF THE SITE.
- LOAM AND SEED ALL LAWN AREAS DISTURBED BY CONSTRUCTION WHETHER OR NOT SPECIFICALLY SHOWN ON THE PLANTING PLAN.

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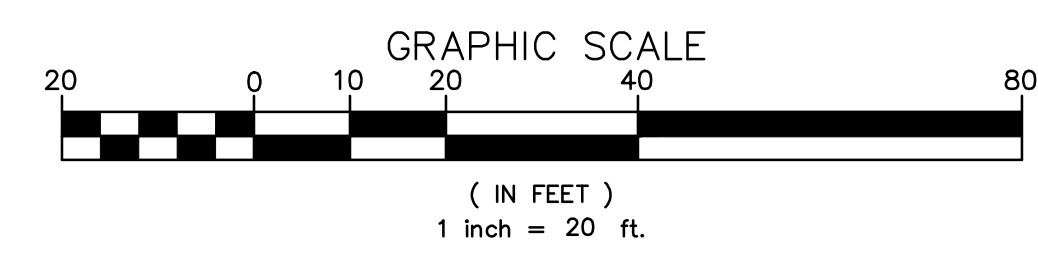
Project:
**CITY OF WALTHAM
DRAKE PLAYGROUND
3 HAZEL STREET
WALTHAM, MA 02451**

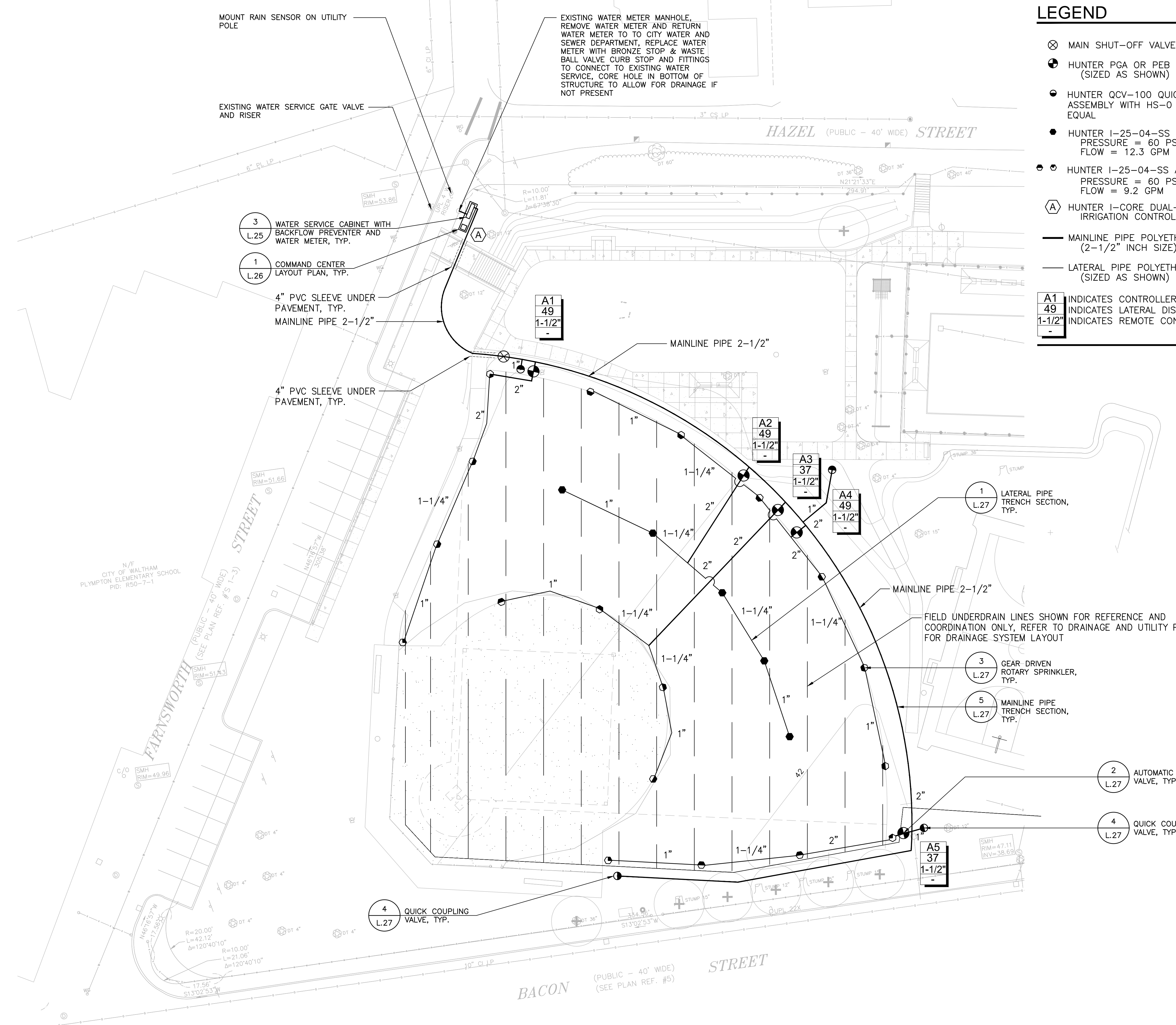
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510 MOODY STREET
WALTHAM, MA 02453**

TITLE:
PLANTING PLAN

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DWG No. **L-6**





LEGEND

Symbol	Description	Quantity
⊗	MAIN SHUT-OFF VALVE	1
⊕	HUNTER PGA OR PEB REMOTE CONTROL VALVE (SIZED AS SHOWN)	5
⊙	HUNTER QCV-100 QUICK COUPLING VALVE AND KEY ASSEMBLY WITH HS-0 HOSE SWIVEL ADAPTOR, OR EQUAL	4
●	HUNTER I-25-04-SS W/#13 NOZZLE FULL CIRCLE PRESSURE = 60 PSI RADIUS = 54 FEET FLOW = 12.3 GPM	5
⊙	HUNTER I-25-04-SS ADJUSTABLE ARC W/#8 NOZZLE PRESSURE = 60 PSI RADIUS = 50 FEET FLOW = 9.2 GPM	14
⊕	HUNTER I-CORE DUAL-2 2-WIRE IRRIGATION CONTROLLER W/12 STATIONS	1
—	MAINLINE PIPE POLYETHYLENE (PE) (2-1/2" INCH SIZE)	
—	LATERAL PIPE POLYETHYLENE (PE) (SIZED AS SHOWN)	

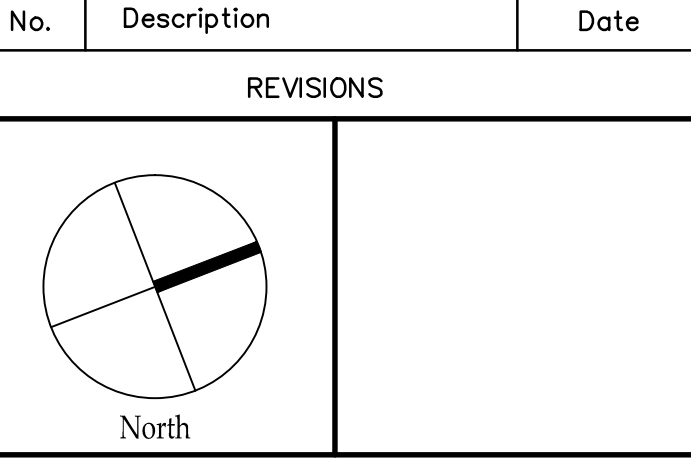
A1 49 INDICATES CONTROLLER AND CONTROLLER STATION NUMBER
49 INDICATES LATERAL DISCHARGE IN GPM
1-1/2" INDICATES REMOTE CONTROL VALVE SIZE

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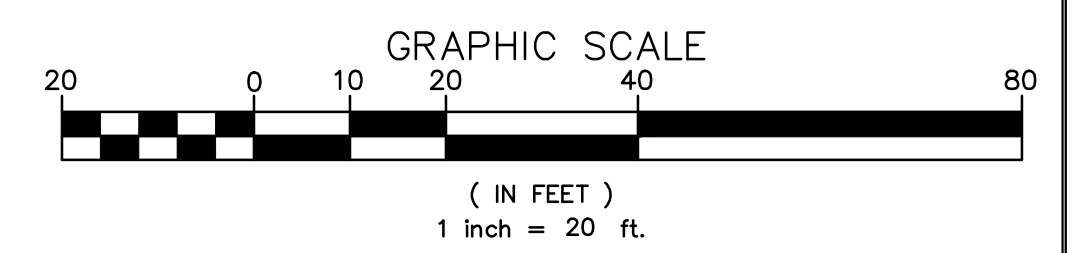
Project:
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 DRAKE PLAYGROUND
 3 HAZEL STREET
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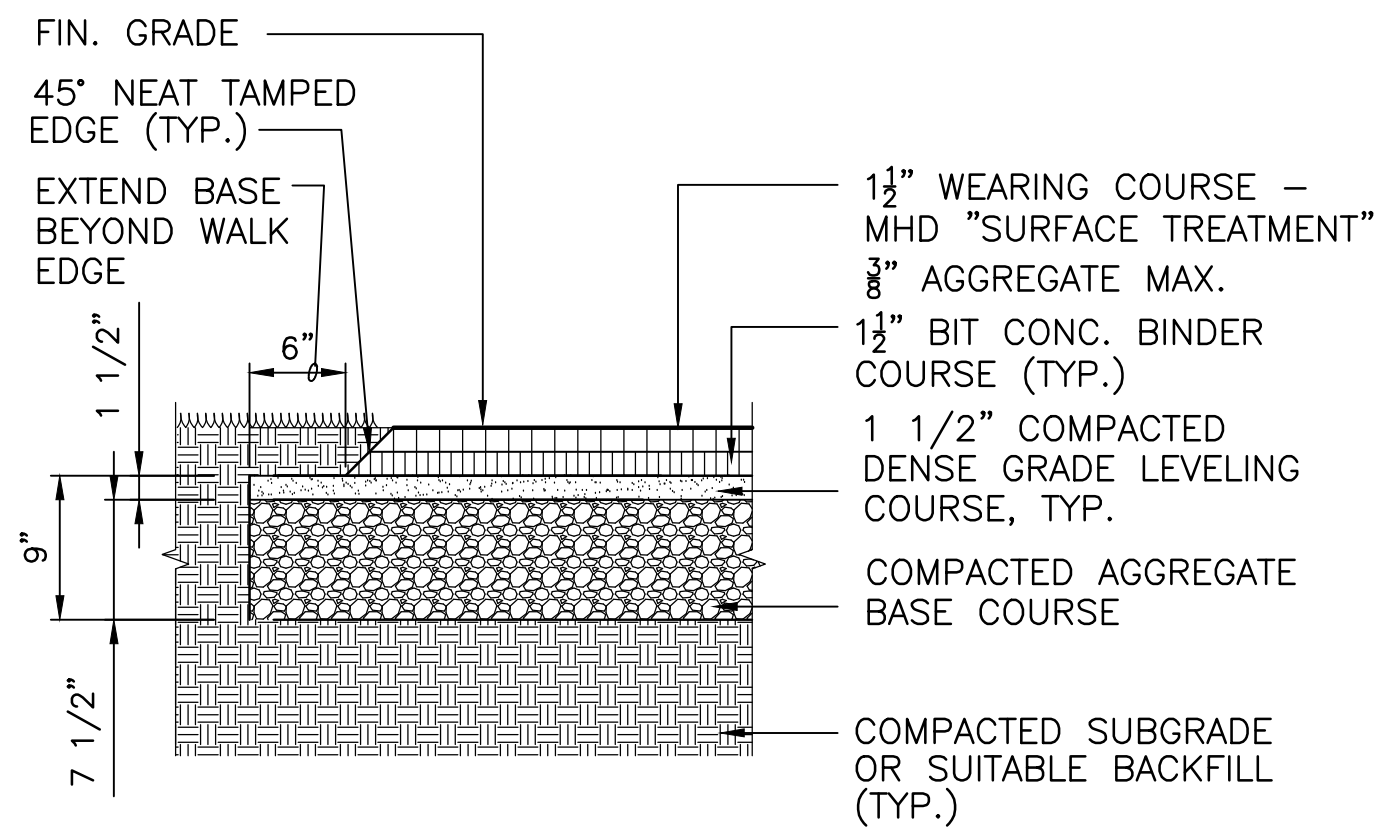
Prepared For:
**CITY OF WALTHAM
 DEPARTMENT OF RECREATION
 510 MOODY STREET
 WALTHAM, MA 02453**

TITLE:
IRRIGATION PLAN

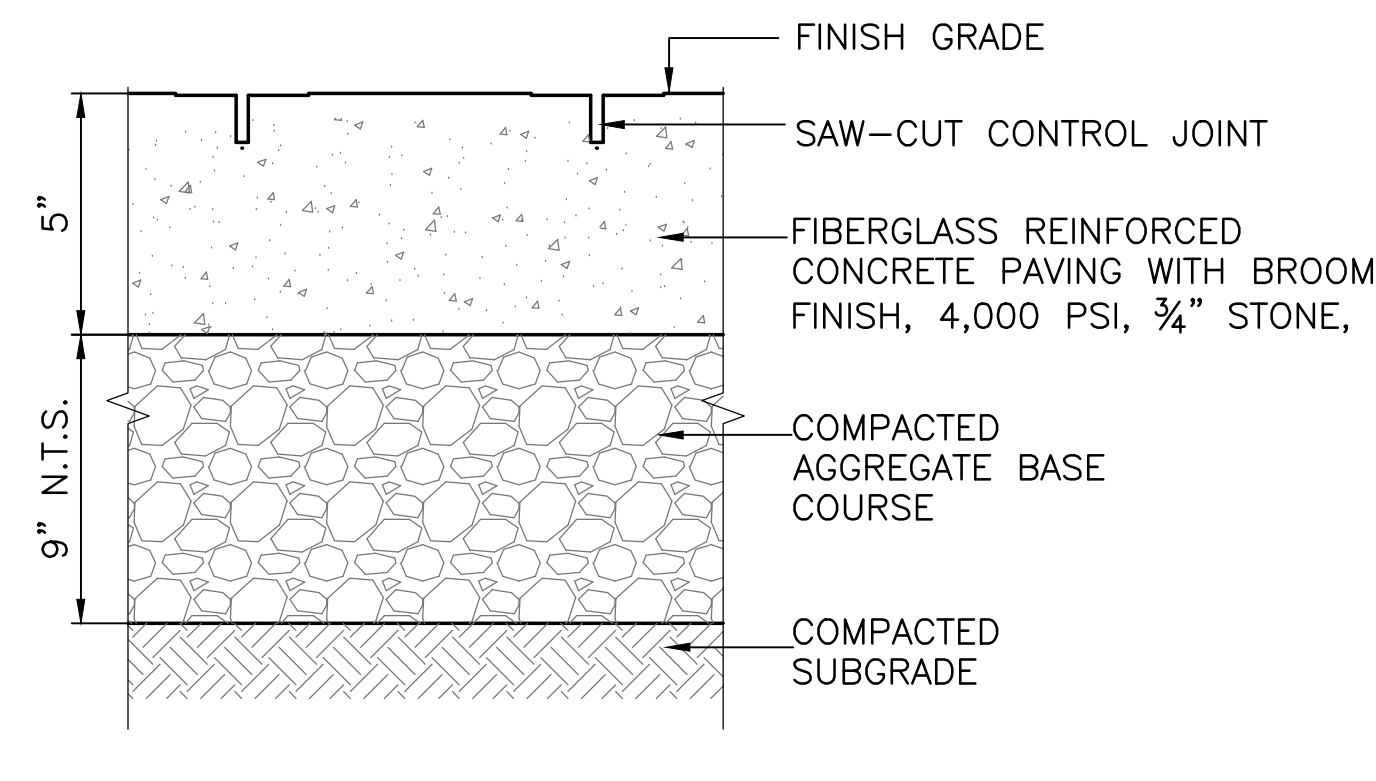
Scale 1" = 20' Date NOV 10, 2015
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 Approved By AS
 Project No. 1313.00

DWG No. **L-7**

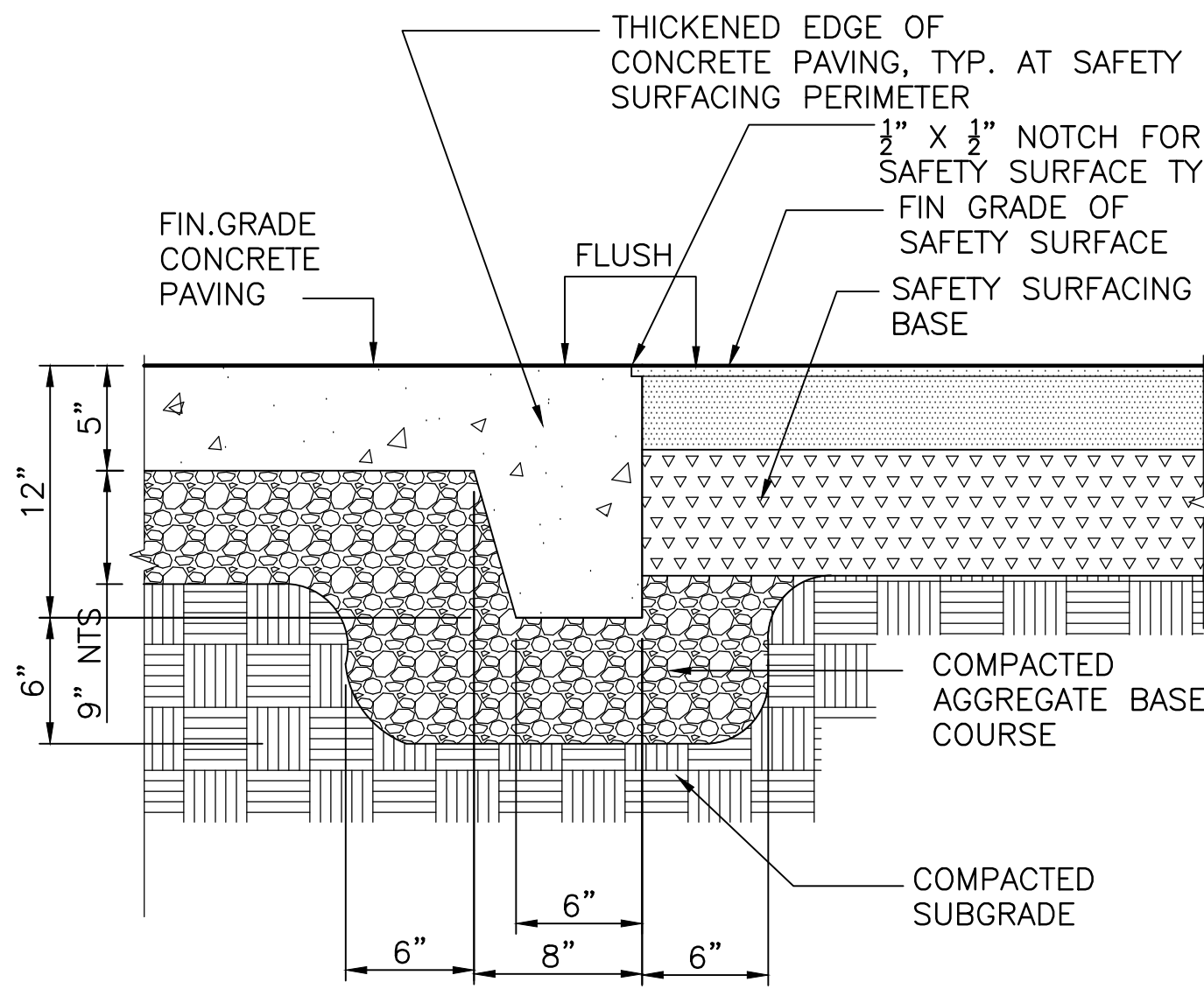




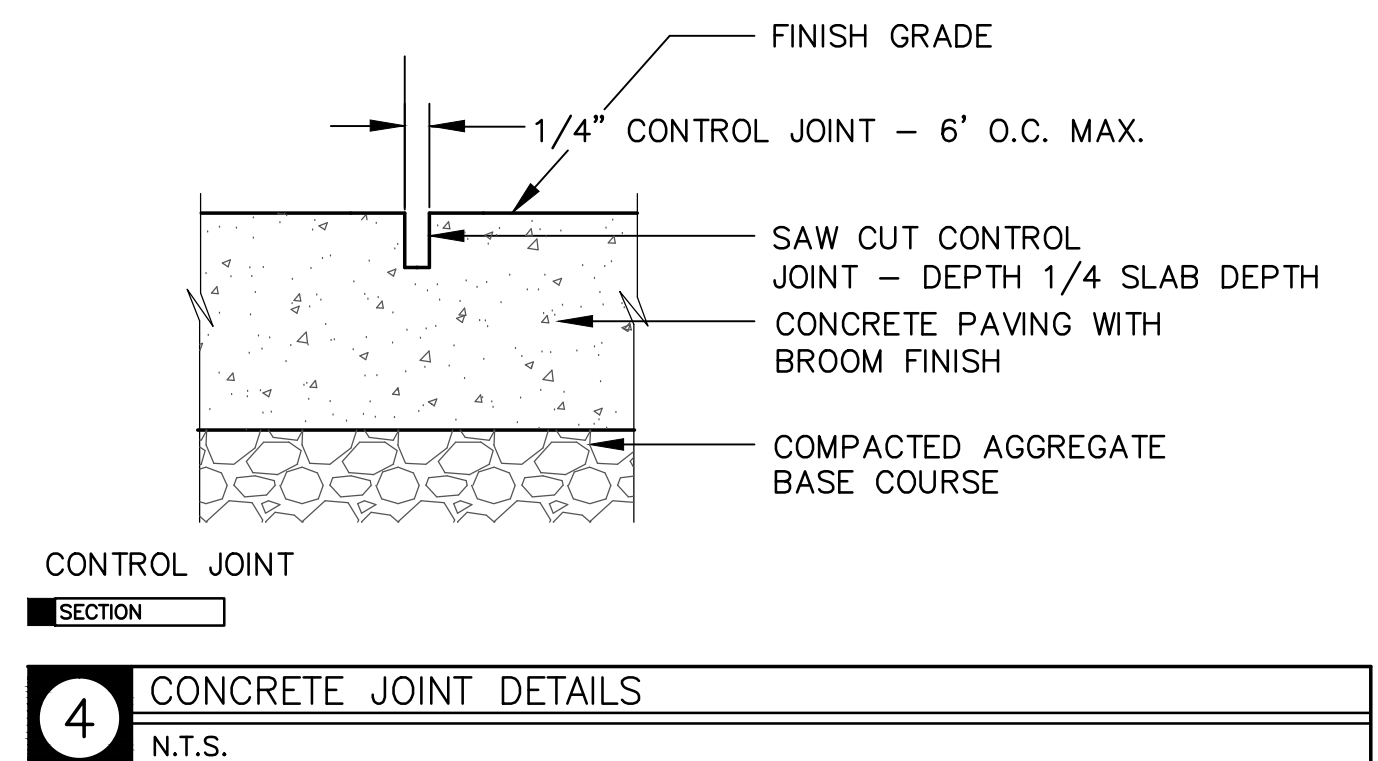
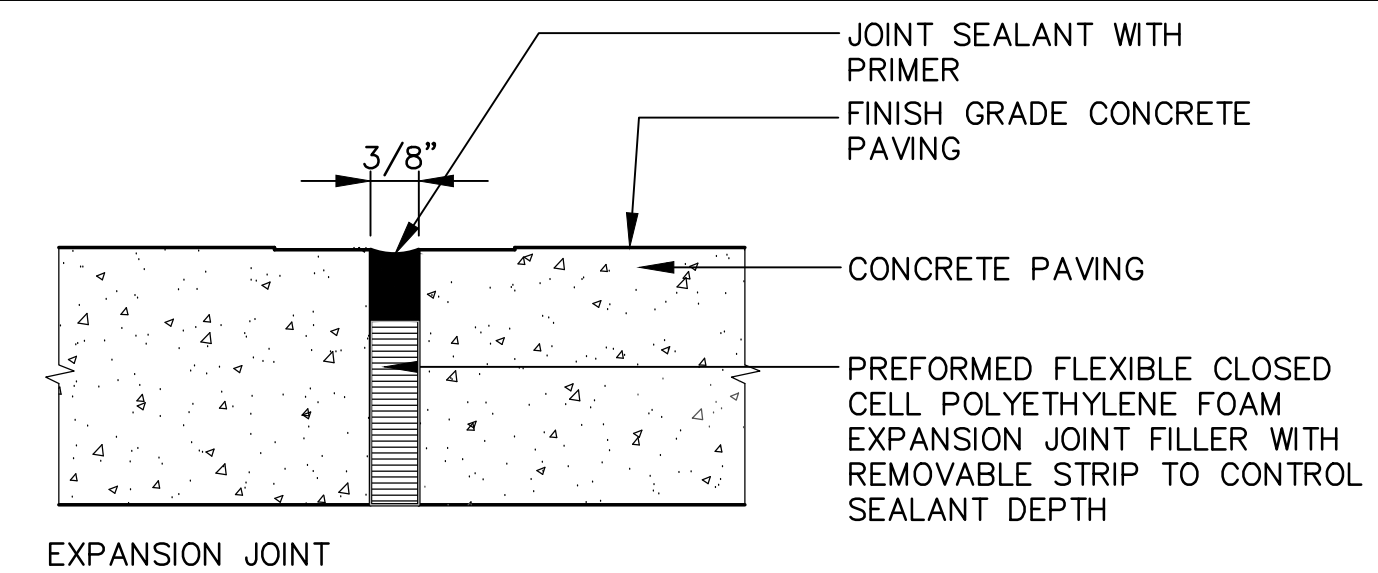
1 BITUMINOUS CONCRETE WALKWAY PAVEMENT
1" = 1'-0"



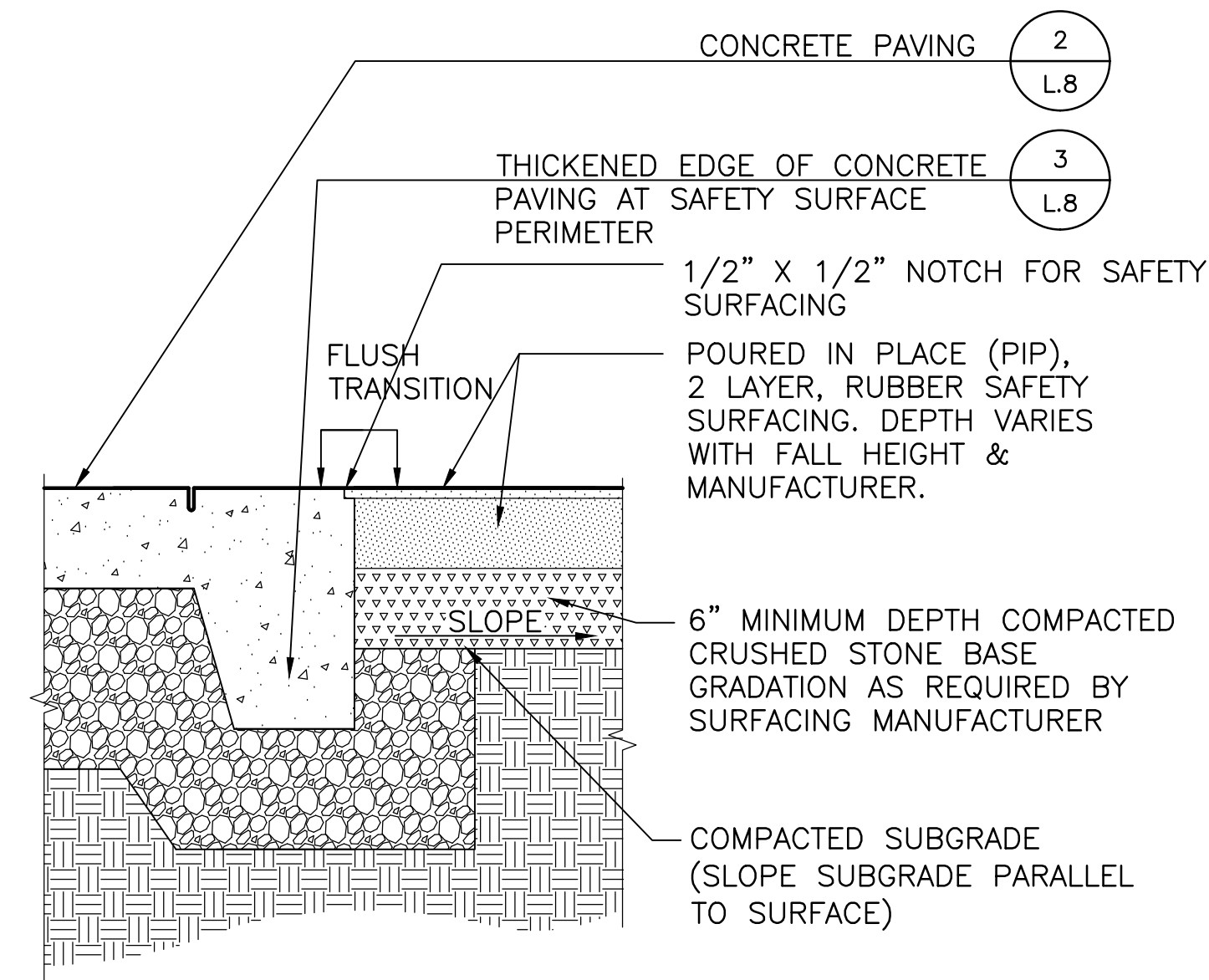
2 CONCRETE WALKWAY PAVEMENT
3" = 1'-0"



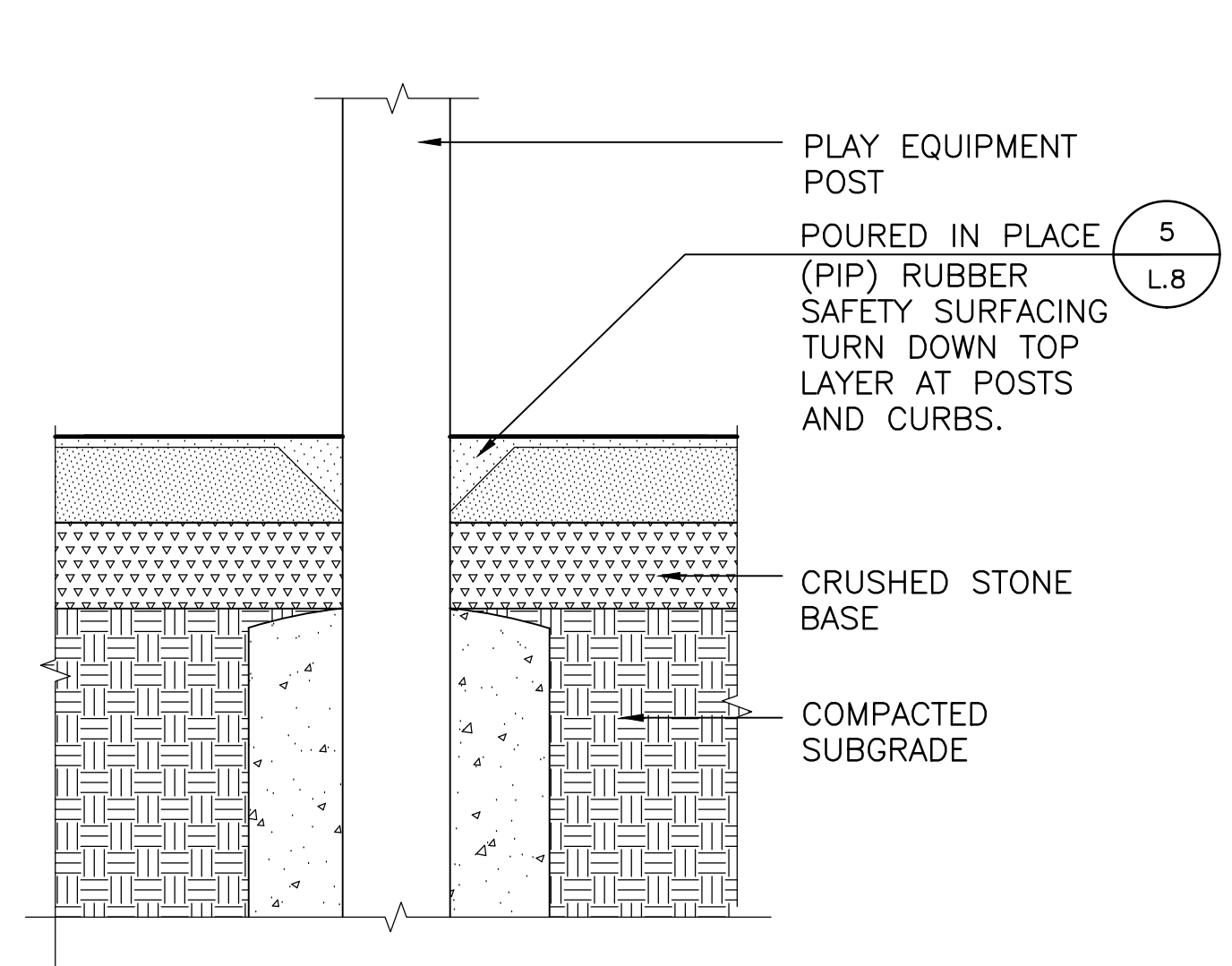
3 CONCRETE WALK PAVING AT PLAY AREA PERIMETER
1-1/2" = 1'-0"



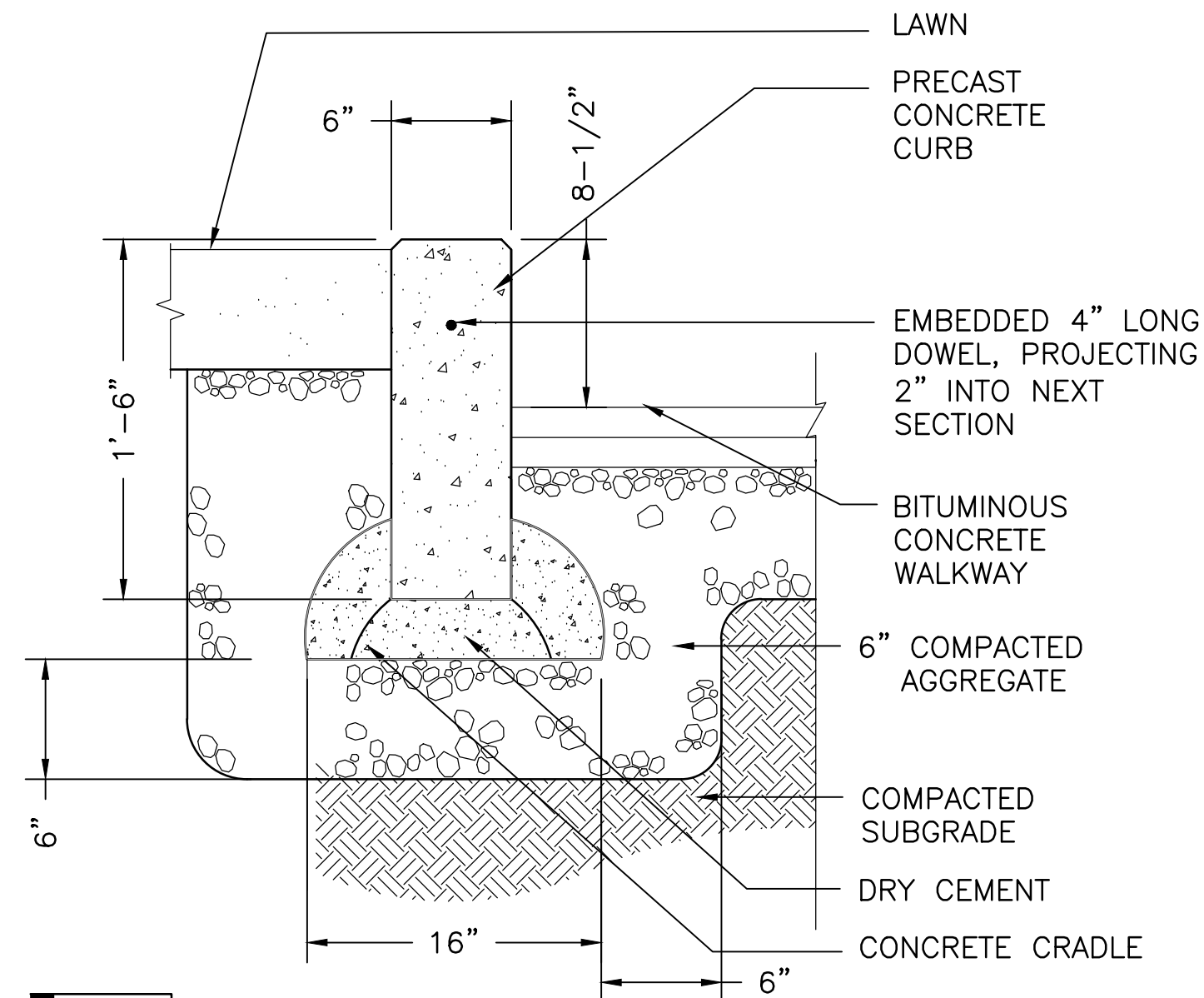
4 CONCRETE JOINT DETAILS
N.T.S.



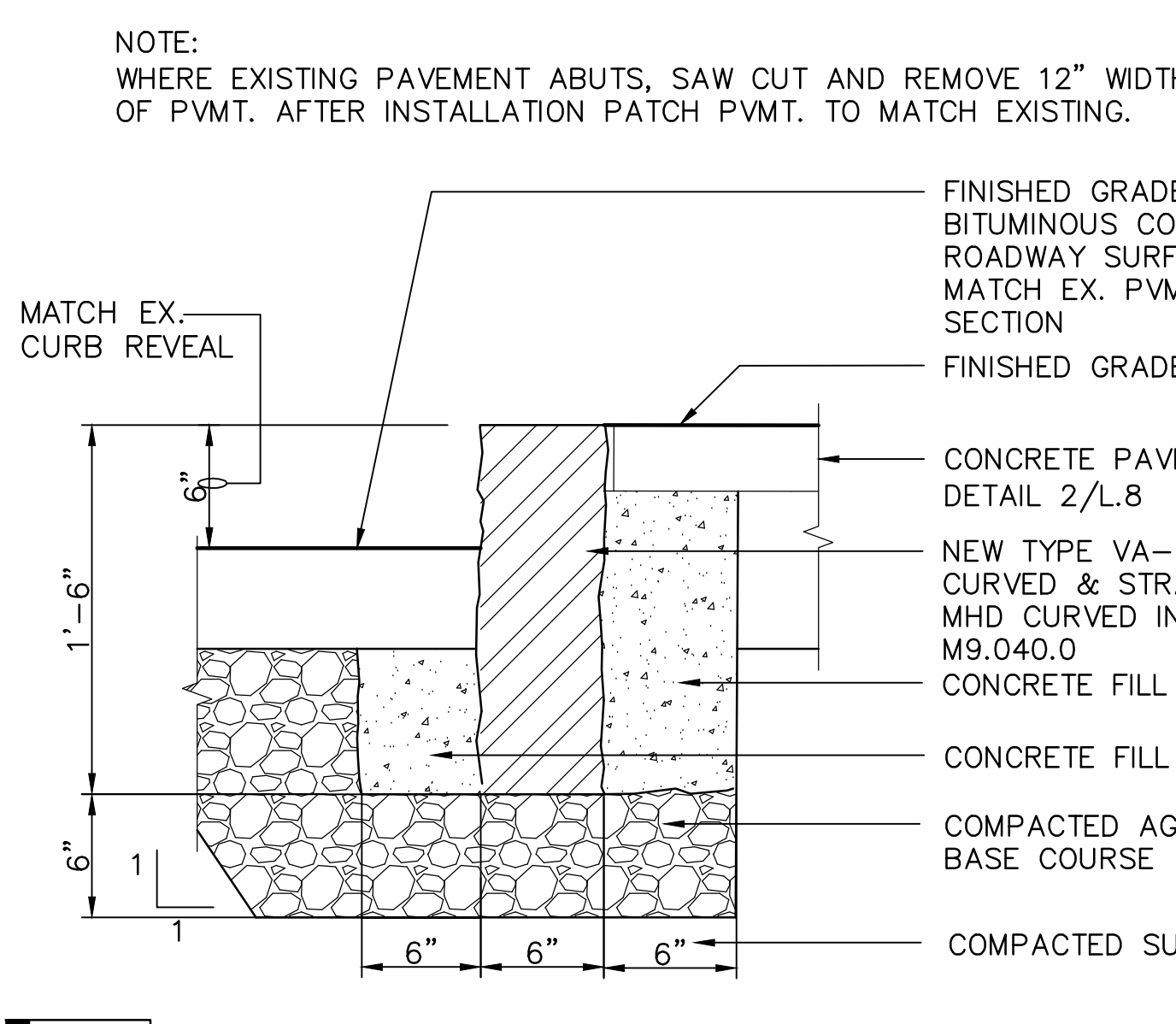
5 POURED-IN-PLACE (PIP) SAFETY SURFACING
1-1/2" = 1'-0"



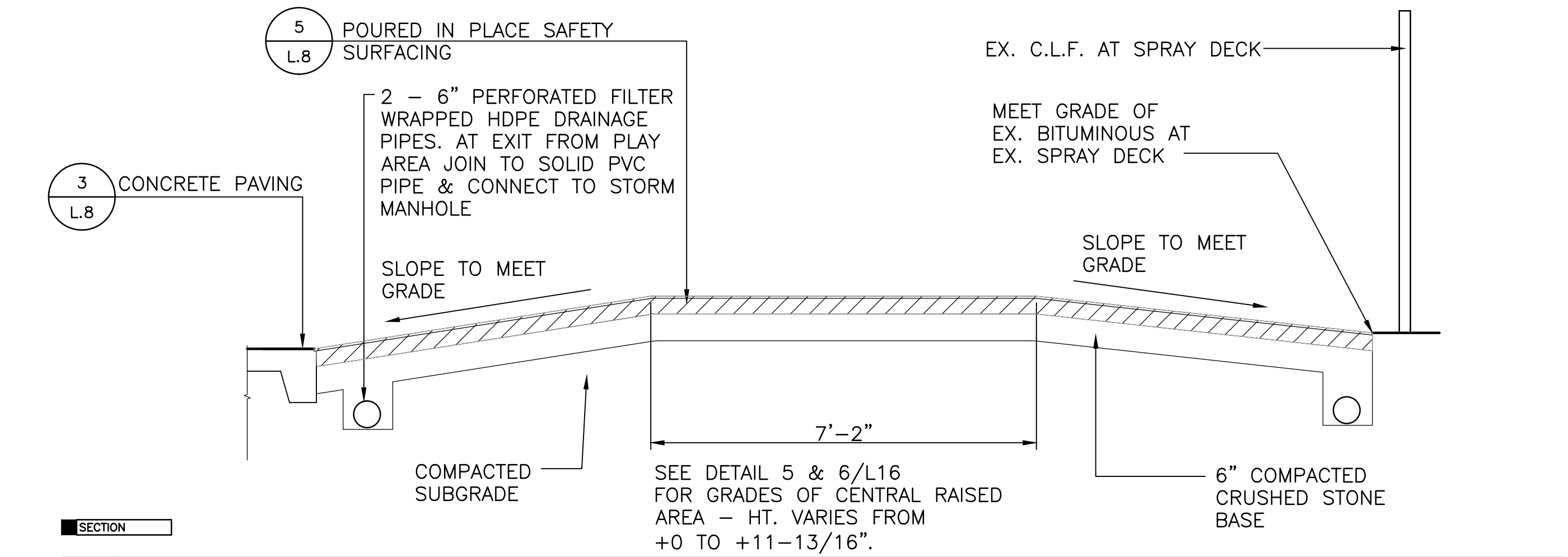
6 POURED-IN-PLACE SAFETY SURFACING - DETAIL AT POSTS
1-1/2" = 1'-0"



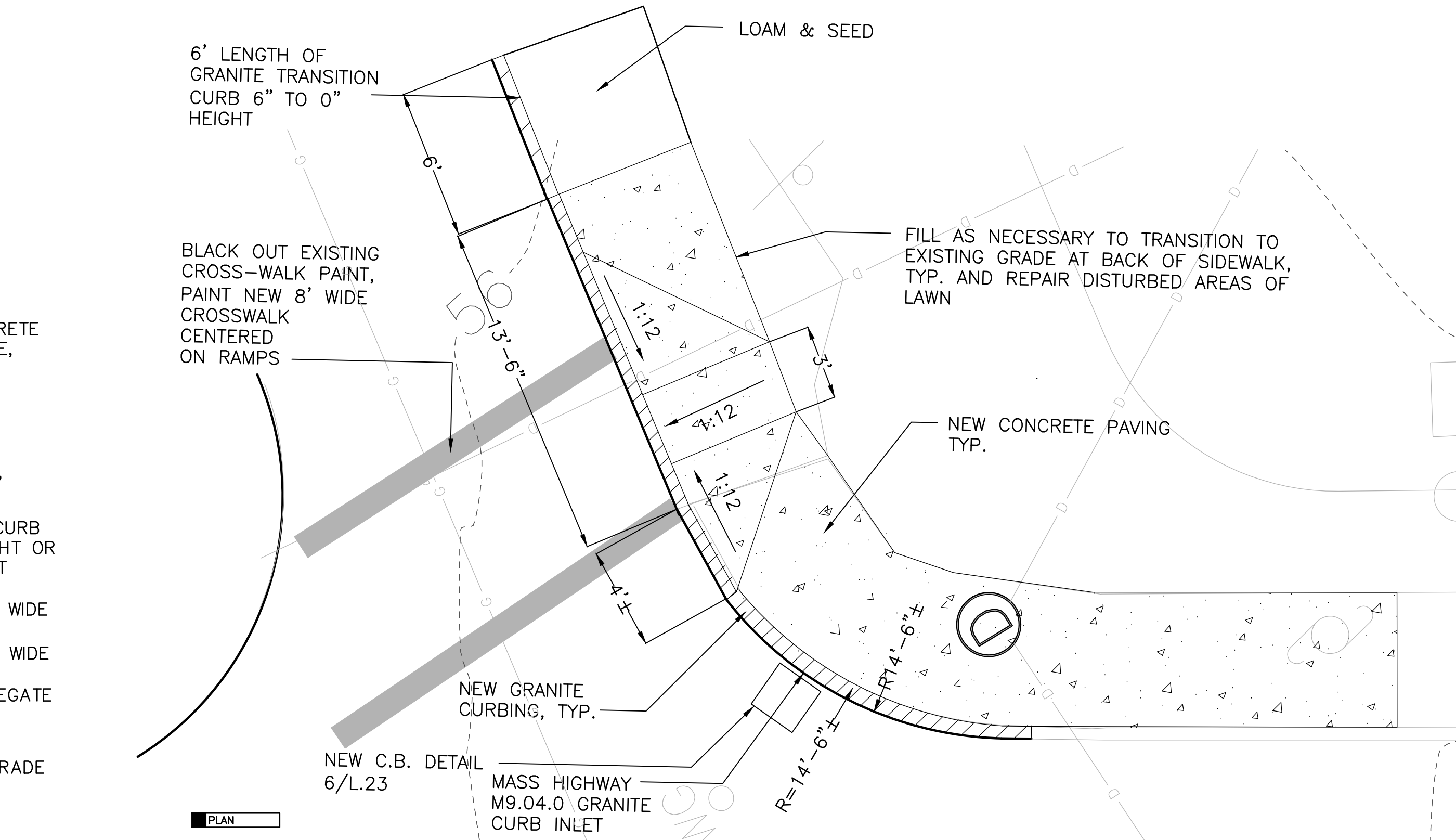
8 PRECAST CONCRETE CURB
1-1/2" = 1'-0"



9 RESET/NEW GRANITE CURB
1-1/2" = 1'-0"



7 SAFETY SURFACING AT ZIPLINE
1/2" = 1'-0"



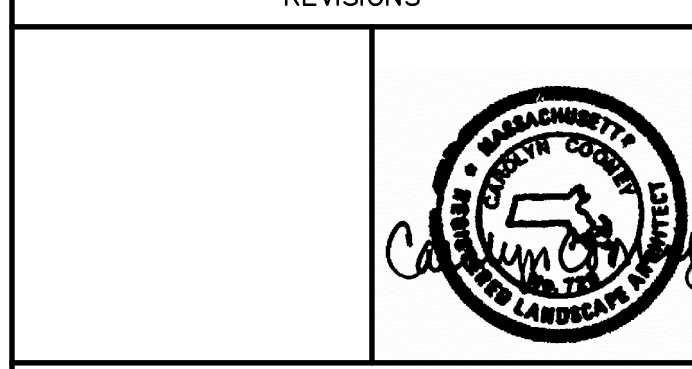
10 HC RAMP/CURBING AT FARNSWORTH & HAZEL STS.
1/4" = 1'-0"

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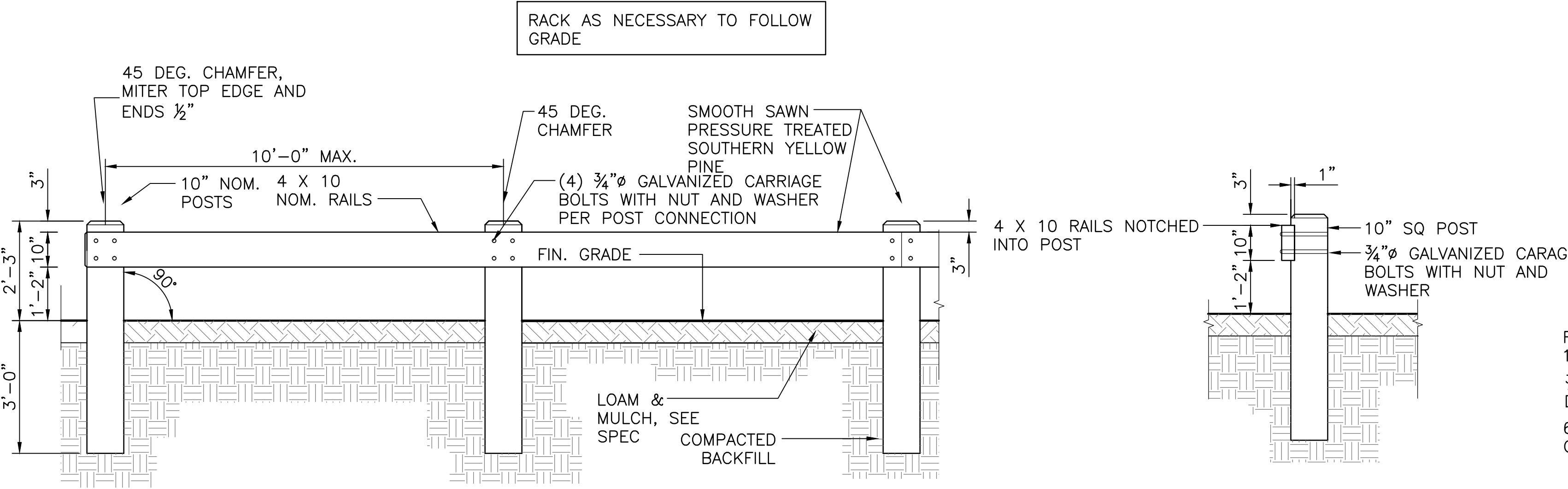
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DRAKE PLAYGROUND
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Prepared For:
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510 MOODY STREET
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TITLE:
**PAVING & CURBING
DETAILS**

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Approved By VH
Project No. 1313.00

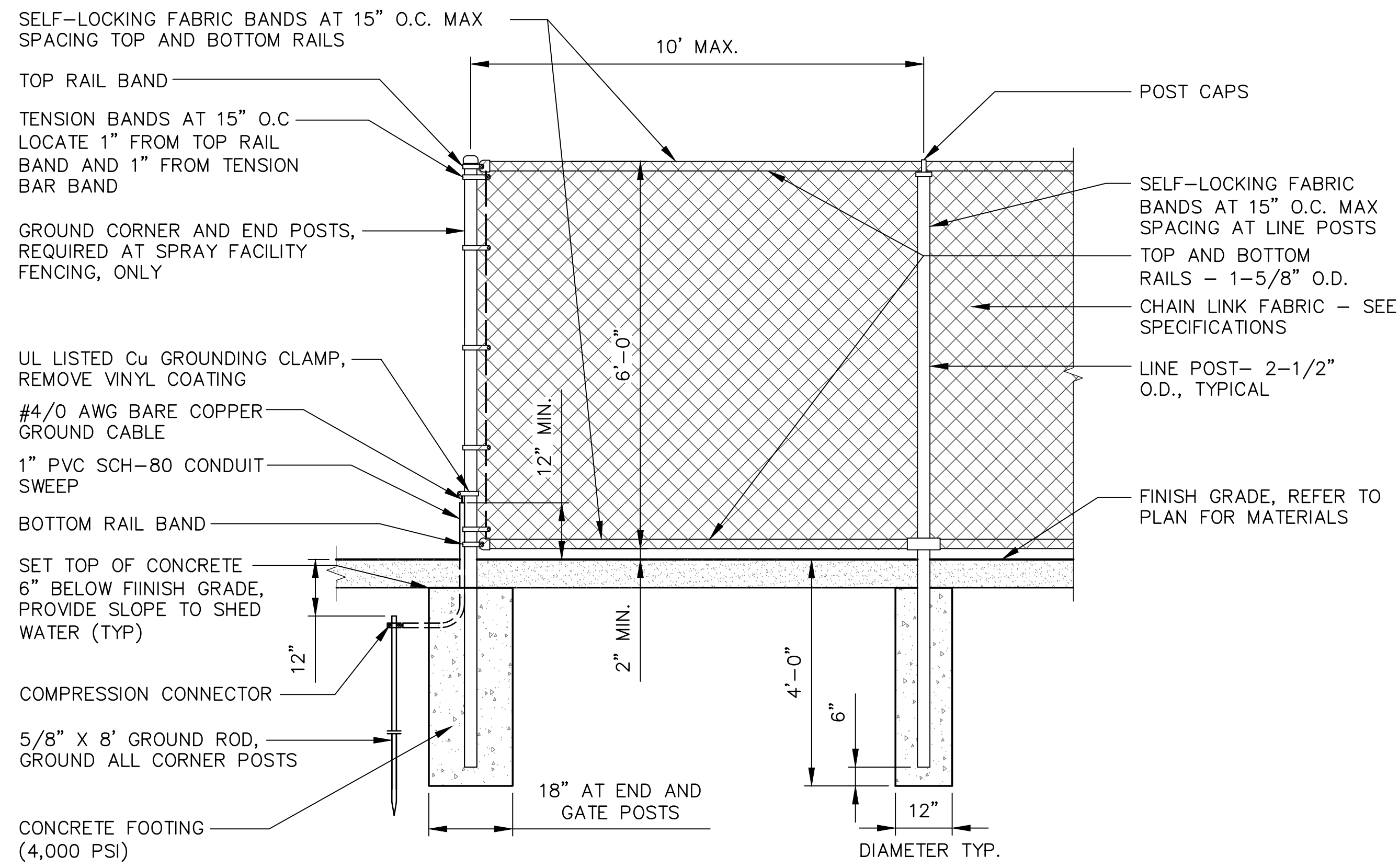
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SECTION/ELEVATION

1 WOOD GUARDRAIL
1/2" = 1'-0"

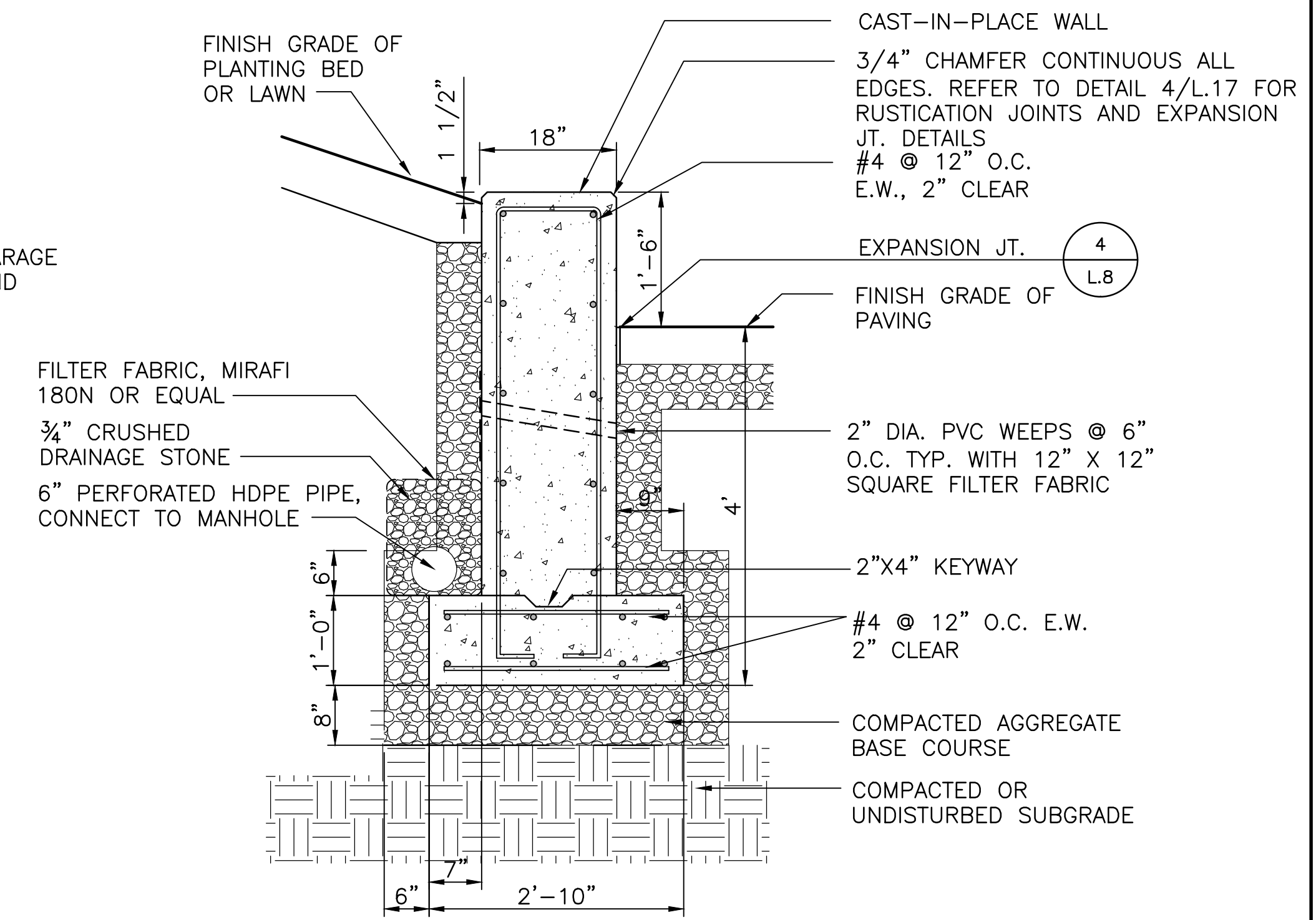
- NOTE:
1. PROVIDE BLACK VINYL PRIVACY SLATS IN NEW 6' C.L.F. ALONG THE NORTHERN PROPERTY LINE, TO MATCH EXISTING.
 2. FENCE GRONDING ONLY FOR NEW FENCE SECTION AT EXISTING SPRAY DECK.



SECTION

3 6' CHAIN LINK FENCE
1/2" = 1'-0"

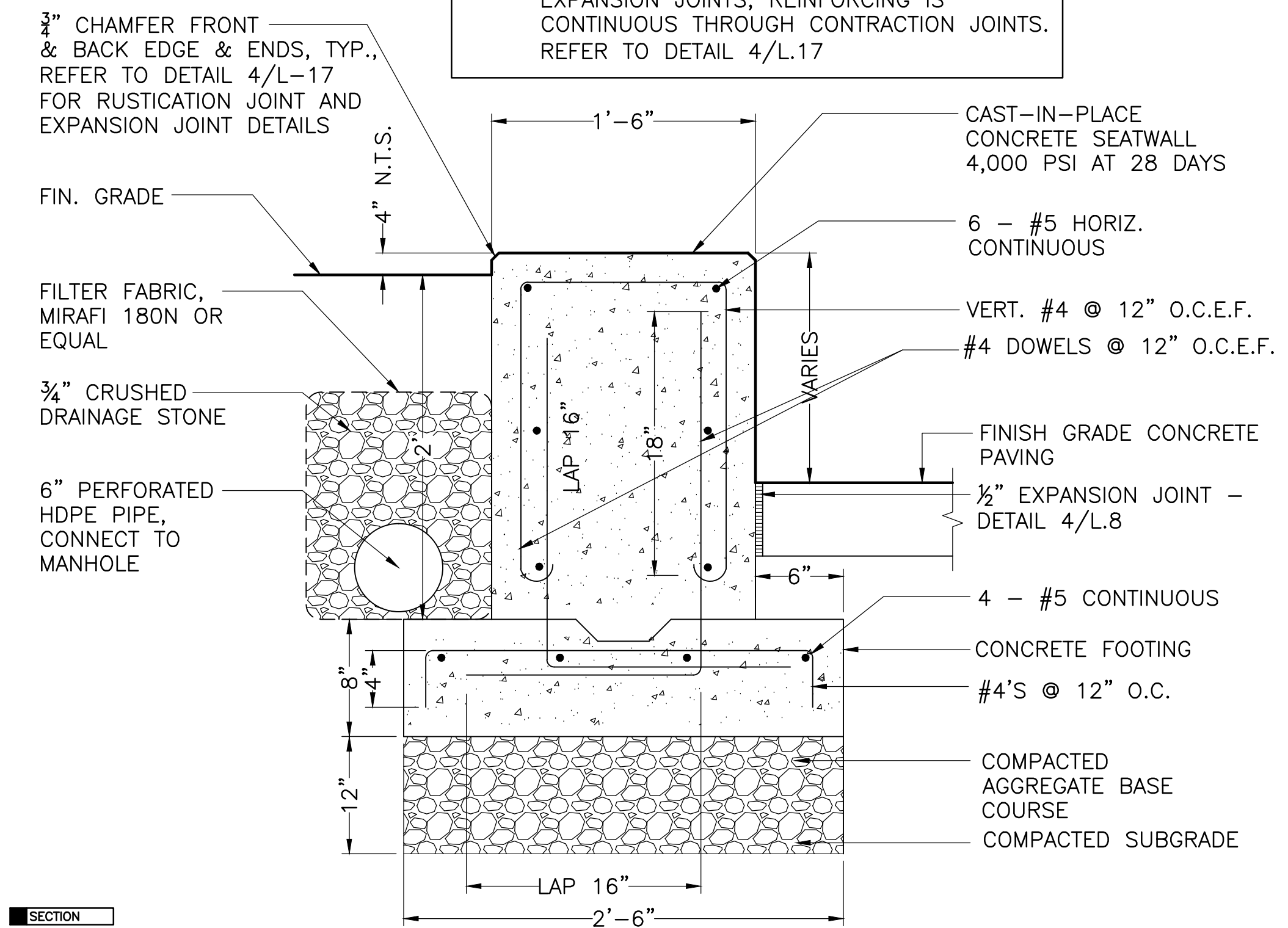
- NOTES:
1. PROVIDE HAND RUBBED FINISH ON ALL EXPOSED FACES.
 2. INSTALL ANTI-SKATEBOARD HARDWARE @ 4' O.C. TYP.
 3. DO NOT EXTEND REINFORCING THRU EXPANSION JOINTS; REINFORCING IS CONTINUOUS THROUGH CONTRACTION JOINTS. REFER TO DETAIL 4/L.17



SECTION

2 CAST-IN-PLACE CONCRETE RETAINING WALL
3/4" = 1'-0"

- NOTES:
1. PROVIDE HAND RUBBED FINISH ON ALL EXPOSED FACES.
 2. INSTALL ANTI-SKATEBOARD HARDWARE @ 4' O.C. TYP.
 3. DO NOT EXTEND REINFORCING THRU EXPANSION JOINTS; REINFORCING IS CONTINUOUS THROUGH CONTRACTION JOINTS. REFER TO DETAIL 4/L.17



SECTION

4 CAST-IN-PLACE CONCRETE SEAT WALL
1-1/2" = 1'-0"

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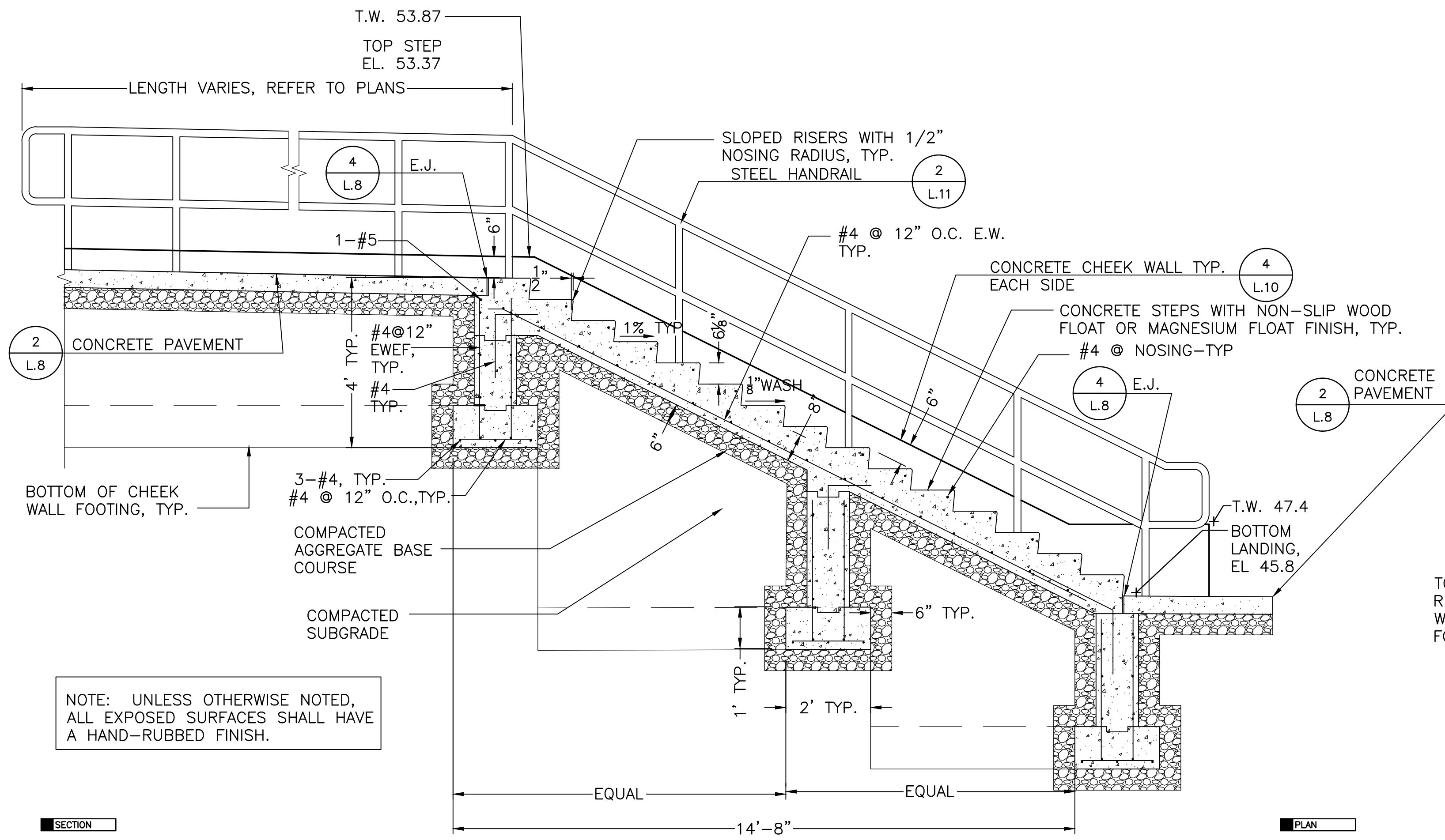
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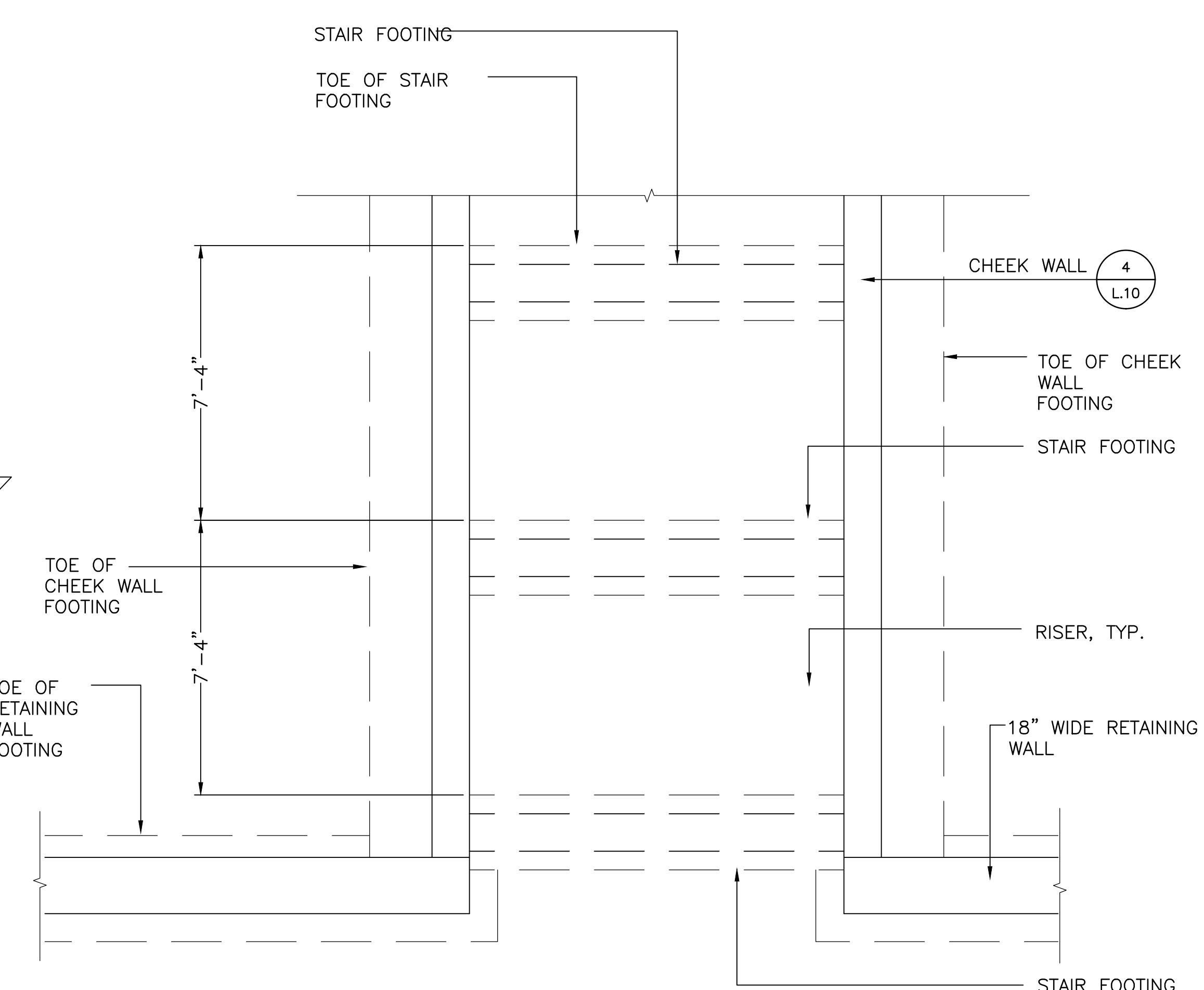
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**FENCING & WALL
DETAILS**

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Approved By VH
Project No. 1313.00

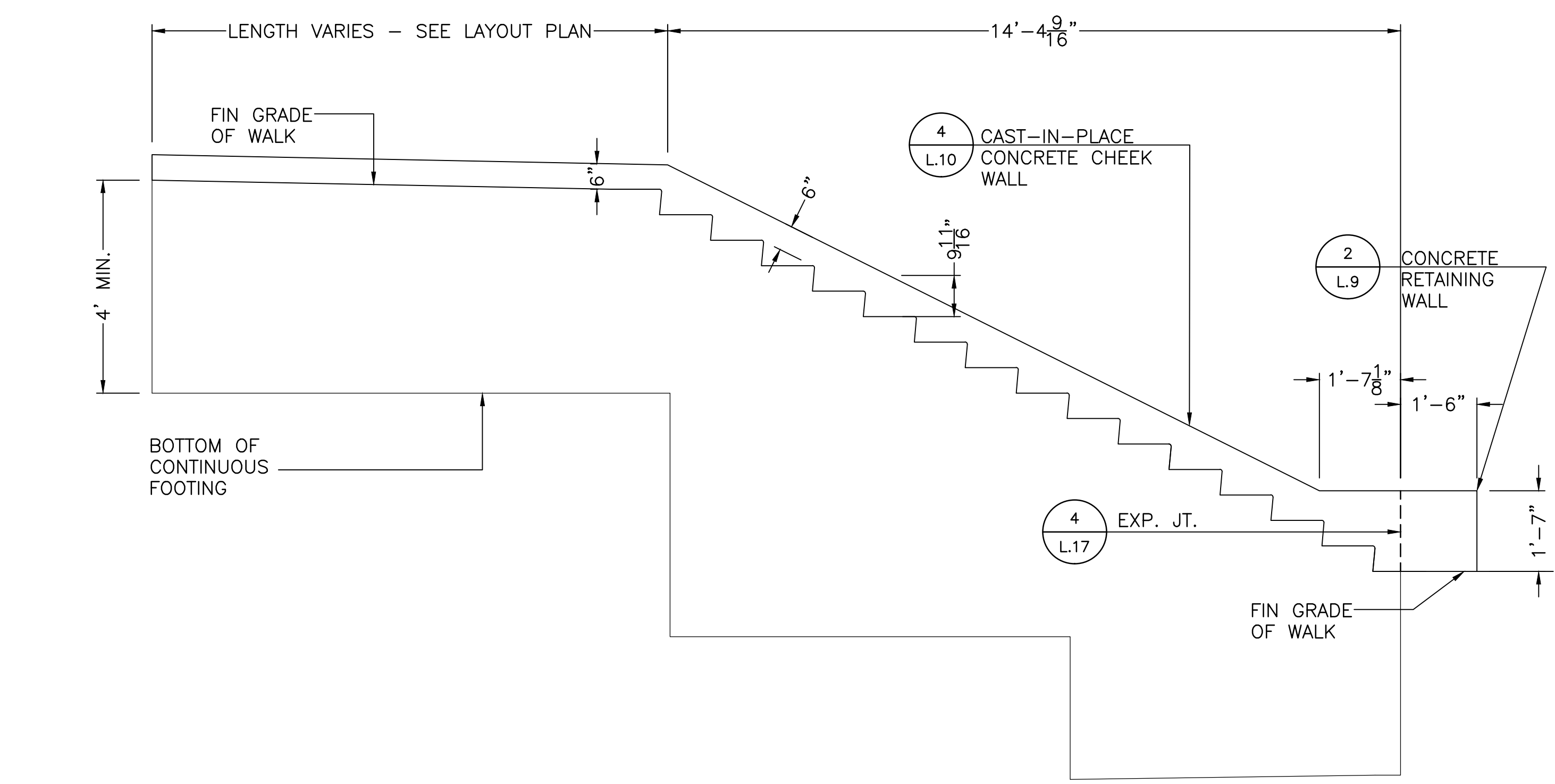
DWG No. **L-9**



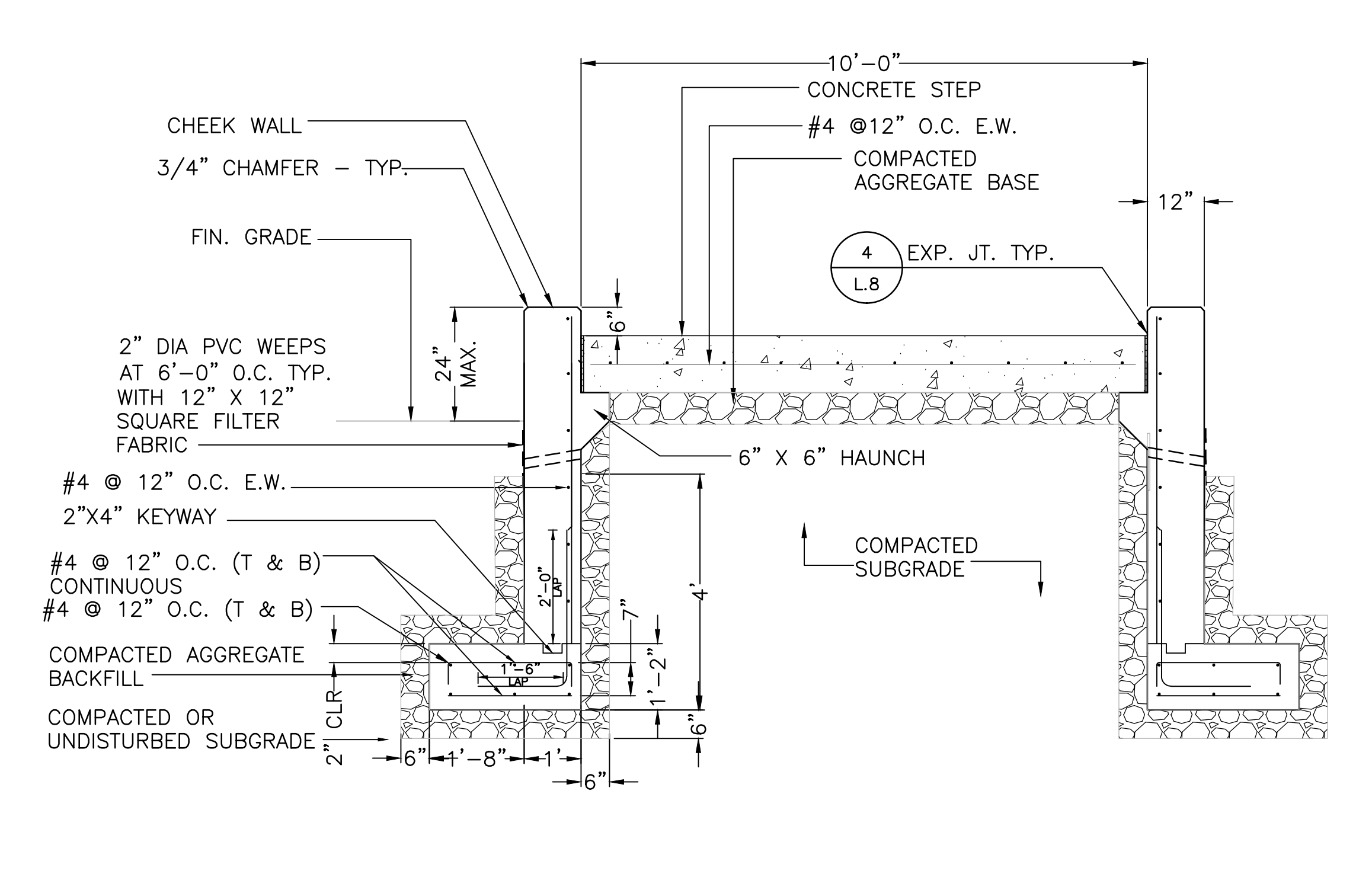
1 STAIR LONGITUDINAL SECTION
1/2" = 1'-0"



2 STAIR FOUNDATION PLAN
3/8" = 1'-0"



3 STAIR CHEEK WALL - INTERIOR ELEVATION, TYP.
1/2" = 1'-0"



4 STAIR CHEEK WALL & STEPS
1/2" = 1'-0"

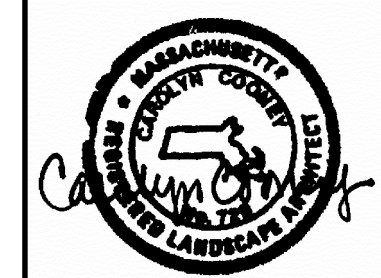
Carolyn Cooney & Associates
Landscape Architecture / Planning
13 Elm Street, Millis, MA 01757
Telephone 508 478 8426, Facsimile 508 478 8607

Site Engineering Consultants, Inc.
55 Grape Shot Road
Sharon, Massachusetts 02067
TEL: (781) 784-0326
FAX: (781) 784-0492
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695 WAREHAM STREET
MIDDLEBOROUGH, MASSACHUSETTS 02346
(508) 295-5505

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REVISIONS



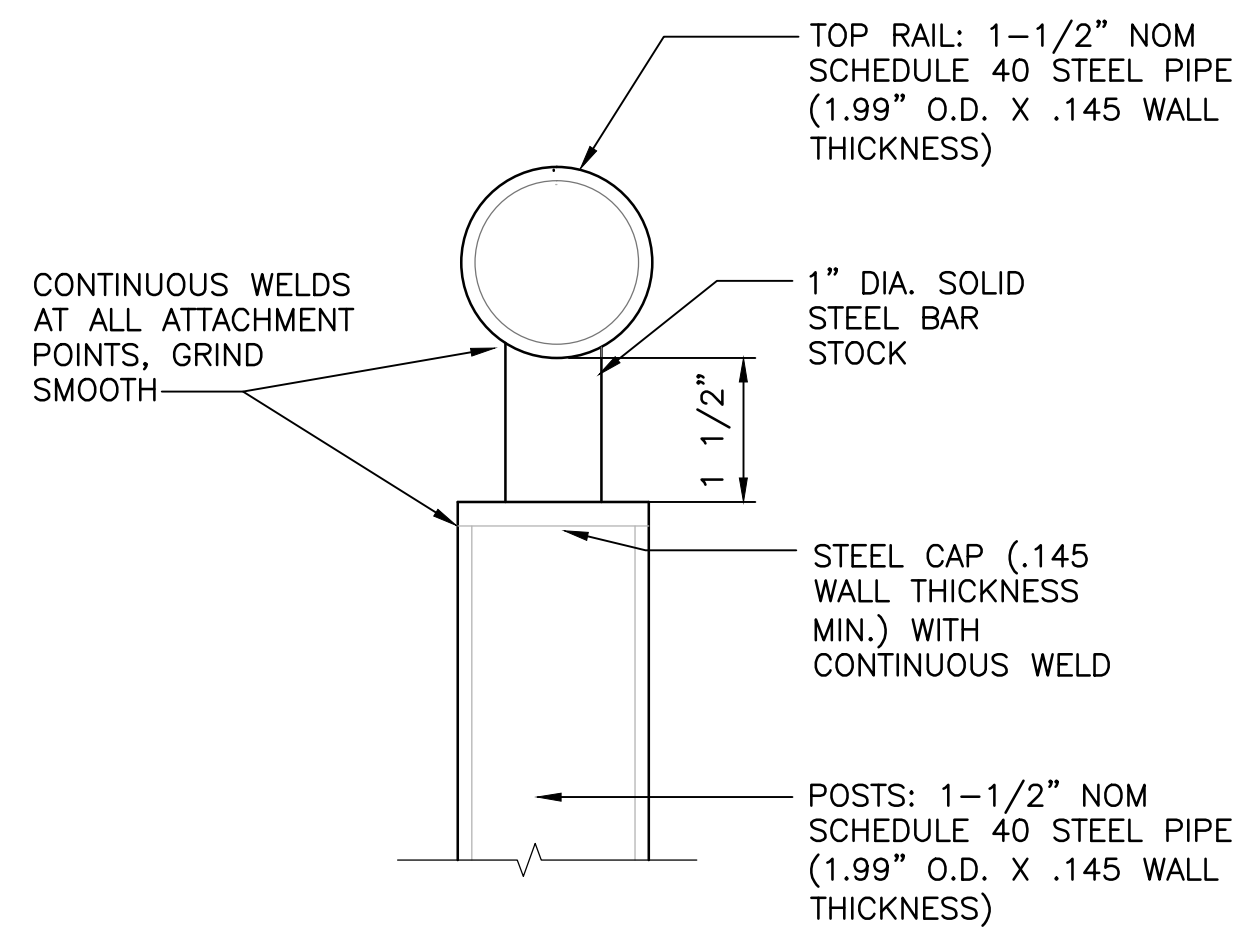
Project:
**CITY OF WALTHAM
DRAKE PLAYGROUND
3 HAZEL STREET
WALTHAM, MA 02451**

Prepared For:
**CITY OF WALTHAM
DEPARTMENT OF RECREATION
510 MOODY STREET
WALTHAM, MA 02453**

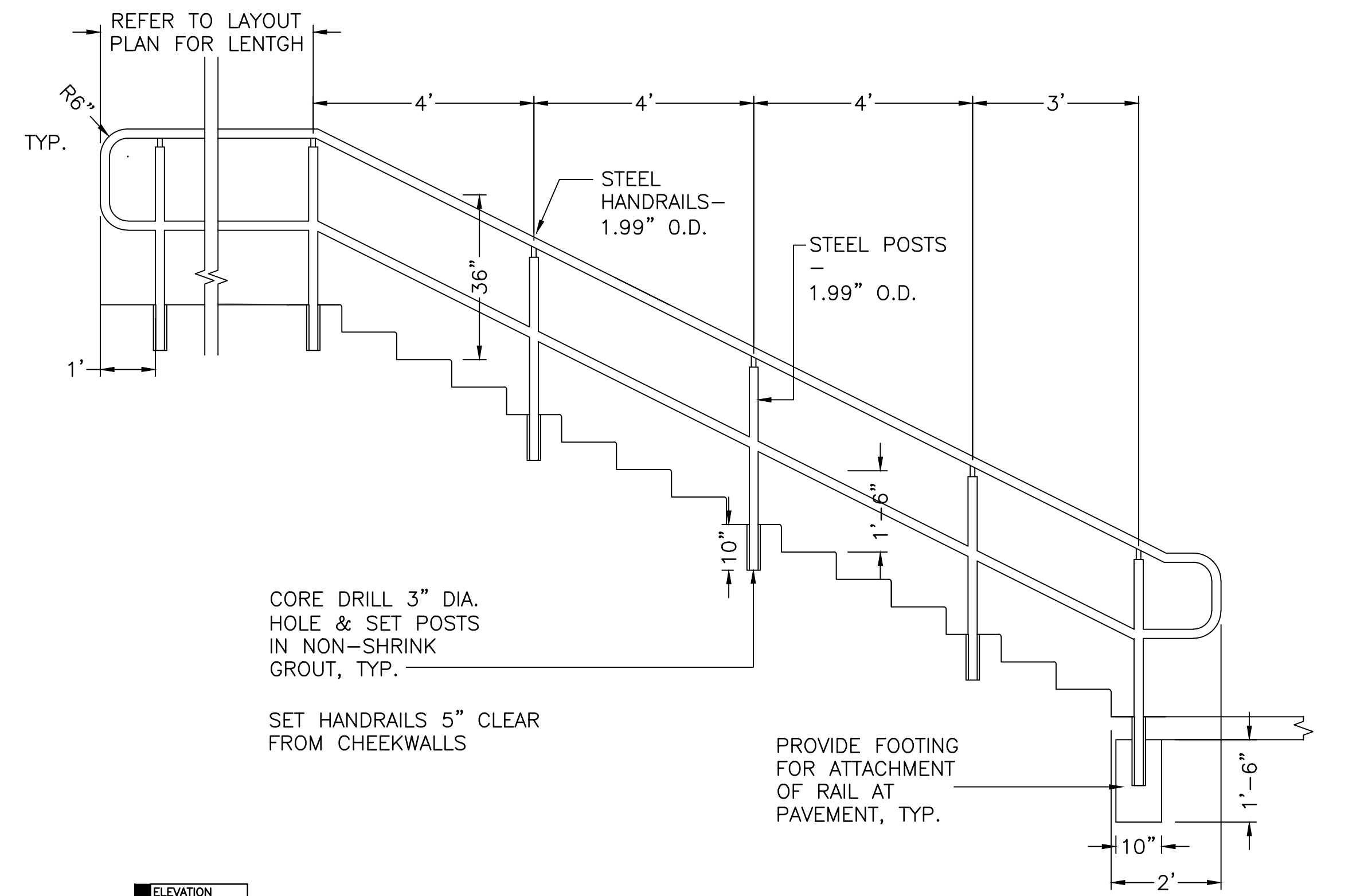
TITLE:
STAIR DETAILS

Scale AS NOTED Date NOV 10, 2015
Drawn By DRB
Checked By MJB
Approved By YH
Project No. 1313.00

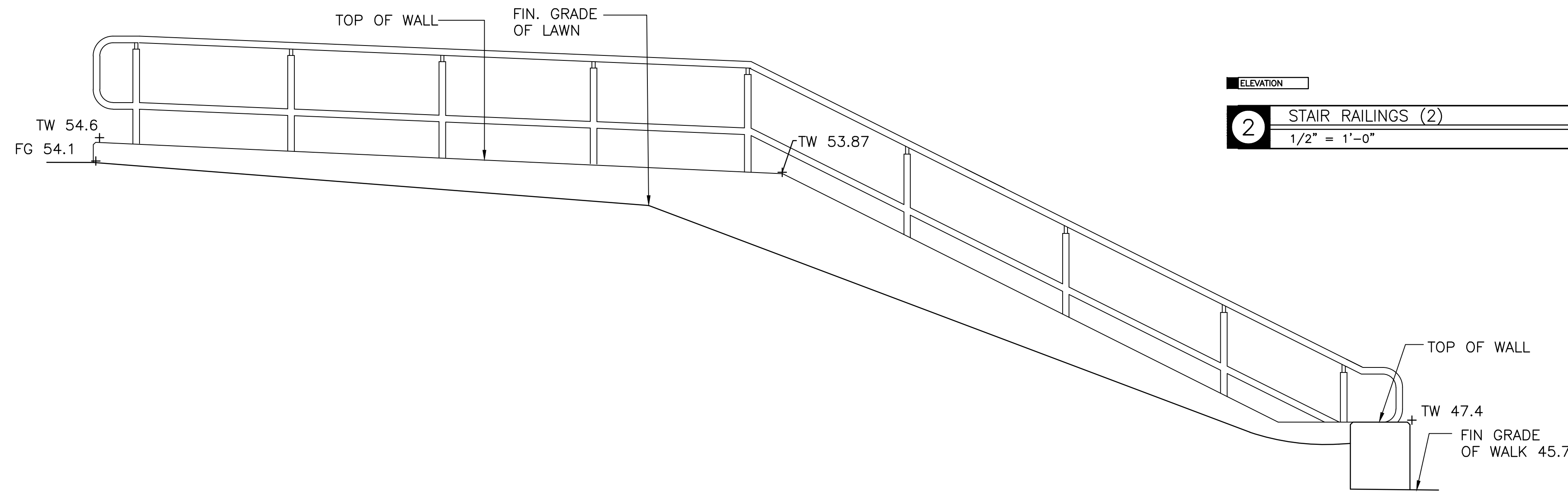
DWG No. **L-10**



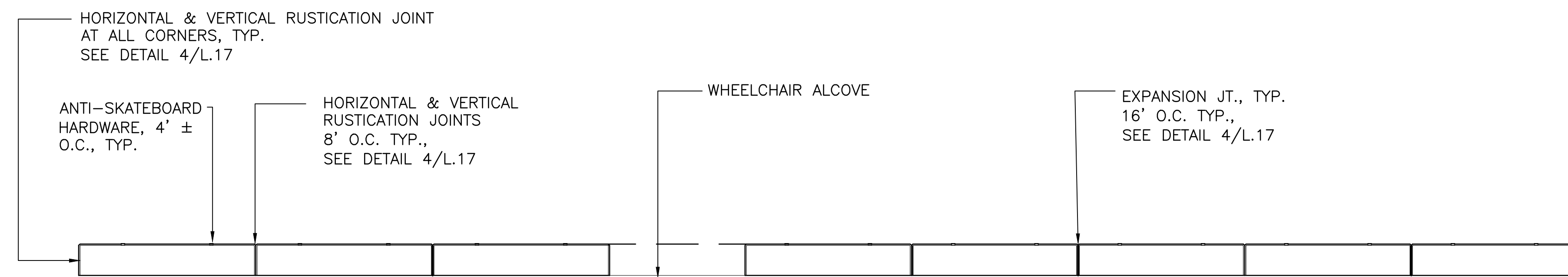
SECTION
1 RAIL ATTACHMENT DETAIL
 ONE-HALF SCALE



ELEVATION
2 STAIR RAILINGS (2)
 1/2" = 1'-0"



ELEVATION
3 STAIR WALLS - EAST/WEST EXTERIOR ELEVATIONS, TYP.
 1/2" = 1'-0"



SSE ELEVATION OF SEAT WALL



NE ELEVATION OF RETAINING WALL AT STAIR

ELEVATION
4 JOINTING - SEAT WALL AND 18" HEIGHT RETAINING WALL
 1/4" = 1'-0"

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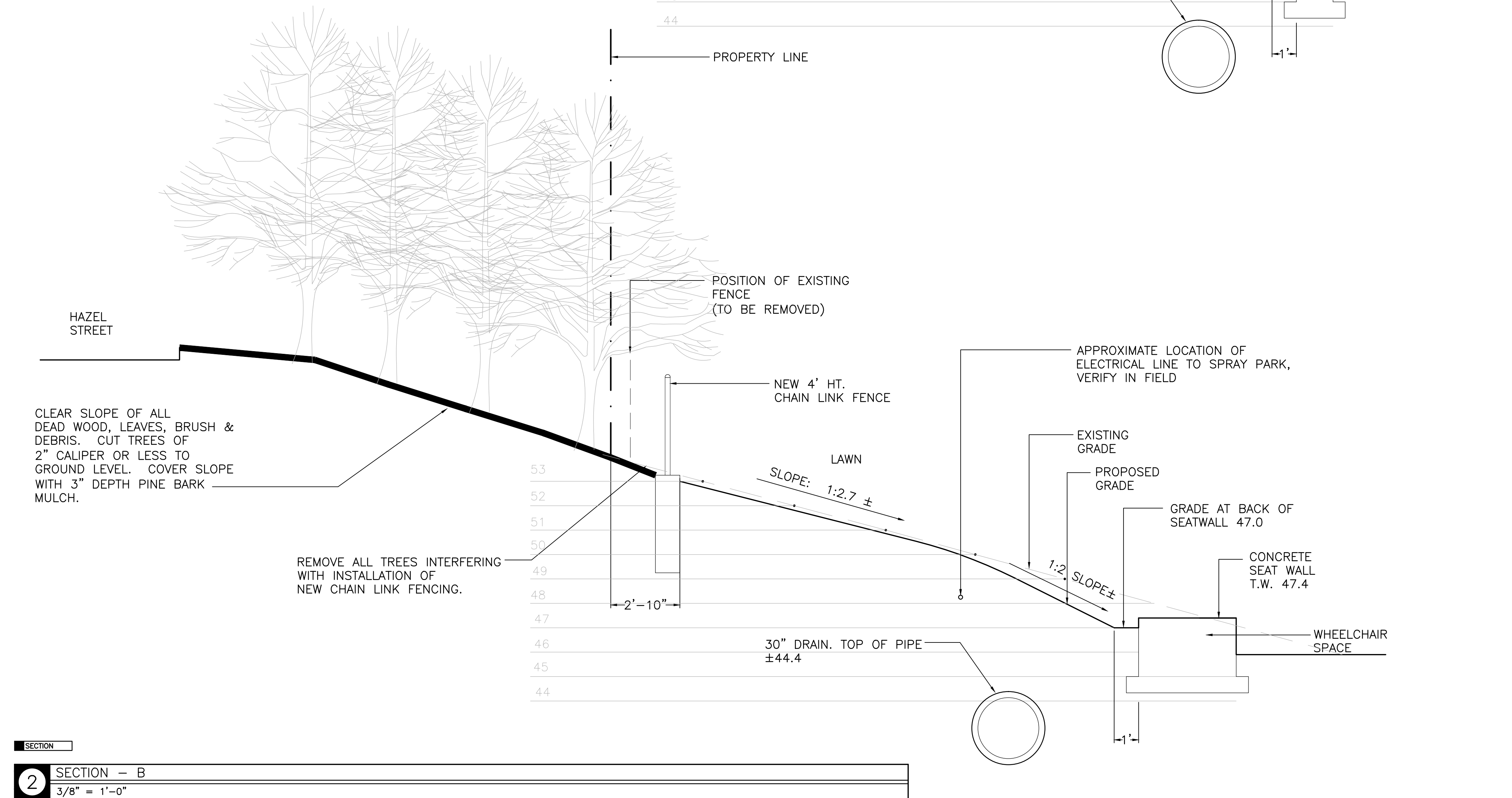
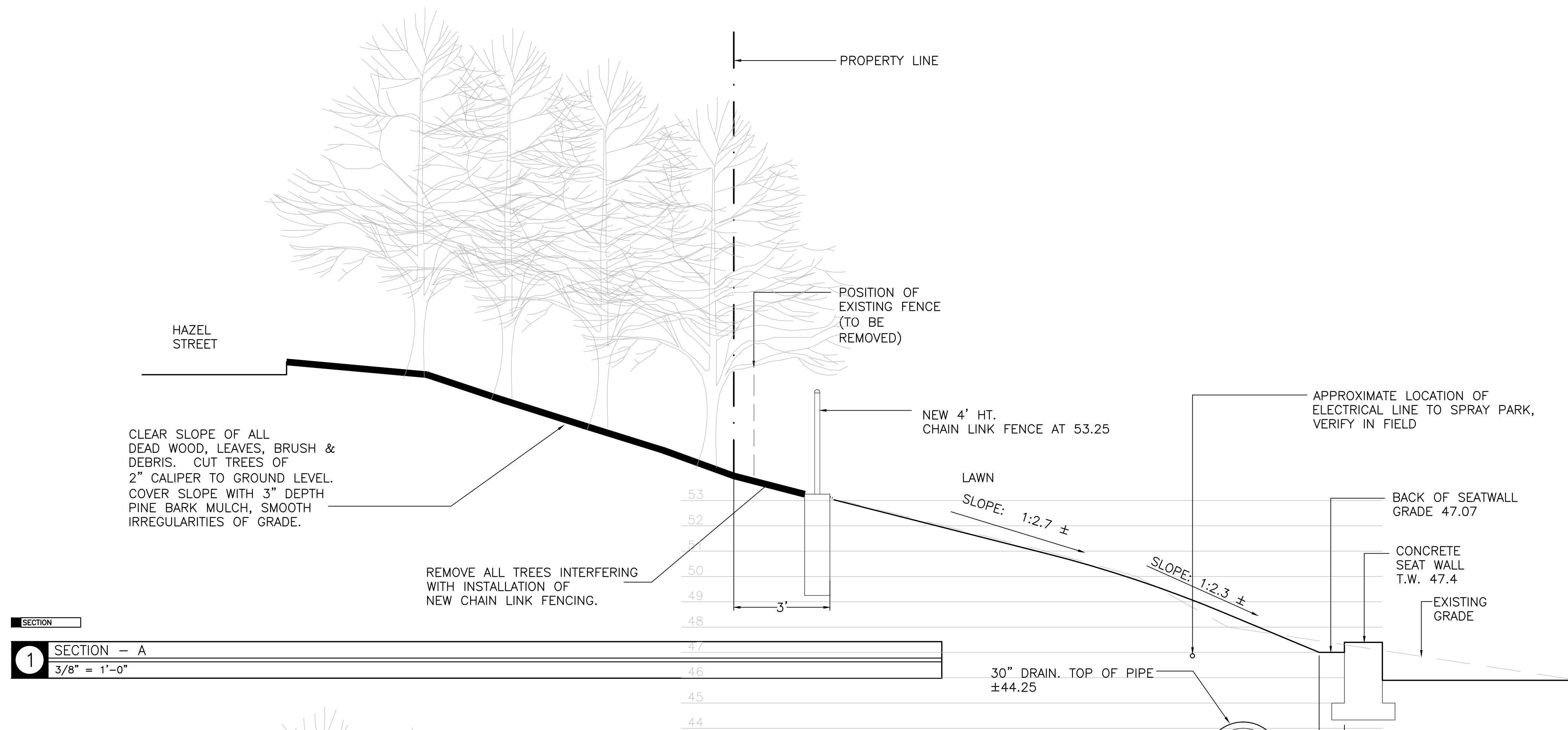
Project:
**CITY OF WALTHAM
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TITLE:
STAIR DETAILS

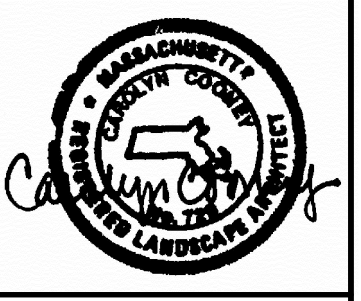
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DWG No. **L-11**



No.	Description	Date

REVISIONS



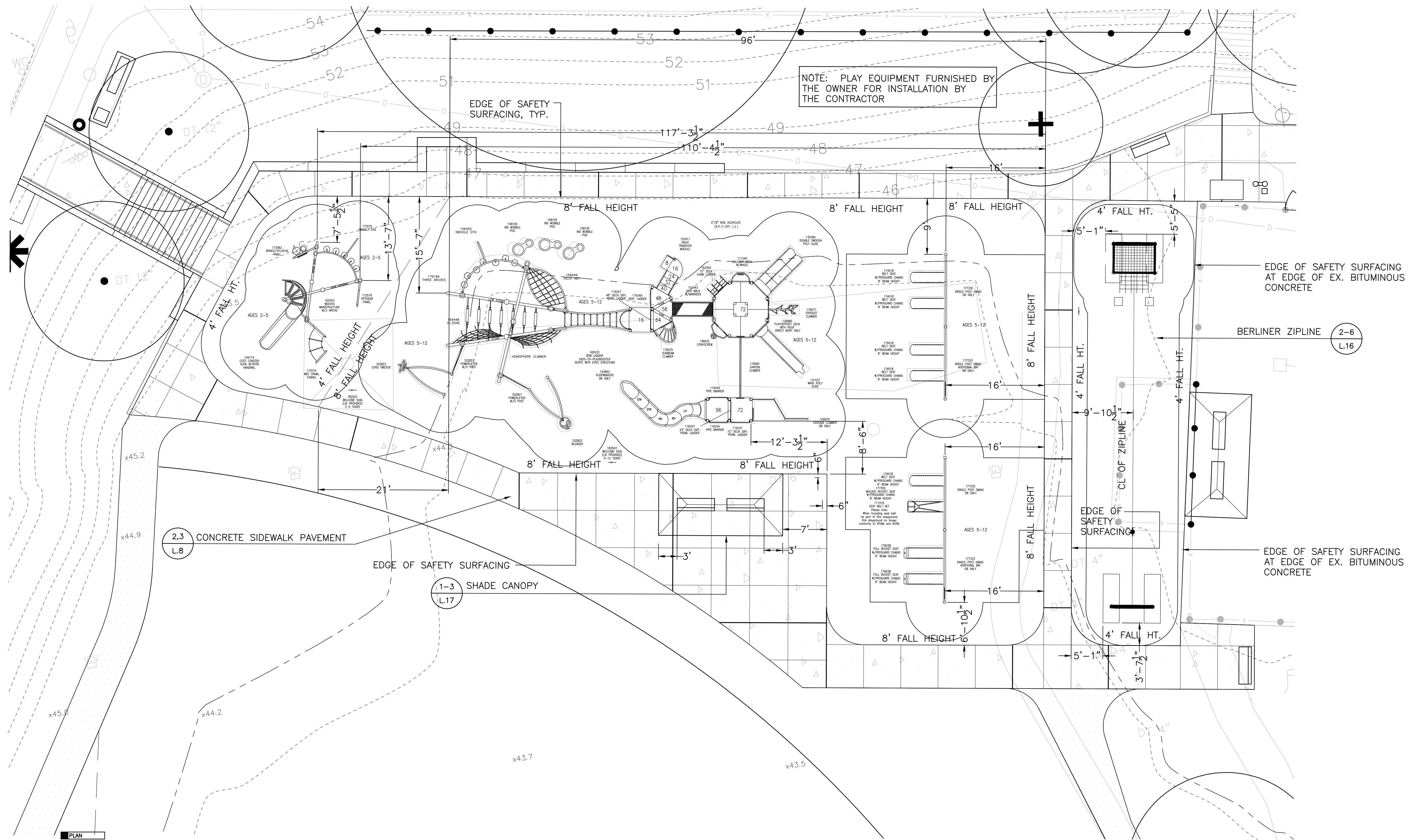
Project:
**CITY OF WALTHAM
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Prepared For:
**CITY OF WALTHAM
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 WALTHAM, MA 02453**

TITLE:
GRADING SECTIONS

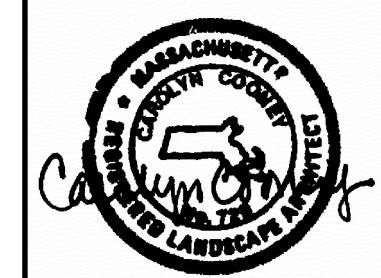
Scale AS NOTED Date NOV 10, 2015
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 Approved By VH
 Project No. 1313.00

DWG No. **L-12**



NOTE: PLAY EQUIPMENT FURNISHED BY THE OWNER FOR INSTALLATION BY THE CONTRACTOR

No.	Description	Date
REVISIONS		



Project:
**CITY OF WALTHAM
DRAKE PLAYGROUND
3 HAZEL STREET
WALTHAM, MA 02451**

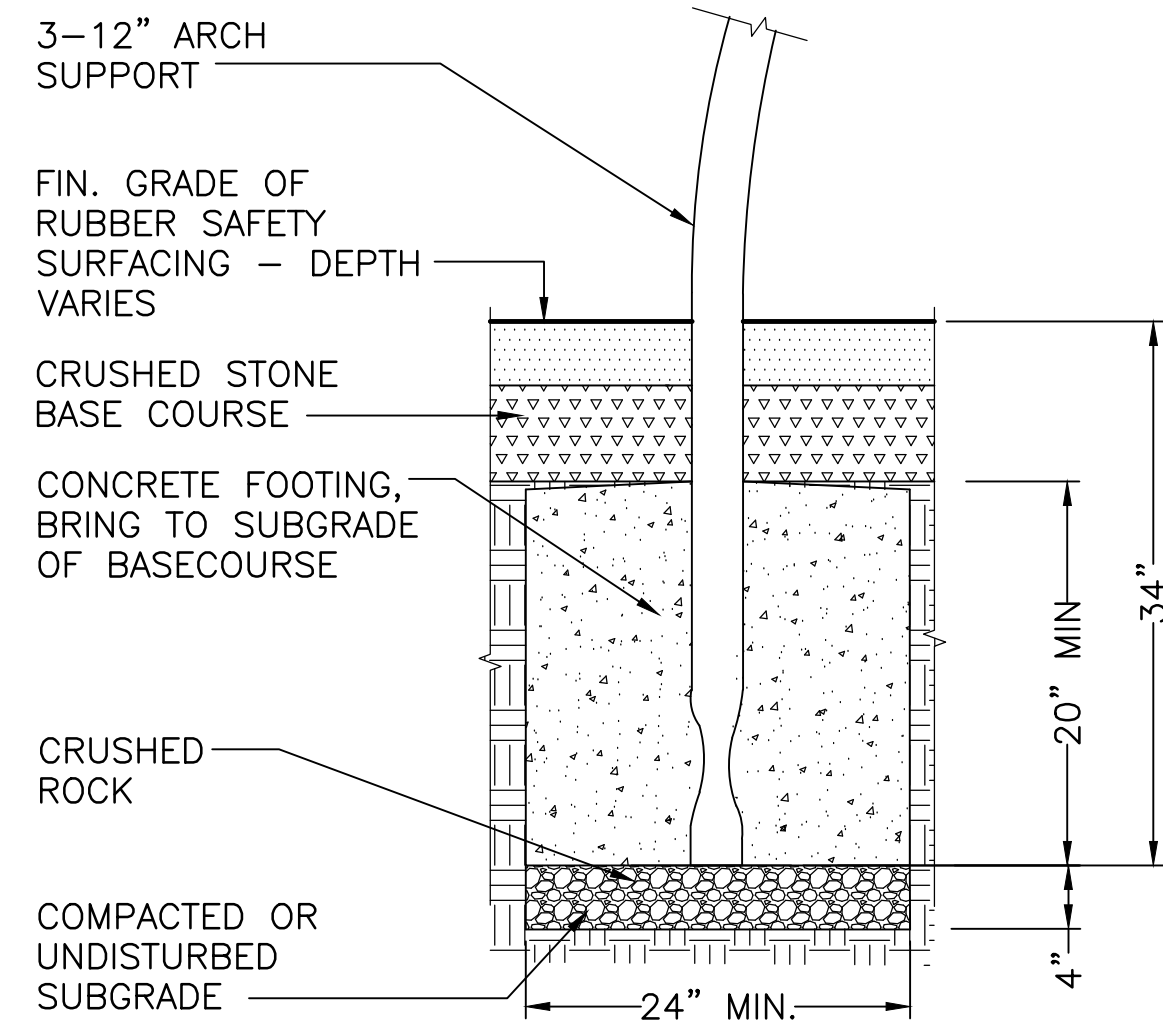
Prepared For:
**CITY OF WALTHAM
DEPARTMENT OF RECREATION
510 MOODY STREET
WALTHAM, MA 02453**

TITLE:
**PLAYGROUND
ENLARGEMENT PLAN**

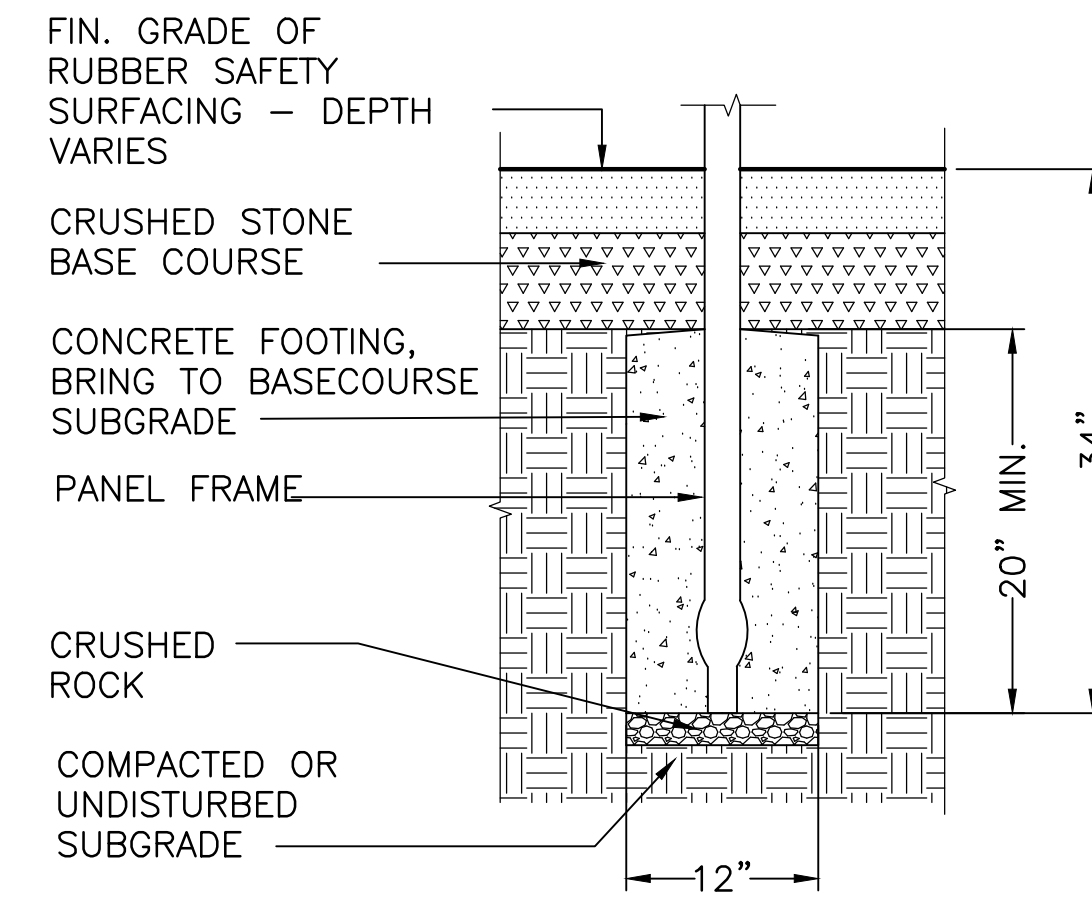
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Checked By MJB
Approved By VH
Project No. 1313.00

DWG No. **L-13**

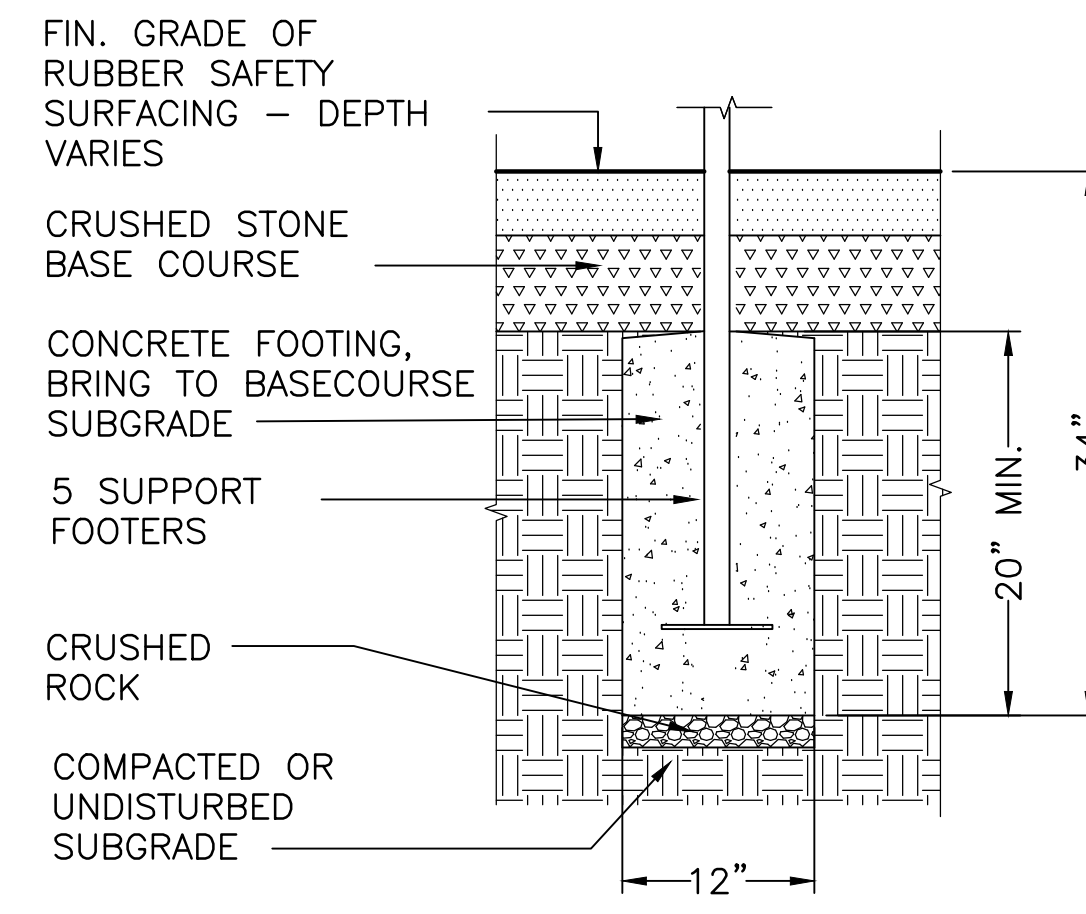
1 PLAYGROUND PLAN
1/8" = 1'-0"



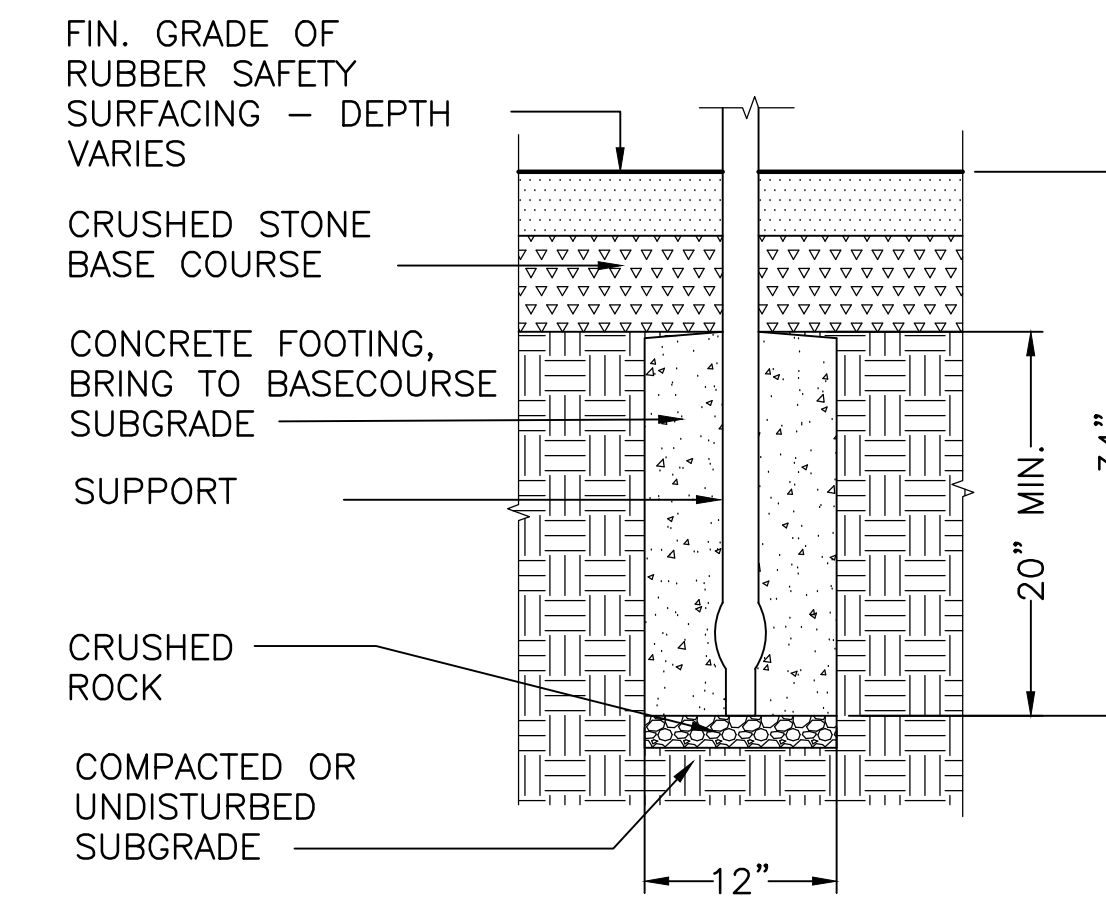
SECTION
1 WEEVOS 3-1/2" ARCH FOOTING, TYPICAL
 1" = 1'-0"



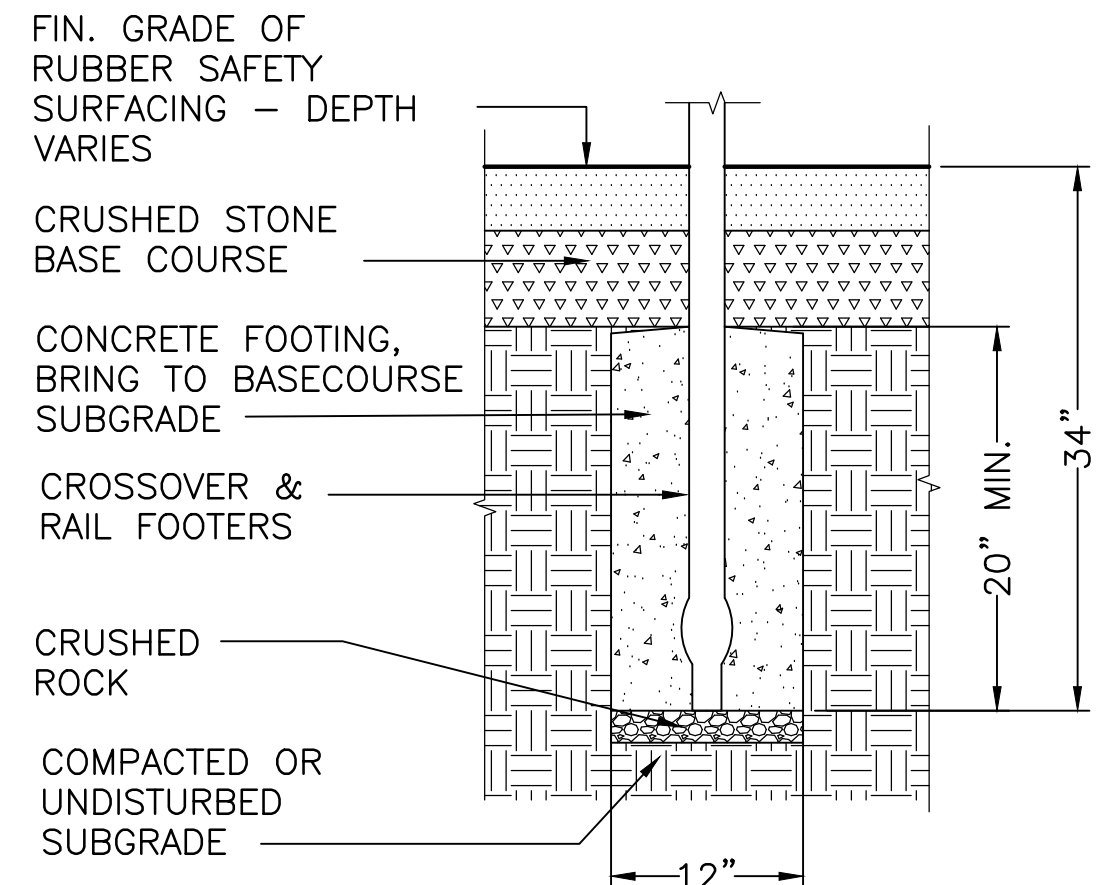
SECTION
2 WEEVOS - BONGO, XYLOFUN, OPTIGEAR FTGS (1 EA)
 1" = 1'-0"



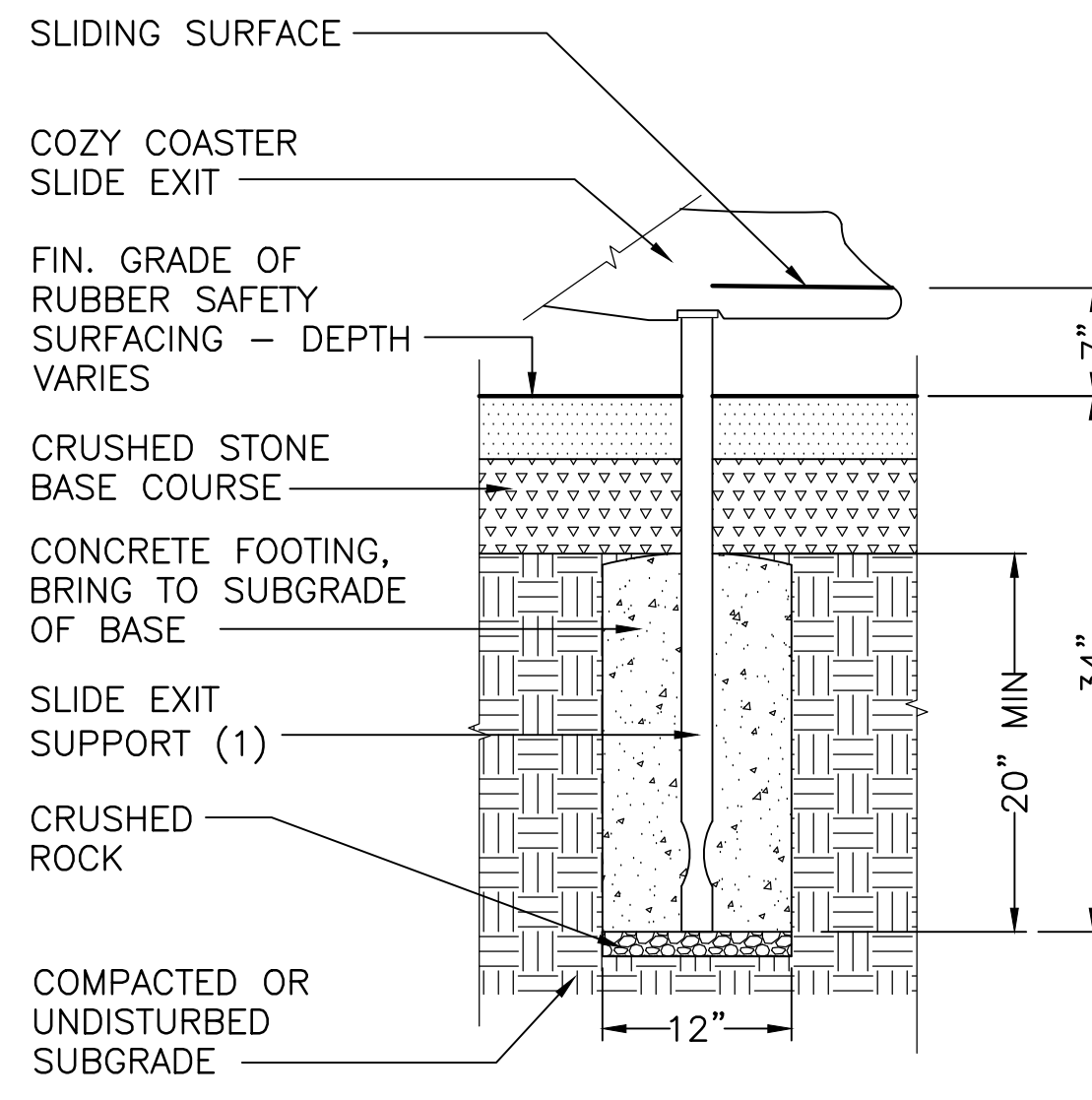
SECTION
3 WEEVOS SWIGGLY STIX BRIDGE FOOTINGS
 1" = 1'-0"



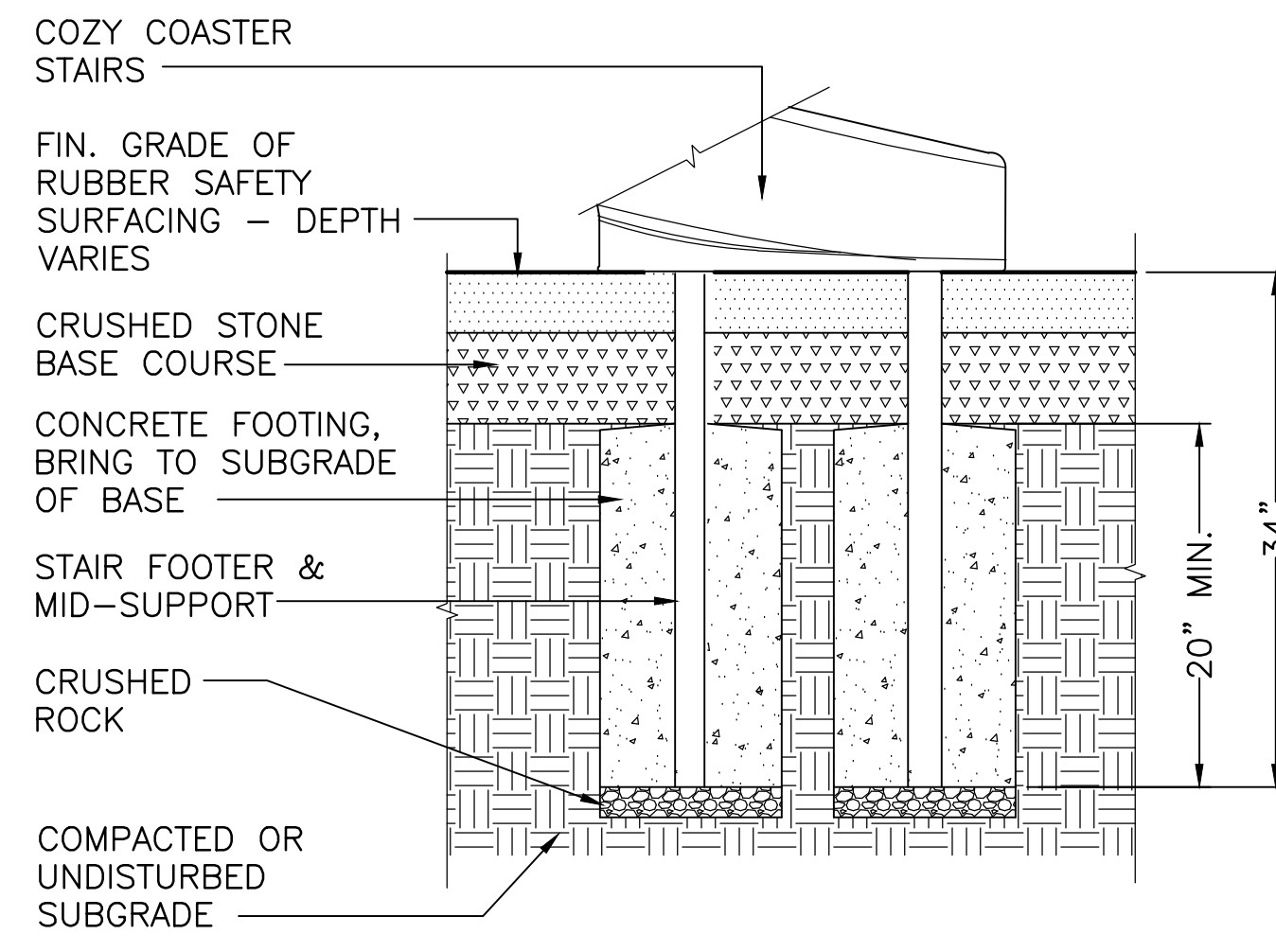
SECTION
3 WEEVOS SWIGGLY STIX BRIDGE FOOTINGS
 1" = 1'-0"



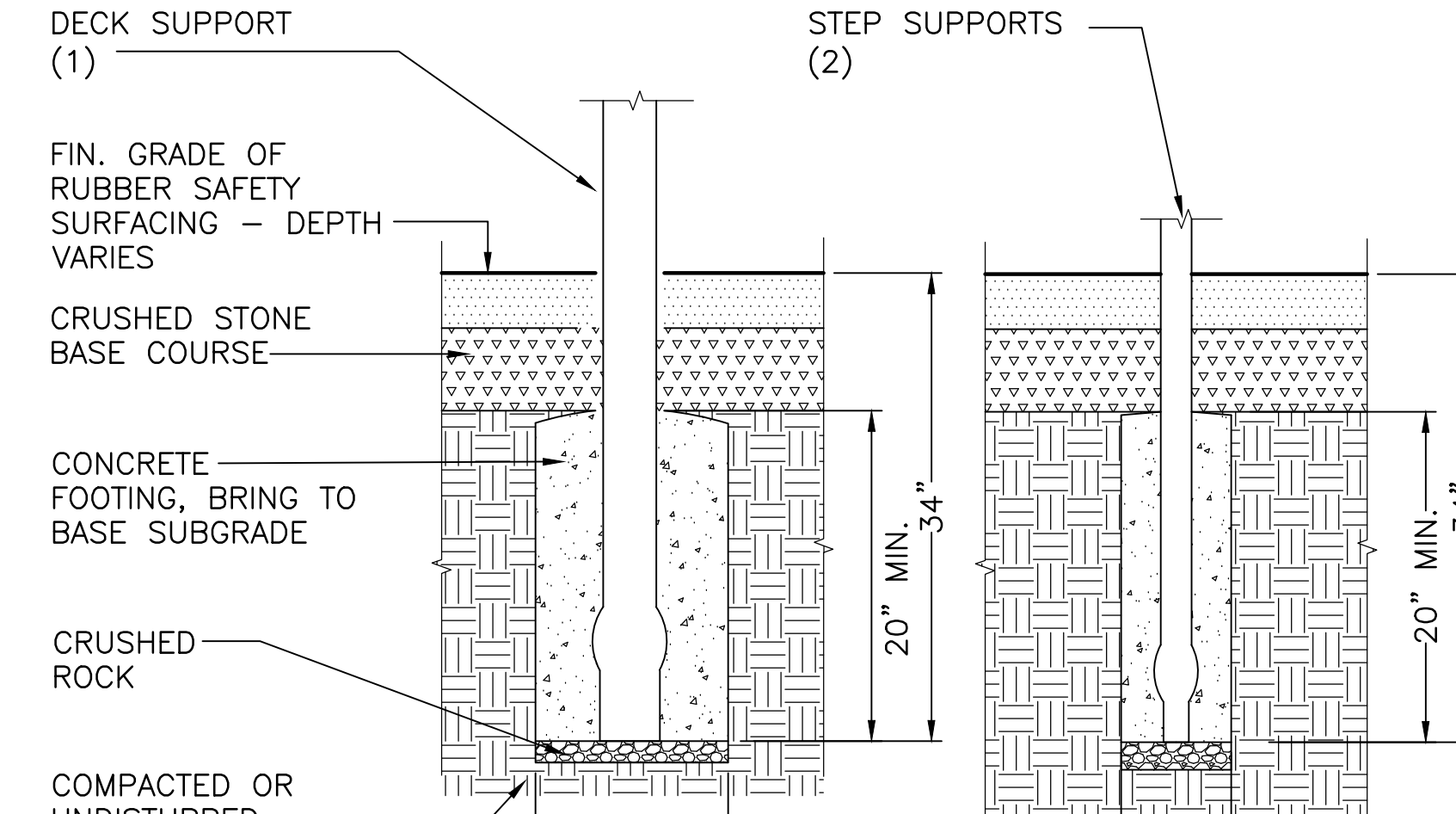
SECTION
4 WEEVOS COZY COASTER SLIDE FOOTINGS
 1" = 1'-0"



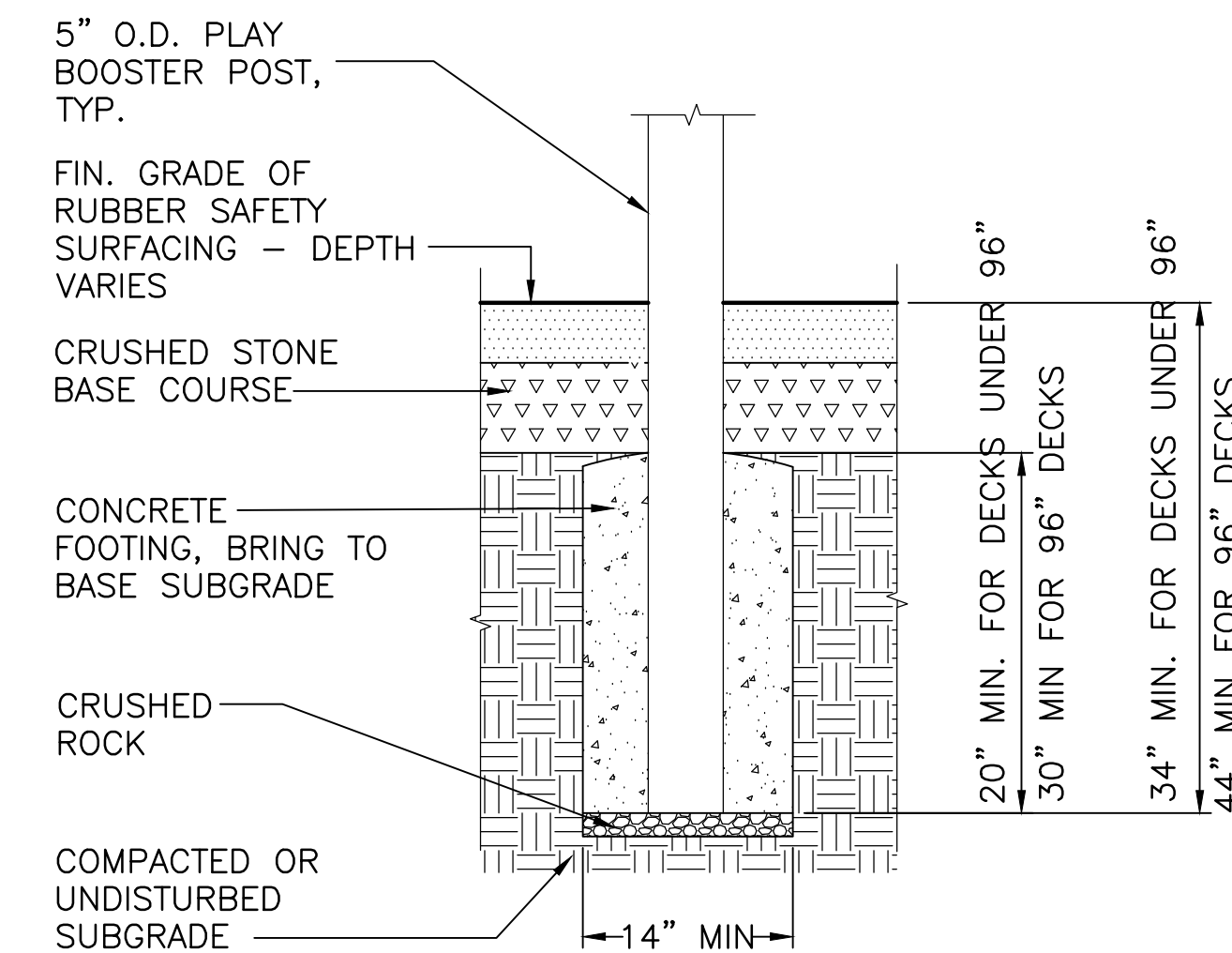
SECTION
4 WEEVOS COZY COASTER SLIDE FOOTINGS
 1" = 1'-0"



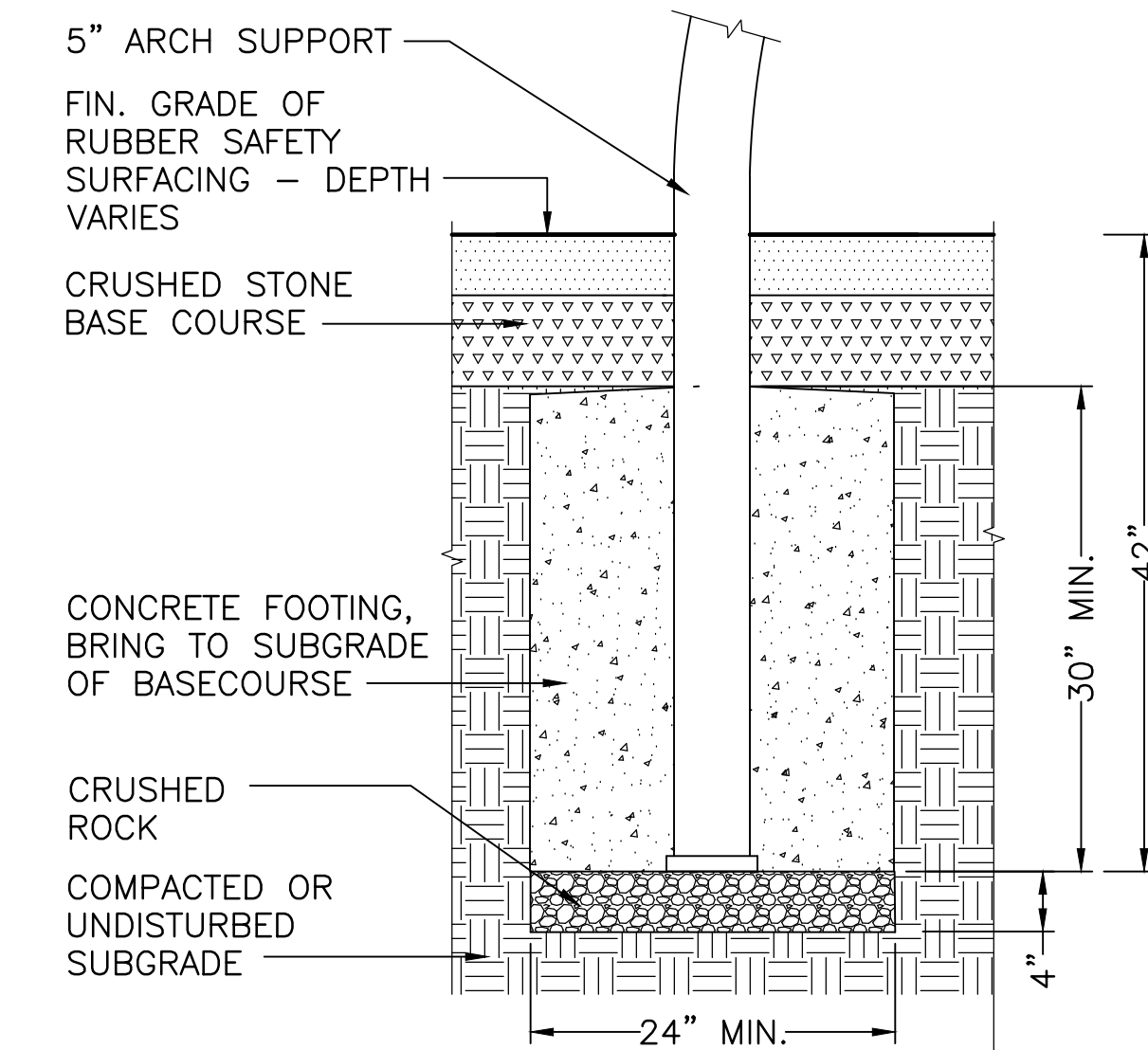
SECTION
5 TRANSFER MODULE 3 FOOTINGS TOTAL
 1" = 1'-0"



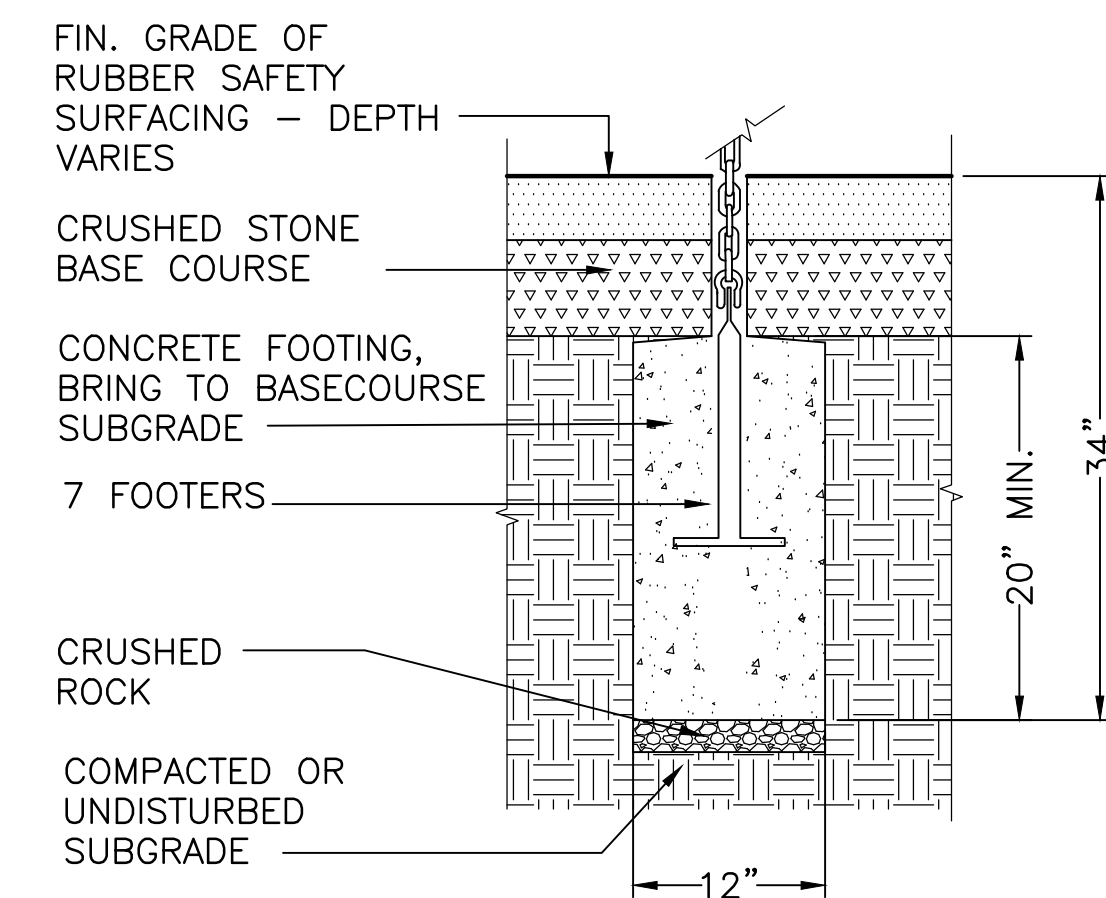
SECTION
5 TRANSFER MODULE 3 FOOTINGS TOTAL
 1" = 1'-0"



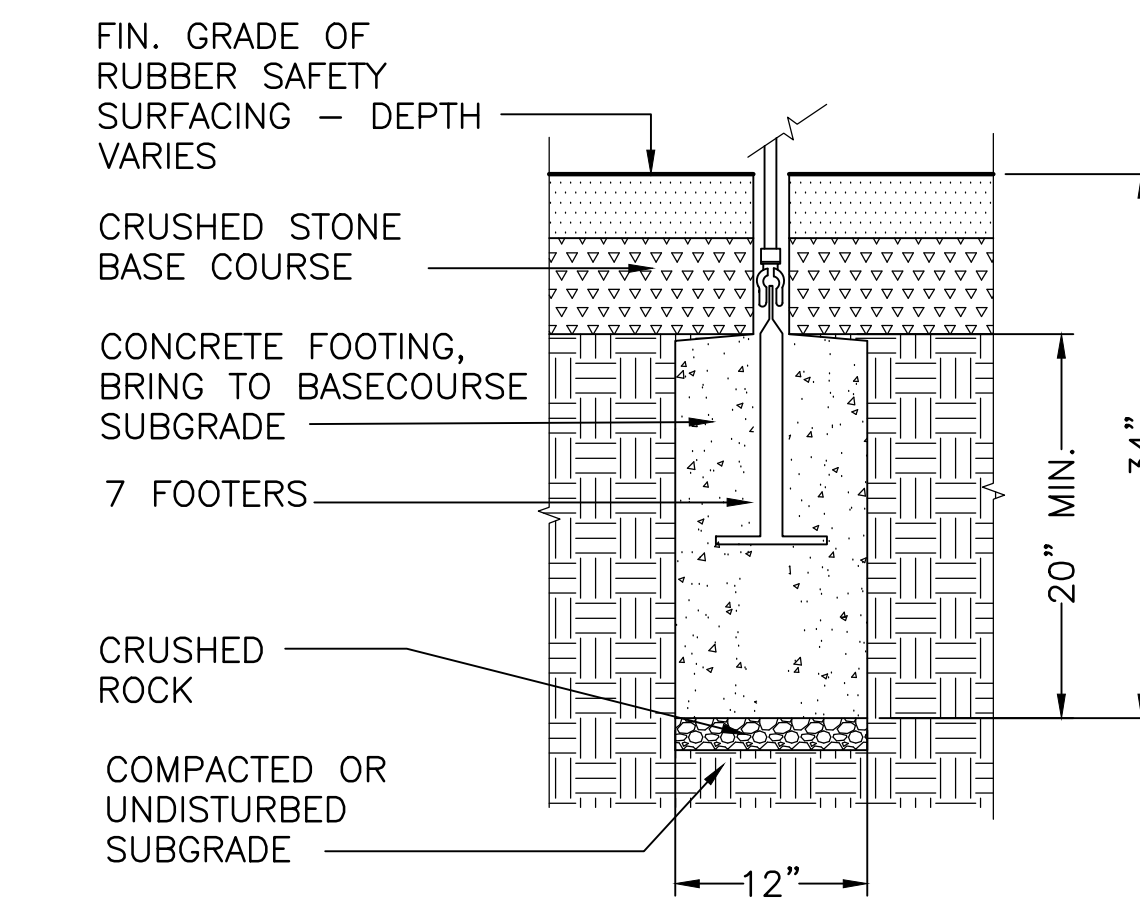
SECTION
6 5" POST FOOTING
 1" = 1'-0"



SECTION
7 5" ARCH FOOTING
 1" = 1'-0"



SECTION
8 EVOS SWIGGLE STIX BRIDGE - 7 FOOTERS TOTAL
 1" = 1'-0"



SECTION
9 EVOS OZONE CLIMBER - 7 FOOTERS TOTAL
 1" = 1'-0"

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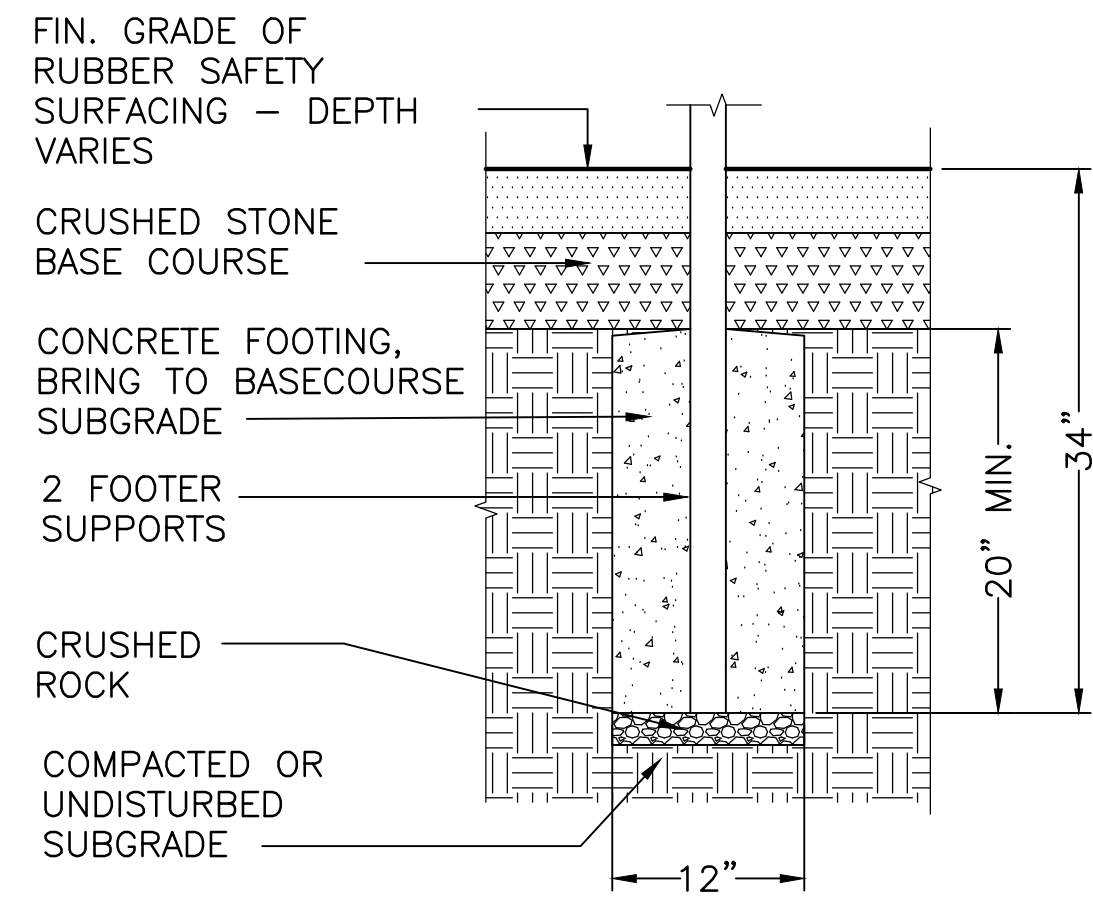
Project:
**CITY OF WALTHAM
 DRAKE PLAYGROUND
 3 HAZEL STREET
 WALTHAM, MA 02451**

Prepared For:
**CITY OF WALTHAM
 DEPARTMENT OF RECREATION
 510 MOODY STREET
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TITLE:
**PLAY EQUIPMENT
 DETAILS**

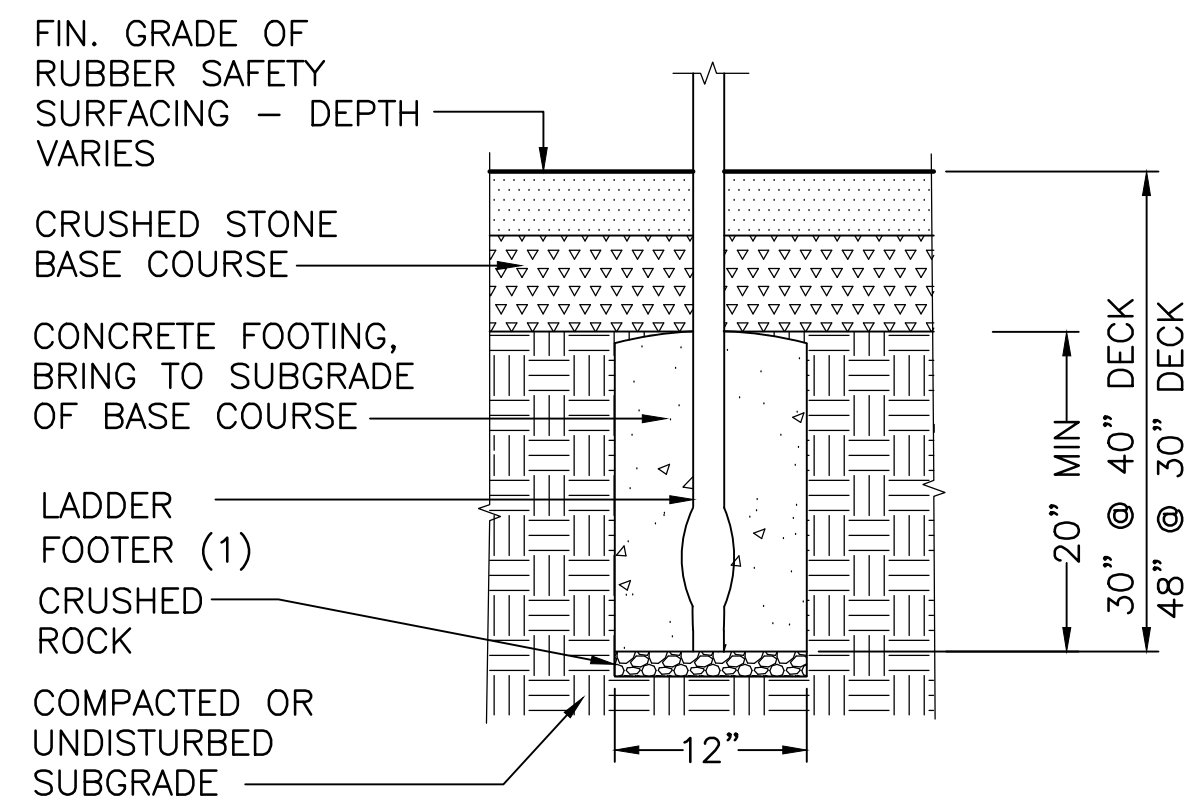
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DWG No. **L-14**



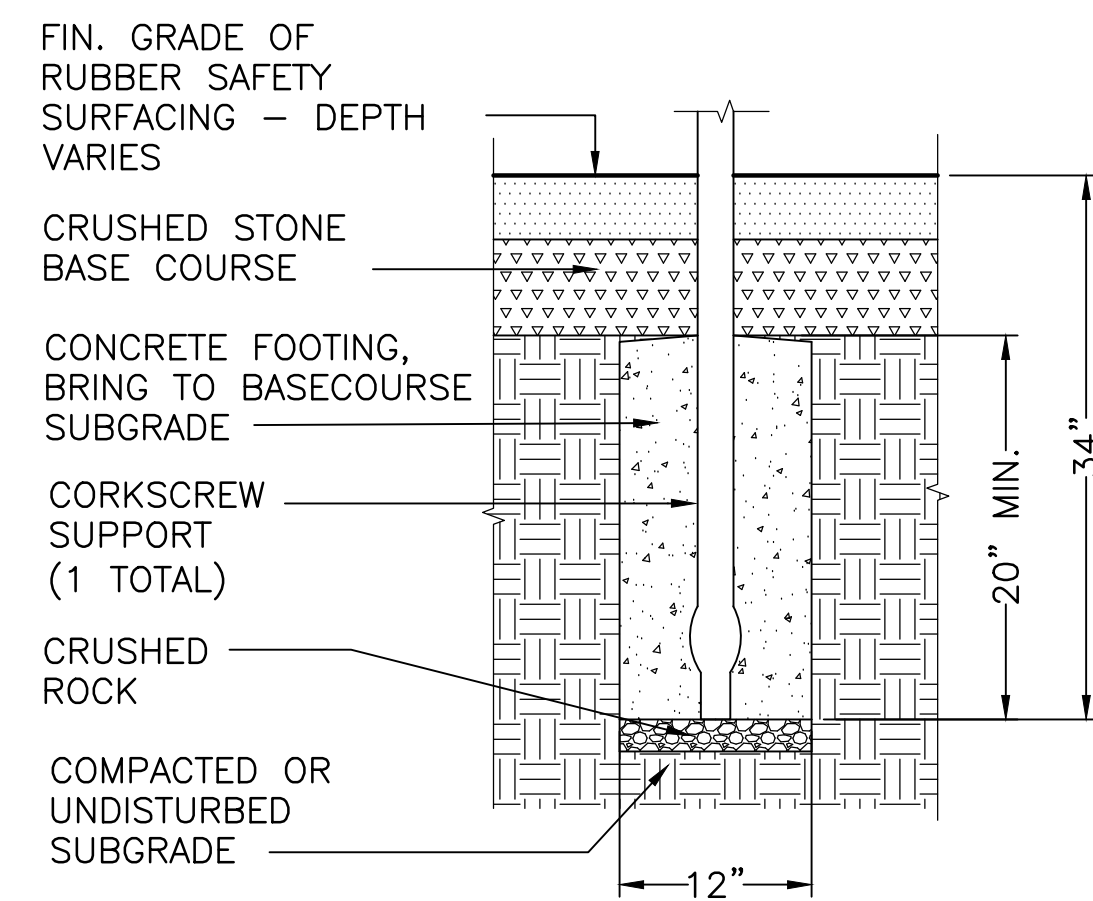
SECTION

1 EVOS HELIX NET CLIMBER - 2 FOOTERS TOTAL
1" = 1'-0"



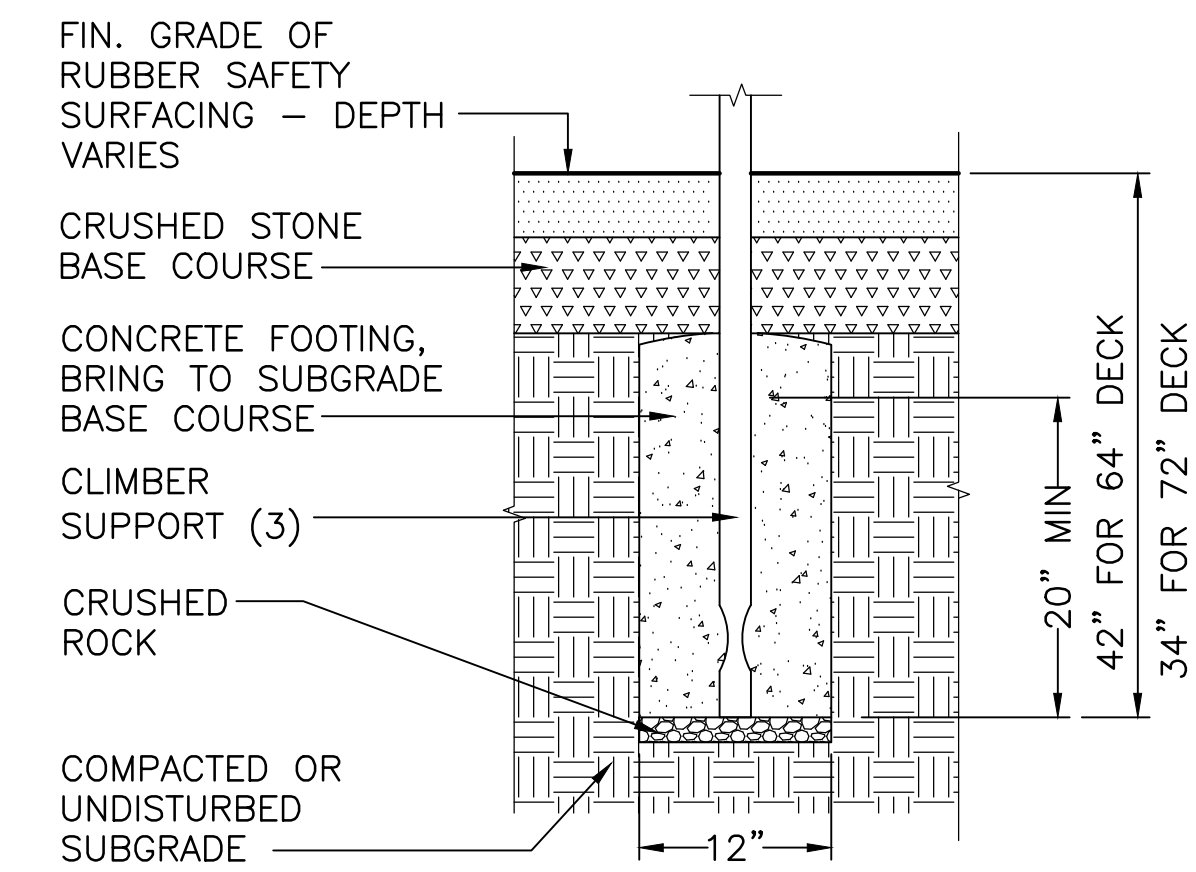
SECTION

2 VERTICAL LADDER - 1 FOOTER
1" = 1'-0"



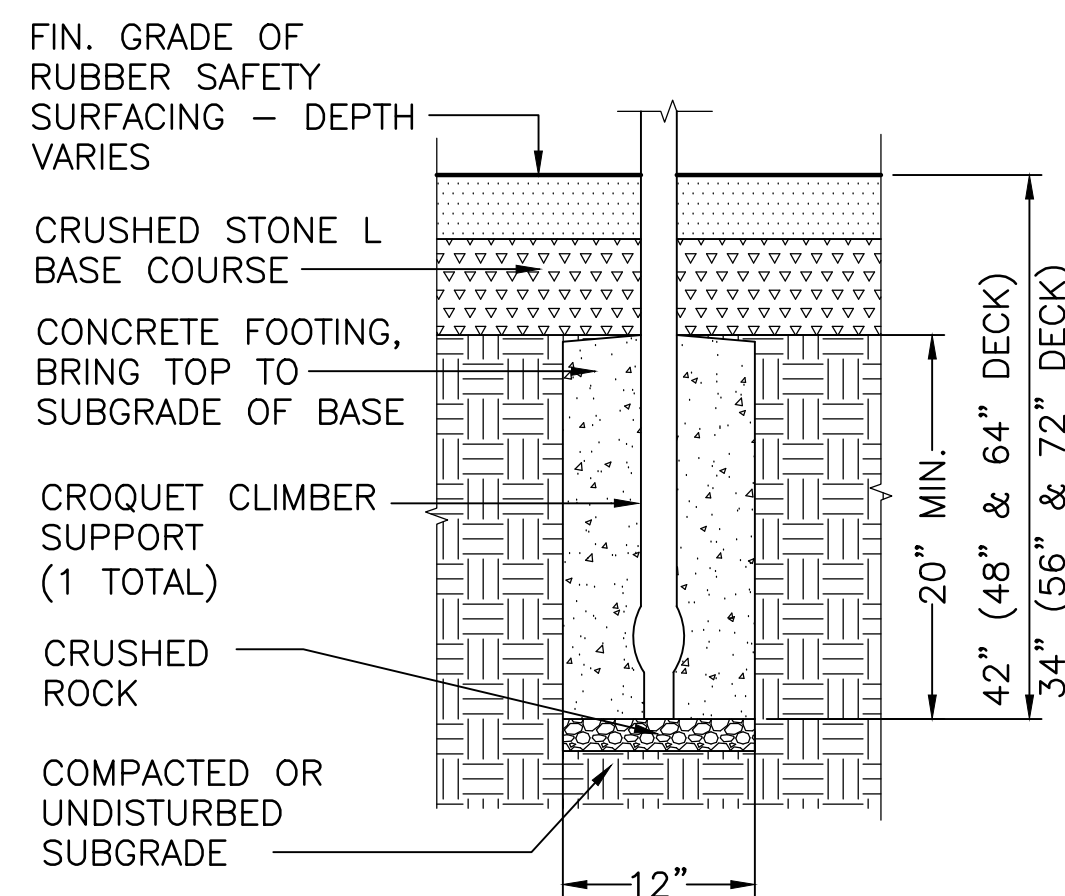
SECTION

3 CORKSCREW FOOTING - 32-72" DECKS
1" = 1'-0"



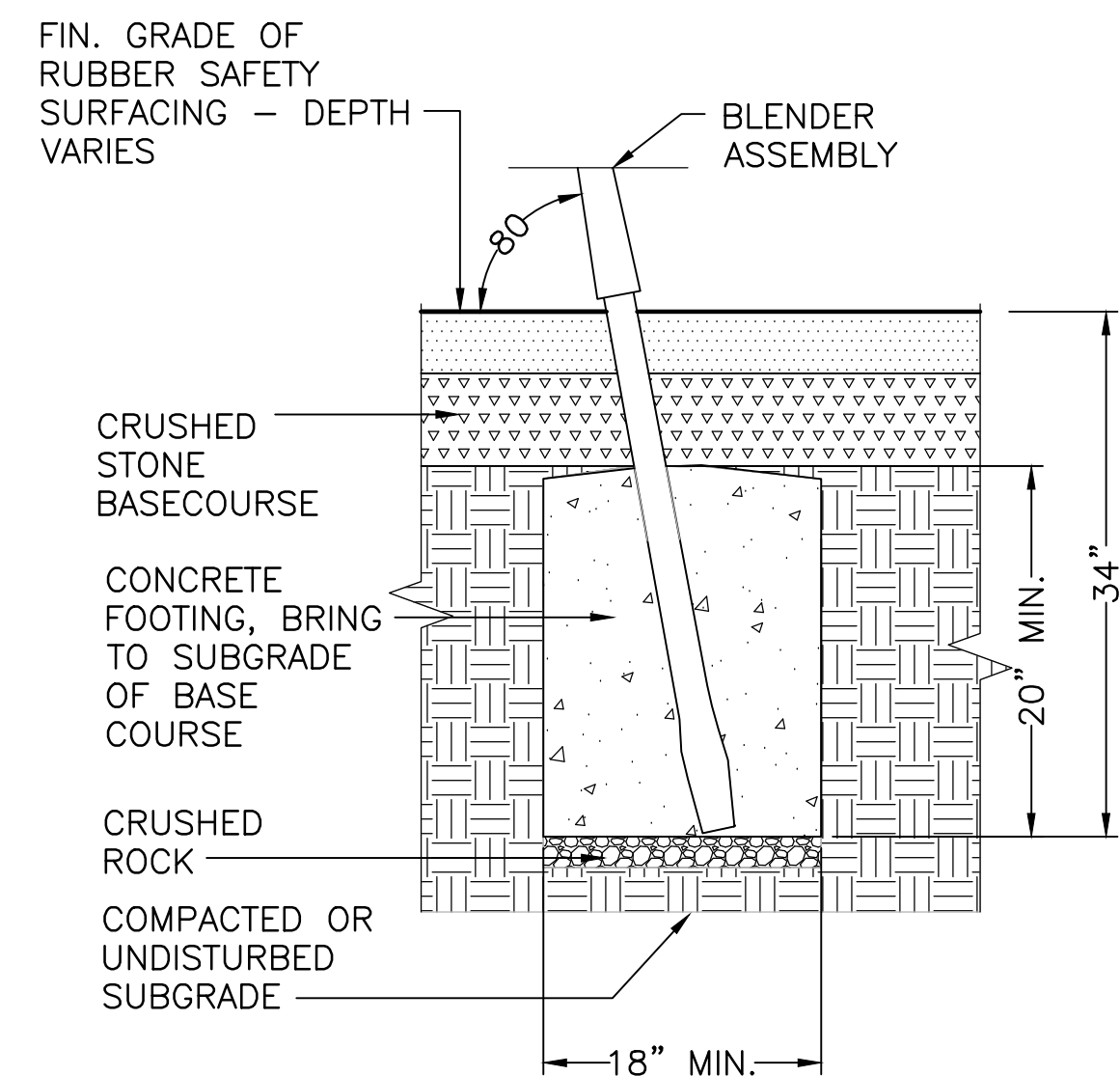
SECTION

4 CASCADE CLIMBER FOOTINGS (3 TOTAL)
1" = 1'-0"



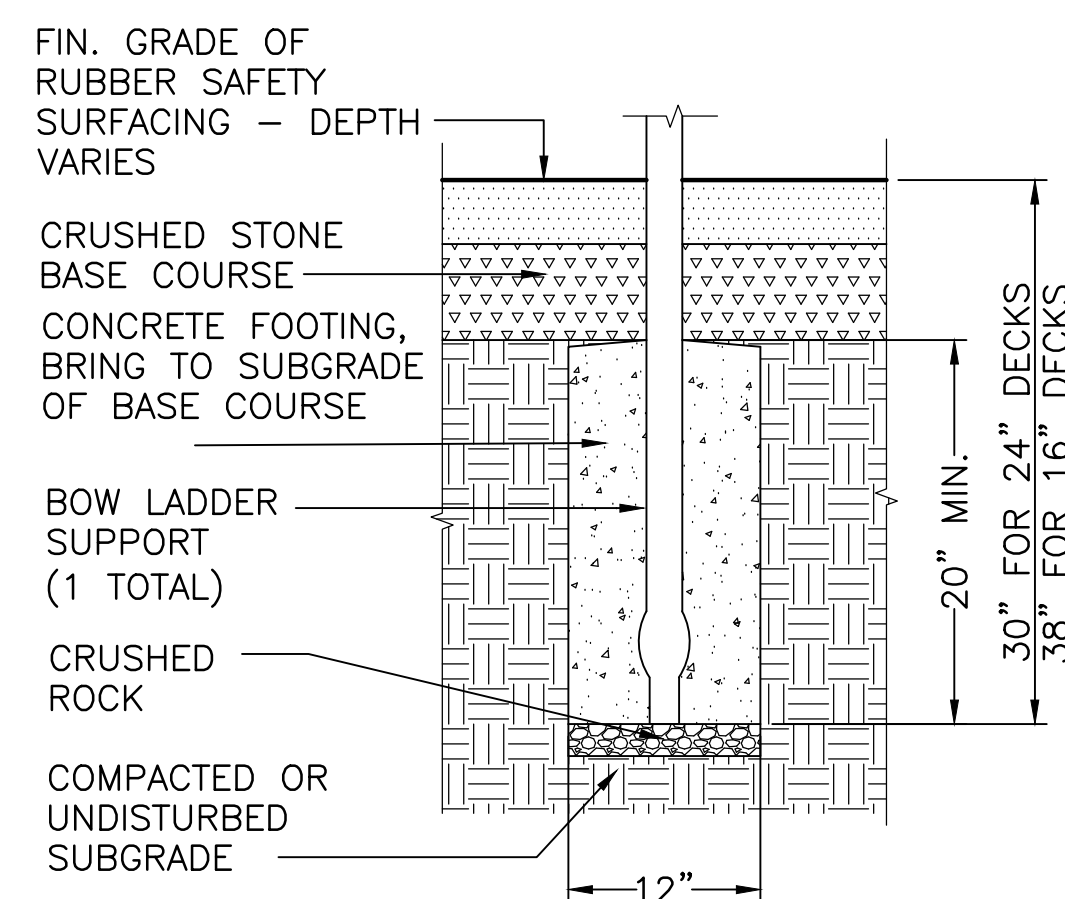
SECTION

5 CROQUET CLIMBER SUPPORT (1 TOTAL)
1" = 1'-0"



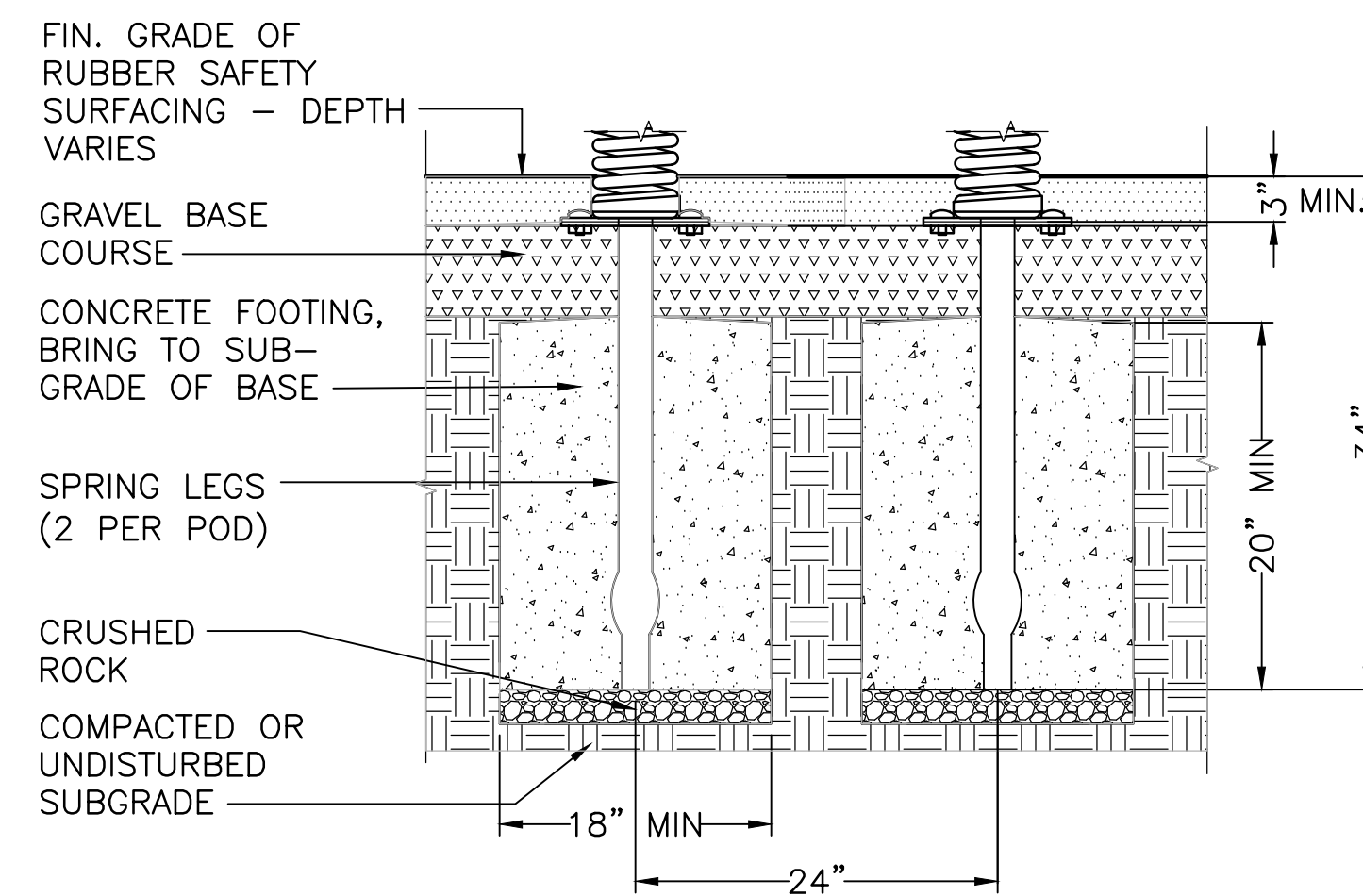
SECTION

6 BLENDER SPINNER FOOTER ATTACHMENT
1/8" = 1'-0"



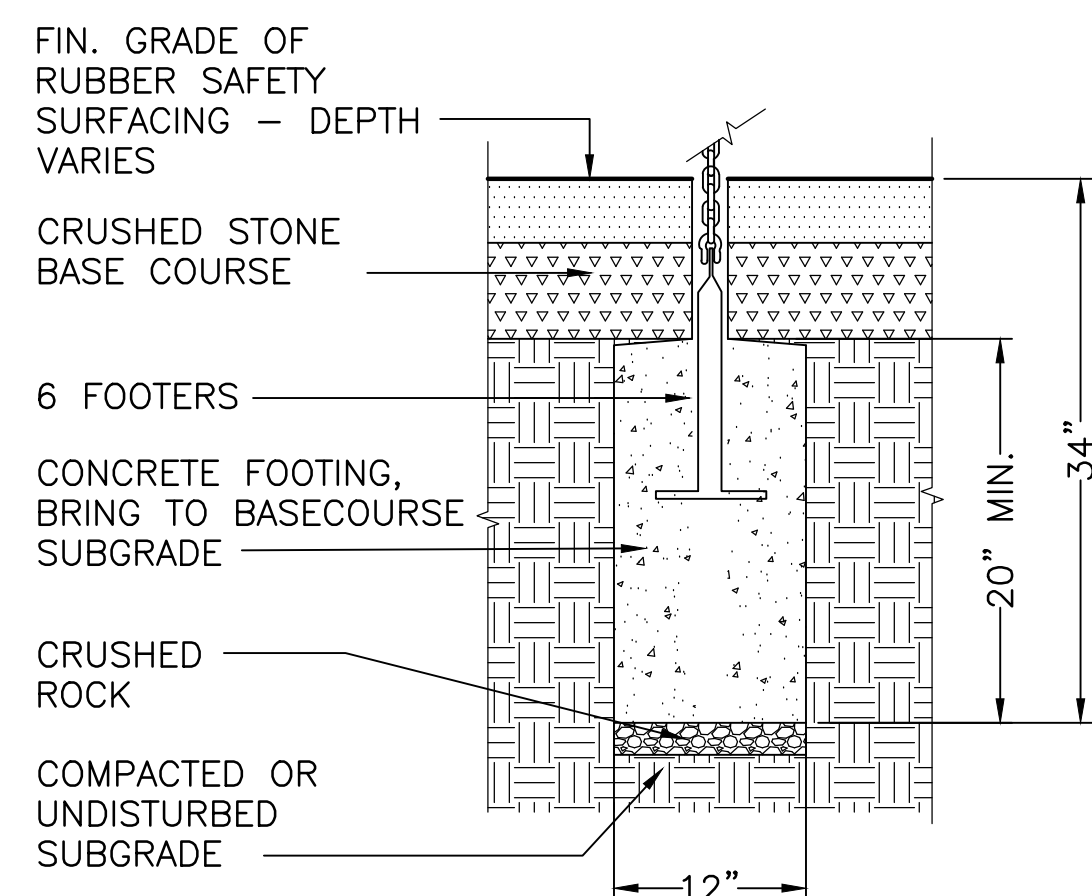
SECTION

7 BOW LADDER SUPPORT
1" = 1'-0"



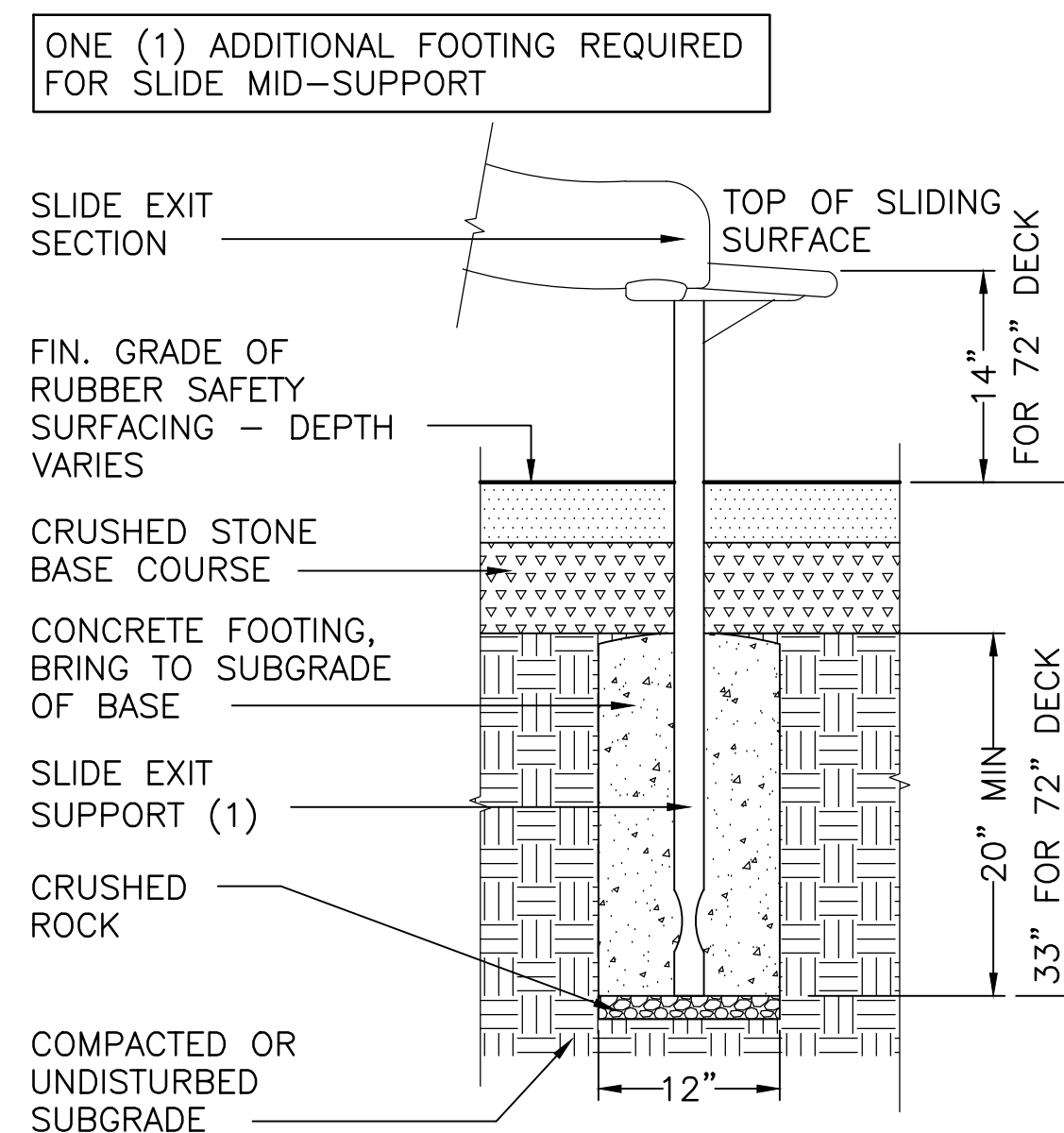
SECTION

8 WOBBLE POD BOUNCER FOOTINGS
1" = 1'-0"



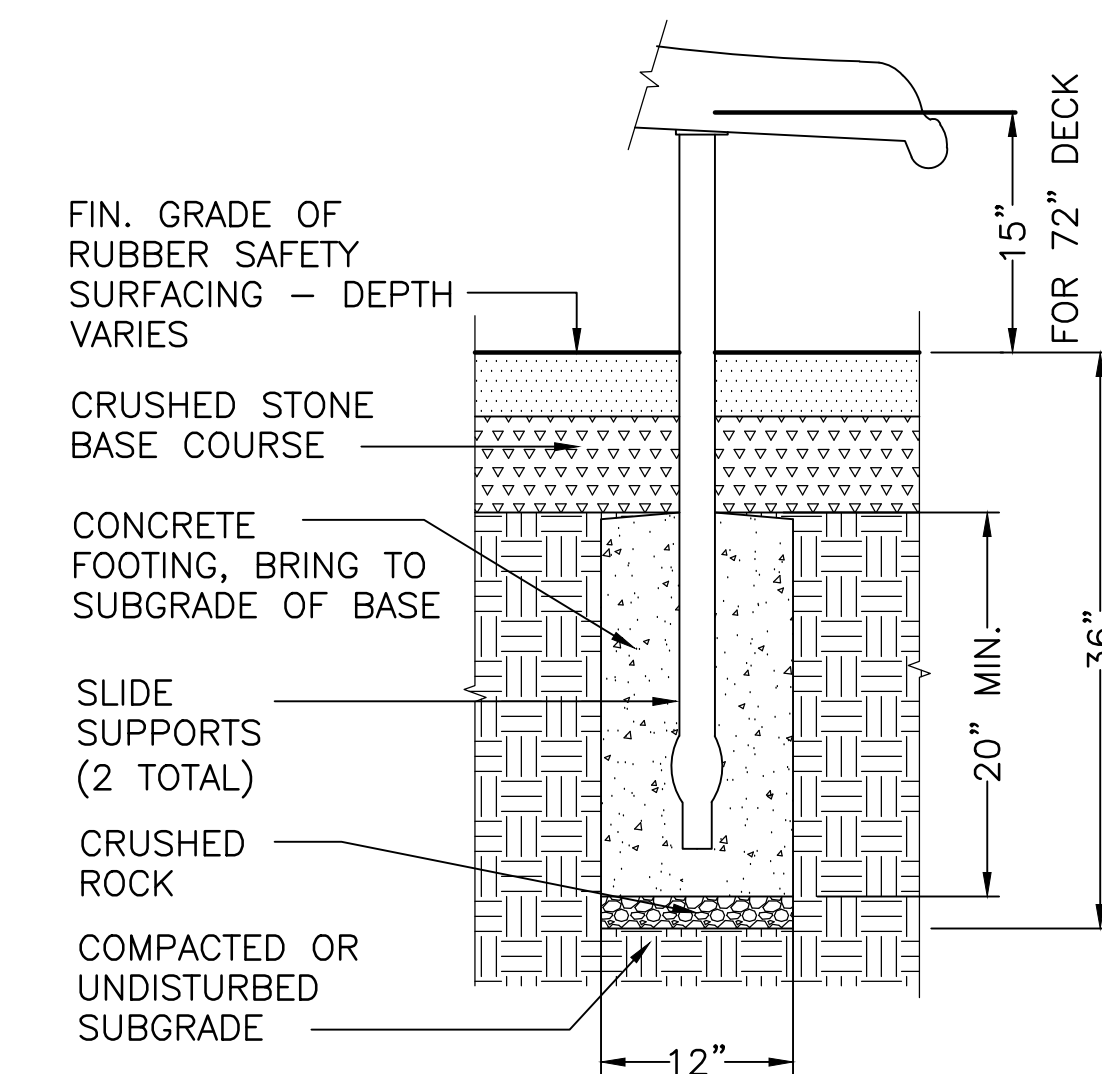
SECTION

9 HEMISPHERE CLIMBER FOOTER SUPPORTS (7)
1" = 1'-0"



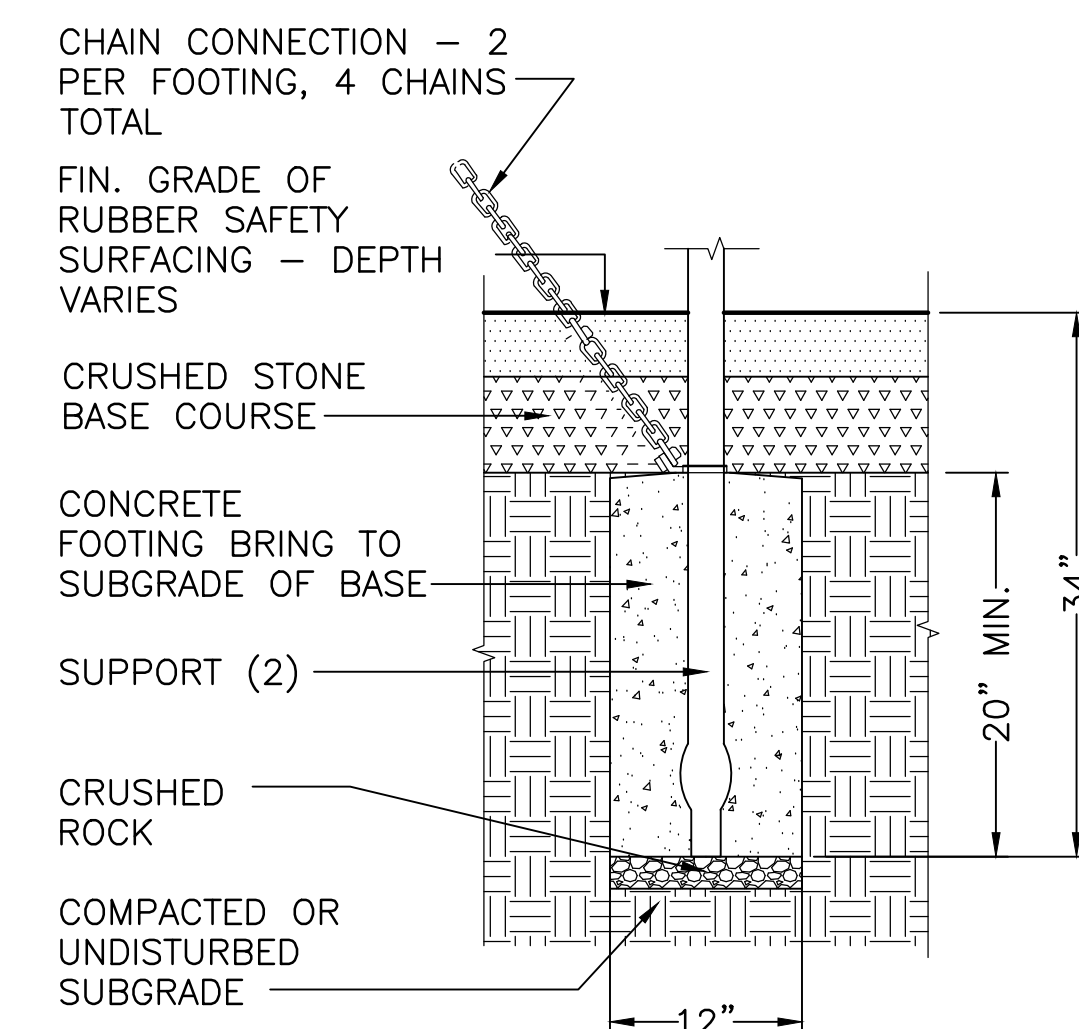
SECTION

10 72" WAVE POLY SLIDE - FOOTINGS (2)
1" = 1'-0"



SECTION

11 72" DOUBLE SWOOSH POLY SLIDE - FOOTINGS (2)
1" = 1'-0"



SECTION

12 CHAIN LADDER - FOOTINGS (2)
1" = 1'-0"

No.	Description	Date
REVISIONS		



Project:

**CITY OF WALTHAM
DRAKE PLAYGROUND
3 HAZEL STREET
WALTHAM, MA 02451**

Prepared For:

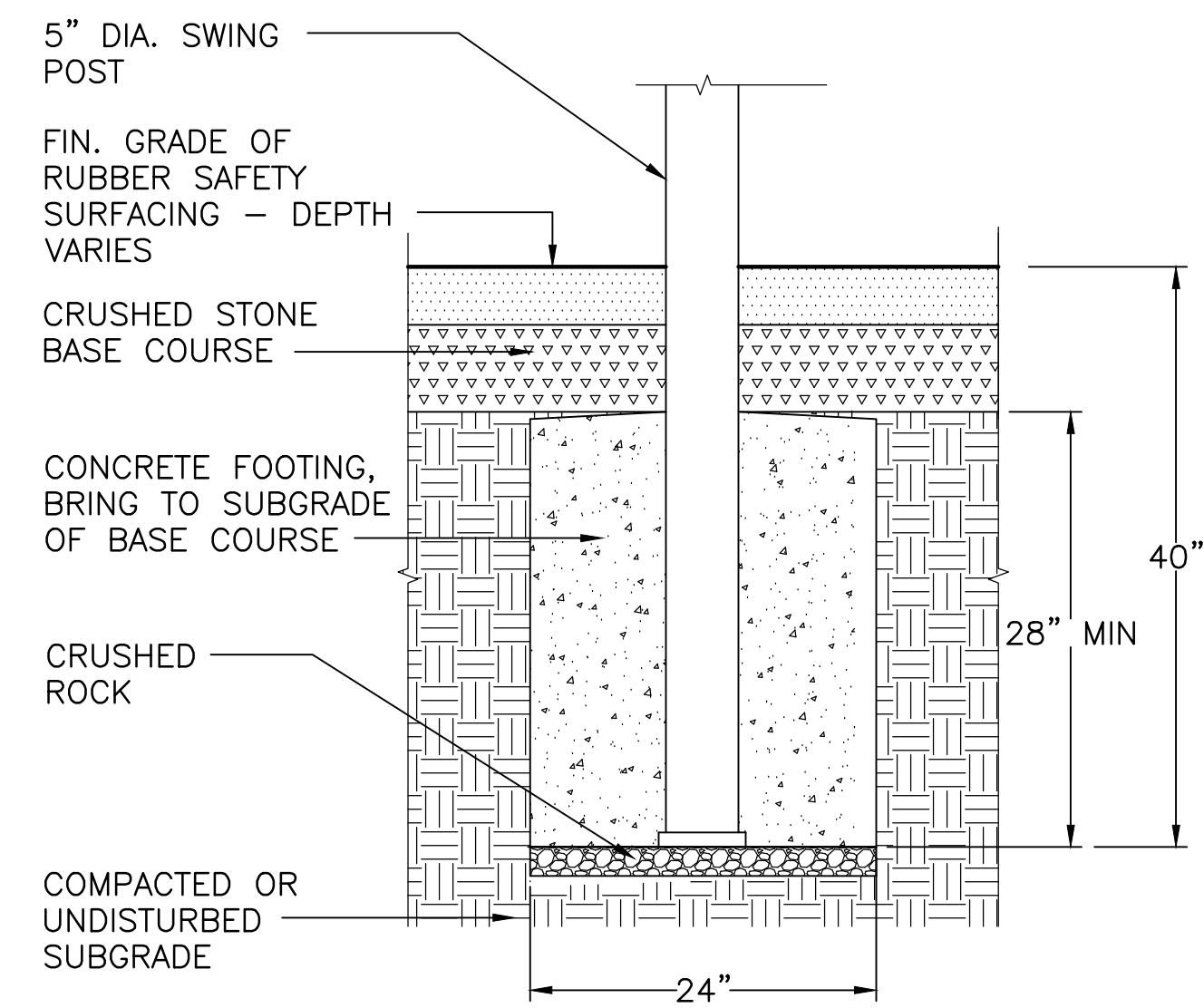
**CITY OF WALTHAM
DEPARTMENT OF RECREATION
510 MOODY STREET
WALTHAM, MA 02453**

TITLE:

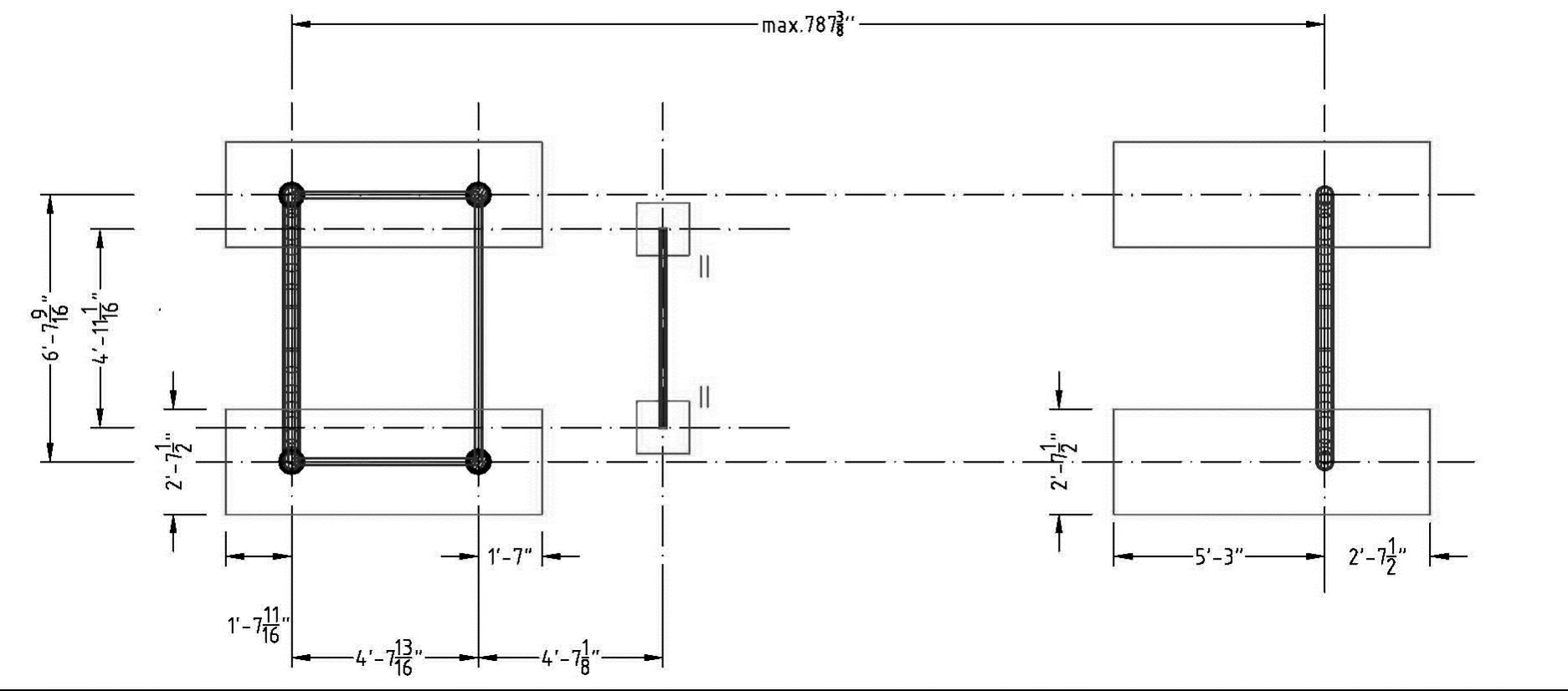
**PLAY EQUIPMENT
DETAILS**

Scale AS NOTED Date NOV 10, 2015
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Project No. 1313.00

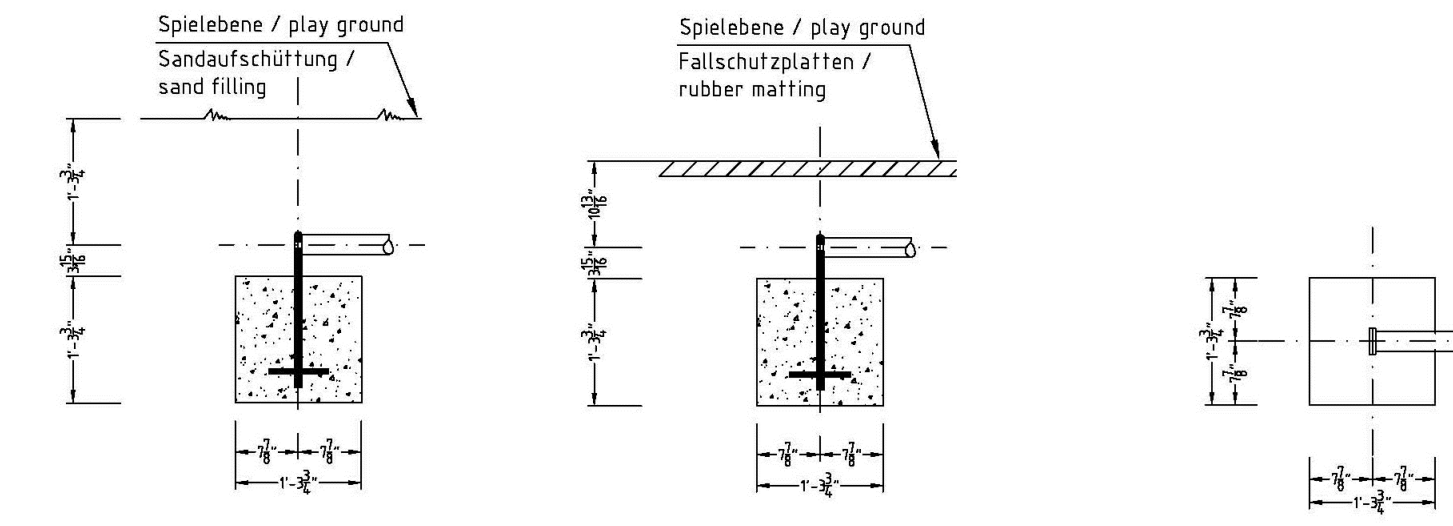
DWG No. **L-15**



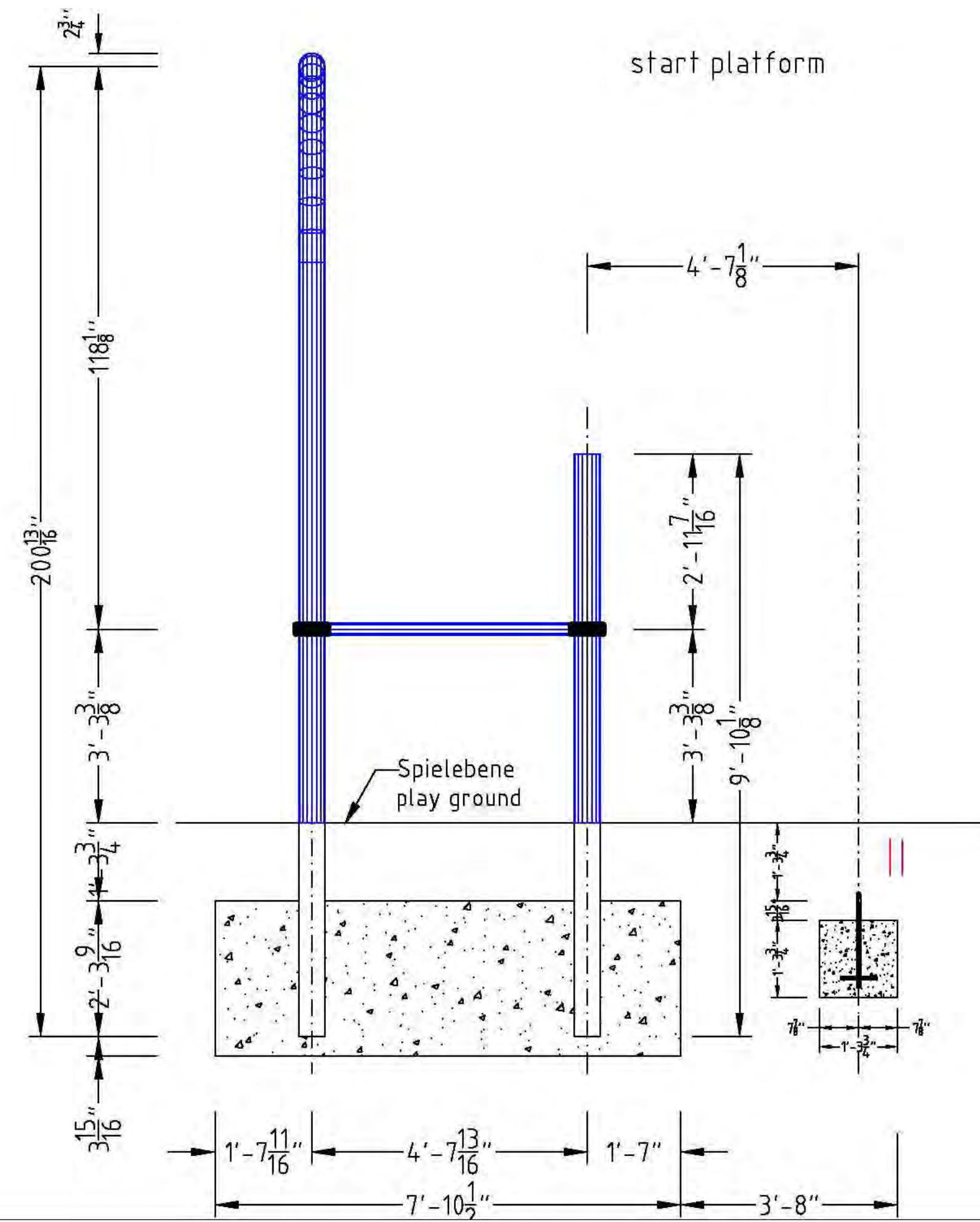
SECTION
1 SWING POST FOOTING DETAIL
 1" = 1'-0"



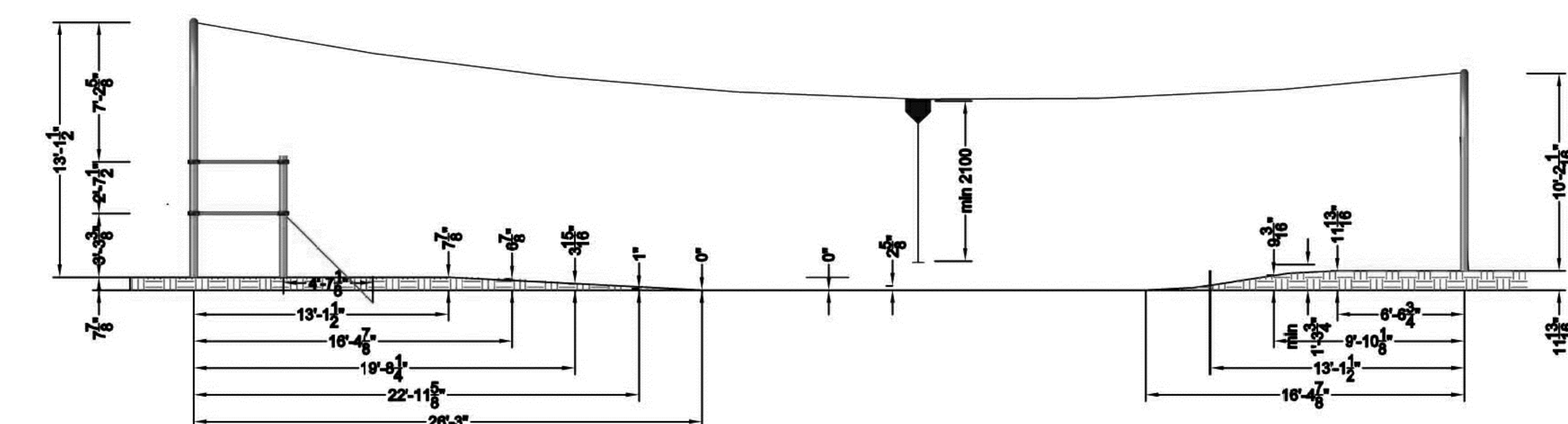
PLAN
2 ZIP LINE -- PLATFORM AND END ARCH FOOTING DETAIL
 1/2" = 1'-0"



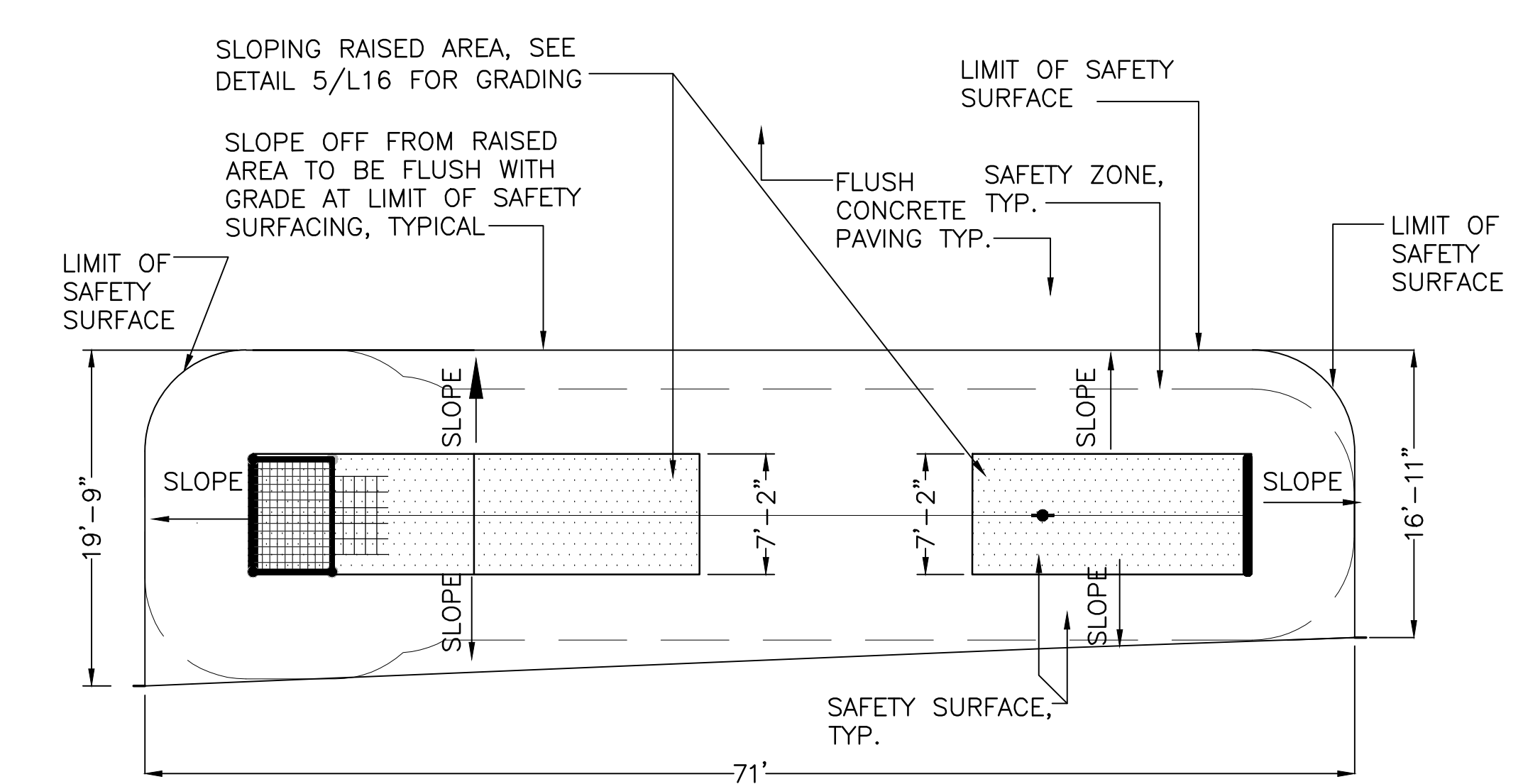
SECTION
3 ZIP LINE NET FOOTINGS
 1/2" = 1'-0"



SECTION
4 ZIP LINE PLATFORM AND NET FOOTINGS
 1/2" = 1'-0"



SECTION
5 ZIP LINE ELEVATIONS
 N.T.S.



PLAN
6 ZIP LINE LAYOUT & GRADING DETAIL
 N.T.S.

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Project:
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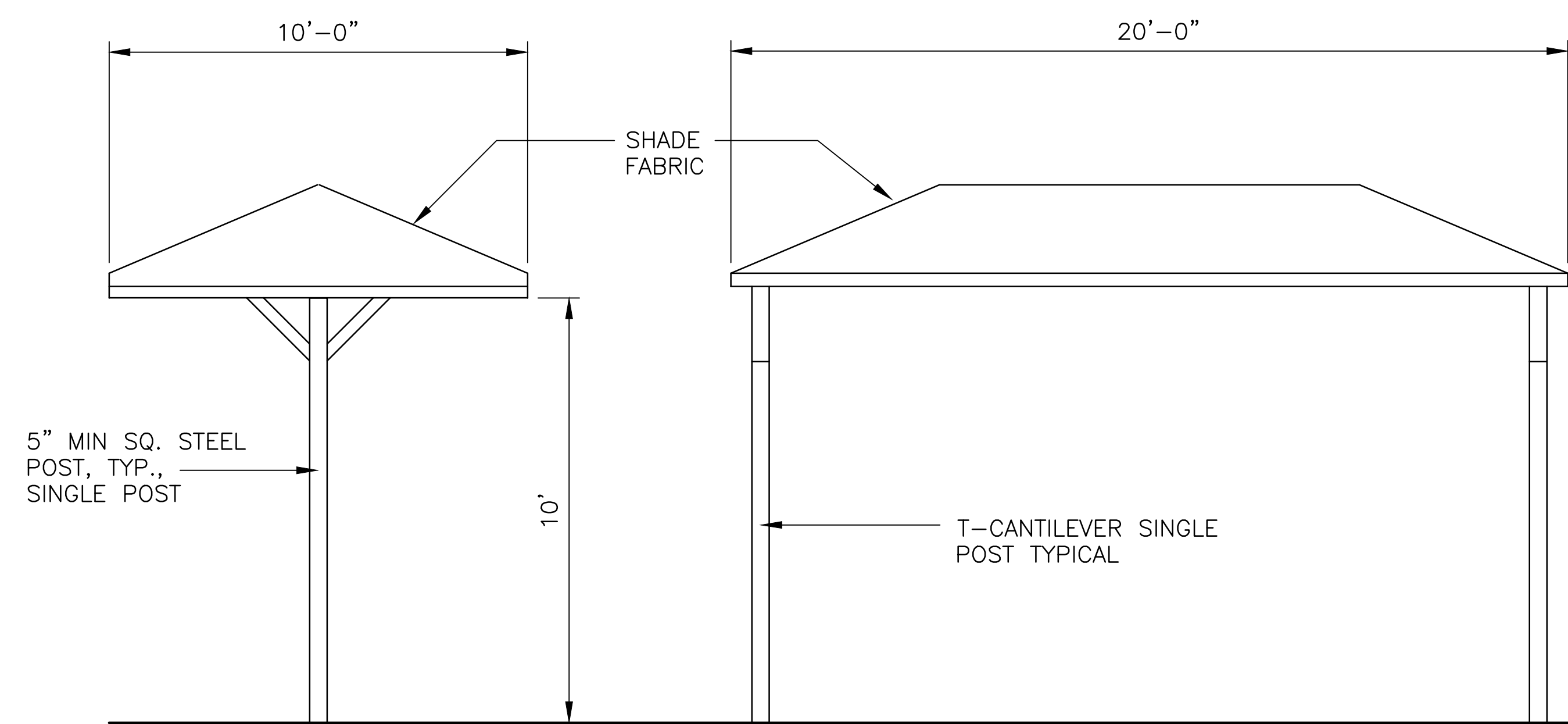
Prepared For:
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 510 MOODY STREET
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TITLE:
**PLAY EQUIPMENT
 DETAILS**

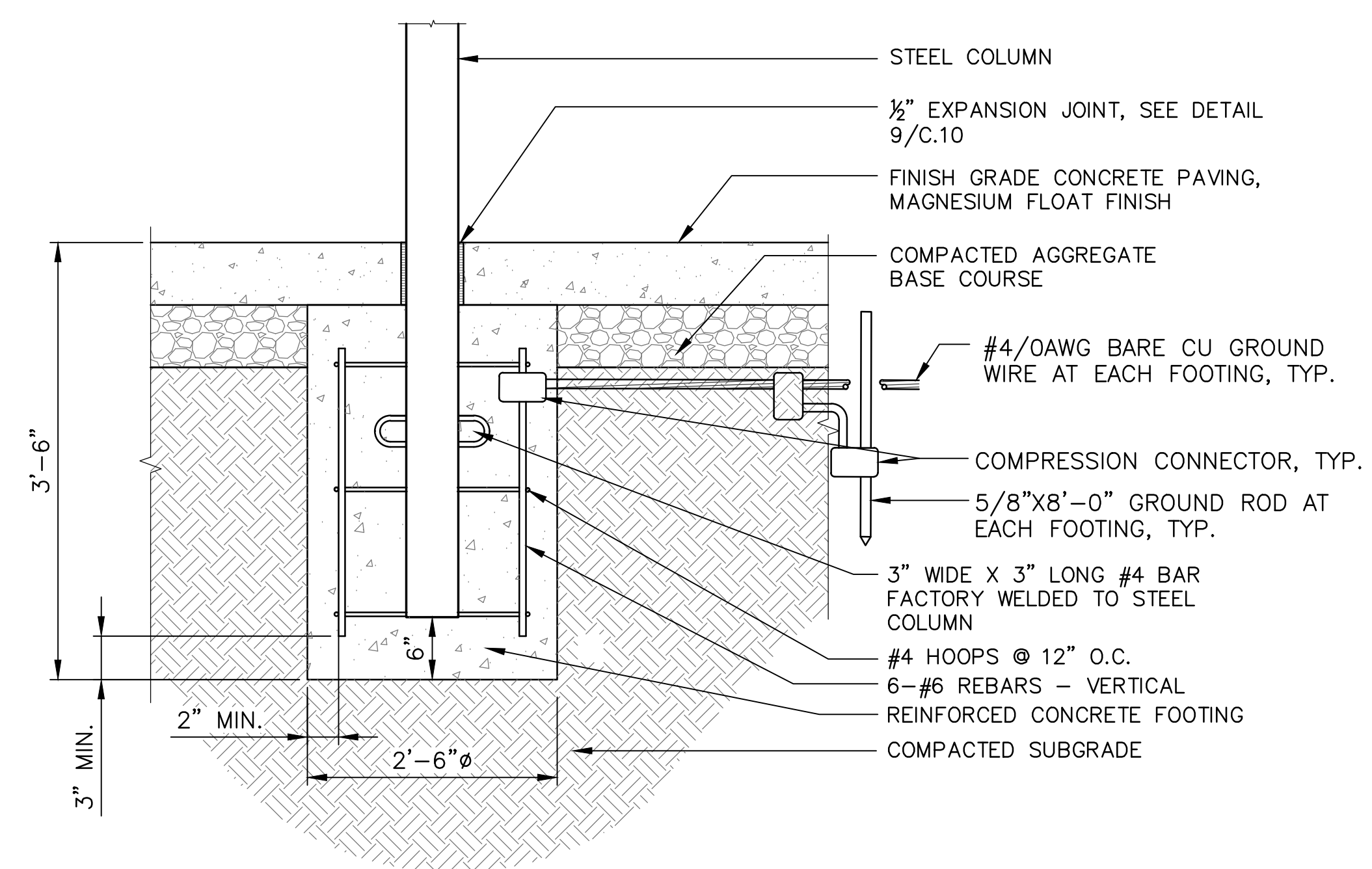
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DWG No. **L-16**

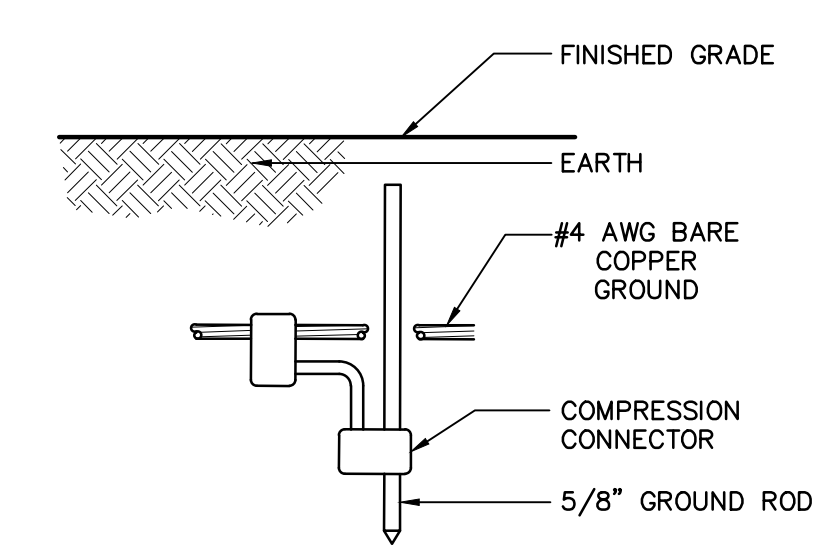
NOTE:
 THE CONTRACT REQUIRES INSTALLATION OF 3 CANTILEVERED SHADE STRUCTURES AT DRAKE PLAYGROUND, AND THE RE-INSTALLATION OF ONE SALVAGED 4 POST CANVAS SHADE STRUCTURE AT PROSPECT HILL PARK, 314 TOTTEN POND ROAD, WALTHAM, MA IN A LOCATION CHOSEN BY THE OWNER. PROVIDE GROUNDING AND FOOTINGS FOR ALL 4 STRUCTURES.



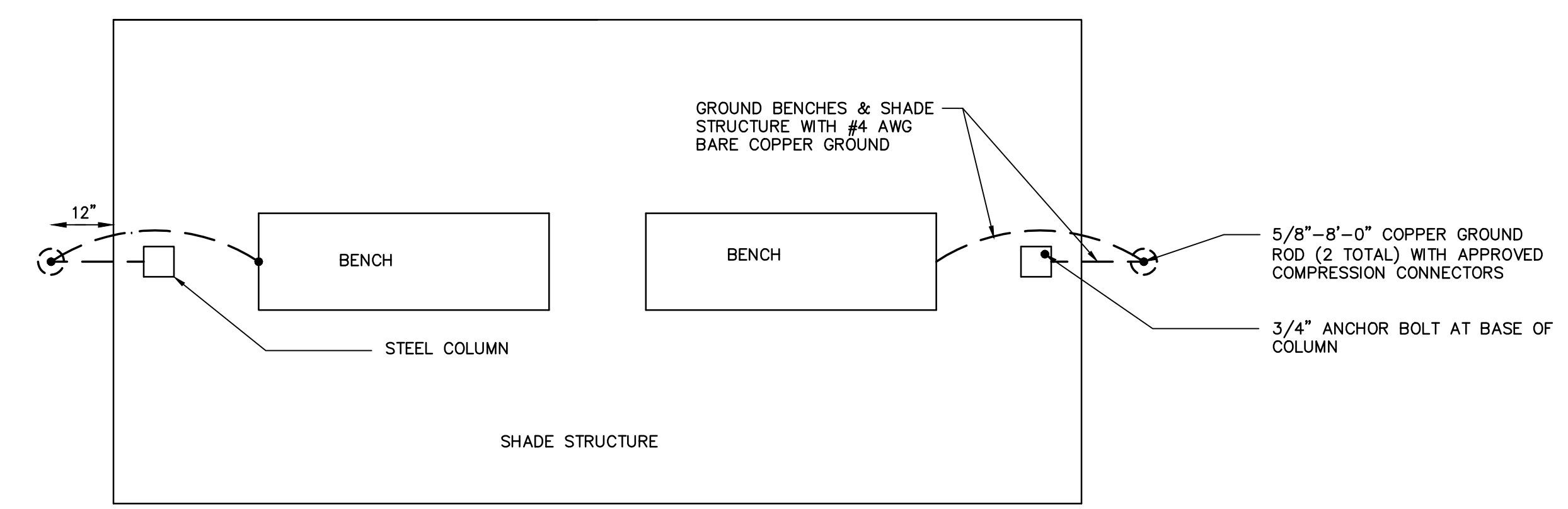
1 T-CANTILEVER SHADE STRUCTURES (3 TOTAL) + RE-INSTALLATION OF 1 4-POSTED STRUCTURE AT PROSPECT HILL PARK
 1/4" = 1'-0"



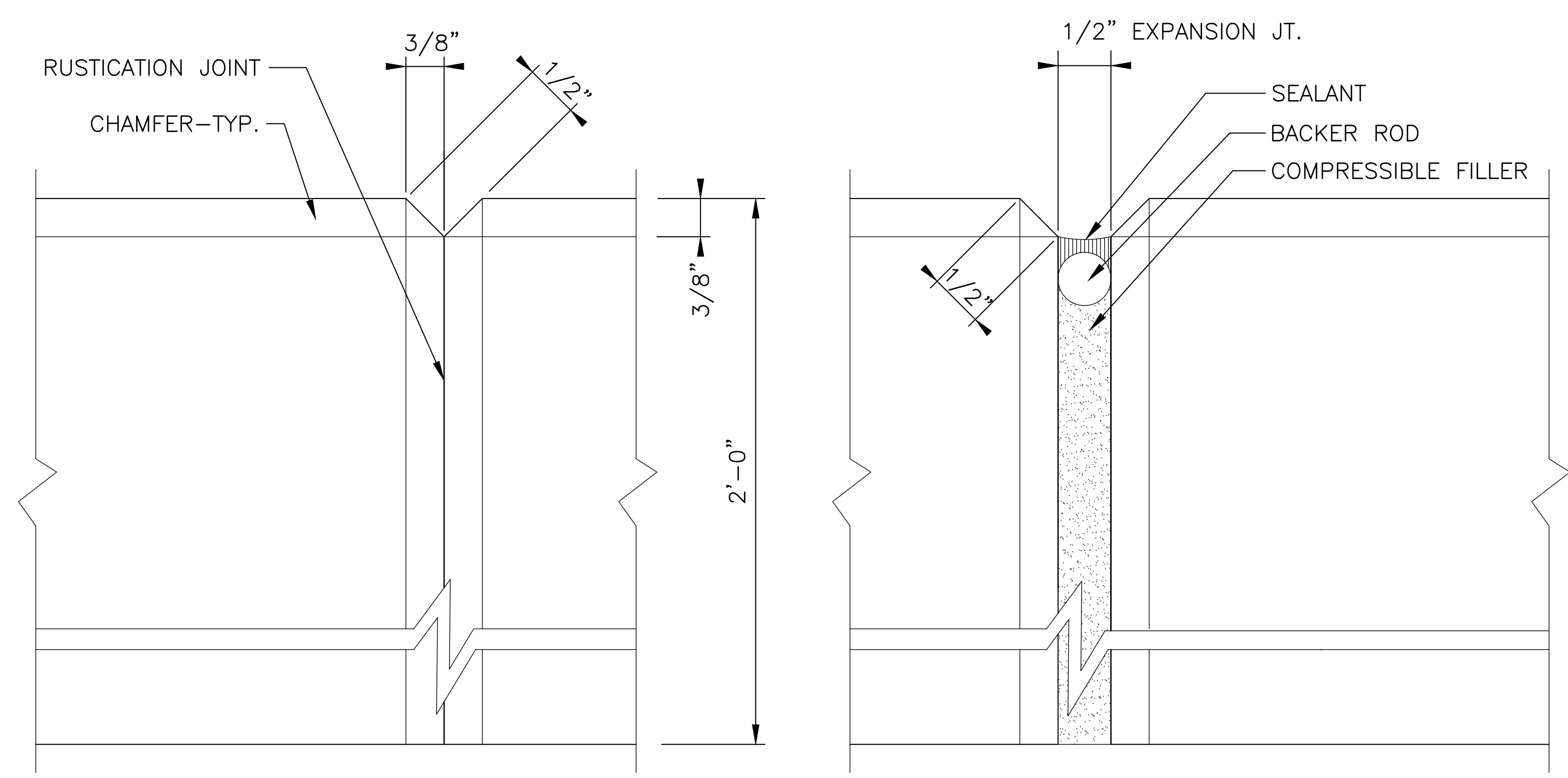
2 SHADE STRUCTURE FOOTING
 1/4" = 1'-0"



SECTION
 ROD TO CABLE CONNECTION



3 SHADE STRUCTURE GROUNDING PLAN
 N.T.S.



4 WALL RUSTICATION AND EXPANSION JOINTS
 FULL SIZE

Carolyn Cooney & Associates
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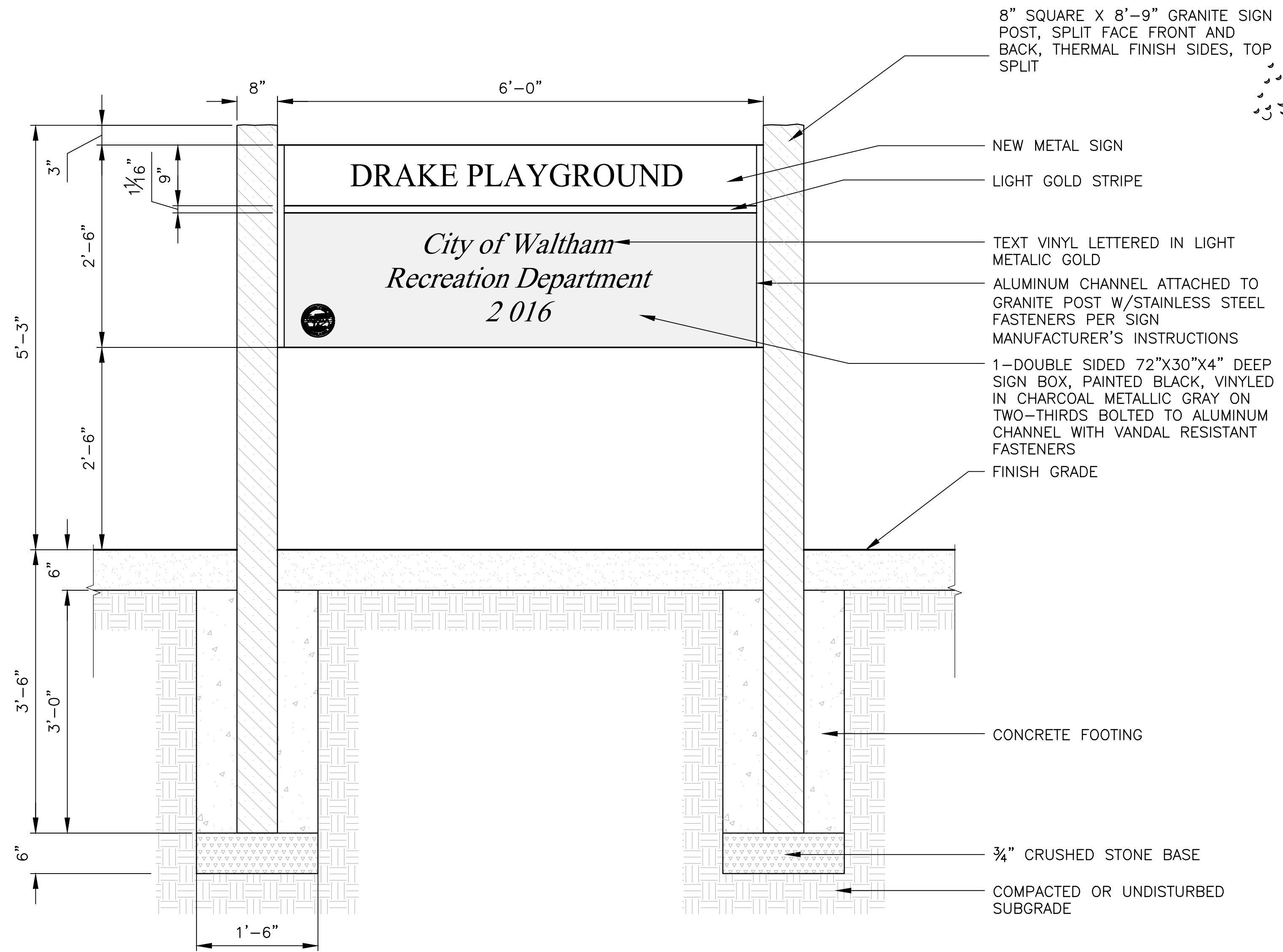
Project:
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Prepared For:
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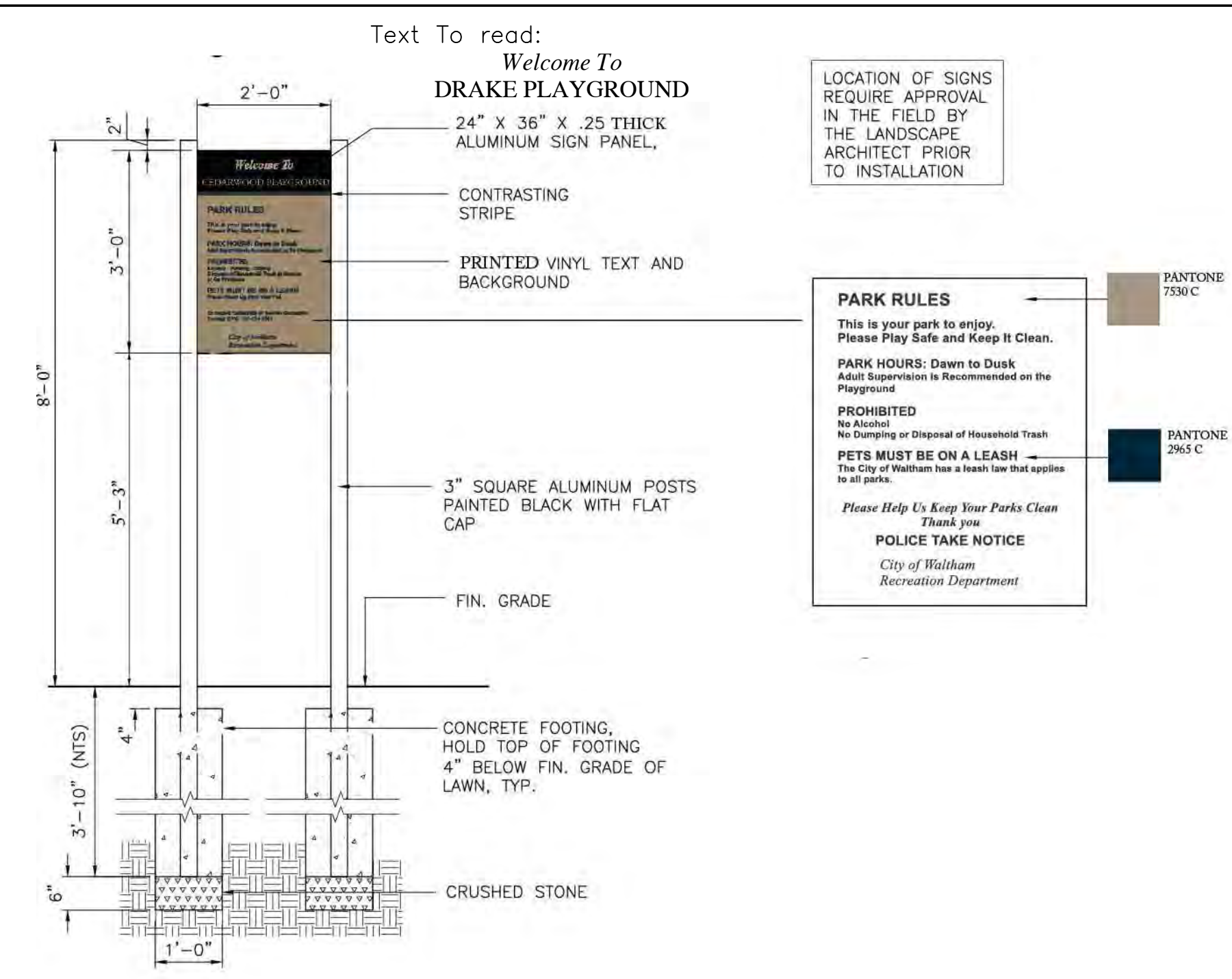
TITLE:
**SHADE STRUCTURE
 DETAILS**

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 Project No. 1313.00

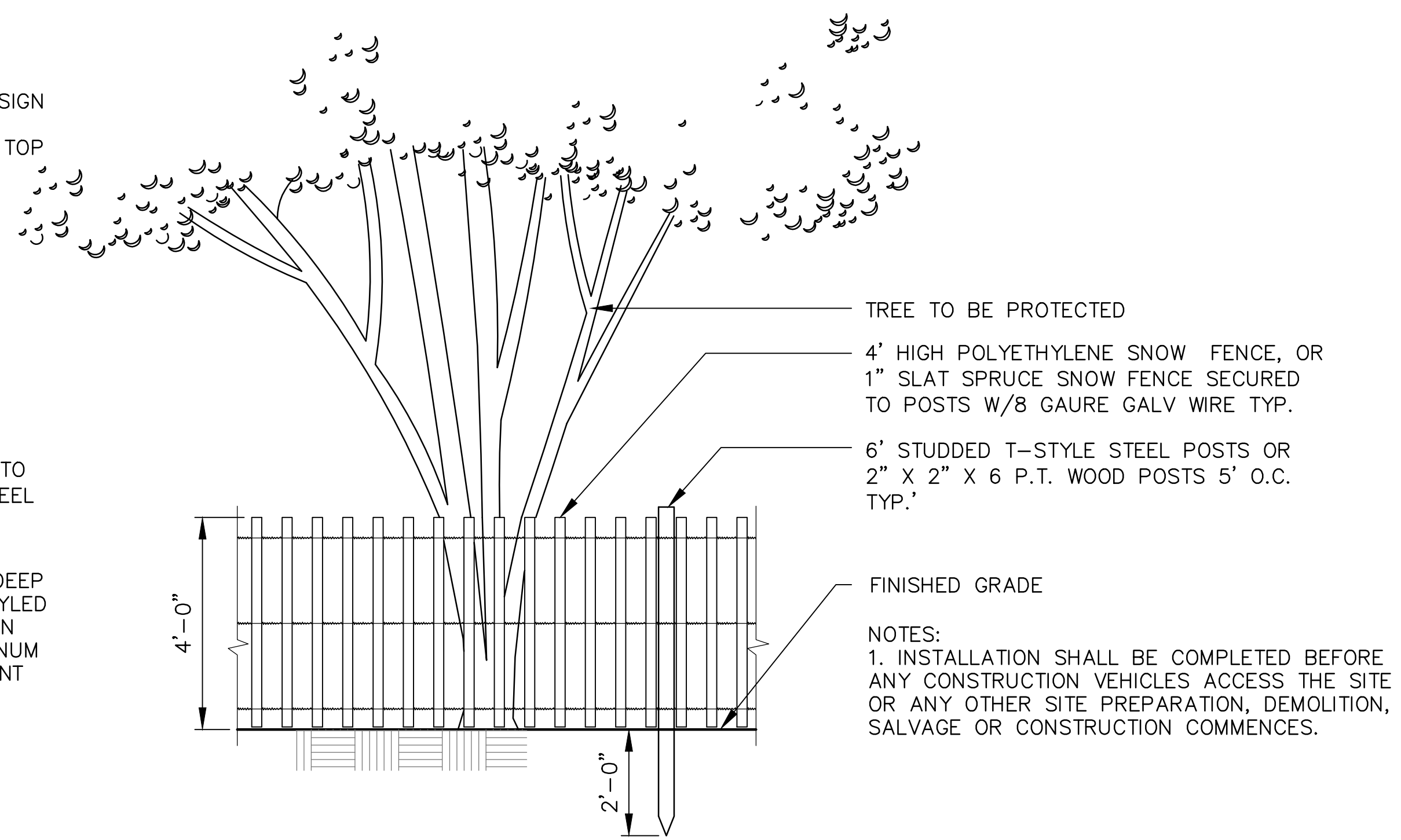
DWG No. **L-17**



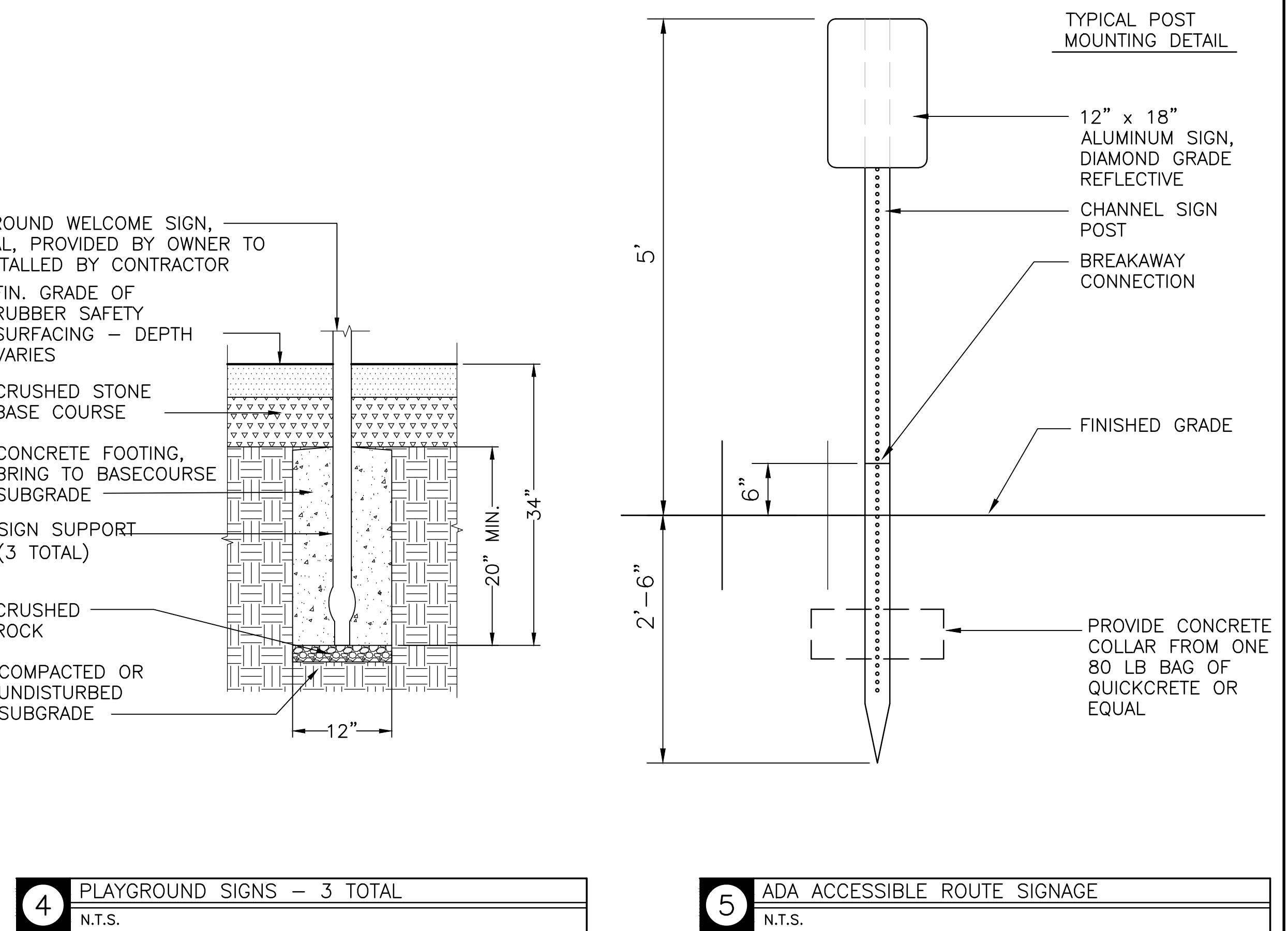
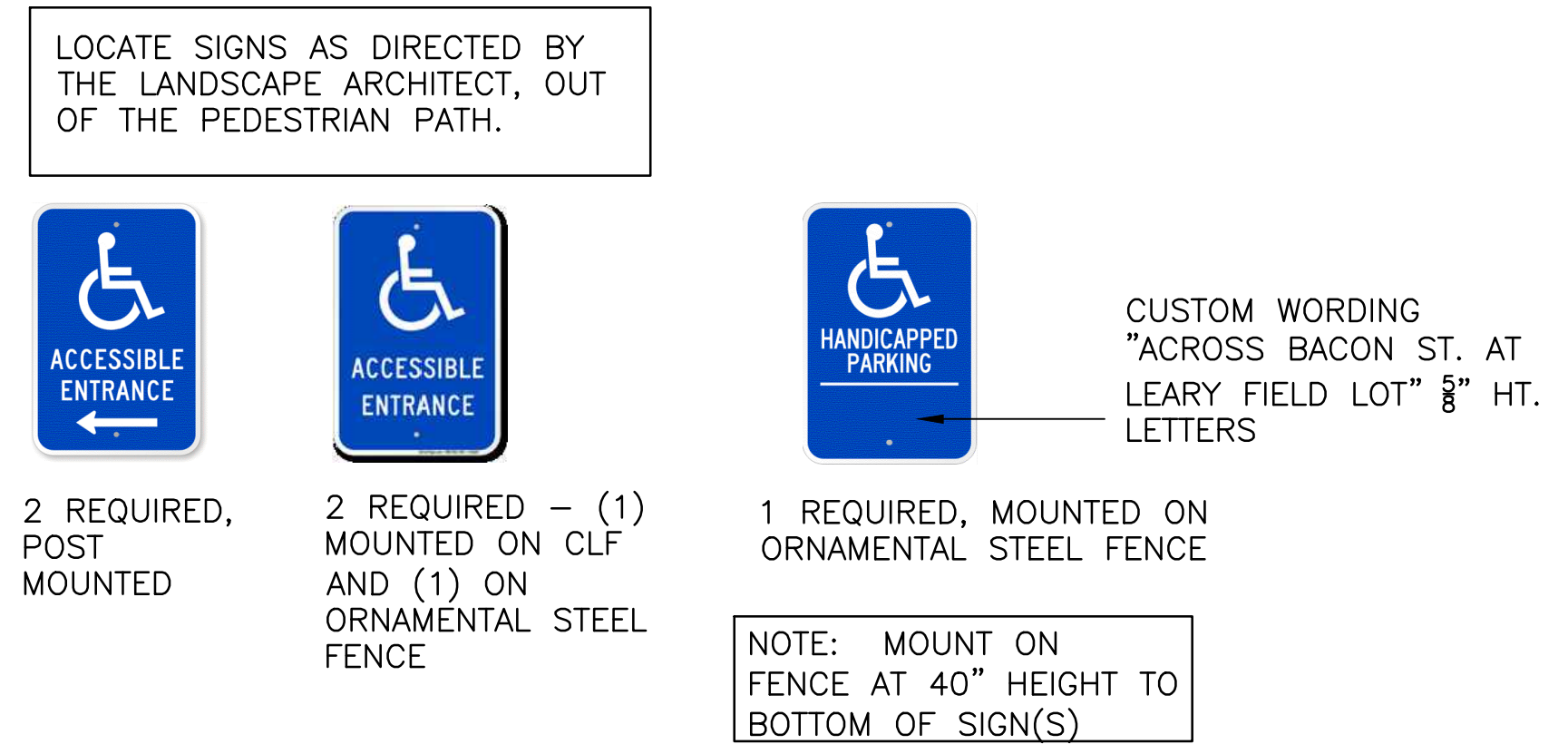
1 PARK SIGN - 1 REQUIRED
1" = 1'-0"



2 WELCOME SIGN - 2 REQUIRED
N.T.S.



3 TREE PROTECTION DETAIL
N.T.S.



4 PLAYGROUND SIGNS - 3 TOTAL
N.T.S.

5 ADA ACCESSIBLE ROUTE SIGNAGE
N.T.S.

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TEL: (781) 784-0326
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ALPHA SURVEYING AND ENGINEERING INC.
695 WAREHAM STREET
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(508) 295-5505

No.	Description	Date

REVISIONS

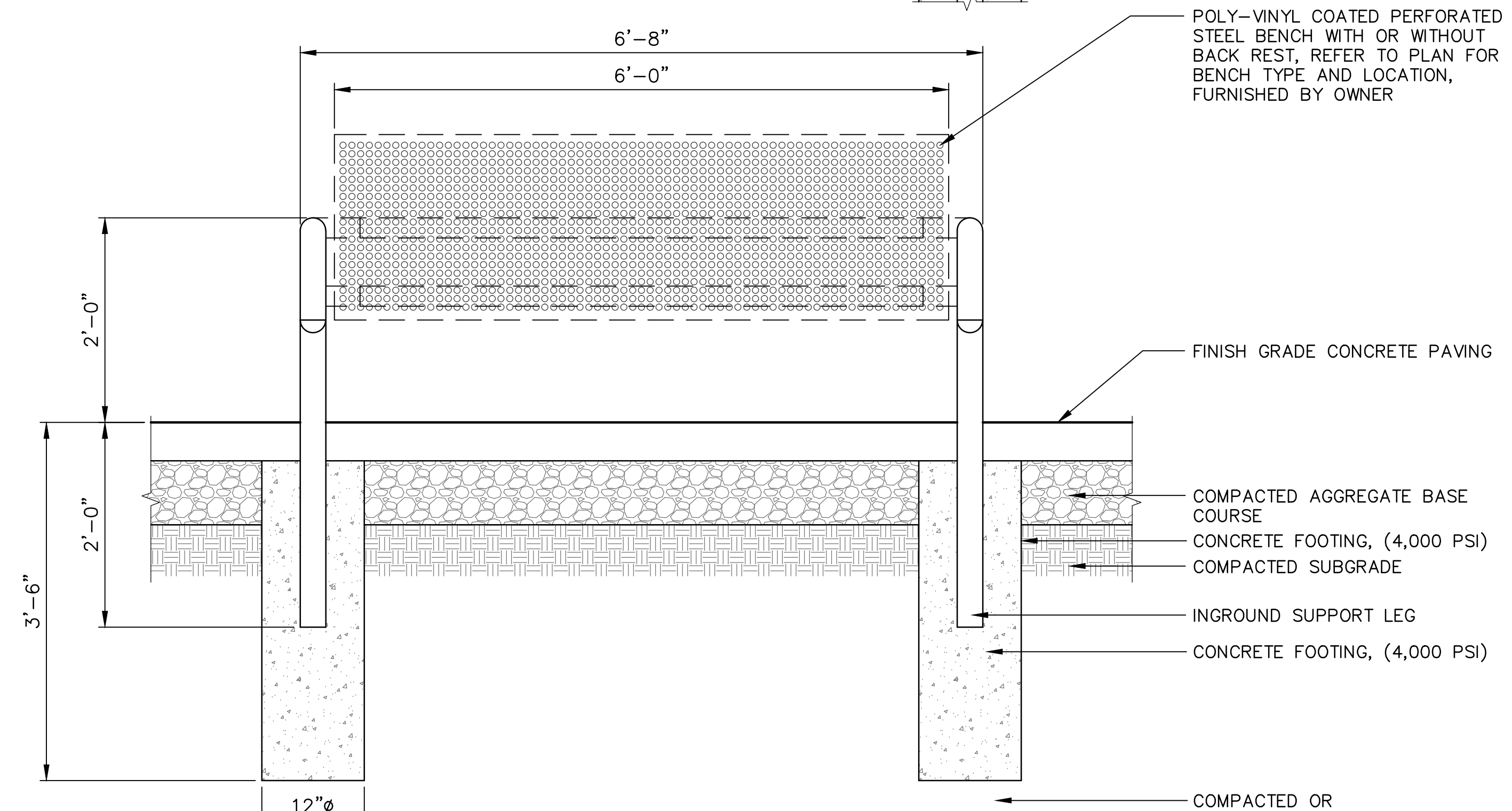
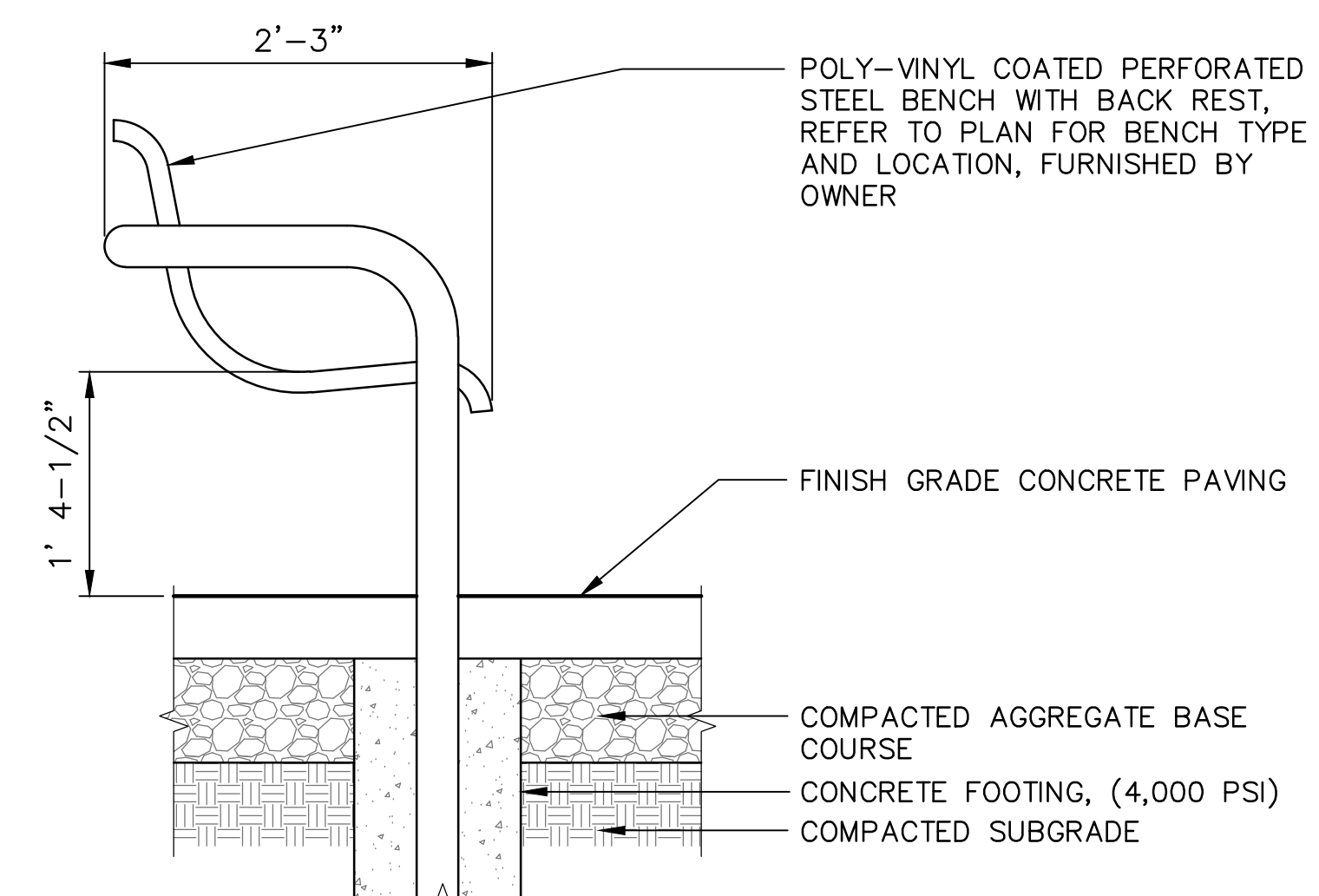
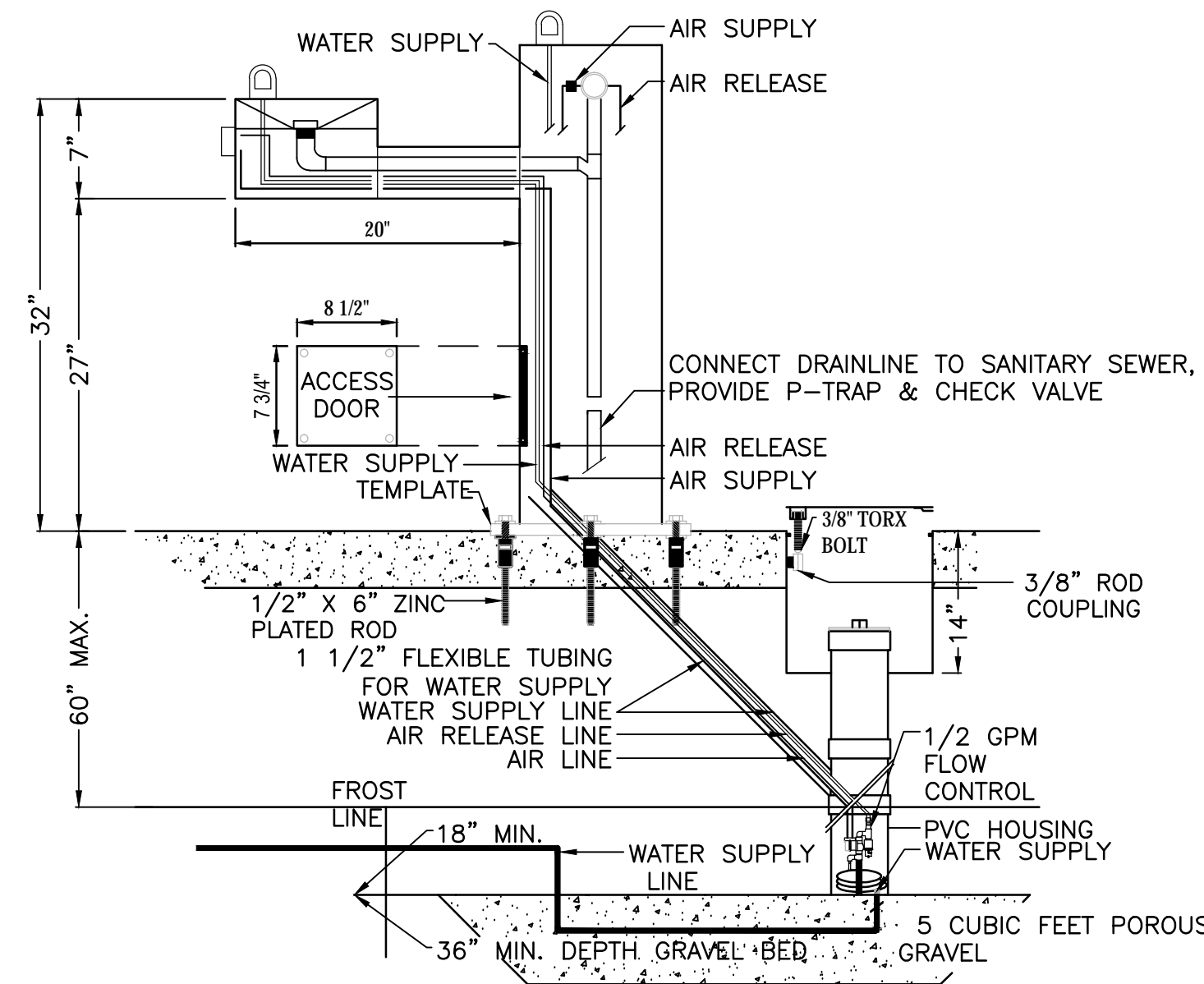
Project:
**CITY OF WALTHAM
DRAKE PLAYGROUND
3 HAZEL STREET
WALTHAM, MA 02451**

Prepared For:
**CITY OF WALTHAM
DEPARTMENT OF RECREATION
510 MOODY STREET
WALTHAM, MA 02453**

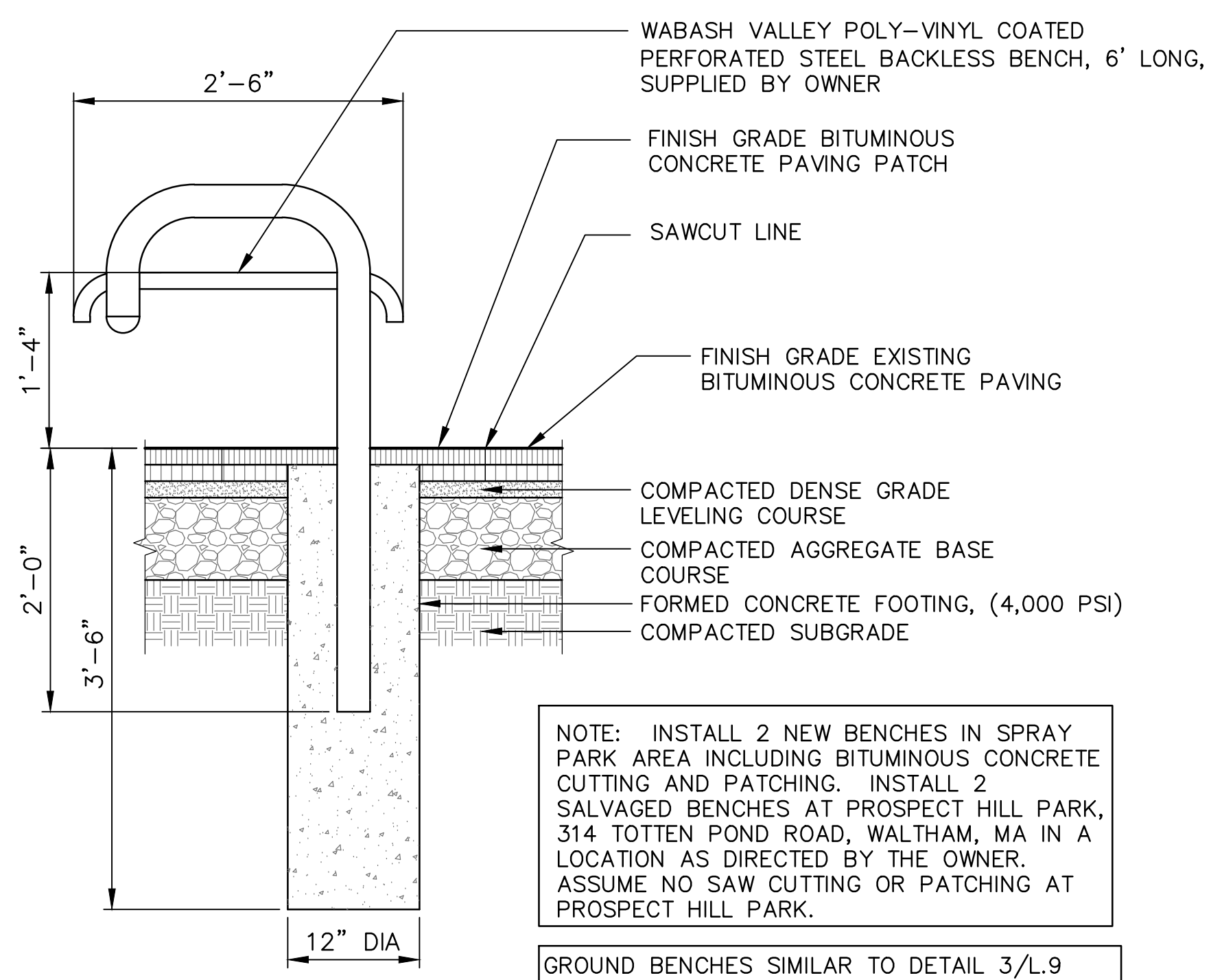
TITLE:
**SIGNAGE/TREE
PROTECTION**

Scale AS NOTED Date NOV 10, 2015
Drawn By DRB
Checked By MJB
Approved By VH
Project No. 1313.00

DWG No. **L-18**



NOTE:
WHERE BENCHES ARE INSTALLED WITHIN EXISTING SPRAY PARK, NEATLY SAW-CUT A SQUARE AREA FROM EXISTING BIT. CONC. TO INSTALL FOOTING. AFTER INSTALLATION, PATCH BITUMINOUS TO MATCH EXISTING PROFILE.



SECTION 3
3 PERFORATED STEEL BENCH WITH BACK - SUPPLIED BY OWNER/INSTALLED BY CONTRACTOR - 4 TOTAL
1" = 1'-0"

SECTION 2
2 PERFORATED STEEL BACKLESS BENCH - SUPPLIED BY OWNER/INSTALLED BY CONTRACTOR - 2 NEW, 2 REMOVED & RESET
1" = 1'-0"

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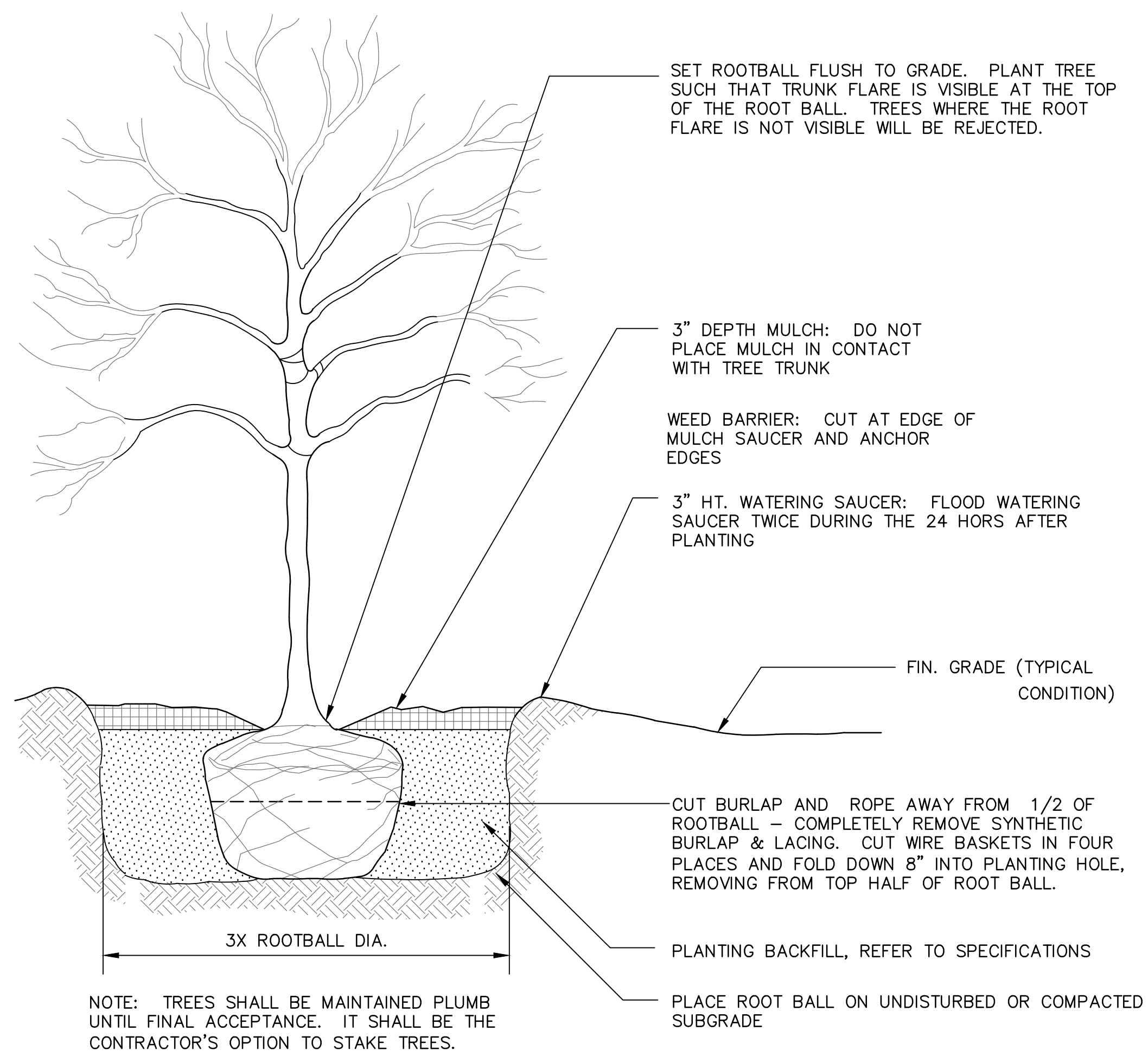
Project:
**CITY OF WALTHAM
DRAKE PLAYGROUND
3 HAZEL STREET
WALTHAM, MA 02451**

Prepared For:
**CITY OF WALTHAM
DEPARTMENT OF RECREATION
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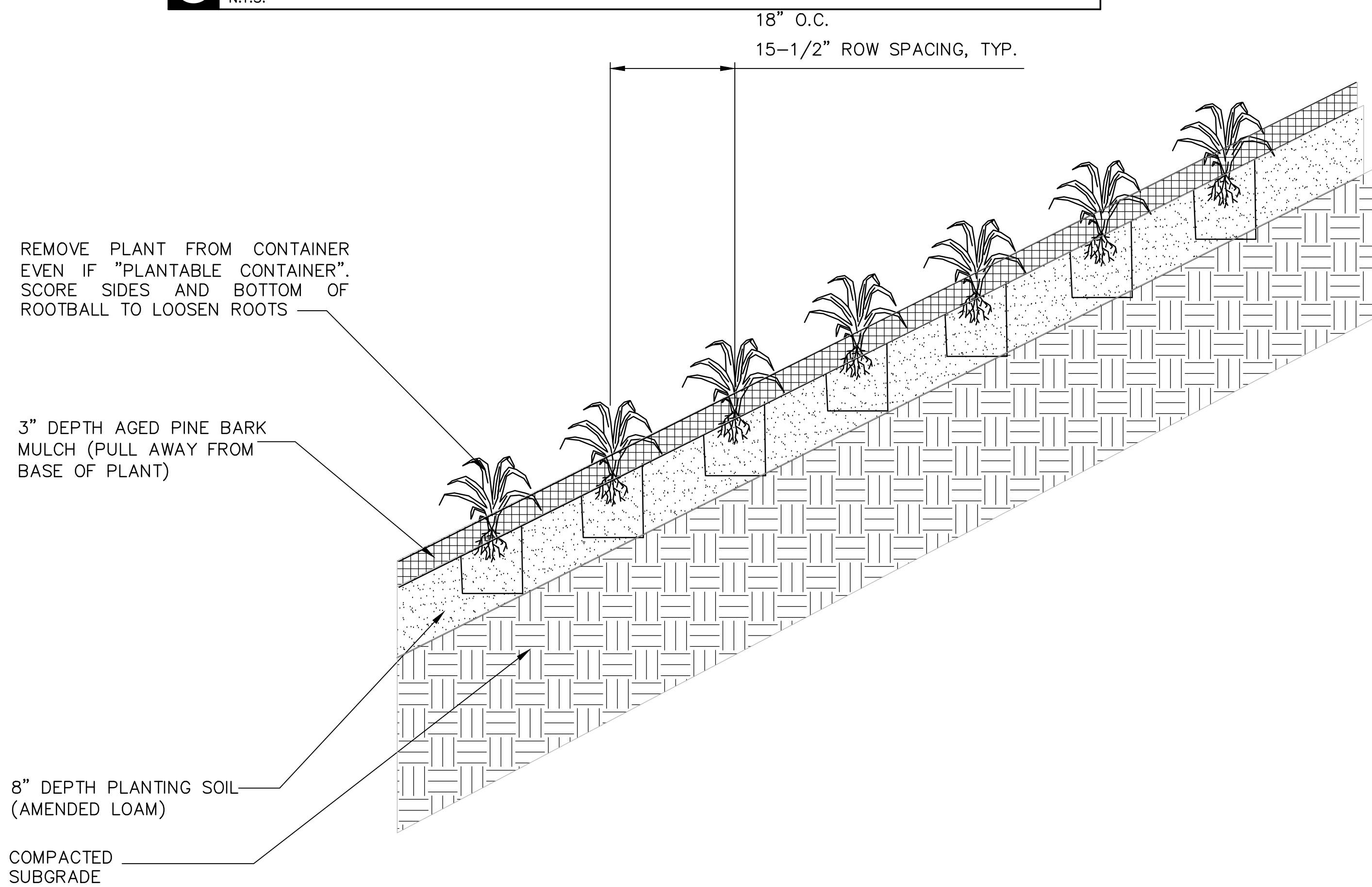
TITLE:
**BENCH/DRINKING
FOUNTAIN DETAILS**

Scale AS NOTED Date NOV 10, 2015
Drawn By DRB
Checked By MJB
Approved By VH
Project No. 1313.00

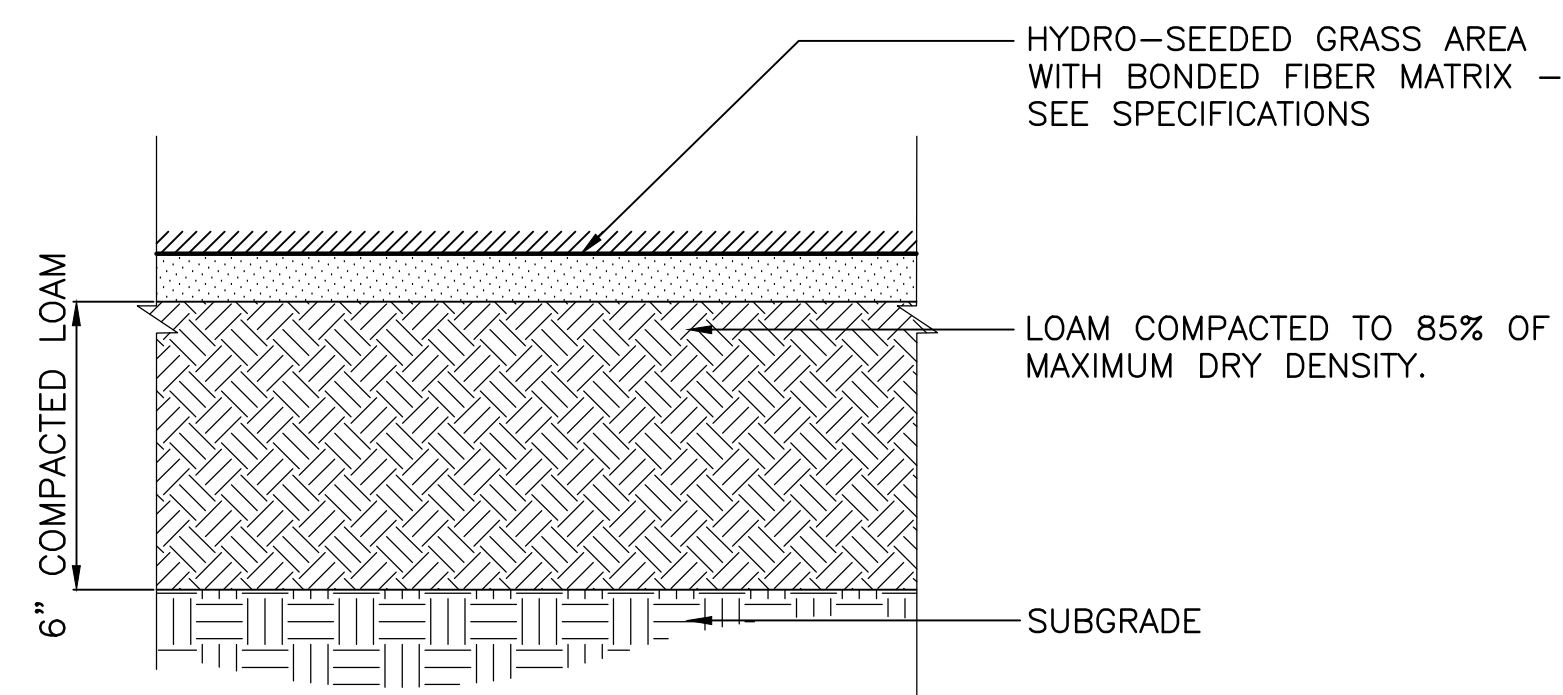
DWG No. **L-19**



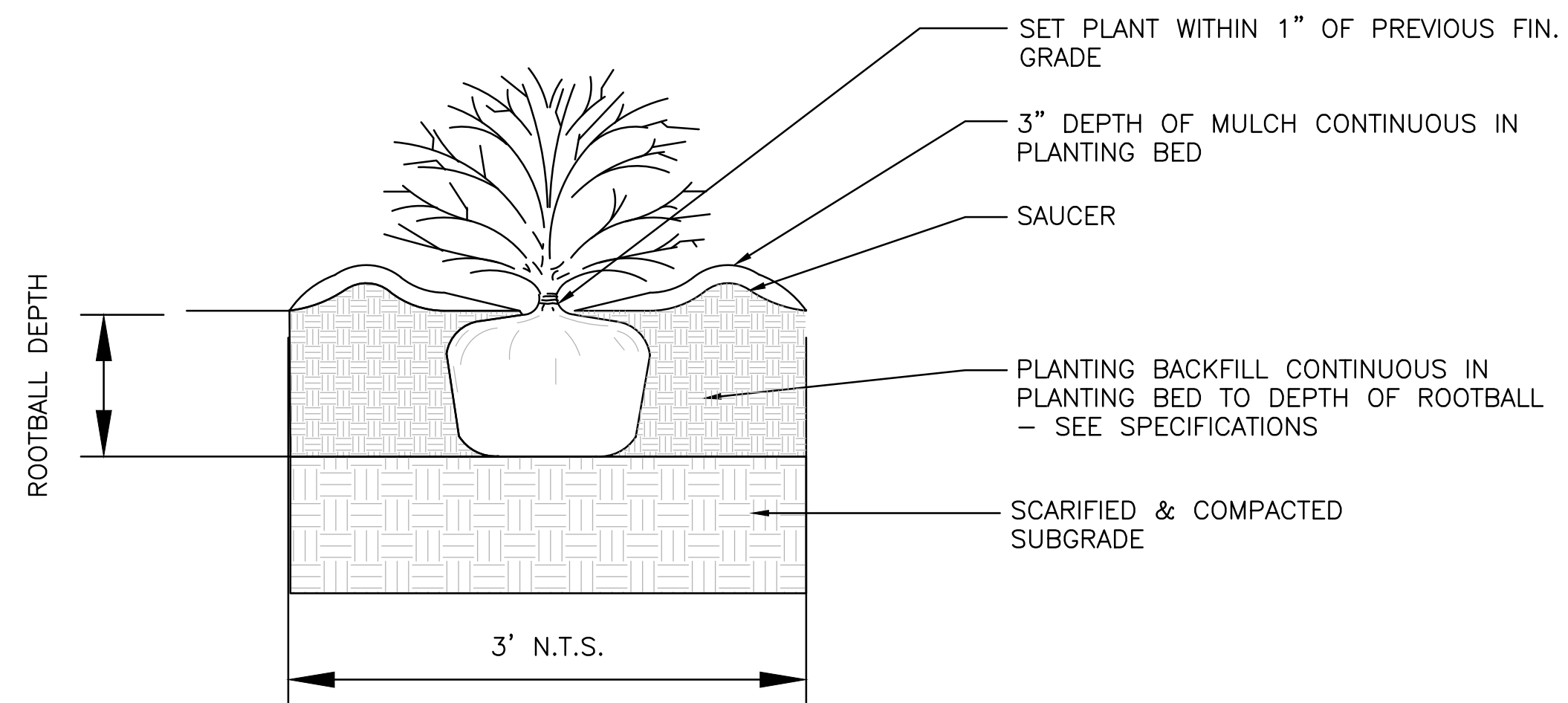
SECTION
1 DECIDUOUS TREE PLANTING DETAIL
 N.T.S.



SECTION
2 ORNAMENTAL GRASS PLANTING DETAIL
 1" = 1'-0"



SECTION
3 LOAM AND HYDROSEED DETAIL
 N.T.S.

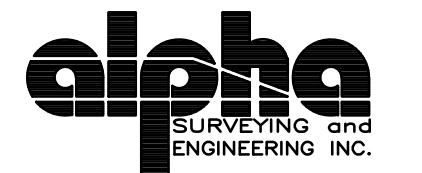


SECTION
4 SHRUB PLANTING DETAIL
 N.T.S.

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No.	Description	Date

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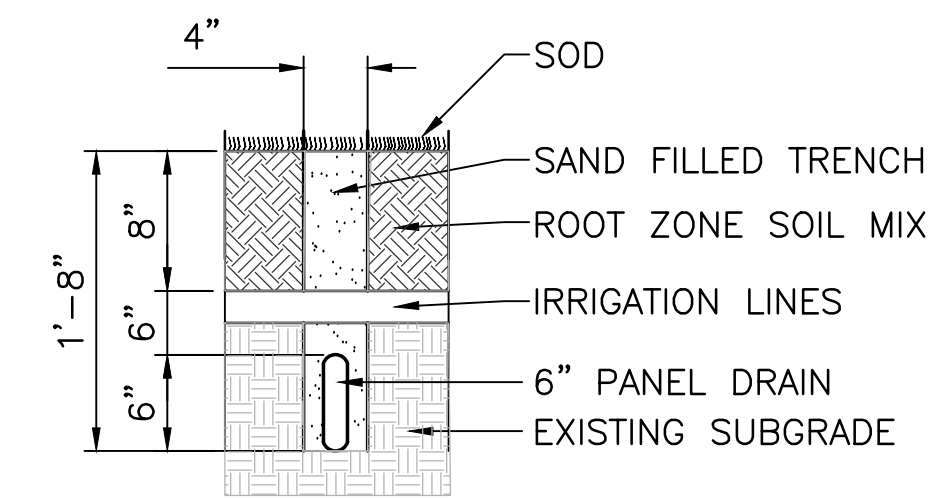
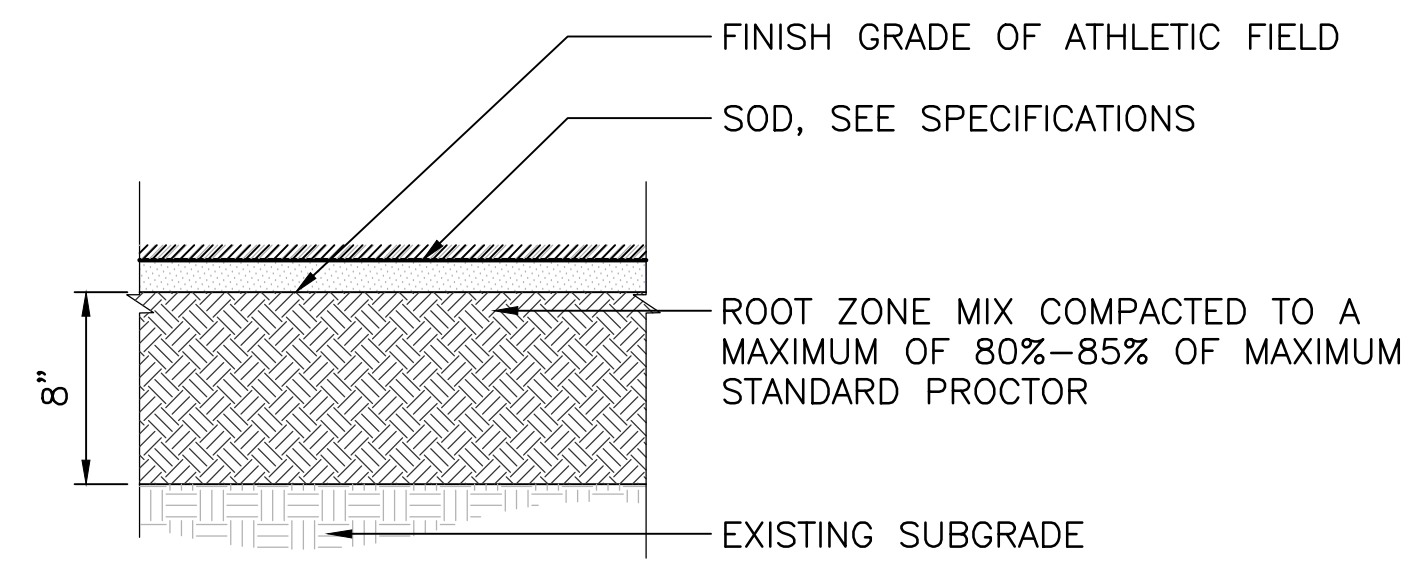
Project:
**CITY OF WALTHAM
 DRAKE PLAYGROUND
 3 HAZEL STREET
 WALTHAM, MA 02451**

Prepared For:
**CITY OF WALTHAM
 DEPARTMENT OF RECREATION
 510 MOODY STREET
 WALTHAM, MA 02453**

TITLE:
**PLANTING/BIG BELLY
 DETAILS**

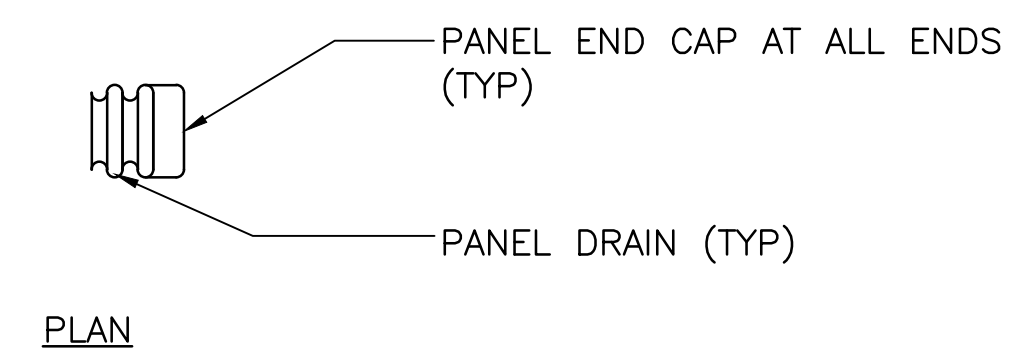
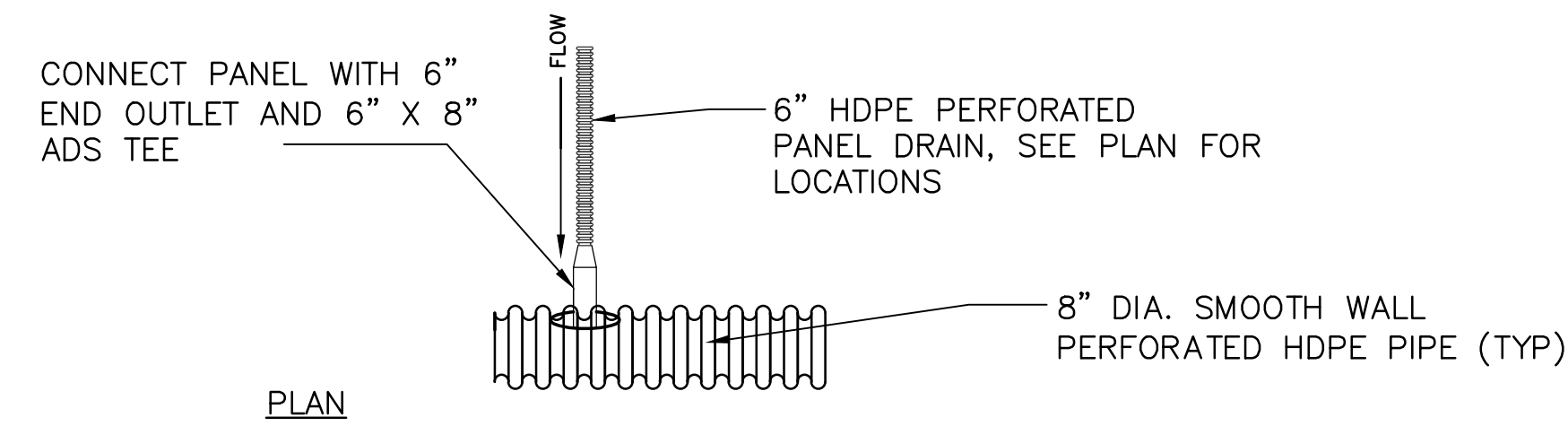
Scale AS NOTED Date NOV 10, 2015
 Drawn By DRB
 Checked By MJB
 Approved By VH
 Project No. 1313.00

DWG No. **L-20**



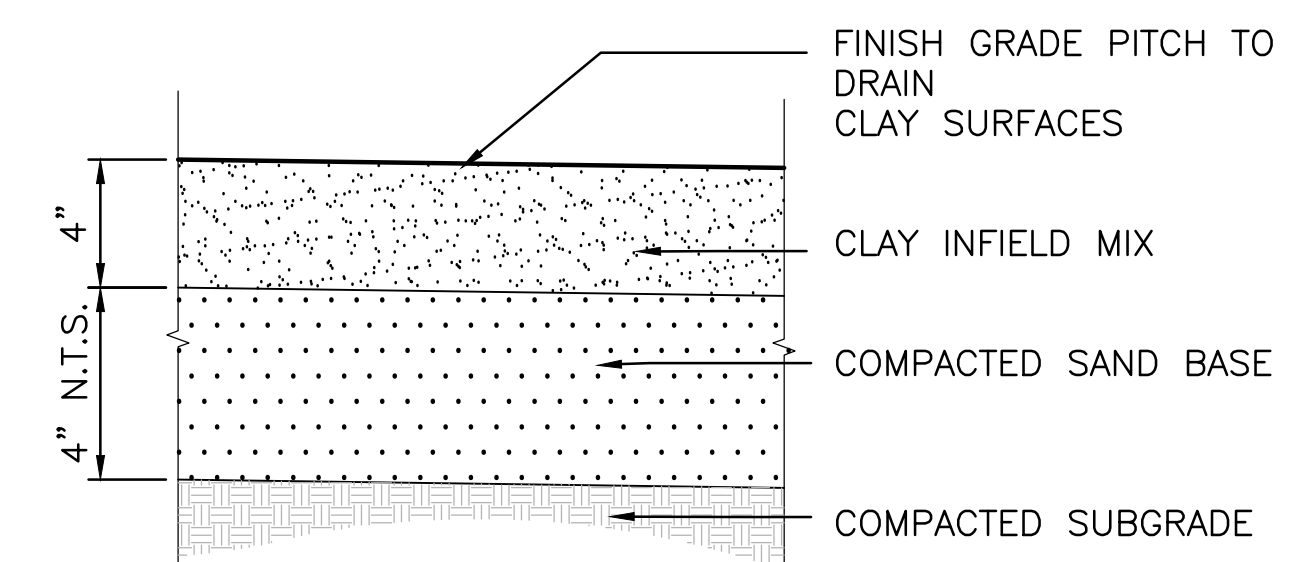
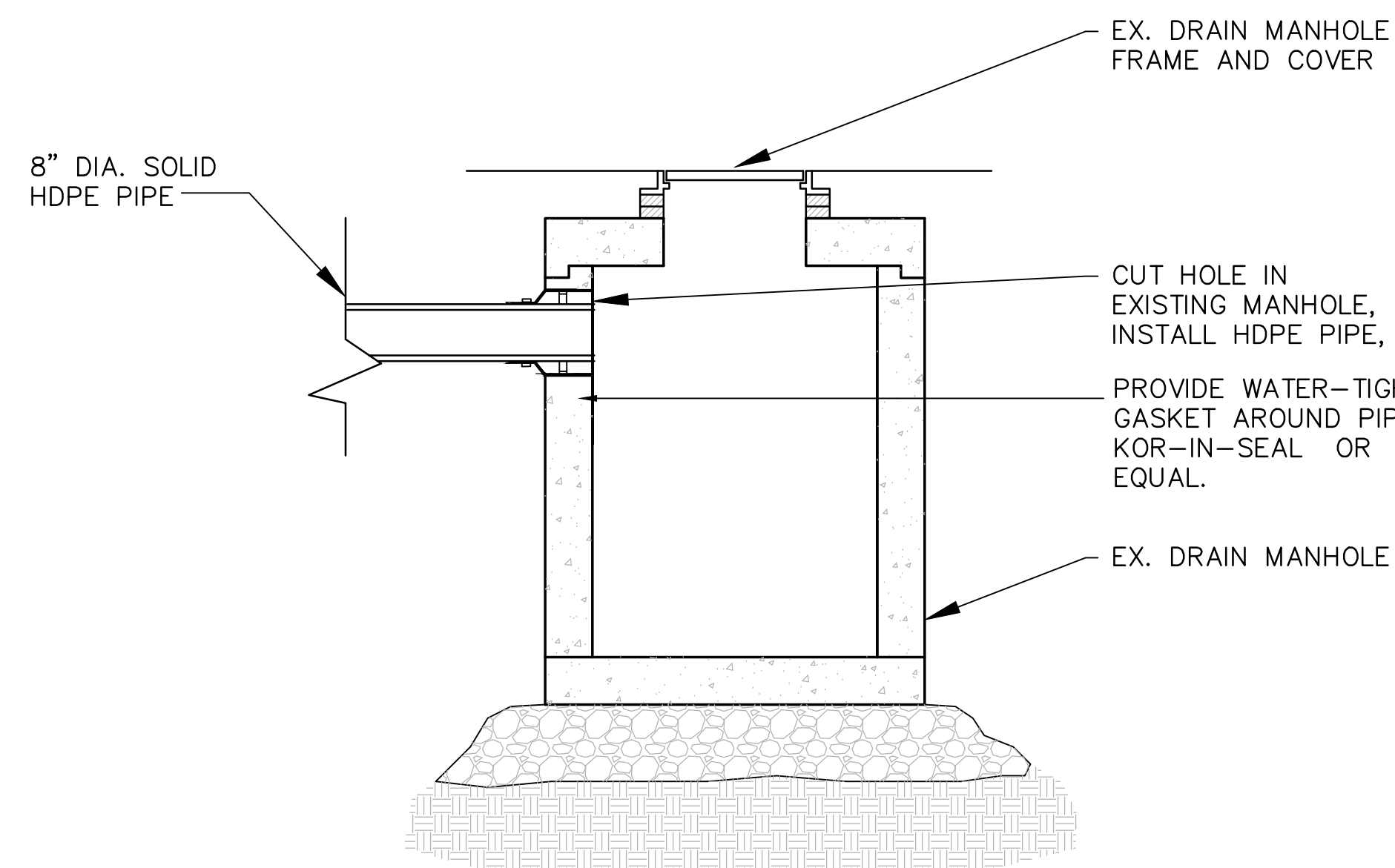
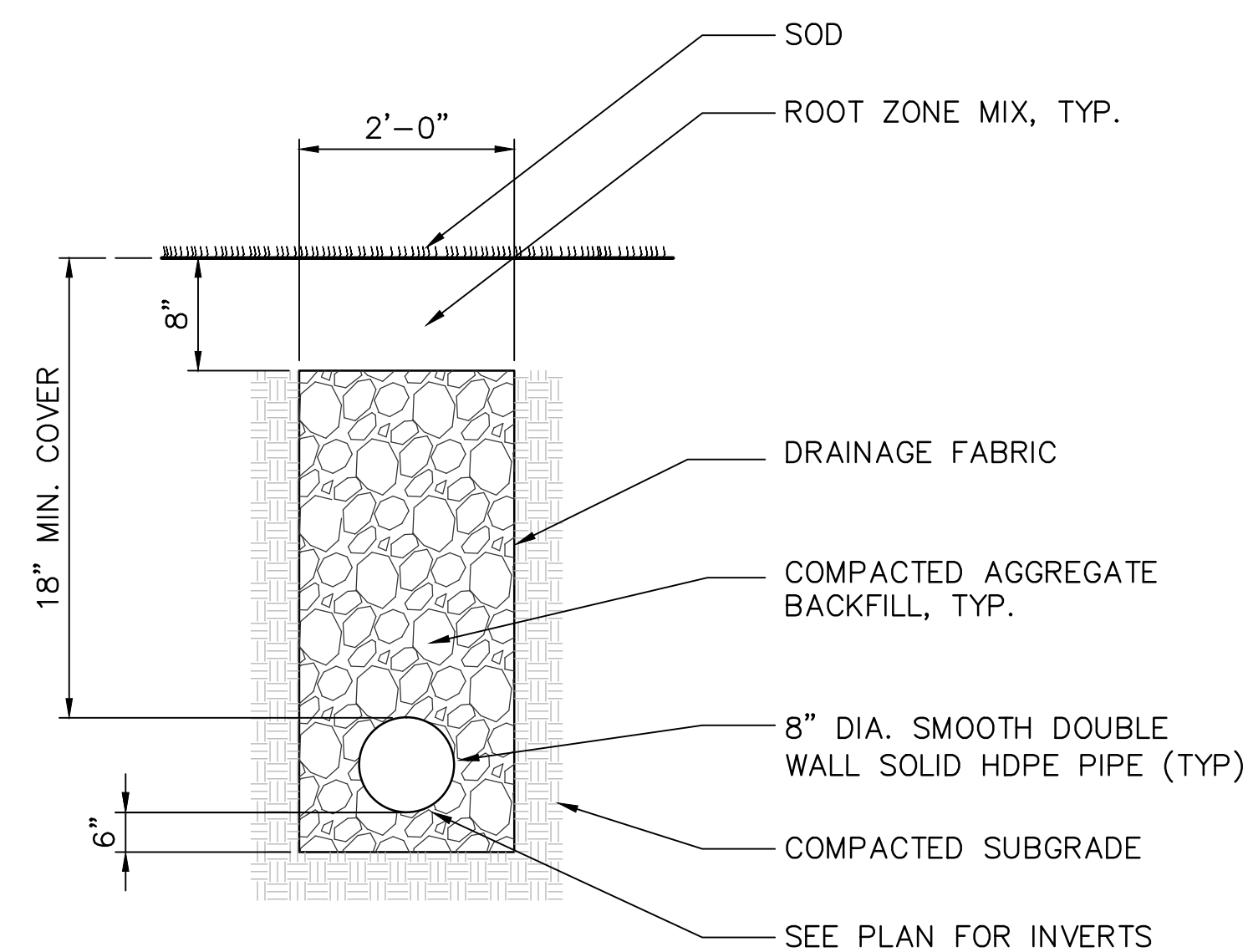
SECTION
1 ATHLETIC FIELD SOIL AND SOD SECTION
 N.T.S.

SECTION
2 PANEL DRAIN DETAIL
 N.T.S.



PLAN
3 PANEL DRAIN CONNECTION DETAIL
 N.T.S.

PLAN
4 PANEL DRAIN END CAP DETAIL
 N.T.S.



SECTION
5 COLLECTOR PIPE
 N.T.S.

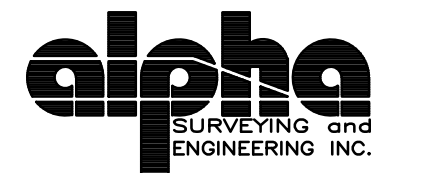
SECTION
6 CONNECTION TO EXISTING MANHOLE
 N.T.S.

SECTION
7 SKINNED INFIELD DETAIL
 N.T.S.

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No.	Description	Date

REVISIONS



Project:

**CITY OF WALTHAM
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 WALTHAM, MA 02451**

Prepared For:

**CITY OF WALTHAM
 DEPARTMENT OF RECREATION
 510 MOODY STREET
 WALTHAM, MA 02453**

TITLE:

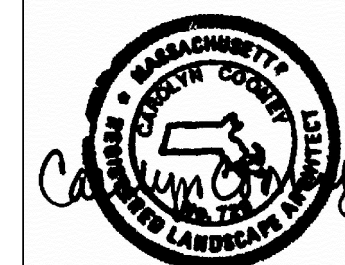
BALLFIELD DETAILS

Scale AS NOTED Date NOV 10, 2015
 Drawn By DRB
 Checked By MJB
 Approved By VH
 Project No. 1313.00

DWG No. **L-21**

No.	Description	Date

REVISIONS



Project:

**CITY OF WALTHAM
DRAKE PLAYGROUND
3 HAZEL STREET
WALTHAM, MA 02451**

Prepared For:

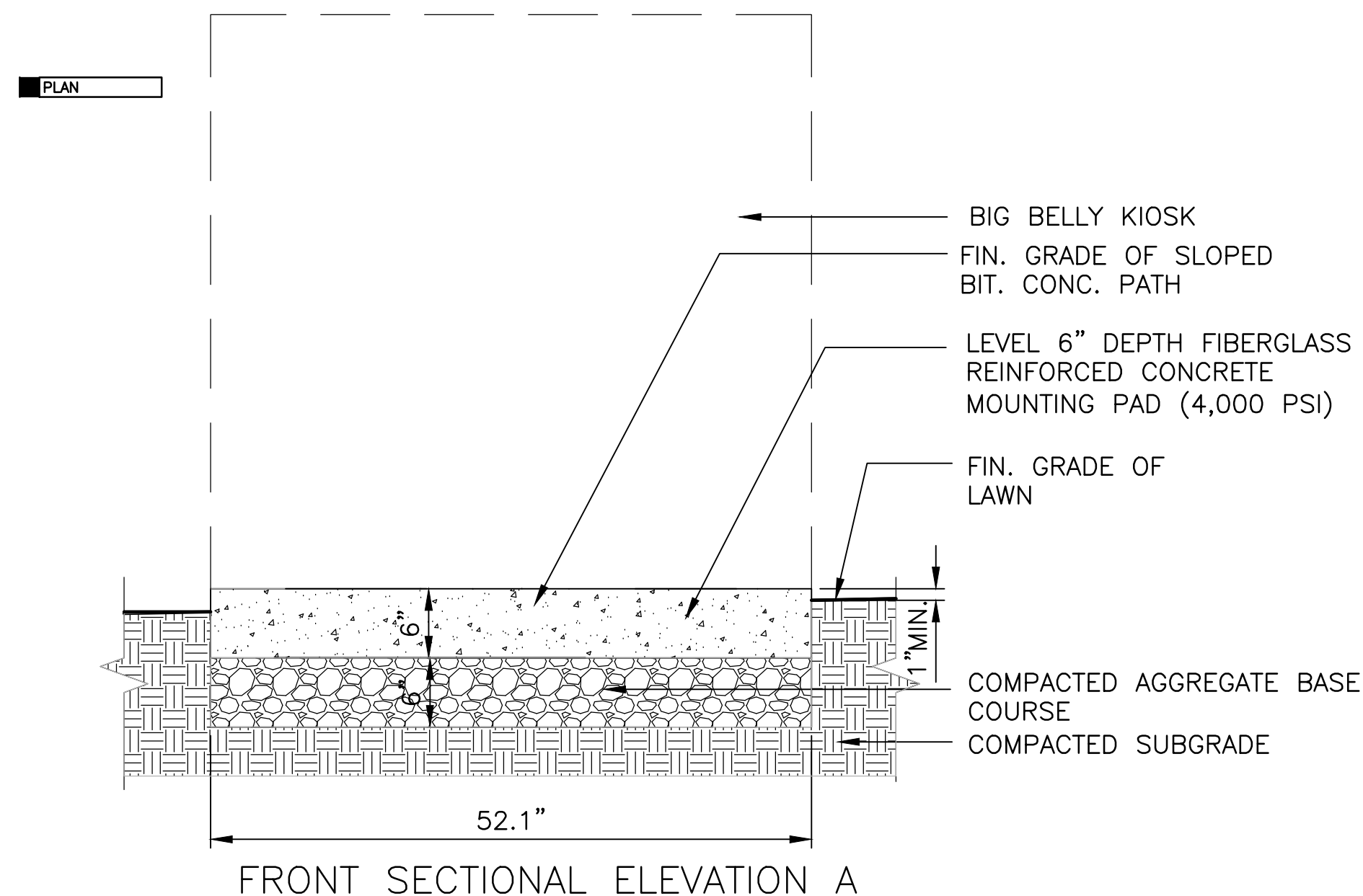
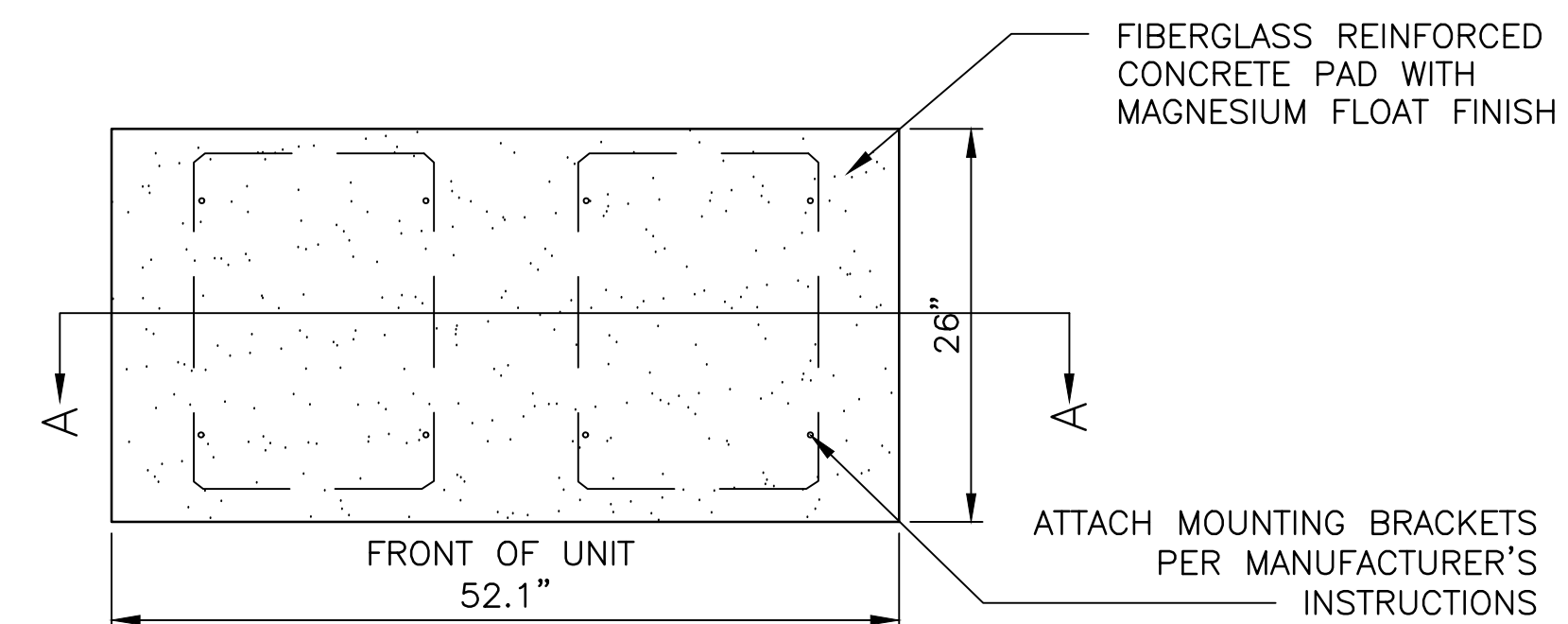
**CITY OF WALTHAM
DEPARTMENT OF RECREATION
510 MOODY STREET
WALTHAM, MA 02453**

TITLE:

**BASKETBALL/ BIG BELLY
DETAILS**

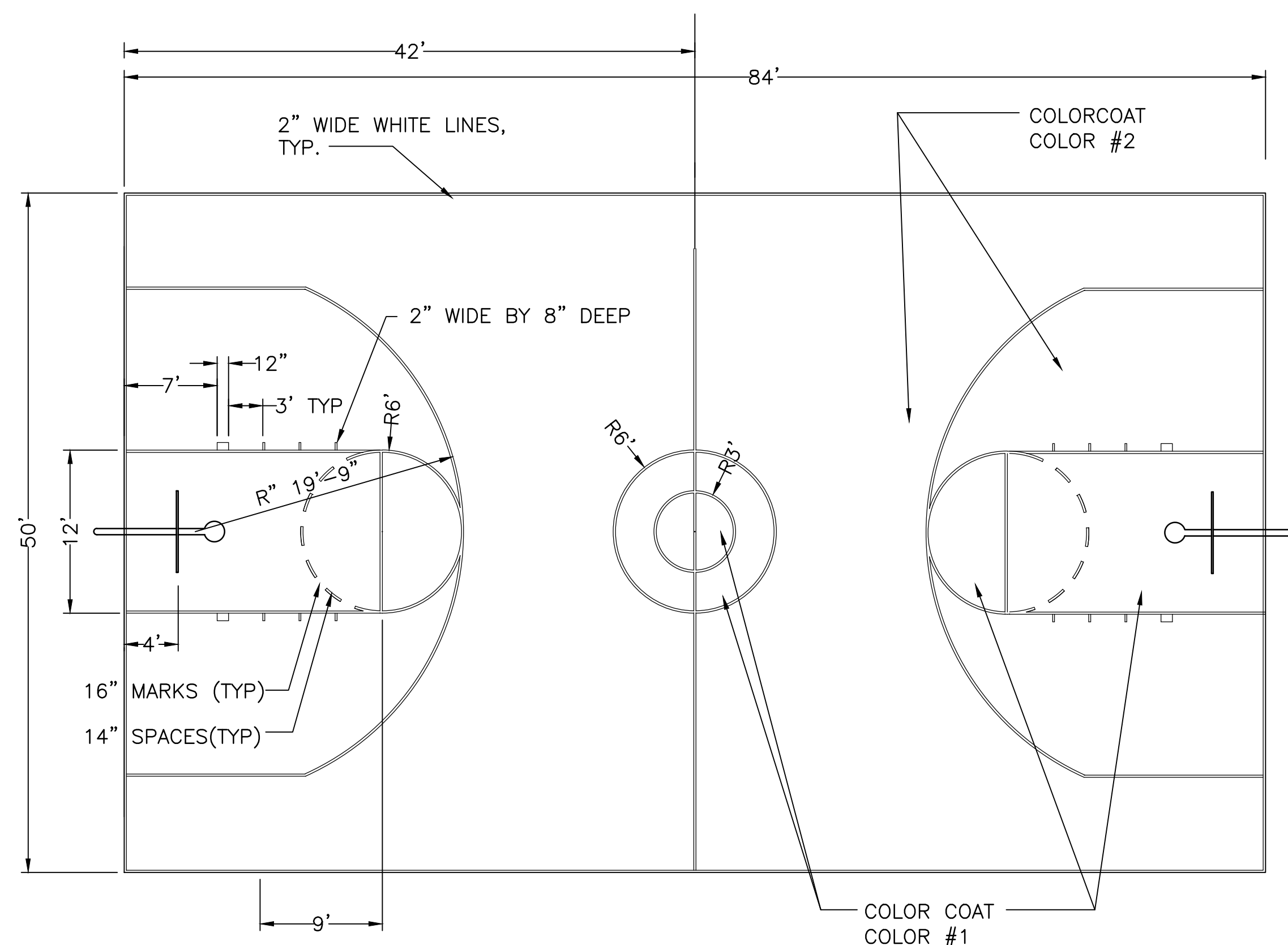
Scale AS NOTED Date NOV 10, 2015
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Project No. 1313.00

DWG No. **L-21A**



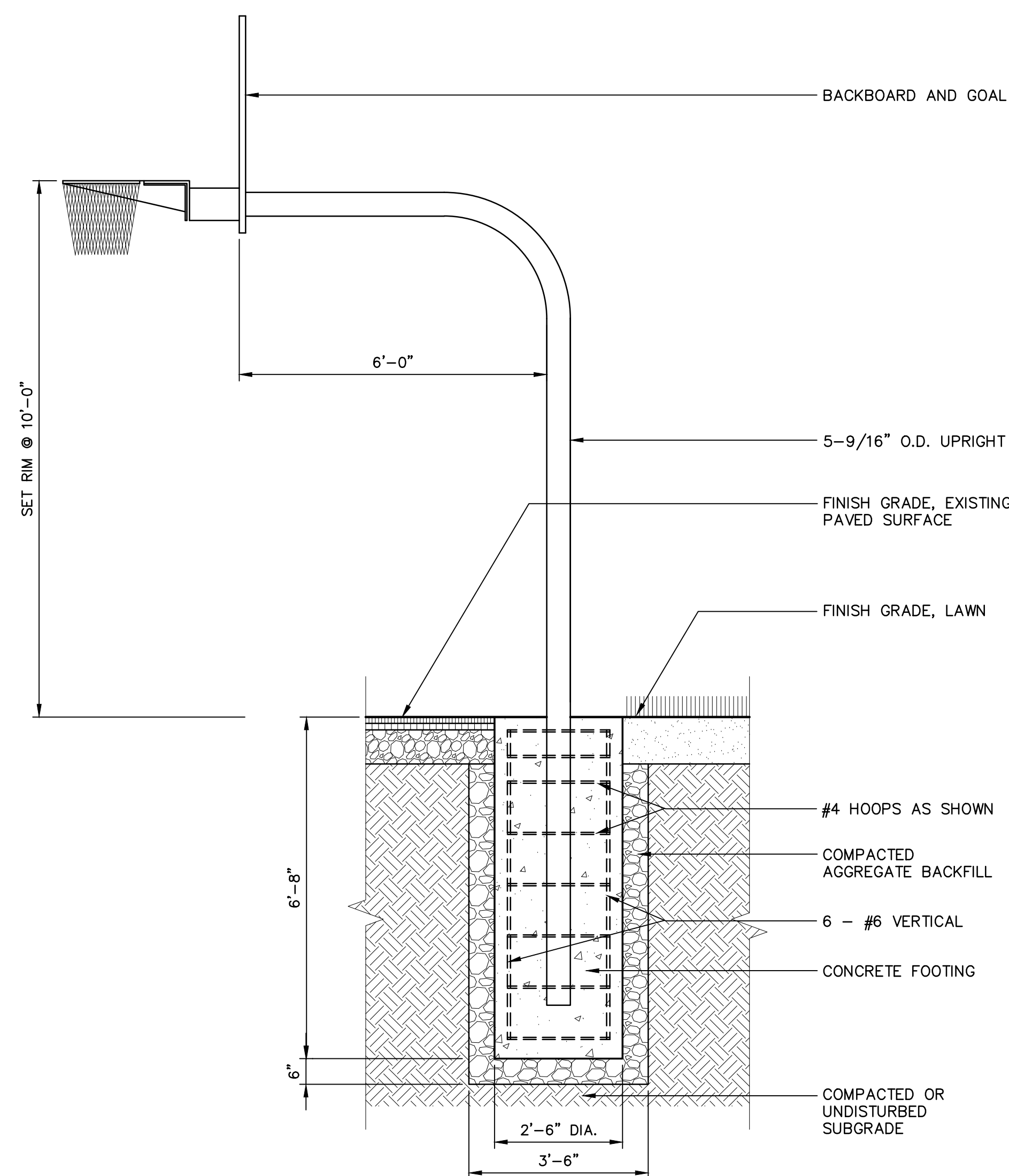
SECTION

1 BIG BELLY KIOSK - 3 TOTAL
1" = 1'-0"



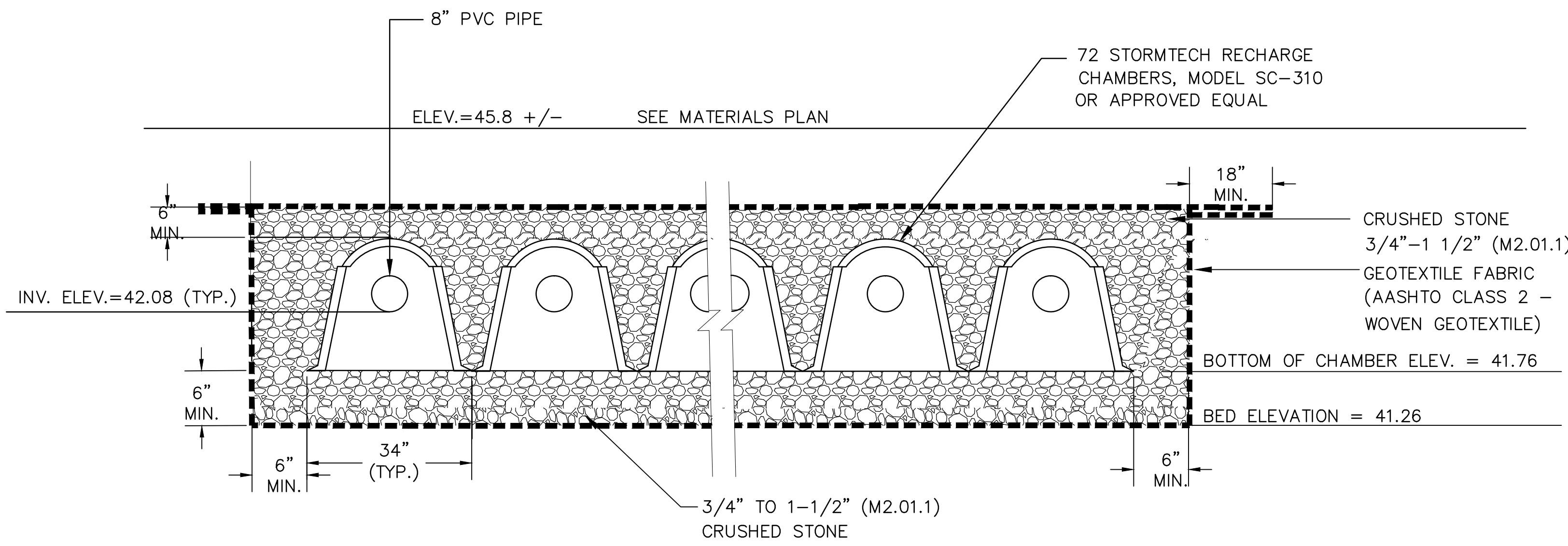
PLAN

2 BASKETBALL LAYOUT
1/8" = 1'-0"

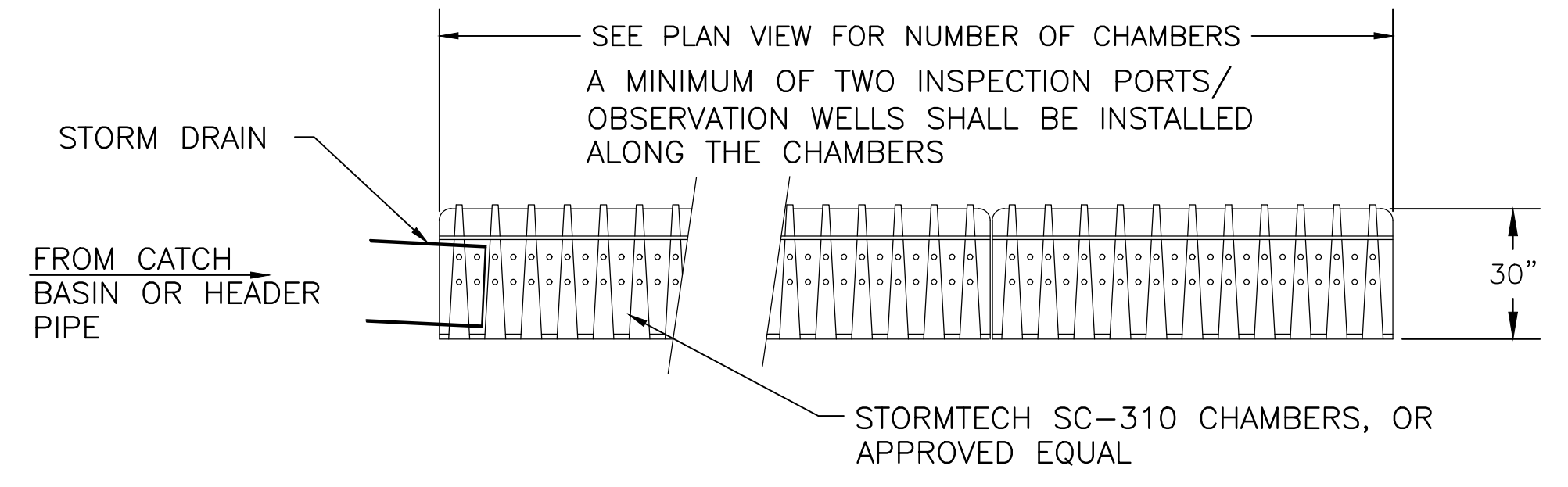


SECTION

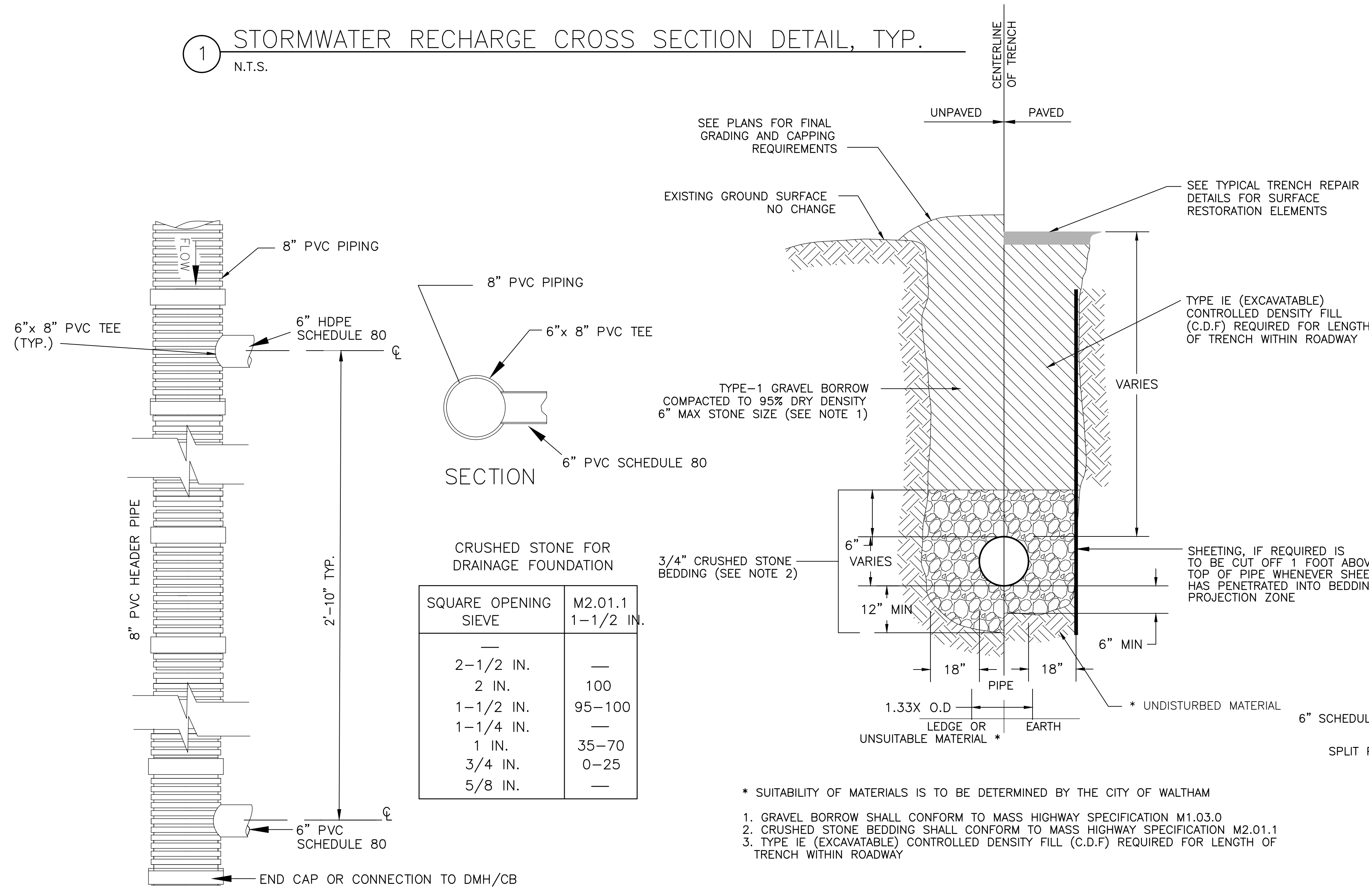
3 6' OFFSET BASKETBALL STANDARD
1/2" = 1'-0"



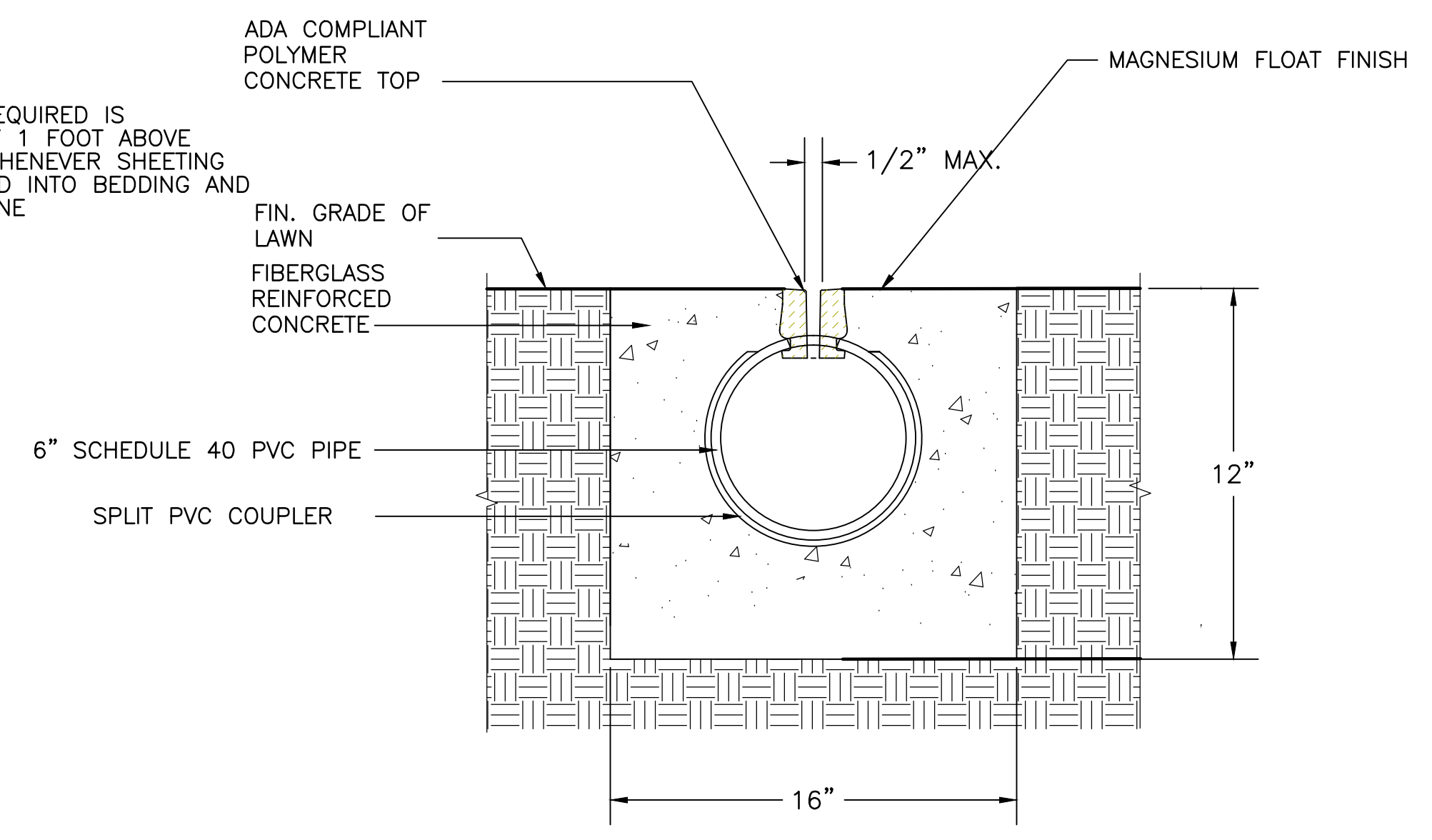
1 STORMWATER RECHARGE CROSS SECTION DETAIL, TYP.
N.T.S.



2 PROPOSED RECHARGE TRENCH PROFILE
STORMWATER RECHARGE UNIT DETAIL, TYP.
N.T.S.



4 TRENCH SECTION DETAIL
N.T.S.



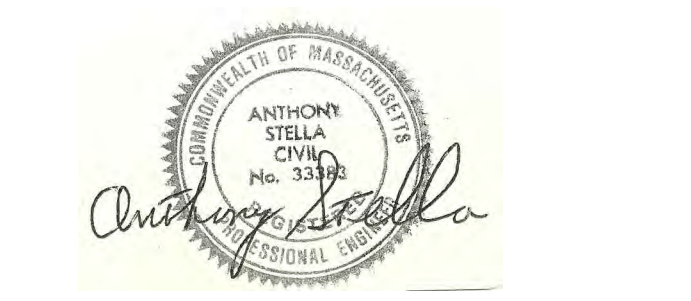
5 SLOT DRAIN DETAIL
N.T.S.

3 RECHARGE SYSTEM HEADER CONNECTOR
N.T.S.

Carolyn Cooney & Associates
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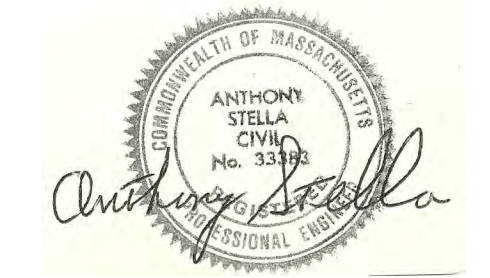
Project:
**CITY OF WALTHAM
DRAKE PLAYGROUND
3 HAZEL STREET
WALTHAM, MA 02451**

Prepared For:
**CITY OF WALTHAM
DEPARTMENT OF RECREATION
510 MOODY STREET
WALTHAM, MA 02453**

TITLE:
**UTILITY
DETAILS I**

Scale AS NOTED Date NOV 10, 2015
Drawn By CCC
Checked By AS
Approved By AS
Project No. 1313.00

DWG No. **L-22**



No.	Description	Date
REVISIONS		

Project:

**CITY OF WALTHAM
 DRAKE PLAYGROUND
 3 HAZEL STREET
 WALTHAM, MA 02451**

Prepared For:

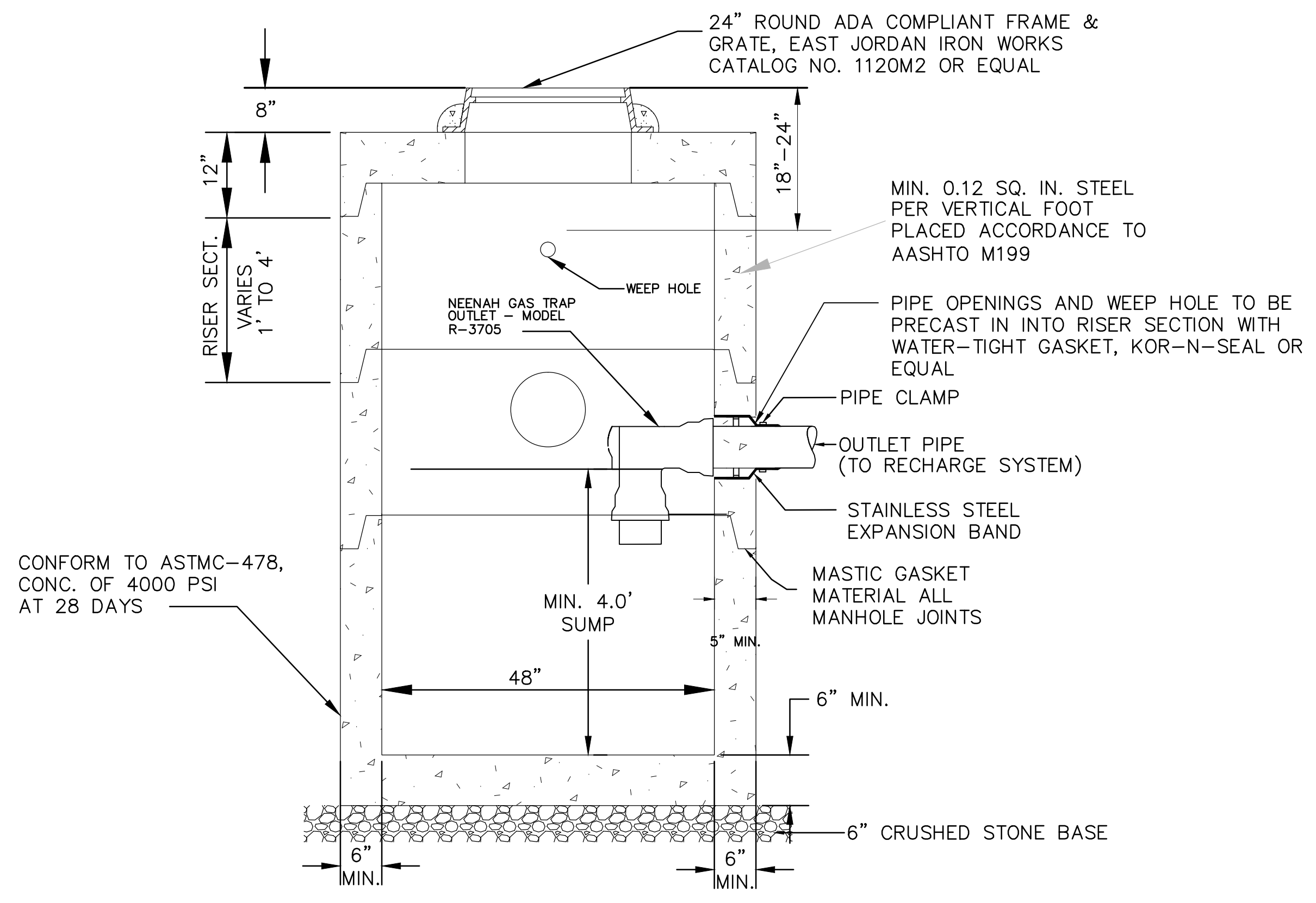
**CITY OF WALTHAM
 DEPARTMENT OF RECREATION
 510 MOODY STREET
 WALTHAM, MA 02453**

TITLE:

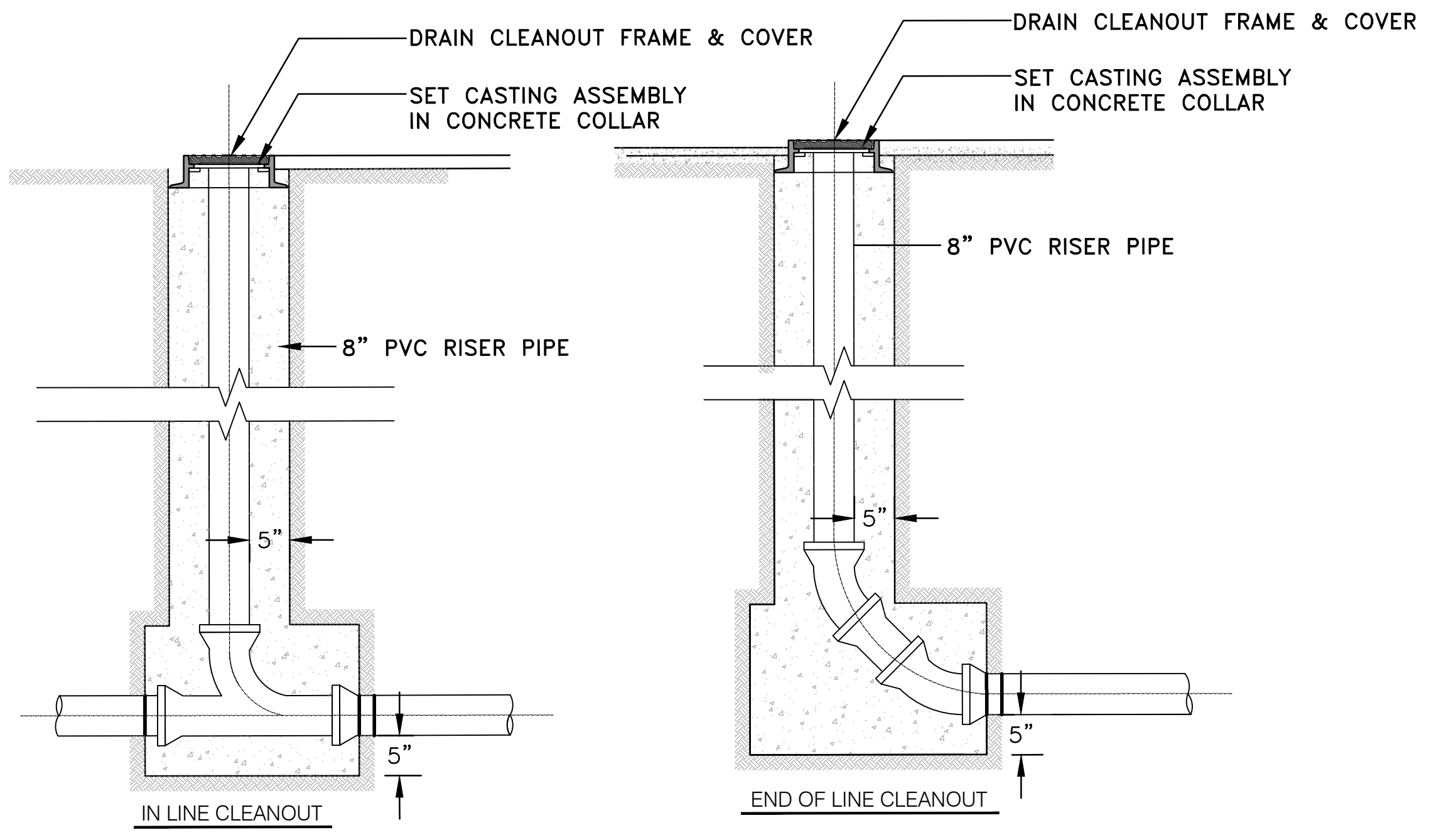
**UTILITY
 DETAILS II**

Scale AS NOTED Date NOV 10, 2015
 Drawn By AS
 Checked By CCC
 Approved By AS
 Project No. 1313.00

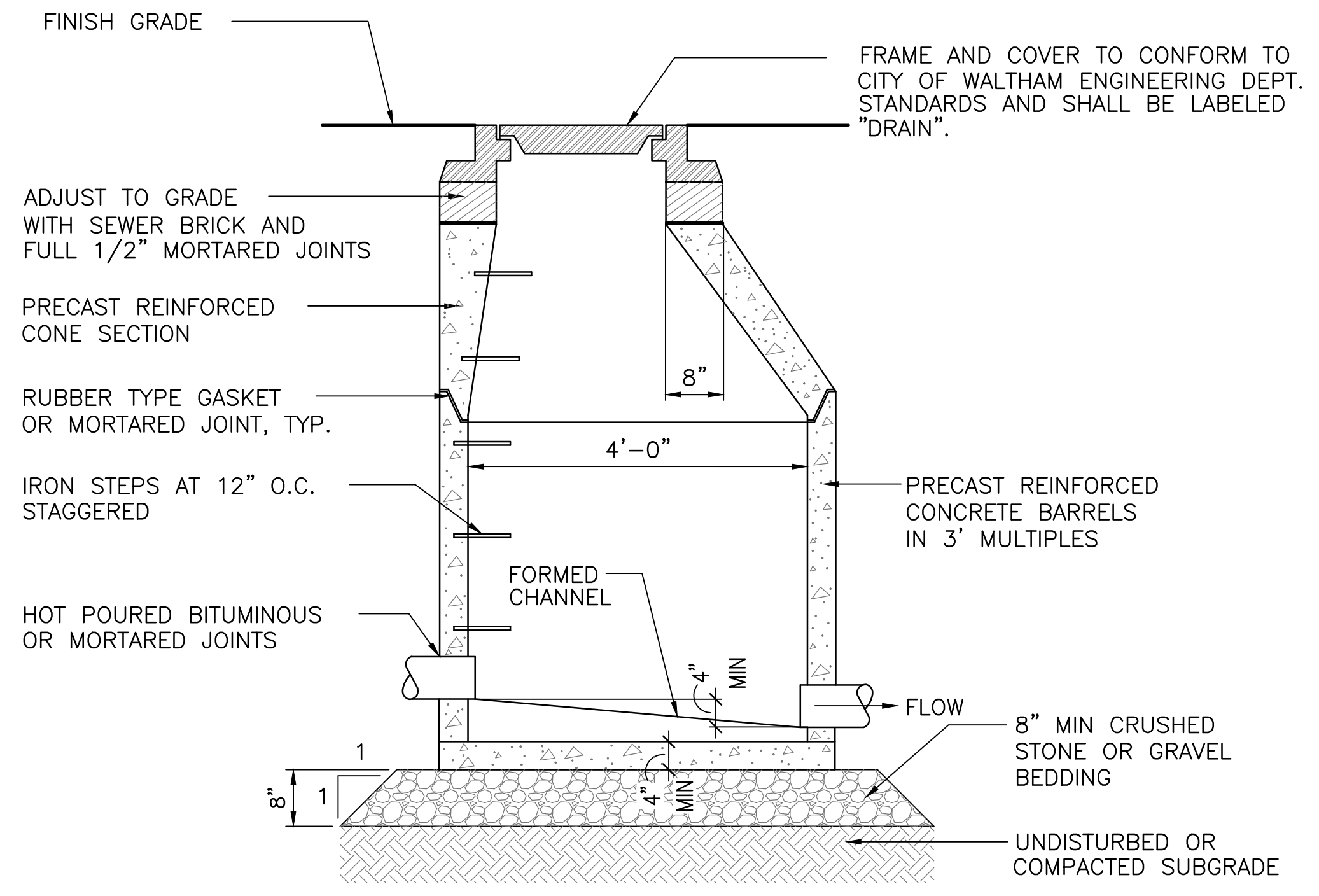
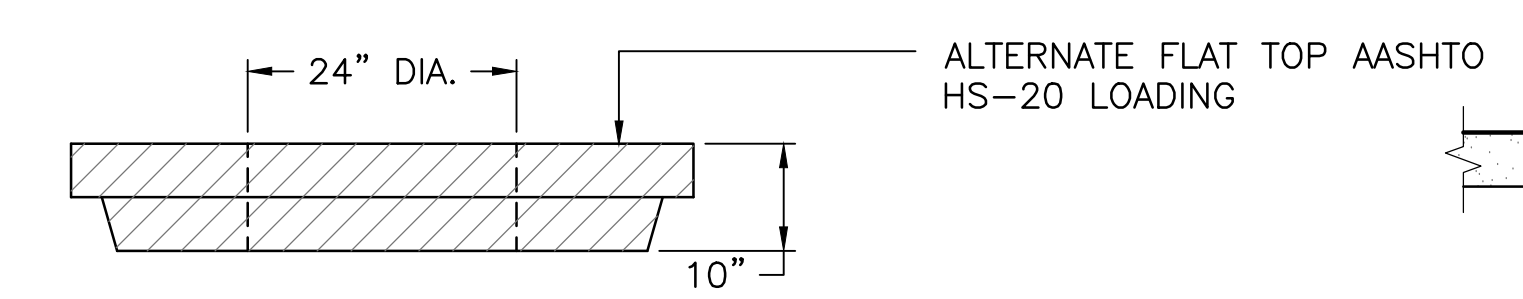
DWG No. **L-23**



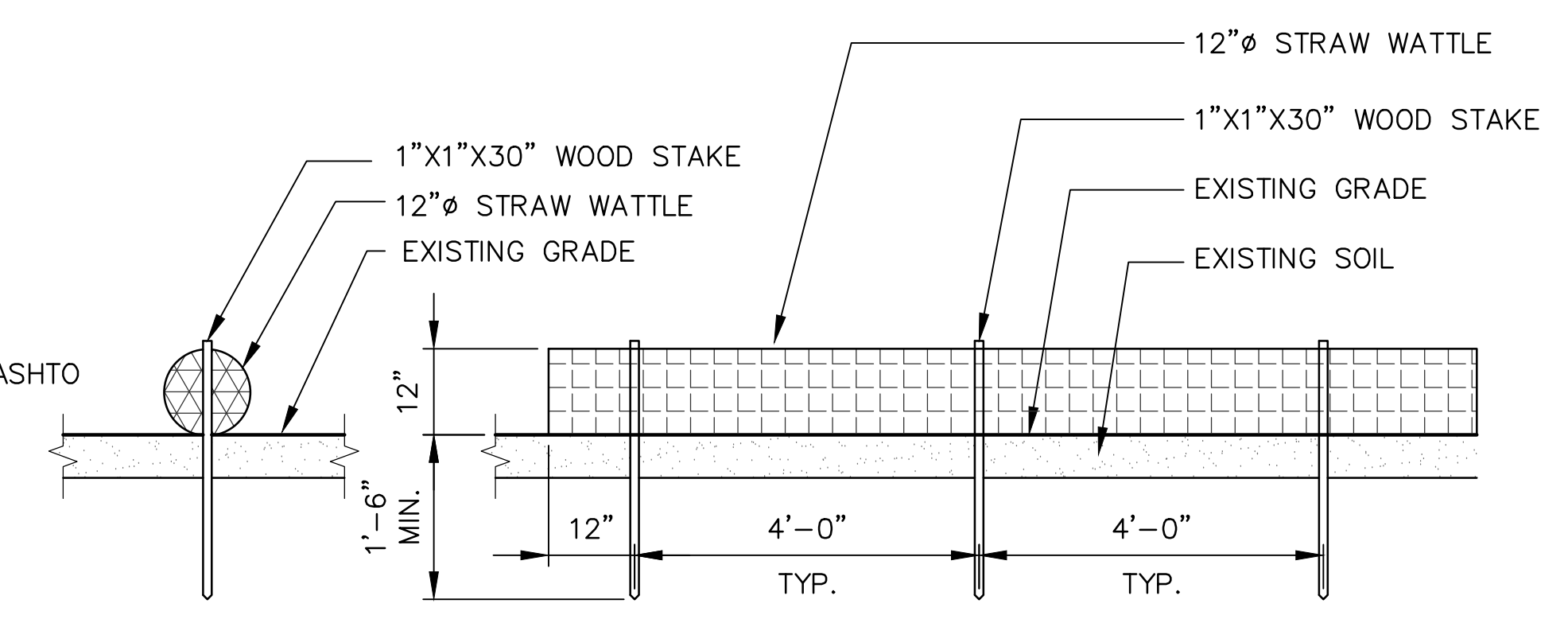
1 CATCH BASIN DETAIL
 N.T.S.



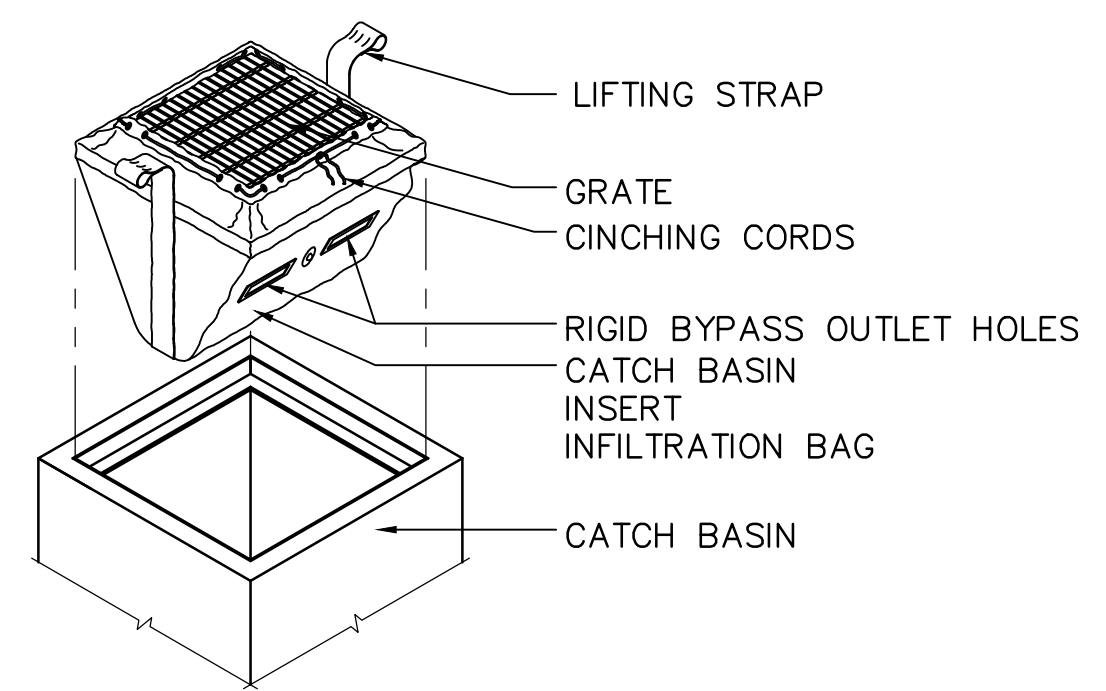
2 TYPICAL CLEAN-OUT DETAILS
 N.T.S.



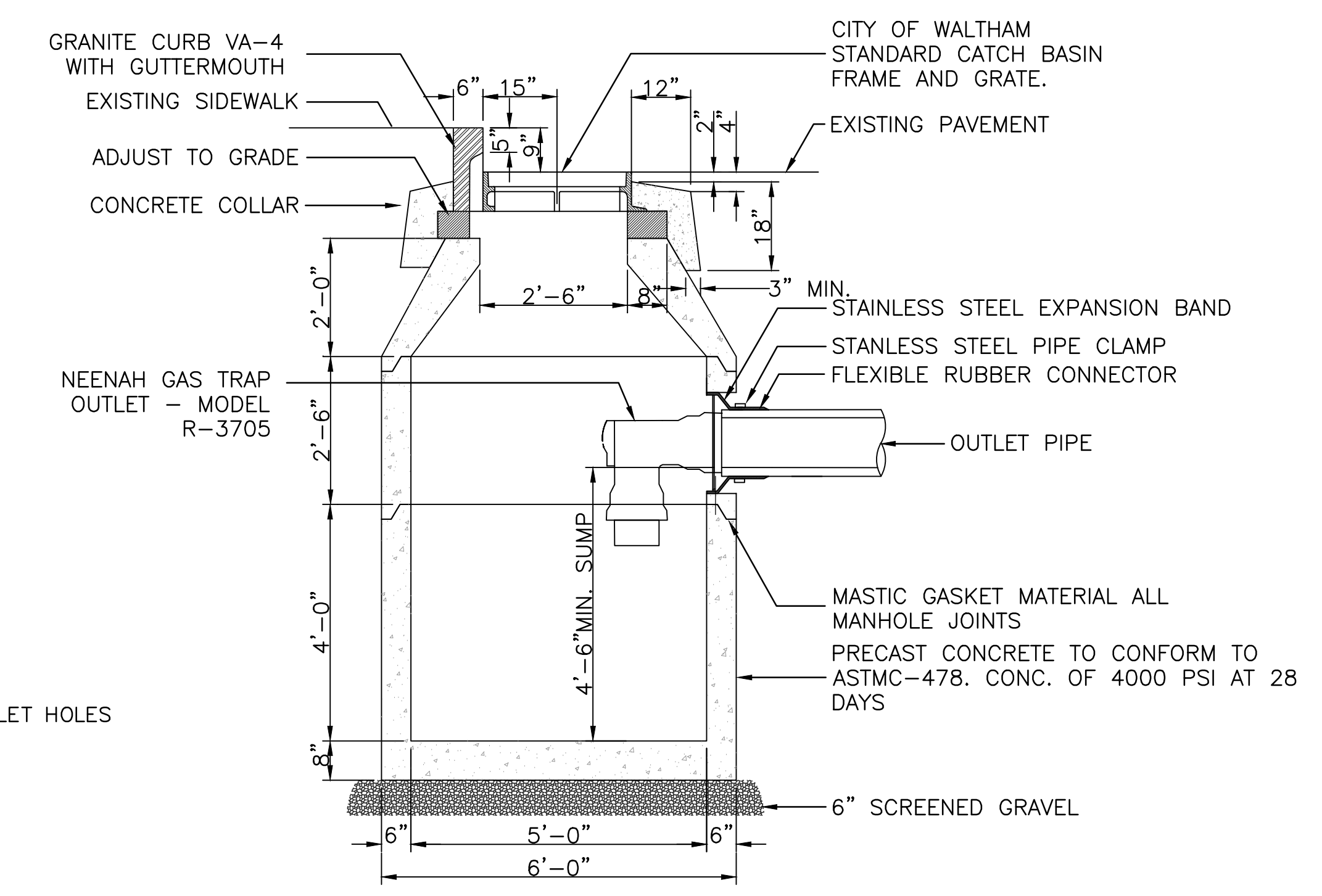
3 STORM DRAIN MANHOLE DETAIL
 N.T.S.



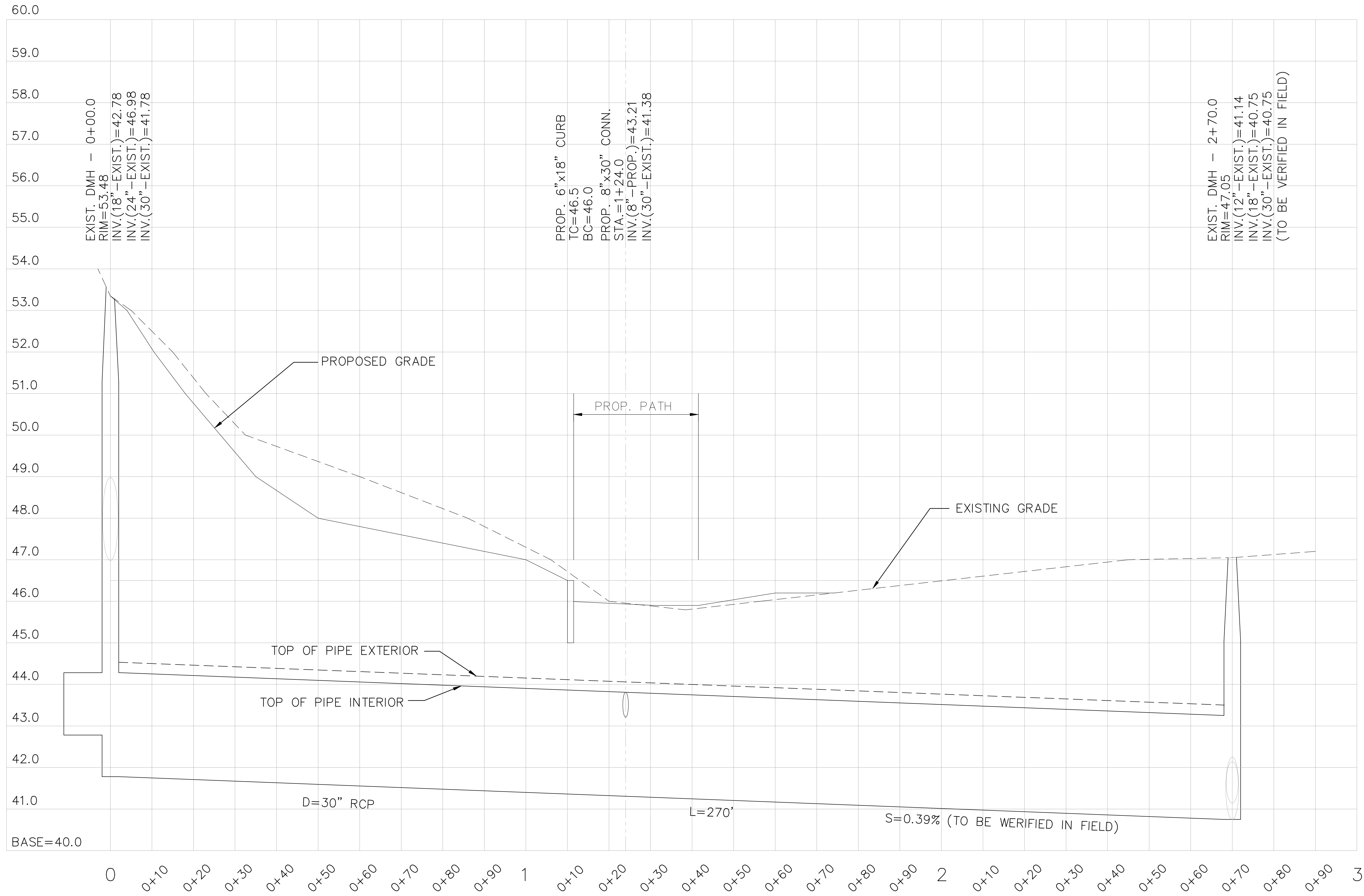
4 STRAW WATTLE DETAIL
 N.T.S.



5 CATCH BASIN SILT BAG
 N.T.S.



6 CATCH BASIN WITH CURB INLET DETAIL
 N.T.S.



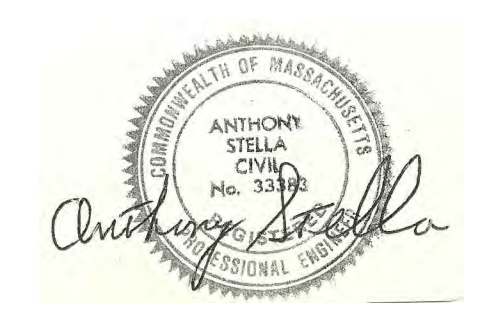
PROFILE - 30" RCP STORM DRAIN

SCALES HOR: 1"=20'
VERT: 1"=2'

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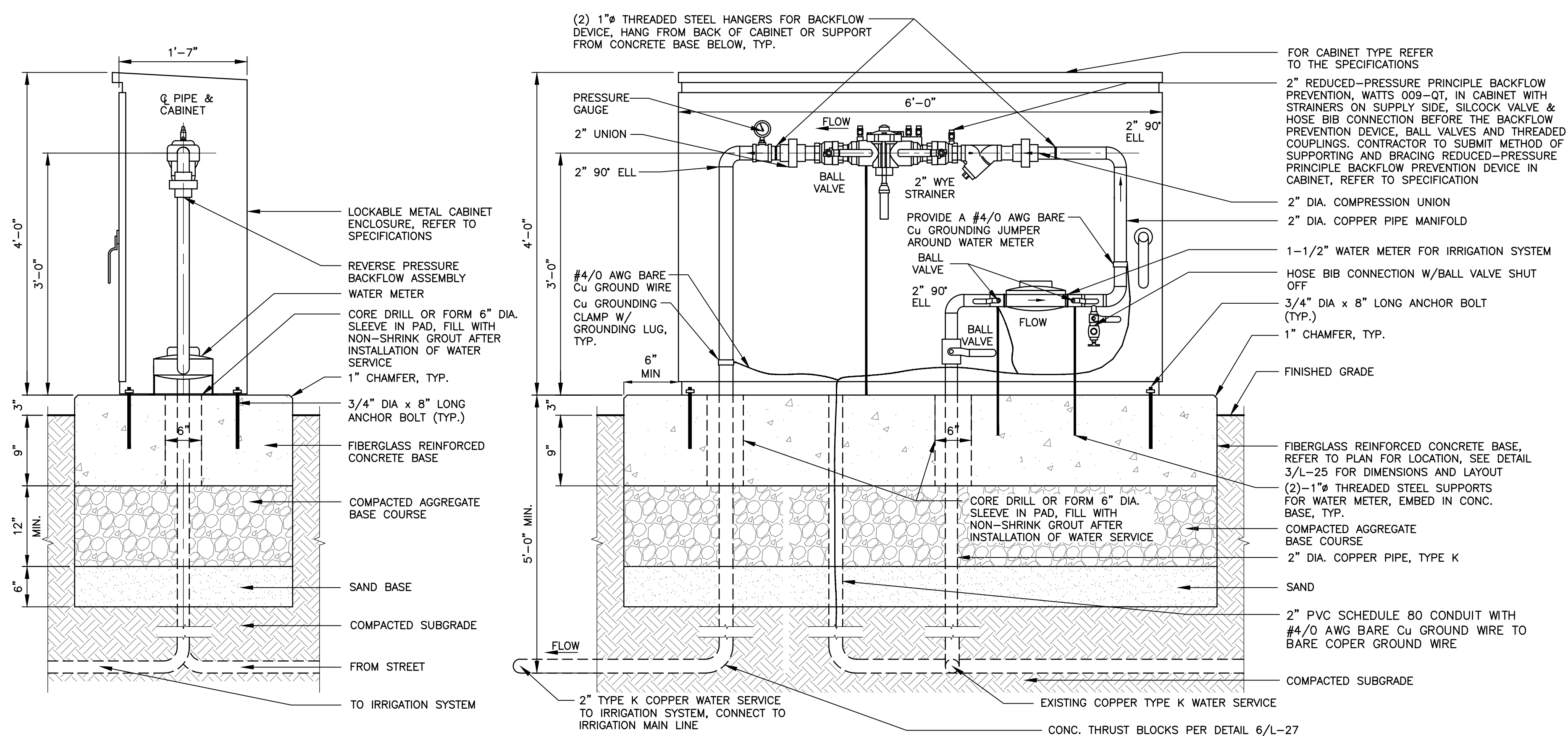
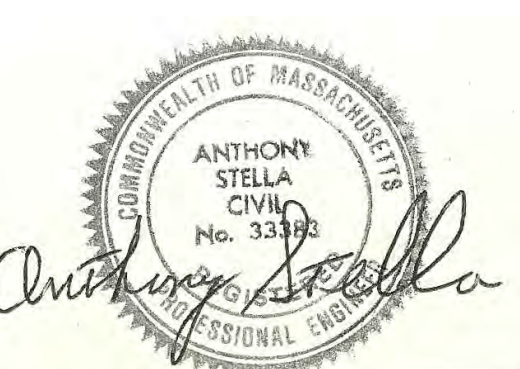
Project:
**CITY OF WALTHAM
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3 HAZEL STREET
WALTHAM, MA 02451**

Prepared For:
**CITY OF WALTHAM
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510 MOODY STREET
WALTHAM, MA 02453**

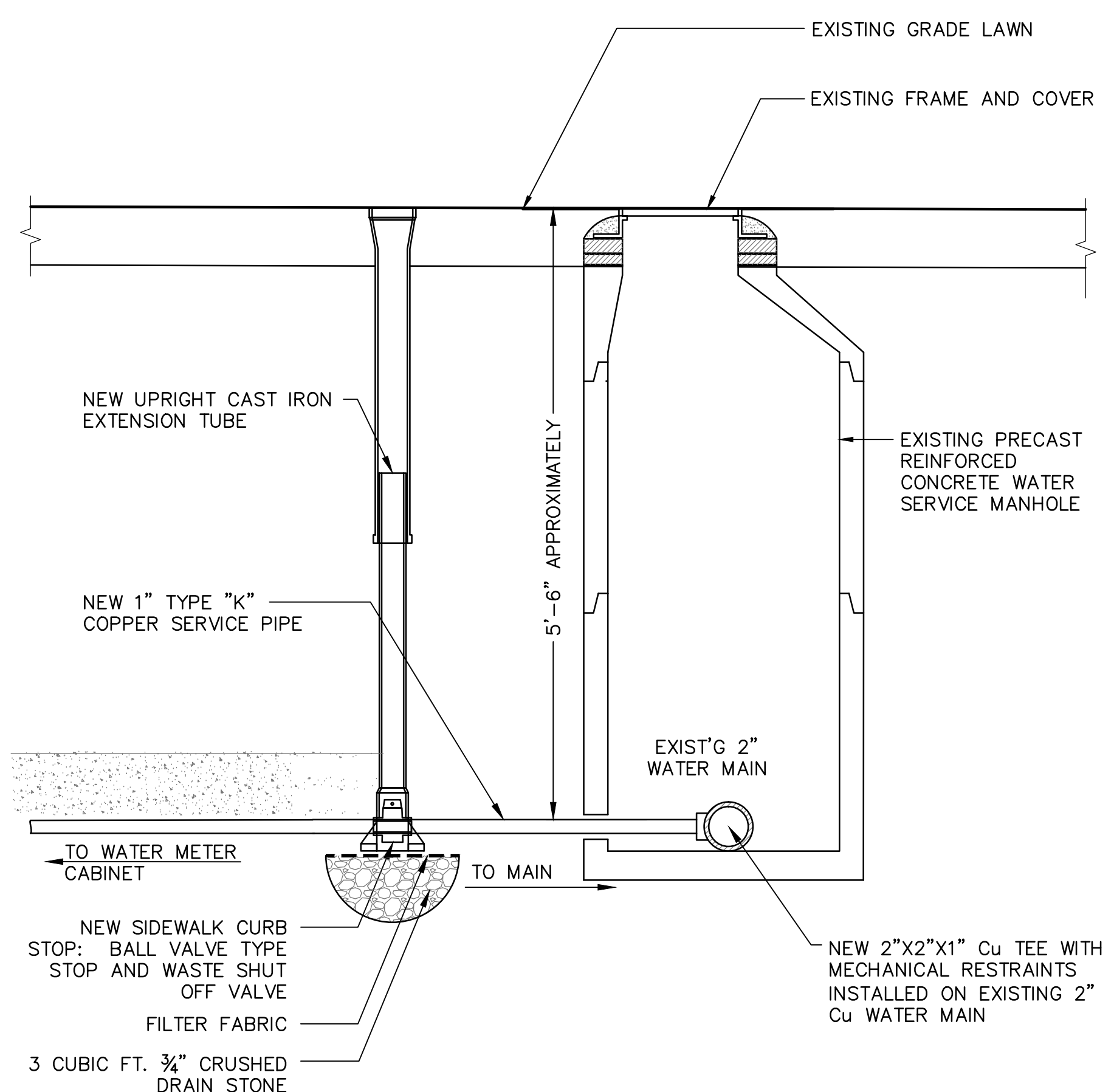
TITLE:
EXISTING PIPE PROFILE

Scale AS NOTED Date NOV 10, 2015
Drawn By AS
Checked By CCC
Approved By AS
Project No. 1313.00

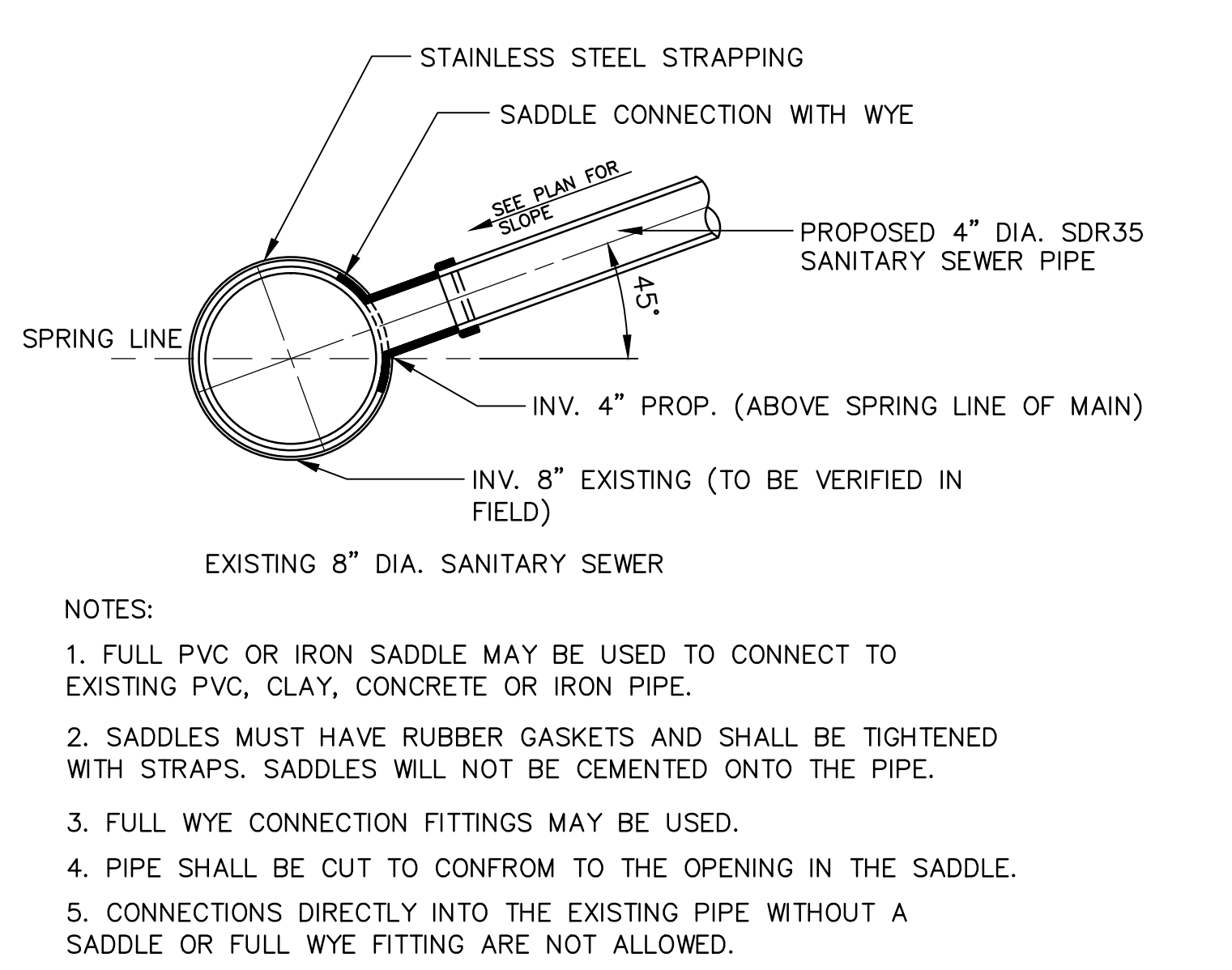
DWG No. **L-24**



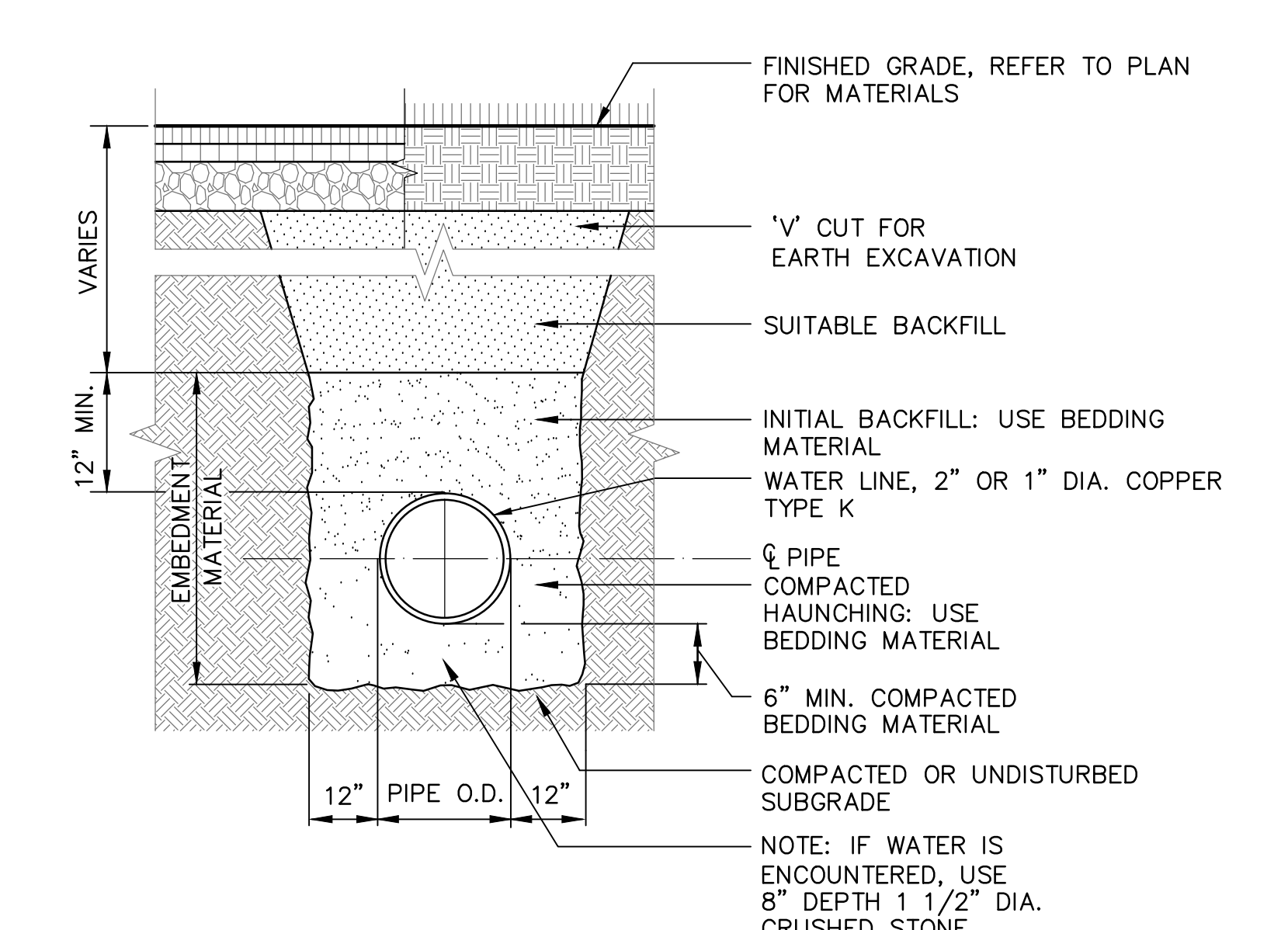
SECTION 3 REDUCED-PRESSURE PRINCIPLE BACKFLOW-PREVENTION DEVICE IN CABINET FOR IRRIGATION SYSTEM
N.T.S.



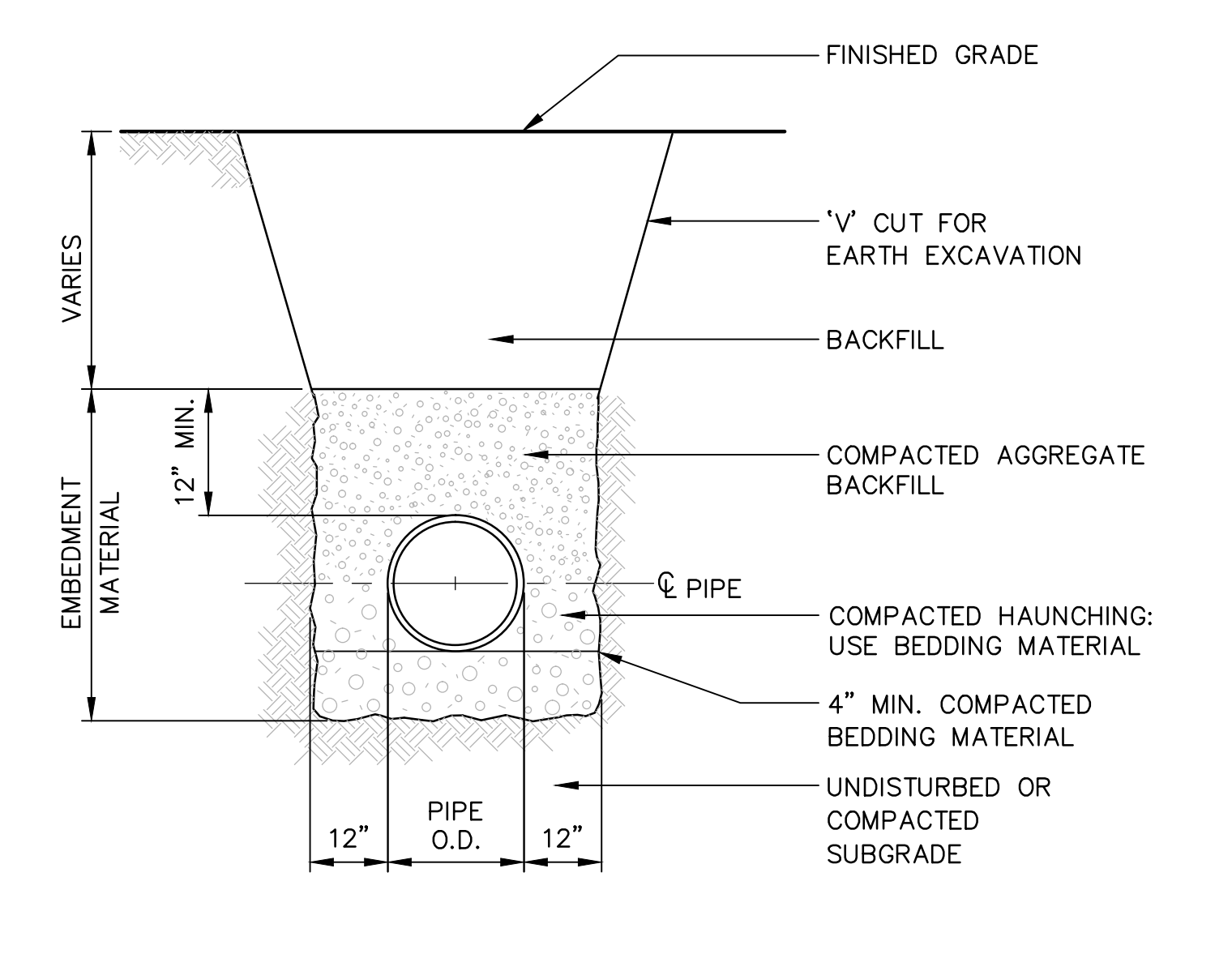
SECTION 1 WATER SERVICE TRENCH PROFILE DETAIL, TYP.
N.T.S.



SECTION 5 SADDLE CONNECTION TO EXISTING SANITARY SEWER, TYP.
N.T.S.



SECTION 4 WATERLINE TRENCH SECTION DETAIL, TYP.
N.T.S.



SECTION 2 UTILITY LINE TRENCH SECTION DETAIL, TYP.
N.T.S.

No.	Description	Date

REVISIONS

Project:

**CITY OF WALTHAM
DRAKE PLAYGROUND
3 HAZEL STREET
WALTHAM, MA 02451**

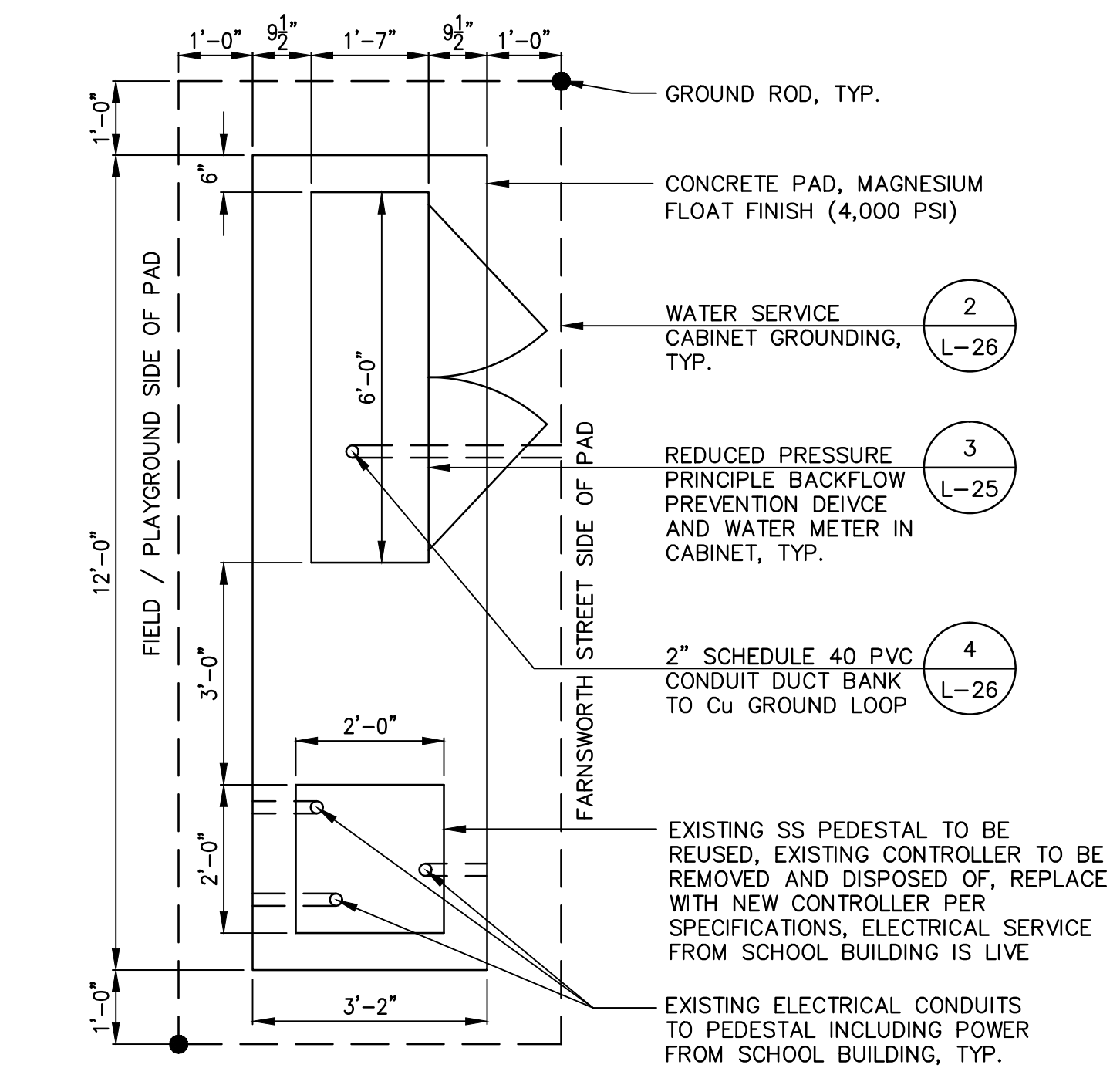
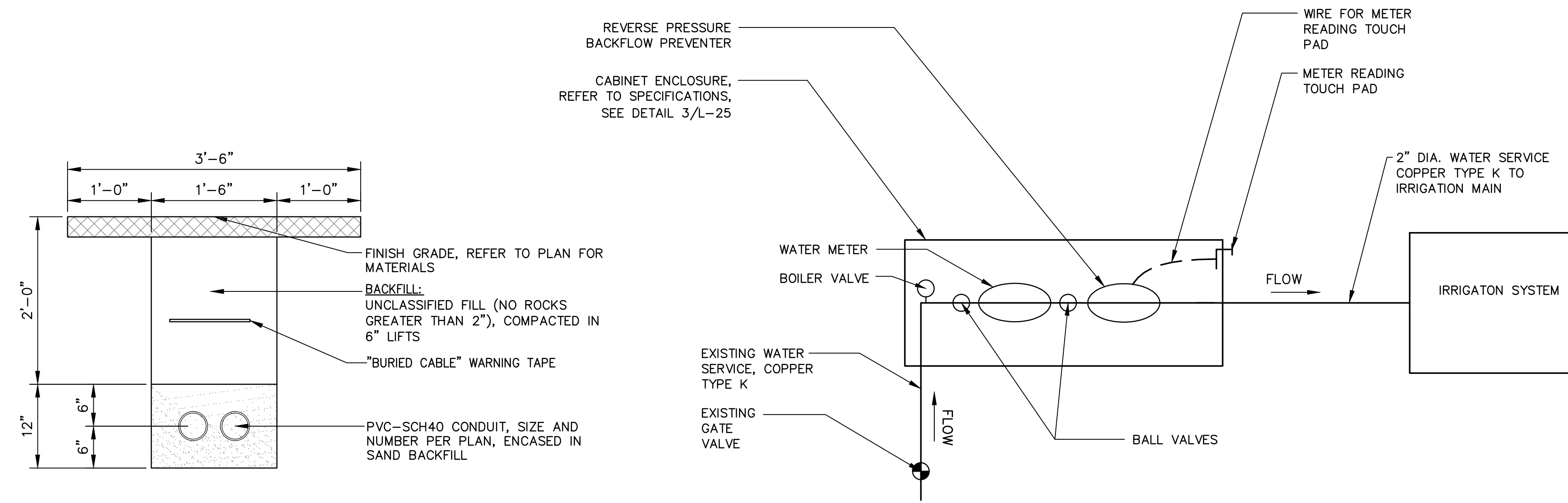
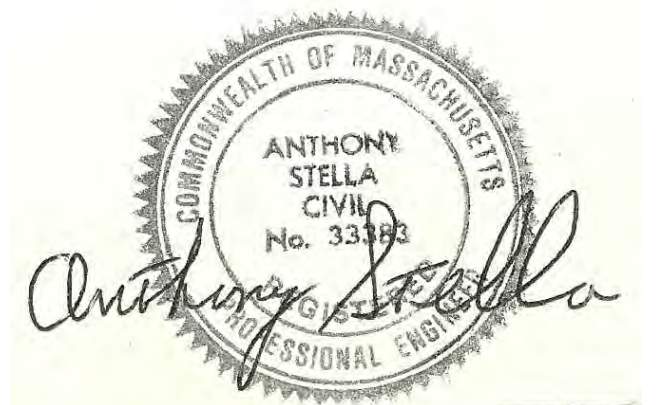
Prepared For:

**CITY OF WALTHAM
DEPARTMENT OF RECREATION
510 MOODY STREET
WALTHAM, MA 02453**

TITLE:

UTILITY DETAILS III

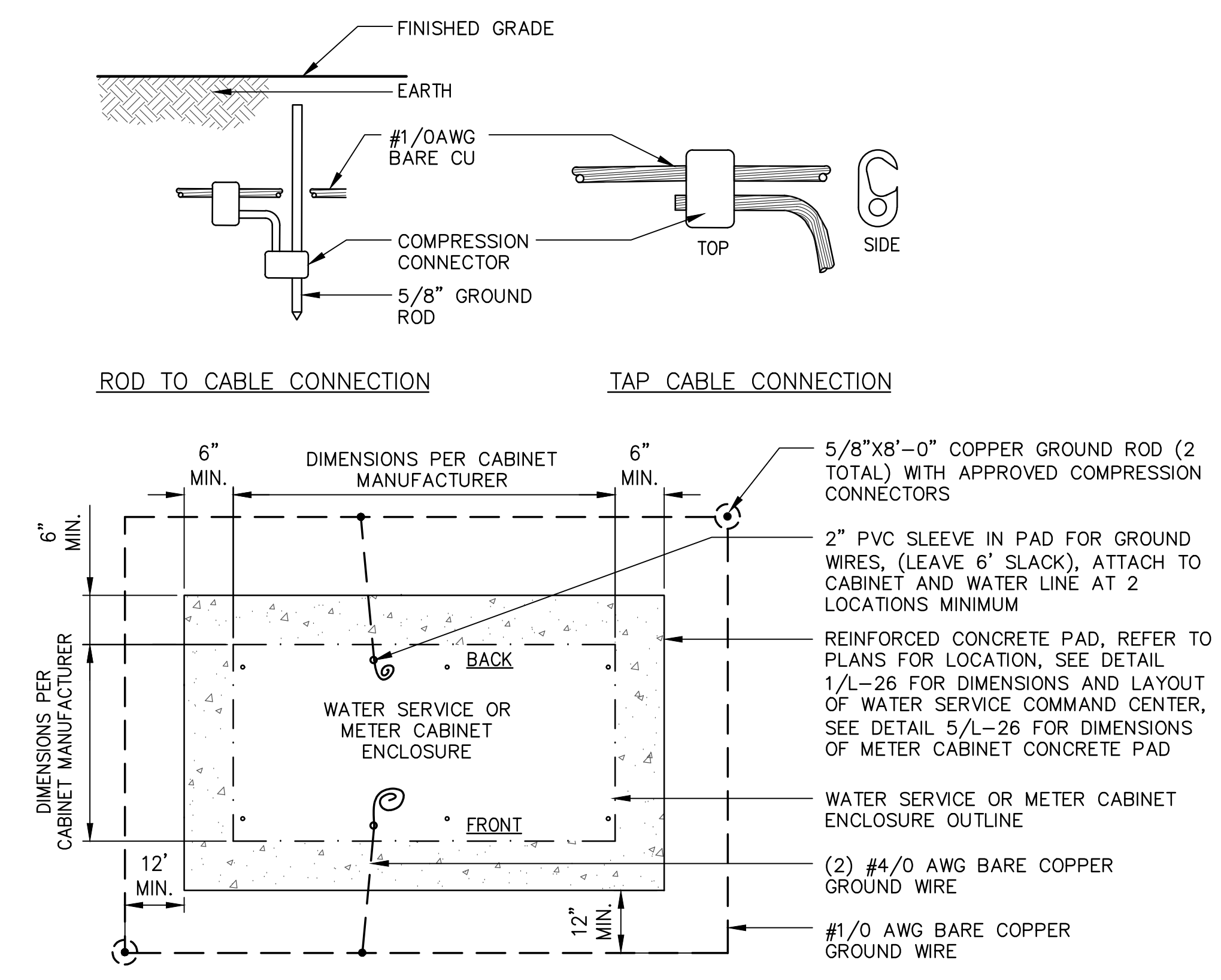
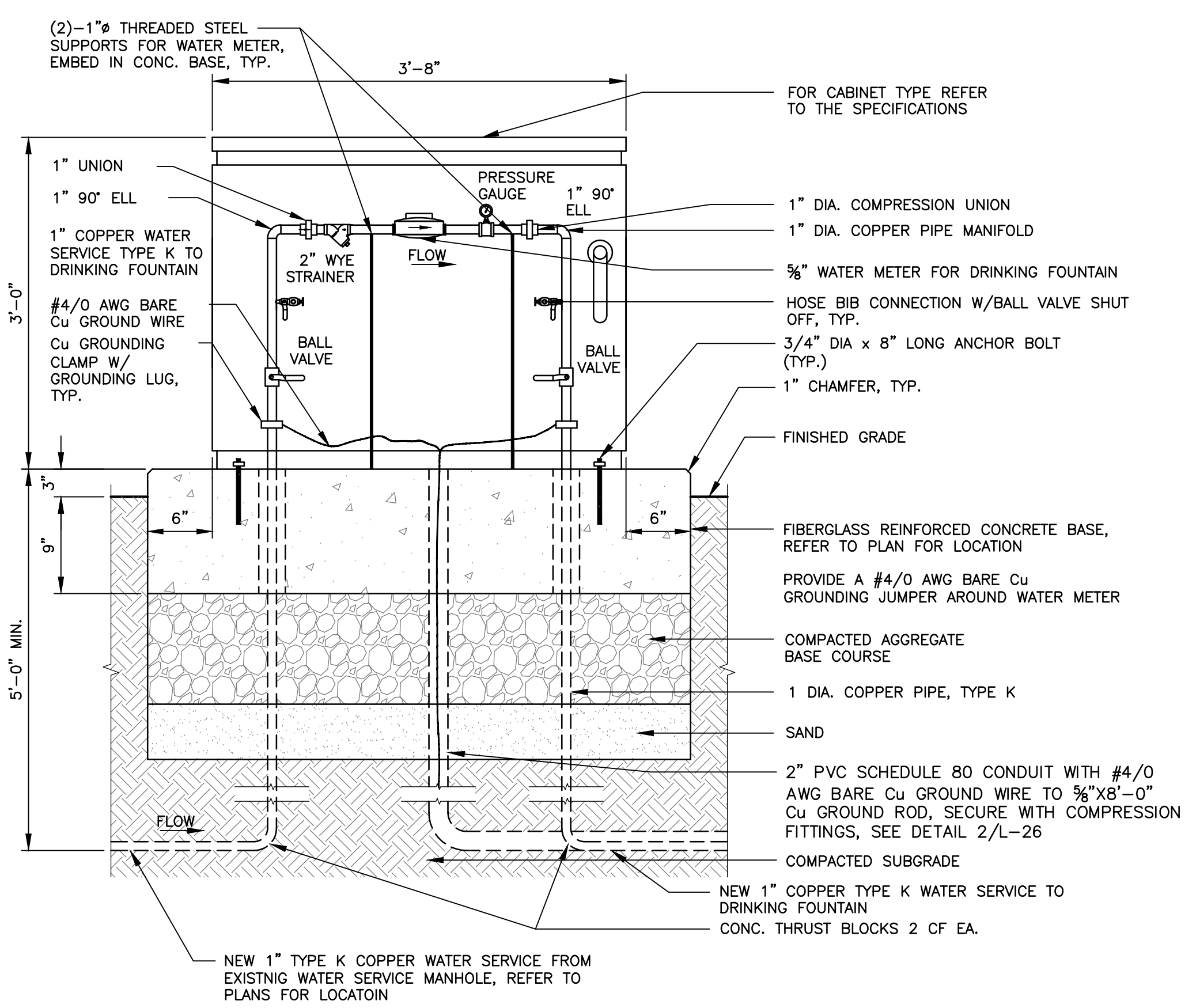
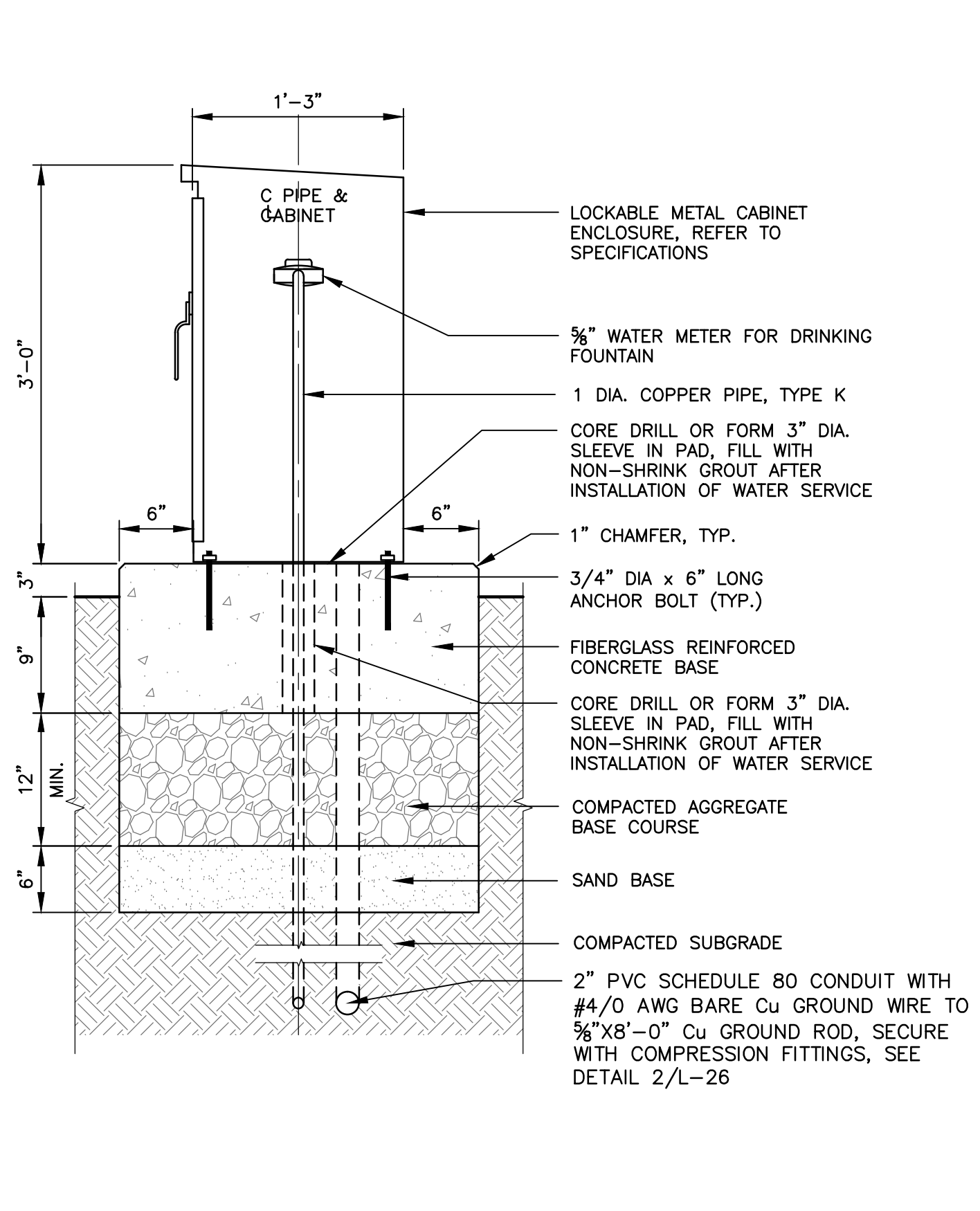
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Project No. 1313.00



SECTION
4 PVC CONDUIT DUCTBANK CROSS-SECTION DETAIL, TYP.
N.T.S.

ELEVATION
3 WATER SERVICE ONE LINE SCHEMATIC DIAGRAM FOR IRRIGATION SYSTEM
N.T.S.

PLAN
1 COMMAND CENTER LAYOUT PLAN FOR IRRIGATION SYSTEM
1/2" = 1'-0"



SECTION
5 WATER METER CABINET FOR DRINKING FOUNTAIN
N.T.S.

ELEVATION
3 WATER SERVICE ONE LINE SCHEMATIC DIAGRAM FOR IRRIGATION SYSTEM
N.T.S.

PLAN
2 WATER SERVICE OR METER CABINET GROUNDING PLAN, TYP.
N.T.S.

No.	Description	Date
REVISIONS		

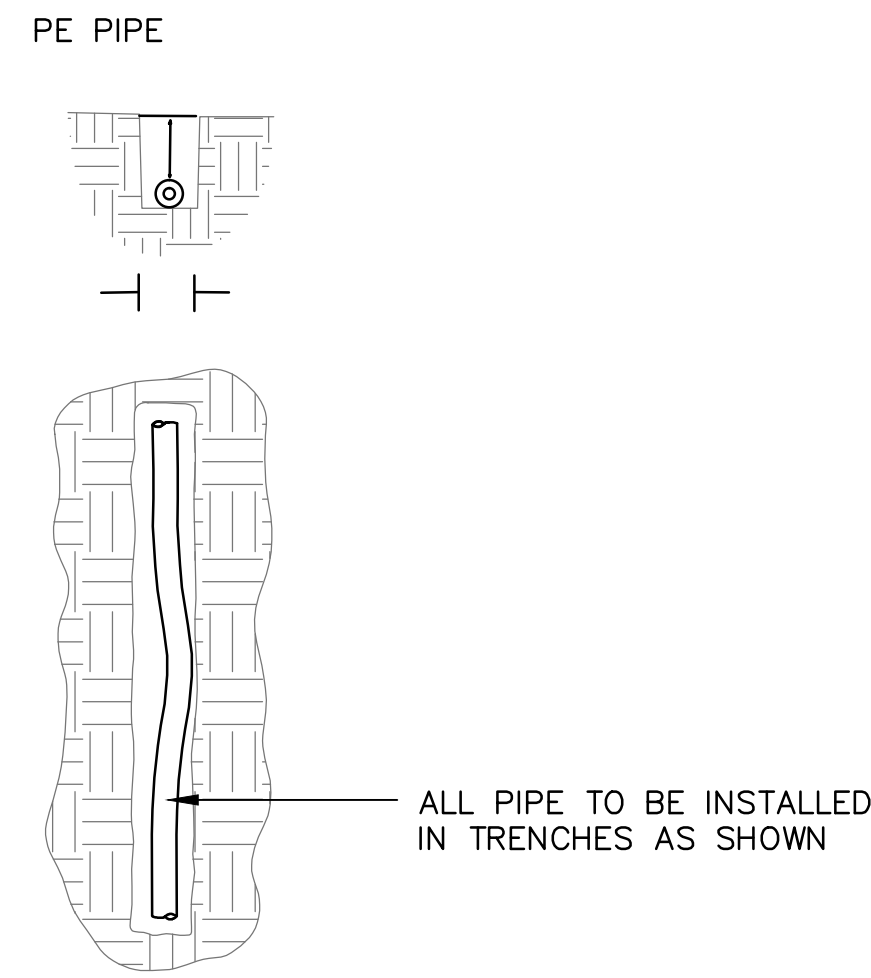
Project:
**CITY OF WALTHAM
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WALTHAM, MA 02451**

Prepared For:
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DEPARTMENT OF RECREATION
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WALTHAM, MA 02453**

TITLE:
UTILITY DETAILS IV

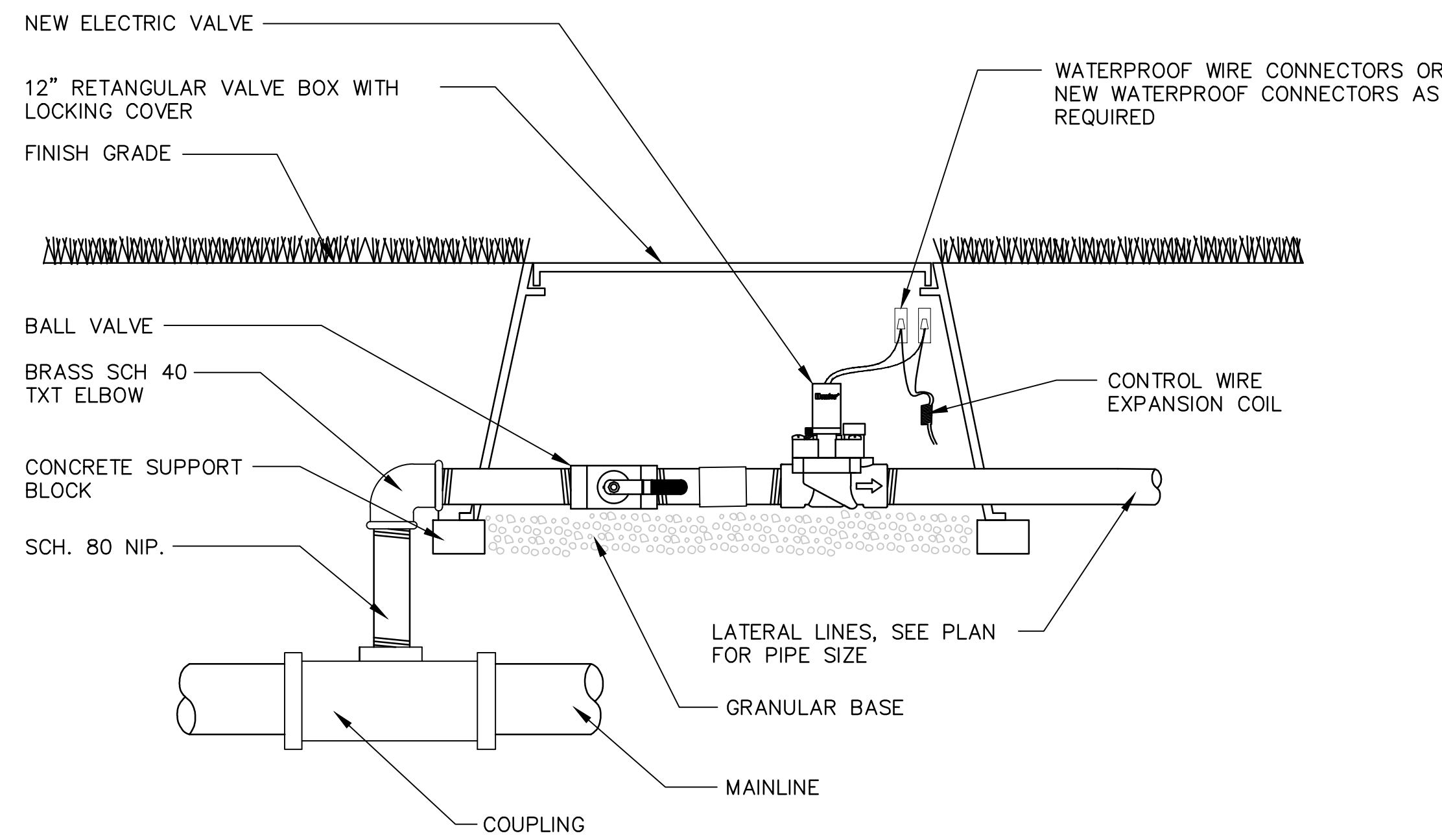
Scale AS NOTED Date NOV 10, 2015
Drawn By DRB
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DWG No. **L-26**

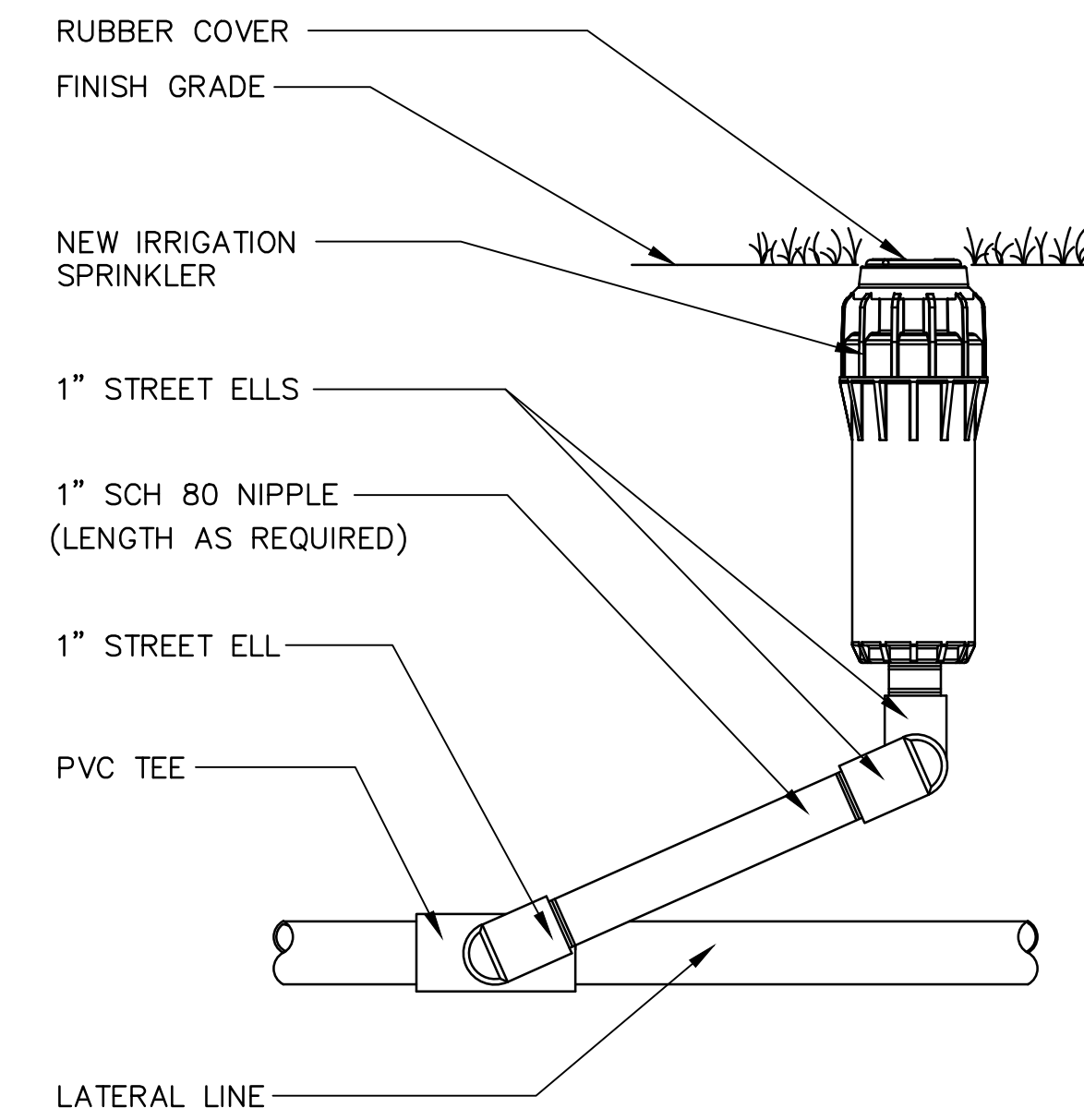


NOTE:
ALL OF THE PIPE DEPTHS ARE BASED ON THE INDIVIDUAL PIPE SIZES. REFER TO THE SPECIFICATIONS FOR THE MINIMUM DEPTH OF COVER FOR EACH SIZE OF PIPE.

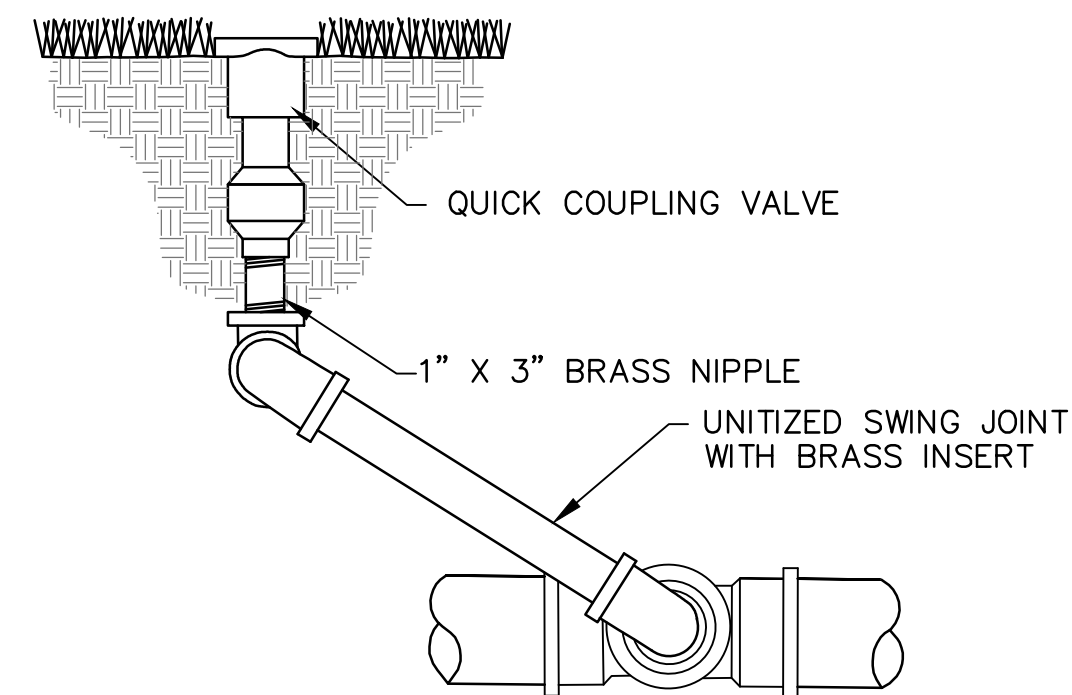
SECTION
1 TRENCH DETAIL, TYP.
N.T.S.



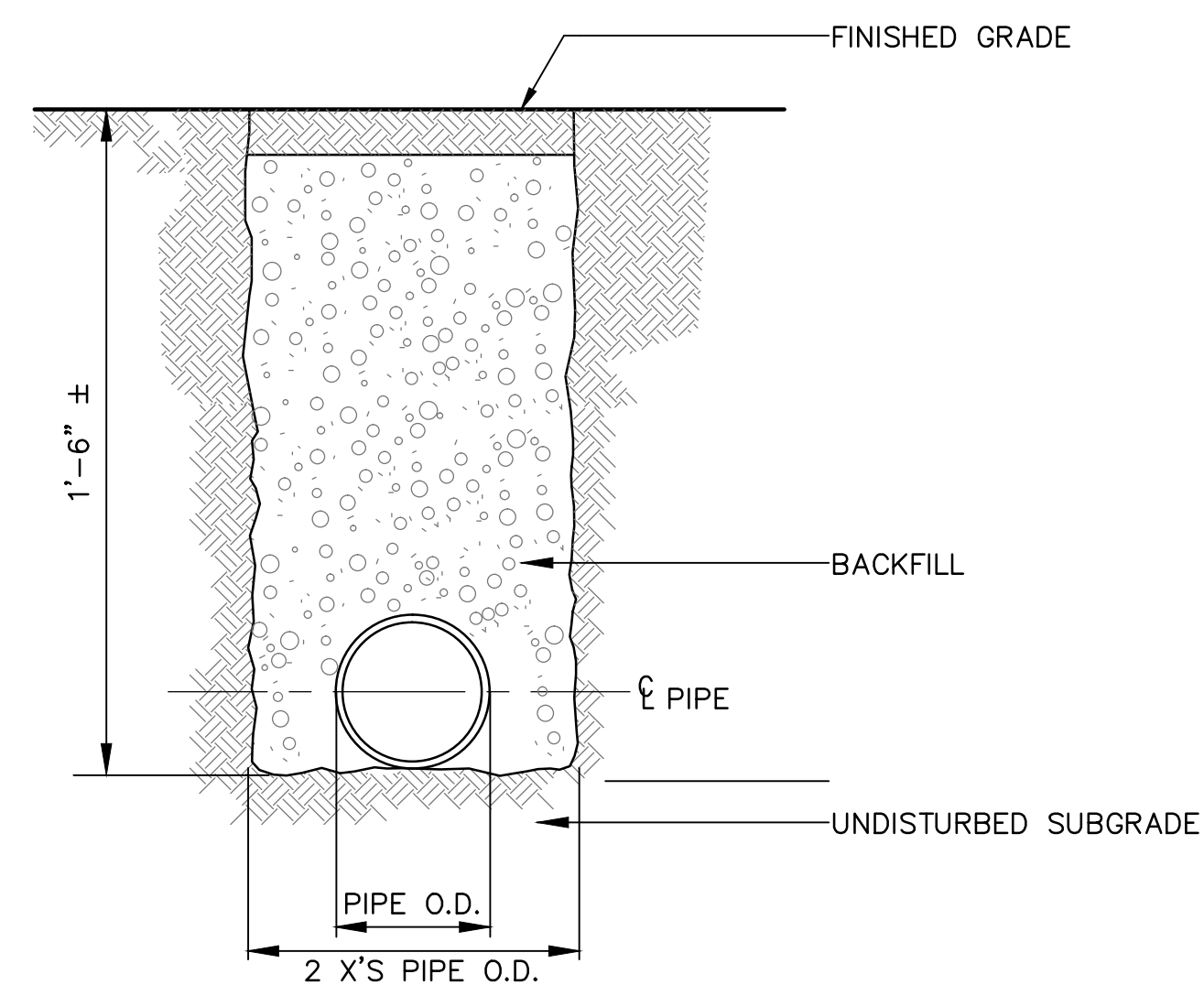
SECTION
2 AUTOMATIC CONTROL VALVE DETAIL, TYP.
N.T.S.



SECTION
3 GEAR DRIVEN ROTARY IRRIGATION SPRINKLER INSTALLATION DETAIL, TYP.
N.T.S.



SECTION
4 QUICK COUPLING VALVE DETAIL, TYP.
N.T.S.

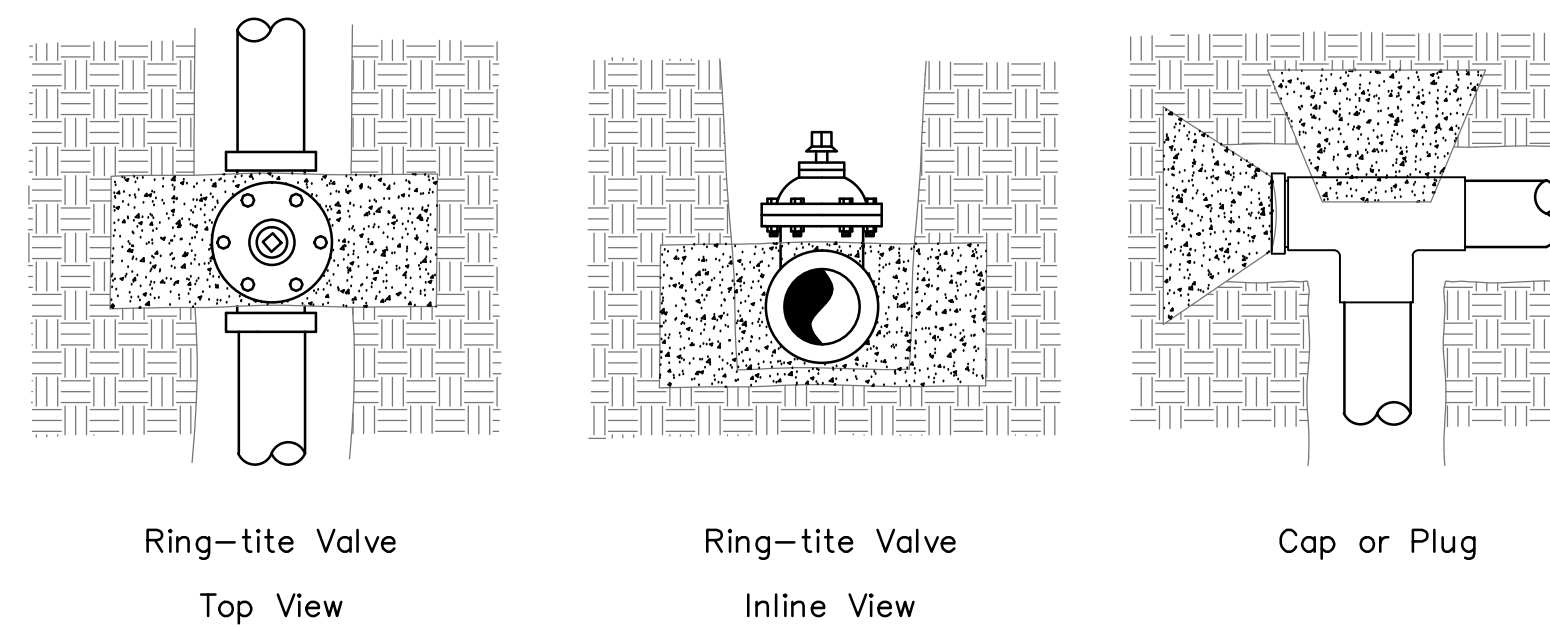


SECTION
5 PE MAINLINE TRENCH SECTION DETAIL, TYP.
N.T.S.

PROVIDE THRUST BLOCKS AT ALL CHANGES IN SIZE OR DIRECTION, ELBOWS, REDUCERS, PLUGS, VALVES, AND THE OPPOSITE SIDE OF TEE BRANCHES.

THE SIZES OF THE BLOCK IS DETERMINED BY THE WORKING PRESSURE, THE SIZE AND TYPE OF FITTING, AND SOIL CONDITIONS AT THE JOB SITE. TO CALCULATE THE AREA OF CONTACT WITH THE SOIL, FOLLOW THESE STEPS:

- CALCULATE THE THRUST BY SELECTING THE VALVE BY SIZE AND TYPE OF FITTING (TABLE 1), AND MULTIPLYING THAT VALUE BY THE MAXIMUM WORKING PRESSURE AT THE FITTING.
- DIVIDE THE TOTAL THRUST BY BEARING CAPACITY OF THE SOIL IN EXCAVATION (TABLE 2).
- THE RESULT IS THE TOTAL AREA (IN SQUARE FEET) OF THRUST BLOCK REQUIRED TO BE IN CONTACT WITH THE UNDISTURBED SOIL OF THE TRENCH WALL.



SECTION
6 THRUST BLOCKING DETAIL, TYP.
N.T.S.

Table 1
Fitting Thrust Factors

Size	Tee, Cap or Valve	90° Elbow	45° Elbow	22.5° Elbow
1 1/2	2.94	4.16	2.25	1.15
2	4.56	6.45	3.50	1.78
2 1/2	6.65	9.40	5.10	2.60
3	9.80	13.90	7.51	3.82
4	16.20	23.00	12.40	6.31
6	34.80	49.20	26.70	13.60
8	59.00	83.50	45.20	23.00
10	91.50	130.00	70.00	35.80
12	129.00	182.00	98.50	50.30

Table 2
Soil Bearing Loads

SOIL TYPE	SAFE BEARING LOAD LBS PER SQ FT
Muck, peat, etc.	0
Soft Clay	500
Medium Clay	1,000
Sand	1,000
Sand & Gravel	1,500
Compact Sand	3,000
Sand & Gravel cemented w/Clay	4,000
Hard Pan Clay	5,000
Sound Shale	10,000

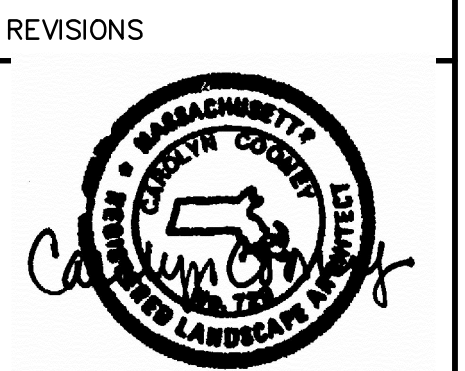
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No.	Description	Date



Project:
**CITY OF WALTHAM
DRAKE PLAYGROUND
3 HAZEL STREET
WALTHAM, MA 02451**

Prepared For:
**CITY OF WALTHAM
DEPARTMENT OF RECREATION
510 MOODY STREET
WALTHAM, MA 02453**

TITLE:
**IRRIGATION
DETAILS**

Scale AS NOTED Date NOV 10, 2015
Drawn By DRB
Checked By MJB
Approved By VH
Project No. 1313.00

DWG No. **L-27**