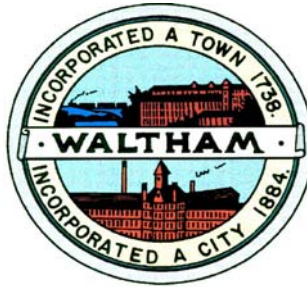


# The City of Waltham



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

**IMPROVEMENTS to PETER GILMORE PLAYGROUND**

**The bid opening will be held: 10:00 AM on Thursday April 28, 2016**

**A pre-bid conference: 10:00 AM on Friday April 8, 2016**

(Meet at 90 Hall Street, Waltham, MA 02452)

**Last day for written questions: 12 Noon Monday April 11, 2016.**

(to [Jpedulla@city.waltham.ma.us](mailto:Jpedulla@city.waltham.ma.us))

## Table of Contents

### **DIVISION 00**

00020 Notice to Bidders  
00100 Instructions to Bidders  
00310 Form for General Bid  
00500 Agreement  
00503 General Conditions  
00600 Federal Wage Standards

### **DIVISION 2**

02100 Site Preparation  
02200 Earthwork  
02500 Granite Curb  
02510 Bituminous Concrete Paving  
02540 Safety Surfacing  
02590 Color Coating & Line Painting  
02667 Water Service Systems  
02670 Backflow Preventer Cabinet  
02725 Drainage Pipe  
02728 Drainage Structures  
02780 Recycled Plastic Interlock Pavers  
02800 Site Furnishings  
02810 Irrigation System  
02825 Chain Link Fencing  
02830 Welded Wire Fence  
02835 Steel Service Gate  
02845 Wood Guardrail  
02860 Playground Equipment  
02865 Dasher Board System  
02870 Shade Structure  
02900 Seeding  
02901 Planting Soils  
03300 Cast-in-Place Concrete  
09614 Detectable Warning Panels  
10430 Exterior Signs and Plaques  
15400 Drinking Fountain  
16100 Electrical Service Improvements

### **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 & Controls  
01571 Order of Conditions  
01700 Project Close-out

## **DIVISION 00**

**SECTION 00020  
CITY OF WALTHAM  
MASSACHUSETTS**

**NOTICE TO BIDDERS**

**Gilmore Playground  
90 Hall Street**

**WALTHAM, MASSACHUSETTS**

The City of Waltham, Massachusetts invites sealed bids from Contractors for the **Gilmore Playground Improvements**, Waltham, Massachusetts. The work at Gilmore Playground includes park-wide improvements related to sub-drainage system, general earthwork and grading operations, installation of play equipment, paving, granite curbing, fencing, bituminous concrete, drainage improvements, etc. For a more complete description of the project go to Sec. 01010.

**PLANS, SPECIFICATIONS** and other Contract Documents may be obtained by visiting the City's Web Site at [www.city.waltham.ma.us/open-bids](http://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 at the Purchasing Department, Waltham City Hall, 610 Main Street, Waltham, MA 02452 until **10:00 AM on April 28, 2016**, 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 **10:00 AM on April 8, 2016** at the site of the **Gilmore Playground, 90 Hall Street, Waltham MA 02453**. 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.

**LAST DAY FOR WRITTEN QUESTIONS is at 12 noon April 11, 2016**. Questions are to be sent via e-mail only to [Jpedulla@city.waltham.ma.us](mailto:Jpedulla@city.waltham.ma.us)

**THE BUDGET** for the base project is **NOT TO EXCEED \$2,200,000.00**.

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](http://www.city.waltham.ma.us/open-bids) .

## Gilmore Playground

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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 and Vehicle 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.

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

**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 March 30, 2016
- B. **Pre-bid walkthrough and site inspection: April 8, 2016, at 10:00 AM.** Meet at **90 Hall St. Waltham.**
- C. **Questions** and requests for interpretations may be submitted in writing via e-mail ONLY to [Jpedulla@city.waltham.ma.us](mailto:Jpedulla@city.waltham.ma.us) up to **12:00 noon April 11, 2016.**
- 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: 10:00 A.M. on April 28, 2016,** in the Purchasing Department, City Hall, 610 Main Street, Waltham, MA 02452, Attn: J. Pedulla, CPO, 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.

- 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 100% 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

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:  
Gilmore Park Improvements

**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.



## Gilmore Playground

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- 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 **April 8, 2016 at 10:00 AM.** at the **Gilmore Playground 90 Hall St., Waltham, MA.** Interested parties are encouraged to attend given that this will be the only time the site is available prior to the submission of bids.

### 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](http://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

## Gilmore Playground

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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 **300 calendar days** after the date of the Notice-to-Proceed.

### 1.18 GENERAL CONDITIONS CHARGES.

General Condition charged to the Payment application for AIA 702 shall be spread over a period of 7 months or 7 Payment application cycles whichever is later

### 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 Federal Government and the Commissioner of Labor and Industries, pursuant to the provision of the Massachusetts General Laws. The Prevailing Wage Schedules for this project can be found in the City's web Site at [www.city.waltham.ma.us/open-bids](http://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 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-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.

**Gilmore Playground**

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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**

**INSTRUCTION TO BIDDERS  
00100 - 8**

**GILMORE PLAYGROUND IMPROVEMENTS  
WALTHAM, MASSACHUSETTS**

**General Bid Opening Date: 10:00 am, April 28, 2016**

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

**A. Basic 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:

<b>Base Bid</b>	<b>\$ _____</b>
<b>Allowance, Police Detail</b>	<b>\$ 60,000</b>
<b>Allowance, Unforeseen Conditions</b>	<b>\$ 100,000</b>
<b>Allowance, 1 Lease for Big Belly Trash Container</b>	<b>\$ 10,000</b>
<b>Allowance, Electricity/ Utilities</b>	<b>\$ 20,000</b>

**TOTAL Bid** \_\_\_\_\_, \$ \_\_\_\_\_  
(in words)

**B. Add Alternate 1, (Cast Iron Fountain, see Sec. 01030)** \$ \_\_\_\_\_

C. 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

**Gilmore Playground Improvements**

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.

- D. 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.
- E. 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 Safety Data Sheets applicable to such material or equipment, as required by M.G.L. Chapter 111F, so called "Right to Know Law".
- F. 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.
- G. Substantial Completion
  - 1. The work of the Contract shall be Substantially Completed in three hundred **(300) calendar days from the date of the Notice-to-Proceed (NTP)**.
- H. In accordance with M.G.L., 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 \_\_\_\_\_, 2016 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: \_\_\_\_\_

\_\_\_\_\_  
John Cervone. 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**

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**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
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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:

## Gilmore Playground

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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 by the Federal Government and by 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](http://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 and shall be in force until the date of Final acceptance excluding any guarantee period.

### **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**  
**FEDERAL WAGE STANDARDS**

**Federal Funding Provision**

The City has applied for and received funds from the United States Government under the provisions of Title I of the Housing and Community Development Act of 1974, as amended, Public Law 93-383; and Catalog of Federal Domestic Assistance Number 14.218; the City wishes to engage the Contractor to assist the City in utilizing such funds to carry out the purposes and responsibilities associated therewith in connection with the City's Community Development Program, and; Agreement sets forth the terms and conditions under which the Contractor will become the recipient of said grant;

**Federal Objective**

The activity funded with Community Development Block Grant (hereinafter referred to as CDBG) funds must meet the national objective of benefit to low-and moderate-income persons; as defined in 24 CFR 570.208.

**Uniform Administrative Requirements**

The Contractor shall comply with Federal Regulation 2 CFR 200. Upon request of the Contractor, the City will assist the Contractor in complying with applicable regulations and standards, and in establishing necessary administrative procedures and recordkeeping and financial control systems and procedures. This offer of assistance shall not in any way relieve the Contractor of the responsibility to ensure compliance with all relevant management requirements. Contractor agrees to adhere to the accounting principles and procedures required therein, utilize adequate internal controls and maintain necessary source documentation for all costs incurred.

The Contractor agrees that the City of Waltham, The United States Department of Housing and Urban Development, the Comptroller General of the United States, or any of their duly authorized representatives shall have access to any records, Agreements, invoices, materials, payrolls, personnel records, books, documents, papers, financial records or computer data maintained, kept or used by which are related to this Agreement, for the purpose of making copies, audits, examinations, excerpts, and transcriptions. Such inspections may be made during normal business hours, and as often as the aforementioned governmental agencies deem necessary.

**Massachusetts Unmarked Burial Law**

It shall be the duty of a person who discovers unmarked human remains, or who knowingly causes human remains to be disturbed through construction, to immediately notify the office of the chief medical examiner.

The medical examiner shall make reasonable attempts to promptly identify unmarked human remains including, but not limited to, obtaining: (i) photographs of the human remains prior to an autopsy; (ii) dental or skeletal X-rays; (iii) photographs of items found with the human remains; (iv) fingerprints from the remains, if possible; and (v) a sample of bone, hair or tissue for DNA testing.

The office shall conduct an inquiry to determine whether the remains are suspected of being 100 years old or more and, if so determined, shall immediately notify the state archaeologist. The state archaeologist shall determine if the skeletal remains are Native American. If the remains are deemed likely to be Native American, the state archaeologist shall immediately notify the commission on Indian affairs which shall cause a site evaluation to be made to determine if the place where the remains were found is a Native American burial site.

### **Identification of Federal Funding**

The following statement shall be placed permanently on the site once work has completed

*“Peter Gilmore Playground was partially financed through a City of Waltham Community Development Block Grant, administered by the United States Department of Housing and Urban Development.”*

### **Women- and Minority-Owned Businesses (W/MBE)**

The Contractor will use its best efforts to afford small businesses, minority business enterprises, and women’s business enterprises the maximum practicable opportunity to participate in the performance of this contract. As used in this contract, the terms “small business” means a business that meets the criteria set forth in section 3(a) of the Small Business Act, as amended (15 U.S.C. 632), and “minority and women’s business enterprise” means a business at least fifty-one (51) percent owned and controlled by minority group members or women. For the purpose of this definition, “minority group members” are Afro-Americans, Spanish-speaking, Spanish surnamed or Spanish-heritage Americans, Asian-Americans, and American Indians. The Contractor may rely on written representations by businesses regarding their status as minority and female business enterprises in lieu of an independent investigation.

### **“Section 3” Clause**

Compliance with the provisions of Section 3 of the HUD Act of 1968, as amended, and as implemented by the regulations set forth in 24 CFR 135, and all applicable rules and orders issued hereunder prior to the execution of this contract, shall be a condition of the Federal financial assistance provided under this contract and binding upon the Grantee, the Contractor and any of the Contractor’s s and subcontractors. Failure to fulfill these requirements shall subject the Grantee, the Contractor and any of the Contractors and subcontractors, their successors and assigns, to those sanctions specified by the Agreement through which Federal assistance is provided. The Contractor certifies and agrees that no contractual or other disability exists that would prevent compliance with these requirements.

The Contractor further agrees to comply with these “Section 3” requirements and to include the following language in all subcontracts executed under this Agreement:

*“The work to be performed under this Agreement is a project assisted under a program providing direct Federal financial assistance from HUD and is subject to the requirements of Section 3 of the Housing and Urban Development Act of 1968, as amended (12 U.S.C. 1701). Section 3 requires that to the greatest extent feasible opportunities for training and employment be given to low- and very low-income residents of the project area, and that contracts for work in connection with the project be awarded to business concerns that provide economic opportunities for low- and very low-income persons residing in the metropolitan area in which the project is located.”*

The Contractor further agrees to ensure that opportunities for training and employment arising in connection with a housing rehabilitation (including reduction and abatement of lead-based paint hazards), housing construction, or other public construction project are given to low- and very low-income persons residing within the metropolitan area in which the CDBG-funded project is located; where feasible, priority should be given to low- and very low-income persons within the service area of the project or the neighborhood in which the project is located, and to low- and very low-income participants in other HUD programs; and award contracts for work undertaken in connection with a housing

rehabilitation (including reduction and abatement of lead-based paint hazards), housing construction, or other public construction project to business concerns that provide economic opportunities for low- and very low-income persons residing within the metropolitan area in which the CDBG-funded project is located; where feasible, priority should be given to business concerns that provide economic opportunities to low- and very low-income residents within the service area or the neighborhood in which the project is located, and to low- and very low-income participants in other HUD programs.

The Contractor agrees to send to each labor organization or representative of workers with which it has a collective bargaining agreement or other contract or understanding, if any, a notice advising said labor organization or worker's representative of its commitments under this Section 3 clause and shall post copies of the notice in conspicuous places available to employees and applicants for employment or training.

The Contractor will include this Section 3 clause in every subcontract and will take appropriate action pursuant to the subcontract upon a finding that the subcontractor is in violation of regulations issued by the grantor agency. The Contractor will not subcontract with any entity where it has notice or knowledge that the latter has been found in violation of regulations under 24 CFR Part 135 and will not let any subcontract unless the entity has first provided it with a preliminary statement of ability to comply with the requirements of these regulations.

## Applicability

The Project or Program to which the construction work covered by this contract pertains is being assisted by the United States of America and the following Federal Labor Standards Provisions are included in this Contract pursuant to the provisions applicable to such Federal assistance.

**A. 1. (i) Minimum Wages.** All laborers and mechanics employed or working upon the site of the work, will be paid unconditionally and not less often than once a week, and without subsequent deduction or rebate on any account (except such payroll deductions as are permitted by regulations issued by the Secretary of Labor under the Copeland Act (29 CFR Part 3), the full amount of wages and bona fide fringe benefits (or cash equivalents thereof) due at time of payment computed at rates not less than those contained in the wage determination of the Secretary of Labor which is attached hereto and made a part hereof, regardless of any contractual relationship which may be alleged to exist between the contractor and such laborers and mechanics. Contributions made or costs reasonably anticipated for bona fide fringe benefits under Section 1(b)(2) of the Davis-Bacon Act on behalf of laborers or mechanics are considered wages paid to such laborers or mechanics, subject to the provisions of 29 CFR 5.5(a)(1)(iv); also, regular contributions made or costs incurred for more than a weekly period (but not less often than quarterly) under plans, funds, or programs, which cover the particular weekly period, are deemed to be constructively made or incurred during such weekly period.

Such laborers and mechanics shall be paid the appropriate wage rate and fringe benefits on the wage determination for the classification of work actually performed, without regard to skill, except as provided in 29 CFR 5.5(a)(4). Laborers or mechanics performing work in more than one classification may be compensated at the rate specified for each classification for the time actually worked therein: Provided, That the employer's payroll records accurately set forth the time spent in each classification in which work is performed. The wage determination (including any additional classification and wage rates conformed under 29 CFR 5.5(a)(1)(ii) and the Davis-Bacon poster (WH-1321) shall be posted at all times by the contractor and its subcontractors at the site of the work in a prominent and accessible, place where it can be easily seen by the workers.

**(ii) (a)** Any class of laborers or mechanics which is not listed in the wage determination and which is to be employed under the contract shall be classified in conformance with the wage determination. HUD shall approve an additional classification and wage rate and fringe benefits therefor only when the following criteria have been met:

**(1)** The work to be performed by the classification requested is not performed by a classification in the wage determination; and

**(2)** The classification is utilized in the area by the construction industry; and

**(3)** The proposed wage rate, including any bona fide fringe benefits, bears a reasonable relationship to the wage rates contained in the wage determination.

**(b)** If the contractor and the laborers and mechanics to be employed in the classification (if known), or their representatives, and HUD or its designee agree on the classification and wage rate (including the amount designated for fringe benefits where appropriate), a report of the action taken shall be sent by HUD or its designee to the Administrator of the Wage and Hour Division, Employment Standards Administration, U.S. Department of Labor, Washington, D.C. 20210. The Administrator, or an authorized representative, will approve, modify, or disapprove every additional classification action within 30 days of receipt and so advise HUD or its designee or will notify HUD or its designee within the 30-day period that additional time is necessary. (Approved by the Office of Management and Budget under OMB control number 1215-0140.)

**(c)** In the event the contractor, the laborers or mechanics to be employed in the classification or their representatives, and HUD or its designee do not agree on the proposed classification and wage rate (including the amount designated for fringe benefits, where appropriate), HUD or its designee shall refer the questions, including the views of all interested parties and the recommendation of HUD or its designee, to the Administrator for determination. The Administrator, or an authorized representative, will issue a determination within 30 days of receipt and so advise HUD or its designee or will notify HUD or its designee within the 30-day period that additional time is necessary. (Approved by the Office of Management and Budget under OMB Control Number 1215-0140.)

**(d)** The wage rate (including fringe benefits where appropriate) determined pursuant to subparagraphs (1)(ii)(b) or (c) of this paragraph, shall be paid to all workers performing work in the classification under this contract from the first day on which work is performed in the classification.

**(iii)** Whenever the minimum wage rate prescribed in the contract for a class of laborers or mechanics includes a fringe benefit which is not expressed as an hourly rate, the contractor shall either pay the benefit as stated in the wage determination or shall pay another bona fide fringe benefit or an hourly cash equivalent thereof.

**(iv)** If the contractor does not make payments to a trustee or other third person, the contractor may consider as part



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of the wages of any laborer or mechanic the amount of any costs reasonably anticipated in providing bona fide fringe benefits under a plan or program, Provided, That the Secretary of Labor has found, upon the written request of the contractor, that the applicable standards of the Davis-Bacon Act have been met. The Secretary of Labor may require the contractor to set aside in a separate account assets for the meeting of obligations under the plan or program. (Approved by the Office of Management and Budget under OMB Control Number 1215-0140.)

**2. Withholding.** HUD or its designee shall upon its own action or upon written request of an authorized representative of the Department of Labor withhold or cause to be withheld from the contractor under this contract or any other Federal contract with the same prime contractor, or any other Federally-assisted contract subject to Davis-Bacon prevailing wage requirements, which is held by the same prime contractor so much of the accrued payments or advances as may be considered necessary to pay laborers and mechanics, including apprentices, trainees and helpers, employed by the contractor or any subcontractor the full amount of wages required by the contract. In the event of failure to pay any laborer or mechanic, including any apprentice, trainee or helper, employed or working on the site of the work, all or part of the wages required by the contract, HUD or its designee may, after written notice to the contractor, sponsor, applicant, or owner, take such action as may be necessary to cause the suspension of any further payment, advance, or guarantee of funds until such violations have ceased. HUD or its designee may, after written notice to the contractor, disburse such amounts withheld for and on account of the contractor or subcontractor to the respective employees to whom they are due. The Comptroller General shall make such disbursements in the case of direct Davis-Bacon Act contracts.

**3. (i) Payrolls and basic records.** Payrolls and basic records relating thereto shall be maintained by the contractor during the course of the work preserved for a period of three years thereafter for all laborers and mechanics working at the site of the work. Such records shall contain the name, address, and social security number of each such worker, his or her correct classification, hourly rates of wages paid (including rates of contributions or costs anticipated for bona fide fringe benefits or cash equivalents thereof of the types described in Section 1(b)(2)(B) of the Davis-bacon Act), daily and weekly number of hours worked, deductions made and actual wages paid. Whenever the Secretary of Labor has found under 29 CFR 5.5 (a)(1)(iv) that the wages of any laborer or mechanic include the amount of any costs reasonably anticipated in providing benefits under a plan or program described in Section 1(b)(2)(B) of the Davis-Bacon Act, the contractor shall maintain records which show that the commitment to provide such benefits is enforceable, that the plan or program is financially responsible, and that the plan or program has been

communicated in writing to the laborers or mechanics affected, and records which show the costs anticipated or the actual cost incurred in providing such benefits. Contractors employing apprentices or trainees under approved programs shall maintain written evidence of the registration of apprenticeship programs and certification of trainee programs, the registration of the apprentices and trainees, and the ratios and wage rates prescribed in the applicable programs. (Approved by the Office of Management and Budget under OMB Control Numbers 1215-0140 and 1215-0017.)

**(ii) (a)** The contractor shall submit weekly for each week in which any contract work is performed a copy of all payrolls to HUD or its designee if the agency is a party to the contract, but if the agency is not such a party, the contractor will submit the payrolls to the applicant sponsor, or owner, as the case may be, for transmission to HUD or its designee. The payrolls submitted shall set out accurately and completely all of the information required to be maintained under 29 CFR 5.5(a)(3)(i) except that full social security numbers and home addresses shall not be included on weekly transmittals. Instead the payrolls shall only need to include an individually identifying number for each employee (e.g., the last four digits of the employee's social security number). The required weekly payroll information may be submitted in any form desired. Optional Form WH-347 is available for this purpose from the Wage and Hour Division Web site at <http://www.dol.gov/esa/whd/forms/wh347instr.htm> or its successor site. The prime contractor is responsible for the submission of copies of payrolls by all subcontractors. Contractors and subcontractors shall maintain the full social security number and current address of each covered worker, and shall provide them upon request to HUD or its designee if the agency is a party to the contract, but if the agency is not such a party, the contractor will submit the payrolls to the applicant sponsor, or owner, as the case may be, for transmission to HUD or its designee, the contractor, or the Wage and Hour Division of the Department of Labor for purposes of an investigation or audit of compliance with prevailing wage requirements. It is not a violation of this subparagraph for a prime contractor to require a subcontractor to provide addresses and social security numbers to the prime contractor for its own records, without weekly submission to HUD or its designee. (Approved by the Office of Management and Budget under OMB Control Number 1215-0149.)

**(b)** Each payroll submitted shall be accompanied by a "Statement of Compliance," signed by the contractor or subcontractor or his or her agent who pays or supervises the payment of the persons employed under the contract and shall certify the following:

**(1)** That the payroll for the payroll period contains the information required to be provided under 29 CFR 5.5 (a)(3)(ii), the appropriate information is being maintained under 29 CFR 5.5(a)(3)(i), and that such information is correct and complete;

(2) That each laborer or mechanic (including each helper, apprentice, and trainee) employed on the contract during the payroll period has been paid the full weekly wages earned, without rebate, either directly or indirectly, and that no deductions have been made either directly or indirectly from the full wages earned, other than permissible deductions as set forth in 29 CFR Part 3;

(3) That each laborer or mechanic has been paid not less than the applicable wage rates and fringe benefits or cash equivalents for the classification of work performed, as specified in the applicable wage determination incorporated into the contract.

(c) The weekly submission of a properly executed certification set forth on the reverse side of Optional Form WH-347 shall satisfy the requirement for submission of the "Statement of Compliance" required by subparagraph A.3.(ii)(b).

(d) The falsification of any of the above certifications may subject the contractor or subcontractor to civil or criminal prosecution under Section 1001 of Title 18 and Section 231 of Title 31 of the United States Code.

(iii) The contractor or subcontractor shall make the records required under subparagraph A.3.(i) available for inspection, copying, or transcription by authorized representatives of HUD or its designee or the Department of Labor, and shall permit such representatives to interview employees during working hours on the job. If the contractor or subcontractor fails to submit the required records or to make them available, HUD or its designee may, after written notice to the contractor, sponsor, applicant or owner, take such action as may be necessary to cause the suspension of any further payment, advance, or guarantee of funds. Furthermore, failure to submit the required records upon request or to make such records available may be grounds for debarment action pursuant to 29 CFR 5.12.

#### 4. Apprentices and Trainees.

(i) **Apprentices.** Apprentices will be permitted to work at less than the predetermined rate for the work they performed when they are employed pursuant to and individually registered in a bona fide apprenticeship program registered with the U.S. Department of Labor, Employment and Training Administration, Office of Apprenticeship Training, Employer and Labor Services, or with a State Apprenticeship Agency recognized by the Office, or if a person is employed in his or her first 90 days of probationary employment as an apprentice in such an apprenticeship program, who is not individually registered in the program, but who has been certified by the Office of Apprenticeship Training, Employer and Labor Services or a State Apprenticeship Agency (where appropriate) to be eligible for probationary employment as an apprentice. The allowable ratio of apprentices to journeymen on the job site in any craft classification shall not be greater than the ratio permitted to the contractor as to the entire work force under the registered program. Any worker listed on a payroll at an apprentice wage rate, who

is not registered or otherwise employed as stated above, shall be paid not less than the applicable wage rate on the wage determination for the classification of work actually performed. In addition, any apprentice performing work on the job site in excess of the ratio permitted under the registered program shall be paid not less than the applicable wage rate on the wage determination for the work actually performed. Where a contractor is performing construction on a project in a locality other than that in which its program is registered, the ratios and wage rates (expressed in percentages of the journeyman's hourly rate) specified in the contractor's or subcontractor's registered program shall be observed. Every apprentice must be paid at not less than the rate specified in the registered program for the apprentice's level of progress, expressed as a percentage of the journeymen hourly rate specified in the applicable wage determination. Apprentices shall be paid fringe benefits in accordance with the provisions of the apprenticeship program. If the apprenticeship program does not specify fringe benefits, apprentices must be paid the full amount of fringe benefits listed on the wage determination for the applicable classification. If the Administrator determines that a different practice prevails for the applicable apprentice classification, fringes shall be paid in accordance with that determination. In the event the Office of Apprenticeship Training, Employer and Labor Services, or a State Apprenticeship Agency recognized by the Office, withdraws approval of an apprenticeship program, the contractor will no longer be permitted to utilize apprentices at less than the applicable predetermined rate for the work performed until an acceptable program is approved.

(ii) **Trainees.** Except as provided in 29 CFR 5.16, trainees will not be permitted to work at less than the predetermined rate for the work performed unless they are employed pursuant to and individually registered in a program which has received prior approval, evidenced by formal certification by the U.S. Department of Labor, Employment and Training Administration. The ratio of trainees to journeymen on the job site shall not be greater than permitted under the plan approved by the Employment and Training Administration. Every trainee must be paid at not less than the rate specified in the approved program for the trainee's level of progress, expressed as a percentage of the journeyman hourly rate specified in the applicable wage determination. Trainees shall be paid fringe benefits in accordance with the provisions of the trainee program. If the trainee program does not mention fringe benefits, trainees shall be paid the full amount of fringe benefits listed on the wage determination unless the Administrator of the Wage and Hour Division determines that there is an apprenticeship program associated with the corresponding journeyman wage rate on the wage determination which provides for less than full fringe benefits for apprentices. Any employee listed on the payroll at a trainee rate who is not registered and participating in a training plan approved by

the Employment and Training Administration shall be paid not less than the applicable wage rate on the wage determination for the work actually performed. In addition, any trainee performing work on the job site in excess of the ratio permitted under the registered program shall be paid not less than the applicable wage rate on the wage determination for the work actually performed. In the event the Employment and Training Administration withdraws approval of a training program, the contractor will no longer be permitted to utilize trainees at less than the applicable predetermined rate for the work performed until an acceptable program is approved.

**(iii) Equal employment opportunity.** The utilization of apprentices, trainees and journeymen under 29 CFR Part 5 shall be in conformity with the equal employment opportunity requirements of Executive Order 11246, as amended, and 29 CFR Part 30.

**5. Compliance with Copeland Act requirements.** The contractor shall comply with the requirements of 29 CFR Part 3 which are incorporated by reference in this contract

**6. Subcontracts.** The contractor or subcontractor will insert in any subcontracts the clauses contained in subparagraphs 1 through 11 in this paragraph A and such other clauses as HUD or its designee may by appropriate instructions require, and a copy of the applicable prevailing wage decision, and also a clause requiring the subcontractors to include these clauses in any lower tier subcontracts. The prime contractor shall be responsible for the compliance by any subcontractor or lower tier subcontractor with all the contract clauses in this paragraph.

**7. Contract termination; debarment.** A breach of the contract clauses in 29 CFR 5.5 may be grounds for termination of the contract and for debarment as a contractor and a subcontractor as provided in 29 CFR 5.12.

**8. Compliance with Davis-Bacon and Related Act Requirements.** All rulings and interpretations of the Davis-Bacon and Related Acts contained in 29 CFR Parts 1, 3, and 5 are herein incorporated by reference in this contract

**9. Disputes concerning labor standards.** Disputes arising out of the labor standards provisions of this contract shall not be subject to the general disputes clause of this contract. Such disputes shall be resolved in accordance with the procedures of the Department of Labor set forth in 29 CFR Parts 5, 6, and 7. Disputes within the meaning of this clause include disputes between the contractor (or any of its subcontractors) and HUD or its designee, the U.S. Department of Labor, or the employees or their representatives.

**10. (i) Certification of Eligibility.** By entering into this contract the contractor certifies that neither it (nor he or she) nor any person or firm who has an interest in the contractor's firm is a person or firm ineligible to be awarded Government contracts by virtue of Section 3(a) of the Davis-Bacon Act or 29 CFR 5.12(a)(1) or to be

awarded HUD contracts or participate in HUD programs pursuant to 24 CFR Part 24.

**(ii)** No part of this contract shall be subcontracted to any person or firm ineligible for award of a Government contract by virtue of Section 3(a) of the Davis-Bacon Act or 29 CFR 5.12(a)(1) or to be awarded HUD contracts or participate in HUD programs pursuant to 24 CFR Part 24.

**(iii)** The penalty for making false statements is prescribed in the U.S. Criminal Code, 18 U.S.C. 1001. Additionally, U.S. Criminal Code, Section 1 01 0, Title 18, U.S.C., "Federal Housing Administration transactions", provides in part: "Whoever, for the purpose of . . . influencing in any way the action of such Administration..... makes, utters or publishes any statement knowing the same to be false..... shall be fined not more than \$5,000 or imprisoned not more than two years, or both."

**11. Complaints, Proceedings, or Testimony by Employees.** No laborer or mechanic to whom the wage, salary, or other labor standards provisions of this Contract are applicable shall be discharged or in any other manner discriminated against by the Contractor or any subcontractor because such employee has filed any complaint or instituted or caused to be instituted any proceeding or has testified or is about to testify in any proceeding under or relating to the labor standards applicable under this Contract to his employer.

**B. Contract Work Hours and Safety Standards Act.** The provisions of this paragraph B are applicable where the amount of the prime contract exceeds \$100,000. As used in this paragraph, the terms "laborers" and "mechanics" include watchmen and guards.

**(1) Overtime requirements.** No contractor or subcontractor contracting for any part of the contract work which may require or involve the employment of laborers or mechanics shall require or permit any such laborer or mechanic in any workweek in which the individual is employed on such work to work in excess of 40 hours in such workweek unless such laborer or mechanic receives compensation at a rate not less than one and one-half times the basic rate of pay for all hours worked in excess of 40 hours in such workweek.

**(2) Violation; liability for unpaid wages; liquidated damages.** In the event of any violation of the clause set forth in subparagraph (1) of this paragraph, the contractor and any subcontractor responsible therefor shall be liable for the unpaid wages. In addition, such contractor and subcontractor shall be liable to the United States (in the case of work done under contract for the District of Columbia or a territory, to such District or to such territory), for liquidated damages. Such liquidated damages shall be computed with respect to each individual laborer or mechanic, including watchmen and guards, employed in violation of the clause set forth in subparagraph (1) of this paragraph, in the sum of \$10 for each calendar day on which such individual was required or permitted to work in excess of the standard workweek of 40 hours without payment of the overtime wages required by the clause set forth in subparagraph (1) of this paragraph.

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**(3) Withholding for unpaid wages and liquidated damages.** HUD or its designee shall upon its own action or upon written request of an authorized representative of the Department of Labor withhold or cause to be withheld, from any moneys payable on account of work performed by the contractor or subcontractor under any such contract or any other Federal contract with the same prime contract, or any other Federally-assisted contract subject to the Contract Work Hours and Safety Standards Act which is held by the same prime contractor such sums as may be determined to be necessary to satisfy any liabilities of such contractor or subcontractor for unpaid wages and liquidated damages as provided in the clause set forth in subparagraph (2) of this paragraph.

**(4) Subcontracts.** The contractor or subcontractor shall insert in any subcontracts the clauses set forth in subparagraph (1) through (4) of this paragraph and also a clause requiring the subcontractors to include these clauses in any lower tier subcontracts. The prime contractor shall be responsible for compliance by any subcontractor or lower tier subcontractor with the clauses set forth in subparagraphs (1) through (4) of this paragraph.

**C. Health and Safety.** The provisions of this paragraph C are applicable where the amount of the prime contract exceeds \$100,000.

**(1)** No laborer or mechanic shall be required to work in surroundings or under working conditions which are unsanitary, hazardous, or dangerous to his health and safety as determined under construction safety and health standards promulgated by the Secretary of Labor by regulation.

**(2)** The Contractor shall comply with all regulations issued by the Secretary of Labor pursuant to Title 29 Part 1926 and failure to comply may result in imposition of sanctions pursuant to the Contract Work Hours and Safety Standards Act, (Public Law 91-54, 83 Stat 96). 40 USC 3701 et seq.

**(3)** The contractor shall include the provisions of this paragraph in every subcontract so that such provisions will be binding on each subcontractor. The contractor shall take such action with respect to any subcontractor as the Secretary of Housing and Urban Development or the Secretary of Labor shall direct as a means of enforcing such provisions.

**U.S. Department of Labor**  
Wage and Hour Division

**PAYROLL**

(For Contractor's Optional Use; See Instructions at [www.dol.gov/whd/forms/wh347instr.htm](http://www.dol.gov/whd/forms/wh347instr.htm))



Persons are not required to respond to the collection of information unless it displays a currently valid OMB control number.

NAME OF CONTRACTOR	OR SUBCONTRACTOR	ADDRESS	OMB No.: 1235-0008 Expires: 01/31/2015
PAYROLL NO.	FOR WEEK ENDING	PROJECT AND LOCATION	PROJECT OR CONTRACT NO.

(1) NAME AND INDIVIDUAL IDENTIFYING NUMBER (e.g., LAST FOUR DIGITS OF SOCIAL SECURITY NUMBER) OF WORKER	(2) NO. OF WITHHOLDING EXEMPTIONS	(3) WORK CLASSIFICATION	OT. OR ST.	(4) DAY AND DATE							(5) TOTAL HOURS	(6) RATE OF PAY	(7) GROSS AMOUNT EARNED	(8) DEDUCTIONS					(9) NET WAGES PAID FOR WEEK
				HOURS WORKED EACH DAY										FICA	WITH- HOLDING TAX	OTHER	TOTAL DEDUCTIONS		
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While completion of Form WH-347 is optional, it is mandatory for covered contractors and subcontractors performing work on Federally financed or assisted construction contracts to respond to the information collection contained in 29 C.F.R. §§ 3.3, 5.5(a). The Copeland Act (40 U.S.C. § 3145) contractors and subcontractors performing work on Federally financed or assisted construction contracts to "furnish weekly a statement with respect to the wages paid each employee during the preceding week." U.S. Department of Labor (DOL) regulations at 29 C.F.R. § 5.5(a)(3)(ii) require contractors to submit weekly a copy of all payrolls to the Federal agency contracting for or financing the construction project, accompanied by a signed "Statement of Compliance" indicating that the payrolls are correct and complete and that each laborer or mechanic has been paid not less than the proper Davis-Bacon prevailing wage rate for the work performed. DOL and federal contracting agencies receiving this information review the information to determine that employees have received legally required wages and fringe benefits.

**Public Burden Statement**

We estimate that it will take an average of 55 minutes to complete this collection, including time for reviewing instructions, searching existing data sources, gathering and maintaining the data needed, and completing and reviewing the collection of information. If you have any comments regarding these estimates or any other aspect of this collection, including suggestions for reducing this burden, send them to the Administrator, Wage and Hour Division, U.S. Department of Labor, Room S3502, 200 Constitution Avenue, N.W. Washington, D.C. 20210

Date \_\_\_\_\_

I, \_\_\_\_\_ (Name of Signatory Party) \_\_\_\_\_ (Title)

do hereby state:

(1) That I pay or supervise the payment of the persons employed by

\_\_\_\_\_ on the \_\_\_\_\_ (Contractor or Subcontractor) \_\_\_\_\_; that during the payroll period commencing on the \_\_\_\_\_ (Building or Work)

\_\_\_\_\_ day of \_\_\_\_\_, \_\_\_\_\_, and ending the \_\_\_\_\_ day of \_\_\_\_\_, \_\_\_\_\_, all persons employed on said project have been paid the full weekly wages earned, that no rebates have been or will be made either directly or indirectly to or on behalf of said

\_\_\_\_\_ from the full \_\_\_\_\_ (Contractor or Subcontractor)

weekly wages earned by any person and that no deductions have been made either directly or indirectly from the full wages earned by any person, other than permissible deductions as defined in Regulations, Part 3 (29 C.F.R. Subtitle A), issued by the Secretary of Labor under the Copeland Act, as amended (48 Stat. 948, 63 Stat. 108, 72 Stat. 967; 76 Stat. 357; 40 U.S.C. § 3145), and described below:

\_\_\_\_\_  
\_\_\_\_\_  
\_\_\_\_\_

(2) That any payrolls otherwise under this contract required to be submitted for the above period are correct and complete; that the wage rates for laborers or mechanics contained therein are not less than the applicable wage rates contained in any wage determination incorporated into the contract; that the classifications set forth therein for each laborer or mechanic conform with the work he performed.

(3) That any apprentices employed in the above period are duly registered in a bona fide apprenticeship program registered with a State apprenticeship agency recognized by the Bureau of Apprenticeship and Training, United States Department of Labor, or if no such recognized agency exists in a State, are registered with the Bureau of Apprenticeship and Training, United States Department of Labor.

(4) That:

(a) WHERE FRINGE BENEFITS ARE PAID TO APPROVED PLANS, FUNDS, OR PROGRAMS

- in addition to the basic hourly wage rates paid to each laborer or mechanic listed in the above referenced payroll, payments of fringe benefits as listed in the contract have been or will be made to appropriate programs for the benefit of such employees, except as noted in section 4(c) below.

(b) WHERE FRINGE BENEFITS ARE PAID IN CASH

- Each laborer or mechanic listed in the above referenced payroll has been paid, as indicated on the payroll, an amount not less than the sum of the applicable basic hourly wage rate plus the amount of the required fringe benefits as listed in the contract, except as noted in section 4(c) below.

(c) EXCEPTIONS

EXCEPTION (CRAFT)	EXPLANATION	

REMARKS:

NAME AND TITLE	SIGNATURE
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THE WILLFUL FALSIFICATION OF ANY OF THE ABOVE STATEMENTS MAY SUBJECT THE CONTRACTOR OR SUBCONTRACTOR TO CIVIL OR CRIMINAL PROSECUTION. SEE SECTION 1001 OF TITLE 18 AND SECTION 231 OF TITLE 31 OF THE UNITED STATES CODE.

General Decision Number: MA160013 01/22/2016 MA13

Superseded General Decision Number: MA20150013

State: Massachusetts

Construction Types: Heavy (Heavy and Marine)

Counties: Barnstable, Bristol, Dukes, Essex, Middlesex, Nantucket, Norfolk, Plymouth and Suffolk Counties in Massachusetts.

HEAVY AND MARINE CONTRUCTION PROJECTS

Note: Under Executive Order (EO) 13658, an hourly minimum wage of \$10.15 for calendar year 2016 applies to all contracts subject to the Davis-Bacon Act for which the solicitation was issued on or after January 1, 2015. If this contract is covered by the EO, the contractor must pay all workers in any classification listed on this wage determination at least \$10.15 (or the applicable wage rate listed on this wage determination, if it is higher) for all hours spent performing on the contract in calendar year 2016. The EO minimum wage rate will be adjusted annually. Additional information on contractor requirements and worker protections under the EO is available at [www.dol.gov/whd/govcontracts](http://www.dol.gov/whd/govcontracts).

Modification Number	Publication Date
0	01/08/2016
1	01/22/2016

BOIL0029-001 10/01/2009

	Rates	Fringes
BOILERMAKER.....	\$ 38.25	17.04

-----  
BRMA0001-011 09/01/2015

FOXBORO CHAPTER

BRISTOL (Attleboro, Berkley, Dighton, Mansfield, North Attleboro, Norton, Raynham, Rehoboth, Seekonk, Taunton); NORFOLK, (Bellingham, Canton, Dedham, Foxboro, Franklin, Norfolk, Norwood, Plainville, Sharon, Walpole, Westwood, Wrentham); and PLYMOUTH (Lakeville)

	Rates	Fringes
Bricklayer/Cement Mason.....	\$ 47.76	28.25

-----  
BRMA0001-012 09/01/2015

LOWELL CHAPTER

MIDDLESEX (Acton, Ashby, Ayer, Bedford, Billerica, Boxboro,

Carlisle, Chemsford, Dracut, Dunstabale, Ft Devens, Groton, Littleton, Lowell, North Acton, Pepperell, Shirley, South Acton, Tewksbury, Townsend, Tyngsboro, West Acton, Westford, Wilmington)

	Rates	Fringes
BRICKLAYER.....	\$ 47.76	28.25

-----  
BRMA0001-013 09/01/2015

LOWELL CHAPTER  
MIDDLESEX (Ashland, Framingham, Holliston, Hopkinton, Hudson, Maynard, Natick, Sherbourn, Stow); and NORFOLK (Medfield, Medway, Millis)

	Rates	Fringes
BRICKLAYER.....	\$ 47.76	28.25

-----  
BRMA0003-001 08/01/2015

	Rates	Fringes
Marble & Tile Finisher.....	\$ 38.08	27.55
Marble, Tile & Terrazzo Workers.....	\$ 49.90	29.07
TERRAZZO FINISHER.....	\$ 48.80	28.90

-----  
BRMA0003-003 08/01/2015

BOSTON CHAPTER  
MIDDLESEX (Arlington, Cambridge, Everett, Malden, Medford, Melrose, Somerville); NORFOLK (Brookline, Milton); and SUFFOLK

	Rates	Fringes
BRICKLAYER.....	\$ 49.86	29.12

-----  
BRMA0003-011 08/01/2015

LYNN CHAPTER  
ESSEX (Amesbury, Andover, Beverly, Boxford, Danvers, Essex, Georgetown, Gloucester, Groveland, Hamilton, Haverhill, Ipswich, Lawrence, Lynn, Lynnfield, Manchester, Marblehead, Merrimac, Methuen, Middleton, Nahant, Newbury, Newburyport, North Andover, Peabody, Rockport, Rowley, Salisbury, Salem, Saugus, Swampscott, Topsfield, Wakefield, Wenham, West Newbury); and MIDDLESEX (North Reading, Reading, Wakefield)

	Rates	Fringes
Bricklayer/Cement Mason.....	\$ 49.86	29.12

-----  
BRMA0003-012 08/01/2015



	Rates	Fringes
BRICKLAYER		
WALTHAM CHAPTER -		
MIDDLESEX (Belmont,		
Burlington, Concord,		
Lexington, Lincoln,		
Stoneham, Sudbury,		
Waltham, Watertown,		
Wayland, Weston,		
Winchester, Woburn).....\$ 49.86		
		29.12

-----

BRMA0003-014 08/01/2015

QUINCY CHAPTER

PLYMOUTH COUNTY (Abington, Bridgewater, Brockton, Carver,  
Duxbury, East Bridgewater, Halifax, Hanover, Hanson, Hingham,  
Hull, Kingston, Marshfield, Middleboro, Norwell, Pembroke,  
Plymouth, Rockland, Scituate, West Bridgewater, Whitman)

	Rates	Fringes
Bricklayer/Cement Mason.....\$ 49.86		29.12

-----

BRMA0003-025 08/01/2015

NEW BEDFORD CHAPTER

BARNSTABLE; BRISTOL (Acushnet, Darmouth, Fairhaven, Fall River,  
Freetown, New Bedford, Somerset, Swansea, Westport); DUKES;  
NANTUCKET; PLYMOUTH (Marion, Mattapoisett, Rochester, Wareham)

	Rates	Fringes
Bricklayer/Cement Mason.....\$ 49.86		29.12

-----

BRMA0003-033 08/01/2015

NEWTON CHAPTER

MIDDLESEX (Newton); NORFOLK (Dover, Needham, Wellesley)

	Rates	Fringes
Bricklayer, Plasterer.....\$ 49.86		29.12

-----

CARP0026-003 03/01/2015

BRISTOL (Attleborough, North Attleborough); ESSEX; MIDDLESEX  
(Except Belmont, Cambridge, Everett, Malden, Medford,  
Somerville); AND NORFOLK (Bellingham, Braintree, Canton,  
Cohasset, Foxboro, Franklin, Medfield, Medway, Millis,  
Needham, Norfolk, Norwood, Plainville, Quincy, Sharon, Walpole,  
Wellesley, Westwood, Weymouth, Wrentham) COUNTIES

	Rates	Fringes
CARPENTER.....	\$ 35.75	26.88

-----  
 CARP0033-003 03/01/2015

MIDDLESEX (Belmont, Cambridge, Everett, Malden, Medford, Somerville); NORFOLK (Brookline, Dedham, Milton); AND SUFFOLK COUNTIES

	Rates	Fringes
CARPENTER.....	\$ 42.30	27.38

-----  
 CARP0056-001 08/01/2015

All of SUFFOLK COUNTY; and those areas of BARNSTABLE, BRISTOL, ESSEX, MIDDLESEX, NORFOLK, and PLYMOUTH COUNTIES situated INSIDE Boston Beltway (I-495) and North of Cape Cod Canal. ALL of DUKES and NANTUCKET COUNTIES

	Rates	Fringes
PILEDRIVERMAN.....	\$ 42.04	29.73

-----  
 CARP0056-002 08/01/2015

The areas of BARNSTABLE, BRISTOL, PLYMOUTH, and NORFOLK COUNTIES situated OUTSIDE Boston Beltway (I-495) and South of Cape Cod Canal

	Rates	Fringes
PILEDRIVERMAN.....	\$ 42.04	29.73

-----  
 CARP0056-003 08/01/2015

Those areas of ESSEX and MIDDLESEX COUNTIES situated OUTSIDE Boston Beltway (I-495)

	Rates	Fringes
PILEDRIVERMAN.....	\$ 42.04	29.73

-----  
 CARP0056-004 08/01/2015

	Rates	Fringes
DIVER TENDER.....	\$ 42.04	29.73
DIVER.....	\$ 58.86	29.73

-----  
 CARP0424-001 03/01/2015

NORFOLK (Braintree, Quincy, Cohasset, Weymouth, etc.) PLYMOUTH (Duxbury, Hanover, Hull, Hingham, Marshfield, Norwell, Pembroke Rockland, Scituate)

	Rates	Fringes
CARPENTER.....	\$ 35.75	26.88
-----		
CARP0624-002 03/01/2015		
DUKES; NANTUCKET		

	Rates	Fringes
CARPENTER.....	\$ 42.30	27.38
-----		
CARP0624-006 03/01/2015		

BARNSTABLE; BRISTOL (Except Attleboro & North Attleboro);  
 NORFOLK (Avon, Holbrook, Randolph, Stoughton); PLYMOUTH  
 (Bridgewater, Kingston, Lakeville, Middleboro, Plymouth, S.  
 Hanover, Whitman)

	Rates	Fringes
CARPENTER.....	\$ 35.75	26.88
-----		
CARP1121-001 04/01/2015		

	Rates	Fringes
MILLWRIGHT.....	\$ 36.64	27.88
-----		
ELEC0096-001 12/01/2015		

MIDDLESEX (Ashby, Ashland, Ayer, Ft. Devens, Groton, Hopkinton,  
 Hudson, Marlboro, Pepperell, Shirley, Stow, Townsend)

	Rates	Fringes
ELECTRICIAN.....	\$ 39.37	11%+18.26
Teledata System Installer.....	\$ 26.83	3%+20.46
-----		
ELEC0099-001 06/01/2015		

BRISTOL (Attleboro, North Attleboro, Seekonk)

	Rates	Fringes
ELECTRICIAN.....	\$ 35.83	59.94%
Teledata System Installer.....	\$ 26.87	13.72%+3.33
-----		
ELEC0103-002 09/01/2015		

ESSEX (Amesbury, Andover, Boxford, Georgetown, Groveland,  
 Haverhill, Lawrence, Merrimac, Methuen, Newbury, Newburyport,  
 North Andover, Rowley, Salisbury, West Newbury); MIDDLESEX  
 (Bedford, Billerica, Boxboro, Burlington, Carlisle, Chelmsford,  
 Dracut, Dunstable littleton, Lowell, North Reading, Tewksbury,  
 Tyngsboro, Westford, Wilmington)

	Rates	Fringes
ELECTRICIAN.....	\$ 45.67	29.58

-----  
 ELEC0103-004 09/01/2015

ESSEX (Beverly, Danvers, Essex, Gloucester, Hamilton, Ipswich, Manchester, Marblehead, Middleton, Peabody, Rockport, Salem, Topsfield, Wenham)

	Rates	Fringes
ELECTRICIAN.....	\$ 45.67	29.58

-----  
 ELEC0103-005 09/01/2015

ESSEX (Lynn, Lynnfield, Nahant, Saugus, Swampscott); MIDDLESEX (Acton, Arlington, Belmont, Cambridge, Concord, Everett, Framingham, Holliston, Lexington, Lincoln, Malden, Maynard, Medford, Melrose, Natick, Newton, Reading, Sherborn, Somerville, Stoneham, Sudbury, Wakefield, Waltham, Watertown, Wayland, Weston, Winchester, Woburn); NORFOLK (Bellingham, Braintree, Brookline, Canton, Cohasset, Dedham, Dover, Foxboro, Franklino, Medfield, Medway, Millis, Milton, Needham, Norfolk, Norwood, Quincy, Sharon, Walpole, Wellesley, Westwood, Weymouth, Wrentham); PLYMOUTH (Hingham and Hull); SUFFOLK

	Rates	Fringes
ELECTRICIAN.....	\$ 45.67	29.58

-----  
 ELEC0104-001 08/31/2014

	Rates	Fringes
Line Construction:		
Cableman.....	\$ 43.51	21.64+A
Equipment Operator.....	\$ 36.98	18.93+A
Groundman.....	\$ 23.93	12.26+A
Lineman.....	\$ 43.51	21.64+A

A. PAID HOLIDAYS: New Year's Day; Memorial Day; Independence Day; Labor Day; Thanksgiving Day; Christmas Day and Columbus Day, provided the employee has been employed 5 working days prior to any one of the listed holidays.

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 ELEC0223-002 09/01/2015

BARNSTABLE, BRISTOL (Except Attleboro, North Attleboro, Seekonk); DUKES; NANTUCKET; PLYMOUTH (Except Hingham and Hull Twp); NORFOLK (Avon, Halbrook, Randolph, Sloughton)

Rates	Fringes
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ELECTRICIAN.....\$ 38.31            27.75%+9.85

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 ENGI0004-009 12/01/2015

	Rates	Fringes
Power equipment operators:		
Group 1.....	\$ 43.73	25.80+A
Group 2.....	\$ 43.31	25.80+A
Group 3.....	\$ 30.13	25.80+A
Group 4.....	\$ 36.34	25.80+A
Group 5.....	\$ 22.27	25.80+A
Group 6.....	\$ 26.08	25.80+A

HOURLY PREMIUM FOR BOOM LENGTHS (Including Jib):

Over 150 ft.	+2.12
Over 185 ft.	+3.72
Over 210 ft.	+5.23
Over 250 ft.	+7.92
Over 295 ft.	+10.97
Over 350 ft.	+12.76

FOOTNOTE FOR POWER EQUIPMENT OPERATORS:

A. PAID HOLIDAYS: New Year's Day, Washington,s Birthday,  
 Labor Day, Memorial Day, Independence Day, Patriot's Day,  
 Columbus Day, Veteran's Day, Thanksgiving Day, Christmas Day

POWER EQUIPMENT OPERATORS CLASSIFICATIONS [HEAVY  
 CONSTRUCTION]

GROUP 1: Power shovel; crane; truck crane; derrick; pile  
 driver; trenching machine; mechanical hoist pavement  
 breaker; cement concrete paver; dragline; hoisting engine;  
 three drum machine; pumpcrete machine; loaders; shovel  
 dozer; front end loader; mucking machine; shaft hoist;  
 steam engine; backhoe; gradall; cable way; fork lift;  
 cherry picker; boring machine; rotary drill; post hole  
 hammer; post hole digger; asphalt plant on job site;  
 concrete batching and/or mixing plant on job site; crusher  
 plant on job site; paving concrete mixer; timber jack  
 GROUP 2: Sonic or vibratory hammer; grader; scraper; tandem  
 scraper; bulldozer; tractor; mechanic - maintenance; York  
 rake; mulching machine; paving screed machine; stationary  
 steam boiler; paving concrete finishing machine; grout  
 pump; portable steam boiler; portable steam generator;  
 roller; spreader; asphalt paver; locomotives or machines  
 used in place thereof; tamper (self propelled or  
 tractor-draw); cal tracks; ballast regulator; rail anchor  
 machine; switch tamper; tire truck  
 GROUP 3: Pumps (1-3 grouped); compressor; welding machines  
 (1-3 grouped); generator; sighting plant; heaters (power  
 driven, 1- 5); syphon-pulsometer; concrete mixer; valves  
 controlling permanent plant air steam, conveyor, wellpoint  
 system (operating)  
 GROUP 4: Assitant engineer (fireman)  
 GROUP 5: Oiler (other than truck cranes and gradalls)  
 GROUP 6: Oiler (on truck cranes and gradalls)

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 IRON0007-001 03/16/2015

AREA 1: BRISTOL (Easton); ESSEX (Beverly, Gloucester, Lynn, Lynnfield, Manchester, Marblehead, Nahant, Rockport, Salem, Saugus, Swampscott); MIDDLESEX (Arlington, Bedford, Belmont, Burlington, Cambridge, Carlisle, Concord, Dunstable, Everett, Framingham, Lexington, Lincoln, Malden, Maynard, Medford, Melrose, Natick, Newton, Reading, Sherborn, Somerville, Stoneham, Sudbury, Wakefield, Waltham, Watertown, Wayland, Weston, Winchester, Woburn); NORFOLK (Except Medway); PLYMOUTH (Abington, Bridgewater, Brocton, Duxbury, East Bridgewater, Halifax, Hanover, Hanson, Hingham, Hull, Kingston, Marshfield, Norwell, Pembroke, Plymouth, Plympton, Rockland, Scituate, West Bridgewater, Whitman); SUFFOLK

AREA 2: ESSEX (Amesbury, Andover, Boxford, Danvers, Essex, Georgetown, Hamilton, Haverhill, Ipswich, Lawrence, Merrimac, Methuen, Newbury, Newburyport, North Andover, Rowley, Salisbury, Topsfield, Wenham, West Newbury); MIDDLESEX (Action, Billerica, Chelmsford, Dracut, Groton, Groveland, Littleton, Lowell, Middleton, North Reading, Pepperell, Tewksbury, Tyngsboro, Westford, Wilmington)

	Rates	Fringes
IRONWORKER		
AREA 1.....	\$ 42.11	28.67
AREA 2.....	\$ 37.70	28.67

-----  
IRON0007-010 03/16/2015

MIDDLESEX (Ashby, Ashland, Ayer, Boxboro, Holliston, Hopkinton, Hudson, Marlboro, Shirley, Stow, Townsend); NORFOLK (Medway)

	Rates	Fringes
IRONWORKER.....	\$ 41.81	28.67

-----  
IRON0037-002 03/16/2015

BARNSTABLE; BRISTOL (Acushnet, Attleboro, Berkley, Dartmouth, Dighton, Fairhaven, Fall River, Freetown, Mansfield, New Bedford, North Attleboro, Norton, Raynham, Rehoboth, Seekonk, Somerset, Swansea, Taunton, Westport); DUKES; NANTUCKET; NORFOLK (Billingham, Franklin, Plainville, Wrentham); PLYMOUTH (Lakeville, Marion, Mattapoisett, Middleboro, Rochester, Wareham)

	Rates	Fringes
IRONWORKER.....	\$ 33.96	23.77

-----  
LABO0022-006 06/01/2015

SUFFOLK COUNTY (Boston, Chelsea, Revere, Winthrop, Deer & Nut Islands); MIDDLESEX COUNTY (Arlington, Belmont, Burlington, Cambridge, Everett, Malden, Medford, Melrose, Reading, Somerville, Stoneham, Wakefield, Winchester, Winthrop and

Woburn only); NORFOLK COUNTY (Brookline, Dedham, and Milton only)

	Rates	Fringes
Laborers:		
GROUP 1.....	\$ 35.10	21.20
GROUP 2.....	\$ 35.35	21.20
GROUP 3.....	\$ 35.85	21.20
GROUP 4.....	\$ 36.10	21.20
GROUP 5.....	\$ 20.50	21.20
GROUP 6.....	\$ 37.10	21.20

LABORERS CLASSIFICATIONS

GROUP 1: Laborers; carpenter tenders; cement finisher tenders

GROUP 2: Asphalt raker; fence and guard rail erector; laser beam operator; mason tender; pipelayer; pneumatic drill operator; pneumatic tool operator; wagon drill operator

GROUP 3: Air track operator; block paver; rammer; curb setter

GROUP 4: Blaster; powderman

GROUP 5: Flagger

GROUP 6: Asbestos Abatement; Toxic and Hazardous Waste Laborers

-----  
LABO0022-012 06/01/2015

Counties of BARNSTABLE; BRISTOL; DUKES; ESSEX; NANTUCKET; PLYMOUTH; MIDDLESEX (With the exception of Arlington, Belmont, Burlington, Cambridge, Everett, Malden, Melrose, Reading, Somerville, Stoneham, Wakefield, Winchester, Winthrop and Woburn); NORFOLK (With the exception of Brookline, Dedham, and Milton)

	Rates	Fringes
Laborers:		
GROUP 1.....	\$ 31.15	20.30
GROUP 2.....	\$ 31.40	20.30
GROUP 3.....	\$ 31.90	20.30
GROUP 4.....	\$ 32.15	20.30
GROUP 5.....	\$ 20.50	20.30
GROUP 6.....	\$ 33.15	20.30

LABORERS CLASSIFICATIONS

GROUP 1: Laborers; carpenter tenders; cement finisher tenders

GROUP 2: Asphalt raker; fence and guard rail erector; laser

beam operator; mason tender; pipelayer; pneumatic drill operator; pneumatic tool operator; wagon drilloperator

GROUP 3: Air track operator; block paver; rammer; curb setter; hydraulic & similar self powere drills

GROUP 4: Blaster; powderman

GROUP 5: Flagger

GROUP 6: Asbestos Abatement; Toxic and Hazardous Waste Laborers

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LABO0022-013 06/01/2015

	Rates	Fringes
Laborers:		
(FREE AIR OPERATION):		
SHIELD DRIVEN AND LINER		
PLATE IN FREE AIR)		
GROUP 1.....	\$ 39.40	21.80+a
GROUP 2.....	\$ 39.40	21.80+a
(OPEN AIR CASSONS,		
UNDERPINNING AND TEST		
BORING INDUSTRIES):		
TEST BORING & WELL DRILLING		
Driller.....	\$ 33.70	19.85+A
Laborer.....	\$ 32.30	19.85+A
(OPEN AIR CASSONS,		
UNDERPINNING AND TEST		
BORING INDUSTRIES):		
OPEN AIR CASSON,		
UNDERPINNING WORK & BORING		
CREW		
Bottom man.....	\$ 33.45	19.85+A
Laborers; Top man.....	\$ 32.30	19.85+A
(TUNNELS, CAISSON &		
CYLINDER WORK IN		
COMPRESSED AIR)		
GROUP 1.....	\$ 36.85	21.80+a
GROUP 2.....	\$ 47.33	21.80+a
GROUP 3.....	\$ 47.33	21.80+a
GROUP 4.....	\$ 47.33	21.80+a
GROUP 5.....	\$ 47.33	21.80+a
GROUP 6.....	\$ 49.33	21.80+a
CLEANING CONCRETE AND		
CAULKING TUNNEL (Both New		
& Existing)		
GROUP 1.....	\$ 39.40	21.80+a
GROUP 2.....	\$ 39.40	21.80+a
ROCK SHAFT, CONCRETE		
LINING OF SAME AND TUNNEL		



IN FREE AIR

GROUP 1.....	\$ 36.85	21.80+a
GROUP 2.....	\$ 39.40	21.80+a
GROUP 3.....	\$ 39.40	21.80+a
GROUP 4.....	\$ 39.40	21.80+a
GROUP 5.....	\$ 41.40	21.80+a

LABORERS CLASSIFICATIONS for TUNNELS, CAISSON & CYLINDER WORK IN COMPRESSED AIR

GROUP 1: Powder watchman; Top man on iron bolt; change house attendant

GROUP 2: Brakeman; trackman; groutman; tunnel laborer; outside lock tender; lock tender; guage tender

GROUP 3: Motorman, miner

GROUP 4: Blaster

GROUP 5: Mucking machine operator

GROUP 6: Hazardous Waste work within the "HOT" zone. (A premium of two dollars \$2.00 per hour over the basic wage rate.

LABORERS CLASSIFICATIONS for (FREE AIR OPERATION): SHIELD DRIVEN AND LINER PLATE IN FREE AIR

GROUP 1: Miner; miner welder; conveyor operator; motorman; mucking machine operator; nozzle man; grout man-; pumps, shaft and tunnel steel and rodman; shield and erector arm operators, mole nipper, outside motorman, burner, TBM operator, safety miner; laborer topside; heading motormen; erecting operators; top signal men

GROUP 2: Brakeman; trackman

LABORERS CLASSIFICATIONS FOR CLEANING CONCRETE AND CAULKING TUNNEL (Both New & Existing)

GROUP 1: Concrete workers; strippers and form movers (wood & steel), cement finisher

GROUP 2: Form erector (wood & steel and all accessories)

LABORERS CLASSIFICATIONS for ROCK SHAFT, CONCRETE LINING OF SAME AND TUNNE IN FREE AIR

GROUP 1: Change house attendants

GROUP 2: Laborers, topside, bottom men (when heading is 50 ft. from shaft) and all other laborers

GROUP 3: Brakeman; trackman; tunnel laborers; shaft laborers

GROUP 4: Miner; cage tender; bellman

GROUP 5: Hazardous Waste work within the "HOT" zone. (A premium of two dollars \$2.00 per hour over the basic wage rate)

FOOTNOTE FOR LABORERS:

A. PAID HOLIDAYS: New Year's Day, Washington's Birthday, Patriot's Day, Memorial Day, Independence Day, Labor Day, Columbus Day, Veteran's Day, Thanksgiving Day, and Christmas Day

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LABO1421-001 06/01/2015

WRECKING LABORERS:

	Rates	Fringes
Laborers: (Wrecking)		
Group 1.....	\$ 35.25	21.20
Group 2.....	\$ 36.00	21.20
Group 3.....	\$ 36.25	21.20
Group 4.....	\$ 31.25	21.20
Group 5.....	\$ 34.35	21.20
Group 6.....	\$ 35.25	21.20

Group 1: Adzeman, Wrecking Laborer.

Group 2: Burners, Jackhammers.

Group 3: Small Backhoes, Loaders on tracks, Bobcat Type Loaders, Hydraulic "Brock" Type Hammer Operators, Concrete Cutting Saws.

Group 4: Yardman (Salvage Yard Only).

Group 5: Yardman, Burners, Sawyers.

Group 6: Asbestos, Lead Paint, Toxic and Hazardous Waste.

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PAIN0035-001 01/01/2015

BARNSTABLE BRISTOL; DUKES; ESSEX; NANTUCKET; PLYMOUTH  
(Remainder of NORFOLK; MIDDLESEX AND SUFFOLK COUNTIES)

	Rates	Fringes
Painters:		
NEW CONSTRUCTION:		
Bridge.....	\$ 46.76	25.95
Brush, Taper.....	\$ 36.26	25.95
Spray, Sandblast.....	\$ 37.66	25.95
REPAINT:		
Bridge.....	\$ 46.76	25.95
Brush, Taper.....	\$ 34.32	25.95
Spray, Sandblast.....	\$ 35.72	25.95

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PAIN0035-015 01/01/2015

MIDDLESEX (Cambridge, Everett, Malden, Medford, Somerville)  
 SUFFOLK COUNTY (Boston, Chelsea) NORFOLK COUNTY (Brookline)

	Rates	Fringes
Painters:		
NEW CONSTRUCTION:		
Brush, Taper.....	\$ 42.05	25.95
Spray, Sandblast.....	\$ 43.45	25.95
REPAINT:		
Bridge.....	\$ 46.76	25.95
Brush, Taper.....	\$ 40.11	25.95
Spray, Sandblast.....	\$ 41.51	25.95

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 \* PLAS0534-001 01/01/2016

ESSEX; MIDDLESEX; NORFOLK AND SUFFOLK COUNTY

	Rates	Fringes
CEMENT MASON/CONCRETE FINISHER...	\$ 38.65	33.11

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 PLUM0004-001 09/01/2014

MIDDLESEX (Ashby, Ayer-West of Greenville branch of Boston and  
 Maine Railroad, Ft. Devens, Groton, Shirley, Townsend)

	Rates	Fringes
Plumbers and Pipefitters.....	\$ 41.11	24.71

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 PLUM0012-001 09/01/2013

ESSEX (Ames, Andover, Beverly, Boxford, Byfield, Danvers,  
 Essex, Georgetown, Gloucester, Groveland, Hamilton, Haverhill,  
 Ipswich, Lawrence, Manchester, Marblehead, Merrimac, Methuen,  
 Middleton, Newbury, Newburyport, North Andover, Peabody,  
 Rockport, Rowley, Salem, Salisbury, Topsfield, Wenham, West  
 Newbury)

	Rates	Fringes
PLUMBER.....	\$ 44.98	24.56

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 PLUM0012-003 09/01/2013

ESSEX (Ames, Andover, Beverly, Boxford, Byfield, Danvers,  
 Essex, Georgetown, Gloucester, Groveland, Hamilton, Haverhill,  
 Ipswich, Lawrence, Manchester, Marblehead, Merrimac, Methuen,  
 Middleton, Newbury, Newburyport, North Andover, Peabody,  
 Rockport, Rowley, Salem, Salisbury, Topsfield, Wenham, West  
 Newbury)

	Rates	Fringes
Plumber, Pipefitter,		

Steamfitter.....\$ 44.98 24.56

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 PLUM0012-006 09/01/2013

ESSEX (Lynn, Lynnfield, Nahant, Saugus, and Swampscott);  
 MIDDLESEX (Acton, Arlington, Ashland, Ayer - except W. of  
 Greenville Branch of Boston & Maine RR, Bedford, Belmont,  
 Billerica, Boxboro, Burlington, Cambridge, Carlisle,  
 Chelmsford, Concord, Dracut, Dunstable, Everett, Framingham,  
 Hudson, Holliston, Hopkinton, Lexington, Lincoln, Littleton,  
 Lowell, Malden, Marlboro, Maynard, Medford, Melrose, Natick,  
 Newton, North Reading, Pepperell, Reading, Sherborn,  
 Somerville, Stoneham, Stow, Sudbury, Tewksbury, Tyngsboro,  
 Wakefield, Waltham, Watertown, Wayland, Westford, Wilmington,  
 Winchester, Woburn); NORFOLK (Bellingham, Braintree,  
 Brookline, Canton, Cohasset, Dedham, Dover, Foxboro, Franklin,  
 Medfield, Medway, Millis, Milton, Needham, Norfolk, Norwood,  
 Plainville, Quincy, Sharon, Walpole, Wellesley, Westwood,  
 Weymouth, Wrentham); PLYMOUTH (Hingham, Hull, Scituate);  
 SUFFOLK

Rates Fringes

PLUMBER.....\$ 49.06 24.56

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 PLUM0051-005 03/01/2014

BARNSTABLE; BRISTOL; DUKES; NANTUCKET; NORFOLK (Avon, Holbrook,  
 Randolph, Stoughton) PLYMOUTH (Remainder of County)

Rates Fringes

Plumbers and Pipefitters.....\$ 35.51 27.32

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 PLUM0537-001 09/01/2015

MIDDLESEX (Arlington, Cambridge, Everett, Malden, Medford,  
 Melrose, Reading, Wakefield, Winchester and Woburn); NORFOLK  
 (Bellingham, Braintree, Brookline, Canton, Cashasset, Dedham,  
 Foxboro, Franklin, Millis, Milton, Sharon, Walpole, Westwood,  
 and Wrentham); PLYMOUTH (Hingham, Hull, Scituate); ESSEX (Ames,  
 Andover, Beverly, Boxford, Byfield, Danvers, Essex, Georgetown,  
 Gloucester, Groveland, Hamilton, Haverhill, Ipswich,  
 Lawrence, Lynn, Lynnfield, Manchester, Marblehead, Merrimac,  
 Methuen, Middleton, Nahant, Newbury, Newburyport, North  
 Andover, Peabody, Rockport, Rowley, Salem, Salisbury, Saugus,  
 Swampscott, Topsfield, Wenham, West Newbury)

Rates Fringes

PIPEFITTER.....\$ 50.69 27.76

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 TEAM0379-001 08/01/2015

Rates Fringes

Truck drivers:

Group 1.....	\$ 31.48	20.65+A+B
Group 2.....	\$ 31.65	20.65+A+B
Group 3.....	\$ 31.72	20.65+A+B
Group 4.....	\$ 31.84	20.65+A+B
Group 5.....	\$ 31.94	20.65+A+B
Group 6.....	\$ 32.23	20.65+A+B
Group 7.....	\$ 32.52	20.65+A+B

POWER TRUCKS \$.25 DIFFERENTIAL BY AXLE  
TUNNEL WORK (UNDERGROUND ONLY) \$.40 DIFFERENTIAL BY AXLE  
HAZARDOUS MATERIALS (IN HOT ZONE ONLY) \$2.00 PREMIUM

TRUCK DRIVERS CLASSIFICATIONS

- Group 1: Station wagons; panel trucks; and pickup trucks
- Group 2: Two axle equipment; & forklift operator
- Group 3: Three axle equipment and tireman
- Group 4: Four and Five Axle equipment
- Group 5: Specialized earth moving equipment under 35 tons other than conventional type trucks; low bed; vachual; mechanics, paving restoration equipment
- Group 6: Specialized earth moving equipment over 35 tons
- Group 7: Trailers for earth moving equipment (double hookup)

FOOTNOTES:

- A. PAID HOLIDAYS: New Year's Day, Washington's Birthday, Memorial Day, Independence Day, Labor Day, Patriot's Day, Columbus Day, Veteran's Day, Thanksgiving Day and Christmas Day
- B. PAID VACATION: Employees with 4 months to 1 year of service receive 1/2 day's pay per month; 1 week vacation for 1 - 5 years of service; 2 weeks vacation for 5 - 10 years of service; and 3 weeks vacation for more than 10 years of service

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WELDERS - Receive rate prescribed for craft performing operation to which welding is incidental.  
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Unlisted classifications needed for work not included within the scope of the classifications listed may be added after award only as provided in the labor standards contract clauses (29CFR 5.5 (a) (1) (ii)).  
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The body of each wage determination lists the classification and wage rates that have been found to be prevailing for the cited type(s) of construction in the area covered by the wage determination. The classifications are listed in alphabetical order of "identifiers" that indicate whether the particular rate is a union rate (current union negotiated rate for local), a survey rate (weighted average rate) or a union average rate (weighted union average rate).

#### Union Rate Identifiers

A four letter classification abbreviation identifier enclosed in dotted lines beginning with characters other than "SU" or "UAVG" denotes that the union classification and rate were prevailing for that classification in the survey. Example: PLUM0198-005 07/01/2014. PLUM is an abbreviation identifier of the union which prevailed in the survey for this classification, which in this example would be Plumbers. 0198 indicates the local union number or district council number where applicable, i.e., Plumbers Local 0198. The next number, 005 in the example, is an internal number used in processing the wage determination. 07/01/2014 is the effective date of the most current negotiated rate, which in this example is July 1, 2014.

Union prevailing wage rates are updated to reflect all rate changes in the collective bargaining agreement (CBA) governing this classification and rate.

#### Survey Rate Identifiers

Classifications listed under the "SU" identifier indicate that no one rate prevailed for this classification in the survey and the published rate is derived by computing a weighted average rate based on all the rates reported in the survey for that classification. As this weighted average rate includes all rates reported in the survey, it may include both union and non-union rates. Example: SULA2012-007 5/13/2014. SU indicates the rates are survey rates based on a weighted average calculation of rates and are not majority rates. LA indicates the State of Louisiana. 2012 is the year of survey on which these classifications and rates are based. The next number, 007 in the example, is an internal number used in producing the wage determination. 5/13/2014 indicates the survey completion date for the classifications and rates under that identifier.

Survey wage rates are not updated and remain in effect until a new survey is conducted.

#### Union Average Rate Identifiers

Classification(s) listed under the UAVG identifier indicate that no single majority rate prevailed for those classifications; however, 100% of the data reported for the classifications was union data. EXAMPLE: UAVG-OH-0010 08/29/2014. UAVG indicates that the rate is a weighted union average rate. OH indicates the state. The next number, 0010 in the example, is an internal number used in producing the wage

determination. 08/29/2014 indicates the survey completion date for the classifications and rates under that identifier.

A UAVG rate will be updated once a year, usually in January of each year, to reflect a weighted average of the current negotiated/CBA rate of the union locals from which the rate is based.

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WAGE DETERMINATION APPEALS PROCESS

1.) Has there been an initial decision in the matter? This can be:

- \* an existing published wage determination
- \* a survey underlying a wage determination
- \* a Wage and Hour Division letter setting forth a position on a wage determination matter
- \* a conformance (additional classification and rate) ruling

On survey related matters, initial contact, including requests for summaries of surveys, should be with the Wage and Hour Regional Office for the area in which the survey was conducted because those Regional Offices have responsibility for the Davis-Bacon survey program. If the response from this initial contact is not satisfactory, then the process described in 2.) and 3.) should be followed.

With regard to any other matter not yet ripe for the formal process described here, initial contact should be with the Branch of Construction Wage Determinations. Write to:

Branch of Construction Wage Determinations  
Wage and Hour Division  
U.S. Department of Labor  
200 Constitution Avenue, N.W.  
Washington, DC 20210

2.) If the answer to the question in 1.) is yes, then an interested party (those affected by the action) can request review and reconsideration from the Wage and Hour Administrator (See 29 CFR Part 1.8 and 29 CFR Part 7). Write to:

Wage and Hour Administrator  
U.S. Department of Labor  
200 Constitution Avenue, N.W.  
Washington, DC 20210

The request should be accompanied by a full statement of the interested party's position and by any information (wage payment data, project description, area practice material, etc.) that the requestor considers relevant to the issue.

3.) If the decision of the Administrator is not favorable, an interested party may appeal directly to the Administrative Review Board (formerly the Wage Appeals Board). Write to:

Administrative Review Board  
U.S. Department of Labor  
200 Constitution Avenue, N.W.  
Washington, DC 20210

4.) All decisions by the Administrative Review Board are final.

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END OF GENERAL DECISION



# **DIVISION 1**

# Improvements To Gilmore Playground

90 Hall Street  
Waltham, Massachusetts 02453

## Technical Specifications

CITY OF WALTHAM  
RECREATION DEPARTMENT

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

March 21, 2016

## SECTION 01010

### SUMMARY OF WORK

#### PART 1- GENERAL

##### 1.01 PROJECT DESCRIPTION

- A. The project consists of improvements to the existing Peter Gilmore Playground, 90 High Street, Waltham, MA 02453 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 and Bicycle Racks
    - c. Fabric shade structures
  3. Big Belly Kiosks: The Contractor shall be responsible for constructing concrete pads for three (3) Big Belly Kiosks as detailed on the Drawings. The Contractor shall be responsible for salvage and re-installation of two (2) Big Belly Kiosks presently installed on-site. The installation of the third Big-Belly Kiosk , including delivery to the site, will be by Others, namely Big Belly, Newton, MA. The Contractor shall be responsible for any coordination necessary to the installation by Others.
  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, granite curbing, concrete sidewalk paving, bituminous concrete paving, precast unit pavers on bituminous setting bed and concrete base, recycled interlocking pavers, safety surfacing, color-coating, cast-in-place concrete walls, chain link and welded wire fencing, granite and wood railing, metal shade shelters, basketball/futsal goals, exercise equipment, bronze plaques, site lighting, electrical service and irrigation systems, sodding, planting and preservation of existing trees to remain.
  4. Fountain with associated support systems is Add Alternate #1.

##### 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.

#### 1.03 CONTRACT TIME

- A. The time for Substantial Completion of the work is as stated in the bidding documents.
- 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.

#### 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. The Contractor shall furnish his/her own toilet facilities on-site.
- B. 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.
- C. 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. The 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 Sixty Thousand dollars (\$60,000) 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 ALLOWANCE FOR BIG BELLY LEASE PURCHASE

- A. The Contractor shall include as a line item in his/her bid, an allowance in the amount of Ten Thousand Dollars (\$10,000) for payment of a 5 year service agreement to be made between the City of Waltham and Big Belly, for subscription for 1 Big Belly Kiosk (Big Belly, 150A Street, Suite 103, Newton, MA; Contact Joe Nardello 617-340-6357).
- B. The City of Waltham will work directly with Big Belly in reviewing and signing the service agreement. Payment to Big Belly by the Contractor for the cost of the service agreement is to proceed only upon direction by the City, which will be given after the City has signed the agreement with Big Belly.
- C. The allowance and reimbursement for the cost of the service agreement does not include any provisions for Contractor time, overhead and profit or other expense related to the payment for the agreement, other than the direct cost of the service agreement charged by Big Belly.
- D. If the amount of the service agreement is more or less than the Allowance, the Contract sum shall be adjusted accordingly by Change Order.

##### 1.03 ALLOWANCE FOR ELECTRICAL WORK

- A. The Contractor shall include as a line item in his/her bid, an allowance in the amount of

Twenty Thousand dollars (\$20,000) to pay for utility company fees, as described in Section 16100 Electrical Service Improvements. The allowance does not include any provisions for Contractor overhead and profit or other expenses related to this item. This sum is to be included in the total bid price proposed by the Contractor.

- B. Whatever costs are more or less than Allowances, the Contract Sum shall be adjusted by Change Order based on the difference between actual costs and the Allowances

#### 1.04 ALLOWANCE FOR UNFORSEEN CONDITIONS

- 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 One Hundred Thousand dollars (\$100,000). 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



## SECTION 01025

### MEASUREMENT AND PAYMENT

#### PART 1- GENERAL

##### 1.01 BASE BID & ALTERNATES

###### A. Measurement & Payment

1. Payment for construction of Improvements to Gilmore 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

01025-1  
Measurement & Payment

## 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.

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 Contract Sum, or a change in the Contract 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 01030

### ALTERNATES

#### 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 work of this section.

##### 1.02 ALTERNATE BIDS

- A. General Bidders shall insert in the space provided on the bid forms the amounts to be added to their respective Base Bids for the following Alternates. Each proposal amount shall include the entire cost of the alternate portion of the work including overhead, profit, and other costs to furnish and install the alternate complete-in-place, including the cost of interfacing and coordinating the alternate with related and adjacent work. All work shall be done in conformance with the relevant plans, specifications, and details. The following Alternates are ADD ALTERNATES, which if accepted by the Owner, shall directly increase the Contractor's base bid contract price and lump sum bid.

#### **ADD ALTERNATE NO. 1:**

Furnish and install Cast-iron Fountain and Granite basin, as shown on the Drawings as Alternate #1 and described in the Specifications. Alternate #1 includes all work necessary to provide the fountain and basin complete in place with associated utilities including but not necessarily limited to: cast-iron fountain, granite surround and pedestal, associated footings, water line connection, pump station, sewer connection and water-proofing. This work is shown on but is not necessarily limited to Sheets F-1 through F-7, L-4A Utility Connections, and L-28 thru L-29, Fountain Basin Details. Delete from Add Alternate #1 the cost of 202 square feet of precast concrete paving which is contained in the base bid in lieu of the fountain.

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.

##### 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 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.

#### 1.05 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.

#### 1.06 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.

#### 1.07 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.

#### 1.08 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.

#### 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.
- C. All major site features, including steps, walls, play areas and walkways shall be laid out by a Surveyor registered in the State of Massachusetts.

#### 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



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.

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

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

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.

- 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.

#### 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 four (4) 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 four 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.

END OF SECTION



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. Warranties.
  - 5. 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.
  - 6. Final Completion.

1.03 FINAL CLEANING

- A. Immediately prior to Substantial Completion of the work, the Contractor shall perform all cleanup work as follows:
  - 1. Remove all waste materials and rubbish from the site and legally dispose of it.
  - 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.

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 RECORD DRAWINGS (Electronic and Hard-copy)

- A. General: The Contractor is responsible for As-Built record drawings and for providing a final As-Built drawings in electronic format at the project close-out. 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. The Landscape Architect will provide the Contractor with an Autocad file of the site plan. The Contractor shall edit the file to provide the City of Waltham with an electronic as-built drawing file at the close-out of the project.
  3. 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.
  4. 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

- 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. Notify the Landscape Architect one week prior to removing trees scheduled to be demolished to schedule a site visit by the City of Waltham Tree Warden to inspect trees prior to removal.

##### 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 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
  - 5. Provision of a 6' height temporary chain link fence enclosing the site during construction.

##### 1.03 RELATED WORK

- A. Section 01050 - Field Engineering: Layout of site improvements.
- B. Section 01500 - Temporary Facilities and Controls.
- C. Section 02150 – Existing Trees to Remain
- D. 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.

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. The Contractor shall provide a source of water for dust control either a water truck on-site or permitted connection to City fire hydrant throughout the period of construction.
- B. 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 exposed earth during demolition to prevent the spread of dust. Avoid flooding or contaminated run-off.
  - 1. Continue dust control operation as necessary and as directed by the Landscape Architect throughout the construction period until all disturbed areas have been permanently stabilized.
- 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. The Contractor shall provide barricades for substantial construction in accordance with safety regulations of authorities having jurisdiction and 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.

### 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.
- 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. Dispose of existing grass and topsoil and dispose of 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

Site Preparation  
02100-6

## SECTION 02150

### EXISTING TREES TO REMAIN

#### 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. This Section specifies requirements for maintaining existing trees, before, during and after construction.
  - 1. The Contractor's attention is directed to the protection of all existing trees within the project area, and in particular the protection of the large 36" caliper Sugar Maple at the corner of Chestnut and Lowell Streets, 3 Columnar Maples at the edge of the proposed playground, and any trees where grading within the dripline is required to install improvements.
  - 2. The section contains requirements for pruning and aeration of existing trees, at the completion of construction. Do not prune or aerate trees prior to construction.
  - 3. No construction activity shall occur on-site before tree protective fencing has been installed.
  - 4. No pruning or removal of tree limbs shall be allowed to provide clearance for construction work unless approved by the City of Waltham Tree Warden.

##### 1.02 REFERENCE STANDARDS

- A. National Arborist Association Pruning Standards for Shades Trees (1988 Revision)

##### 1.03 QUALITY ASSURANCE

- A. Work under this Section is subject to inspection by the City of Waltham Tree Warden and shall be done to his satisfaction.
- B. Pruning and aeration of trees shall be done by or under the direct supervision of a Massachusetts Registered Arborist.
- C. Notify the Landscape Architect at least one week before trees are scheduled for pruning.

#### PART 2 – PRODUCTS

## 2.01 TREE PROTECTION FENCE

- A. Trees shall be protected by temporary moveable 6' height chain link fence, dimensioned as shown on the Drawings.
- B. Cover area within tree enclosure with 3" depth of mulch.
- C. Tree protection fence is minimal area required to protect trunk and branches and does not define the full extent of tree canopy. No materials shall be stockpiled or vehicles parked or driven within the tree canopy, unless it is necessary to install site improvements in that area. This area is delineated on the Drawings.

## 2.02 ACTIVITIES WHICH ARE PROHIBITED WITHIN THE TREE CANOPY (DRIP-LINE)

- A. Parking or driving of equipment, machinery, and stockpiling of materials.
- B. Dumping of any liquid waste such as paint thinner from cleaning brushes, wash-out materials from cleaning equipment, or debris of any kind.

## PART 3 – EXECUTION

### 3.01 GRADING OPERATIONS 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 in these areas.
  - 2. Deep water tree to a depth of 12" one week prior to grading operations, and immediately after grading operations are complete.
- B. When excavating or trenching with the drip-line, hand dig in a manner which will cause minimum damage to roots systems.
- C. Cut roots cleanly and to a depth 3" below finished grade. Do not cut tree roots over 2 inches in diameter unless approved by the Landscape Architect or Tree Warden.
- D. Prune injured roots clean and backfill as soon as possible.

### 3.02 WATERING OF EXISTING TREES TO REMAIN DISTURBED BY CONSTRUCTION

- A. All existing trees whose canopy has been disturbed by construction, by grading and/or installation of paving or walls, shall be watered throughout the construction period.
  - 1. The Contractor shall maintain at the site at all times a watering truck or

permitted connection to a fire hydrant for the purpose of tree watering through the months of June through September and additional periods as determined by the Landscape Architect.

2. Watering of trees disturbed by construction shall consist of deep watering (12"-24" depth) monthly, and additionally as directed by the Landscape Architect or Tree Warden.

### 3.03 PRUNING EXISTING TREES TO REMAIN

- A. All existing trees shall be pruned after substantial completion of construction.
- B. Pruning shall be done by or under the direct supervision of a registered Arborist.
- C. Removal of limbs which are 6" in diameter or greater is prohibited without consent of the City Tree Warden.
- D. Pruning shall be done to the satisfaction of the City of Waltham Tree Warden and shall consist of the following for each tree:
  1. Corrective Pruning/Crown Cleaning/Fine Pruning
    - a. Removal of dead, dying, diseased, decaying, interfering, objectionable, obstructing and weak branches. An occasional undesirable branch up to one-half inch in diameter may remain within the main leaf area to its full length when it is not practicable to remove it.
  2. Crown Raising: Remove limbs of any tree within 5' of sidewalks or walks to a height of 80" above finished grade.

### 3.04 AERATION OF EXISTING TREES TO REMAIN

- A. Air-spade and backfill with compost, any areas within the drip-line of existing trees which have become compacted due to construction activities.

END OF SECTION

Existing Trees to Remain  
02150-3



## 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 courses for paving
  - 2. Miscellaneous fill for footings and slabs.
  - 3. Excavation for infiltration chambers.
  - 4. Site grading. For grading within the dripline of existing trees to remain, refer to Section 02150 – Existing Trees to Remain.

##### 1.03 RELATED WORK

- A. Section 02100 - Site Preparation & Demolition
- B. Section 02150 – Existing Trees to Remain
- C. Section 02510 - Bituminous Concrete Paving
- D. Section 02515 – Unit Pavers
- E. Section 02540 - Safety Surfacing
- F. Section 02800 - Site Furnishings
- G. Section 02950 - Planting

##### 1.04 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

### EARTHWORK 02200-1

- 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.
  - 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:
  - 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 adult exercise area, and crushed stone base for safety surfacing at play area and adult exercise 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 and 4 separate locations within adult exercise 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

EARTHWORK  
02200-4

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:

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 WITHIN THE DRIPLINE OF EXISTING TREES TO REMAIN

- A. Refer to Section 02150 Existing Trees to Remain for notification and procedural requirements.

### 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. 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.
- B. 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.
- C. Grade areas to drain away from structures and to prevent ponding. Finish surfaces free from irregular surface changes, and as follows:
  - 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.
- D. Compaction: After grading, compact subgrade surfaces to the depth and indicated percentage of maximum or relative density for each area classification.
- E. 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.
- F. 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

## 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. The work under this section consists of furnishing all material, labor, tools, equipment, and supervision necessary to install granite curb, curb corners, transition curb and curb inlets.
- B. The Contractor shall be responsible for removing and resetting existing granite curbing and furnishing and installing new granite curbing.

##### 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

GRANITE CURB  
02500-1

- 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 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. New 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. Existing on-site granite curb which has been removed may be re-used unless ends are broken, or curb is less than two feet in length.
- C. Mortar M4.02.15
- D. 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 Salvage of Existing Curbing

- A. The Contractor shall carefully remove, store, and clean all curbing specified for resetting. The Contractor shall replace all existing curbing that is to be reset which is lost, damaged, or destroyed during the removal operation, at no expense to the Owner.

3.02 Excavation of Trench

- A. The trench for the curb shall be excavated as detailed on the Drawings.

3.03 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.

3.04 Setting Curb

GRANITE CURB  
02500-2

- 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

GRANITE CURB  
02500-3

## 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

### BITUMINOUS CONCRETE PAVING

02510-1



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. Bituminous concrete base course shall conform to MHD Standard Specifications, Section M3, Table A Job Mix Formula for "Base Course".
  - 2. Binder course shall conform to MHD Standard Specifications, Section M3, Table A Job Mix Formula for "Binder Course."
  - 3. Wearing course for bituminous concrete walkways and athletic court 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 proceeding 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 02515

PRECAST CONCRETE PAVERS

PART 1 - GENERAL

1.01 WORK INCLUDED

- 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. Provide all equipment and materials and do all work necessary to furnish and install the precast concrete pavers, as indicated on the Drawings and as specified.

1.02 RELATED WORK

- 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 limbed to:
  - 1. Section 02200 - Earthwork
  - 2. Section 02510 - Bituminous Concrete Paving
  - 3. Section 03300 - Cast-in-place Concrete.

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.
  - 1. American Association of State Highway and Transportation Officials (AASHTO):

Specifications	Standard Specifications for Highway Bridges
M 81	Cut-back Asphalt (Rapid-Curing Type)
  - 2. American Society for Testing and Materials (ASTM):

C 67	Sampling and Testing Concrete unit and Structural Clay Tile
C 144	Aggregate for Masonry Mortar
C 902	Pedestrian and Light Traffic Paving Concrete unit
D36	Softening Point of Bitumen (Ring-and-Ball Apparatus)
D 113	Ductility of Bituminous Materials

D 3381 Viscosity-Graded Asphalt Cement for Use in Pavement Construction

1.04 SUBMITTALS

- A. Samples:
  - 1. Concrete Unit Pavers: Furnish five individual Concrete Unit Pavers of each type as samples, showing extreme variations in color and texture.
  - 2. Preformed Joint Filler: Submit sample showing color and texture.
  
- B. Manufacturers Product Data: Manufacturers product data shall be submitted for the following items:
  - 1. Precast Concrete paver.
  - 2. Neoprene-modified asphalt adhesive.
  - 3. Expansion joint filler.
  
- C. Test Report: Submit reports from tests conforming to ASTM C 67 methods indicating:
  - 1. Compressive strength, psi.
  - 2. Absorption, 5 hr. submersion in cold water.
  - 3. Absorption, 24 hr. submersion in cold water.
  - 4. Maximum saturation coefficient.
  - 5. Initial rate of absorption (suction).
  - 6. Abrasion index.
  - 7. Freeze-thaw.
  - 8. Efflorescence.
  
- D. Qualification data for firms and persons specified in "Quality Assurance" Article to demonstrate their capabilities and experience. Include list of completed projects with project names, addresses, names of Architects and Owners, plus other information specified.

#### 1.05 QUALITY ASSURANCE

- A. Installer Qualifications: Engage an experienced Installer who has successfully completed precast concrete paver installations similar in material, design, and extent to that indicated for this Project.
  
- B. Single-Source Responsibility: Obtain each color, type, and variety of precast concrete paver, joint material, and setting material from a single source with resources to provide products and materials of consistent quality in appearance and physical properties without delaying progress of the Work.

#### 1.06 SAMPLE PANEL

- A. Construct a sample panel of precast concrete paving on each specified base and setting bed before start of any precast concrete paving. Sample panel shall include one fully constructed expansion joint to full depth and width of sample panel. Expansion joint shall be fully constructed including joint filler, backer rod, and joint sealant.
  - 1. One-half of Sample panel shall illustrate pavers when laid with bevel up, and pavers laid with bevel down, for selection by the Owner.

2. Sample panel shall exhibit proposed precast concrete unit paver size, color range, texture, bond, jointing, paving pattern, and workmanship.
  3. Expansion joint shall exhibit proposed joint filler size and width, backer rod, and color and texture of approved joint sealant.
  4. Joints between concrete units shall be sand swept as specified.
  5. Size of panel for shall be 7 feet long x 6 feet-4 inches wide, minimum.
- B. Sample panel shall be Inspected by the Architect. If the sample is not acceptable, construct additional panels at no cost to the Owner until an acceptable panel is constructed. Accepted panel shall become the standard for the entire job, and shall remain undisturbed until completion of all work.
1. When directed, demolish and remove sample panel from the Project site.

#### 1.07 DELIVERY, STORAGE, AND HANDLING

- A. Concrete unit pavers shall be carefully packed by the supplier for shipment.
- B. Concrete unit pavers shall be stored off the ground and protected against staining and other damage.
- C. Pavers damaged in any manner will be rejected and replaced with new materials at no additional cost to the Owner.

#### 1.08 PROJECT CONDITIONS

- A. Cold-Weather Protection: Do not use frozen materials or materials mixed or coated with ice or frost. Do not build on frozen subgrade or setting beds. Remove and replace concrete unit paver work damaged by frost or freezing.
- B. Weather Limitations for Bituminous Setting Bed: Comply with the following requirements:
  1. Apply asphalt primer coat when ambient temperature is above 50 deg F (10 deg C) and when temperature has not been below 35 deg F (1 deg C) for 12 hours immediately prior to application. Do not apply when base is wet or contains an excess of moisture.
  2. Install bituminous setting bed only when atmospheric temperature is above 40 deg F (4 deg C) and when base is dry.
- C. Weather Limitations: Protect unit paver work against freezing when atmospheric temperature is 40 deg F (4 deg C) and falling. Heat materials and provide temporary protection of completed portions of unit paver work. Comply with International Masonry All-Weather Council's "Guide Specification for Cold-Weather Masonry Construction," Section 04200, Article 3.



- D. Hot-Weather Requirements: Protect unit paver work when temperature and humidity conditions produce excessive evaporation of setting beds and grout. Provide artificial shade and wind breaks and use cooled materials as required. Do not apply mortar to substrates with temperatures of 100 deg F (38 deg C) and above.

#### 1.09 PROTECTION OF FINISHED SURFACES

- A. Finished surfaces adjacent to the concrete unit paving work shall be adequately protected from soiling, staining, and other damage during construction.

### PART 2 - PRODUCTS

#### 2.01 PRECAST CONCRETE UNIT PAVERS

- A. Precast Concrete Unit Paver "Colonial Pavers" manufactured by Ideal Block Company, Inc. 232 Lexington Street, Waltham, MA p 781-894-3200 or equal conforming to the following:
  - 1. Pavers shall be solid, interlocking paving units, made from normal-weight aggregates in sizes and shapes indicated. Pavers shall conform to ASTM C936 summarized as follows:
    - a. Average compressive strength shall be 8,000 psi with no individual unit under 7,200 psi.
    - b. Average water absorption (ASTM C 140) shall be 5% with no unit greater than 7%.
  - 2. Pavers shall be dimensioned 4" x 8" x 2-3/8" thick.
- B. Color of pavers shall be chosen by the Owner from manufacturer's standard color choices for Colonial Pavers, or equal.

#### 2.02 BITUMINOUS SETTING BED

- A. Asphalt cement to be used in the bituminous setting bed shall conform to ASTM D 3381. Viscosity grade shall be AC - 10 or AC- 20.
- B. Fine aggregate to be used in the bituminous setting bed shall be clean, hard sand with durable particles and free from adherent coating, lumps of clay, alkali salts, and organic matter. Aggregate shall be uniformly graded from "coarse" to "fine" with 100% by weight passing the No. 4 sieve and shall meet the gradation requirements when tested in accordance with ASTM C 136.
- C. Fine aggregate shall be dried and shall be combined with hot asphalt cement, and the mix shall be heated to approximately 300°F at an asphalt plant. The approximate proportion of materials shall be 7% cement asphalt and 93% fine aggregate. Each ton of material shall be apportioned by weight in the approximate ratio of 145 lb. asphalt to 1,855 lb. sand. The Contractor shall determine the exact proportions to produce the

best possible mixture for construction of the bituminous setting bed to meet specified requirements.

### 2.03 NEOPRENE-MODIFIED ASPHALT ADHESIVE

A. Neoprene modified asphalt adhesive shall meet the following requirements:

1. Mastic (asphalt adhesive):

- a. Solids (base) content by volume =  $75\pm 1\%$ .
- b. Weight = 8 to 8.5 lb/gal.
- c. Solvent vehicle = Varsol (over 100°F. flash).

2. Base (2% neoprene, 10% fibers, 88% asphalt):

- a. Melting point (ASTM D 36) = 200°F., minimum.
- b. Penetration at 77°F. 100 gram load 5 second (0.1 mm) = 23 to 27.
- c. Ductility (ASTM D 113 at 25°C, 5 cm/minute) = 125 cm, minimum.

### 2.04 CUT-BACK ASPHALT

A. Primer for concrete base slab beneath concrete unit pavers subject to vehicular traffic shall be with rapid curing cut-back asphalt conforming to AASHTO M 81.

### 2.05 EDGE RESTRAINTS

A. Edge restraints shall be as shown on the Drawings and of such dimension as to be below finished surface of pavement after installation. Edge restraints shall be metal. Heat resistant plastic edge restraints may be used if recommended by the manufacturer for use with bituminous setting beds.

### 2.06 SAND JOINT FILLER & BINDER

A. Joint filler between paver joints shall be a clean, washed, uniformly well graded masonry sand conforming to ASTM C 144, except that the fineness modulus shall be  $2.25\pm 0.10$ . Sand shall be from a single source.

B. Binder for joint sand shall be "SandLock" by Pave Tech (1-800-728-3832) or approved equal.

### 2.07 GEOTEXTILE AT WEEPHOLES

A. Filter fabric at weepholes shall be a permeable light-weight non-woven fabric recommended by the manufacturer for separation of soil aggregates.

### 2.08 WATER

A. Water shall be potable and shall be free of injurious contaminants.

### 2.09 CONCRETE BASE COURSE

- A. Provide concrete base course with as specified in Section 03300 - Cast-in-Place Concrete .
  - 1. Provide expansion joints at 30' o.c. maximum, with preformed filler and sealant as specified in Section 03300.
  - 2. Provide weep holes in concrete base, 20' o.c. and at low points, covered with filter fabric at interface with bituminous base.

### PART 3 - EXECUTION

#### 3.01 INSTALLATION - GENERAL

- A. Concrete unit pavers shall be set true to the required lines and grades in the pattern detailed on the Drawings. Concrete unit pavers shall be neatly cut and fitted at all perimeters and closures to fit neatly and closely with joint uniform in specified thickness. Neatly cut pavers with guillotine or saw. Joint width shall not exceed 1/16".
- B. Tolerances: Do not exceed 1/16" inch unit-to-unit offset from flush (lippage).
- C. There is no tolerance for required ADA/MAAB slopes on paved walkways or plaza areas. Cross-slopes shall not exceed 2% and longitudinal slopes shall be less than 5%, measured with a 2' long smart level.

#### 3.02 ACCEPTABILITY OF CONCRETE BASE

- A. Contractor shall examine the concrete base slab to determine its adequacy to receive concrete unit paving and setting bed. Concrete shall have fully cured with sealed expansion joints. Evidence of inadequate base shall be brought to the immediate attention of the Architect.
- B. Vacuum clean concrete substrates to remove dirt, dust, debris, and loose particles.
- C. Start of work of this Section shall constitute acceptance of concrete base slab.

#### 3.03 CUT-BACK ASPHALT PRIME COAT

- A. Cut-back asphalt shall be applied to concrete base slab at a rate sufficient to act as an adhesive between the concrete slab and the bituminous setting bed.

#### 3.04 BITUMINOUS SETTING BED

- A. Bituminous setting bed shall be installed over the fully cured concrete base. Control bars 3/4 in. deep shall be placed directly over the base. If grades must be adjusted, wood chocks under depth control bars shall be set to proper grade. Set two bars parallel to each other to serve as guides for the striking board. The depth control bars must be set carefully to bring the pavers, when laid, to proper grade.
- B. While still hot (not less than 250°F.) some of the bituminous bed material shall be

placed between the parallel depth control bars. This bed shall be pulled with the striking board over the control bars several times. After each passage, low porous spots shall be showered with fresh bituminous material to produce a smooth, firm, and even setting bed. As soon as this initial panel is completed, advance the first bar to the next position in readiness for striking the next panel. After the depth control bars and wood chocks have been removed, carefully fill any depressions that remain.

- C. The setting bed shall be rolled with a power roller to a nominal depth of 3/4 inch, while still hot. The thickness shall be adjusted so that when the Concrete units are placed and rolled, the top surface of the pavers will be at the required finished grade.
- D. A coating of neoprene-modified asphalt adhesive shall be applied by mopping, squeegeeing, or troweling over the top surface of the bituminous setting bed so as to provide a bond under the pavers.
  - 1. If adhesive is trowel-applied, trowel shall be serrated type with serrations not to exceed 1/16 inch.

### 3.05 SETTING PRECAST CONCRETE UNIT PAVERS

- A. Concrete unit pavers shall be on a bituminous setting bed over a prepared concrete base. All setting shall be done by competent masons under adequate supervision.
- B. Concrete unit pavers with chips, cracks, stains, or other defects which might be visible in the finished work shall not be used.
- C. After the modified asphalt adhesive is applied, carefully place the pavers by hand in straight courses with hand tight joints and uniform top surface.
- D. Concrete unit pavers shall be set true to the required lines and grades in the pattern detailed on the Drawings. Concrete unit pavers shall be neatly cut and fitted at all perimeters and closures to fit neatly and closely, with joints uniform in thickness. Pavers shall be cut with a water-cooled, cut-off wheel masonry saw using a diamond blade. Protect newly laid unit pavers with panels of plywood on which workers stand. Advance protective panels as work progresses but maintain protection in areas subject to continued movement of materials and equipment to avoid creating depressions or disrupting alignment of unit pavers. If additional leveling of paving is required, and before treating joints, roll with power roller after sufficient heat has built up in the surface from several days of hot weather. Check and maintain alignment as often as necessary.
- E. Tolerances: Do not exceed 1/32 inch unit-to-unit offset from flush (lippage) and a tolerance of 1/8 inch in 10 feet from level or slope as indicated for finished surface of paving.
- F. Expansion and Control Joints: Provide for sealant-filled joints at locations and of widths indicated. Sealant materials and installation are specified in Section 02764 - Joint Sealants.

### 3.06 JOINT TREATMENT

- A. Joints between pavers shall be hand tight and shall be uniform in thickness. Joint thickness shall not exceed 1/16 inch.
- B. Joint filler shall be swept dry into the joints between pavers until the joints are completely filled. Surface shall be swept clean. Swept surface shall then be thoroughly dampened with a low-volume fine spray of water.

3.07 CLEANING AND PROTECTION OF CONCRETE UNIT SURFACES

- A. Remove and replace unit pavers that are loose, chipped, broken, stained, or otherwise damaged or if units do not match adjoining units as intended. Provide new units to match adjoining units and install in same manner as original units, with same joint treatment to eliminate evidence of replacement.
- B. After completion of concrete unit paving, surfaces shall be carefully cleaned, removing all dirt, excess mortar, filler, and stains.
- C. Provide final protection and maintain conditions in a manner acceptable to Installer, which ensures unit paver work being without damage or deterioration at time of Substantial Completion.

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 02850 - Athletic Equipment
- C. Section 02860 - Play Equipment
- D. Section 03300 - Cast-in-Place Concrete

##### 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

### SAFETY SURFACING

02540-1

adjacent to a play structure that is designated for unrestricted circulation around the 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-14, Playground Enlargement Plan and Exercise Area Enlargement Plan for fall heights of exercise and play equipment.

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,

SAFETY SURFACING  
02540-4

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

SAFETY SURFACING  
02540-5

- (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 urethane 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 play surface.
- B. Provide subsurface drain at downslope ends of subgrade.
- 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%.
- 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 02590

### COLOR COATING

#### 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. Color coating of multi-use basketball/futsal court

##### 1.03 SUBMITTALS

- A. Submit the following in accordance with the requirements of the General Conditions:
  - 1. Paint: Submit manufacturer's product data demonstrating specification compliance for line paint, and fortified and non-fortified paint for area painting.
    - (a) Submit color samples of manufacturer's standard colors for final selection by the Owner.
  - 2. Submit manufacturer's directions for 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.
  - 3. Submit installer name and evidence of qualifications.

##### 1.04 REFERENCES

Color Coating

02590-1

- 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 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) Colors shall be as noted on the Drawings.
  - 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

Color Coating

02590-2

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:
5. Colors for court shall be as shown on the Drawings.

### PART 3 - EXECUTION

#### 3.01 APPLICATION - 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.

#### 3.02 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.

#### 3.03 LINE PAINTING

Color Coating

02590-3



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

#### 3.04 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

Color Coating

02590-4

## 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 on High Street for Base bid irrigation and Alternate #1 Fountain supply , (2) the installation of a new 2" water service to support the Base Bid irrigation system and Alternate #1 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 two (1) 1-1/2" water meter and (1) 5/8" water meter, and one (1) 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.
- 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.
- E. Section 15400 - Fountain

### 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 fountain, Neptune T-10, or approved equal, with provisions for a remote ARB reading device to be mounted to the outside of 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
- E. Section 15400 - Fountain

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,

Backflow Preventer Cabinet  
02670-1

Bridges and Waterways, 1988 Edition, the Commonwealth of Massachusetts, 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.

Backflow Preventer Cabinet  
02670-2

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 AND SEWER 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 and sewer 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 and/or sewer pipe and all incidentals thereto.
- B. Drainage and sewer pipe shall be placed in the sizes and lengths indicated on the plans. Gate valves shall be placed along the drain and sewer pipes at locations as shown on the plans.
- C. Provide all coordination and pay all fees associated with installation of the sewer connection.

##### 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.
  5. ASTM D2729 Poly(Vinyl Chloride) (PVC) Sewer 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 AND SEWER PIPE



- A. PVC Pipe for use as storm drainage and sewer 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 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 sewer and drainage pipe installation and connection complete and acceptable, including all materials necessary for the excavation, backfill, and compaction.

## PART 3 - EXECUTION

### 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 AND SEWER 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 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, slot drain, 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

## 2.06 SLOT DRAIN

- A. Slot drain shall be as manufactured by SportEdge or approved equal.
  - 1. Drain Channel shall be fabricated of polymer concrete and schedule 40 PVC pipe, 8 inch ID with radius non-sloping bottom conforming to the following:
    - a. ½" maximum polymer concrete drainage slot with interlocking ends, with polymer concrete reinforcing at 6"± intervals.
    - b. Joint coupler: 8" PVC slip coupler, 3.75 inch minimum width.
    - c. Channel length: 2 meter Slot drain cover shall be polymer concrete, ½"

maximum slot, removable.

2. Slot opening shall be ½" maximum
3. Accessories: Slot drain PVV 8" end cup when required for straight runs.

### 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 (½) 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 Slot Drain:
  - A. Install per manufacturer's instructions and as indicated on the plans.
- 3.13 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 02780

### RECYCLED PLASTIC INTERLOCKING PAVERS

#### PART 1 - GENERAL

##### 1.01 WORK INCLUDED

- 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. Furnish and install Recycled Interlocking Pavers, as indicated on the Drawings and as specified.

##### 1.02 RELATED WORK

- 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 02200 - Earthwork.

##### 1.03 SUBMITTALS

- A. Samples:
  - 1. One 2' x 2.5' paver
- B. Manufacturers Product Data demonstrating compliance with the Specifications.
- C. Manufacturer's installation instructions.
- D. Qualification data for firms and persons specified in "Quality Assurance" Article to demonstrate their capabilities and experience.

##### 1.04 QUALITY ASSURANCE

- A. Pavers must be installed by an installer experienced in unit paver installation.

##### 1.05 DELIVERY, STORAGE, AND HANDLING

- A. Unit pavers shall be carefully packed by the supplier for shipment.
- B. Unit pavers shall be stored off the ground and protected against staining and other damage.
- C. Pavers damaged in any manner will be rejected and replaced with new materials at no

additional cost to the Owner.

## PART 2 - PRODUCTS

### 2.01 PAVERS

- A. Modular recycled plastic interlocking pavers shall be Terrewalks as manufactured by Terrecon, Inc., 10061 Talbert Ave. #200, Fountain Valley, CA (714-964-1400) or approved equal. Pavers shall have the following characteristics:
1. Pavers shall be manufactured from 100% waste polyethylene plastic (post-consumer) molded under compression.
  2. Pavers shall be interlocking modular units, approximately 2' x 2.5' x 1.75".
  3. Pavers shall weigh approximately 5 lbs per square foot.
  4. Tile shall be designed with up to .0626" rise in center to shed water, provide resilience, and provide shock attenuation.
  5. Under-base shall have a patented channel design system to facilitate water storage.
  6. Material Characteristics:
    - a. Hardness: Shore A 93
    - b. Coefficient of Friction: ASTM C 1028: Dry=0.72, Wet=0.62
    - c. All components shall be non-toxic inert solids, without volatile organic compounds, or latex content.
  7. Color will be chosen from manufacturer's standard color choices.

### 2.02 BASE COURSE

- A. Base course shall be equivalent to crushed stone base course for rubber safety surfacing as specified in Section 02200- Earthwork.

### 2.03 GEOTEXTILE FABRIC

- A. Fabric shall be a non-woven pervious geotextile fabric.

### 2.04 ACCESSORIES

1. 10" Permaloc Spiral Steel Spikes

## PART 3 - EXECUTION

### 3.01 EXAMINATION

- A. Do not begin installation until substrates have been properly laid and compacted per specified in Section 02200 - Earthwork.
- B. Install according to manufacturer's instructions.

### 3.02 WARRANTY

- A. Manufacturer shall provide a 5-year normal "wear and tear" warranty against defects in material and product workmanship. Warranty shall provide that during the warranty period that pavers will not chip, harden, become brittle, tear, crack or exhibit signs of excessive deterioration.

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. Items supplied by Owner for Installation by the Contractor:

1. Benches: Dumor Model 163 Recycled Plastic Benches
  - (a) 5 – 8' long benches
  - (b) 4 – 6' long benches (under fabric shade shelters)
2. Benches: Dumor Steel Bench Model 118
  - (a) 8 - 6' long
3. Picnic Tables: Dumor Series 100
  - (a) 3 – 8' long
  - (b) 1 – 6' long
4. Game Tables: Custom by Dumor
  - (a) Two tables with 5 seats total
5. Bike Loops by Dumor
  - (a) 3 loops

C. Items Supplied and Installed by Others

1. Big Belly of Newton, MA will supply, deliver and install one (1) Big Belly Kiosk.
  - (a) The Contractor shall be responsible for construction of the concrete pad

as detailed on the Drawings, and for any coordination necessary with Big Belly of Newton MA.

D. Salvaged Items for Re-Installation

1. The Contractor is responsible for construction of two additional concrete pads for re-installation of the two (2) existing salvaged Big Belly Kiosks.

E. Contractor furnished and installed items for work within this Section

1. All other materials and items not specifically indicated to be supplied by the Owner shall be furnished by the Contractor.

1.02 RELATED SECTIONS

- A. Section 02200 - Earthwork.
- B. Section 02510 - Bituminous Concrete Paving.
- C. Section 02879 – Shade Structures.
- D. Section 03300 - Cast-in-Place Concrete.

1.03 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.

1.04 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)

1.05 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 PRODUCTS

- A. Refer to Paragraph 1.02.B

## 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 CONCRETE FOOTINGS

- A. Cast-in-place concrete footings for site improvements shall be 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 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 a new 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 new electrical enclosure as shown on the drawings.
- 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.
  - 2. Section 02510 - Bituminous Concrete Paving.
  - 3. Section 02725 - Drainage and Sewer Pipe.
  - 4. Section 02780 - Unit Pavers.
  - 5. Section 02930 - Sodded Lawn.
  - 6. 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, Spray 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

- 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.
- B. All PVC Schedule 80 pipe shall be manufactured from a Type I, Grade I Polyvinyl Chloride (PVC) compound with a Cell Classification of 12454 per ASTM D1784. The pipe shall be manufactured in strict compliance to ASTM D1785, consistently meeting and/or exceeding the Quality Assurance test requirements of this standard with regard to material, workmanship, burst pressure, flattening, and extrusion quality. Standard lengths of pipe sizes 6" and larger shall be beveled each end by the pipe manufacturer. All pipe shall be stored indoors after production at the manufacturing site until shipped from factory. This pipe shall carry the National Sanitation Foundation (NSF) seal of approval for potable water applications.
- C. Sleeves for PE irrigation pipe shall be two times pipe diameter minimum.

#### 2.05 GEAR DRIVEN SPRINKLERS

- A. The sprinkler shall be Hunter Industries Incorporated I-20 gear-driven, rotary type, capable of covering a 17 foot to 46 foot radius at 50 PSI with a discharge rate of 0.36 to 14.8 GPM. The sprinkler shall be available with thirty four (34) nozzles discharging 0.36 GPM to 14.8 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 STREAM SPRAY SPRINKLERS

- A. The sprinkler shall be Hunter Industries Incorporated Pro-Spray PSR 30 Spray Sprinkler, capable of matched precipitation rate of 8 foot to 17 foot radius at 30 PSI. The sprinkler shall have radius adjustment capabilities, adjustable from 0 degrees to 360 degrees by means of a stainless-steel nozzle retainer/radius adjustment screw.
- B. The sprinkler shall be available with a 4-, 6-, or 12-inch (10-, 15-, or 30-cm) pop-up stroke, depending on the body specified, to bring the nozzle into a clean environment. The sprinkler shall be available as an aboveground shrub head. The sprinkler shall have the option of either a factory-installed or field-installed drain check valve capable of checking up to 10 feet (3.0 m) in elevation change. When specified as factory-installed, the sprinkler shall have the words "CHECK VALVE" stamped in white lettering on the body cap. The sprinkler shall have available an optional, snap-on cap, molded in purple alcryn rubber, or a replacement body cap, molded in purple to indicate the use of reclaimed water. A vandal-resistant locking cap shall be available as a field-installed option.
- C. The sprinkler shall have a standard pressure-regulating device as an integral part of the pop-up riser. This regulator will prevent fogging or misting of the nozzle spray pattern by maintaining a constant nozzle outlet pressure of 30 PSI with inlet pressures of up to 100 PSI, regardless of the nozzle installed.
- D. The body of the sprinkler shall be constructed of corrosion and UV-resistant, heavy-duty A.B.S. The riser of the sprinkler shall be constructed of abrasion and UV-resistant A.B.S. and shall be adjustable for pattern alignment. The riser shall be compatible with female threaded nozzles and shall have a stainless steel spring for positive retraction when irrigation is complete.
- E. The sprinkler shall have a pressure-activated, multi-function, UV stable wiper seal that will clean debris from the pop-up stem while it retracts. The seal shall be molded around a rigid plastic ring to prevent seal deformation. This seal shall prevent the sprinkler from sticking in the up position and be capable of sealing the sprinkler riser stem to the sprinkler cap under normal operating pressures. The seal shall be removable from the cap for easy service and shall be replaceable.
- F. The sprinkler shall have a factory-installed, removable flush cap with a pull-up tab that

shall prevent debris from entering the sprinkler during installation and allow the system to be flushed before installing the nozzle. The flush cap shall have a directional flushing action that allows the water to escape only in one direction. The flush cap shall open as the stem extends and completely close when the stem is in the retracted position.

- G. The sprinkler shall have an exposed surface diameter after installation of 2-1/4 inches (6 cm). In addition, the 6-inch (15 cm) and 12-inch (30 cm) sprinklers shall be available with a 1/2-inch FNPT side inlet. When specified with a factory-installed check valve, the 6-inch (15 cm) and 12-inch (30 cm) sprinklers will be supplied without the side inlet.
- H. The sprinkler shall carry a five-year, exchange warranty (not prorated).

#### 2.07 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.

#### 2.08 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 ells.
- 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 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 /2mm<sup>2</sup> for distances up to 5000 ft/1500 m, or 12AWG/3.3mm<sup>2</sup> 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 24 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:
  - 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 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 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 02815

FOUNTAIN MECHANICAL & ELECTRICAL SYSTEMS  
(ADD ALTERNATE #1)

PART 1 – GENERAL

1.01 SUMMARY

- A. The general, supplementary, and special conditions as well as the general requirements form a part of this section as if written herein. The intention of these specifications is to ensure that a single fountain equipment manufacturer provides a system with single source responsibility for the components in the fountain system.

1.02 SCOPE OF WORK

- A. All labor, materials, equipment and services necessary for the completion of the designed fountain system to meet the design criteria specified in the operation statement for each fountain shall be supplied by the Contractor.
- B. The Contractor shall integrate all work associated with the fountain system with the other sections of the specifications which may apply to the proper installation of the fountain.
- C. The work shall include but not be limited to the proper installation and connection of:
  - 1. Pool Basin Equipment.
  - 2. Lighting and Electrical Support Equipment.
  - 3. Pumping System.
  - 4. Control Panel Equipment.
- D. The Contractor shall arrange and pay for a minimum of two (2) on-site visits by the fountain equipment supplier as described in Paragraph 3.01.

1.03 RELATED WORK

- A. Section 04420 – Fountain Structure and Basin
- B. Section 02667 – Water Service Systems

1.04 APPLICABLE CODES AND STANDARDS

- A. The materials shall be installed in accordance with:
  - 1. ANSI and ASTM.
  - 2. Underwriter's Laboratory.
  - 3. National Electric Code.
  - 4. National Fire Protection Agency.

FOUNTAIN MECHANICAL & ELECTRICAL SYSTEMS  
(ALTERNATE #1)

02815 - 1

5. Occupational Safety and Health Act.
  6. Other state or local codes which are applicable.
- B. The above mentioned guidelines shall be considered minimum standards for the materials or the installation practices applicable for the fountain system.
  - C. The Contractor shall obtain the equipment specified in fountain system from a single, qualified fountain equipment manufacturer. The manufacturer must have at least twenty (20) years' experience in the design and manufacturing processes of pumping system packages and necessary fountain basin equipment.
  - D. Pumping systems and support fountain equipment shown on the drawings meet the specified qualifications for a fountain system mechanically and electrically as well as aesthetically.

#### 1.05 DRAWINGS AND SUBMITTALS

- A. The Contractor shall obtain from the fountain manufacturer drawings showing the sizes, locations, and installation details of the interconnecting piping, fountain jets, pool equipment, submersible lights and junction boxes.
- B. Three complete sets of drawings and operation and maintenance manuals shall be supplied on the equipment installed by the Contractor.

#### 1.06 SUBSTITUTIONS

- A. Proposed equipment substitutions shall meet or exceed the standards established for the original designed and specified equipment.
- B. The intention of these specifications is to ensure that a single fountain equipment manufacturer provides a system with single source responsibility for the components in the fountain system.
- C. Any proposal for substitutions of materials and/or equipment must be made in writing to the Landscape Architect within (7) seven days prior to bid date for approval.
- D. All Contractors offering bids on substitute systems must also submit a bid on the "as specified" system.
- E. Material suppliers or contractors desiring to substitute the specified items shall submit (3) three copies of the following data for review and approval.
  1. A complete fountain system isometric schematic to include a complete bill of materials.
  2. A written description of the fountain's operation.
  3. Specification and original manufacturer's cut sheets of all components.

4. A written performance guarantee certifying that the alternate system shall produce the specified water effects.
  5. Pertinent data on substitute systems, including engineering performance calculations on the pumping system, jets, pool equipment, and electrical system, diagrams and schematics shall be provided to the fountain consultant.
- F. Submitting party shall be responsible for all consulting and engineering cost associated with reviewing and approval of the substitute component.
- G. Submitting party shall be held responsible for any project delay resulting from the submission of substitute components.

#### 1.07 DELIVERY AND HANDLING OF THE FOUNTAIN SYSTEM

- A. The products shall be delivered in the manufacturer's original packaging.
- B. The Contractor shall inspect the fountain system and all other equipment in the shipment upon arrival to ascertain any damage incurred of repair or replacement of equipment if necessary.

#### 1.08 GUARANTEE

- A. The Contractor shall guarantee that any equipment found defective within one year of the final acceptance shall be replaced at no cost to Owner.

### PART 2 - PRODUCT

#### 2.01 SCOPE

- A. The Contractor is to provide all necessary labor, materials, equipment, and services for the proper installation of the fountain mechanical and electrical systems.
- B. All equipment and products in the fountain system shall be new and meet the standards provided in but not limited to these specifications.

#### 2.02 PRODUCTS

- A. Pumping systems and equipment shall be manufactured by Georgia Fountain Company, Inc. (GEFCO), 2513 Royal Place; Tucker, GA 30084; Telephone: (770) 934-3297 Fax: (770) 934-8770; [www.georgiafountain.com](http://www.georgiafountain.com) ; or equal meeting the specified qualifications for a fountain system mechanically as well as aesthetically. Refer to 1.06 Substitutions.

#### 2.03 FOUNTAIN POOL BASIN COMPONENTS

- A. GEFCO Select #PE106-20SP Overflow/Drain Standpipe: cast bronze base; 23" tall, 2" dia. copper standpipe; cast bronze cover dome; 2" female N.P.T. connection; removable standpipe for draining fountain.

- B. GEFCO #PE107-09 Sump: hi-impact cyclac plastic body; 8" diameter anti-vortex plate; 2" N.P.T. female bottom connections; 1-1/2" N.P.T. female side connections.
- C. GEFCO #PE108E 12" sq. Anti-Vortex Plate: 12" x 12" stainless steel anti-vortex plate.
- D. GEFCO #PE109-07-BRS Pool Penetration Fitting: cast brass coupling with water stop flange, bonding screw, 3/4" female N.P.S. connection.
- E. GEFCO #PE109-15-BRS Pool Penetration Fitting: cast brass coupling with water stop flange, bonding screw, 1-1/2" female N.P.S. connection.
- F. GEFCO #PE109-20-BRS Pool Penetration Fitting: cast brass coupling with water stop flange, bonding screw, 2" female N.P.S. connection.
- G. GEFCO #PE112 Adjustable Inlet Fitting: cast brass body with water stop flange, adjustable slotted brass deflection plate, bonding screw, Brass or CPB companion flange, 2" female N.P.S. connection.

#### 2.04 FOUNTAIN ELECTRICAL COMPONENTS

- A. GEFCO Select #EE106-3 Electrical Junction Box: cast bronze body and cover plate; stainless steel cover bolts; neoprene cover gasket; 17 cu. in. content area; external and internal bonding screws; U.L. Listed; 3 ea. 1/2" N.P.T. side tap connection; 1 ea. 3/4" N.P.T. bottom conduit connection.
- B. GEFCO Select #2123-C Potting Compound: 12.3 ounce re-enterable potting compound.
- C. GEFCO Select #EE112-00 Cord Seal: machined brass; compression type neoprene gland; U.L. Listed; for cable size 16/3; slip washer; 1/2" male N.P.T. connection.
- D. GEFCO #EE113-07 Electrical Slab Conduit: brass water stop flange; bonding screw; 10" long; 3/4" diameter brass pipe; 3/4" male N.P.T. connections at both ends.
- E. GEFCO #EE131A Conduit Mount Dual Water Level Sensor: cast bronze and brass construction; stainless steel cover bolts; wave retardation housing; external and internal bonding screws; 3/4" female N.P.T. bottom connection.
- F. GEFCO Select #EE152-W27 Watt LED Wet/Dry Freestanding Light Fixture: directional adjustability cast bronze, brass housing, cast bronze, stainless steel fitted, housing rock guard and neoprene o-ring seal, U. L. Listed, 27 watt, 12 VDC V. maximum, 9 feet of 18/3 cable, clear soft focus lens, lamp required (9) 3 watt, White LED Lamps; LAMPS INCLUDED.

#### 2.05 PUMPING AND SUPPORT EQUIPMENT

- A. Design Requirements: The equipment and the material specified in this section shall be installed by the Contractor in accordance with the fountain manufacturer's recommendation to form a complete operating fountain pumping system to produce the desired effect in the design statement written and shown on the drawings.
1. The fountain shall consist of an overall 16'-0" diameter, single level, circular pool basin with an inside diameter of 14'-0". Located in the center of the pool basin on top of a concrete pedestal shall be a three tiered cast iron fountain by Robinson Iron.
  2. The water shall be introduced into the single level pool basin and up through the three tiered cast iron bowls with three individually valve lines. A 3/4" discharge line shall feed water up to a 1/2" copper line and to the top 2'-5" diameter bowl in order to create a 1/8" drip effect of water over the 7'-7" linear edge. The water from the upper bowl shall flow over the edge and into the 5'-2" diameter intermediate bowl below. A 1-1/2" discharge line shall feed water up to a 1" copper line and to the intermediate 5'-2" diameter bowl in order to create a 1/8" drip effect of water over the 16'-3" linear weir edge of the middle tiered bowl. A 2" discharge line shall feed water up to a 1-1/2" copper line and to the lower 7'-5" diameter bowl in order to create a 1/8" drip effect of water over the 23'-4" linear weir edge. The water shall flow over the 23'-4" weir edge and toward the lower pool basin.
  3. Illumination for the three tiered cast iron fountain shall consist of a total of (6) six GEFCO Select #EE152-W24 Submersible, 27 Watt, 12 Volt, White LED Light Fixtures installed around the perimeter of the lower pool basin in order to shine up and flood light the cast iron bowls. All of the fountain lights shall only operate when the fountain and bowls are filled with water and the pump is in full operation.
  4. The display system requires a pump size 1 Horsepower to operate the required spray aesthetics and the necessary filtration for the fountain system. The 1 HP pump shall deliver 75 GPM at 40 TDH. An In-Line Bromine unit and Ionization Unit is included to help aid water treatment of the entire volume of water as it re-circulates through the fountain system.
  5. Located no further than 75'-0" from the center of the fountain basin and within the planting area just outside of the path walkways shall be a GEFCO Select #ST443-75 Pre-fabricated Small Fiberglass Pump Vault buried into the landscaping. The small pump vault shall include the 1 HP display pump, (1) 75 GPM cartridge filter, in-line bromine unit, ionization unit and valves. The small pump vault shall be equipped with a ventilation fan, sump pump, convenience outlet, disconnect switch and accessible through the 4'-0" square, white gel coated, landscape access hatch. The Control Panel shall be installed outside of the small pump vault and within eye site.

6. The Control Panel shall be UL Listed and Labeled complete with main power disconnect switch, display pump motor starter, panel board, circuit breakers, GFCI breakers, water level monitor and time clock all supplied in a NEMA 4 steel enclosure. An incoming water supply of 1" at 50 PSI maximum is to be brought to the small pump vault and protected by a backflow preventer located inside of the vault. The incoming power requirement for the control panel is 120/240volt, 1 phase and 60 amps. The water from the fountain shall be emptied into the sanitary sewer line.
  7. The electrical control panel supplied shall be no less than a UL Listed assembly with industrial application rating, NEMA 4 enclosure construction, containing all required disconnects, starters, relays, timing devices, control switches and all indicating pilot lights for local and/or remote automatic operation, pre-wired to field terminals. The UL Listed assembly shall contain all additionally required protection per 2015 NEC Section 680.
- B. The Fiberglass Pump Vault.
1. The Fiberglass Pump vault shall be installed in the landscaped area per the landscape architect drawings.
    - a. GEFCO Custom ST443-75 48" sq. Fiberglass Enclosure:48" sq. x 36" high fiberglass shell; 48" sq. gel coated white lockable lid; white gel coated interior; (5) 3/4" Bulk Head Fittings, PVC, S x S; (1) 1" Bulk Head Fittings, PVC, S x S; (1) 1-1/2" Bulk Head Fittings, PVC, S x S; (6) 2" Bulk Head Fittings, PVC, S x S
  2. Included in the system shall be a fountain pump properly sized to provide the gallons per minute and the total dynamic head to fulfill the requirements of the design statement. The pumps shall be either self priming, end suction centrifugal or horizontal split case centrifugal.
    - a. Fresh Water End suction pumps shall be of all bronze or thermoplastic construction with an integral basket strainer if the RPM rating is 3450. If the pump is rated at 1750 RPM, an in-line basket strainer shall be provided. It shall be at least 125# cast iron construction with a clamp on cover and flanged connections. The debris basket shall be of all stainless steel construction and removable.
  3. Also included in the system, there shall be a manifold system. Above 3" in diameter, the manifold shall be constructed out of Schedule 80 PVC. Connections, threaded and flanged, shall be welded or glued into the manifold to provide the appropriate discharge arrangements. The manifold shall be pressure tested, and all leaks shall be repaired as necessary. The manifold shall be finished, corrosion free and painted.
  4. Pipe and fitting materials shall conform to the following criteria:

FOUNTAIN MECHANICAL & ELECTRICAL SYSTEMS  
 (ALTERNATE #1)  
 02815 - 6

- a. All suction lines and discharge piping 4" and under shall be type "L" copper or Schedule 40 PVC.
  - b. Discharge piping 6" and above shall be Schedule 80 PVC.
  - c. All suction and discharge fittings 4" and under shall be wrought copper, cast brass or Schedule 40 PVC.
  - d. Discharge fittings 6" and above shall be Schedule 80 PVC.
  - e. Flexible electrical conduit shall be liquid tight copper with a PVC coating.
  - f. Rigid electrical conduit shall be schedule 40 PVC.
  - g. Reducers on the suction side of the pump shall be eccentric. Above 4", they shall be of cast iron 125# flanged construction.
  - h. Reducers on the discharge side of the pump shall be concentric. Above 4", they shall be of cast iron 125# flanged construction.
    - (1) PVC slip connections shall be made using the manufacturer's recommendations and using the industry's standards.
    - (2) Flanged connections shall be made using stainless steel bolts or studs.
5. Valve Selection:
- a. Throttling operation: 2" and under shall be ball valves, 150# cast bronze body, neoprene seats and seals, infinite position vinyl covered handle.
  - b. Throttling operation: 3" and over shall be butterfly valves; 150# cast bronze construction; infinite position.
  - c. On-off operation: 3" and under shall be gate valves, 150# cast bronze construction.
  - d. On-Off operation: 4" and over shall be butterfly valves; 150# cast bronze construction; 10 position.
  - e. Check Valves: Spring or swing check valves shall be made of cast bronze construction; bronze discs, neoprene seats.
  - f. Solenoid Valves: 1" and under shall be 150# cast iron constructed body; pilot controls and molded epoxy coils rated at 115 V., 50 cycles. Solenoid Valves: 1" and under shall be 150# cast iron constructed body; pilot controls and molded epoxy coils rated at 115 V., 60 cycles.



6. GEFCO Select #PM104-05 Filter Pump: 1 Horsepower pump; all heavy duty durable glass filled thermoplastic construction; oversized integral basket strainer with lexan cover; 2" suction; 2" discharge; 75 GPM at 45 FH; 230V., 1 phase, 3450 RPM, 60 Hz;
7. GEFCO Select #PM900-75 Cartridge Filter Assembly: 75 sq.ft. Cartridge filter; made of cycolac construction; with (1) 75 sq.ft. replacement cartridge filter.
8. GEFCO Select #PM1525 Ionization System: 115 vac at 0.5a, 60 Hz; LED readout; NEMA 250-4X; UL 508-4X enclosure; (2) ions consisting of silver, copper and zinc.
9. GEFCO Select #PM1720 In-Line High Capacity Brominator; made of all cycolac plastic; with automatic dial feed; NSF Listed; 2" N.P.T. connection; Bromine Not Included.
10. GEFCO #PM800-10 Water Control Manifold: Automatic Fill/Level Control Manifold; miscellaneous copper tube and fittings; 1" pressure reducing valve, brass (1) 3/4" Solenoid Valve, bronze, 120 volt, T x T; (2) 3/4" ball valves, bronze; 1" ball valve, bronze; 1" backflow preventer, bronze; 3/4" water hammer arrestor; 3/4" hose bibb, bronze.
11. GEFCO Select PM702-11 Ventilation Fan: 1/6 Hp 115/230 V., 1 phase, 60 Hz.
12. GEFCO Select PM701-40 Vent Caps: cast iron construction; 4", 3" or 2" slip connection.
13. GEFCO Select #PM502-02 Sump Pump Assembly: cast iron motor and pump housing; water tight square neoprene; float operated mechanical switch; stainless steel fasteners and switch arm; 1-1/2" female N.P.T. connection.

## 2.06 GEFCO AND GEFCO SELECT FOUNTAIN CONTROL PANEL

- A. The control panel shall consist of an enclosure, control devices, circuit breakers, switches, relays, terminal strips, and inter-connecting wiring as necessary.
- B. The ENTIRE control panel assembly shall be U.L. Listed (per U.L. 508) and shall be equipped with a flush mounted door.
- C. The enclosure shall be NEMA 4 rated steel construction. Sized for the application and shall include gasket hinge mounted door.
- D. Main Disconnect Switch shall be provided and installed integral to the enclosure. The disconnect switch shall be door mounted interlocking red handle; padlock capable device. The disconnect switch shall be UL Listed, (I.E.C. IP55).

- E. Hands Off Automatic (HOA) selector switch shall be provided and installed integral to the enclosure. The HOA switch shall be horsepower rated non-teasing heavy duty cam switches with the required number of contacts. These HOA switches shall be UL Listed, (I.E.C. IP55).
- F. Pilot lights shall be full voltage, UL Listed, (I.E.C IP55).
- G. Combination motor starters shall consist of the following:
  - 1. The motor disconnect shall have three adjustable magnetic short circuit protection trips and one adjustable overload (the adjustment sets three individual bi-metallic overloads) and trip indicating handle. Short circuit rating shall be as required, up to 42,000 ARMS at 600 Volts (AC).
  - 2. Contactors shall be horsepower rated as per international electric codes (I.E.C.) with a minimum of two normally open and two normally closed auxiliary contacts. Contactors shall have a guaranteed technical life span of one million operations or more as per I.E.C.
- H. All control relays shall be horsepower rated and have contacts that are rated at 20 amps continuous operation and shall have a minimum of two normally open and two normally closed contacts.
- I. Control voltage to external pilot devices and solenoid valves shall be 120VAC isolated.
- J. All control components shall be pre-wired to a master terminal located at the top or bottom of the control panel.
- K. Daily start/stop timing functions shall be provided by programmable (manual or digital) timing devices.
- L. GEFCO #EE115 Water level monitor shall be a solid state module and sensor with no moving parts. The module shall have 2 miniature relays rated for 1/4 HP at 120 volt, with two normally open and two normally closed contacts. The sensor voltage of the module shall meet Article 680, National Electric Code (N.E.C.) requirements and shall have an isolated transformer with a metal ground barrier between the primary and secondary windings. The module shall be equipped with green and red light emitting diodes to indicate water level status. The sensor voltage shall be rated at less than 15 volts (DC).
- M. The following controls and pilot lights shall be mounted on front of the control panel enclosure and shall indicate and perform specified operations.
  - 1. Recalculating display pump HOA switch has a blue pilot light.
    - a. Hand position; power to pump, pilot light illuminated, timing devices over ridden.

- b. Auto position; pump operation and pilot light interlocked with time devices.
  - c. Off position; pump shall not operate.
- 2. Water level monitor module pilot lights (one red and green light for each operation model).
  - a. Water Level control mode:
    - (1) Green pilot light illuminated; normal operating.
    - (2) Red pilot light illuminated; low water operating.
  - b. Low water protection mode:
    - (1) Green pilot light illuminated; normal operating.
    - (2) Red pilot light illuminated; low operating water.
- N. 1 ea. 24VDC 10 amp regulated power supply system
- O. Control Panel internal wiring color code shall be:
  - 1. Load wiring: black (neutral – white)
  - 2. AC control wiring: red (neutral – white)
  - 3. DC control wiring: blue
  - 4. Wire type: Machine assembly per NEC.
  - 5. Solenoid field terminals: Fusible disconnect type.

PART 3 - EXECUTION

3.01 INSTALLATION OF THE FOUNTAIN SYSTEM

- A. The fountain component system shall be installed in compliance with the fountain system's manufacturer's recommendations and codes that may apply.
- B. The Contractor shall arrange and pay for Job site visits by a representative of the fountain manufacturer as follows:
  - 1. Pre-construction meeting for the coordination of the trades involved in the fountain installation and instruction on the suggested installation techniques and the sequence of the installation.
  - 2. Start Up and Operation of the Fountain: The Contractor shall pay for a factory representative for the initial start-up and adjustment of the fountain system to meet the performance levels established in these Specifications. At this time, the manufacturer's representative will also be engaged to instruct the maintenance staff of the City of Waltham on the proper operation and maintenance techniques required to keep the fountain in good running condition as well those actions required to satisfy the conditions of the warranty.

- a. Before the arrival of the manufacturer's representative for the start-up meeting, all the following work needs to be complete:
- (1) Electrical connections need to be made and tested.
  - (2) Junction Boxes, such as water level sensor, need to be properly sealed.
  - (3) Spray effect devices such as jets, weirs, bars, rings, etc., should be installed.
  - (4) Hydraulic piping and fittings need to be complete and tested for leaks, repaired if necessary, and flushed clean.
  - (5) The fountain pool(s) needs to be cleaned and filled to the correct water depth.

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

02825-1

Chain Link Fencing

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

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 "Bandit" multi-lock cable ties as furnished by Hin and Coon of Boston, MA (Tel 617-268-1010), or an approved equal. Multi-lock cable 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 02826

GRANITE POST AND WOOD RAIL FENCE

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 DESCRIPTION

- A. Provide all equipment and materials, and do all work necessary to furnish and install granite sign posts, and granite post and wood rail fence as indicated on the Drawings and as specified.

1.03 RELATED WORK

- A. Examine Contract Documents for requirements that affect the work of this Section. Other Specification Sections that relate directly to work of this Section include, but are not limited to:
  - 1. Section 02770 - Granite Curbing.
  - 2. Section 02780 - Unit Pavers.
  - 3. Section 03300 - Cast-in-place Concrete.
  - 4. Section 02764 - Joint Sealants.

1.04 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 Institute of Steel Construction (AISC).
- C. National Building Granite Quarries Association Inc. (NBGQA).
- D. American Society for Testing and Materials (ASTM):
  - 1. C 144 Aggregate for Masonry Mortar
  - 2. C 150 Portland Cement
  - 3. C 207 Hydrated Lime for Masonry Purposes
  - 4. C 270 Mortar for Unit Masonry
  - 5. A 153 Zinc - Coating (Hot-Dip) on Iron and Steel Hardware
  - 6. F 537 Design, Fabrication, and Installation of Fences Constructed of Wood and Related Materials

- E. SSPC-SP 1 - Solvent Cleaning.
- F. SSPC-SP 2 - Hand Tool Cleaning.
- G. SSPC-SP 3 - Power Tool Cleaning.
- H. SSPC-SP 13 / NACE No. 6 Surface Preparation for Concrete.
- I. EPA-Method 24.

#### 1.05 SUBMITTALS

- A. Samples:
  - 1. Granite: Submit two 12" x 12" samples of the granite proposed for the granite posts to the Architect for approval. Sample shall show the full range of color, texture and finish of the granite.
  - 2. Dowels: One each of each size, 4 in. length.
  - 3. Wood: Submit two 4" x 4" x 12" samples of fence rails for Architect's approval.
- B. Submit manufacturer's product data for mortar materials, including additives.
- C. Shop Drawings: Cutting and setting drawings of granite posts specified herein shall be submitted. Drawings shall indicate anchorage system, including steel support angles, anchors, cramps, dowels, etc., complete granite sizes, dimensions, layout, finishes, arrangement and other necessary details for reception of other work.
  - 1. Drawings shall indicate locations of inserts for granite anchors and supports which are to be built into concrete and masonry, and locations and dimensions of cut-outs, holes, openings, and other provisions required for the work of other trades.
- D. Contractor's Review: Before commencing work, submit written statement signed by the Contractor stating that the Contract Documents have been reviewed with a qualified representative of the granite supplier, and that he is in agreement with the selected materials and construction techniques are proper, compatible with adjacent materials, and adequate for the application shown.
- E. Solid Exterior Stain: Submit manufacturer's product data demonstrating specification compliance for stain.
  - 1. For wood rail paint, submit color samples of manufacturer's standard colors for final selection by the Owner. Color shall be a dark green similar to "Hunter Green".
  - 2. Submit manufacturer's directions for application, including required preparation, permissible temperature for application and storage, drying time, coating thickness and application rates, and period of curing time prior to

application to new rails.

3. Provide samples that designate prime & finish coats.

#### 1.06 COORDINATION

- A. Coordinate work with that of other Sections affecting this work, as necessary to assure the steady progress of the work under this Contract.
- B. Do all cutting and drilling to accommodate work of other Sections, as expressly indicated and as reasonably inferred from Contract Documents, or required for the proper completion of the Work.

#### 1.07 DELIVERY, HANDLING AND STORAGE

- A. Granite shall be carefully packed and banded by the supplier for shipment. Following shipping, granite shall be stored on wood skids or pallets, covered with non-staining, waterproof membrane and protected from the weather. Skids shall be placed and stacked in such a manner as to evenly distribute the weight of the granite materials and to prevent breakage, cracking, and damage to stone pieces. Granite materials shall be stored in such a manner as to allow air to circulate around the stone material. Granite shall not be permitted to be in direct contact with the ground at any time during storage.
- B. Granite shall be carefully handled to prevent chipping, breakage, soiling, or other damage. Pinch or wrecking bars shall not be used without protecting edges of granite with wood or other rigid materials. Granite units shall be lifted with wide-belt type slings wherever possible: wire rope or ropes containing tar or other substances which might cause staining or damage to granite finish shall not be used.
- C. Granite damaged in any manner will be rejected and shall be replaced with new materials at no additional cost to the Owner.
- D. Store all materials on raised platforms or slabs, under watertight covers or indoors. Protect metal angles, anchors, cramps, dowels, wood rails, etc., from the elements. Immediately before placing remove all loose dirt, and other foreign materials.
- E. All packaged materials shall be delivered to the site in original unopened containers clearly indicating manufacturer name, brand name, and other identifying information. Opaque Exterior Stain shall be stored within the temperature ranges indicated by the manufacturer.

#### 1.08 PROTECTION OF FINISHED SURFACES

- A. Finished surfaces adjacent to the stone work shall be adequately protected from soiling, staining, and other damage.

#### 1.09 QUALITY ASSURANCE

- A. 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.
- B. Granite shall conform to the requirements of ASTM C 515, Architectural Grade and NBGA Specifications except as modified herein.
- C. 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.

#### 1.10 ENVIRONMENTAL REQUIREMENTS

- A. Solid Exterior Stain shall be applied within the temperature ranges recommended by the paint manufacturer.

### PART 2 - PRODUCTS

#### 2.01 GRANITE

- A. Granite shall be of the sizes and dimensions indicated on the Drawings.
- B. Exposed surfaces shall be finished as follows:
  - 1. Fence Posts: Split face four (4) sides and top; Bottom, Sawn.
  - 2. Sign Posts: Split face front and back, Sawn and Thermal finish sides, Top, Split, Bottom, Sawn.
- C. Beds and Joints: Pieces shall be bedded and jointed as shown on the approved shop drawings, and bed joint surfaces shall be cut with 3/16 inch beds and joints, as indicated on the approved shop drawings.
- D. All faces, shall be at right angles to the plane of the top.
- E. Granite shall be cut accurately to required shape and dimensions.
- F. Holes, cut-outs, sinkages, and openings in granite work for anchors, cramps, dowels, supports, and lifting devices, shall be accurately cut or drilled to required dimensions, as shown on the approved shop drawings, and necessary to secure granite in place to insure correct location and accurate fit of all fixtures. Setting beds shall be shaped to fit supports.

#### 2.02 SETTING BED MORTAR

- A. Setting bed mortar shall conform to ASTM C 270, Type 5, except that latex polymer

additive shall be mixed with the cementitious materials and aggregate in lieu of water.

1. Cement shall conform to ASTM C 150, Type I, complying with the staining requirements of ASTM C 91 for not more than 0.03% water soluble alkali, Furnish Type I, except Type III may be used for setting stone in cold weather.
2. Sand shall conform to ASTM C 144, non-staining.
3. Hydrated lime shall conform to ASTM C 207.
4. Latex polymer additive shall be "Laticrete 3701" setting liquid, manufactured by Laticrete International, Inc., Woodbridge, CT 06525, or approved equal. Mix according to manufacturers instructions.

#### 2.03 BOND COAT

- A. High strength bond coat between concrete base and setting bed mortar, and between setting bed mortar and granite shall be "Laticrete 4237" mortar additive bond coat manufactured by Laticrete International, Inc., Woodbridge, CT 06525, or approved equal.

#### 2.04 ANCHORAGE AND SETTING MATERIALS

- A. Anchors, dowels, shims, and other metal items required for the support and anchorage of the stone work shall be furnished under this Section.
- B. Anchors, dowels, and other items to be set into concrete shall be furnished under this Section for installation under the concrete section. Other metal items shall be installed under this Section.
- C. Anchors, dowels, shims, and other metal items, shall be hot-dip galvanized in accordance with ASTM A 153.
- D. Provide plastic setting buttons as necessary.

#### 2.05 WOOD RAILS

- A. Fence lumber shall be Grade "A" & Better (BTR), Mixed Grain (MG), S4S, Douglas Fir or Western Larch of sound stock, conforming to ASTM F 537, Architectural Class I Sawn Rails.
- B. Lumber shall bear a mark of mill identification and shall bear the grade - trademark of the association under the rules or standards of which they were produced.
  1. Top and bottom rails shall be 4 inch square nominal dimension.

#### 2.06 SOLID EXTERIOR STAIN

- A. Solid Exterior Stain - General:

1. Solid Alkyd Stain shall be as manufactured by The Sherwin-Williams Company, 101 Prospect Avenue NW, Cleveland, OH 44115, Tel: (800) 321-8194, Fax: (216) 566-1392, or approved equal.
2. Unless otherwise indicated, provide factory-mixed coatings. When required, mix coatings to correct consistency in accordance with manufacturer's instructions before application. Do not reduce, thin, or dilute coatings or add materials to coatings unless such procedure is specifically described in manufacturer's product instructions.
3. For opaque finishes, tint each coat including primer coat and intermediate coats, one-half shade lighter than succeeding coat, with final finish coat as base color.

B. Surface to be coated: Wood Rails.

1. Solid Color Alkyd Stain:
  - a. 1st Coat: S-W Solid Color Alkyd Stain, A14-500 Series
  - b. 2nd Coat: S-W Solid Color Alkyd Stain, A14-500 Series (200-300 sq ft/gal)
2. Color of paint be chosen by the Owner. Owner's range of color choices shall be equivalent to "Hunter Green" of standard colors available for Sherwin Williams, or approved equal.

2.07 ACCESSORIES

A. Coating Application Accessories:

1. Provide all primers, sealers, cleaning agents, cleaning cloths, sanding materials, and clean-up materials required, per manufacturer's specifications.

PART 3 - EXECUTION

3.01 PLACEMENT OF STEEL SUPPORT ANCHORS

- A. Granite shall be anchored and dowelled as indicated, and as shown on the approved shop and setting drawings.

3.02 SETTING GRANITE

- A. Setting shall be done by competent granite setters under adequate supervision and in accordance with the approved shop and setting drawings.
- B. Granite units with chips, cracks, stains, or other defects which might be visible in the finish work shall not be used.
- C. Before setting, granite shall be clean and free of dirt and foreign matter on all sides, thoroughly scrubbed with a mild cleaner and rinsed with fresh clean water. Granite

shall be dry before setting.

- D. Install granite plumb and true to line and grade, and straight plumb corners.
- E. Install anchors, cramps, dowels, etc., as the granite work progresses. Clean off excess mortar after setting, while still fresh. Mix mortar in small batches to assure continuing freshness.
- F. Maintain granite work clean as the work progresses. Exercise extreme care at exposed work to prevent smearing or staining with mortar. Wash mortar stains immediately from exposed surfaces.

### 3.03 CLEANING

- A. Upon completion of granite work, surfaces shall be left in a clean, unsoiled condition, acceptable to the Landscape Architect. Remove all dirt, excess mortar, stains, and other defacements.
  - 1. Mild abrasive cleaners that contain no harsh or caustic ingredients may be used, with fiber brooms or brushes and clear water. Wire brushes, steel wool, and acids or other solutions which may cause discoloration are expressly prohibited.
  - 2. Expansion joints shall be cleaned and left ready for sealing of joints under Section 02764 - Joint Sealants.

### 3.04 WOOD RAILS

- A. Unless otherwise indicated, installation of wood rails shall conform to ASTM F 537.
- B. Steel anchor dowels shall be set into granite posts as indicated on the Drawings.
- C. Fence rails shall be installed by experienced fence erection crews. Rails shall be straight and true to line and grade.
- D. All rails shall fit securely into anchor dowels and fastened securely using vandal resistant screws, 4 each to top and bottom rails.

### 3.05 PAINTING

- A. Surface Preparation:
  - 1. The surface must be dry and in sound condition. Remove oil, dust, dirt, loose rust, peeling paint or other contamination to ensure good adhesion.
  - 2. Remove mildew before painting by washing with a solution of 1 part liquid household bleach and 3 parts of warm water. Apply the solution and scrub the mildewed area. Allow the solution to remain on the surface for 10 minutes. Rinse thoroughly with clean water and allow the surface to dry 48 hours before painting. Wear protective glasses or goggles, waterproof gloves, and protective clothing. Quickly wash off any of the mixture that comes in contact with your skin. Do not add detergents or ammonia to the bleach/water solution.

3. No exterior painting should be done immediately after a rain, during foggy weather, when rain is predicted, or when the temperature is below 50°F, unless products are designed specifically for these conditions.
  4. Knots and pitch streaks must be scraped, sanded, and spot primed before a full priming coat is applied.
- B. Installation:
1. Testing: Due to the wide variety of substrates, preparation methods, application methods and environments, one should test the product in an inconspicuous spot for adhesion and compatibility prior to full-scale application.
  2. Apply all coatings and materials in accordance with manufacturer's specifications. Mix and thin coatings according to manufacturer's recommendation.
  3. Do not apply to wet or damp surfaces.
  4. Apply coatings using methods recommended by manufacturer.
  5. Uniformly apply coatings without runs, drips, or sags, without brush marks, and with consistent sheen.
  6. Apply coatings at spreading rate required to achieve the manufacturer's recommended dry film thickness.
  7. Regardless of number of coats specified, apply as many coats as necessary for complete hide and uniform appearance.
  8. Exterior Woodwork: If final painting must be delayed more than 2 weeks after installation of woodwork, apply primer within 2 weeks and final coating within 2 weeks.
  9. Inspection: The coated surface must be inspected and approved by the Architect or Engineer just prior to each coat.
- C. Protection:
1. After the stone work has been installed, it shall be properly and adequately protected from damage.
  2. Protect finished coatings from damage until completion of project.
  3. Touch-up damaged coatings after substantial completion, following manufacturer's recommendation for touch up or repair of damaged coatings. Repair any defects that will hinder the performance of the coatings.

END OF SECTION



## SECTION 02830

### WELDED WIRE FENCE

#### PART 1 - GENERAL

- 1.01 Include General Conditions and all other Division 1 – General Requirements as part of the Section.
- 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 with trades affecting, or affected by, work of this Section. Cooperate with such trades to assure the steady progress of all work under the Contract.
  - C. The contractor shall provide all labor, materials and appurtenances necessary for the complete installation of the industrial steel ornamental fence system as specified.
- 1.02 WORK INCLUDED
- A. Furnish and install custom color welded steel wire fence and at play area and exercise area, as shown on the Drawings.
  - B. Furnish and install custom color welded steel wire double swing gates at play area.
  - C. Related Work in other Sections:
    - 1. Section 02200 - Earthwork.
    - 2. Section 03300 - Cast-in-Place Concrete.
- 1.03 QUALITY ASSURANCE
- A. The work of this Section shall be completely coordinated with the work of other Sections. Verify dimensions and work of other trades which adjoin materials of the Section before installing items specified.
- 1.04 SUBMITTALS
- A. Product Information: Provide manufacturer's product data and information showing installation and limitations in use. Supply Certificates of Compliance for all materials required for fabrication and installation on all components. Provide color samples of surface finish for approval before fabrication.
  - B. Shop Drawings:
    - 1. Shop drawings for welded steel wire fence shall show size and thicknesses of all members, types of materials, methods of connection and assembly, complete dimensions, clearances, anchorage, relationship to surrounding work by other trades, shop paint and protective coatings, and other pertinent details of

02830-1  
Welded Wire Fence

fabrication and installation.

2. Indicate elevation, sections, sizes, connection attachments, reinforcing, anchorage, openings, size and type of fasteners, size of welds, and any accessories.
- C. Certificate of Conformance: Provide certificate verifying that each item was prepared, coated, inspected, and repairs made in accordance with this specification.
- D. Warranty: Provide warranty that all materials furnished and work executed under this Section comply with Specifications and authorized changes.
- E. Structural Certification: Provide written certification that structural requirements meet or exceed specifications included in Article 1.05 Performance Requirements.

#### 1.05 PRODUCT HANDLING AND STORAGE

- A. Upon receipt at the job site, all materials shall be checked to ensure that no damage occurred during shipping or handling. Materials shall be stored in such a manner to ensure proper ventilation and drainage and to protect against damage, weather, vandalism and theft.

### PART 2 - MATERIALS

#### 2.01 Welded steel wire fence

- A. The welded wire fence system shall be Legi R/W fence (OuterSpace Landscape Furnishings, 7533 Draper Ave., La Jolla, CA 92037 858-459-0994) or approved equal.
- B.
  1. Mesh panels shall be Legi R-S.W.O. Mesh, or equal conforming to the following:
    - a) Panels for playground perimeter:
      - 1) Panels shall be 4' ht nominal welded steel wire with curved top with 50 x 200 mm (1.9" x 7.9") rectangular mesh openings, manufactured from 6 mm (.24") o.d. vertical wire, 8 mm (.31") o.d. double horizontal wire as shown on the Drawings.
      - 2) End panels shall have straight top and shall in all other respects conform to the specifications of 2.01.B.1.
    - b) Panels for playground interior:
      - 1) Panels for interior of playground shall be 30" nominal height with straight top and shall in all other respects conform to the specifications of 2.01.B.1.
    - c) Panels at exercise area:

- 1) Panels at exercise area shall be 56" height nominal with straight top 56" and shall in all other respects conform to the specifications of 2.01.B.1.
  2. Fence Posts shall be Legi "R" fence post, or equal, conforming to the following:
    - a) Post shall be rectangular steel tube (2.4" x 1.6") in cross section, with welded top cap (1.6" x 3.5") and 40 mm wide backing plate x the length of the mesh. Interior threaded inserts to receive bolts shall be spaced 7.9" o.c. along back of post.
    - b) On center post-spacing shall be 2500mm (98.4" or 8.2').
  3. Bolts shall be .31" x 1.8" V2A stainless steel security one-way vandal resistant bolts removable only with a special tool.
  4. Mesh ends to be overlapped behind post. Bolts to be passed through backing plate and mesh ends into threaded insrts. Overlapping mesh ends shall be 2.75" wide, which shall allow up to 0.8" tolerance in post spacing. Extra mesh shall be taken up at the corner panels, as shown on the drawings. Corners panels shall be field cut, and finished as shown on the Drawings.
- C. Gates, Hinges & Latches
1. Gate shall be Legi "Klassik" double swing gate or approved equal, and as shown on the Drawings.
    - a) Gate posts shall consist of square tube steel 100 mm square with welded head and foot plates.
    - b) Gate leafs shall be composed of rectangular tube frames 60 x 40 mm or larger with mesh welded directly the frame.
    - c) The gate hinges shall have 65 x 40 mm mounting plate, brass washer and hinge pin welded to gate post.
    - d) Gate hinge plate 260 mm wide (10.2") with oval holes shall allow for a 0.4 inch adjustment of the gate wing.
    - e) Gates hinges shall be completely contained within the gate profile.
    - f) A base bolt (locking pin) shall be provided for double wing gates and shall be stored within the frame of the gate leaf and be immovable unless the opposite gate leaf is open.
  2. Provide gate without manufacturer's standard latch. Latch to be furnished by Contractor shall be D & D Technologies MagnaLatch. Field drill gate to install latch.
- D. Finish: All material, unless otherwise indicated, shall be hot-dip galvanized after

02830-3  
Welded Wire Fence

fabrication, with a zinc layer a minimum of 1.8 oz/sq.ft., stainless steel sand-blasted for optimum coating adhesion, and polyester powder-coated in non-lead, UV stable, thermally set powder paints.

1. Fence and gate color shall be a custom non-metallic RAL color to be chosen by the Owner from RAL color choices.

### PART 3 - EXECUTION

#### 3.01 INSTALLATION - GENERAL

- A. All new installation shall be laid out by the contractor in accordance with the construction documents.
- B. Cutting, Fitting, and Placement: Perform cutting, drilling, and fitting required for installing metal fabrications. Set metal fabrications accurately in location, alignment, and elevation; with edges and surfaces level, plumb, true and free of rack; and measured from established lines and levels.
- C. Provide temporary bracing or anchors in formwork for items that are to be built or embedded into concrete, masonry or similar construction.
- D. Fit exposed connections accurately together to form hairline joints. Do not weld, cut, or abrade surfaces of exterior units that are for bolted or screwed field connections.

#### 3.02 INSTALLATION - WELDED WIRE FENCE

- A. Field verify and adjust sections of the work prior to anchoring to ensure matching alignments and stability of members at abutting joints.
- B. Install Ornamental Fencing posts plumb. Erect panels plumb true and free from rack and still maintain minimum, maximum, and typical clearances of bottom rail from finish grade. When holding panel true is not possible without exceeding those tolerances, rake assembled panels to approximate finished grade in as long and smooth gradients as possible.
- C. Post Footings:
  1. Coordinate installation of posts with construction of concrete walls and curbs.
  2. When cutting/drilling rails or posts adhere to the following requirements:
    - a. Remove all metal shavings from cut area.
    - b. Apply zinc-rich primer to thoroughly cover cut edge and/or drilled hole.
    - c. Apply 2 coats of custom finish paint matching fence color.
  2. Manufacturers spray cans or paint pens shall be used to prime and finish exposed surfaces; it is recommended that paint pens be used to prevent

overspray.

### 3.03 GATE INSTALLATION

- A. Install Gate posts and gate leaves plumb. Erect gate posts and leaves plumb true and free from rack and still maintain minimum, maximum, and typical clearances of bottom rail from finish grade.
  - 1. Manufacturer's gate drawings shall identify all necessary gate hardware required for the complete and proper installation of gates.
  - 2. Gate hardware shall be installed per manufacturer's recommendations.

### 3.04 ADJUSTING AND CLEANING

- A. Touch-up Painting: Immediately after erection, clean bolted connections and abraded areas per manufacturer's recommendations, and paint exposed areas with the same material (from the same paint lot) as used for shop painting to comply with SSPC-PA 1 and manufacturer's instructions for touching up shop-painted surfaces.
  - 1. Apply by paint pen or spray can to provide a minimum 2.0 mil (0.05mm) dry film thickness.
- B. The contractor shall clean the job site of excess materials, and legally dispose of off-site.

END OF SECTION

## 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) combined futsal/basketball standards & goals.
- B. Furnish and install adult exercise equipment

##### 1.03 RELATED WORK

- A. Section 02540 - Safety Surfacing
- B. Section 02590 – Color Coating
- C. 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, GOALS AND PADDING

- A. Basketball standards shall be 10' offset gooseneck posts manufactured by True Bounce (True Bounce, 56 Conduit St., New Bedford, MA 02745) PG Series Gooseneck, or equal.
  - 1) Post shall be Schedule 40 steel pipe with a 6-layer galvanized finish, sized as shown On the Drawings.
  - 2) Padding of Basketball Standard: Apply 2" thick padding to horizontal supports as shown on the Drawings. Padding shall be fire-retardant polyurethane foam securely held in place with velcro fasteners. Padding shall be recommended by the manufacturer for exterior use.
- B. Basketball backboards shall be a sound deadening backboard, True Bounce XL7042 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 a heavy duty "E" channeled aluminum with stainless steel fasteners.
  4. The lower edge and corners of basketball backboards shall be padded with manufacturer's supplied sports cushioning.
- 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.

## 2.02 FUTSAL GOAL

- A. Futsal goal shall be an all metal goal, dimensioned as shown on the Drawings, Euronix EBM007 distributed by Euronix Metal S.I., Zaragoza, Spain ([international@euronix.es](mailto:international@euronix.es) attn.: Alina Gainar) or equal.
- B. The front of the futsal goal shall be custom padded on three sides with 2" thick fire-retardant polyurethane foam secured with Velcro fastening, color to be selected by the Owner from manufacturer's standard color choices, as supplied by Truebounce or equal. Foam used shall be recommended by the manufacturer for exterior use.

## 2.03 EXERCISE EQUIPMENT

- A. Exercise equipment shall be as manufactured by Outdoor-Fitness Inc., Monument, CO (1-877-517-2200) or equal, conforming to the following:
1. Equipment for each exercise station shall be of the form and function detailed on the Drawings and shall accomplish that function without moveable parts.
  2. Equipment shall be all steel with a heavy duty polyester powder coat.
  3. Equipment shall be fabricated from Schedule 40 steel pipe or other steel members as required. All members shall be welded.
- B. **Stainless steel hardware shall be provided in lieu of manufacturer's standard galvanized screws and bolts.**

- C. Manufacturer shall provide a 4 year warranty minimum on main frame steel posts, bars, steel structural equipment.

### PART 3 - INSTALLATION

#### 3.01 New Backboards and Goals

- A. Install according to manufacturer's directions.
- B. Install level and plumb.

#### 3.02 Futsal Goal

- A. Permanently attach bottom of goal frame into concrete as shown on the Drawings using stainless steel wedge anchors.

#### 3.03 EXERCISE EQUIPMENT

- A. Install according to manufacturer's instructions and as follows.
- B. Install such that safety surfacing extends a minimum of 6' outwards from all points of the equipment.
- C. Install such that there is at least 6' clear between pieces of equipment.
- D. Install manufacturer's stickers with directions for use.
- E. Install according to manufacturer's directions.
- F. Install level and plumb.

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, Kompan, Gametime 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 installation of the following play equipment furnished by the Owner.
  - 1. Landscape Structures
    - a. Composite play structure for 6 mos-2 years.
    - b. One 4-bay swing with 3 strap swings, 1 molded swing and 2 tot buckets seats.
    - c. Two spring animals
  - 2. Gametime
    - a. One (1) Expressions swing mounted on LSI 4-bay swing frame
  - 3. Kompan Inc.
    - a. Multi-component play structure the "Custom Palace" Model ELE4901695.
  - 4. Berliner
    - a. Univers Combination Net Structure with curved slide, top fortress, access net, bridge, ladder, and triangular nets.

b. O'Tannebaum rotatable climber 95.200.080

- 1.03 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. 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. Audit shall contain a listing of each separate piece of equipment.
- 1.04 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.
- 1.05 RELATED SECTIONS
- A. Section 02200 – Earthwork
  - B. Section 02540 – Safety Surfacing.
  - C. Section 03300 – Cast-in-Place Concrete
- 1.06 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 each of the Equipment manufacturers to review the installation and to provide a written statement asserting that the supplied equipment and installation meet manufacturer's standards.
- 1.07 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

- 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 each different manufacturer 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. Some of the play equipment is illustrated at the end of this Section.

### 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.
- C. 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.
- D.. 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, spacing, 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 list individual pieces of equipment in the playground. 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.

### 3.08 PLAY EQUIPMENT FURNISHED BY THE OWNER TO BE INSTALLED BY THE CONTRACTOR





A PLAYCORE Company  
1-800-235-2440

5128

**EXPRESSION  
SWING**

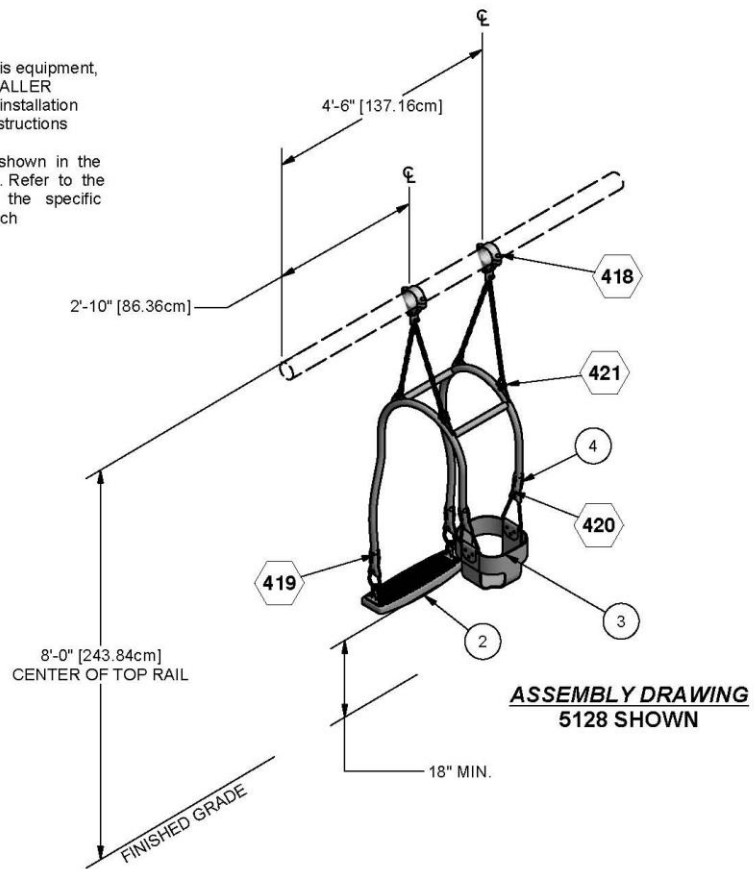
ISSUED/REVISED: 6/10/2015

-  = INSTALLATION  
DETAIL
-  = PARTS LIST  
REFERENCE

3 1/2" O.D. x 8' TOPRAIL 5128  
5" O.D. x 8' TOPRAIL 5145

**INSTALLATION  
INSTRUCTIONS**

1. Before assembling this equipment, read the enclosed INSTALLER INSTRUCTIONS in the installation booklet; follow all the instructions during installation.
2. Assemble parts as shown in the ASSEMBLY DRAWING. Refer to the assembly details for the specific hardware required in each connection.



3.09

A. Kompan Custom Palace

02860-6  
Playground Equipment



02860-7  
Playground Equipment

## B. Berliner Play Equipment

**Product Family** : Univers Net Structures

**Project name** : Peter Gilmore Park, MA.

**Project number** : USP.01534

**Children's age** : 5+

**Fall Height** : 8'-3"

**Dimensions: Length, width, height** : 37'-3" x 47'-8" x 21'-1"

**Protective Surfacing Area required** : 49'-5" x 61'-0" (1696 Sq.ft.)

**Number of foundations** : 13

**Concrete Volume C20/25 (3.000 psi)** : 4.04 m<sup>3</sup>

**Number of skilled installers required** : 4

**Installation time without foundation** : 8 hours

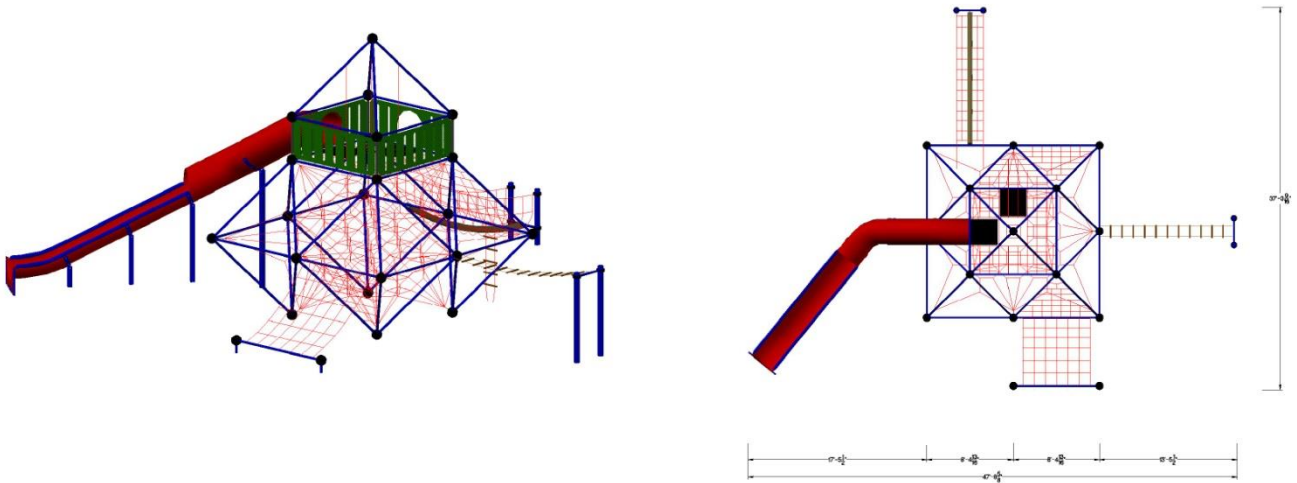
**Dimensions of largest part** : 31 1/2" x 31 1/2" x 28'-6 17/32"

**Weight of heaviest part** : 661.5 lb (300 kg)

**Freight volume** : 600.5 ft<sup>3</sup> (17 m<sup>3</sup>)

**Gross weight** : 3748.5 lb (1700 kg)

**Spare part guarantee** : Lifelong



Product description (on request also available as doc-file):

Net structure Univers CombiNation with curved slide from the top fortress, an access net, a jungle bridge, a hand-over-hand-ladder, and triangular nets.

**Members:** Framework-steel pipes,  $\varnothing$  60.3 mm (2 3/8"); anticorrosion treatment and color finish: sandblasting and zinc-/ epoxy-/ polyester-process.

02860-8  
Playground Equipment



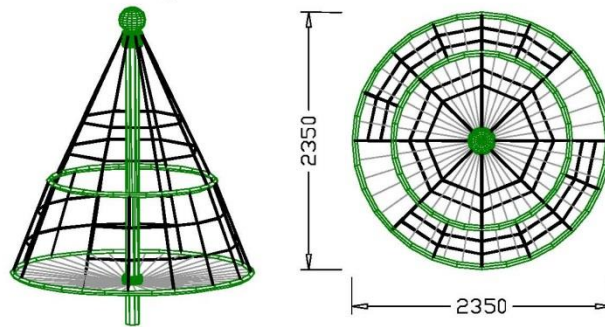
Nodes :	Framework-aluminum ball connectors, Ø 250mm (9-13/16"); anticorrosion treatment and color finish: sandblasting and zinc-/ epoxy-/ polyester-process; incorporating an ASTEM TT net tensioning system, securely closed with durable ebonite caps.
Ropes:	U-Rope-round strand ropes with galvanized steel cores, Ø 16mm (5/8") – unless otherwise noted; external strands are covered with non-abrasive UV-resistant Polyamide-yarn (no Polypropylene!).
Spatial netting:	Rope crossing points localized by durable, drop forged aluminum-cloverleaf rings; in situ-replaceable rope lines (no special tools required).
Planar netting:	Rope crossing points localized by durable, drop forged aluminum-ballknots (no plastic)
Hand-over-hand rope loops:	All ropes Ø 21mm (13/16"), length per loop 300 – 350mm (11-13/16" - 13 3/4")
Steel supports:	Uprights comprised of steel tubes $\approx$ 5 1/4" (133 mm) with rounded cast aluminum post tops, minimum wall thickness 1/4" (7.1mm); horizontal members comprised of Framework-steel tubes, $\approx$ 2 3/8" (60.3 mm); All connections to upright posts are with cast aluminum Terranos clamps; anticorrosion treatment and color finish: sandblasting and epoxy-/polyester powdercoating.
Jungle bridge:	Bridge with thick walk rope comprised of PP-cordage, $\approx$ 5 7/8" (150 mm); with steel core $\approx$ 1/2" (12 mm), external PP-winding durable stabilized with shrink-rubber sleeves at regular intervals; supporting points at railing net for walk rope protected with shrinkrubber sleeves; ends are fixed with shackles.
Hand-over-hand ladder:	Width 290 mm (11-7/16"), distance between rungs 250-300 mm(9-13/16" to 11-13/16"), rungs comprised of Nylon 6.6.
Climbing rope :	All ropes $\approx$ 13/16" (21mm), vertical ropes with worked-in ebonite cylinders, distance between cylinders 9-13/16" to 11-13/16" (250-300mm)
Triangular netting:	Net fills one triangle in the framework of the net structure, system dimension 2060 mm (6-9 1/8"), mesh width 250 x 250 mm(9-13/16" to 9-13/16"), connected to frame with cast aluminum rope clamps.
Flubber membrane:	Square rubber element for the insertion into net squares, comprised of durable, vandalresistant conveyor belt material.

- Fort: Four HDPE-panels at the top of the Neptun net climber, panel thickness 19 mm (3/4"), connected to steel tubes with cast aluminum panel clamps
- Curved slide: Attached to one of the entrance panels, comprised of plastic or stainless steel AISI304 (DIN 1.4301) with 51,5°-curve; Start height 3550mm (11- 7 3/4'); equipped with BSF-start bracket and one support.



### Product Specification

**Product Family** : PicolinoPlaypoints  
**Product name** : O'Tannebaum  
**Item number** : 95.200.080  
**Children's age** : 3+  
**Fall Height (EN1176)** : 2.00 m (6'-7")  
**Dimensions: Length, width, height** : 2.4 x 2.4 x 3.1 m (7'-11" x 7'-11" x 10')  
**Protective Surfacing Area required (EN1176)** : 5.4 x 5.4 m  
**Protective Surfacing Area required (ASTM 1487)** : 6.1 x 6.1 m (19'-9" x 19'-9")  
**Minimum space required** : **EN1176:** 22.5 m<sup>2</sup> / **ASTM 1487:** 28.4 m<sup>2</sup>  
**Number of foundations** : 1  
**Concrete Volume C20/25 (3,000 psi)** : 1.2 m<sup>3</sup>  
**Number of skilled installers required** : 3  
**Installation time without foundation** : 6 hours  
**Dimensions of largest part** : Ø 0.14 x 4.6 m (Ø 5 ½" x 15'-1")  
**Weight of heaviest part** : 92 kg  
**Freight volume** : 1.7 m<sup>3</sup>  
**Gross weight** : 360 kg  
**Spare part guarantee** : Lifelong  
**Certificate according to EN 1176** : No.: Z2 05 10 10256 043 – TÜV Product Service



Rotatable climber with central mast. Outer netting connected to steel rings is suspended from cables. The base is made from rubber with a robust conveyor-belt-quality allowing easy access for disabled users.

Central mast:	Steel pipes Ø 133mm (5 ¼"), wall thickness 6.3mm (1/4"); anticorrosion treatment and color finish: sandblasting and zinc-/ epoxy-/ polyester-process.
Mast node:	<b>Frameworkx</b> -aluminum ball connector, Ø 250mm (9-13/16"); anticorrosion treatment and color finish: sandblasting and zinc-/ epoxy-/

Berliner Seilfabrik Play Equipment Corporation  
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 Greenville, SC 29607  
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 www www.berliner-playequipment.com

Revised: April 2009

page 1 of 2



**Product Specification**

	polyester-process
Outer rings:	Bended Framework-steel pipes, Ø 48.3 mm (1 7/8''); anticorrosion treatment and color finish: sandblasting and zinc-/ epoxy-/ polyester-process.
Netting and suspension ropes:	<b>U-Rope</b> -round strand ropes with steel cores, Ø 16mm (5/8'') – unless otherwise noted ; with galvanized wires, external strands are covered with non-abrasive UV-resistant Polyamide-yarn (no Polypropylene!); Rope crossing points are localized with durable, drop forged aluminum-balknots (no plastic).
Flubber bottom:	Rotating bottom comprised of durable, vandal-resistant conveyor belt material.

END OF SECTION

02860-12  
Playground Equipment

## SECTION 02870

### SHADE 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. 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 Drawings and as specified.
- B. The work shall include, but is not limited to, the following:
  - 1. Furnish and Install two (2) metal 12' x 24' shade structures including lightening protection and grounding materials.
  - 2. Install 2 canvas shade shelters furnished by the Owner. Refer to Section 01040 Control of the Work, Paragraph 1.13 for additional responsibilities of the Contractor for coordinating, receiving and checking Owner Furnished Materials.
  - 3. The Contractor shall supply miscellaneous hardware required for the installation of Owner supplied materials, if same is not supplied by the manufacturer.

##### 1.03 RELATED WORK

- A. Section 02100 - Site Preparation and Demolition.
- B. Section 02200 - Earthwork.
- C. Section 02780 -Section 03300 - Cast-in-Place Concrete.

##### 1.04 SUBMITTALS

- A. Submit the following in accordance with the requirements of section 01300 - Submittals for the Metal Shade Structures:
  - 1. Manufacturer's complete shop drawings indicating type, size & gauge of

materials, connection details, and layout plan for footings and posts, demonstrating compliance with the Specifications.

2. The metal shade structure manufacturer shall submit structural calculations for the shade structure and foundation design , sealed by a registered engineer in the state of Massachusetts.
3. Shop drawings for steel reinforcement of metal shade structure footings.
4. Manufacturer's installation instructions.
5. Manufacturer's standard color chart and samples.

#### 1.05 QUALITY CONTROL

- A. Manufacturer qualifications: All manufacturers shall have a minimum of 5 years experience in the fabrication of tubular steel shade structures. Shade structure and kiosk fabrication shall be the manufacturer's primary business. Manufacturer shall have fabricated similar structures to that which is specified.
- B. Members shall be designed according to the American Institute of Steel Construction (AISC) specifications and the American Iron end Steel Institute (AISA) specifications for cold-formed members.
- C. Fabrication welds shall be in strict accordance with the structural welding code of the American Welding Society (AWS) specifications. All structural welds shall be in compliance with the requirements of "Pre-qualified" welded joints. All welding shall conform to ASTM A-233 series E-70XX electrodes - low hydrogen. Field welding is not allowed.

#### 1.06 DELIVERY, STORAGE AND HANDLING

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

#### 1.07 REFERENCE STANDARDS

- A. Materials and methods of construction shall comply with the following standards:
  1. ASTM A 36/A 36M - Standard Specification for Carbon Structural Steel; 2003a.
  2. ASTM A 325 - Standard Specification for Structural Steel Bolts, Heat Treated, 120,000 PSI Minimum Tensile Strength; 2004.
  3. ASTM A 307 - Standard Specification for Carbon Steel Bolts and Studs, 60,000 PSI Tensile Strength; 2003a.
  4. ASTM A 563 - Standard Specification for Carbon and Alloy Steel Nuts; 2004.

5. ASTM A 500 - Standard Specification for Cold-Formed Welded and Seamless Carbon Steel Structural Tubing in Rounds and Shapes; 2003a.
6. ASTM A 653/A 653M - Standard Specification for Steel Sheet, Zinc-Coated (Galvanized) or Zinc-Iron Alloy-Coated (Galvanealed) by the Hot-Dip Process; 2003.
7. ASTM A 792/A 792M - Standard Specification for Steel Sheet, 55% Aluminum-Zinc Alloy Coated by the Hot-Dip Process; 2003.
8. American Institute of Steel Construction (AISC).
9. American Iron and Steel Institute (AISI) Specifications for Cold Formed Members.
10. American Society of Testing Material (ASTM).
11. American Welding Society (AWS).
12. OSHA Steel Erection Standard 29 CFR 1926.750 Part R.
13. SSPC-SP 2 – Hand Tool Cleaning; Society for Protective Coatings; 2000.
14. SSPC-SP 10 - Near-White Blast Cleaning; Society for Protective Coatings; 2000.
15. ICC Evaluation Service, ESR-1006, Structural Insulated Panels.

#### 1.08 WARRANTY

- A. Provide manufacturer's standard five year warranty.

#### PART 2 - PRODUCTS

##### 2.01 ORNAMENTAL METAL HIP-ROOF SHADE STRUCTURE

- A. Shade structure shall be as manufactured by Icon Shelter Systems, Inc. (Local Distributor: New England Recreation Group, Westborough, MA 508-393-1963) all steel shade structure or approved equal and shall meet the following specifications:
  1. Shade structure shall be a Craftsman style rectangular, hipped roof all metal structure with four support posts conforming to the following dimensions and requirements:
  2. Dimensions: 12' x 24' roof dimension.
  3. Roof materials & finish:
    - a. Roof shall be composed of 24 gauge steel panels standing seam metal roof panel. Ribs shall run with the slope of the roof.

- b. Roof fascia trim shall be 3.5" x 3.5" J channel 24 gauge steel minimum or steel cross-section of equivalent strength.
  - c. Screws and rivets shall match roof color. **All screw tips shall be concealed.**
  - d. Roof elements shall be factory finished with a Zinalume / Kynar 500 or equal coating, warrantied for 20 years.
  - e. Metal Roof Trim: Roof trim shall match the color of the roof and shall be formed from 26-gauge painted galvalume steel as follows:
    - (1) Metal ridge caps shall be preformed with a single central bend to match the roof slope. The trim shall be hemmed on both sides.
    - (2) Roof peak cap shall be supplied on all buildings that do not include a framed cupola.
    - (3) Edge of the roof deck shall have a preformed "J" channel eave trim, the channel shall be applied along all the eaves to trim and straighten the eave. The "J" shall have weep holes at 6" on center for roof drainage.
    - (4) Highside trim shall be in a "J" shape and shall supplied for all tiered buildings.
  - f. Color shall be chosen by the Owner from manufacturer's standard color choices.
4. Frame and support posts:
- a. Beams and post supports shall be structural steel tubing, ASTM 500 Grade B, sized according to the Engineering calculations.
  - b. Support posts (columns) shall be ASTM 500 Grade B square steel tubing, 6" x 6" minimum.
  - c. Frame shall be bolted together or shop-welded. Field welding is not permissible.
  - d. Frame shall be factory finished. All frame members shall be sand blasted or shot blasted to a white finish and cleaned to remove all rust, scale, oil and grease. Frame members shall be finished with zinc rich primer followed by a baked on TGIC polyester coating, or equal. Finish shall be a smooth uniform surface with no pits, runs or sags.
  - e. Color of frame shall be chosen by the Owner from manufacturer's



standard color selections.

5. Structure shall be designed to meet all applicable regulations and building codes of the State of Massachusetts, including but not limited to wind, live load and seismic design requirements.
6. Manufacturer shall supply complete layout and detail plans with installation instructions.
7. Contractor shall provide lightning protection consisting of one or more air terminals and base, two grounding rods with clamps, class I conductors, cable fasteners, and stainless steel screws as manufactured by Harger Lightning & Grounding, 301 Ziegler Drive, Grayslake, IL., 60030, p 800-842-7437, f 847-548-8755.

#### 2.02 FABRIC SHADE STRUCTURES (Supplied by the Owner)

- A. Fabric shade shelters furnished by the Owner will be a steel frame support with polyethylene fabric shelter manufactured by Shade Systems represented locally by O'Brien & Sons, Medfield, MA (508-359-4200).
  1. Model will be as shown on the Drawings.
- B. The Contractor shall assemble, install, and provide any additional hardware necessary for installation.
  1. Contractor shall supply required grounding materials.

### PART 3 - EXECUTION

#### 3.01 Hardware

- A. All exposed hardware shall be rendered vandal-proof by a method acceptable to the Landscape Architect.

#### 3.03 Assembly

- A. Structures shall be erected in a workman-like manner with framing, roofing and trim installed according to the manufacturers's installation instructions.
  1. Care shall be taken to avoid damaging the structure during installation.
  2. Touch-up any damage to finish with manufacturer supplied touch-up paint.
  3. All screw tips securing roofing system shall be concealed.
- B. Carefully lay out footings according to manufacturer's dimensions.
- C. Construct steel reinforced footings in accordance with Section 03300 - Cast-in-Place

Concrete. Footings shall be 4,000 PSI concrete.

- D. For metal shade shelters, the contractor shall install lightening protection consisting of one or more air terminals and base, two grounding rods with clamps, class I conductors, cable fasteners, and stainless steel screws per manufacturer's standard installation details and instructions.

### 3.03 WARRANTY

#### A. Metal Shade Structure

- 1. Manufacturer shall warrantee the structure to be free from defects in material and workmanship for a period of five (5) years from date of Substantial Completion of the project.
- 2. Manufacturer shall warrantee roof finish for twenty (20) years.

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 all equipment and materials and performing all work necessary to supply, test, place, and amend planting soils as indicated on the Drawings and as recommended by the loam soils analysis.
  - 1. Loam for lawns and planting shall be from an off-site source. Existing topsoil shall be removed and disposed of.
  - 2. Refer to Sections 02902 Fertilizers for fertilizer specification , and Section 02925 Lawns for incorporation of fertilizers. Refer to Section 02950 for specific planting mix backfill requirements.

##### 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 02200 - Earthwork
  - 3. Section 02902 - Fertilizers
  - 4. Section 02925 - Lawns
  - 5. Section 02950 - Planting.

##### 1.04 TESTING

- A. The Contractor shall supply testing results for proposed loam source as follows:
  - 1. Comprehensive mechanical sieve analysis of soil to determine USDA classification, determination of pH, soil organic matter, exchangeable acidity, Modified Morgan extractable nutrients (P, K, Ca, Mg, Fe, Mn, Zn, Cu, B, S), lead

(Pb), and aluminum (Al), cation exchange capacity, and base saturation. , as well as crop specific lime and nutrient recommendations.

2. Testing shall also include recommendations by the testing lab for specific lime and nutrient recommendations for the lawns, and specific trees and shrubs listed on the planting plan. Should these recommendations differ from those required by the Specifications, the Contractor shall adjust amendments to match recommendations.

#### 1.05 REFERENCES

- A. Commonwealth of Massachusetts Highway Department (MHD):  
Standard Specifications for Highways and Bridges
- B. USDA Soil Conservation Service Soil Classification System.

#### 1.06 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 loam.
- C. Submit recommended rates and type of Nitrogen and Phosphorus fertilizers recommended by the soils testing agency for lawn areas, roses, and deciduous trees and shrubs.

### PART 2 - PRODUCTS

#### 2.01 LOAM BORROW

- A. Loam shall be a sandy loam or loam soil determined by mechanical analysis based on the USDA Soil Conservation Service Soil classification system. It shall be of uniform composition with no admixture of subsoil.
- B. Prior to amendment, loam shall have an acidity range of pH 6.0 to pH 6.8 and shall contain not less than 4% nor more than 20% organic matter.
- C. Loam shall be free of stones greater than one inch, lumps, plants, and their roots, debris and other extraneous matter over 1" in diameter, or excess quantities of smaller pieces of such material. It shall not contain toxic substances harmful to plant growth.

#### 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 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.

### PART 3 - EXECUTION

#### 3.01 INSPECTION OF SUBGRADE

- 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. 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.
- C. Protect adjacent walls, walks and utilities from damage or staining by the loam borrow.

#### 3.02 PLACING LOAM

- A. Loam borrow delivered to the site shall be protected from erosion at all times. Materials shall be spread immediately. 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.

- B. 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.
- C. 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.
- D. 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.
- E. After loam has been spread and compacted, soil additives per testing recommendations for optimizing pH, texture, and organic matter shall be spread and thoroughly incorporated into the layer of loam borrow by harrowing, tilling, or other methods reviewed by the Owner's Representative. Additives shall be integrated into the full 6 inches of loam.
- F. 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.
- G. After addition of additives, smooth and re-compact loam in preparation for fertilization and sodding, as required in Section 02925 Lawns.

### 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

02901-4  
Planting Soils

## 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 RELATED SECTIONS

- A. Section 02200 - Earthwork
- B. Section 02900 - Lawns
- C. Section 02901 - Planting Soils
- D. Section 02950 - Planting

##### 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 the site.

##### 1.08 FERTILIZER BEST MANAGEMENT PRACTICES

- 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. Fertilizer shall not be applied outside the growing season, defined as April 15<sup>th</sup> to October 31<sup>st</sup>. No late season fertilization is allowed.
- C. No fertilizer shall be applied during rainfall or before prediction of rain.
- D. 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 establishing new turf.
  - a. At least 50% of the nitrogen in the fertilizer shall be a slow release form of nitrogen, such as a polymer-coated time-release nitrogen 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



SECTION 02925

LAWNS

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. Incorporation of fertilizer into spread and compacted loam.
  - 2. Sodding.
  - 3. 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 RELATED WORK

- A. 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
  - 3. Section 02810 - Irrigation System
  - 4. Section 02901 - Planting Soils: Loam
  - 5. Section 02902 - Fertilizers

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 REFERENCES

- A. American Sod Producers Association's (ASPA), "Specifications for Turfgrass Sod Materials and Transplanting/Installing.

## 1.06 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 recommendations for fertilization of loam for optimal growth of specified sod species.
- C. Proposed fertilizer with manufacturer's product literature indicating Compliance with the Specifications.

## 1.07 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.

## 1.08 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 Transplanting/Installing.

## PART 2 - PRODUCTS

### 2.01 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 by Tuckahoe Turf farm, or equal with the following percentages of named grass species and named 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.

## 2.02 FERTILIZER

- A. 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 and maintenance will be paid for by the the Owner.

## PART 3 - EXECUTION

### 3.01 PREPARATION

- A. Do not begin sod installation until Landscape Architect's written approval of the grading and placement of loam.
- B. Do not begin sodding until the Irrigation System is fully operational.

### 3.02 SODDING

- A. Provide and mix fertilizers into loam at rates indicated by soils analysis. Delay mixing fertilizer if planting does not follow within a few days. Apply fertilizer on surface of spread soil mix, and mix thoroughly into to top 6 inches of loam before placement and planting of sod.
- B. Bring grade to proper finished grade for application of sod, allowing for sod thickness. Finish grade shall meet flush with all adjacent finished grades and paved surfaces.
- C. Compact loam 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.

- D. Laying Sod: Lay sod within 24 hours of stripping. Do not lay sod if dormant or if ground is frozen.
- E. 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.
- F. 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 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. Protect from physical damage by means of suitable signs, barricades, and construction fencing. Provide routine inspections. It shall be the Contractors responsibility to replace barriers if removed by vandalism, if he deems them necessary to protect sod throughout the guaranteed period. Provide 24 hour security duty during the first week following sodding.
- F. Watering: Watering shall be provided by the existing irrigation system. Keep lawns uniformly moist to a depth of 4 inches.
- G. 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.
- H. 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 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 and shrubs.
  - 2. Mulching planting beds.
  - 3. Planting maintenance.
  - 4. One year guarantee period for trees and shrubs.

##### 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
  - 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).

02950-1  
Planting

## 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.
  - 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.

02950-2  
Planting

## 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



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.

02950-4  
Planting

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.

02950-5  
Planting

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 as recommended by testing results for the particular species being planted.
1. Planting mix for rose shrub beds shall be 1/3 sand, 1/3 amended loam and 1/3 peat moss, thoroughly mixed and compacted to 85% maximum dry density.

#### 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.
2. 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

02950-6  
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 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

02950-7  
Planting

roots exposed and located above the surrounding finish grade.

7. Prior to completion of planting installations, remove rope and cut wire baskets 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.

### 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 for a minimum 30-day period, and afterwards as necessary to ensure establishment through the one-year guarantee period.
- 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 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 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

02950-11  
Planting



## SECTION 03300

### CAST IN PLACE CONCRETE

#### PART 1 - GENERAL

##### 1.01 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 48' length of seat wall and step wing walls at basketball court.
- B. Related Work:
  - 1. Section 02200 - Earthwork
  - 2. Section 02510 - Bituminous Concrete Paving
  - 3. Section 02830 - Chain Link Fence
  - 4. Section 02800 - Site Improvements
  - 5. 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:
    - (a) Curing materials.

03300-1

Cast-In-Place Concrete

- (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 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.

03300-3

Cast-In-Place Concrete

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 stainless steel or fiberglass-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. 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.

## 2.12 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.
- C. Reinforcing shall continue through control joints.

## 2.13 ANTI-SKATEBOARD HARDWARE

- A. Provide and install anti-skateboard hardware on seatwall at basketball court.
- B. 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.
- C. 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 JOINTING

- A. Unless otherwise indicated on the Drawings, expansion joints shall be located at 30 feet o.c. maximum and at all curbs and walls.

### 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.

### 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.
- B. 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.
- C. 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.
- D. 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. Sidewalk paving and exposed surface of curbs: Broom Finish.



- B. Exposed tops of footings: Smooth trowel exposed surface. Provide light broom finish.
- C. Exposed surfaces of concrete walls and curb/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 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 200 square feet per gallon in two applications perpendicular to each other.
- 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 seat wall and step wing walls at basketball court, at 4' o.c. maximum using manufacturer supplied adhesive and anchors, and according to manufacturer's instructions.

END OF SECTION

SECTION 04420

CAST IRON FOUNTAIN & GRANITE BASIN  
ADD ALTERNATE #1

PART 1 - GENERAL

1.01 GENERAL PROVISIONS

- A. Drawings and general provisions of the Contract, including General and Supplementary Conditions and Division 1 Specification Sections, apply to this Section.

1.02 DESCRIPTION

- A. Provide all equipment and materials, and do all work necessary to furnish and install cast-iron fountain, granite fountain basin, and granite paving band.

1.03 RELATED WORK

- A. Examine Contract Documents for requirements that affect the work of this Section. Other Specification Sections that relate directly to work of this Section include, but are not limited to:
  - 1. Section 02815 - Exterior Fountain
  - 2. Section 03300 - Cast-in-Place Concrete
  - 3. Section 07100 - Fountain Waterproofing

1.04 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 Institute of Steel Construction (AISC).
- C. National Building Granite Quarries Association Inc. (NBGQA).
- D. American Society for Testing and Materials (ASTM):
  - C 144 Aggregate for Masonry Mortar
  - C 150 Portland Cement
  - C 207 Hydrated Lime for Masonry Purposes
  - C 270 Mortar for Unit Masonry

1.05 SUBMITTALS

- A. Samples:

1. Granite: Submit two 12" x 12" samples of the granite. Sample shall show the full range of color, texture and finish of the granite.
  2. Dowels: One each of each size, 4 in. length.
- B. Submit manufacturer's product data for mortar materials, including additives.
- C. Shop Drawings: Cutting and setting drawings of granite pieces specified herein shall be submitted. Drawings shall indicate anchorage system, including steel support angles, anchors, cramps, dowels, etc., complete granite sizes, dimensions, layout, finishes, arrangement and other necessary details for reception of other work.
1. Drawings shall indicate locations of inserts for granite anchors and supports which are to be built into concrete and masonry, and locations and dimensions of cut-outs, holes, openings, and other provisions required for the work of other trades.
  2. Shop drawings shall indicate the setting number of each piece and each piece shall bear the corresponding number in a non-staining paint.
- D. Contractor's Review: Before commencing work, submit written statement signed by the Contractor stating that the Contract Documents have been reviewed with a qualified representative of the granite supplier, and that he is in agreement with the selected materials and construction techniques are proper, compatible with adjacent materials, and adequate for the application shown.

#### 1.06 COORDINATION

- A. Coordinate work with that of other Sections affecting this work, as necessary to assure the steady progress of the work under this Contract.
- B. Do all cutting and drilling to accommodate work of other Sections, as expressly indicated and as reasonably inferred from Contract Documents, or required for the proper completion of the Work.

#### 1.07 DELIVERY, HANDLING AND STORAGE

- A. Granite shall be carefully packed and banded by the supplier for shipment. Following shipping, granite shall be stored on wood skids or pallets, covered with non-staining, waterproof membrane and protected from the weather. Skids shall be placed and stacked in such a manner as to evenly distribute the weight of the granite materials and to prevent breakage, cracking, and damage to stone pieces. Granite materials shall be stored in such a manner as to allow air to circulate around the stone material. Granite shall not be permitted to be in direct contact with the ground at any time during storage.
- B. Granite shall be carefully handled to prevent chipping, breakage, soiling, or other damage. Pinch or wrecking bars shall not be used without protecting edges of granite with wood or other

rigid materials. Granite units shall be lifted with wide-belt type slings wherever possible: wire rope or ropes containing tar or other substances which might cause staining or damage to granite finish shall not be used.

- C. Granite damaged in any manner will be rejected and shall be replaced with new materials at no additional cost to the Owner.
- D. Store setting materials on raised platforms or slabs, under watertight covers or indoors. Protect metal angles, anchors, cramps, dowels, etc., from the elements. Immediately before placing remove all loose dirt, and other foreign materials.

#### 1.08 PROTECTION OF FINISHED SURFACES

- A. Finished surfaces adjacent to the stone work shall be adequately protected from soiling, staining, and other damage.

#### 1.09 QUALITY ASSURANCE

- A. Granite shall conform to the requirements of ASTM C 515, Architectural Grade and NBGA Specifications except as modified herein.

### PART 2 - PRODUCTS

#### 2.01 GRANITE

- A. Granite for basin surround and granite paving bad shall be a homogenous fine grained granite, "Woodbury Grey" supplied by Swenson Granite Works, 10 Main Street Route 109, Medway, Massachusetts 02053, (508)-533-2882 (Fax 508-533-344), or approved equal. Granite shall be supplied by a source approved by the Landscape Architect.
- B. Granite shall be of the sizes and dimensions indicated on the Drawings.
- C. 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 detects which would affect its appearance. Color, texture, and finish shall be within the range of samples approved by the Architect.
- D. Exposed surfaces shall be finished as follows:
  - 1. Fountain basin: Sawn with Thermal Finish all exposed sides, and top; Bottom - Sawn.
  - 2. Fountain basin interior: Sawn with lightly sandblasted finish as required in Section 07100 Fountain Waterproofing, by waterproofing manufacturer.
  - 3. Granite paving: Sawn all sides, thermal finish top.

4. Flatness Tolerances: Variation from true plane, on flat surfaces, shall be determined by use of a 4 ft. long straightedge applied in any direction on the surface. Such variations at the bed and joint arris lines shall not exceed 3/64 inch or 1/6 of the specified joint width whichever is greater. Variations from true plane on other parts of the face surfaces shall not exceed 3/64 inch.
- E. Beds and Joints: Pieces shall be bedded and jointed as shown on the approved shop drawings, and bed joint and vertical joint surfaces shall be cut with 3/16 inch beds and joints, as indicated on the approved shop drawings, sawn or cut full square back from the face at least two-thirds of the piece thickness. From that point the bed may fall under square not more than 1 inch.
- F. All faces, shall be at right angles to the plane of the top.
- G. Granite shall be cut accurately to required shape and dimensions.
- H. Holes, cut-outs, sinkages, and openings in granite work for anchors, cramps, dowels, supports, and lifting devices, shall be accurately cut or drilled to required dimensions, as shown on the approved shop drawings, and necessary to secure granite in place to insure correct location and accurate fit of all fixtures. Setting beds shall be shaped to fit supports.
- I. Arrises shall be cut sharp and true to square, and continuous with adjoining arrises. Where exposed, arrises shall be eased.

#### 2.02 SETTING BED MORTAR

- A. Setting bed mortar shall conform to ASTM C 270, Type 5, except that latex polymer additive shall be mixed with the cementitious materials and aggregate in lieu of water.
  1. Cement shall conform to ASTM C 150, Type I, complying with the staining requirements of ASTM C 91 for not more than 0.03% water soluble alkali, Furnish Type I, except Type III may be used for setting stone in cold weather.
  2. Sand shall conform to ASTM C 144, non-staining.
  3. Hydrated lime shall conform to ASTM C 207.
  4. Latex polymer additive shall be equal to "Laticrete 3701" setting liquid, manufactured by Laticrete International, Inc., Woodbridge, CT 06525. Mix according to manufacturers instructions.

#### 2.03 BOND COAT

- A. High strength bond coat between concrete base and setting bed mortar, and between setting bed mortar and granite shall be equal to "Laticrete 4237" mortar additive bond coat manufactured by Laticrete International, Inc., Woodbridge, CT 06525.

## 2.04 ANCHORAGE AND SETTING MATERIALS

- A. Dovetail slots, anchors, dowels, shims, and other metal items required for the support and anchorage of the stone work shall be furnished under this Section.
- B. Anchors, dowels, and other items to be set into concrete shall be furnished under this Section for installation under the concrete section. Other metal items shall be installed under this Section.
- C. Anchors, dowels, shims, and other metal items, shall be Type 304 stainless steel.
- D. Provide plastic setting buttons as necessary.

## 2.05 CAST IRON FOUNTAIN

- A. Fountain structure shall be a traditional bowl type cast-iron fountain, Robinson Iron "Washington Park Fountain" , or equal, dimensioned as shown on the Drawings.
  - 1. Cast-iron shall be ASM A48 Class 30 Sand Cast Grey Iron.
  - 2. Finish shall be a zinc primer undercoating followed by a hi-solids polyurethane.
    - a. Color of finish coat shall be chosen by the Owner from manufacturer's standard color choices.

## PART 3 - EXECUTION

### 3.01 PLACEMENT OF STEEL SUPPORT ANCHORS

- A. Granite shall be anchored and doweled as indicated, and as shown on the approved shop and setting drawings.

### 3.02 SETTING GRANITE

- A. Setting shall be done by competent granite setters under adequate supervision and in accordance with the approved shop and setting drawings.
- B. Granite units with chips, cracks, stains, or other defects which might be visible in the finish work shall not be used.
- C. Before setting, granite shall be clean and free of dirt and foreign matter on all sides, thoroughly scrubbed with a mild cleaner and rinsed with fresh clean water. Granite shall be dry before setting.
- D. Install granite plumb; true to line; with level courses straight, clean, uniformly wide joints; true surfaces; and straight plumb corners. Maintain horizontal and vertical alignment of joints.

- E. Install anchors, cramps, dowels, etc., as the granite work progresses. Clean off excess mortar after setting, while still fresh. Mix mortar in small batches to assure continuing freshness.
- F. Provide complete protection against breakage, staining and weather damage during and after installation of the granite work by use of suitable, strong, impervious film or fabric securely held in place. Tops of granite shall be positively protected with non-staining waterproof coverings, properly weighted, at night, during showers and whenever granite setters are not working.
- G. Maintain granite work clean as the work progresses. Exercise extreme care at exposed work to prevent smearing or staining with mortar. Wash mortar stains immediately from exposed surfaces.

### 3.03 CLEANING

- A. Upon completion of granite work, surfaces shall be left in a clean, unsoiled condition, acceptable to the Landscape Architect. Remove all dirt, excess mortar, stains, and other defacements.
  - 1. Mild abrasive cleaners that contain no harsh or caustic ingredients may be used, with fiber brooms or brushes and clear water. Wire brushes, steel wool, and acids or other solutions which may cause discoloration are expressly prohibited.
  - 2. Expansion joints shall be cleaned and left ready for sealing of joints under Section 07920, JOINT SEALANTS.

### 3.04 WATERPROOFING

- A. Refer to Section 07100 Fountain Waterproofing.

### 3.05 PROTECTION

- A. After the stone work has been installed, it shall be properly and adequately protected from damage. Boxing or other suitable protection shall be provided by Contractor wherever required. However, no lumber which may stain or deface the stone shall be used. Nails shall be stainless steel.

END OF SECTION 04420



## SECTION 07100

### FOUNTAIN WATERPROOFING

#### PART 1 - GENERAL

##### 1.01 SECTION INCLUDES

- A. Waterproofing for fountain applied to concrete and granite surfaces.

##### 1.02 RELATED SECTIONS

- A. Section 02815 – Fountain Mechanical & Electrical.
- B. Section 03300 – Cast-in-Place Concrete.
- C. Section 04420 – Cast Iron Fountain & Granite Basin: Finish for granite basin

##### 1.03 REFERENCES

- A. SSPC-SP 13/NACE No. 6 - Surface Preparation of Concrete, The Society for Protective Coatings and NACE International, 2003.
- B. International Concrete Repair Institute, Concrete Surface Profile Chips

##### 1.04 SUBMITTALS

- A. Product Data: Submit manufacturer's product data, including surface preparation, application and including surface preparation, application, and curing.
- B. Samples: Submit 3-inch by 1-inch samples of cured high performance lining (60 mils thick) and reinforcing fabric and joint cover sheet.
- C. Applicator's Project References: Submit list of completed project references.
- D. Certification of Applicator: Submit certificate from manufacturer verifying manufacturer's training and certification of installer. **This requirement will not be waived.**
- E. Warranty: Submit manufacturer's standard 5 year warranty.

##### 1.05 QUALITY ASSURANCE

- A. Qualifications:
  - 1. Applicator: Applicator shall be a manufacturer certified and approved installer who has successfully completed manufacturer's contractor training program.

- B. Manufacturer's Representative: The Contractor shall arrange to have a manufacturer's representative attend a pre-application meeting and inspect preparation of concrete and granite surfaces prior to application of lining.

#### 1.06 PRE-APPLICATION MEETING

- A. The Contractor shall convene a pre-application meeting 2 weeks before the start of application of the high performance lining with all parties directly affecting the work, including the applicator and manufacturer's representative.
- B. Review environmental requirements, materials, protection of adjacent work, surface preparation, application, curing, field quality control, cleaning and coordination with other work.

#### 1.06 DELIVERY, STORAGE AND HANDLING

- A. Delivery:
  - 1. Deliver materials to the site in manufacturer's original, unopened containers and packaging, with labels clearly indicating manufacturer and material.
  - 2. Do not deliver material to site more than one month before use.
- B. Storage:
  - 1. Store the material in accordance with manufacturer's instructions.
  - 2. Store materials indoor in an area well ventilated and protected from damage.
  - 3. Do not store material near open flame, sparks or hot surfaces.
  - 4. Store materials on raised platforms and covered by waterproofing covers.
  - 5. Keep material containers dry.
  - 6. Keep scrim fabric dry.
- C. Handling: Protect materials during handling and application to prevent damage.

#### 1.07 ENVIRONMENTAL REQUIREMENTS

- A. Do not apply in wet weather or when rain is imminent.
- B. Apply when the surface is a minimum 50 degrees F and a minimum of 5 degrees F above the dew point. Consult manufacturer for application instructions if the ambient or surface temperature is below 50 degrees F.
- C. Do not apply to porous substrates when substrate or ambient temperatures are rising.

- D. Do not apply to porous substrates when substrate is in direct sunlight.
- E. Do not apply over substrates that are frozen or contain frost.

1.08 WARRANTY

- A. Provide a 5-year material and 1-year labor warranty. Obtain material warranty from manufacturer.

PART 2 –PRODUCTS

2.01 MANUFACTURER

- A. High-performance lining shall be CIM 1000 manufactured by CIM Industries, Inc., 23 Elm Street, Peterborough NH 03458 (800-543-3458), or equal conforming to the following:
  - 1. Lining shall be a two-component, high solids, elastomeric asphalt modified urethane, designed for spray, squeegee, or roller application.
  - 2. Solids by volume: 88 percent.
  - 3. Volatile Organic Compounds (VOC): 0.76 pounds per gallon (92 g/L).
  - 4. Mullen Burst Strength, ASTM D751: CIM 50 mils, Scrim 150 pounds per sq. inch.
  - 5. Tear Strength, ASTM D624, Die C: 150 pounds per square inch.
  - 6. Tensile Strength, ASTM D412, 100-mil sheet: 900 pounds per square inch.
  - 7. Extension to break, ASTM D412: 400 percent.
  - 8. Recovery from 100% Extension:
    - (a) After 5 minutes: 98 percent.
    - (b) After 24 hours: 100 percent.
  - 9. Lining performance, Crack Bridging:
    - (a) 10 cycles at minus 15 degrees F: Greater than 1/8 inch.
    - (b) After heat aging: Greater than ¼-inch.
  - 10. Lining Performance, Weathering ASTM D822: 5000 hours: no cracking.
  - 11. Softening Point, ASTM D36: Greater than 325 degrees F.
  - 12. Deflection temperature, ASTM D648: Below minus 60 degrees.

13. Service Temperature: minus 60 degrees.
  14. Hardness, ASTM D2240, Shore A, 77 degrees: 60.
  15. Permeability to Water Vapor, ASTM E96, Method E, 100 degrees F, 100-mil sheet, 0.03 perms.
  16. Abrasion resistance, Weight Loss, ASTM D4060: 1.2 mg.
  17. Adhesion to Concrete, Dry, Elcometer: 350 pounds per square inch.
  18. Color: Black.
- B. Primer: Primer shall be CIM 61 BG Epoxy Primer, a two-component, high solids, epoxy primer, or equal.
1. Solids by volume: 80 percent mixed.
  2. Volatile Organic Compounds (VOC): 1.41 pounds per gallon (170 g/L).
- C. Bonding Agent: Bonding agent shall be manufactured by CIM or equal. Bonding agent shall be an organo-silane compound dispersed in isopropyl alcohol which provides a continuous and uniform bond between surfaces.
1. Solids by volume: Less than 1%.
  2. Volatile Organic Compounds (VOC): 6.4 pounds per gallon (743 g/L).
- D. Patching Material: CIM 1000 Trowel Grade. Liquid applied, chemical and corrosion resistant urethane elastomer chemically thickened to allow trowel application with minimum sag. Use as a crack filler and for application to vertical surfaces and cold joints.
1. Elastomeric Waterproofing, ASTM C836 and C957: Exceeds all criteria.
  2. Solids by Volume: 89 percent.
  3. Volatile Organic Compounds (VOC): 0.74 pounds per gallon (88g/L).
  4. Mullen Burst Strength, ASTM D751, 50 mils for CIM, Scrim: 150 pounds per square inch.
  5. Tear Strength, ASTM624, Die C: 150 pounds per inch.
  6. Tensile Strength, ASTM D412, 100-mil sheet: 800 pounds per square inch.
  7. Extension to Break, ASTM D412: 300 percent.

8. Recovery from 100 percent extension:
    - (a) After 5 minutes: 98 percent.
    - (b) After 24 hours: 100 percent.
  9. Lining performance, Crack Bridging:
    - (a) 10 cycles at minus 15 degrees F: Greater than 1/8inch.
    - (b) After heat aging: Greater than ¼ inch.
  10. Lining performance, Weathering, ASTM D822: 5000 hours: no cracking.
  11. Softening Point, ASTM D36: Greater than 325 degrees F.
  12. Deflection Temperature, ASTM D648: below minus 60 degrees.
  13. Service Temperature: minus 60 degrees F to 220 degrees F.
  14. Hardness, ASTM D2240, Shore A, 77 degrees F: 60.
  15. Permeability to Water Vapor, ASTM E96, Method E., 100 degrees F, 100 mil sheet: 0.03 perms.
  16. Abrasion Resistance, Weight Loss, ASTM D4060: 1.2 mg.
  17. Adhesion to Concrete, Dry, Elcometer: 350 pounds per square inch.
- Color: Black.
- E. Reinforcing Fabric and Joint Cover Sheet: shall be CIM scrim or equal. Fabric shall be stitch bonded polyester, compatible with lining materials.
1. Weight: 3 ounces per square yard (100 g/square meter).
  2. Tensile Strength, ASTM D1682: 57.1 pounds (30 kg).
  3. Elongation ASTM D1682: 61.65 percent.
  4. Mullen Burst Strength, ASTM D3726: 176.8 pounds per square inch (1,215 kPa).
  5. Trapezoid Tear Strength, ASTM D1117: 16.1 pounds (7.2 kg).

## PART 3 EXECUTION

### 3.01 INSPECTION

- A. Inspect substrate and adjacent areas where high-performance lining will be applied. Notify the Landscape Architect of conditions that would adversely affect the application or subsequent utilization of the high-performance lining. Do not proceed with application until unsatisfactory conditions are corrected.

### 3.02 PROTECTION

- A. Protect adjacent work and surrounding areas from contact with high-performance lining.

### 3.03 SURFACE PREPARATION FOR CONCRETE SURFACE (FOUNTAIN FLOOR)

- A. Ensure that concrete has a minimum compressive strength of 3,000 psi, is dry, and is free of release agents and curing compounds before application of lining.
- B. Remove surface laitance and expose the underlying aggregate consistent with ICRI CSP 4 to 6 in accordance with ICRA 03732.
- C. Abrasive Blasting of Concrete:
  - 1. Prepare concrete by abrasive blasting.
  - 2. Remove dirt, soil, grease, oil, paint, linings, form release agents, curing compounds, laitance, loose material, unsound concrete, and other foreign materials that would inhibit performance of lining in accordance with ASTM D4258 and by abrasive blasting.
  - 3. Obtain a firm, sound concrete surface in which bug holes are fully opened or repaired.
  - 4. Remove sharp concrete edges and projections.
  - 5. Perform abrasive blasting in accordance with ASTM D4256-88.
  - 6. Receive approval by Engineer of blasting media.
  - 7. Maintain air supply for abrasive blasting free of oil and water in accordance with ASTM D4285.
  - 8. Expose aggregate to obtain a profile of ICRI 4 to 6 in accordance with ICRI 03732.
- D. Repair concrete surface to be free of holes. Fully open bug holes before repair. Repair defects in the concrete surface, such as bug holes, air pockets, and honeycomb by filling and smoothing off with patching material, epoxy patching compound, or grout. Abrasive blast repaired surfaces.

- E. Ensure substrate is clean and dry in accordance with manufacturer's instructions. Remove surface laitance from concrete surface to expose aggregate to obtain a profile of ICRI CSP 4 to 6 in accordance with ICRI 03732.
- F. Repair cracks in concrete surface with material suitable for type and width of crack, compatible with substrate and high-performance lining, and approved by the manufacturer's representative.
- G. Moisture tests: Do not apply primer or high-performance lining to concrete or granite surfaces unless two or more of the following moisture tests confirm appropriate moisture levels for properly prepared substrates:
  - 1. Plastic Sheet Method (ASTM D4263): Pass
  - 2. Relative Humidity Test: Less than 75 percent relative humidity at 70 degrees F.
  - 3. Calcium Chloride Test: Less than 5 pounds per 1,000 square feet per 24 hours.
  - 4. Radio Frequency Test: Less than 5 percent moisture.

#### 3.04 SURFACE PREPARATION FOR GRANITE SURFACE (FOUNTAIN BASIN)

- A. Sand-blasted finish is required in Section 04420 – Cast Iron Fountain & Granite Basin.
- B. Provide clean, dry, and structurally sound stone surface.
- C. Remove dirt, soil, grease, oil, and other foreign materials.

#### 3.05 APPLICATION

- A. Apply primer to clean prepared surfaces with a minimum of 5 mils wet thickness. The primed surface must be free of holidays or pinholes in order to minimize outgassing effects. Surfaces may require additional coats to obtain a pinhole free finish.
- B. Allow primer to cure in accordance with manufacturer's instructions before applying bonding agent.
- C. Apply bonding agent in accordance with manufacturer's instructions.
- D. Apply high-performance lining in accordance with manufacturer's instructions.
- E. Keep material containers tightly closed until ready for use.
- F. Keep equipment, air supplies, and application surfaces dry.
- G. Mix and apply when high-performance lining is above 60 degrees F.
- H. Do not use adulterants, thinners, or cutback solutions.

- I. Blend and mix 2-component materials in accordance with manufacturer's instructions. Do not hand mix components.
- J. Maintain air supply for material spray application free of oil and water in accordance with ASTM D4285.
- K. Apply high-performance lining directly to clean and dry surface or to reinforcing fabric.
- L. Apply a 6 to 12 inch wide strip of joint cover sheets over cracks over 1/8" wide, non-working joints, and edges. Adhere center joint cover sheet over all joints by applying a tack coat of the high-performance lining.
- M. Apply sufficient high-performance lining to achieve 60 mils wet film thickness.
- N. Joint Lines:
  - 1. Prepare for joint lines should rain or other conditions require work stoppage or extended delay.
  - 2. Install joint lines clean and straight. Install overlap 6-inches minimum to ensure an impervious joint.
  - 3. Severely abrade with wire brush or sandpaper and apply bonding agent to all areas where the high-performance lining has cured beyond its recoat window.
    - (a) The recoat window is 1-4 hours at 70 degrees. The recoat window is affected by air and substrate temperature. Consult manufacturer's representative for recoat window for specific temperature at which work will be done.
- O. Relining:
  - 1. Recoat the lining system within the recoat window to obtain maximum interlayer adhesion to build to the specific thickness required.
  - 2. Immersion Service: Minimize areas to be recoated outside the recoat window, except at joint lines.
  - 3. Non-immersion Service: Severely abrade with wire brush or surface grinder, apply bonding agent, and recoat, if high-performance lining has cured more than the recoat window. Acceptable adhesion can only be achieved through aggressive abrading.

### 3.06 CURING

- A. Cure high-performance lining in accordance with manufacturer's instructions.



- B. Allow sufficient time for solvents to evaporate from the cured high-performance lining before placing into service.
- C. Allow minimum solvent release time of 24 hours to 48 hours at 60 degrees F for a 60 wet mil lining thickness.
- D. Receive approval of curing lining by the manufacturer's representative.

3.07 FIELD QUALITY CONTROL

- A. Remove and dispose of all temporary materials used to protect adjacent work and surrounding areas.
- B. Immediately remove and clean high-performance lining materials from surfaces not intended to receive the materials.

END OF SECTION

## SECTION 09614

### DETECTABLE WARNING PANELS

#### 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. Provide all equipment and materials, and do all work necessary to furnish and install Cast In Place Detectable Warning Panels as indicated on the Drawings and as specified.

##### 1.03 RELATED WORK

- A. Section 02700 - Granite Curbing.
- B. Section 03300 - Cast-in-Place Concrete.

##### 1.04 REFERENCE STANDARDS AND SPECIFICATIONS

- A. Comply with applicable requirements of the following standards. Where these standards conflict with other specified requirements, the most restrictive requirements shall govern.
- B. Detectable warning surface panels shall comply with detectable warnings on walking surfaces section of the American with Disabilities Act Section 705.1 of the 2010 ADA Standards for Accessible Design (ADAAG).
- C. American Society for Testing and Materials (ASTM):
  - 1. ASTM C-543 Chemical Resistance
  - 2. ASTM D-1501 Simulated Sunlight
  - 3. ASTM D-756 Procedure "E" Accelerated Service Test
  - 4. ASTM D-570 Water Absorption

##### 1.05 SUBMITTALS

- A. Product Data: Submit manufacture's literature describing products, installation procedures and maintenance.
- B. Samples: Submit a sample of the panel proposed to be used.

##### 1.06 QUALITY ASSURANCE

### DETECTABLE WARNING PANELS

09614-1

- A. Provide Cast-in-Place Detectable Warning Panels and accessories as produced by a single manufacturer with a minimum of three (3) years experience in the manufacturing of Cast-in-Place Detectable Warning Panels.

1.07 DELIVERY, STORAGE AND HANDLING

- A. Cast-in-Place Detectable Warning Panels shall be suitably packaged or crated to prevent damage in shipment or handling..

1.08 PROJECT CONDITIONS

- A. Cold Weather Protection: Maintain minimum temperature of 40°F in areas to receive Cast-in-Place Detectable Warning Panels for at least 24 hours prior to installation, during installation, and for not less than 24 hours after installation.

1.09 GUARANTEE

- A. Cast-in-Place Detectable Warning Panels shall be guaranteed in writing for a period of five (5) years from date of final completion. The guarantee includes defective work, breakage, deformation, fading, and loosening of panels.

PART 2 - PRODUCTS

2.01 MANUFACTURER

- A. The Polymer concrete Cast-in-Place Detectable Warning Panel specified is based on Armorcast Products Company (818-982-3600) or approved equal.
- B. Color: to be selected by the Owner from manufacturer's standard color choices.

2.02 DETECTABLE WARNING PANELS

- A. Polymer concrete cast-in-place Detectable Warning Panels shall be manufactured using polymer concrete material. Polymer material shall consist of calcareous and siliceous stone, glass fibers, and thermo set polyester resin.
- B. Detectable Warning Panels shall be manufactured using matched die molds under heat and pressure for superior material compaction, controlling curing and uniform dimension. Panels shall conform to the following dimensions: 24"width x 60" depth x ½" thickness.
- C. Polymer concrete Detectable Warning Panels shall be reinforced with fiberglass mats.
- D. Polymer concrete Detectable Warning Panels shall have ½" minimum material thickness excluding truncated dome height or reinforcement ribs.

DETECTABLE WARNING PANELS  
09614-2

- E. Polymer concrete Detectable Warning Panels shall be fitted with Zinc alloy concrete anchors and stainless steel bolts.
- F. Polymer concrete Detectable Warning Panels shall be coated to keep the panel surface clean during installation. The coating shall be removed after installation.
- G. Polymer concrete Detectable Warning Panels shall be fitted with hot dipped galvanized angles for installation in wet concrete.
- H. Polymer concrete Detectable Warning Panels shall be field replaceable without cutting existing concrete or pouring new concrete.
- I. Slip resistance of Polymer concrete Detectable Warning Panels when tested in accordance with ASTM C-1028 shall not be less than 0.80.
- J. Chemical resistance of Polymer concrete Detectable Warning Panels when tested in accordance with ASTM C-543 to withstand without any degradation or discoloration: 1% Hydrochloric Acid, Acetic Acid, Sulfuric Acid, Sodium Chloride, Sodium Hydroxide, Sodium Sulfate, Sodium Carbonate, Kerosene and Oil.
- K. Polymer concrete Detectable Warning Panels when tested in accordance with ASTM D-635 shall not sustain burning and be self extinguishing.
- L. Polymer concrete Detectable Warning Panels when tested in accordance with ASTM G-21 shall not promote fungus growth.
- M. Polymer concrete Detectable Warning Panel material surface flammability when tested in accordance with ASTM E-162 shall be less than 25.
- N. Polymer concrete Detectable Warning Panel smoke density when tested in accordance with ASTM E-662-03 shall be less than 0.5 at 1.5 minutes and less than 15 at 4 minutes.

2.03 MECHANICAL PROPERTIES

- A. The polymer concrete material shall meet the following for mechanical properties:

Test Method	Mechanical Properties	Average Value
ASTM C-170-99	Compressive Strength	11,430 PSI
ASTM C-580-02	Flexural Strength	3,330 PSI
ASTM C-307-99	Tensile Strength	1,710 PSI
ASTM C-372-02	Shear Strength	11,670 PSI
ASTM C-580	Modulus of Elasticity	1,776,400 PSI

PART 3 - EXECUTION

DETECTABLE WARNING PANELS  
09614-3

### 3.01 INSTALLATION

- A. Concrete shall be placed and finished true to line and grade and smooth to the required dimensions and gradient as indicated in the Drawings and as specified in Section 03300, Cast-in-Place Concrete.
- B. Immediately after finishing concrete, an electronic level shall be used to verify that gradient and slope of finished concrete does not exceed maximum slope and gradient as indicated in the Drawings. No concrete shall be removed in the area to accept the panel.
- C. Detectable Warning Panels shall be tamped (or vibrated) into the fresh concrete to ensure that the level of the panel is flush to the adjacent concrete surface. The embedment process shall not be accomplished by stepping on the panel as this may cause uneven setting which can result in air voids under the panel surface. The base of the truncated domes shall be set flush to the adjacent surface to permit proper drainage and eliminate tripping hazards between adjacent finishes.
- D. Immediately after panel placement, the panel elevation shall be checked to be flush with adjacent concrete. The elevation and slope shall be set as indicated in the Drawings. Ensure that the surface of the panel is flush with the surrounding concrete. Finish concrete around the panel's perimeter with a steel trowel.
- E. Following the concrete curing stage, protective plastic wrap is to be removed from the panel surface by cutting the plastic wrap with a sharp knife tight to the concrete / panel interface.

### 3.02 CLEANING, PROTECTION AND MAINTENANCE

- A. Protect panels against damage during construction period in compliance with manufacturer's specifications.
- B. Protect panels against damage from rolling loads following installation by covering with plywood or hardwood.
- C. Clean panels not more than four days prior to date scheduled for inspection intended to establish date of substantial completion.
- D. Comply with manufacturer's maintenance instructions for cleaning and maintaining panel surface.

END OF SECTION

DETECTABLE WARNING PANELS  
09614-4

## SECTION 10430

### BRONZE PLAQUES

#### 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 two (2) bronze plaques with text.
- C. Exact wording of plaques are subject to change.
- D. The location of plaques 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
  - 2. Section 02200 - Earthwork.
  - 3. Section 03300 - Cast-in-Place Concrete.

##### 1.04 SUBMITTALS

- A. Product Data: Submit manufacturer's product data of work of this Section. Provide complete product description and specifications, catalog cuts, and other descriptive data.
- B. Submit full scale image of plaque for Owner to proof.

#### PART 2 - PRODUCTS

##### 2.01 BRONZE PLAQUES

Bronze Plaques  
10430-1

- A. Provide bronze casting, copper alloy UNS C83600, complying with the requirements of ASTM B584.
  - 1. Casting shall be free from pits, scale, sand holes, or other defects. Comply with the requirements specified for metal, border style, background, texture, and finish and with requirements shown for finish, size, shape, and copy.
  - 2. Border style: Single Line
  - 3. Background Texture:
  - 4. Background Finish: Baked Enamel Dark Brown
  - 5. Font Finish: Satin Polished
  - 6. Font: Helvetica Bold
  - 7. Provide Clear Organic Coating for all surfaces: Air-dried acrylic coating equal to Inctalac as developed by International Copper Research Corporation, 1.0-mil minimum dry thickness.
  - 8. Provide stainless steel vandal resistant hardware for attachment of plaques to concrete.

### PART 3 - EXECUTION

#### 3.01 GENERAL

- A. Locate plaques where shown and scheduled. Use mounting methods indicated.
- B. 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.

#### 3.02 INSTALLATION

- A. Installation: Install units plumb, level, in alignment and plane without warp or rack. Provide vandal resistant hardware to anchor securely in place.

#### 3.03 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.

#### 3.04 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

Bronze Plaques  
10430-2

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 16100

### ELECTRIC SERVICE IMPROVEMENTS

#### 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 electric service improvements.
- C. The Contractor shall furnish a complete finished product, which meets all applicable codes and standards, and the intent and specific requirements of the Drawings and specifications for this project. It is the intent of these specifications that the electrical system shall be suitable in every way for the service (and use) required. All materials and all work, which may be reasonably implied as being incidental to the work of this Section, shall be furnished at no extra cost to the Owner.
- D. As used in this Section, "*provide*" means "furnish and install", "*furnish*" means "to purchase and deliver to the project site complete with every necessary appurtenance and support", and "*install*" means "to unload at the delivery point at the site and perform every operation necessary to establish secure mounting and correct operation at the proper location in the project".
- E. Perform work and provide (furnish and install) material and equipment as shown on Drawings and as specified, or indicated, in this Section of the specifications. Completely coordinate work of this Section with work of other trades and provide a complete and fully functional installation. Drawings and specifications form complimentary requirements; provide work specified and not shown, and work shown and not specified as though explicitly required by both. Although work is not specifically shown or specified, provide supplementary or miscellaneous items, appurtenances, devices and materials obviously necessary for a sound, secure and complete installation.
- F. Remove all debris caused by Contractors' work.
- G. Provide demolition and relocation of existing electrical items as shown on the drawings.

##### 1.02 SCOPE OF WORK

16100-1

ELECTRICAL SERVICE IMPROVEMENTS

- A. Under this Section, the Contractor shall furnish all labor, materials, equipment and transportation necessary to install the following:
  - 1. New underground electrical service from existing EVERSOURCE utility pole. Electrical service to be 100A, single-phase 120/240V, installed in 2" conduit, installed into new 100A, main service panelboard installed in new outdoor NEMA 3R electrical cabinet, provided with utility meter socket. Work shall include all conduits, cable, excavation, backfill, surface restoration, concrete foundation, grounding and all associated equipment necessary for a complete installation.
  - 2. Provide power to fountain spray feature controller in separate enclosure, irrigation controller, duplex receptacles, light in new electrical cabinet and other equipment as shown on Contract Drawings.
  - 3. Provide all materials and electrical work to install walkway lighting shown on the drawings including light poles, luminaires, hand-holes, foundations, conduit and all other associated electrical work.
- B. The Contractor shall include as an Allowance in his/her bid for charges by the utility companies or other authorities for work done by them and charged to the Contractor, or for any other fees or expenses required by utility companies necessary to complete the work of this Contract. Refer to Division I, Section 01020 Allowances and the Bid Form for the amount of the Allowance.
- C. The Contractor shall provide any additional labor and materials required by the utility company to complete the work of this Section, at no additional cost to the Owner.
- D. All work performed under this Section shall be performed by a MA licensed Electrician.
- E. The Contractor is required to apply and obtain all permits required for this work. The City of Waltham will waive all fees associated with these applications.
- F. An EVERSOURCE Electric - Work Order Application will be submitted to EVERSOURCE for the work specified in this section and as indicated on the Drawings by the Architect.

### 1.03 COORDINATION

- A. Coordinate all work with representatives of the City of Waltham Wiring Department Electrical Inspector, Parks and Recreation Department, and EVERSOURCE, as required and applicable at no additional cost to the Owner.
- B. The Contractor shall be responsible for arranging for all inspections required by the City or the Utility companies involved. Contact Person: Tim Kelly, City of Waltham Wiring Department (781-314-3175).

### 1.04 REFERENCES

- A. The following standards and definitions are applicable to the work of this Section to the extent referenced herein:

ANSI/NEMA FB 1	Fittings, Cast Metal Boxes, and Conduit Bodies for conduit and Cable Assemblies.
ANSI/NFPA 70	National Electrical Code, with state amendments where applicable.
NECA	“Standard of Installation.” <sup>3</sup>
NEMA RN 1	Polyvinyl Chloride (PVC) Externally Coated Galvanized Rigid Steel Conduit and Intermediate Metal Conduit.
NEMA TC 2	Electrical Plastic Tubing (EPT) and Conduit (EPC-40 and EPC-80).
NEMA TC 3	PVC Fittings for Use with Rigid PVC Conduit and Tubing.

#### 1.05 STANDARDS AND REQUIREMENTS

- A. All electrical equipment required under this section shall comply with the latest requirements and standards of the National Electric Code, Federal Specifications, the National Electrical Manufacturer’s Association, the Underwriters Laboratories, Inc., the ASTM, ANSI, and the American Institute of Electrical Engineers.

#### 1.06 SUBMITTALS

- A. Submit shop drawings and manufacturer’s specifications for all materials to be furnished under this Section including:
1. Conduits and Wiring.
  2. Panelboards.
  3. Service Cabinets and Equipment.
  4. Circuit Breakers.
  5. Light poles and luminaries.
  6. Wiring Devices and Receptacles.
  7. Meter Sockets
  8. Grounding
  9. Walkway lighting, luminaires and poles.
- B. Submit samples of materials for use under this Section as directed by the Owner or Owner’s Representative.
- C. The Engineer’s review shall be only for conformance with the design concept of the project and compliance with the specifications and Drawings. The responsibility of, and the necessity of, furnishing materials and workmanship required by the specifications

and Drawings which may not be indicated on the shop drawings is included under the work of this Section.

#### 1.07 INSPECTIONS AND FEES

- A. Obtain all necessary permits and licenses, and pay all fees for permits and inspections. Permit fees are the responsibility of the Contractor as part of his bid, as is all coordination with the local utility, EVERSOURCE.
- B. The EVERSOURCE Work Order has not been filed by the Owner with EVERSOURCE. Once the Work Order has been issued, this information will be provided to the Contractor. Coordinate all work with EVERSOURCE once the Work Order is issued.
- C. Copies of the Work Orders will be provided to the successful bidder after receipt of the Work Order by the City.

#### 1.08 ELECTRIC UTILITY

- A. The Electric Utility for this project is EVERSOURCE Electric. All coordination with the Electric Utility is the responsibility of the Contractor. All work and materials for the electric service shall be in accordance with the requirements of the Electric Utility, and are to be met under this Section and included in the bid price of the Contractor. Contractor shall adhere to EVERSOURCE's *"Information and Requirements for Electric Service (2008 or later)"*.

#### 1.09 AS-BUILT DRAWINGS

- A. After completion of the electrical installation, the Contractor shall furnish "As-Built" drawings showing all conduits, cables, cabinets, light fixtures, etc. to scale with dimensions where required. Instruction sheets and parts lists covering all operating equipment will be bound into a folder and furnished to the Owner in duplicate.

### PART 2 - MATERIALS

#### 2.01 GOVERNING SPECIFICATIONS FOR ALL MATERIALS

- A. Unless stipulated otherwise, all materials shall be furnished in accordance with the State and Local Building Codes and the requirements of EVERSOURCE.

#### 2.02 CONDUIT AND WIRES

- A. Conduit shall be as required and meet all Federal, State and Local electric codes. Conduit shall be gray heavy wall rigid plastic conduit of homogenous polyvinyl chloride construction with standard wall thickness. Conduit shall conform to the NEMA Standards Publication TC-2 for Schedule 80 type EPC Conduit, extra rigid.
- B. All conduit shall comply with ASTM D1784 and all solvent cements shall comply with ASTM D2564.

- C. Use wires in the quantities, sizes and types to meet code requirements.
- D. Use a 3/8" polypropylene pullrope within the required conduit run for pulling of electrical wiring.
- E. Use schedule 80 PVC and riser extensions at connection to utility pole.
- F. Unless otherwise noted, conductors for power, lighting, and grounding *above grade* shall be No. 14 through No. 8 AWG, NEC type THWN/THHN, meeting the requirements of UL 83. Conductors for power and lighting shall be no smaller than No. 14 AWG.
- G. Conductors for power, lighting, grounding, and control *below grade* (and in wet locations) shall be No. 2 AWG and larger, NEC type XHHW (or XHHW-2), meeting the requirements of NEMA WC7 and ICEA S-66-524.
- H. All conductors shall be annealed copper, 98% conductivity, Class B stranded, except conductors used for power and lighting circuits No. 10 AWG and smaller which may be solid. All conductors should be rated for 600 volts or less, with a thermal rating of 90° C.
- I. The outside covering of all wiring for power, lighting, grounding, and control uses shall be color coded to identify polarity as follows:

	208Y/120 V 3 Phase	240D/120 V 3 Phase	480Y/277 V 3 Phase
Phase A	Black	Black	Brown
Phase B	Red	Red	Orange
Phase C	Blue	Orange	Yellow
Neutral	White	White	Gray
Ground	Green	Green	Green

2.03 COMPOSITE HANDHOLES

- A. Composite (polymer concrete) handholes for electrical facilities.
  - 1. Manufactured from heavy-duty, fire-retardant polymer concrete reinforced composites, with UV stabilizers and vertical ribs for structural stiffness.
  - 2. Dimensions: 11" W x 18" L x 18" D (small electrical Handhole)
  - 3. Color of electrical hand holes and covers to be green in grass areas and grey in sidewalk areas, as approved by the Engineer. Handholes to be installed flush with finish grade. Handholes to have open bottom. A layer of 6-inches of washed crushed stone (#57) shall be installed under each handhole to assist with drainage, and this compacted gravel base material shall extend out beyond

the sidewalls of the handhole. Conduits shall sweep up and be at least 4-inches above handhole bottom and have all penetrations waterproofed.

4. Handholes and Covers shall be designed for street-rated, heavy duty applications, meeting the requirements of either: AASHTO HS-20 or ANSI/SCTE 77-2002 Tier 15 loading, with a minimum design load of 15,000 lbs for both the hand hole box and cover.
5. Quarzite or equal.
6. Provide with bolted, gasketed cover, containing two (2) stainless steel (penta-head) captive bolts and self-centering corrosion resistant nuts. Cover to have two (2) 5/8" x 4" lifting slots.
7. Cover to have skid resistant surface and be permanently engraved with "ELECTRICAL" logo.
8. Handholes shall meet the requirements of the latest edition of the National Electrical Code (latest edition) with regards to structural integrity, installation methods, grounding of the cover and metallic parts, etc. Handholes shall be UL listed for the intended use. Pullboxes shall be in accordance with the City of Waltham Wiring Department and as otherwise designated on the contract drawings.

#### 2 .04 WIRE AND CABLE CONNECTORS AND DEVICES

- A. Wire and cable connectors and devices shall meet the requirements of UL 486. Connectors, including miscellaneous nuts, bolts, and washers shall be silicon bronze. Ferrous materials shall not be used.

#### 2 .05 BOXES

- A. Outlet and Switch Boxes: NEMA OS 1.
- B. Weatherproof Outlet Boxes: NEMA 3R, NEC 410-57, UL 498 & 514 Outdoor Outlet Boxes for receptacles shall be weatherproof, NEMA 3R rated, and manufactured of stainless steel or aluminum. All hardware (screws, etc.) shall be stainless steel. Covers for outdoor outlet receptacles shall be weatherproof, polycarbonate bubble-type, allowing use of the receptacle with the cover in the "closed" position. Gaskets shall be made of ethylene propylene rubber, or approved equal.
- C. Pull Boxes, Junction Boxes, and Equipment Enclosures: NEMA ICS 6.
- D. Pull boxes, junction boxes, and equipment enclosures shall be of NEMA Type 1 construction for indoor use, and NEMA Type 3R construction for outdoor or wet location use, unless otherwise noted.
- E. Box sizes shall not be less than that required by the Massachusetts Electrical Code.

2 .06 WIRING DEVICES

- A. Wiring Devices: NEMA WD 1.
- B. Wiring devices for shall be specification grade, 20 ampere, ivory with Type 302 stainless steel plates. Ground fault current interrupting (GFCI) devices shall be provided where specified and/or required by applicable codes.

2 .07 PANELBOARDS

- A. Panelboards: NEMA PB1, and UL 67.
- B. Provide new 100A, 120/240V single-phase panelboard with 100A main circuit breaker and branch feeder breakers as listed on panel schedule as indicated on the Contract Drawings.
- C. Panelboards shall be door-in-door construction with copper bus. Circuit breakers shall be molded case, thermal magnetic, bolt-on type rated as noted, and rated to match panelboard voltage and interrupting rating (22 kA). All panelboard doors shall open full 90 degrees without conflict with cabinets and other equipment. No modifications to panelboards or doors shall be made to accommodate installation or removal inside of Electrical Cabinet.

2 .08 METER SOCKETS

- A. Meter Sockets: UL 414, UL 486B, and ANSI C12.7.
- B. Outdoor meter sockets are to be NEMA 3R. Unless otherwise noted, meter sockets shall be ringless, with lever bypass, tin plated connections, and have provision for a fifth terminal on single-phase applications. Meter Sockets shall also meet the requirements of the local electric utility.
- C. Meter Socket shall be either heavy duty or medium duty, 100 ampere minimum, ringless, 5 terminal, with approximate dimensions of 19"H x 13"W x 5"D. (Milbank U2860-XL-5T9 or approved equal).

2 .09 WARNING TAPE

- A. Warning tape shall be six (6) inches wide, polyethylene not less than 3.5 mil thick with a minimum strength of 1,500 psi and shall be manufactured by W.H. Brady Co., Panduit Corp., or approved equal. Tape shall be red for electric conduit, and red or yellow for communication conduit. Tape shall have black lettering on two lines as indicated below:

CAUTION CAUTION CAUTION  
BURIED ELECTRIC LINE BELOW

## 2 .10 ELECTRIC CONTROL CABINETS

- A. Outdoor weatherproof electrical equipment enclosure: NEMA 3R.
- B. Electric Control Cabinets (2) two required, shall be new aluminum enclosure cabinet, 55 9/16" height x 44" width x 26" depth, constructed of aluminum, .125" thick, painted with an approved black powder coating and mounted on a concrete pad. Cabinet to be Model Number MEA554426 as Manufactured by Mass Electrical Apparatus, 42 Oakville Street, Lynn, MA, (or approved equal). Cabinet shall be factory painted powder-coat black; field painting is not acceptable. One cabinet for new electrical service and irrigation controller, one cabinet for fountain controller on same pad. Cabinet dimensions listed are typical.
  - 1. Material: 0.125 5052-H32 Aluminum.
  - 2. Ventilation on roof and door.
  - 3. Open bottom.
  - 4. Stainless Steel full length piano hinge.
  - 5. Single door design with captive door restraint.
  - 6. Stainless steel padlockable handle, 3 point latching mechanism with nylon rollers at top and bottom.
  - 7. Door frame double flanged on all four sides.
  - 8. 3/4" Plywood back panel treated with (2) coats clear polyurethane.
  - 9. Cabinet shall be smooth black powder coat inside and out; field painting is not acceptable.
- C. The cabinet shall be mounted on a cement concrete base as indicated in the Drawings. Forms, reinforcing, and cement concrete cast in place for all cabinets shall conform to Section 03300 - Cast-in-Place Concrete.
- D. Provide grounding in the form of two (2) 5/8" diameter x 8'-0" long copperweld ground rods for each foundation, connected with a loop of #1/0-#4/0 Awg bare copper stranded ground wire (as shown), leaving a 3 foot long tail to ground the enclosure, transformers, etc. Buried loop for Electrical Cabinet to be buried approx. 6-8" below finished grade, offset approximately 12-inches from the edge of concrete foundation on all four sides.
- E. Provide in the electrical enclosure cabinet on the concrete pad, a 0.25 x 2" x 24" copper grounding bus bar with 2 UL recognized standoff insulators, 2 stainless steel mounting brackets, and 4 stainless steel assembly bolts and lock washer.

## 2 .11 LIGHT POLES

- A. Light posts shall be Hancock Style 11'-0" Heavy Wall cast Aluminum Lamp Post Cat #ACDP-H16-11-BK c/w anchor bolts. Refer to Page 16000-13 of this Section.
  - 1. Finish shall be gloss black (wet paint).

## 2 .12 LUMINAIRES



- A. Luminaires shall be decorative post top LED Acorn Style luminaires, 60 watt with photo control. Cat#ALMWSH-LE80/EV1/X2-45-CR3-YS11-FPA-TB-BT-PC-CU (Gloss Block Power Coat). Refer to Page 16100-14 of this Section.

## PART 3 - EXECUTION

### 3.01 GENERAL

- A. This Section covers the requirements for installation of materials, proper workmanship, testing, cleaning, grounding, and work methods to be followed by the Contractor. This Section also includes specific instructions and to be used in conjunction with the contract Drawings. Any discrepancies noted between the specification, Drawings, and actual installation shall be reported immediately to the Owner, Engineer, and Architect. Failure on the part of the Contractor to report discrepancies immediately will be considered negligent.
- B. Contractor is responsible for coordinating work with other trades, Owner, and Architect's schedule. Work will be coordinated such that systems can be properly located, and conflicts and delays are avoided. Contractor shall consider commencement of work acceptance of existing conditions.

### 3.02 MATERIALS AND WORKMANSHIP

- A. Work shall be executed in workmanlike manner and shall present neat, rectilinear and mechanical appearance when completed. Do not run raceway exposed unless shown exposed on Drawings. Material and equipment shall be new and installed according to manufacturer's recommended best practice so that complete installation shall operate safely and efficiently.

### 3.03 CONTINUITY OF SERVICES

- A. Do not interrupt existing services without Owner's, Utilities, Engineer's and Architect's approvals.

### 3.04 TESTING, INSPECTION AND CLEANING

- A. Test wiring and connections for continuity and grounds before fixtures are connected; demonstrate insulation resistance by megger test as required at not less than 500 volts. Insulation resistance between conductors and grounds for secondary distribution systems shall meet National Electrical Code (NEC) and International Electrical Testing Association (NETA) requirements.
- B. Verify and correct as necessary: voltages, tap settings, trip settings and phasing on equipment from secondary distribution system to point of use. Test secondary voltages at transformers, bus in panelboards, and at other locations on distribution systems as necessary. Test secondary voltages under no-load and full-load conditions.
- C. Test lighting fixtures with specified lamps in place for 100 hours. Replace lamps that fail

16100-9

ELECTRICAL SERVICE IMPROVEMENTS

within 90 days after acceptance by Owner at no extra cost to Owner (no exceptions).

- D. Provide necessary testing equipment and testing services.
- E. Failures or defects in workmanship or materials revealed by tests or inspection shall be corrected promptly and retested. Replace defective material.
- F. Clean panels and other equipment. Panelboard interiors shall be cleaned and vacuumed. Equipment with damage to painted finish shall be repaired to Engineer\*s or Architect\*s satisfaction. After completion of project, clean exterior surfaces of electrical equipment.

### 3.05 WIRING METHODS

- A. Install wire and cables in approved raceways as specified and as approved by authorities that have jurisdiction.
- B. Follow homerun circuit numbers and/or notes as shown on Drawings to connect circuits to panelboards. Where homerun circuit numbers are not shown on Drawings, divide similar types of connected loads among phase buses so that currents are approximately equal in normal usage.
- C. Run concealed conduit in as direct lines as possible with a minimum number of bends of longest possible radius. Bends shall be free from dents or flattening. The exact locations and routing of conduit shall be determined by the Contractor subject to the approval of the Owner and Engineer.
- D. Polarity of all electrical connections shall be observed in order to preserve phase relationship in all feeders and equipment.
- E. Splices shall be made in neat, workmanlike manner using approved mechanical connectors. After splicing, insulation equal to that on the spliced wires shall be applied at each splice. Splices are permitted only in junction boxes, outlet boxes, or other permanently accessible locations. Splices installed in electric handholes shall be weather and waterproof, pre-molded polymer splices. Hand taping of splices below-grade is not acceptable.

### 3.06 GROUNDING

- A. Bond and ground equipment and systems connected under this Section in accordance with standards of the NEC and other applicable regulations and codes.
- B. Conduit system shall be electrically continuous throughout, grounded at service entrance. Equipment frames, enclosures, boxes, etc. shall be grounded by use of green-jacketed (or bare copper) ground, sized as per Table 250-95 of the NEC.
- C. Green bonding jumper shall be installed in flexible conduits.

- D. Copper fittings for ground connections shall conform to the requirements of ASTM B 30. All bolts, u-bolts, cap screws, nuts, and lock washers for copper fitting shall be of approved corrosion-resisting material. Compression connectors required for all below grade grounding connections.
- E. Ground Rods shall be 5/8" diameter and 8'-0" in length, copperweld as required by applicable codes (NEC, NESC). Bonding connections to ground rods shall be permanent, welded or crimped, with copper connectors. All wire used for grounding shall be no smaller than #4 Awg copper, stranded conductor.

### 3.07 ELECTRIC SERVICE INSTALLATIONS

- A. Install all equipment required under this Section in accordance with all requirements of the City of Waltham Wiring Department, all governing codes, and as applicable, in accordance with all the requirements of EVERSOURCE.

### 3.08 ELECTRIC SERVICE INSTALLATIONS SPECIAL INSTRUCTIONS

- A. Contractor shall provide new underground single-phase (120/240 volt), 3-wire plus ground electric service from new EVERSOURCE utility pole to new outdoor electric control cabinet.
- B. Service cable shall be 3-#1AWG type XHHW (or XHHW-2), 600 V, as approved by EVERSOURCE, and meet all requirement of the NEC, Massachusetts Electrical Code, and the City of Waltham Wires Department and Inspectional Services Department.
- C. Contractor shall provide new outdoor NEMA 3R electric control cabinet. Cabinet enclosure shall be by Mass Electrical Apparatus, or approved equal. Contractor shall coordinate the incoming underground 100-amp, three (3) wire single phase service from the EVERSOURCE utility pole to the new metering cabinet.
- D. Contractor shall provide new meter socket (100 amp, 5 terminal), and 100 ampere load-center distribution panel board in NEMA 1 enclosure, mounted inside of cabinet. Panelboard shall have 2-pole main breaker, rated 100A (22 kA), one (1) 2-pole 20A (22kA) branch circuit breaker, and three (3) single pole 20A (22kA) branch circuit breakers, and five (5) spare 20A (22kA) circuit breakers.
- E. Install 120V GFCI receptacle, porcelain light bulb socket with cage, 13W compact fluorescent bulb, and electrical switch in electrical enclose on panelboard.
- F. Install 120V, 20A single-phase feed from service panel to 120V GFCI receptacle, electrical switch, and porcelain light bulb socket, typically 2w-#12Awg w/ground.
- G. Install 120V, 20A single-phase feed from service panel to spray/irrigation controller, typically 2w-#12Awg w/ground.
- H. Install underground 60A single-phase feed (120/240 volt), 3-wire plus ground electric service from service panel to Fountain Control Panel in separate electrical control

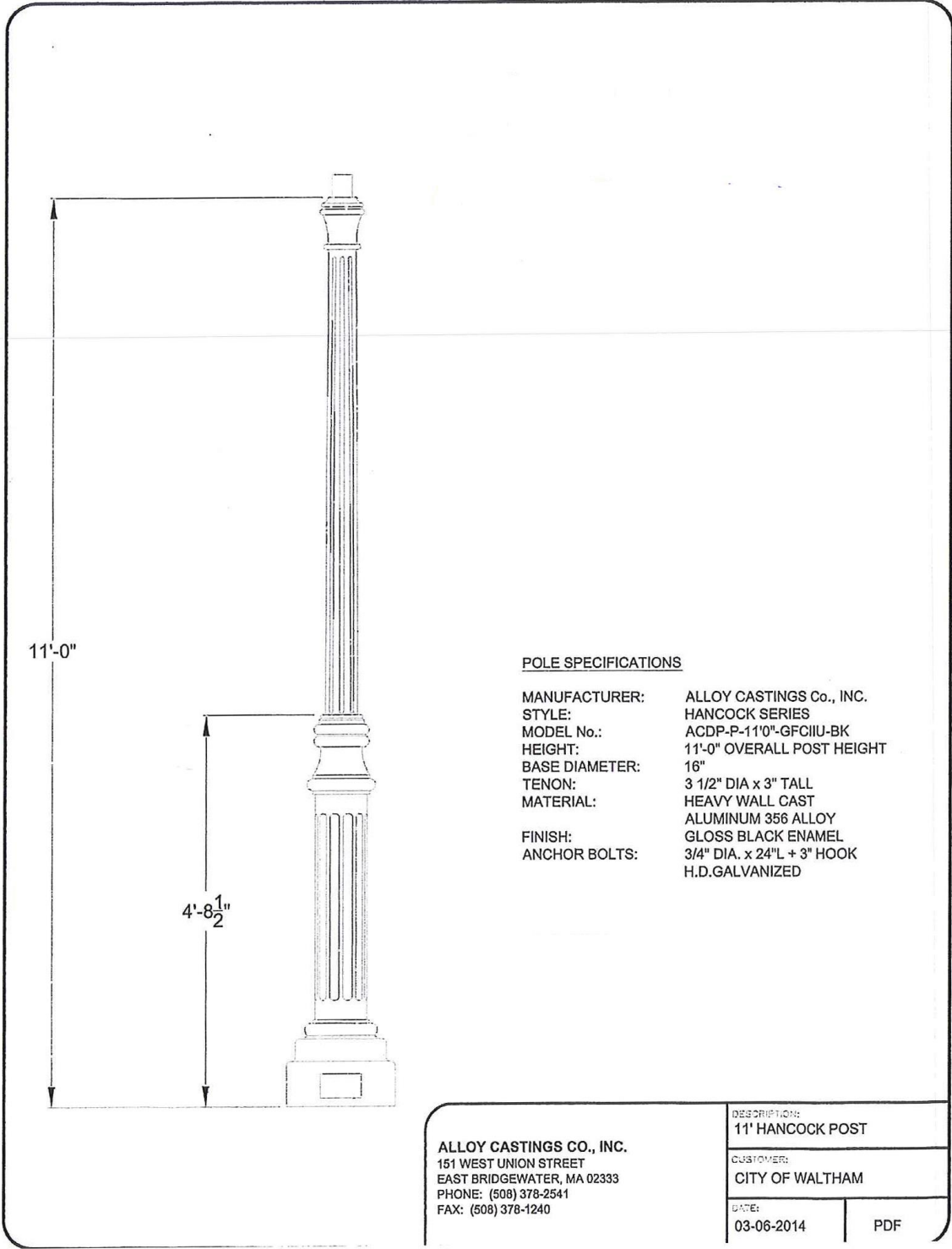
cabinet.

- I. Contractor shall coordinate with local utility for installation of new service pole on property, to be fed from existing utility poles.

### 3.09 INSPECTIONS

- A. The Contractor shall contact the City (refer to paragraph 1.03 B) to arrange for inspection prior to filling any electrical trenches.

# **DRAWINGS**



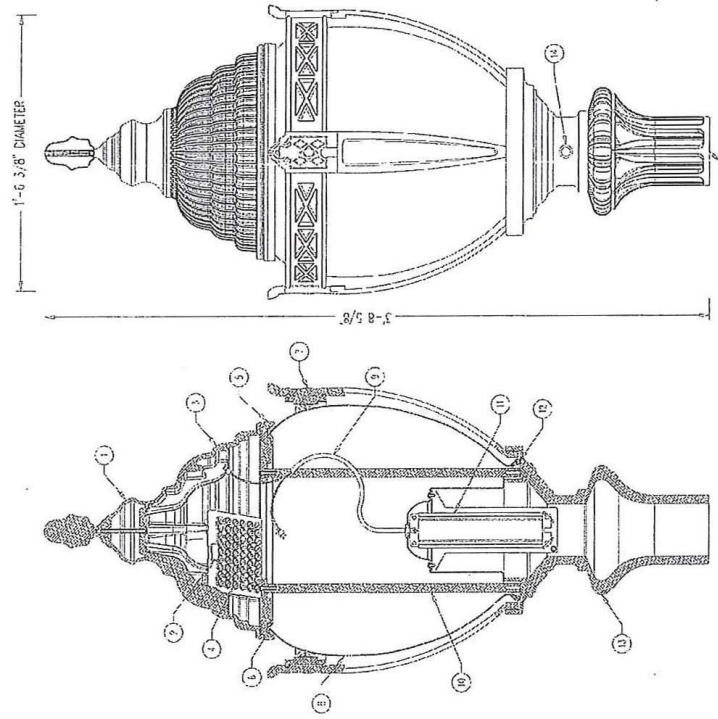
**POLE SPECIFICATIONS**

**MANUFACTURER:** ALLOY CASTINGS Co., INC.  
**STYLE:** HANCOCK SERIES  
**MODEL No.:** ACDP-P-11'0"-GFCIU-BK  
**HEIGHT:** 11'-0" OVERALL POST HEIGHT  
**BASE DIAMETER:** 16"  
**TENON:** 3 1/2" DIA x 3" TALL  
**MATERIAL:** HEAVY WALL CAST ALUMINUM 356 ALLOY  
**FINISH:** GLOSS BLACK ENAMEL  
**ANCHOR BOLTS:** 3/4" DIA. x 24"L + 3" HOOK H.D.GALVANIZED

**ALLOY CASTINGS CO., INC.**  
 151 WEST UNION STREET  
 EAST BRIDGEWATER, MA 02333  
 PHONE: (508) 378-2541  
 FAX: (508) 378-1240

DESCRIPTION: 11' HANCOCK POST	
CUSTOMER: CITY OF WALTHAM	
DATE: 03-06-2014	PDF

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ACCEPTS 3 1/2" DIA. X 3" HIGH TERON

**LUMINAIRE SPECIFICATIONS:**  
 STYLE: WASHINGTON WITH 110 ALUMINUM FINIAL  
 HEIGHT: 3'-8 5/8"  
 WIDTH: 1'-6 3/8" DIAMETER  
 MATERIAL: CAST ALUMINUM ALLOY A561 356 PER A.S.T.M. B261-85  
 FINISH: POWDER COAT - GLOSS BLACK  
**60 WATT LED**  
 LAMPING: PLEASE SEE QUANTITY FOR WATTAGE  
 NO. OF BOARDS: 2  
 COLOR TEMP: 4800K (NEUTRAL WHITE)  
 DISTRIBUTION: TYPE III (ASTROMETRIC)  
 OPTICS: CROSSHIRE REFRACTIVE  
 GLOBE: 118 STIPPLED OR ACrylic  
 BATTERY-TYPE PHOTO CELL  
 MODIFIER: TARGORO RING AND STRUTS  
 CATALOG NO. ALUMINIUM-LE120/EV1743-15-353-1511-FPA-10-BT-PC-00

LUMINAIRE TO BE WIRED WITH BUTTON-TYPE P.C.

- 1) FINIAL: CAST ALUMINUM, 356 ALLOY, SECURED WITH (1) 1/4"-20 ROUND HEAD MACHINE SCREW
- 2) CROSSHIRE OPTICAL SYSTEM INJECTION MOUNTED REFRACTIVE OPTICS
- 3) DIECAST HEAT DISSIPATING HOUSING, CAST ALUMINUM, 356 ALLOY, SECURED WITH (4) 10-24 ROUND HEAD MACHINE SCREWS
- 4) GREE XT E LED, 54 C-IPS TYP. FORWARD TO PRODUCE 120 WATTS
- 5) LUMINAIRE ROOF RING, CAST ALUMINUM, 356 ALLOY
- 6) SILICONE GASKET: ONE PIECE MOLDED GASKET TO SEAL THE LUMINAIRE RING TO THE ROOF AND GLOBE
- 7) DECORATIVE TARGORO RING AND STRUTS, CAST ALUMINUM, 356 ALLOY
- 8) GLOBE: DAMAGE RESISTANT 118 STIPPLED ACrylic
- 9) POWER CABLE: BUNDLED POWER CABLE WITH QUICK DISCONNECTS
- 10) 118-015: (2) MACHINED ALUMINUM PARTS TO SECURE LUMINAIRE RING AND GLOBE TO CASING
- 11) LED DRIVER: LOCATED IN SPHERICAL HOUSING WHEED AT 700mA (SPRIT CURRENT)
- 12) GASKET: SILICONE GASKET TO SEAL GLOBE TO LUMINAIRE CASING
- 13) LUMINAIRE CASING: CAST ALUMINUM, 356 ALLOY
- 14) BUTTON-TYPE PHOTO CELL (SEE QUANTITY FOR VOLTAGE)

**Spring City Electrical Mfg. Co.**  
 100 W. MAIN STREET - P.O. BOX 15 - SPRING CITY, PA 17266  
 PHONE (610) 586-8000 - FAX (610) 586-8277 - WWW.SCEMFG.COM

DESIGN	THE WASHINGTON LED LUMINAIRE WITH TARGORO RING AND STRUTS		
DRAWN	CITY OF WALTHAM, MA		
DATE	ISSUED BY	DATE	DRAWING NO.
	JMG	10 31 13	FLX 28874

END OF SECTION

16100-14  
 ELECTRICAL SERVICE IMPROVEMENTS

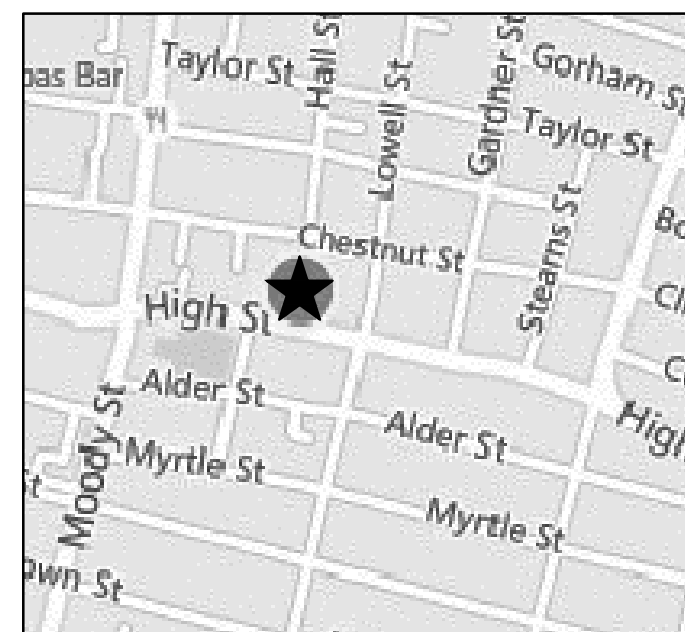
# Waltham 4 Parks Improvements Project

## IMPROVEMENTS TO PETER GILMORE PLAYGROUND

90 HALL STREET  
WALTHAM, MASSACHUSETTS 02453

### Locus Plan

PETER GILMORE PLAYGROUND



**MAYOR JEANNETTE A. McCARTHY**  
CITY OF WALTHAM

CITY OF WALTHAM RECREATION DEPARTMENT  
510 MOODY STREET  
WALTHAM, MASSACHUSETTS 02453

MARCH 21, 2016

LANDSCAPE ARCHITECT:  
CAROLYN COONEY & ASSOCIATES  
13 ELM STREET  
MILFORD, MASSACHUSETTS 01757

TEL: (508) 478-8426  
FAX: (508) 478-8607

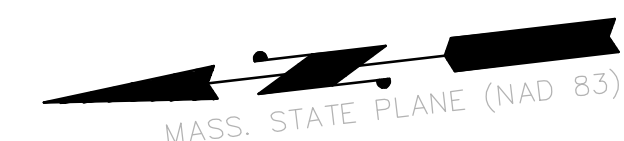
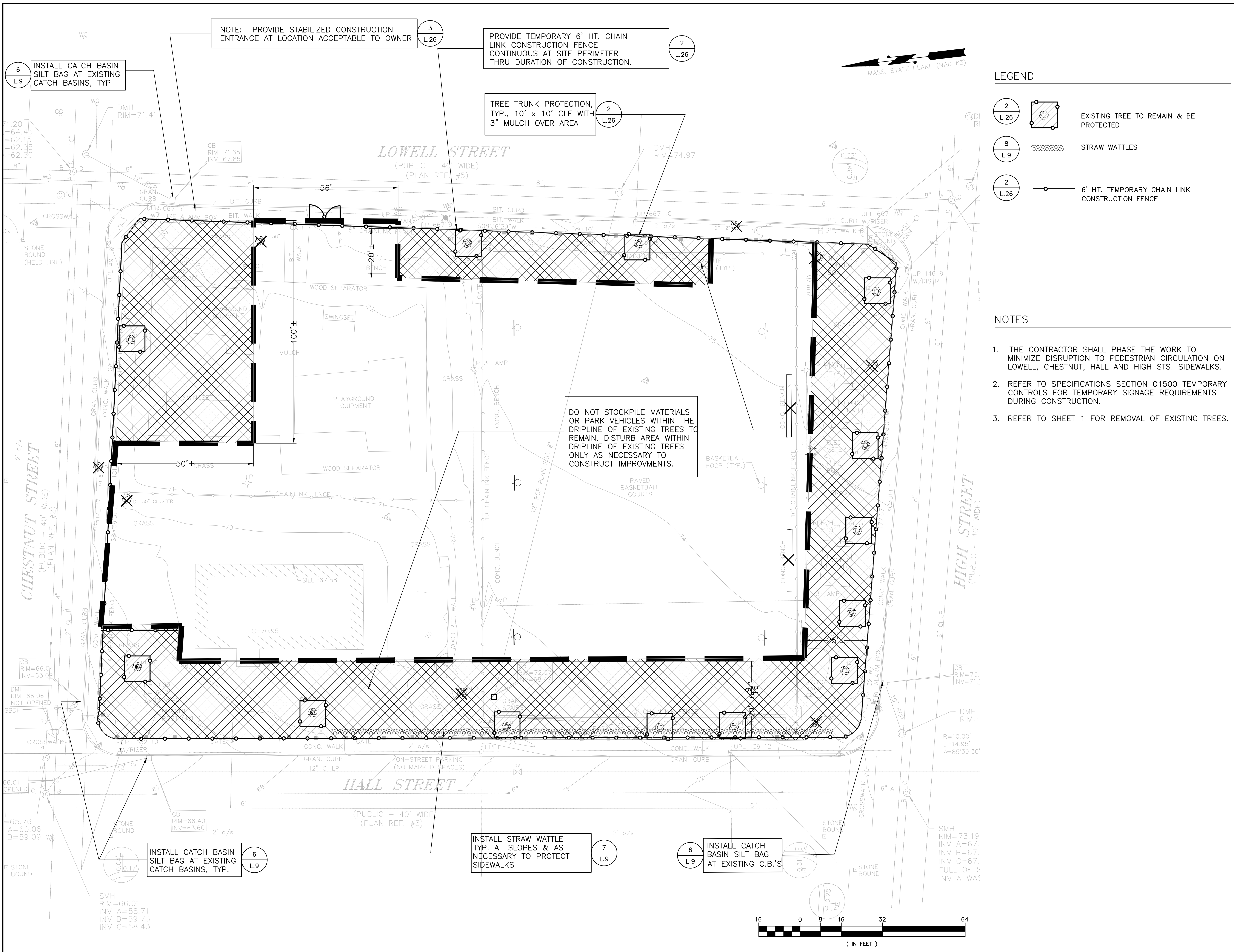
F-1 FOUNTAIN GENERAL NOTES - ALT. #1  
F-2 FOUNTAIN SUCTION/DRAIN PLAN VIEW - ALT. #1  
F-3 FOUNTAIN DISCHARGE PLAN VIEW - ALT. #1  
F-4 FOUNTAIN ELECTRICAL PLAN VIEW - ALT. #1  
F-5 FOUNTAIN DIMENSIONS PLAN VIEW - ALT. #1  
F-6 PUMP STATION DETAILS - ALT. #1  
F-7 FOUNTAIN EQUIPMENT DETAILS - ALT. #1

### Index of Drawings

SHT 1 OF 1	EXISTING CONDITIONS PLAN
L-1A	TEMPORARY SITE CONTROLS
L-1	SITE PREPARATION PLAN
L-2	MATERIALS PLAN
L-3	LAYOUT PLAN
L-4	GRADING & DRAINAGE PLAN
L-4A	UTILITY CONNECTION PLAN
L-5	PLANTING PLAN
L-6	IRRIGATION PLAN
L-7	LIGHTING & ELECTRICAL PLAN
L-8	PAVING & CURBING DETAILS
L-9	SIDEWALK & CURB DETAILS
L-10	WALL DETAILS
L-11	WALL & GRANITE FENCE DETAILS
L-12	FENCE DETAILS
L-13	FENCE ELEVATIONS
L-14	ENLARGEMENT PLANS
L-15	EXERCISE EQUIPMENT DETAILS
L-16	PLAY EQUIPMENT DETAILS I
L-17	PLAY EQUIPMENT DETAILS II
L-18	PLAY EQUIPMENT DETAILS III
L-19	PLAY EQUIPMENT DETAILS IV
L-20	COURT DETAILS
L-21	COURT ELEVATIONS
L-22	FOUNTAIN AREA ENLARGEMENT
L-23	SHADE SHELTER DETAILS
L-24	SITE FURNITURE DETAILS I
L-25	SITE FURNITURE DETAILS II
L-26	PLAQUE DETAILS
L-27	PLANTING DETAILS
L-28	FOUNTAIN BASIN DETAILS I - ALT. #1
L-29	FOUNTAIN BASIN DETAILS II - ALT. #1
L-30	UTILITY DETAILS I
L-31	UTILITY DETAILS II
L-32	DRAINAGE DETAILS
L-33	IRRIGATION DETAILS
L-34	ELECTRICAL DETAILS I
L-35	ELECTRICAL DETAILS II







- LEGEND**
- 2  
L.26 EXISTING TREE TO REMAIN & BE PROTECTED
  - 8  
L.9 STRAW WATTLES
  - 2  
L.26 6' HT. TEMPORARY CHAIN LINK CONSTRUCTION FENCE

- NOTES**
1. THE CONTRACTOR SHALL PHASE THE WORK TO MINIMIZE DISRUPTION TO PEDESTRIAN CIRCULATION ON LOWELL, CHESTNUT, HALL AND HIGH STS. SIDEWALKS.
  2. REFER TO SPECIFICATIONS SECTION 01500 TEMPORARY CONTROLS FOR TEMPORARY SIGNAGE REQUIREMENTS DURING CONSTRUCTION.
  3. REFER TO SHEET 1 FOR REMOVAL OF EXISTING TREES.

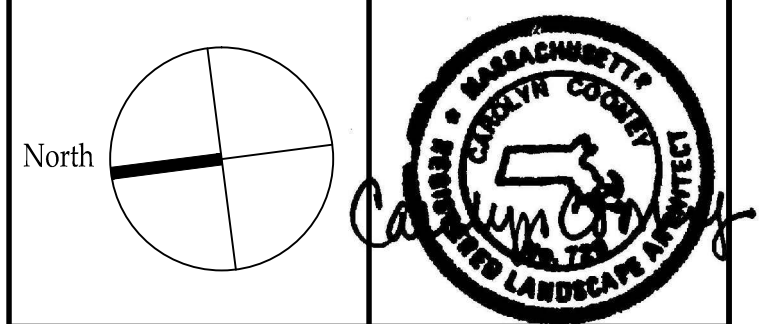
**Carolyn Cooney & Associates**  
 Landscape Architecture / Planning  
 13 Elm Street, Milford, MA 01757  
 Telephone 508 478 8426, Facsimile 508 478 8607

**Site Engineering Consultants, Inc.**  
 55 Grape Shot Road  
 Sharon, Massachusetts 02067  
 TEL: (781) 784-0326  
 FAX: (781) 784-0492  
 CONSULTING CIVIL ENGINEERS

**alpha**  
 SURVEYING and ENGINEERING INC.  
 ALPHA SURVEYING AND ENGINEERING INC.  
 695 WAREHAM STREET  
 MIDDLEBOROUGH, MASSACHUSETTS 02346  
 (508) 295-5505

No.	Description	Date

**REVISIONS**



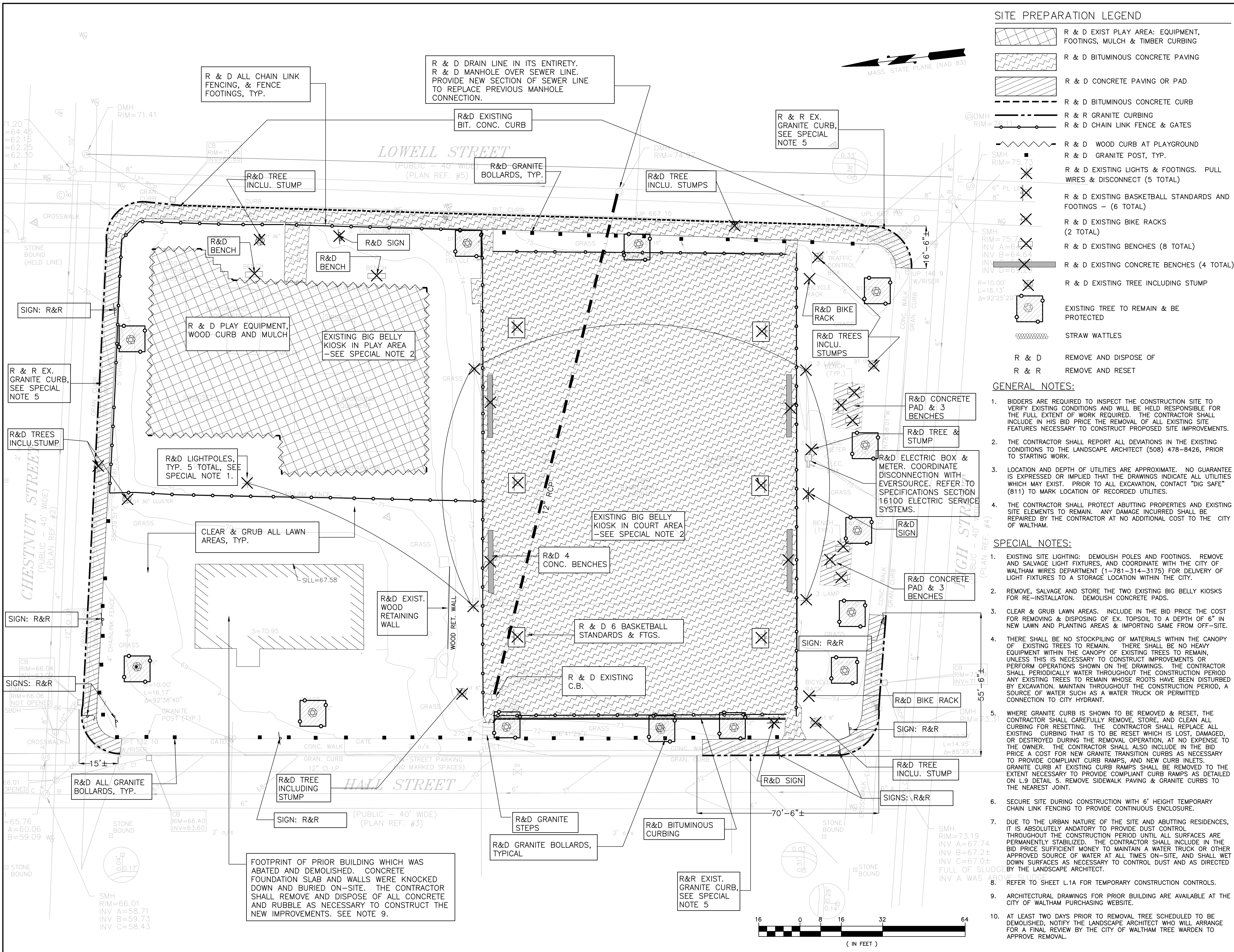
Project:  
**CITY OF WALTHAM  
 IMPROVEMENTS TO  
 PETER GILMORE PLAYGROUND  
 90 HALL STREET  
 WALTHAM, MA 02453**

Prepared For:  
**CITY OF WALTHAM  
 DEPARTMENT OF RECREATION  
 50 MOODY STREET  
 WALTHAM, MA 02453**

TITLE:  
**TEMPORARY SITE  
 CONTROLS**

Scale 1" = 16' Date MAR 21 2016  
 Drawn By CCC  
 Checked By DRB  
 Approved By CCC  
 Project No. 1313.01

DWG No. **L.1A**



- ### SITE PREPARATION LEGEND
- R & D EXIST PLAY AREA: EQUIPMENT, FOOTINGS, MULCH & TIMBER CURBING
  - R & D BITUMINOUS CONCRETE PAVING
  - R & D CONCRETE PAVING OR PAD
  - R & D BITUMINOUS CONCRETE CURB
  - R & R GRANITE CURBING
  - R & D CHAIN LINK FENCE & GATES
  - R & D WOOD CURB AT PLAYGROUND
  - R & D GRANITE POST, TYP.
  - R & D EXISTING LIGHTS & FOOTINGS. PULL WIRES & DISCONNECT (5 TOTAL)
  - R & D EXISTING BASKETBALL STANDARDS AND FOOTINGS - (6 TOTAL)
  - R & D EXISTING BIKE RACKS (2 TOTAL)
  - R & D EXISTING BENCHES (8 TOTAL)
  - R & D EXISTING CONCRETE BENCHES (4 TOTAL)
  - R & D EXISTING TREE INCLUDING STUMP
  - EXISTING TREE TO REMAIN & BE PROTECTED
  - STRAW WATTLES
  - R & D REMOVE AND DISPOSE OF
  - R & R REMOVE AND RESET

- ### GENERAL NOTES:
- BIDDERS ARE REQUIRED TO INSPECT THE CONSTRUCTION SITE TO VERIFY EXISTING CONDITIONS AND WILL BE HELD RESPONSIBLE FOR THE FULL EXTENT OF WORK REQUIRED. THE CONTRACTOR SHALL INCLUDE IN HIS BID PRICE THE REMOVAL OF ALL EXISTING SITE FEATURES NECESSARY TO CONSTRUCT PROPOSED SITE IMPROVEMENTS.
  - THE CONTRACTOR SHALL REPORT ALL DEVIATIONS IN THE EXISTING CONDITIONS TO THE LANDSCAPE ARCHITECT (508) 478-8426, PRIOR TO STARTING WORK.
  - LOCATION AND DEPTH OF UTILITIES ARE APPROXIMATE. NO GUARANTEE IS EXPRESSED OR IMPLIED THAT THE DRAWINGS INDICATE ALL UTILITIES WHICH MAY EXIST. PRIOR TO ALL EXCAVATION, CONTACT "DIG SAFE" (811) TO MARK LOCATION OF RECORDED UTILITIES.
  - 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.

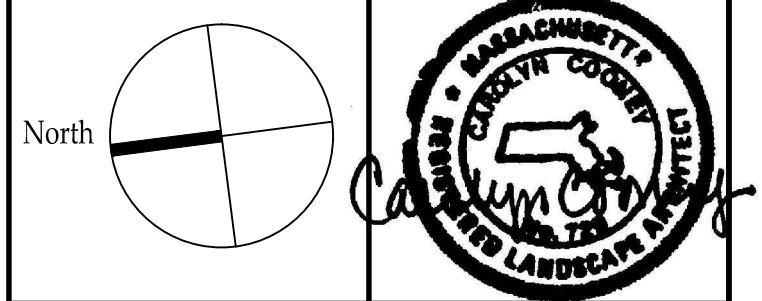
- ### SPECIAL NOTES:
- EXISTING SITE LIGHTING: DEMOLISH POLES AND FOOTINGS. REMOVE AND SALVAGE LIGHT FIXTURES, AND COORDINATE WITH THE CITY OF WALTHAM WIRES DEPARTMENT (1-781-314-3175) FOR DELIVERY OF LIGHT FIXTURES TO A STORAGE LOCATION WITHIN THE CITY.
  - REMOVE, SALVAGE AND STORE THE TWO EXISTING BIG BELLY KIOSKS FOR RE-INSTALLATION. DEMOLISH CONCRETE PADS.
  - CLEAR & GRUB LAWN AREAS. INCLUDE IN THE BID PRICE THE COST FOR REMOVING & DISPOSING OF EX. TOPSOIL TO A DEPTH OF 6" IN NEW LAWN AND PLANTING AREAS & IMPORTING SAME FROM OFF-SITE.
  - THERE SHALL BE NO STOCKPILING OF MATERIALS WITHIN THE CANOPY OF EXISTING TREES TO REMAIN. THERE SHALL BE NO HEAVY EQUIPMENT WITHIN THE CANOPY OF EXISTING TREES TO REMAIN, UNLESS THIS IS NECESSARY TO CONSTRUCT IMPROVEMENTS OR PERFORM OPERATIONS SHOWN ON THE DRAWINGS. THE CONTRACTOR SHALL PERIODICALLY WATER THROUGHOUT THE CONSTRUCTION PERIOD ANY EXISTING TREES TO REMAIN WHOSE ROOTS HAVE BEEN DISTURBED BY EXCAVATION. MAINTAIN THROUGHOUT THE CONSTRUCTION PERIOD, A SOURCE OF WATER SUCH AS A WATER TRUCK OR PERMITTED CONNECTION TO CITY HYDRANT.
  - WHERE GRANITE CURB IS SHOWN TO BE REMOVED & RESET, THE CONTRACTOR SHALL CAREFULLY REMOVE, STORE, AND CLEAN ALL CURBING FOR RESETTING. THE CONTRACTOR SHALL REPLACE ALL EXISTING CURBING THAT IS TO BE RESET WHICH IS LOST, DAMAGED, OR DESTROYED DURING THE REMOVAL OPERATION, AT NO EXPENSE TO THE OWNER. THE CONTRACTOR SHALL ALSO INCLUDE IN THE BID PRICE A COST FOR NEW GRANITE TRANSITION CURBS AS NECESSARY TO PROVIDE COMPLIANT CURB RAMPS, AND NEW CURB INLETS. GRANITE CURB AT EXISTING CURB RAMPS SHALL BE REMOVED TO THE EXTENT NECESSARY TO PROVIDE COMPLIANT CURB RAMPS AS DETAILED ON L.9 DETAIL 5. REMOVE SIDEWALK PAVING & GRANITE CURBS TO THE NEAREST JOINT.
  - SECURE SITE DURING CONSTRUCTION WITH 6' HEIGHT TEMPORARY CHAIN LINK FENCING TO PROVIDE CONTINUOUS ENCLOSURE.
  - DUE TO THE URBAN NATURE OF THE SITE AND ABUTTING RESIDENCES, IT IS ABSOLUTELY ANATATORY TO PROVIDE DUST CONTROL THROUGHOUT THE CONSTRUCTION PERIOD UNTIL ALL SURFACES ARE PERMANENTLY STABILIZED. THE CONTRACTOR SHALL INCLUDE IN THE BID PRICE SUFFICIENT MONEY TO MAINTAIN A WATER TRUCK OR OTHER APPROVED SOURCE OF WATER AT ALL TIMES ON-SITE, AND SHALL WET DOWN SURFACES AS NECESSARY TO CONTROL DUST AND AS DIRECTED BY THE LANDSCAPE ARCHITECT.
  - REFER TO SHEET L.1A FOR TEMPORARY CONSTRUCTION CONTROLS.
  - ARCHITECTURAL DRAWINGS FOR PRIOR BUILDING ARE AVAILABLE AT THE CITY OF WALTHAM PURCHASING WEBSITE.
  - AT LEAST TWO DAYS PRIOR TO REMOVAL TREE SCHEDULED TO BE DEMOLISHED, NOTIFY THE LANDSCAPE ARCHITECT WHO WILL ARRANGE FOR A FINAL REVIEW BY THE CITY OF WALTHAM TREE WARDEN TO APPROVE REMOVAL.

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No.	Description	Date
REVISIONS		



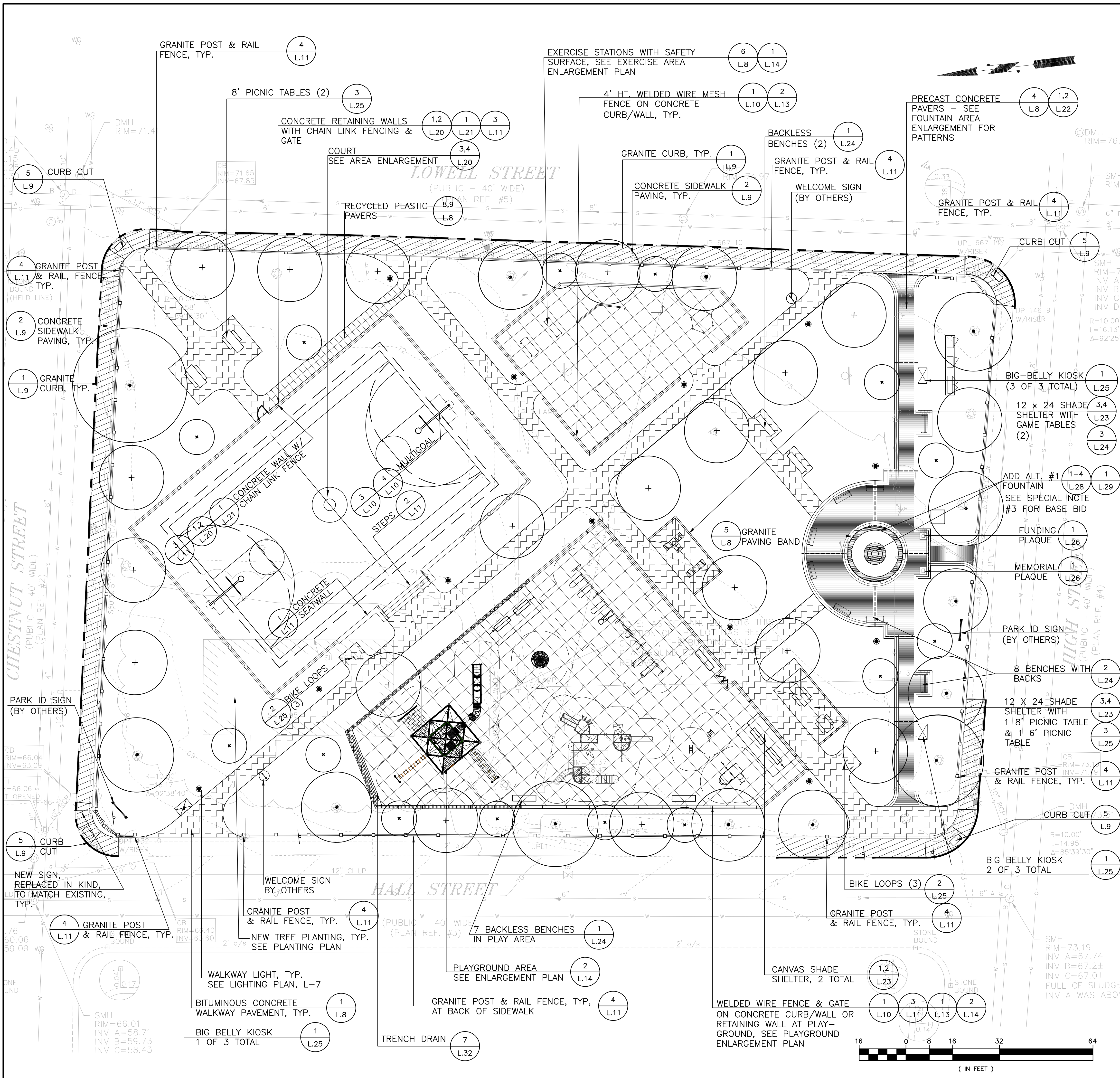
Project:  
**CITY OF WALTHAM  
 IMPROVEMENTS TO  
 PETER GILMORE PLAYGROUND  
 90 HALL STREET  
 WALTHAM, MA 02453**

Prepared For:  
**CITY OF WALTHAM  
 DEPARTMENT OF RECREATION  
 50 MOODY STREET  
 WALTHAM, MA 02453**

TITLE:  
**SITE PREPARATION  
 PLAN**

Scale 1" = 16' Date MAR 21 2016  
 Drawn By CCC  
 Checked By DRB  
 Approved By CCC  
 Project No. 1313.01

DWG No. **L.1**



**GENERAL NOTES:**

- BIDDERS ARE REQUIRED TO INSPECT THE CONSTRUCTION SITE TO VERIFY EXISTING CONDITIONS AND WILL BE HELD RESPONSIBLE FOR THE FULL EXTENT OF WORK REQUIRED.
- THE CONTRACTOR SHALL REPORT ALL DEVIATIONS IN THE EXISTING CONDITIONS TO THE LANDSCAPE ARCHITECT (508) 478-8426, PRIOR TO STARTING WORK.
- LOCATION AND DEPTH OF UTILITIES ARE APPROXIMATE. NO GUARANTEE IS EXPRESSED OR IMPLIED THAT THE DRAWINGS INDICATE ALL UTILITIES WHICH MAY EXIST. PRIOR TO ANY EXCAVATION, CONTACT "DIG SAFE" (811) TO MARK LOCATION OF RECORDED UTILITIES.
- THE CONTRACTOR SHALL PROTECT ADJACENT 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.

**SPECIAL NOTES:**

- REFER TO DRAWING L.6 FOR IRRIGATION PLAN
- CERTAIN MATERIALS WILL BE FURNISHED BY THE CITY TO BE INSTALLED BY THE CONTRACTOR. REFER TO THE SPECIFICATIONS FOR A COMPLETE LISTING OF ITEMS TO BE FURNISHED BY THE CITY.
- BASE BID SHALL INCLUDE COST OF 202 SQUARE FEET OF PRECAST CONCRETE PAVERS NOT SHOWN ON THE PLANS. THIS ADDITIONAL PAVING SHALL BE IN A RUNNING BOND PATTERN AND SHALL INFILL THE AREA WITHIN THE GRANITE PAVING BAND IN LIEU OF THE FOUNTAIN UNDER THE BASE BID. PAVING SHALL INCLUDE PAVERS, SETTING BED, CONCRETE BASE, AND GRAVEL BASE PER DETAIL IN 4/L.8.

**MATERIALS LEGEND**

1 L.8		BITUMINOUS CONCRETE PAVING
2 L.9		CONCRETE PAVING
6,7 L.8		SAFETY SURFACING
8,9 L.8		RECYCLED PLASTIC PAVERS
4 L.8		PRECAST CONCRETE PAVERS WITH SOLDIER COURSE EDGING AND BANDS
1 L.9		NEW OR RESET GRANITE CURB/CURB RAMP (SEE SITE PREPARATION PLAN FOR AREA OF SALVAGED CURB)
7 L.32		TRENCH DRAIN
4 L.11		GRANITE POST & RAIL FENCE
3 L.11		CONCRETE WALL WITH CHAIN LINK FENCE
3 L.11		CONCRETE WALL WITH WELDED WIRE FENCE
1 L.10		CONCRETE CURB WALL WITH WELDED WIRE FENCE
2 L.26		EXISTING TREE TO REMAIN WITH PROTECTIVE FENCE
1 L.25		BIG BELLY KIOSK
		EXISTING SIGN, REPLACED IN KIND WITH NEW (8 TOTAL)
		WALKWAY LIGHT, SEE LIGHTING PLAN, L.8
		WELCOME SIGN (BY OTHERS)
		PARK ID SIGN (BY OTHERS)

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No.	Description	Date
REVISIONS		

Project:

**CITY OF WALTHAM  
 IMPROVEMENTS TO  
 PETER GILMORE PLAYGROUND  
 90 HALL STREET  
 WALTHAM, MA 02453**

Prepared For:  
**CITY OF WALTHAM  
 DEPARTMENT OF RECREATION  
 50 MOODY STREET  
 WALTHAM, MA 02453**

TITLE:  
**MATERIALS PLAN**

Scale 1" = 16' Date MAR 21 2016  
 Drawn By DRB  
 Checked By MJB  
 Approved By CCC  
 Project No. 1313.01

DWG No. **L.2**



**SPECIAL NOTES:**

1. THE CONTRACTOR SHALL PROTECT EXISTING TREES TO REMAIN AND SHALL ERECT TEMPORARY BARRICADES AS SHOWN ON THE DRAWINGS. UNDER NO CIRCUMSTANCES SHALL EQUIPMENT, VEHICLES, AND MATERIALS BE STORED BENEATH OR IN ANY WAY IN CONTACT WITH EXISTING TREES TO REMAIN.
2. EXISTING GRADES SHALL BE MAINTAINED TO THE GREATEST EXTENT POSSIBLE AT ALL EXISTING TREES TO REMAIN. EXCAVATION IN THESE AREAS SHALL BE BY HAND METHODS ONLY. CUT ROOTS CLEANLY TO A DEPTH OF 3" BELOW FINAL FINISHED GRADE.
3. WHERE GRADING OR CONSTRUCTION OPERATIONS OCCUR WITHIN THE CANOPY OR DRIP LINE OF EXISTING TREES TO REMAIN, THE CONTRACTOR SHALL WATER THESE TREES AS DIRECTED BY THE LANDSCAPE ARCHITECT.
4. Kompan playground equipment must be installed on slopes no greater than 0.83%. Playground must be graded to comply with this requirement.

REFER TO L-1 SITE PREPARATION & DEMOLITION PLAN, FOR CAPPING & REMOVAL OF EXISTING STORM DRAIN LINE & CATCH BASIN

SUBSURFACE RECHARGE SYSTEM  
84 STORMTECH MODEL SC-740  
RETENTION CHAMBERS

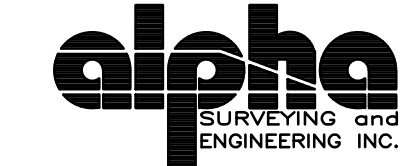
**GENERAL NOTES:**

1. BIDDERS ARE REQUIRED TO INSPECT THE CONSTRUCTION SITE TO VERIFY EXISTING CONDITIONS AND WILL BE HELD RESPONSIBLE FOR THE FULL EXTENT OF WORK REQUIRED.
2. THE CONTRACTOR SHALL REPORT DEVIATIONS IN THE EXISTING CONDITIONS TO THE LANDSCAPE ARCHITECT (508) 478-8426, PRIOR TO STARTING WORK.
3. LOCATION AND DEPTH OF UTILITIES ARE APPROXIMATE. NO GUARANTEE IS EXPRESSED OR IMPLIED THAT THE DRAWINGS INDICATE ALL UTILITIES WHICH MAY EXIST. PRIOR TO ANY EXCAVATION, CONTACT "DIG SAFE" (811) A MINIMUM OF 72 HOURS PRIOR TO BEGINNING GRADING OPERATIONS TO MARK LOCATION OF RECORDED UTILITIES. NOTIFY ALL CORPORATIONS, COMPANIES, INDIVIDUALS OR LOCAL AUTHORITIES OWNING OR HAVING JURISDICTION OVER UTILITIES RUNNING TO, THROUGH OR ACROSS AREAS DISTURBED BY EXCAVATION.
4. THE CONTRACTOR SHALL PROTECT ALL 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.
5. PROVIDE GRADE STAKES SHOWING DEPTH OF VARIOUS MATERIALS AND LIMIT OF GRADING FOR REVIEW BY THE LANDSCAPE ARCHITECT IN THE FIELD BEFORE FINAL GRADING OPERATIONS.
6. GRADING IS TO BE SMOOTH AND CONTINUOUS.
7. CROSS-SLOPES OF PAVEMENT SHALL NOT EXCEED 2%, AND LONGITUDINAL SLOPES SHALL NOT EXCEED 5%. VERIFY CONFORMANCE WITH ADA AND MAAB STANDARDS AND WHERE DISCREPANCIES ARE FOUND TO EXIST, NOTIFY THE LANDSCAPE ARCHITECT PRIOR TO PROCEEDING. THERE ARE NO CONSTRUCTION TOLERANCES ALLOWED BY ADA OR MAAB STANDARDS.

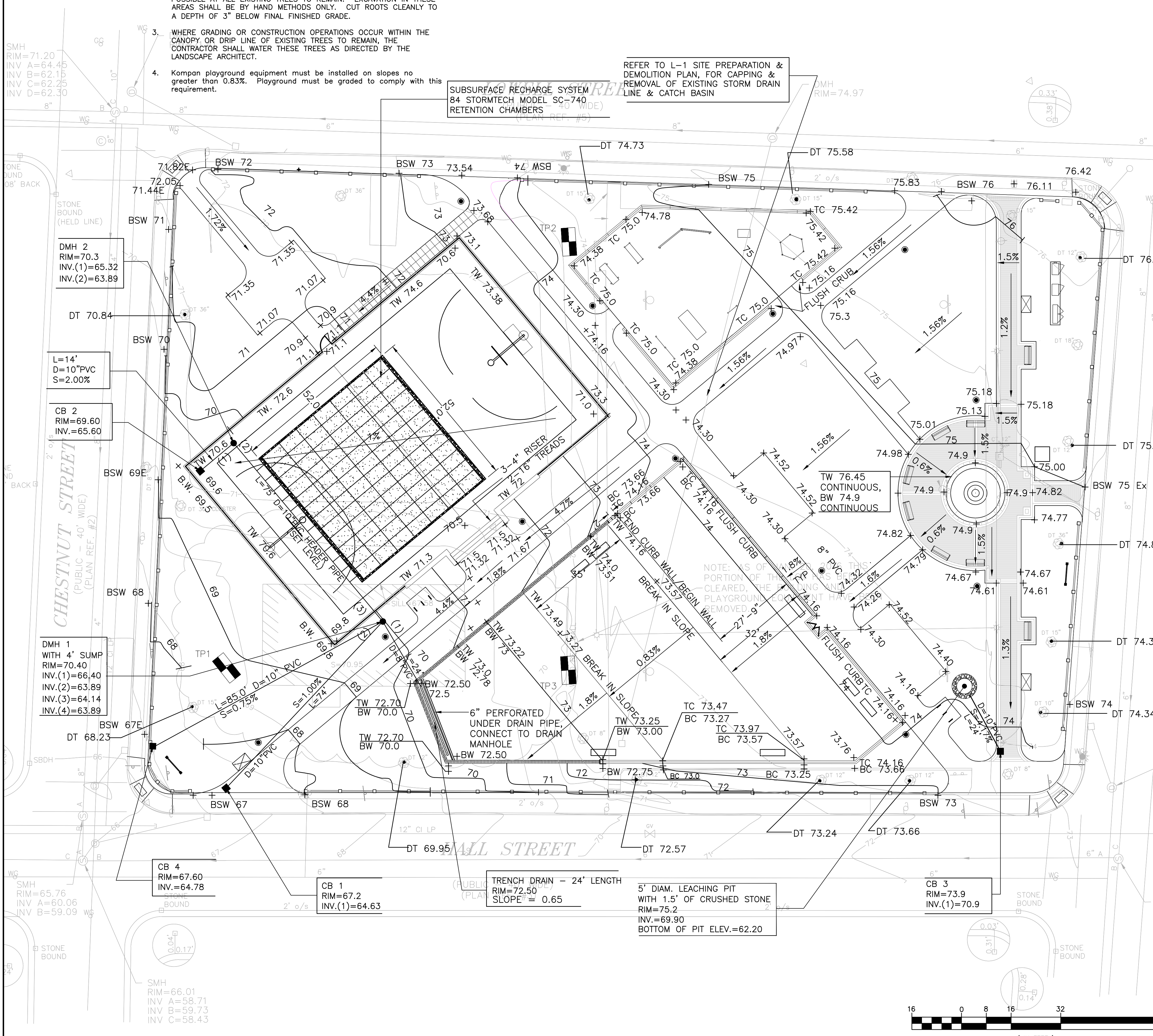
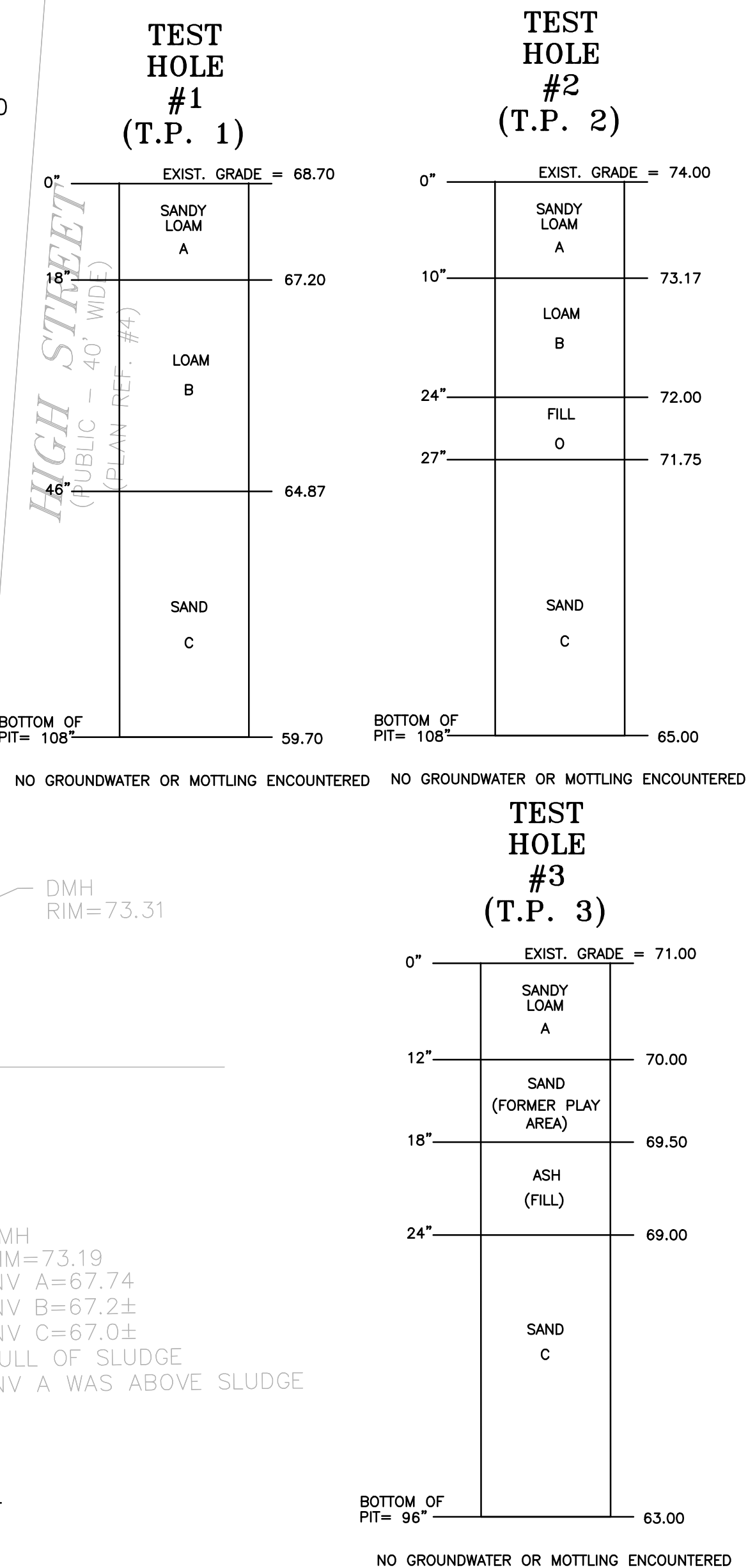
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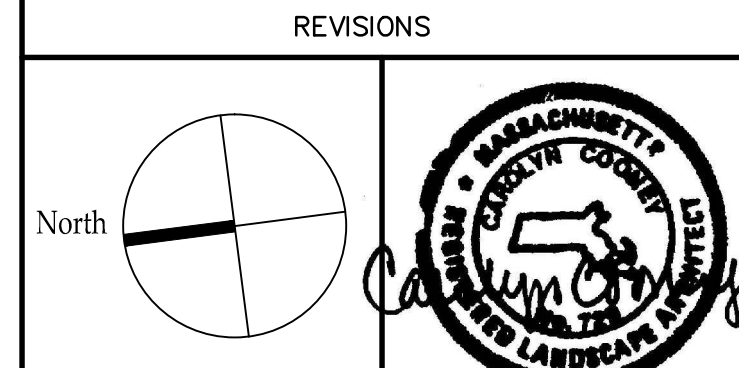
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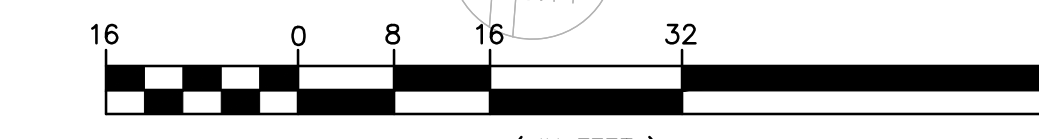
Project:  
**CITY OF WALTHAM  
IMPROVEMENTS TO  
PETER GILMORE PLAYGROUND  
90 HALL STREET  
WALTHAM, MA 02453**

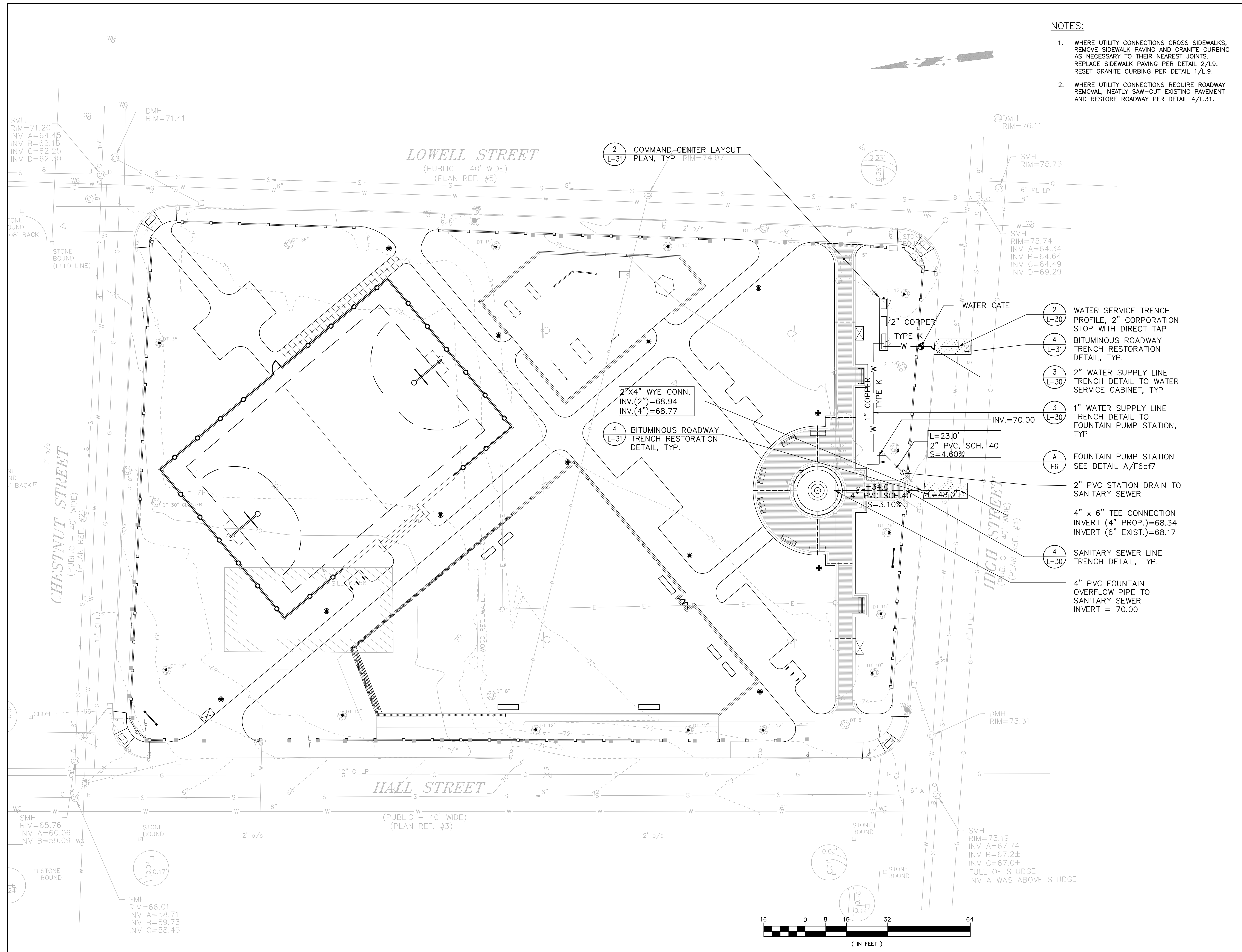
Prepared For:  
**CITY OF WALTHAM  
DEPARTMENT OF RECREATION  
50 MOODY STREET  
WALTHAM, MA 02453**

TITLE:  
**GRADING & DRAINAGE  
PLAN**

Scale 1" = 16' Date MAR 21 2016  
Drawn By CCC  
Checked By DRB  
Approved By CCC  
Project No. 1313.01

DWG No. **L.4**





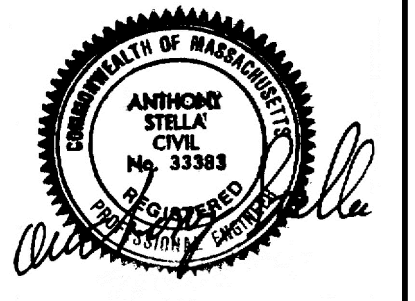
**NOTES:**

- WHERE UTILITY CONNECTIONS CROSS SIDEWALKS, REMOVE SIDEWALK PAVING AND GRANITE CURBING AS NECESSARY TO THEIR NEAREST JOINTS. REPLACE SIDEWALK PAVING PER DETAIL 2/L.9. RESET GRANITE CURBING PER DETAIL 1/L.9.
- WHERE UTILITY CONNECTIONS REQUIRE ROADWAY REMOVAL, NEATLY SAW-CUT EXISTING PAVEMENT AND RESTORE ROADWAY PER DETAIL 4/L.31.

- 2 L-30 WATER SERVICE TRENCH PROFILE, 2" CORPORATION STOP WITH DIRECT TAP
- 4 L-31 BITUMINOUS ROADWAY TRENCH RESTORATION DETAIL, TYP.
- 3 L-30 2" WATER SUPPLY LINE TRENCH DETAIL TO WATER SERVICE CABINET, TYP
- 3 L-30 1" WATER SUPPLY LINE TRENCH DETAIL TO FOUNTAIN PUMP STATION, TYP
- A F6 FOUNTAIN PUMP STATION SEE DETAIL A/F6of7
- 2" PVC STATION DRAIN TO SANITARY SEWER
- 4" x 6" TEE CONNECTION INVERT (4" PROP.)=68.34 INVERT (6" EXIST.)=68.17
- 4 L-30 SANITARY SEWER LINE TRENCH DETAIL, TYP.
- 4" PVC FOUNTAIN OVERFLOW PIPE TO SANITARY SEWER INVERT = 70.00

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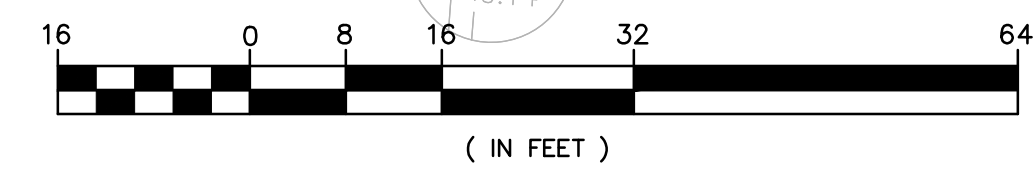
Project:  
**CITY OF WALTHAM  
 IMPROVEMENTS TO  
 PETER GILMORE PLAYGROUND  
 90 HALL STREET  
 WALTHAM, MA 02453**

Prepared For:  
**CITY OF WALTHAM  
 DEPARTMENT OF RECREATION  
 510 MOODY STREET  
 WALTHAM, MA 02453**

TITLE:  
**UTILITY CONNECTION  
 PLAN**

Scale 1" = 16' Date MAR 21 2016  
 Drawn By CCC  
 Checked By DRB  
 Approved By CCC  
 Project No. 1313.01

DWG No. **L.4A**

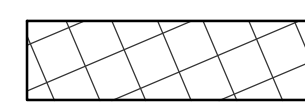



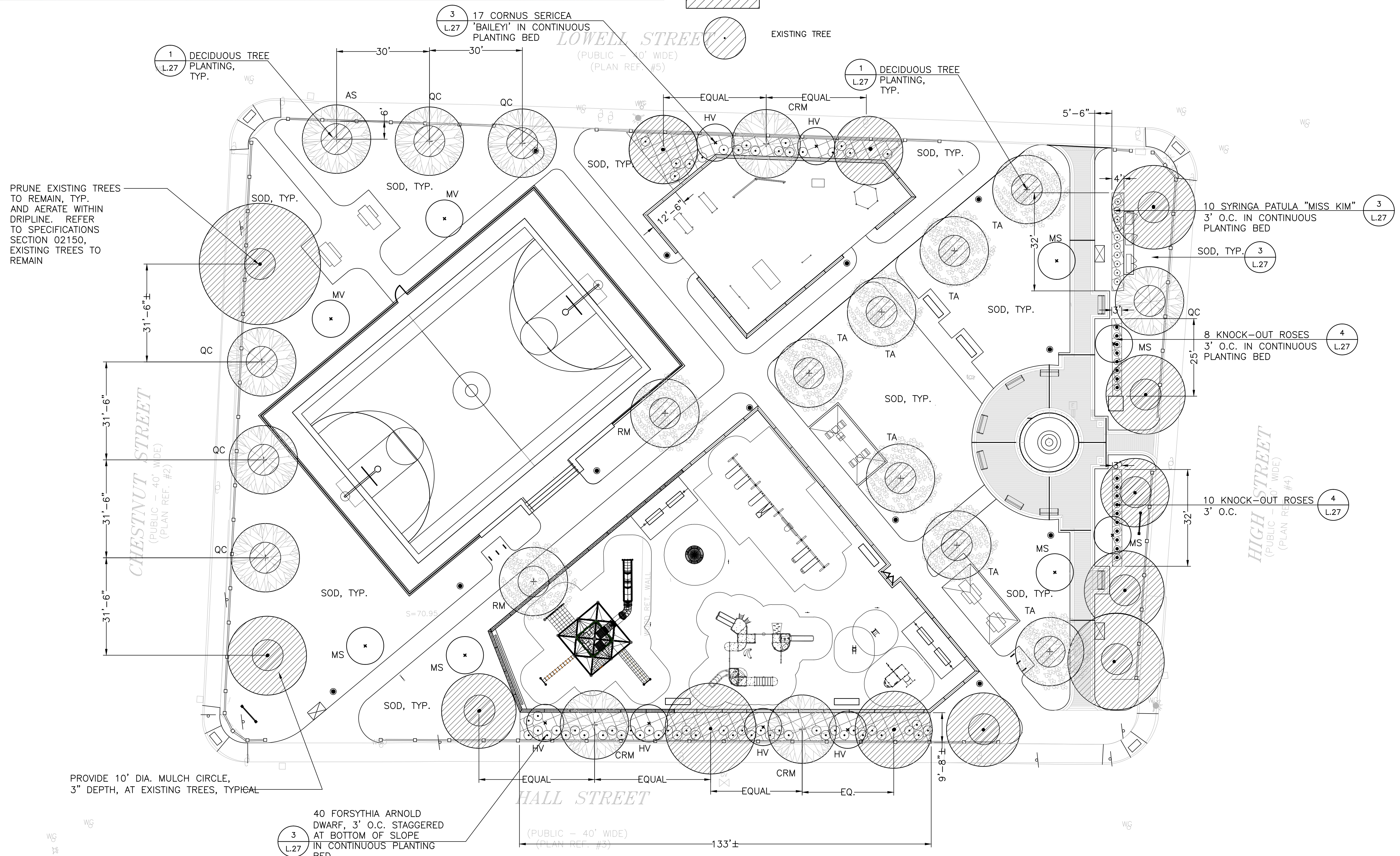
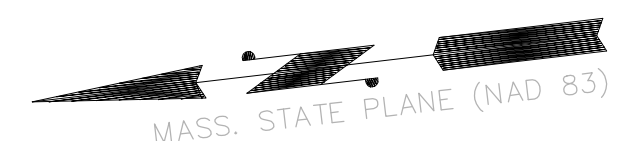
PLANT SCHEDULE						
SCIENTIFIC NAME	SYMBOL	COMMON NAME	SIZE	SPACING	QUANTITY	COMMENTS
<b>SHADE TREES</b>						
Acer rubrum		Red Maple	3 to 3-1/2" Caliper	As Shown	2	Backfill: Amended loam; see Section 02900
Acer rubrum x Armstrong	AR	Columnar Red Maple	3 to 3-1/2" Caliper	As Shown	3	Amended loam backfill
Acer saccharum "Green Mountain"	AS	Sugar Maple	3 to 3-1/2" Caliper	As Shown	1	Amended loam backfill
Quercus coccinea	QC	Scarlet Oak	3 to 3-1/2" Caliper	As Shown	7	Amended loam backfill
Tilia americana	TA	American Linden	4 to 4-1/2" Caliper	As Shown	6	Amended loam backfill
<b>SMALL TREES</b>						
Magnolia stellata "Royal Star"	MS	Star Magnolia	10'-12" Ht.; Multistem	As shown	6	Amended loam backfill
Magnolia virginiana	MV	Sweetbay Magnolia	10'-12" Ht.; Multistem	As shown	2	Amended loam backfill
<b>SHRUBS</b>						
Cornus sericea "Bailey"		Red Twig Dogwood	#5, 3'-4" Ht.	As shown	17	Amended loam backfill
Forsythia "Arnold Dwarf"		Dwarf Forsythia	#3; 18-24" Ht.	3'-0" staggered	40	Amended loam backfill
Hamamelis virginiana	HV	Common Witchhazel	6'-7" Ht.	As shown	6	Amended loam backfill
Rosa "Knock-out"		Knock-out Rose	#3	4' o.c.	18	Planting mix: 1/3 sand; 1/3 loam; 1/3 peat moss
Syringa patula "Miss Kim"		Miss Kim Lilac	4'-5" Ht.	3' o.c.	10	Amended loam backfill

**PLANTING NOTES:**

- REFER TO SPECIFICATIONS SECTION 02150 EXISTING TREES TO REMAIN FOR ADDITIONAL REQUIREMENTS INCLUDING PRUNING AND AERATION OF EXISTING TREES TO REMAIN.
- 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.
- TREES SHALL BE FRESHLY DUG.
- ALL AREAS NOT SCHEDULED FOR MULCH, MULCHED PLANTING BED, OR PAVING, SHALL BE LOAMED AND SODDED.

**PLANTING PLAN LEGEND**

-  MULCHED PLANTING BED, 3" DEPTH MULCH, 12" DEPTH PLANTING SOIL MIX MINIMUM CONTINUOUS.
-  MULCH, 3" DEPTH



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**REVISIONS**

Project:  
**CITY OF WALTHAM  
 IMPROVEMENTS TO  
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 90 HALL STREET  
 WALTHAM, MA 02453**

Prepared For:  
**CITY OF WALTHAM  
 DEPARTMENT OF RECREATION  
 510 MOODY STREET  
 WALTHAM, MA 02453**

TITLE:  
**PLANTING PLAN**

Scale 1" = 16' Date MAR 21 2016  
 Drawn By CCC  
 Checked By DRB  
 Approved By CCC  
 Project No. 1313.01

DWG No. **L.5**



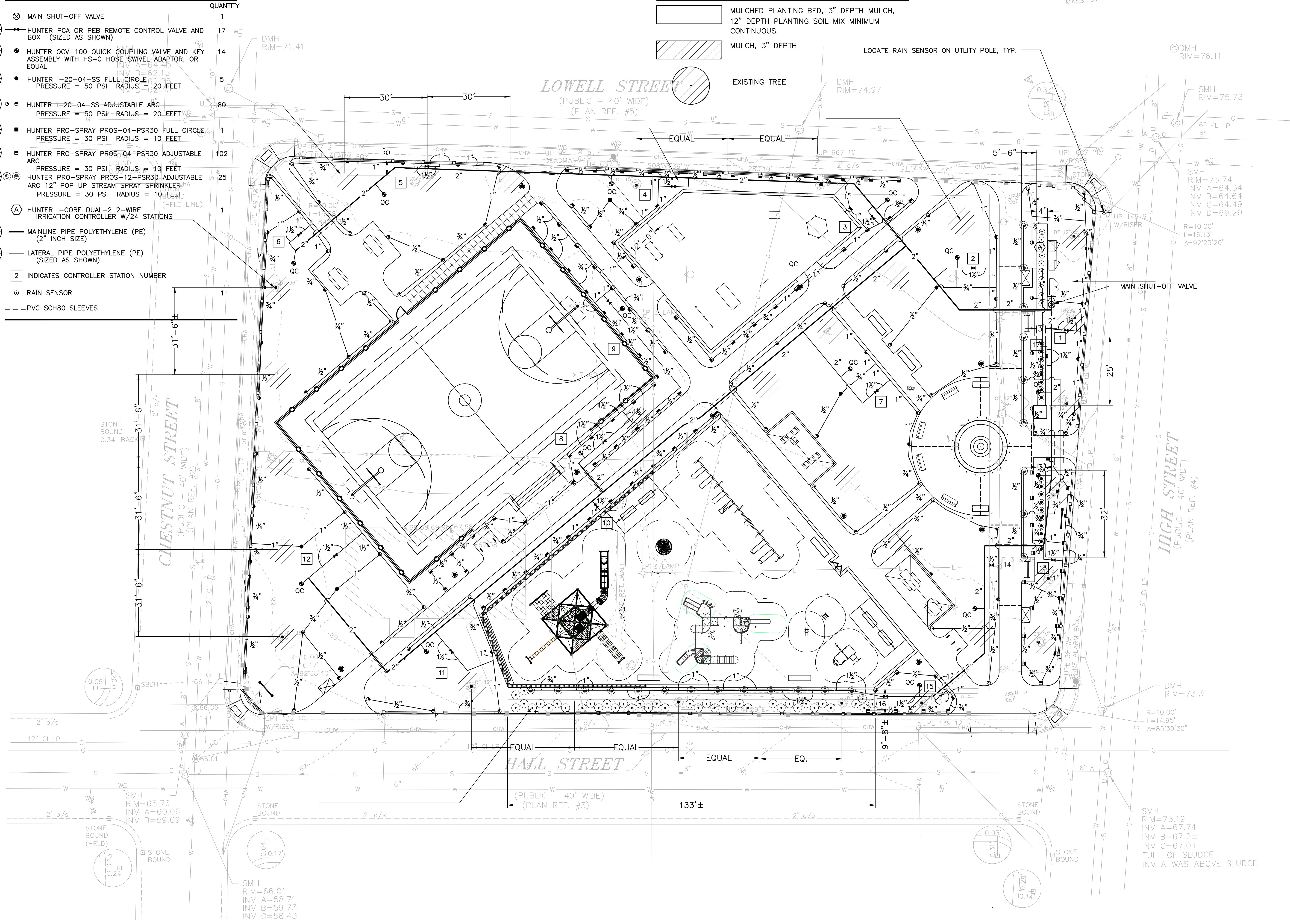
**LEGEND**

- ⊗ MAIN SHUT-OFF VALVE 1
- ④ L.33 HUNTER PGA OR PEB REMOTE CONTROL VALVE AND BOX (SIZED AS SHOWN) 17
- ⑤ L.33 HUNTER QCV-100 QUICK COUPLING VALVE AND KEY ASSEMBLY WITH HS-0 HOSE SWIVEL ADAPTOR, OR EQUAL 14
- ⑦ L.33 HUNTER I-20-04-SS FULL CIRCLE PRESSURE = 50 PSI RADIUS = 20 FEET 5
- ⑦ L.33 HUNTER I-20-04-SS ADJUSTABLE ARC PRESSURE = 50 PSI RADIUS = 20 FEET 80
- ② L.33 HUNTER PRO-SPRAY PROS-04-PSR30 FULL CIRCLE PRESSURE = 30 PSI RADIUS = 10 FEET 1
- ② L.33 HUNTER PRO-SPRAY PROS-04-PSR30 ADJUSTABLE ARC PRESSURE = 30 PSI RADIUS = 10 FEET 102
- ③ L.33 HUNTER PRO-SPRAY PROS-12-PSR30 ADJUSTABLE ARC 12" POP UP STREAM SPRAY SPRINKLER PRESSURE = 30 PSI RADIUS = 10 FEET 25
- Ⓐ HUNTER I-CORE DUAL-2 2-WIRE IRRIGATION CONTROLLER W/24 STATIONS 1
- ⑥ L.33 MAINLINE PIPE POLYETHYLENE (PE) (2" INCH SIZE)
- ① L.33 LATERAL PIPE POLYETHYLENE (PE) (SIZED AS SHOWN)
- ② INDICATES CONTROLLER STATION NUMBER
- ⊙ RAIN SENSOR
- == PVC SCH80 SLEEVES

**PLANTING PLAN LEGEND**

- ▭ MULCHED PLANTING BED, 3" DEPTH MULCH, 12" DEPTH PLANTING SOIL MIX MINIMUM CONTINUOUS.
- ▨ MULCH, 3" DEPTH
- ⊙ EXISTING TREE

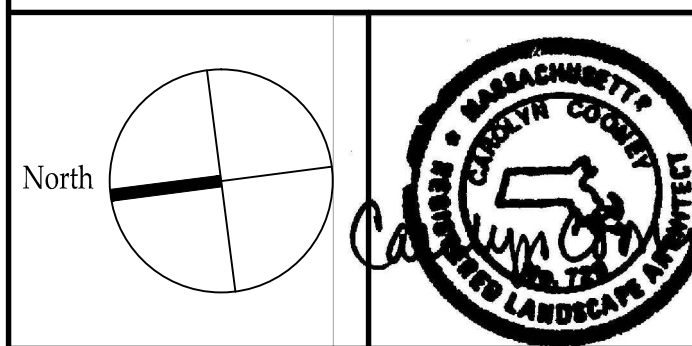
LOCATE RAIN SENSOR ON UTILITY POLE, TYP.



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Project:  
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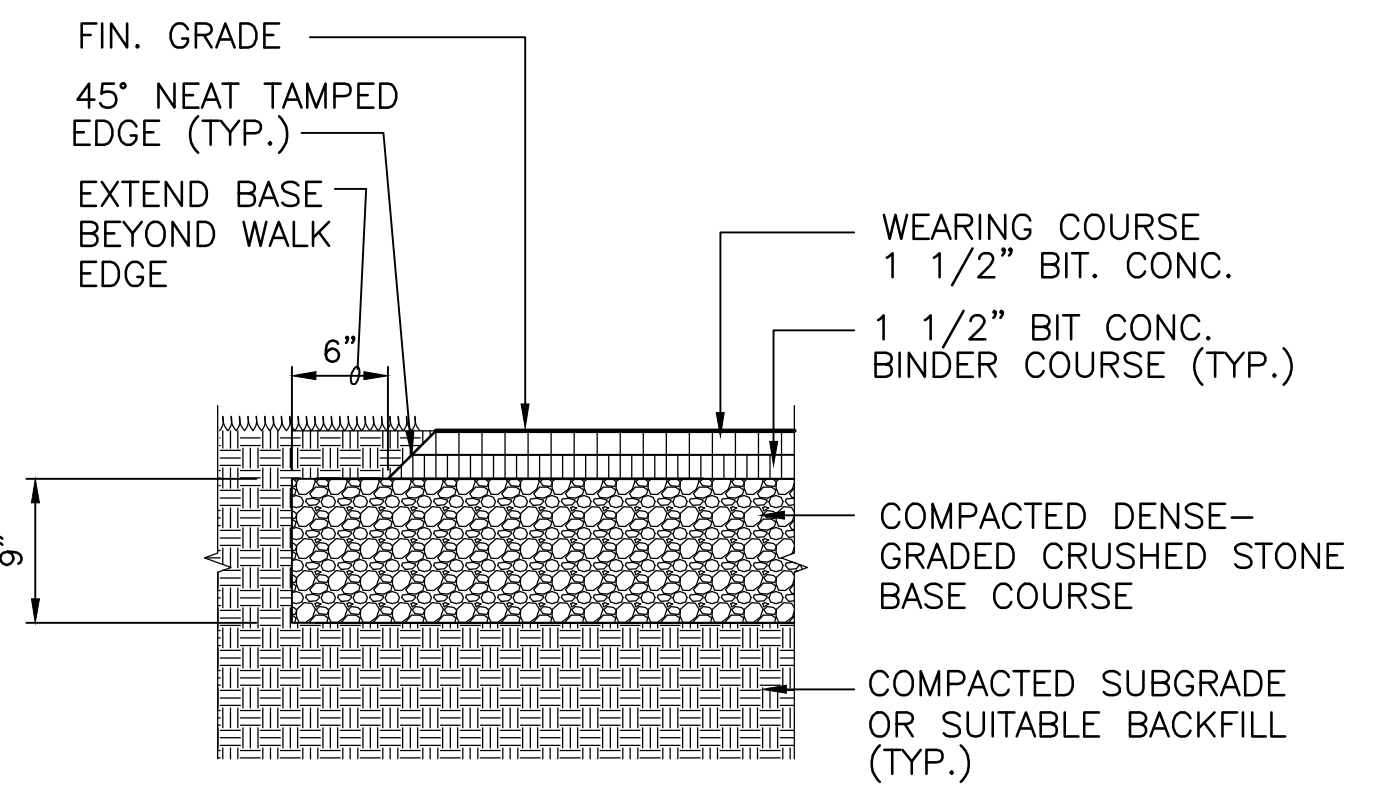
Prepared For:  
**CITY OF WALTHAM  
 DEPARTMENT OF RECREATION  
 50 MOODY STREET  
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TITLE:  
**IRRIGATION  
 PLAN**

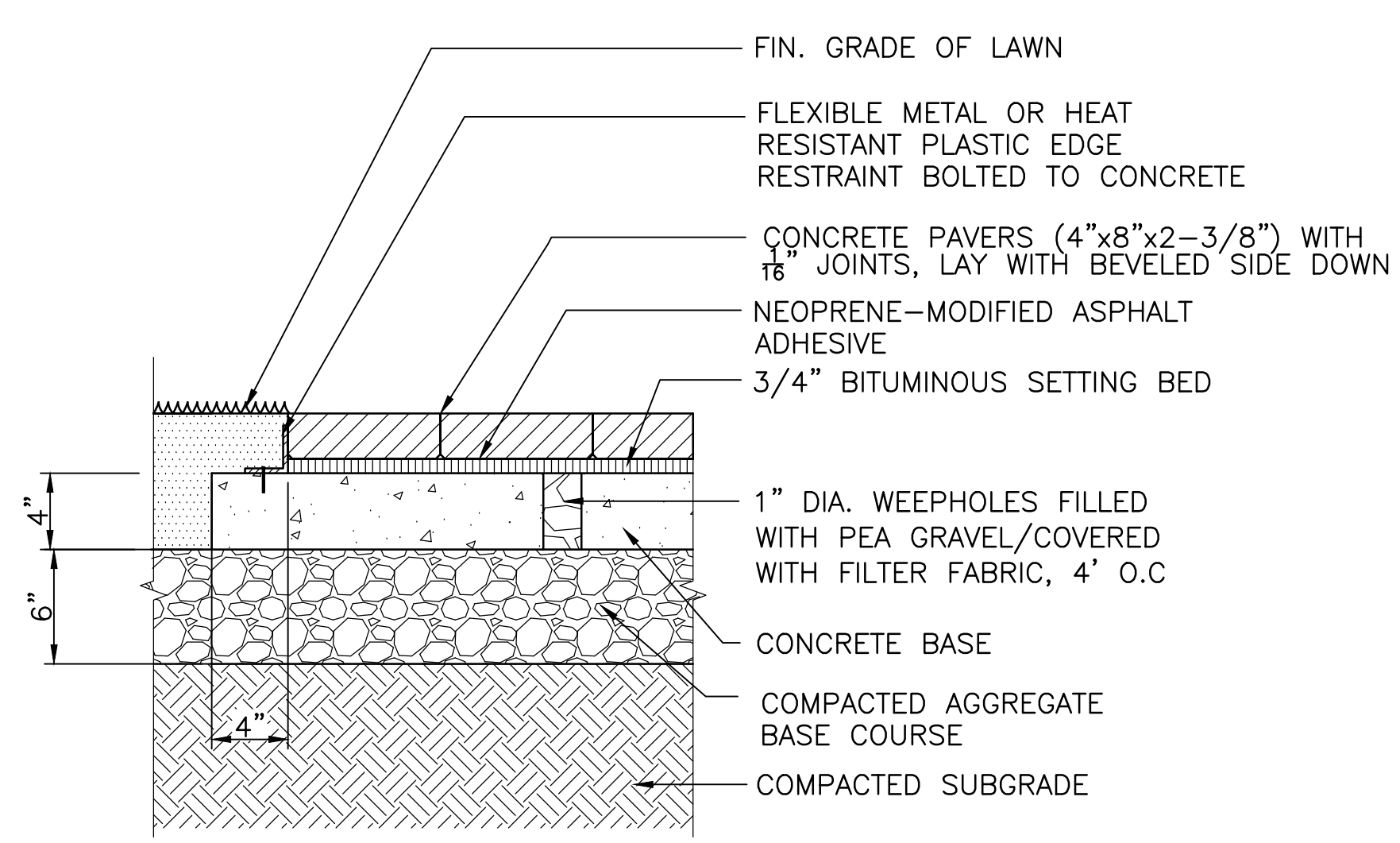
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DWG No. **L.6**

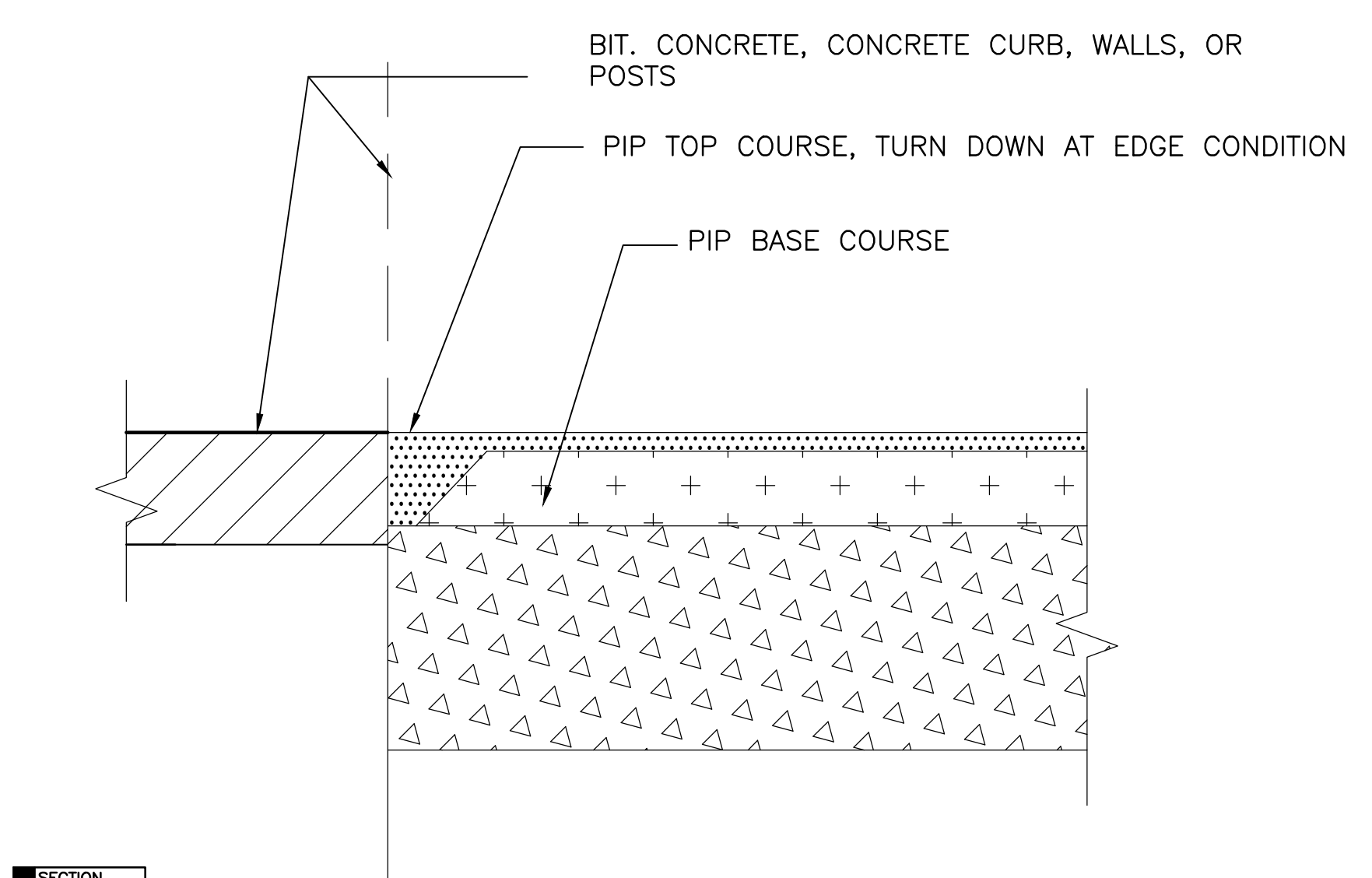




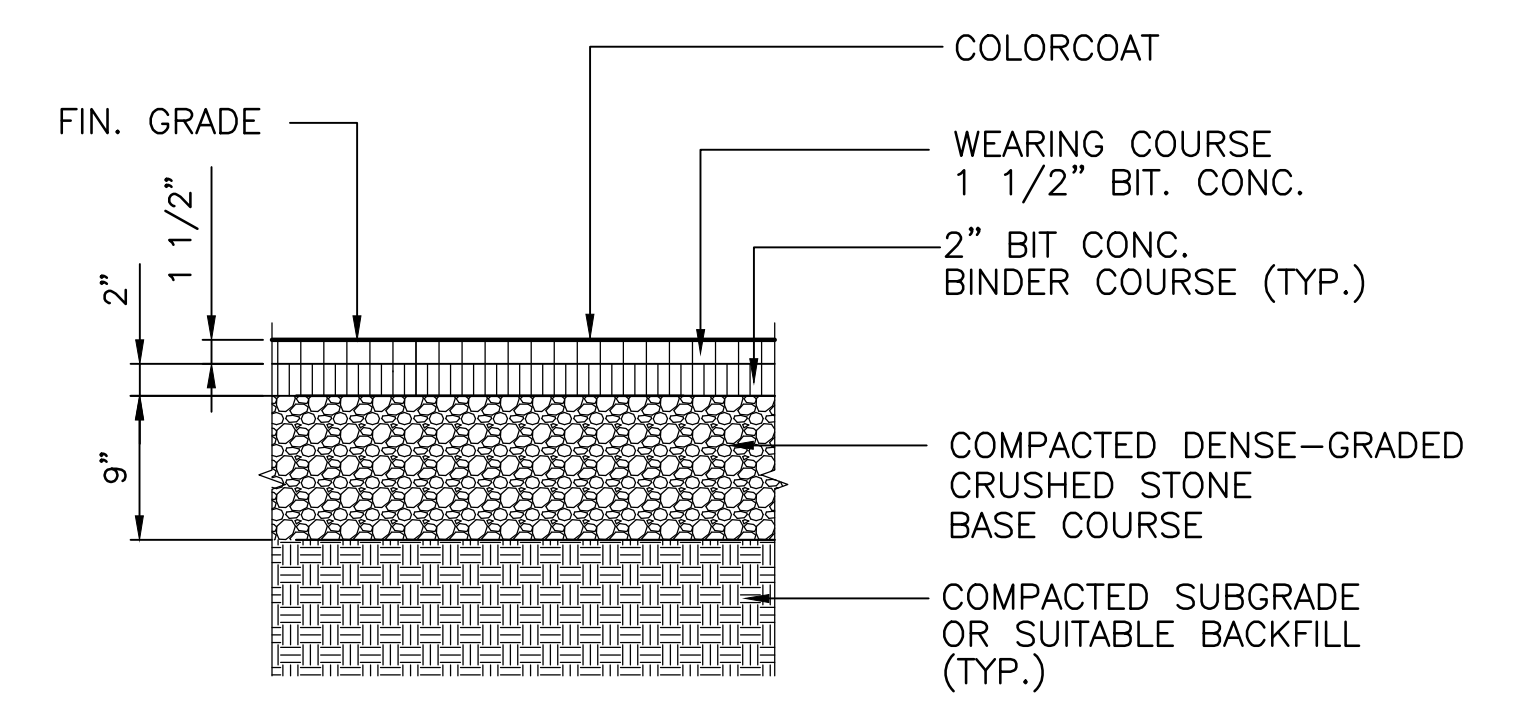
**SECTION**  
**1 BITUMINOUS CONCRETE WALKWAY PAVEMENT**  
 1" = 1'-0"



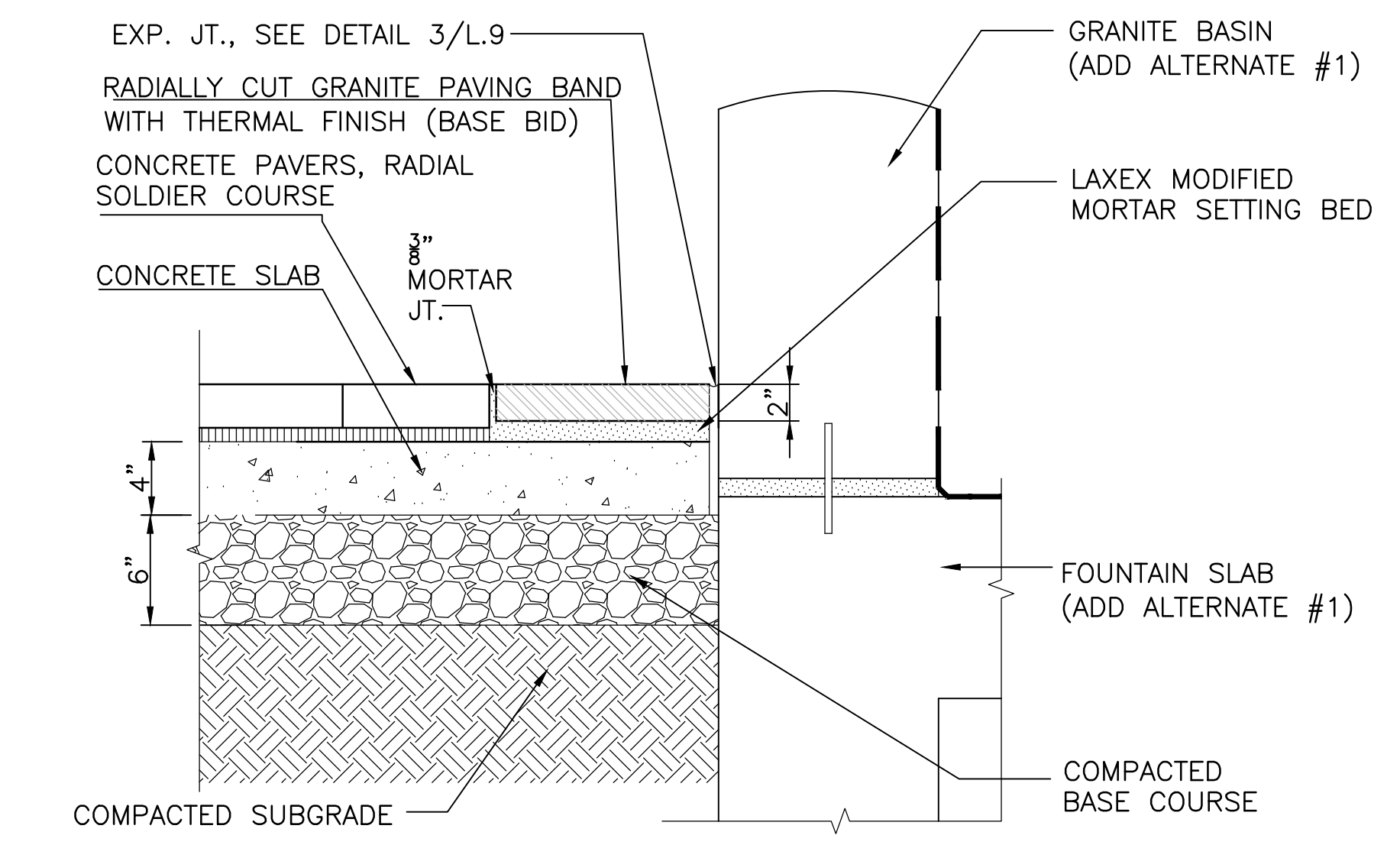
**SECTION**  
**4 PRECAST PAVERS ON CONCRETE BASE**  
 1-1/2" = 1'-0"



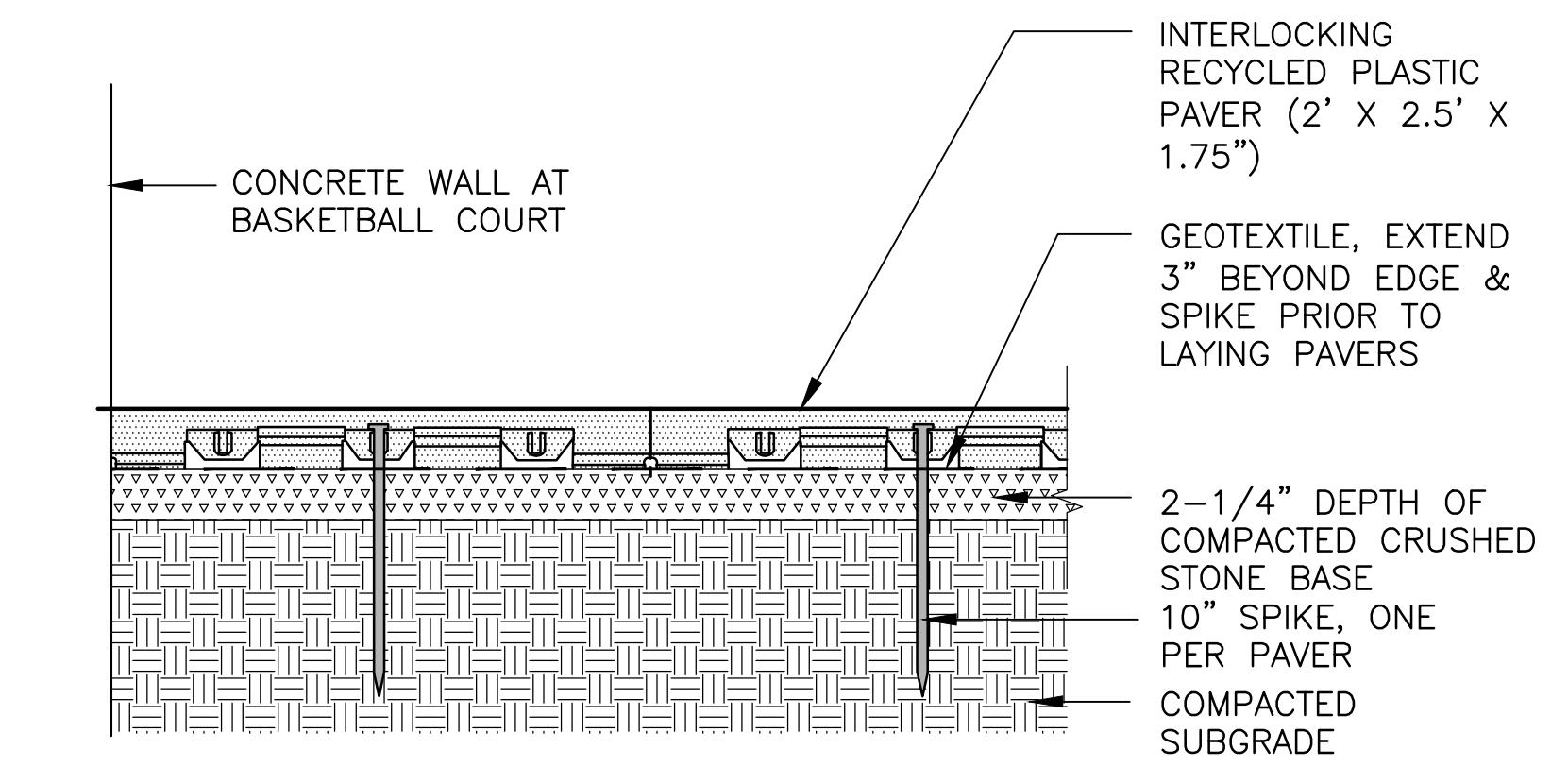
**SECTION**  
**7 SAFETY SURFACING - EDGE CONDITION**  
 3" = 1'-0"



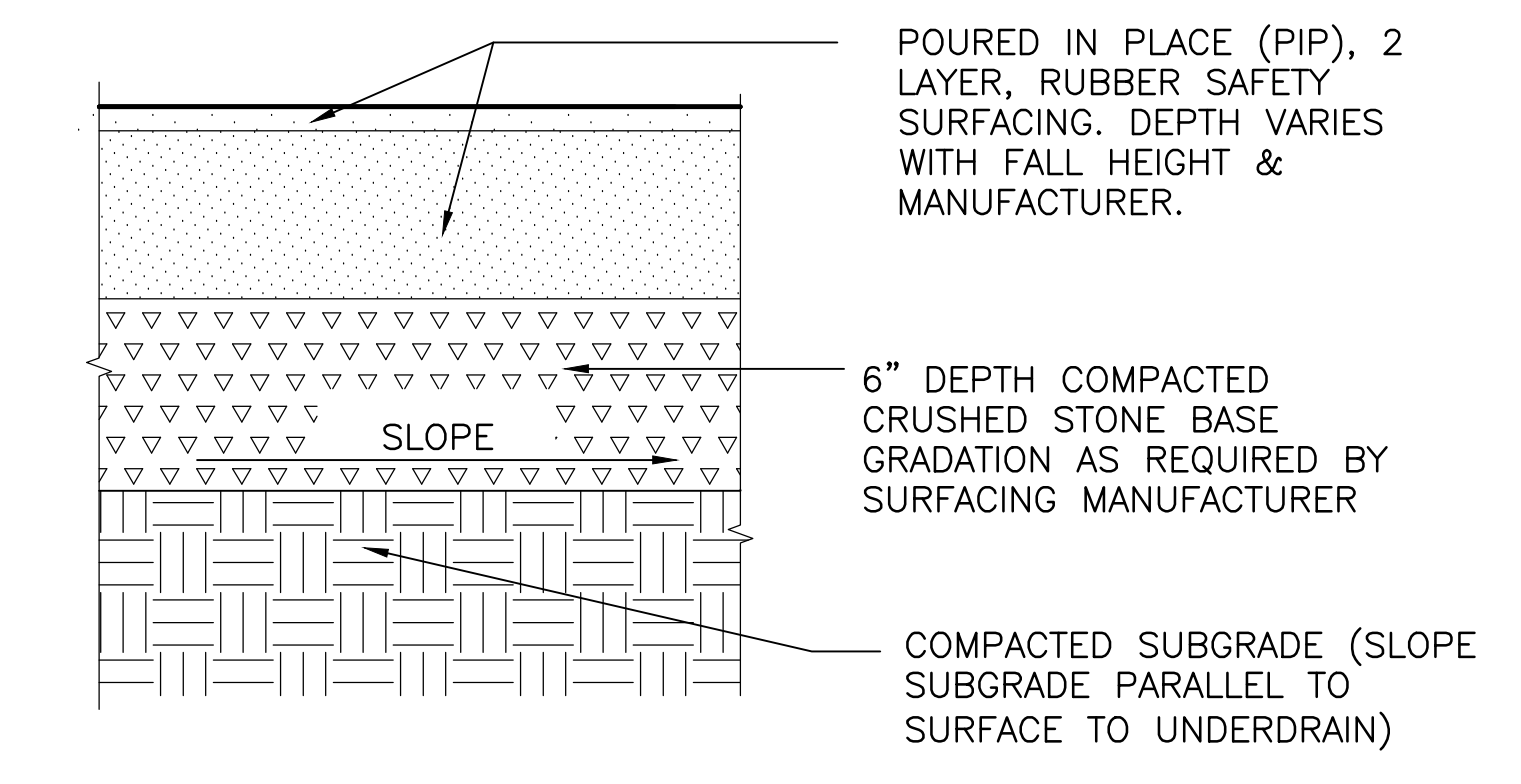
**SECTION**  
**2 COURT PAVING SECTION**  
 1" = 1'-0"



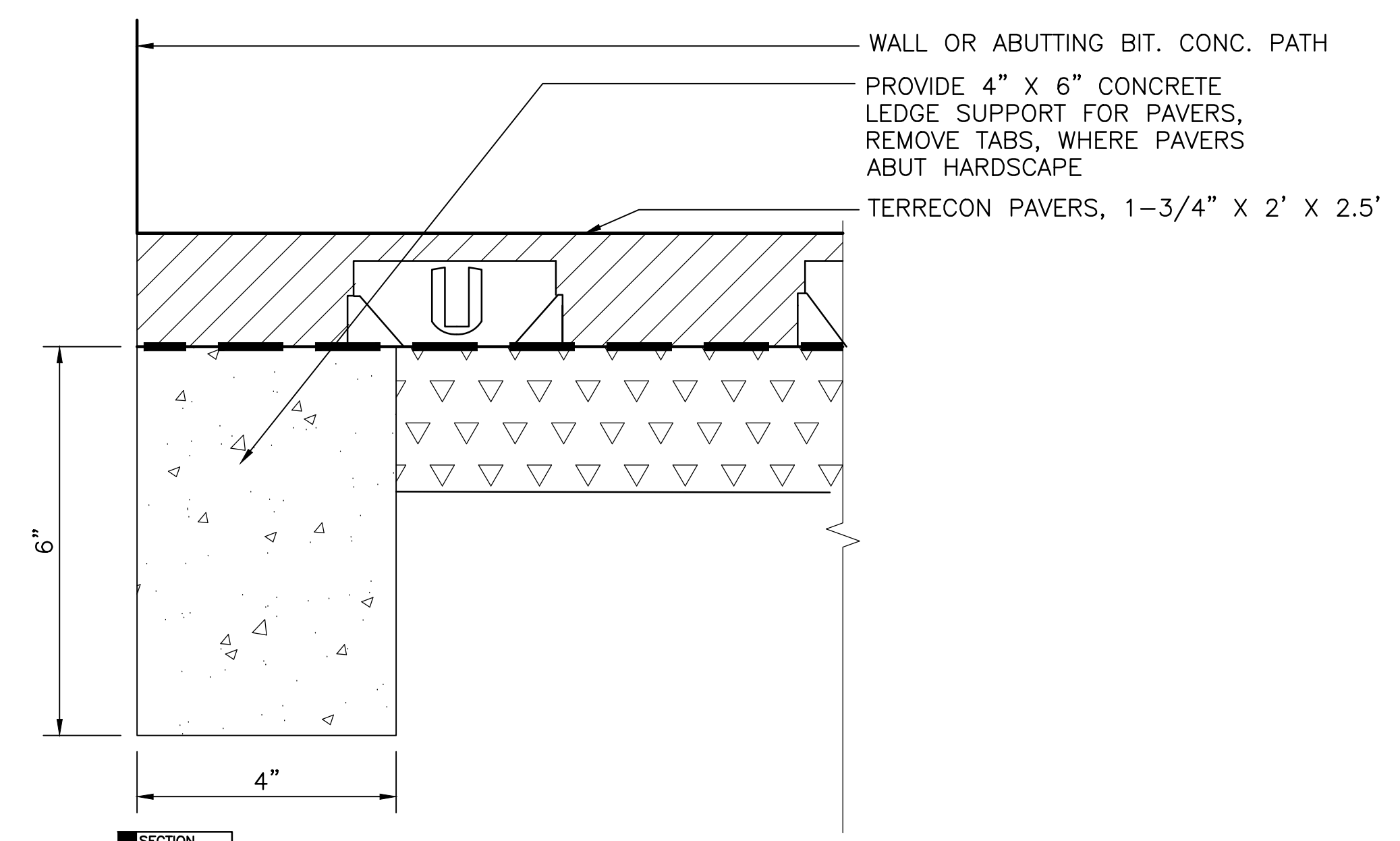
**SECTION**  
**5 GRANITE PAVING**  
 1" = 1'-0"



**SECTION**  
**8 RECYCLED PLASTIC PAVERS**  
 1-1/2" = 1'-0"



**SECTION**  
**6 SAFETY SURFACING**  
 3" = 1'-0"



**SECTION**  
**9 RECYCLED PLASTIC PAVERS - EDGE CONDITION**  
 1-1/2" = 1'-0"

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No.	Description	Date

REVISIONS



Project:  
**CITY OF WALTHAM  
 IMPROVEMENTS TO  
 PETER GILMORE PLAYGROUND  
 90 HALL STREET  
 WALTHAM, MA 02453**

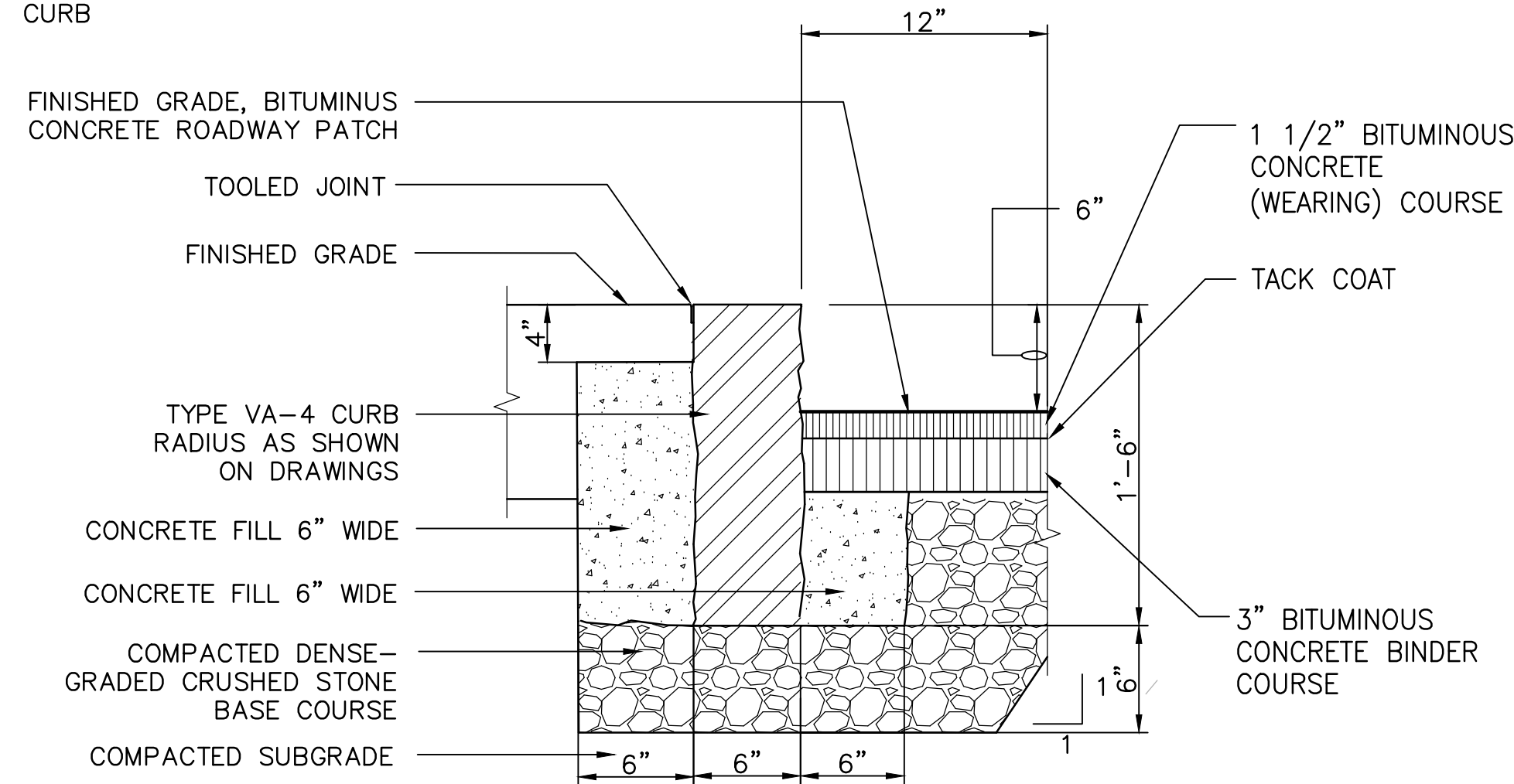
Prepared For:  
**CITY OF WALTHAM  
 DEPARTMENT OF RECREATION  
 510 MOODY STREET  
 WALTHAM, MA 02453**

TITLE:  
**PAVING & CURBING  
 DETAILS**

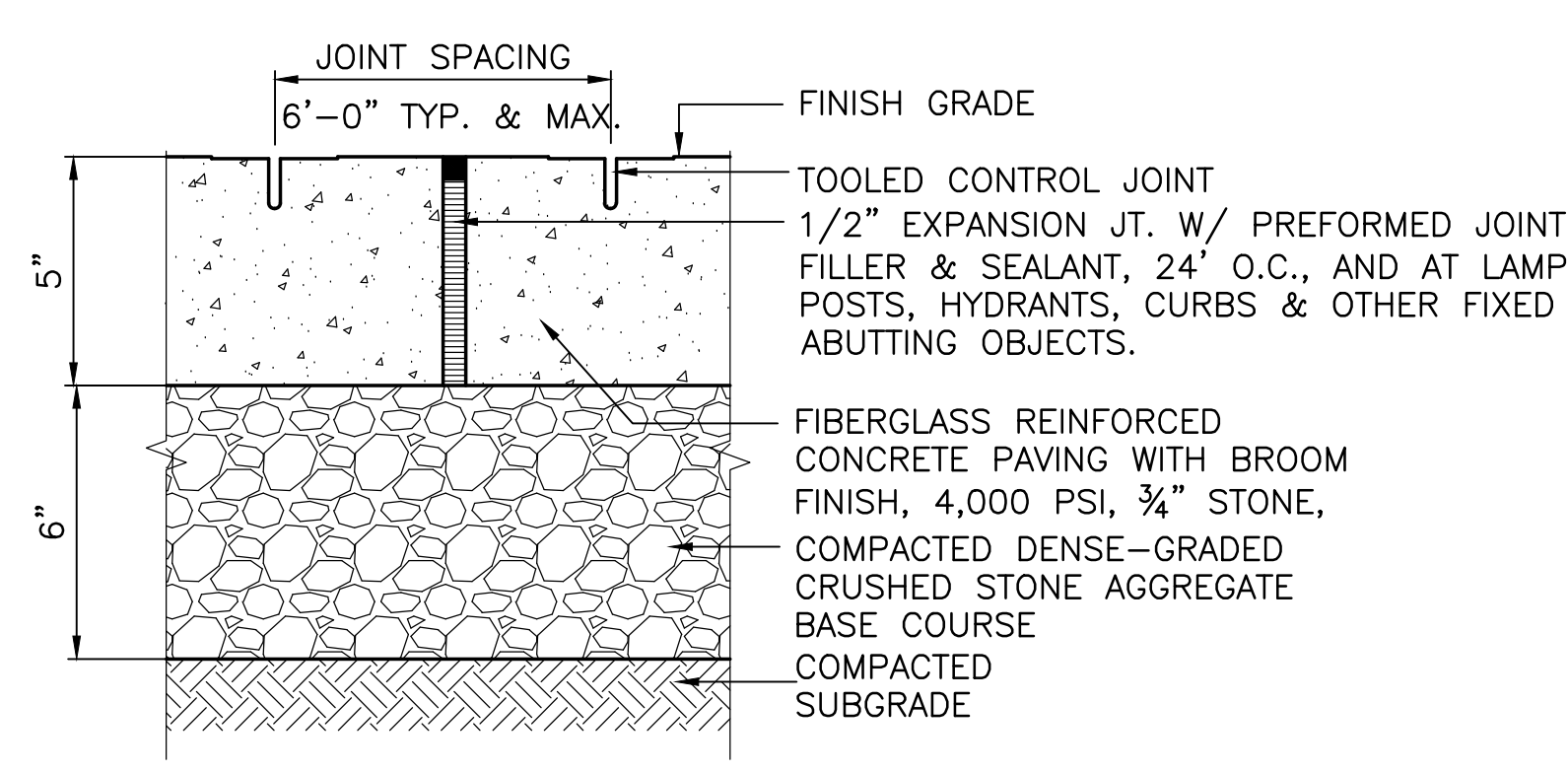
Scale AS NOTED Date MAR 21 2016  
 Drawn By CCC  
 Checked By DRB  
 Approved By VH  
 Project No. 1313.01

DWG No. **L.8**

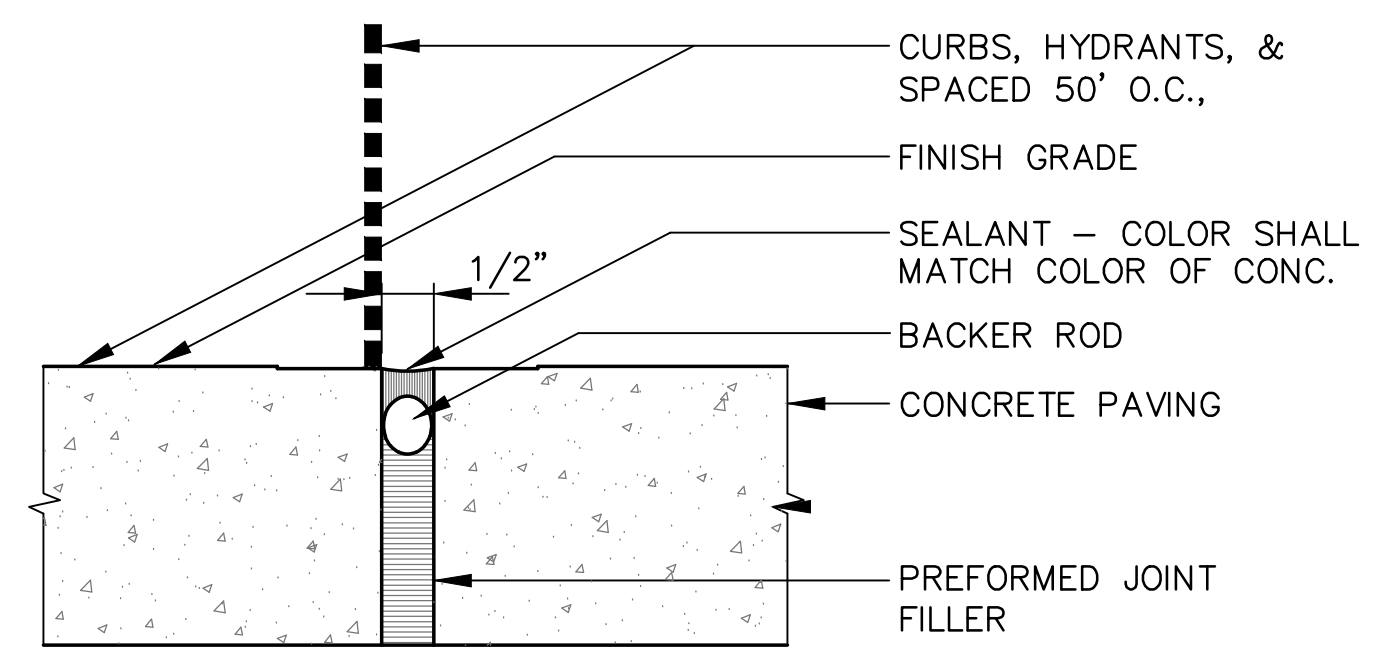
NOTE:  
SAW CUT AND REMOVE 12" OF PVMT. FOR INSTALLATION OF GRANITE CURB



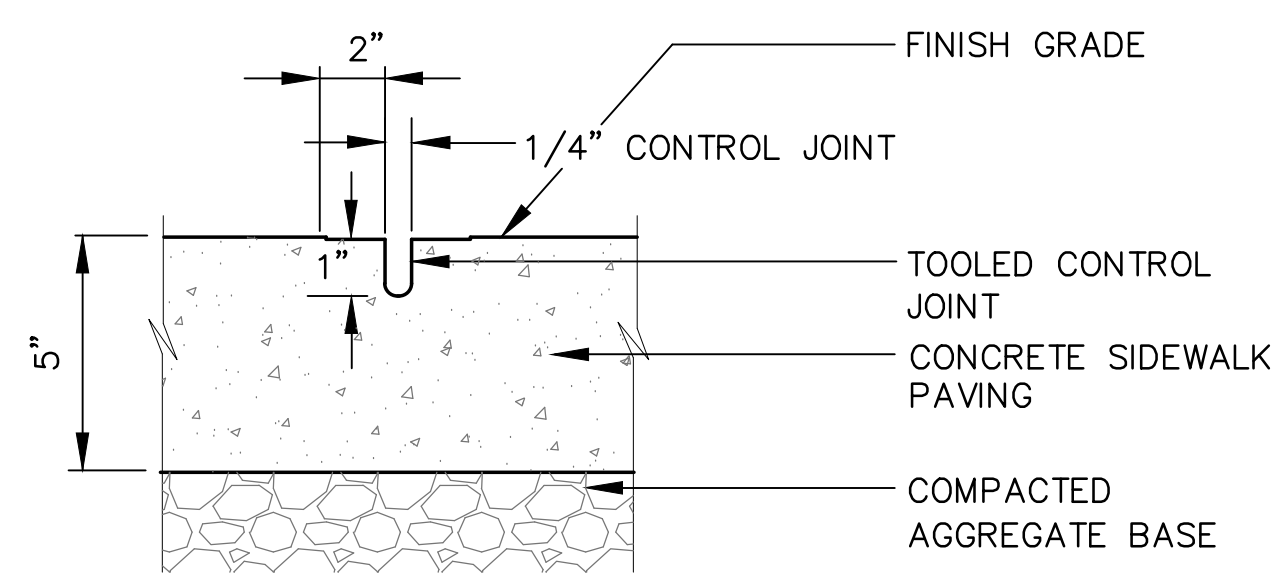
SECTION 1  
**1** GRANITE CURB  
SCALE: NTS



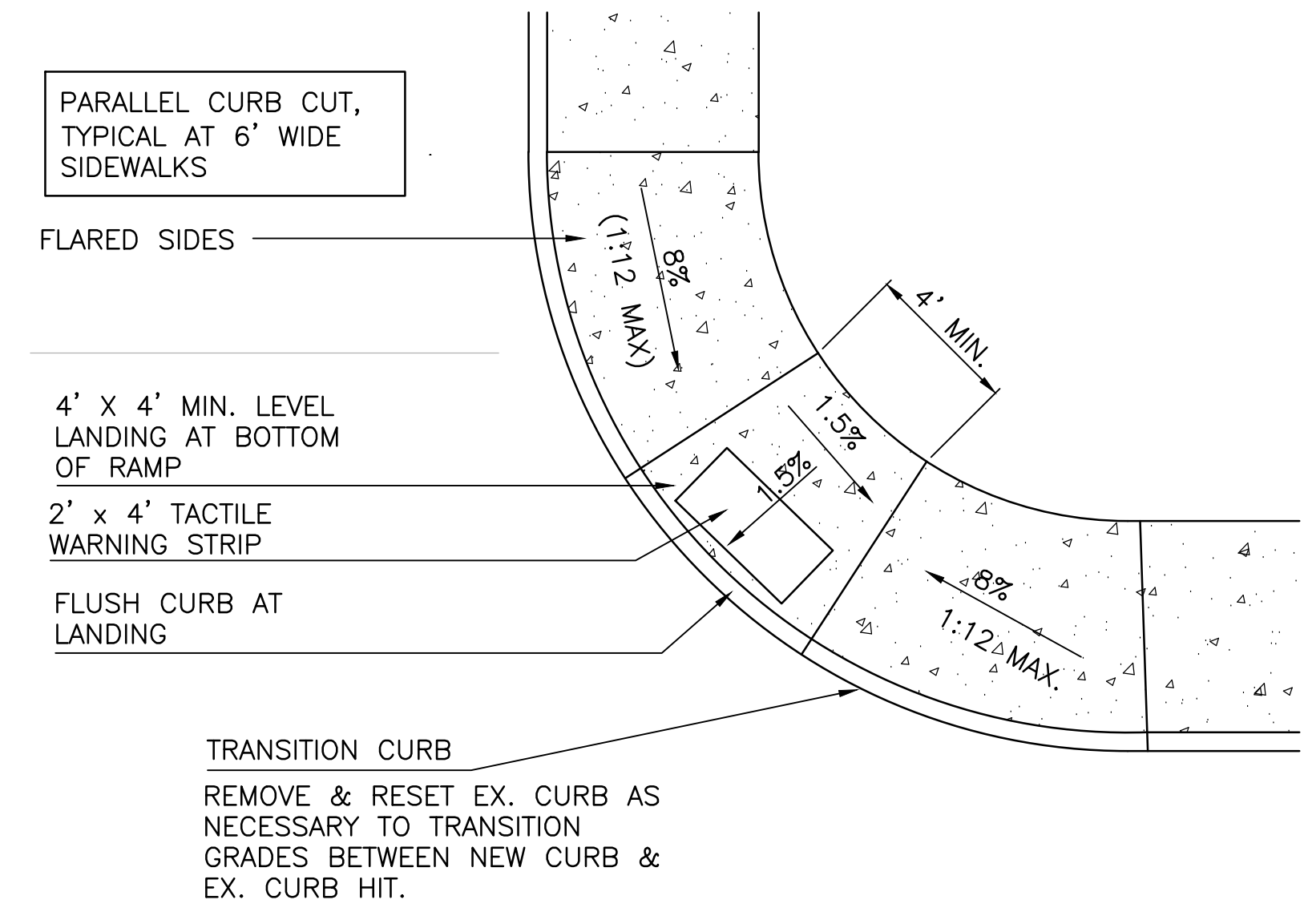
SECTION 2  
**2** CONCRETE SIDEWALK PAVING  
3" = 1'-0"



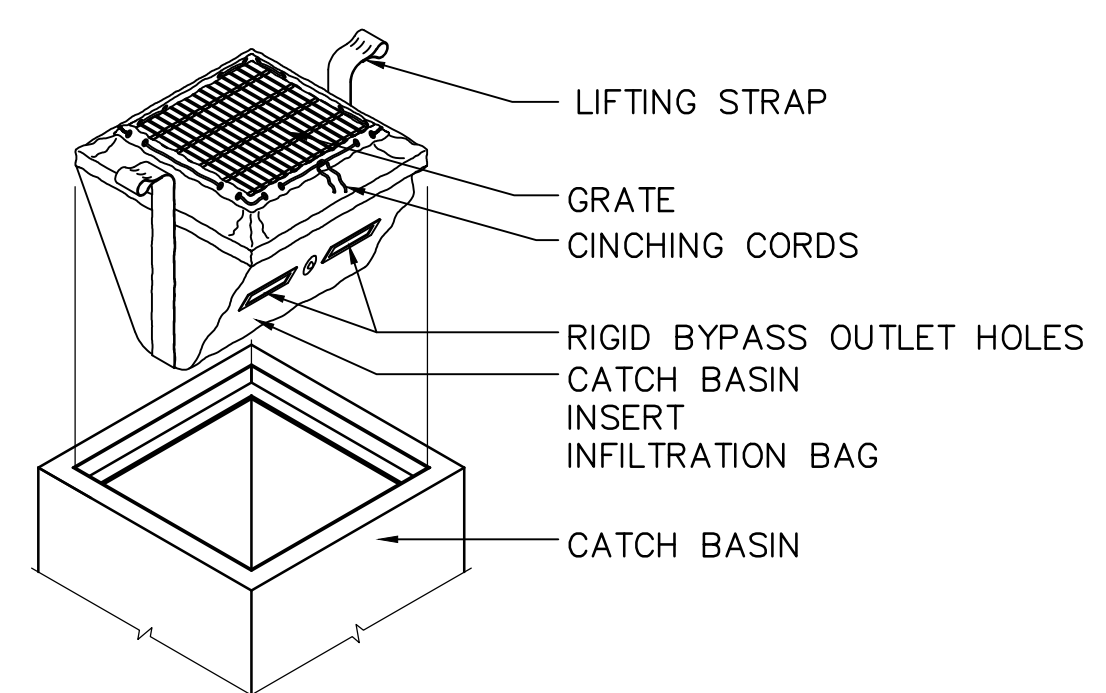
SECTION 3  
**3** EXPANSION JOINT  
N.T.S.



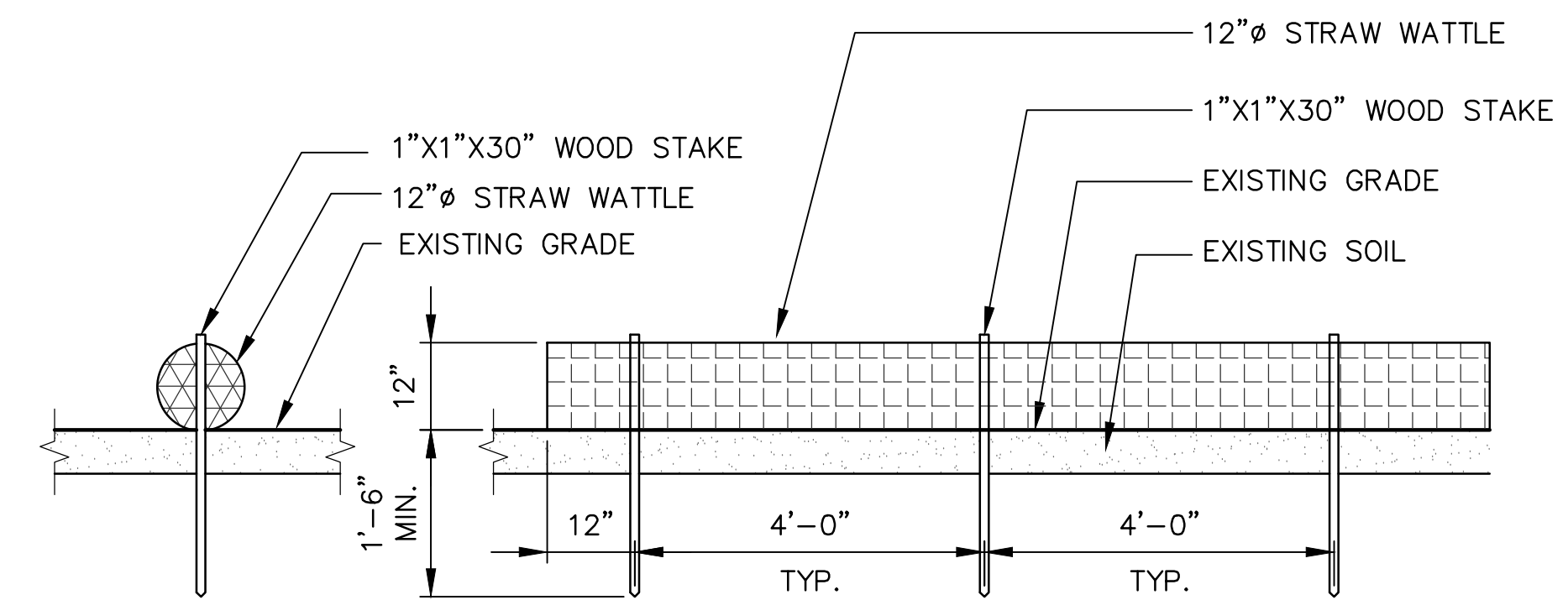
SECTION 4  
**4** CONTRACTION (CONTROL) JOINT  
N.T.S.



SECTION 5  
**5** CURB CUT  
1/4" = 1'-0"



SECTION 6  
**6** CATCH BASIN INSERT  
N.T.S.



SECTION 7  
**7** STRAW WATTLE DETAIL  
N.T.S.

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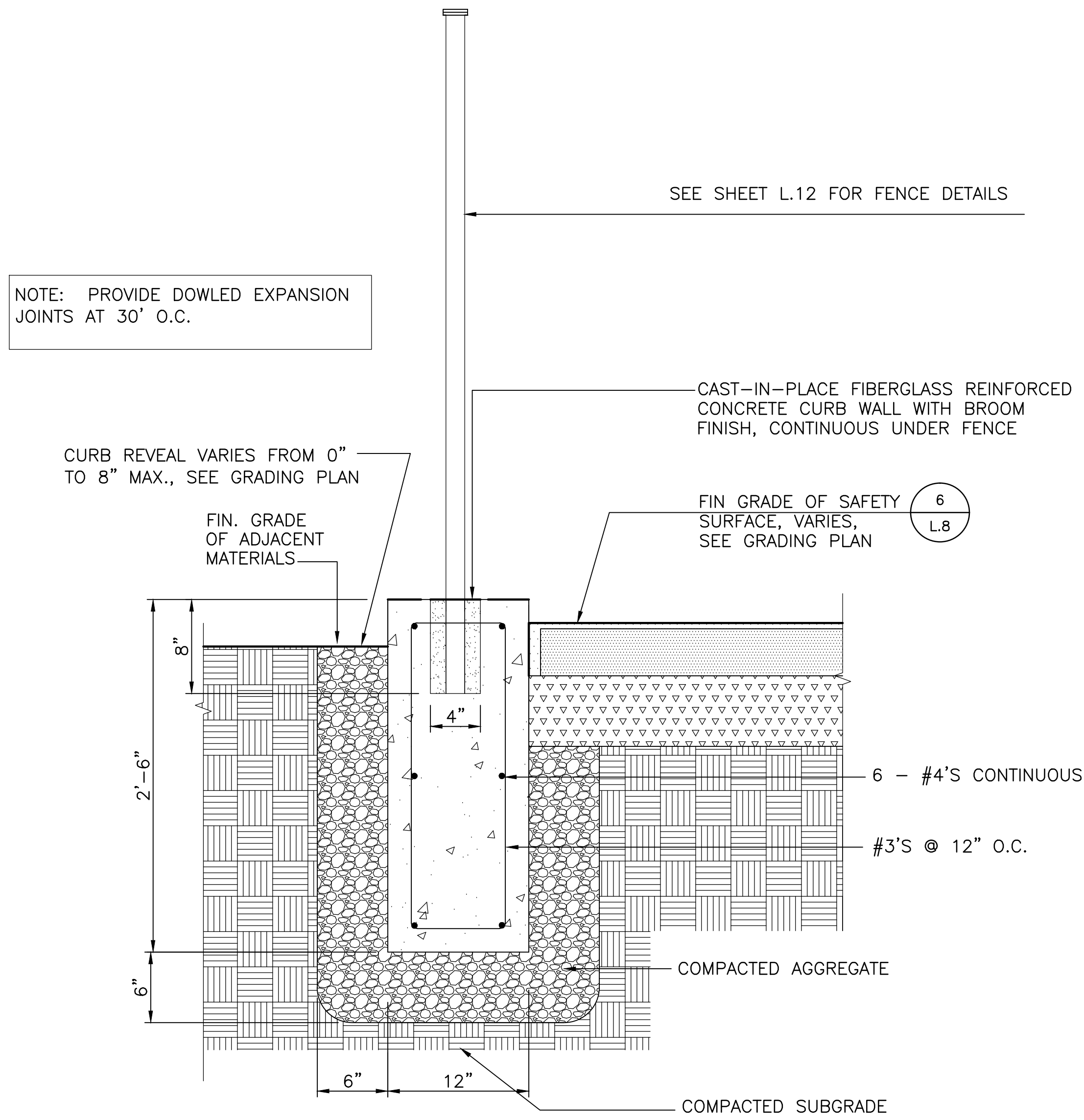
Project:  
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90 HALL STREET  
WALTHAM, MA 02453**

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**CITY OF WALTHAM  
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510 MOODY STREET  
WALTHAM, MA 02453**

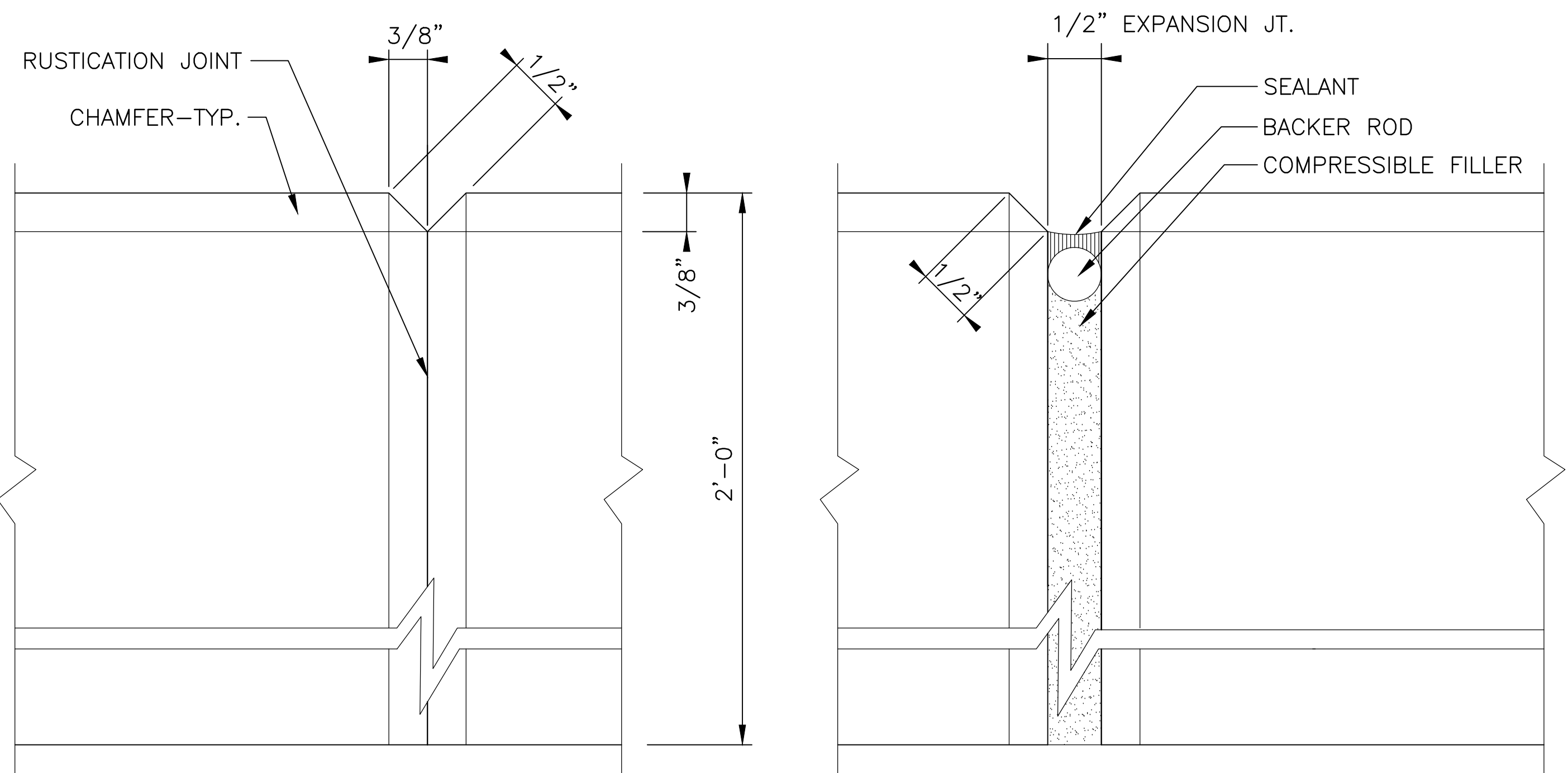
TITLE:  
**SIDEWALK & CURBING  
DETAILS**

Scale AS NOTED Date MAR 21 2016  
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Checked By DRB  
Approved By VH  
Project No. 1313.01

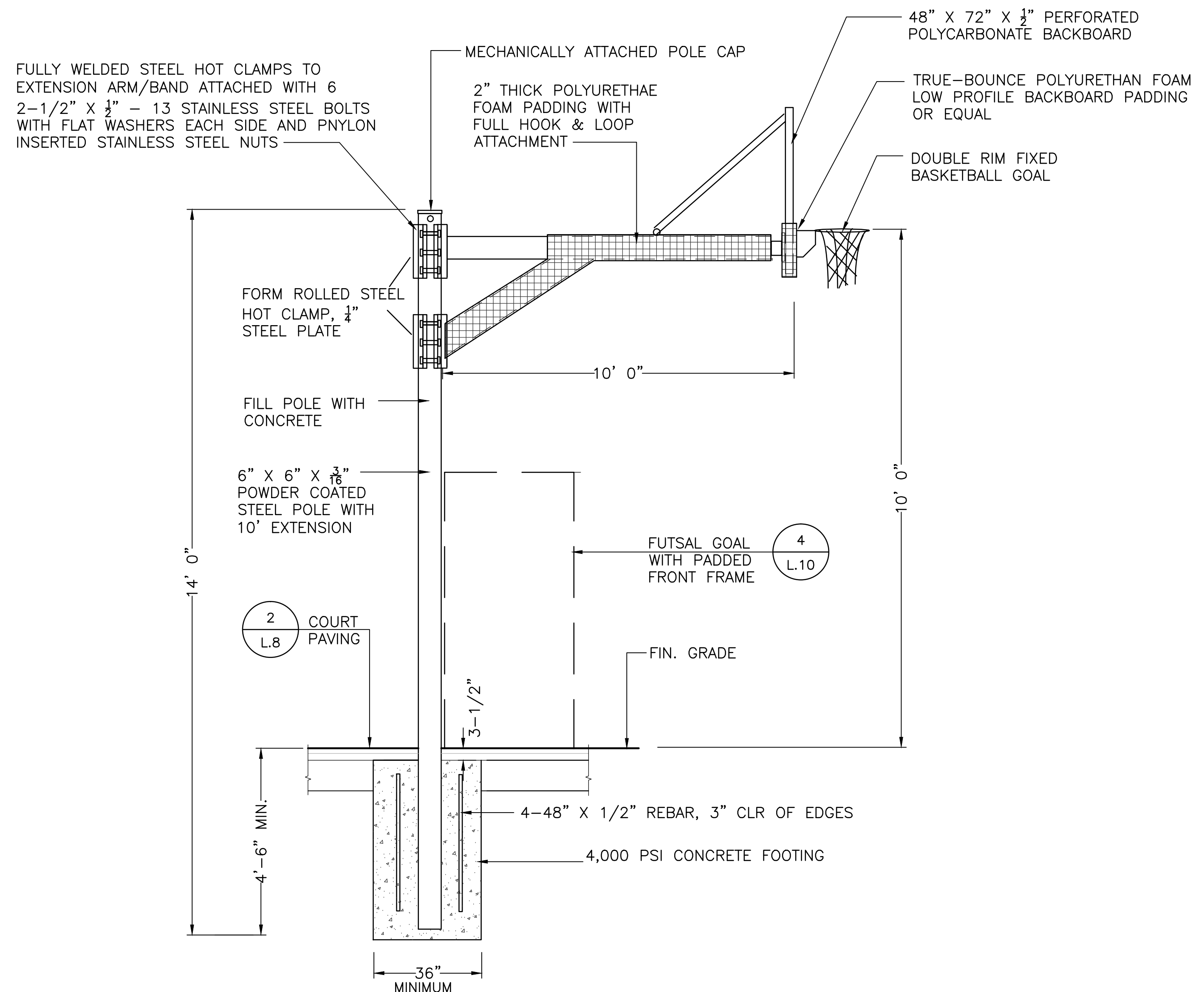
DWG No. **L.9**



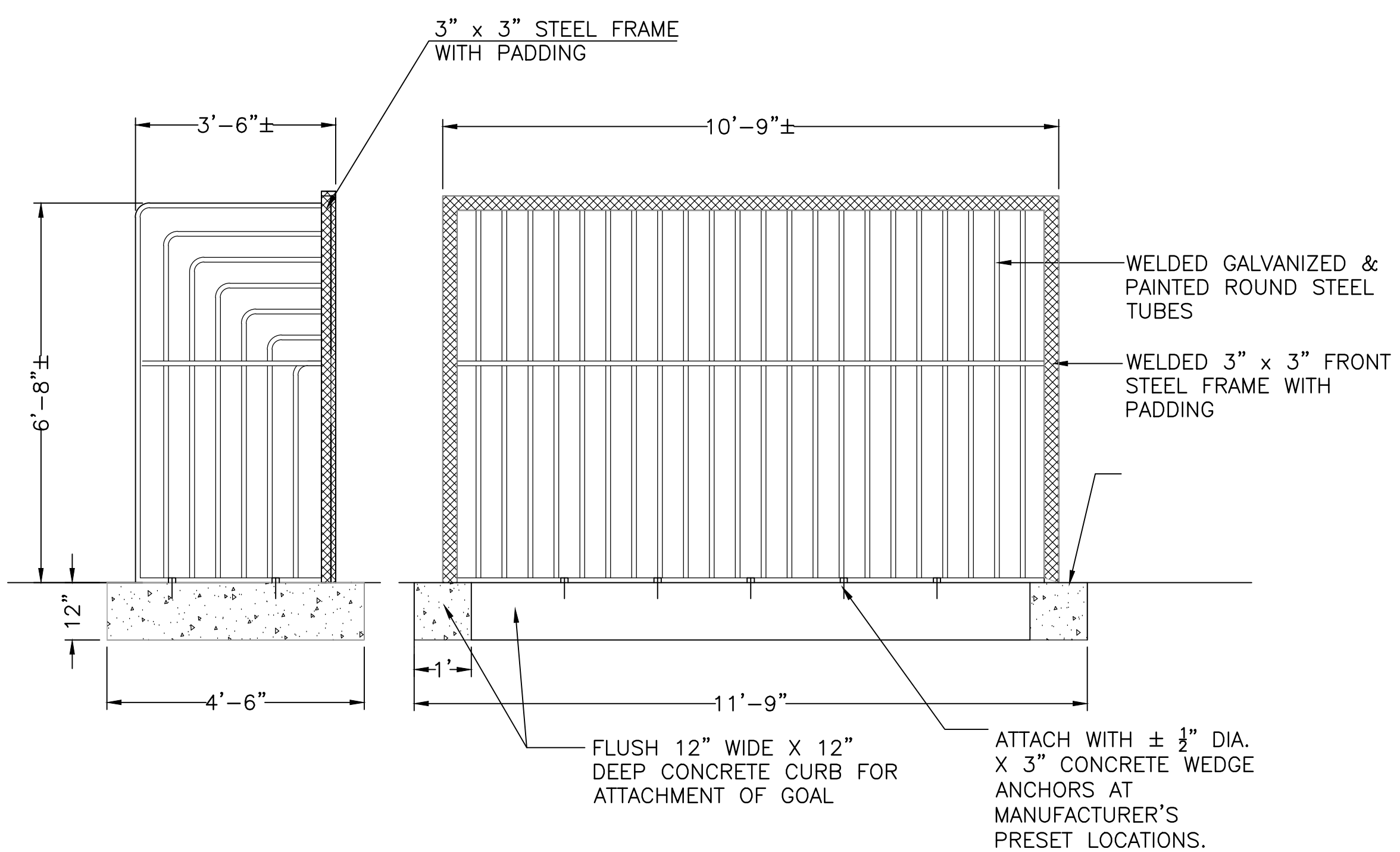
**SECTION 1**  
**1 CONCRETE CURB WALL WITH WELDED WIRE FENCE**  
 1-1/2" = 1'-0"



**SECTION 2**  
**2 WALL JOINT DETAILS**  
 3/4" = 1'-0"



**SECTION 3**  
**3 10' OFFSET BASKETBALL STANDARD - 2 REQUIRED**  
 1/2" = 1'



**SECTION 4**  
**4 FUTSAL GOAL**  
 1/2" = 1'

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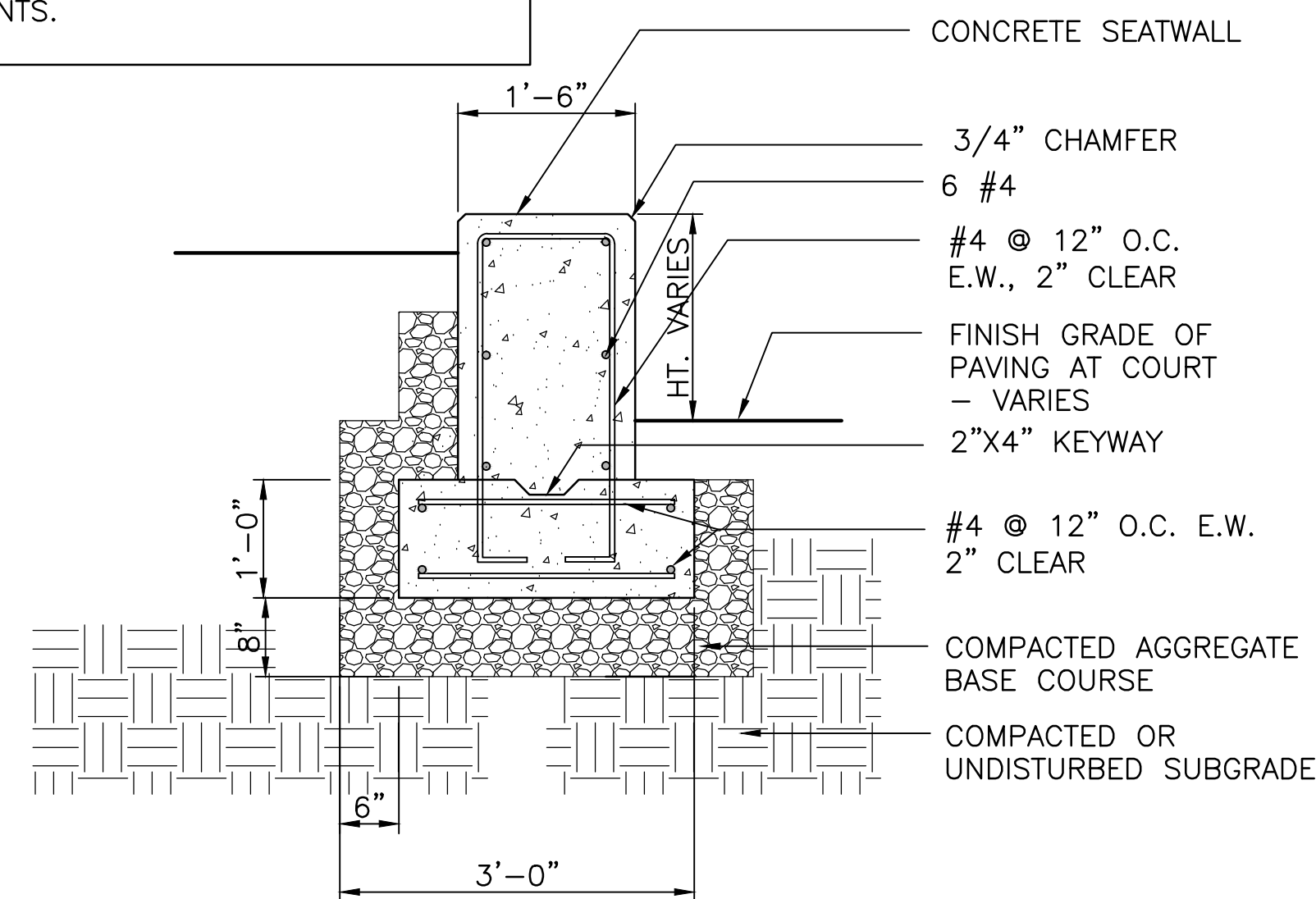
Prepared For:  
**CITY OF WALTHAM  
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TITLE:  
**WALL  
 DETAILS**

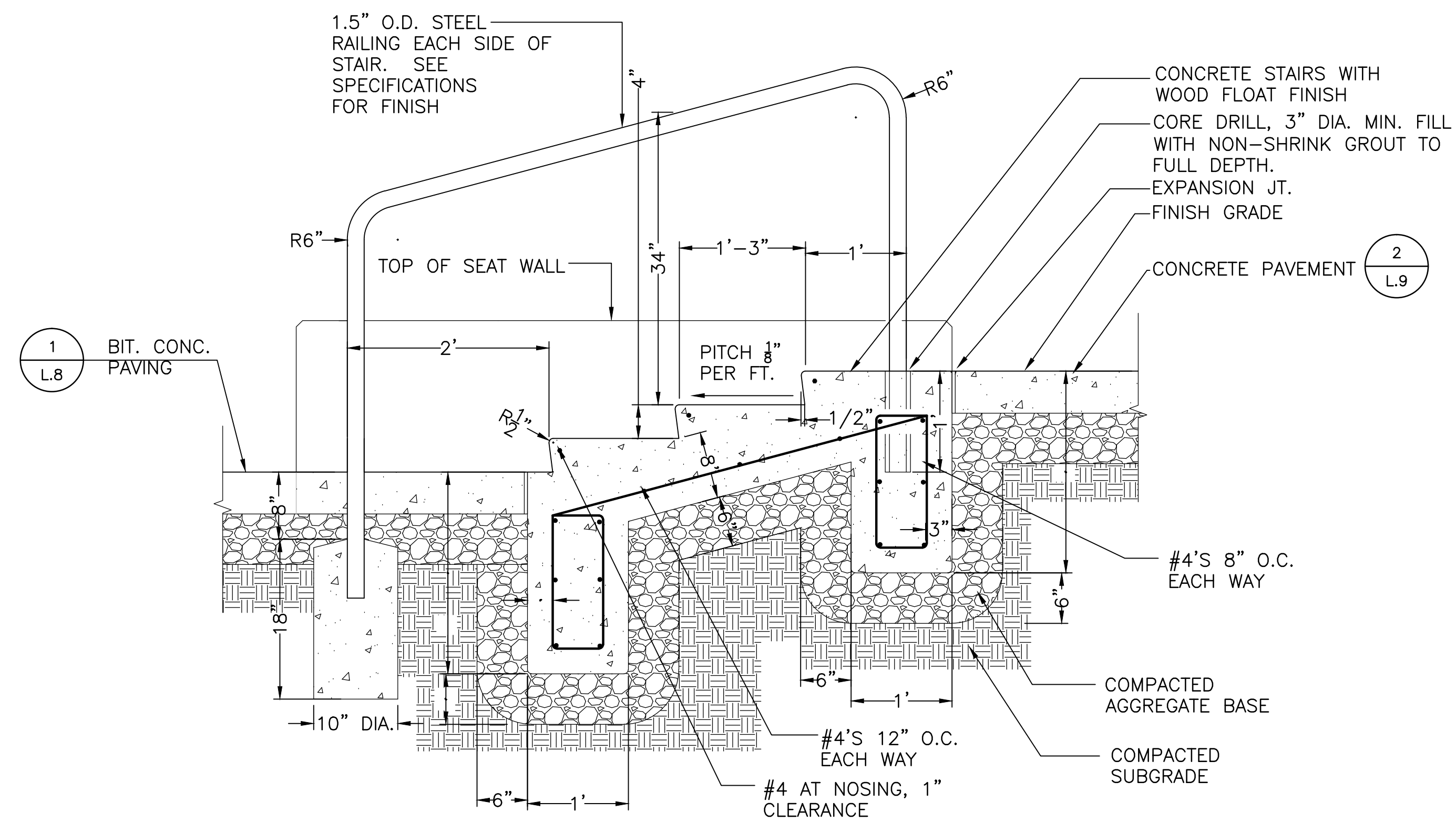
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DWG No. **L.10**

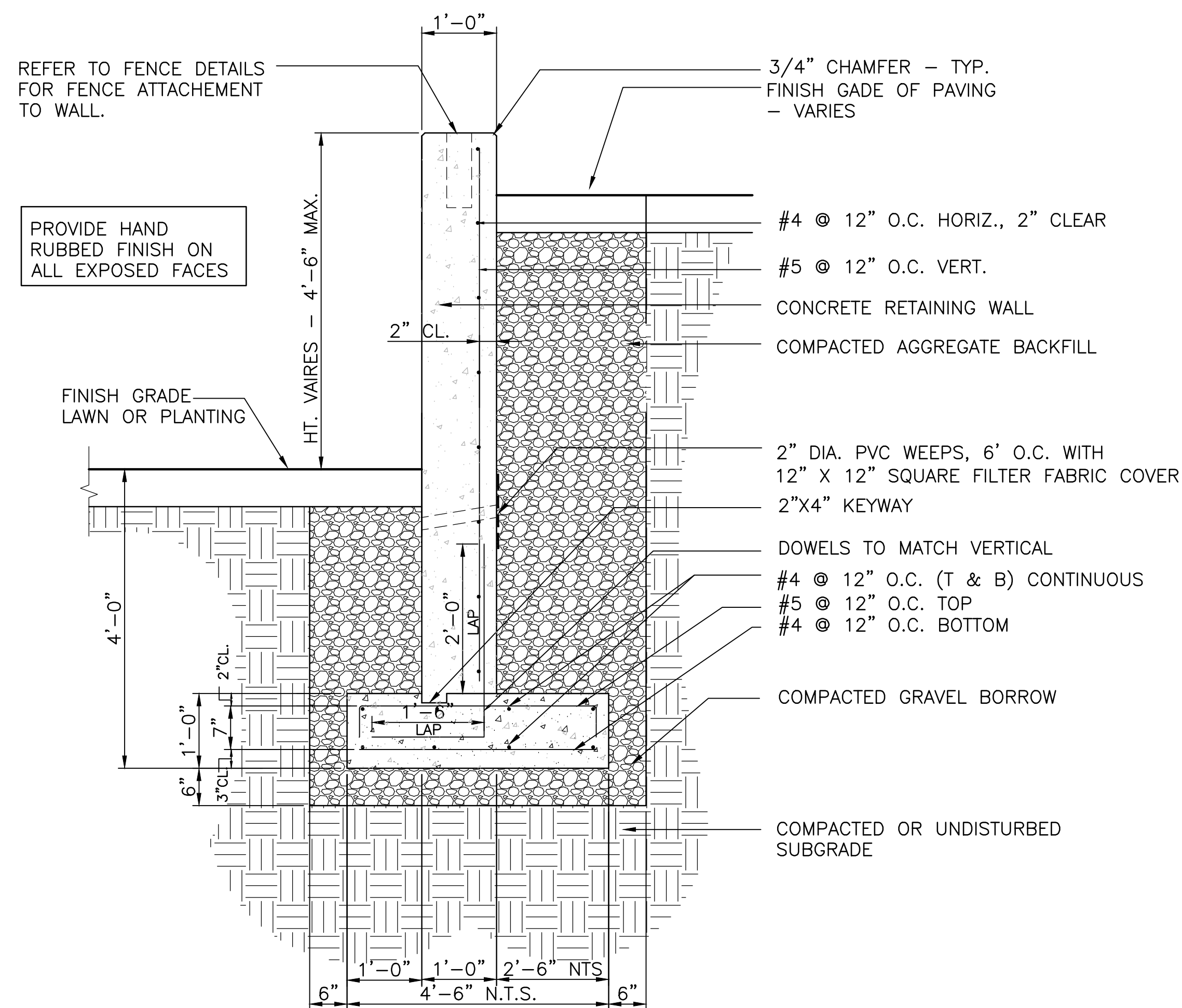
- NOTES:
1. PROVIDE HAND RUBBED FINISH ON ALL EXPOSED FACES.
  2. INSTALL ANTI-SKATEBOARD HARDWARE @ 4' O.C. TYP.
  3. DO NOT EXTEND REINFORCING THRU EXPANSION JOINTS; REINFORCING IS CONTINUOUS THROUGH CONTRACTION JOINTS.



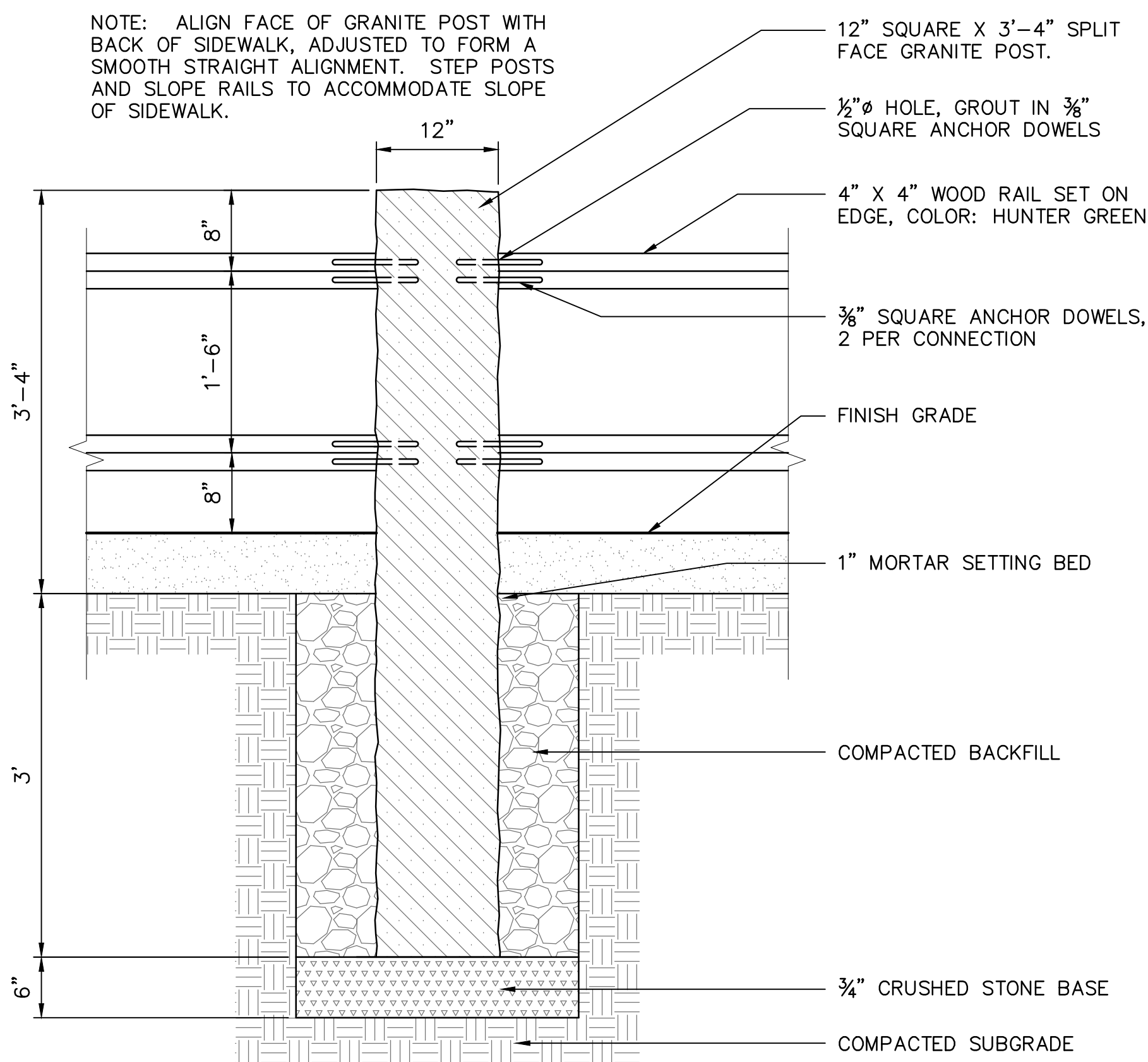
SECTION  
**1** CONCRETE SEATWALL AT COURT  
 3/4" = 1'-0"



SECTION  
**2** STEPS & RAILING AT COURT  
 1" = 1'-0"



SECTION  
**3** CONCRETE RETAINING WALL  
 3/4" = 1'-0"



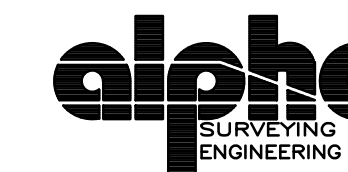
- NOTE: ALIGN FACE OF GRANITE POST WITH BACK OF SIDEWALK, ADJUSTED TO FORM A SMOOTH STRAIGHT ALIGNMENT. STEP POSTS AND SLOPE RAILS TO ACCOMMODATE SLOPE OF SIDEWALK.
- NOTES:
1. REFER TO SPECIFICATIONS FOR GRANITE AND RAILING MATERIALS AND FINISHES.
  2. GRANITE POSTS TO BE GRAY GRANITE IN COLOR, SPLIT FACE ALL SIDES AND TOP.

SECTION  
**4** GRANITE POST & RAIL FENCE  
 1" = 1'-0"

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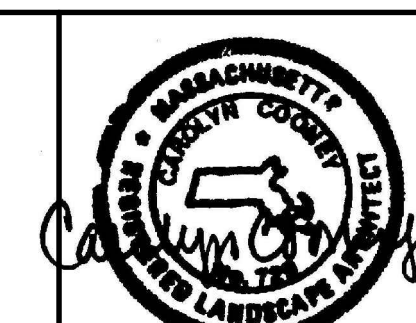
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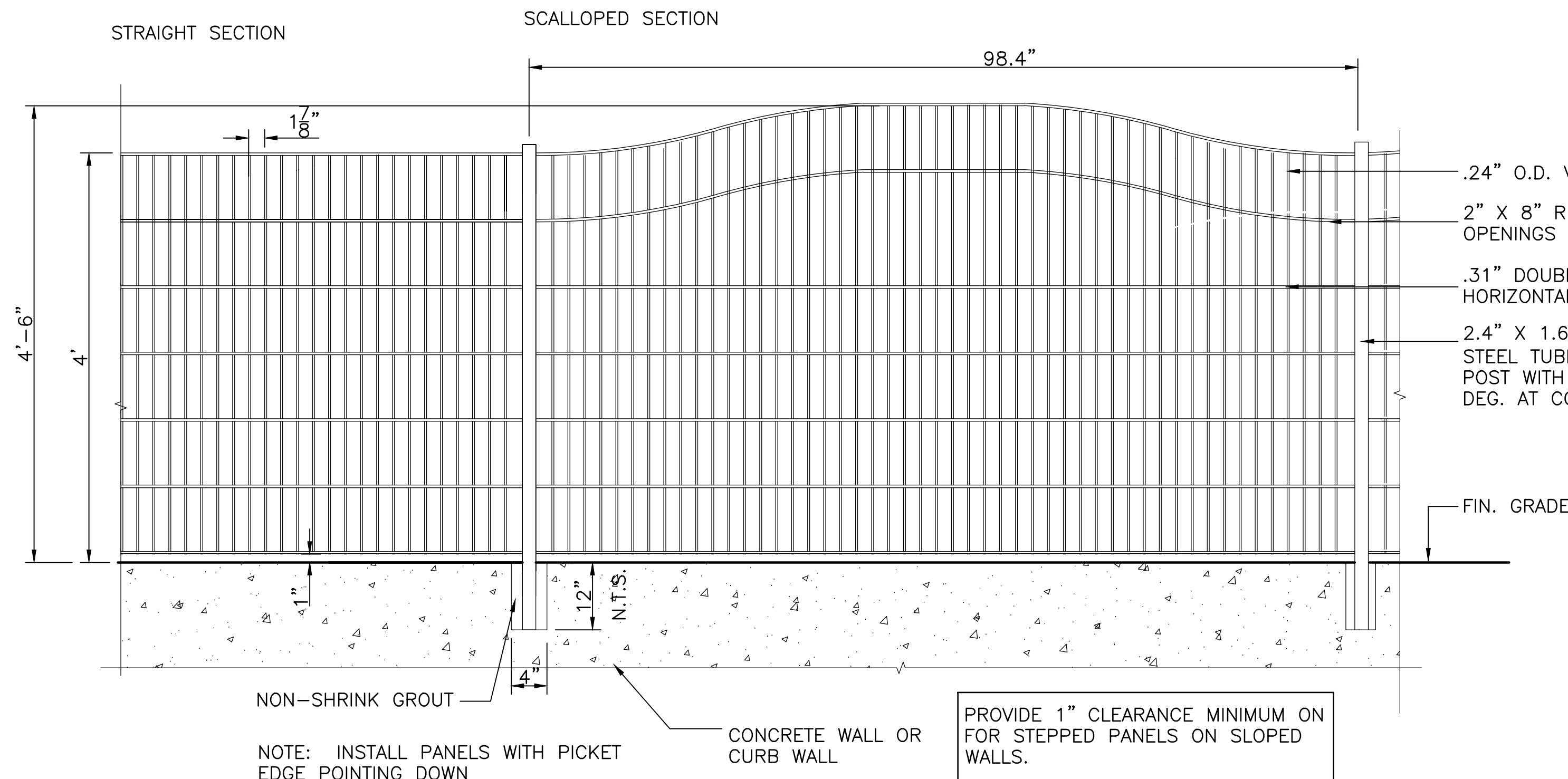
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Prepared For:  
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TITLE:  
**WALL & GRANITE FENCE  
 DETAILS**

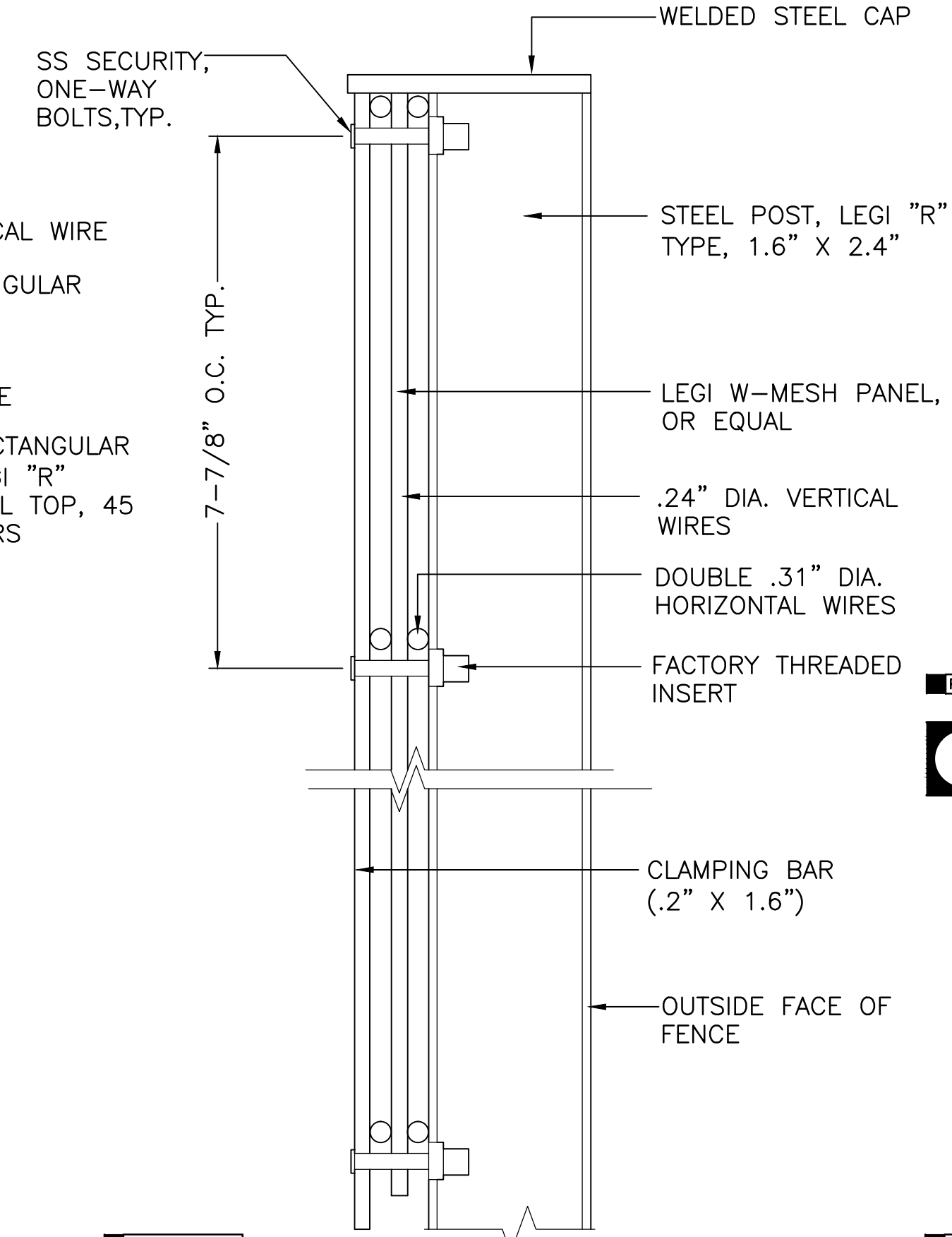
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DWG No. **L.11**



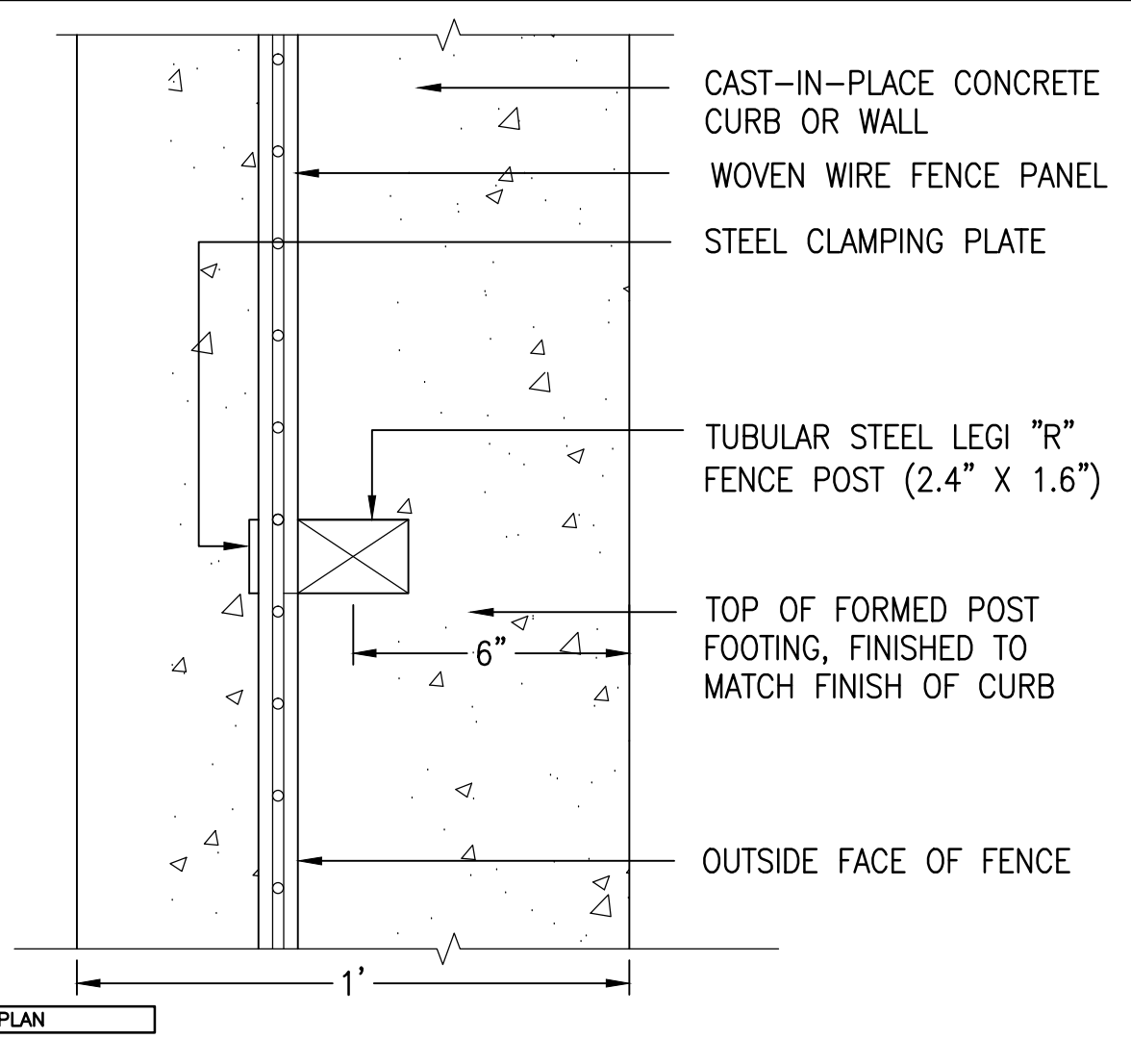
**SECTION**

**1 WELDED WIRE FENCE DETAIL**  
1" = 1'-0"



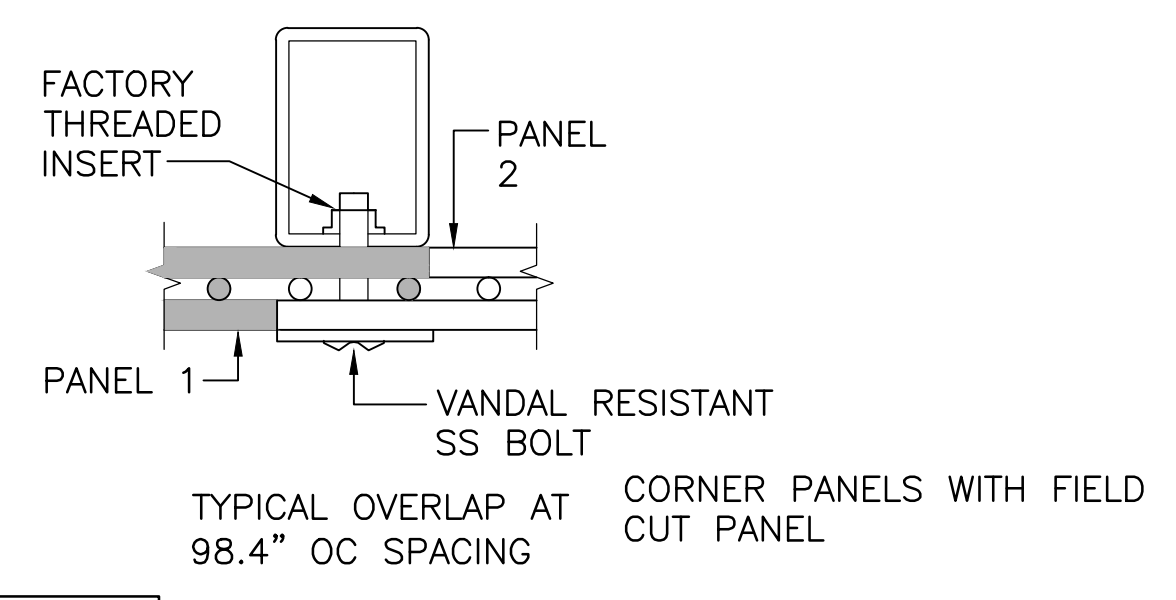
**SECTION**

**2 FENCE POST SECTION**  
1/2 SCALE



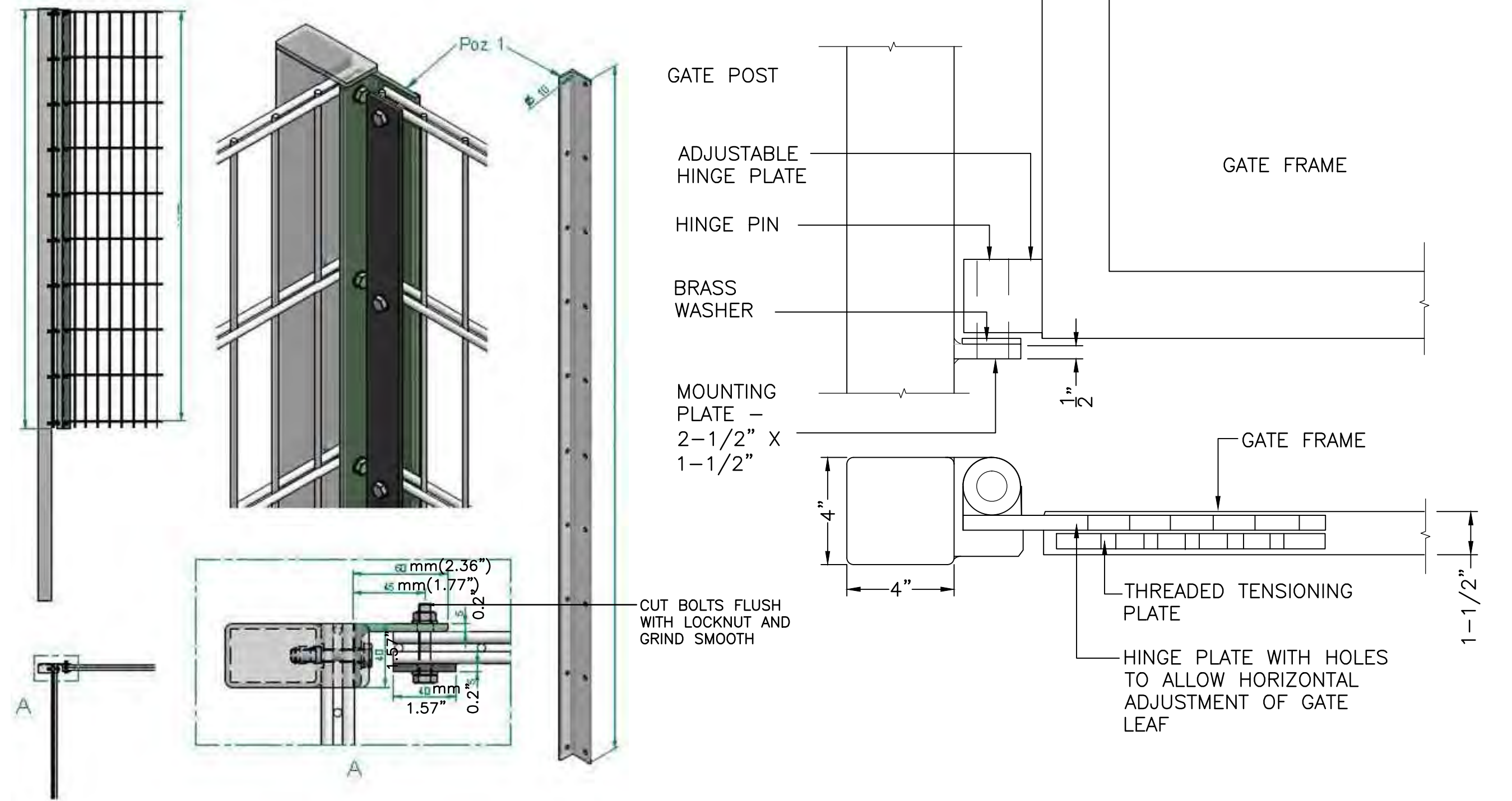
**PLAN**

**3 FENCE POST PLAN**  
3" = 1'-0"



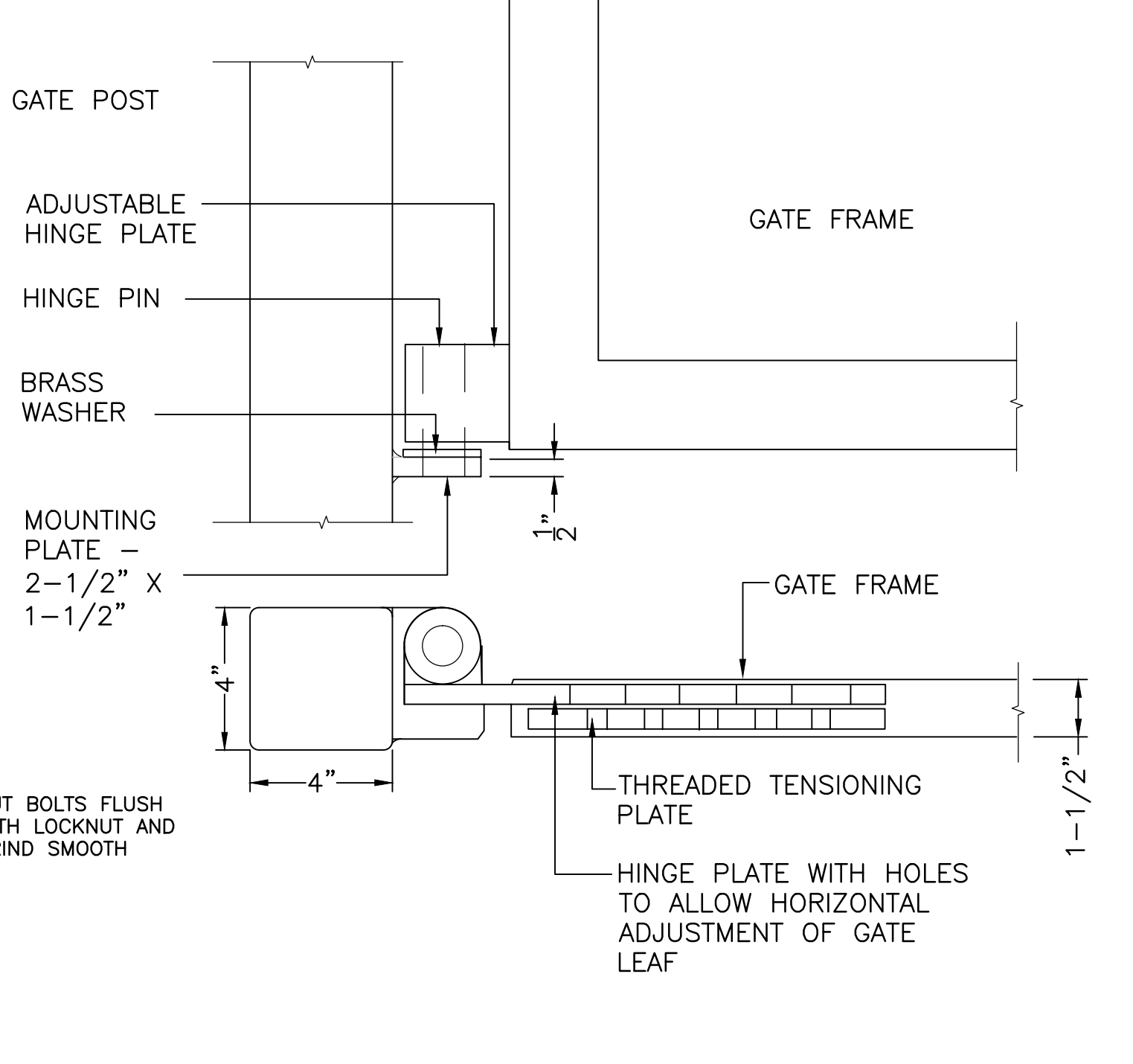
**PLAN**

**3 PANEL ATTACHMENT DETAIL**  
1/2 SCALE



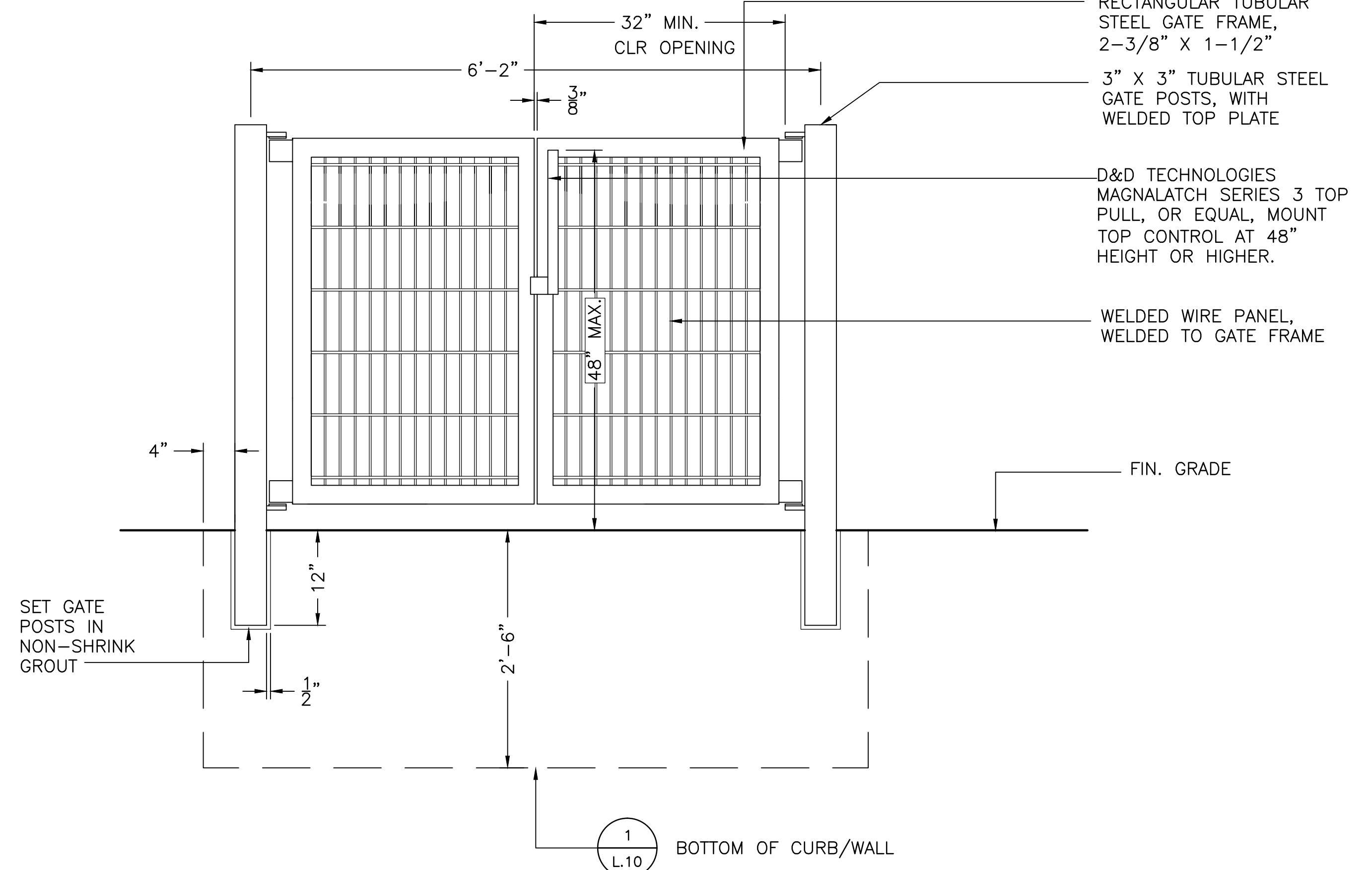
**PLAN**

**4 CORNER POST DETAIL**  
N.T.S.



**PLAN**

**5 HINGE DETAILS**  
3" = 1'-0"



**ELEVATION**

**6 GATE (1 REQUIRED)**  
1" = 1'-0"

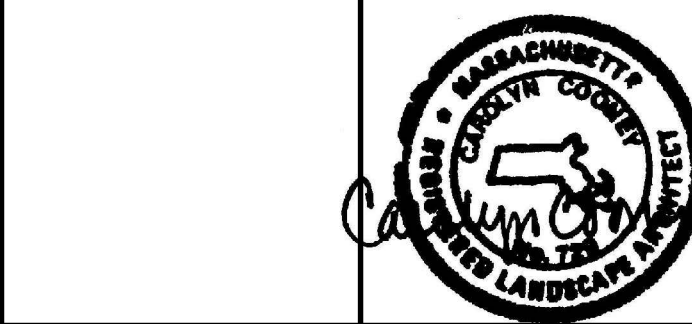
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510 MOODY STREET  
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TITLE:  
**FENCE DETAILS**

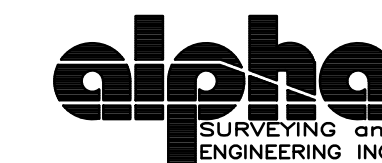
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DWG No. **L.12**

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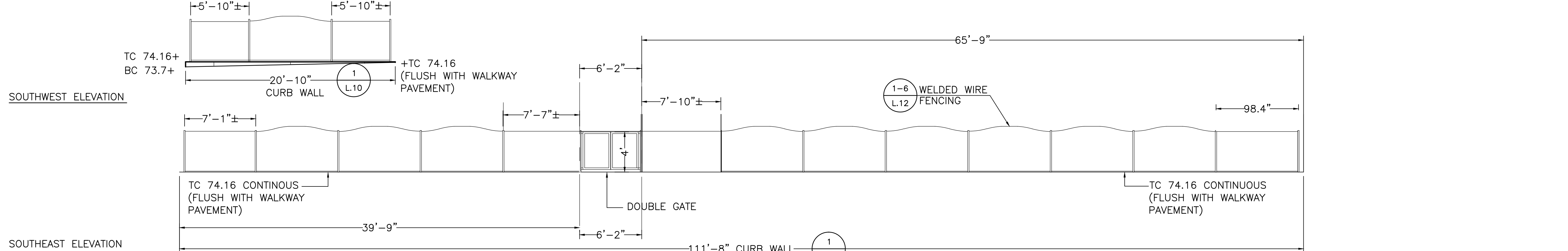
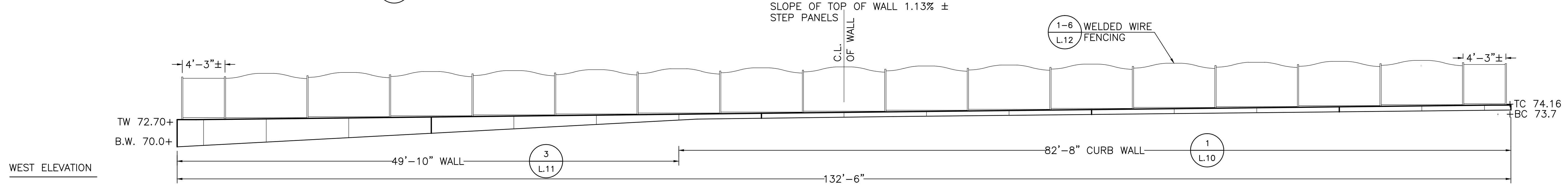
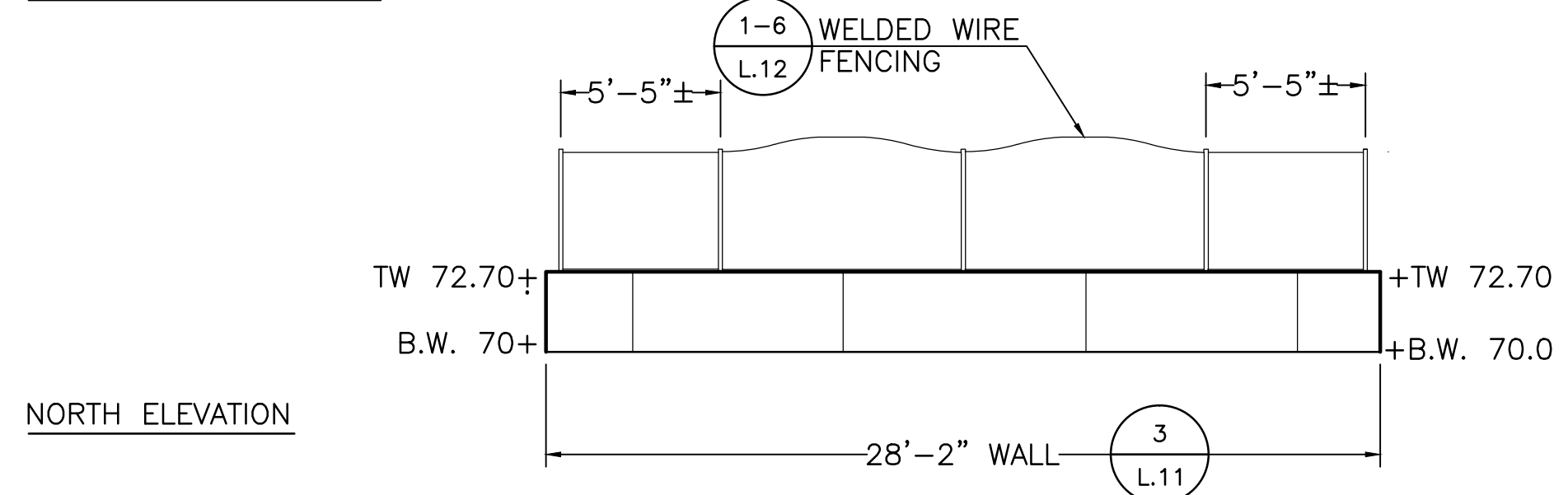
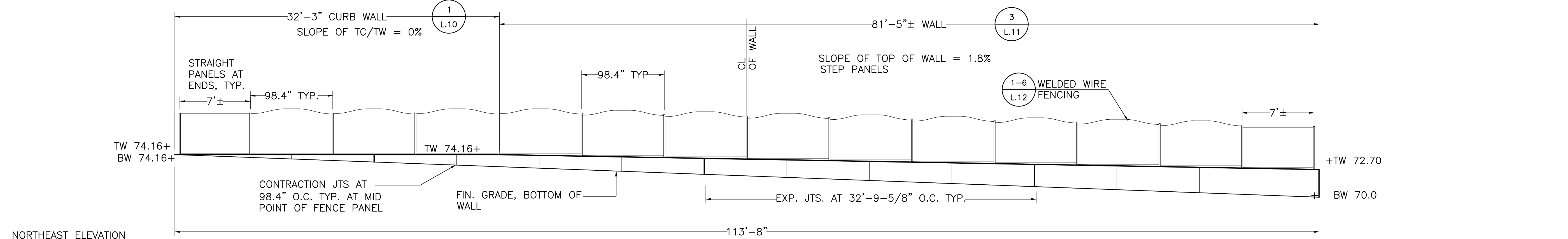
Project:  
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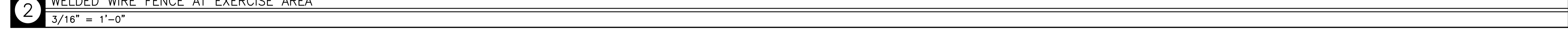
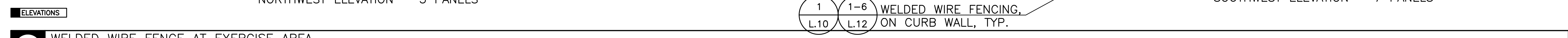
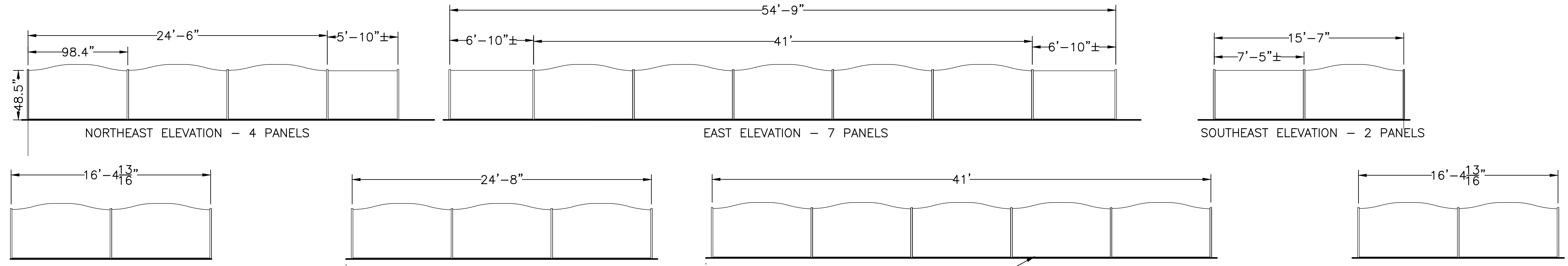
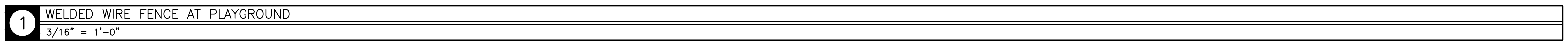
TITLE:  
**FENCE ELEVATIONS**

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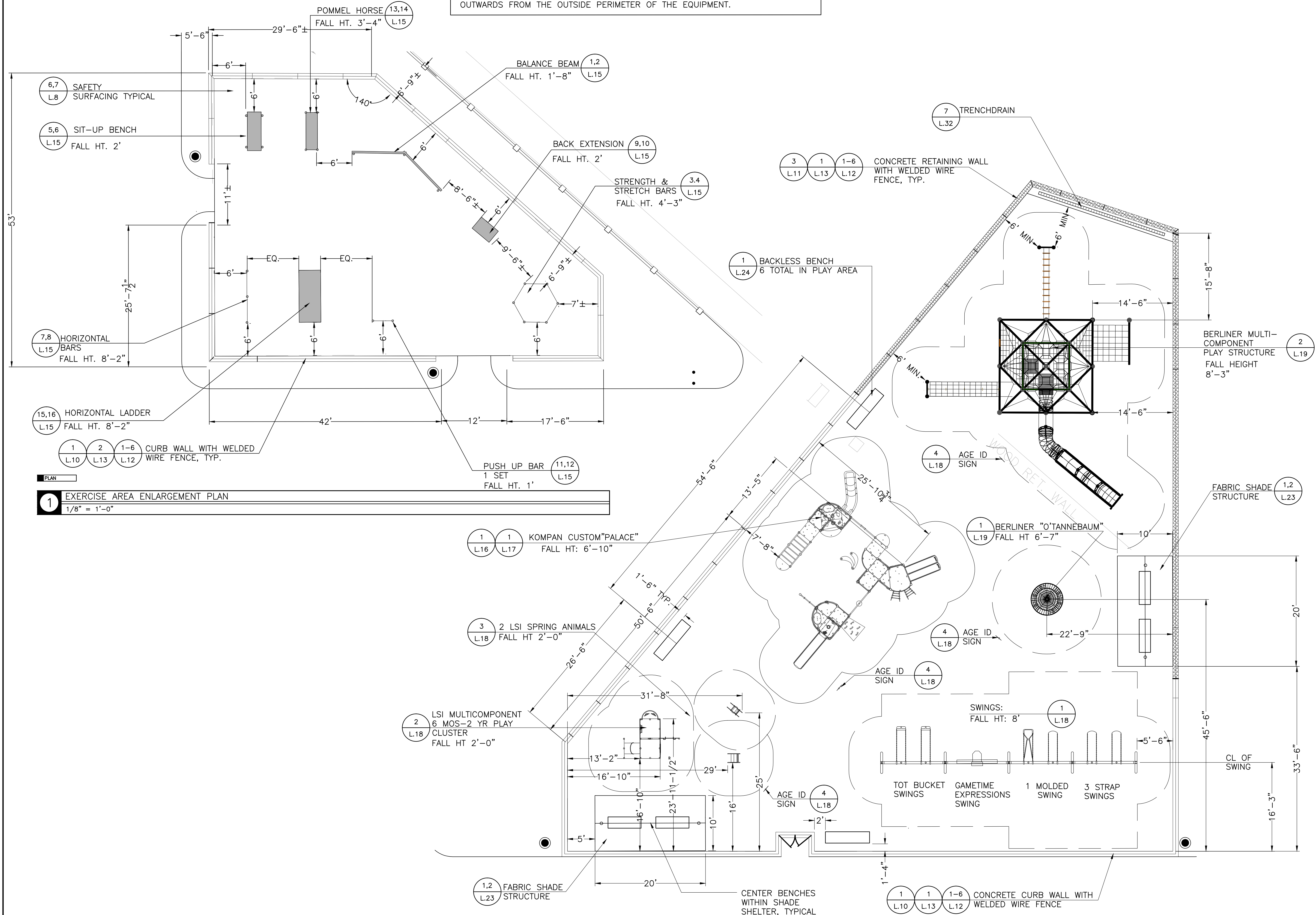


ELEVATIONS





NOTE:  
 PROVIDE SAFETY SURFACE OF A DEPTH REQUIRED BY THE FALL HEIGHT FOR ASTM  
 & CPSC STANDARDS FOR PLAY EQUIPMENT EXTENDING IN A 6' ZONE MINIMUM  
 OUTWARDS FROM THE OUTSIDE PERIMETER OF THE EQUIPMENT.



**1** EXERCISE AREA ENLARGEMENT PLAN  
 1/8" = 1'-0"

**2** PLAYGROUND ENLARGEMENT PLAN  
 1/8" = 1'-0"

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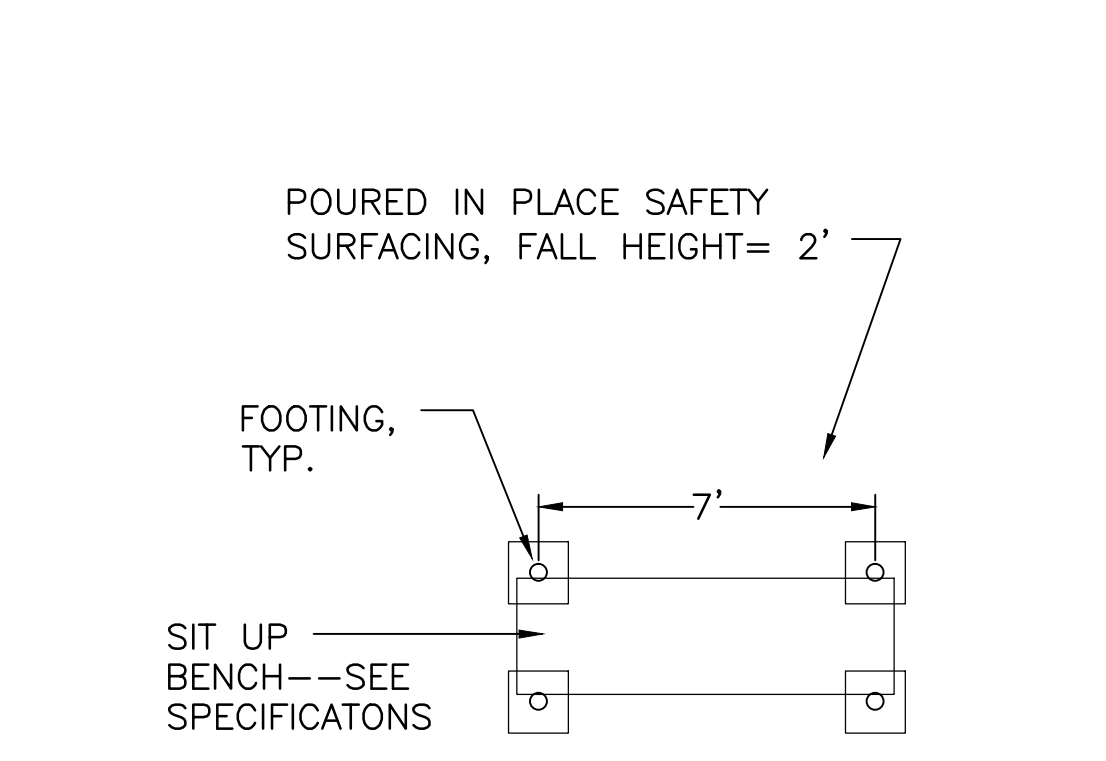
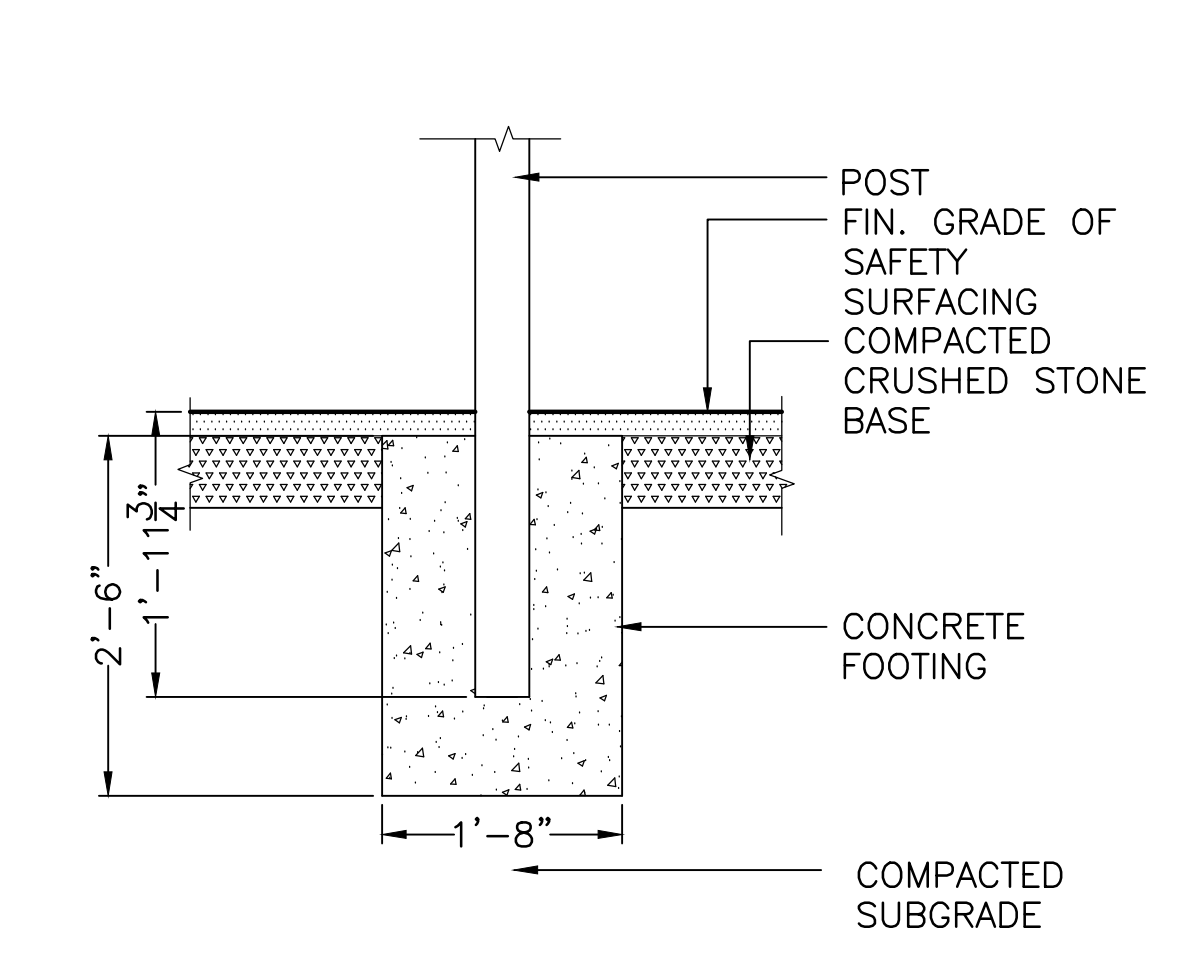
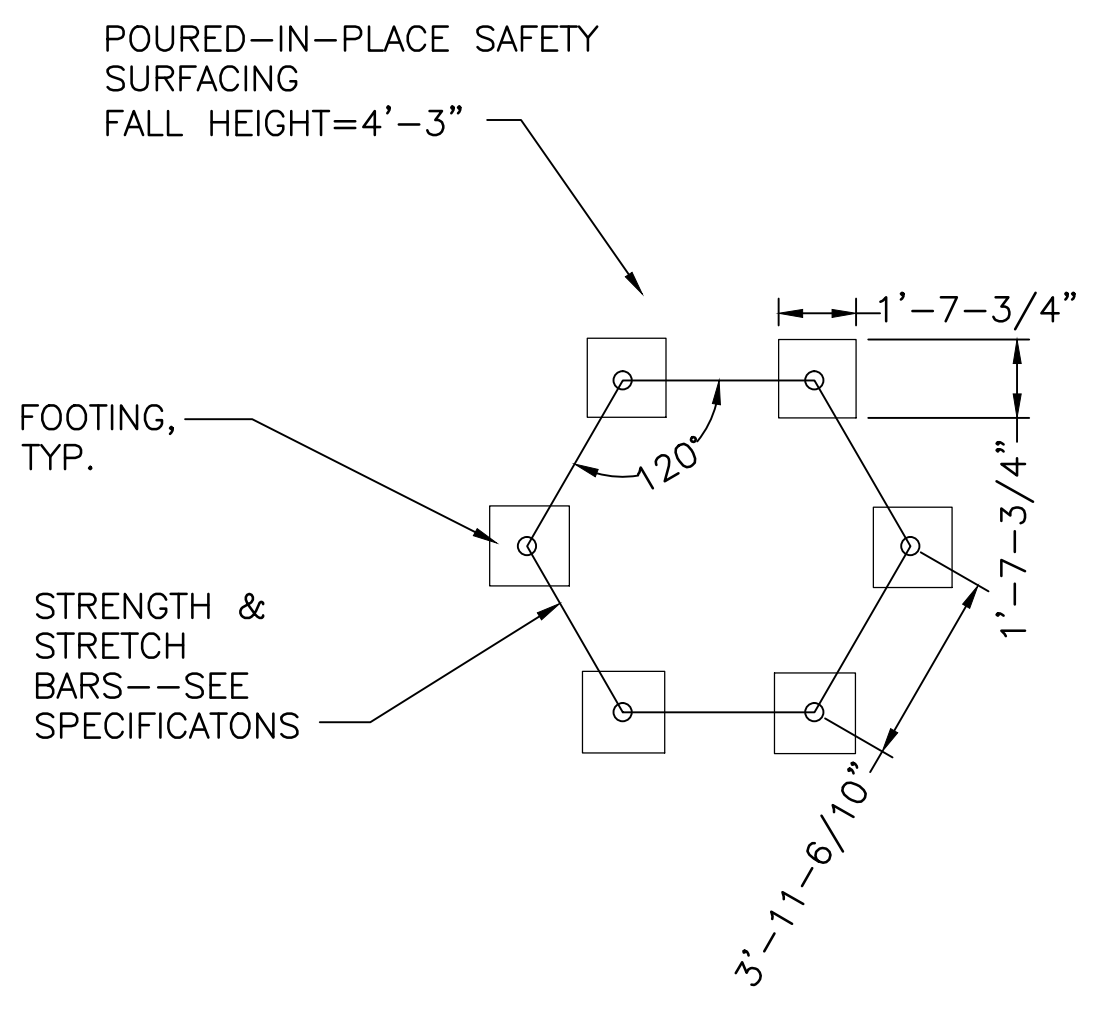
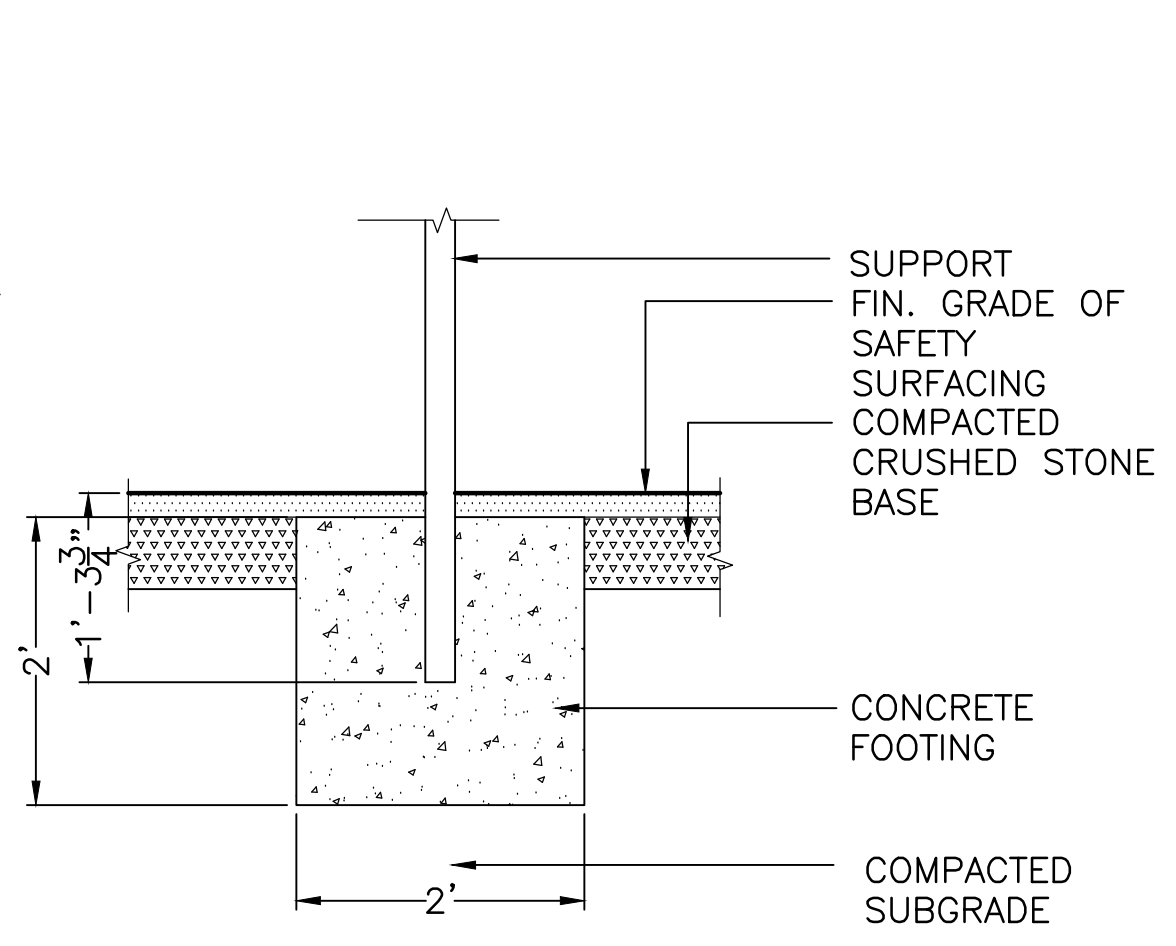
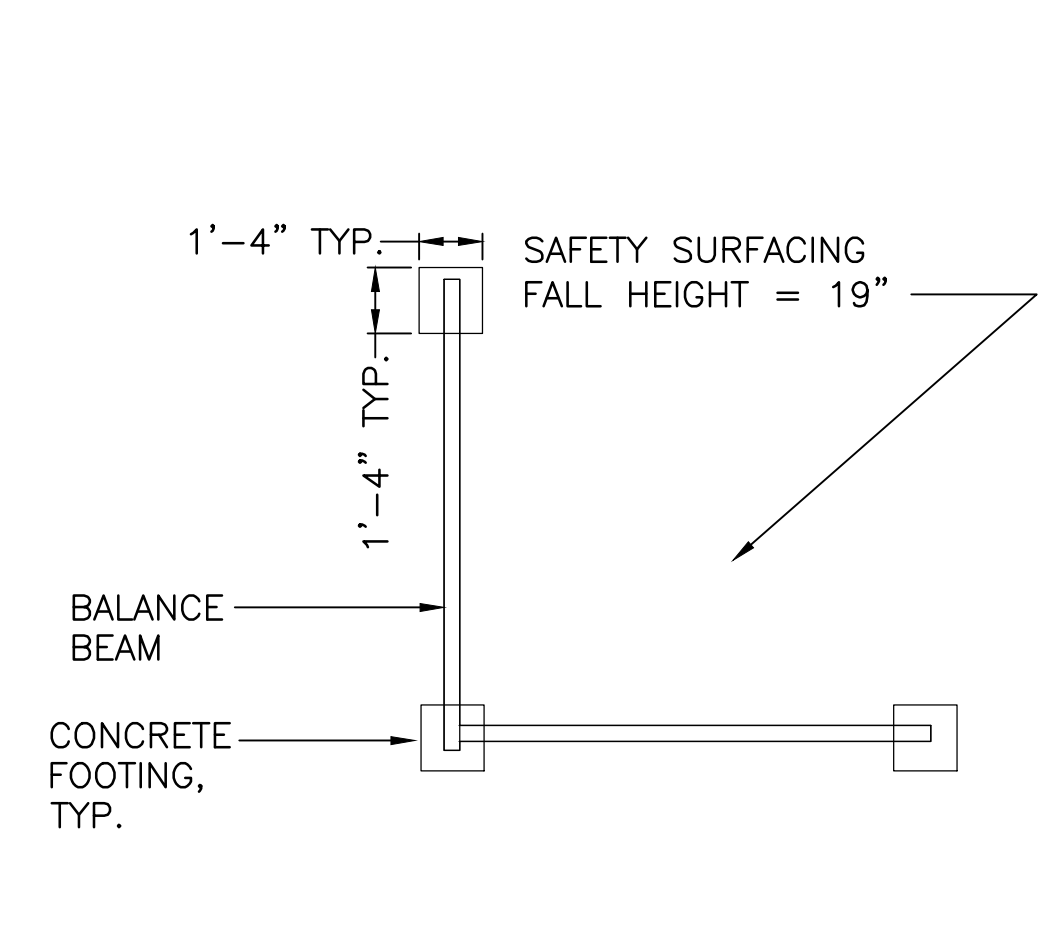
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 90 HALL STREET  
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Prepared For:  
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 DEPARTMENT OF RECREATION  
 50 MOODY STREET  
 WALTHAM, MA 02453**

TITLE:  
**ENLARGEMENT PLANS**

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 Project No. 1313.01

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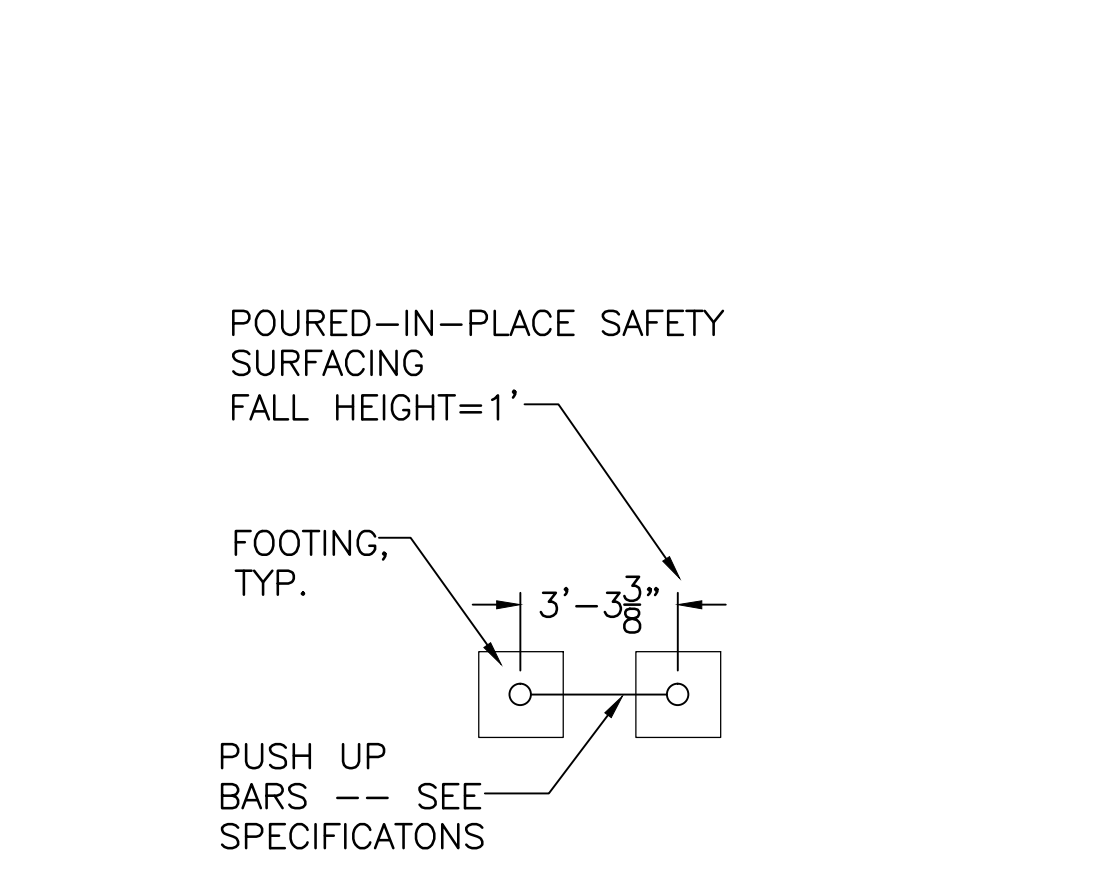
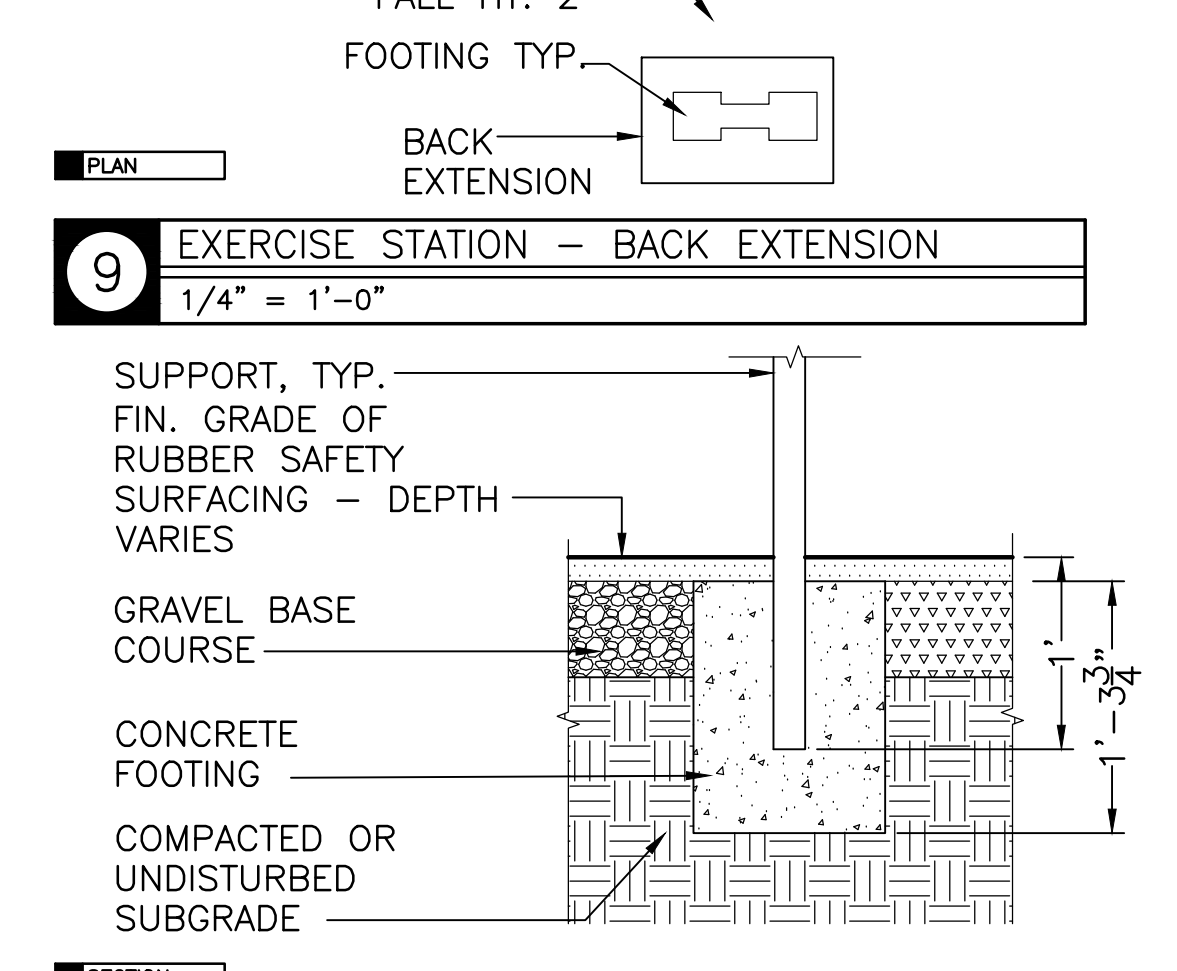
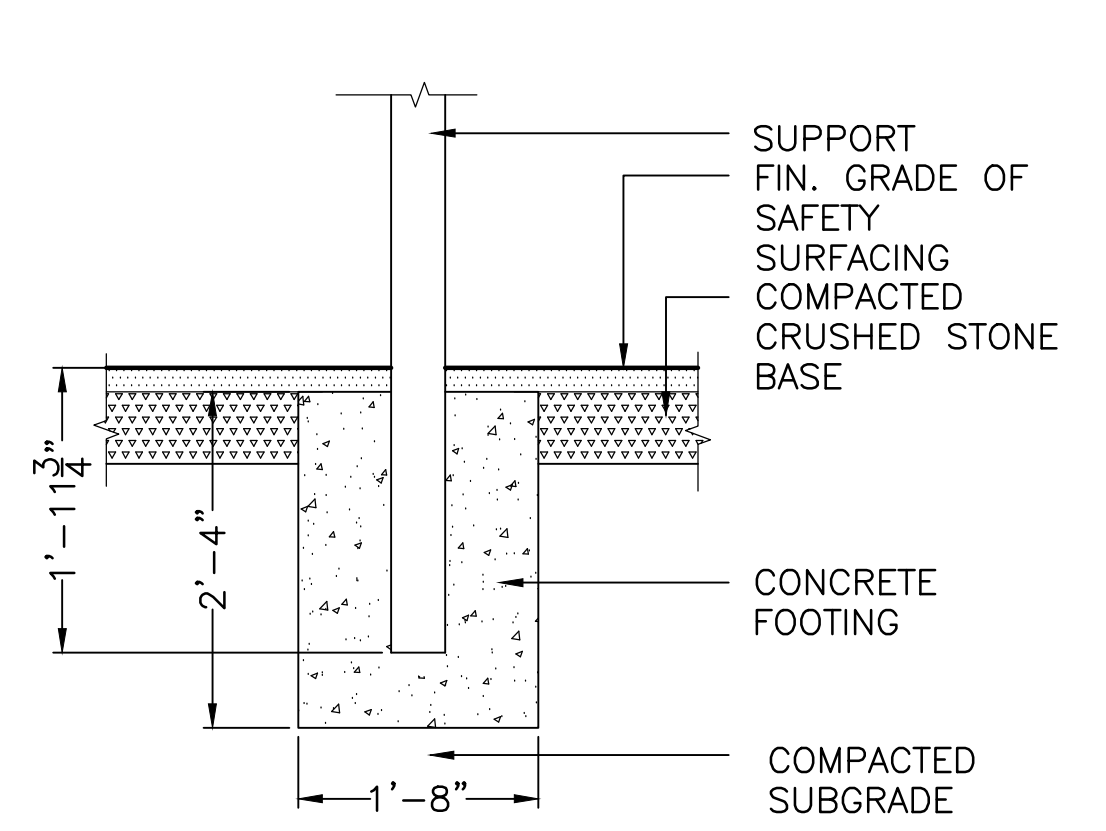
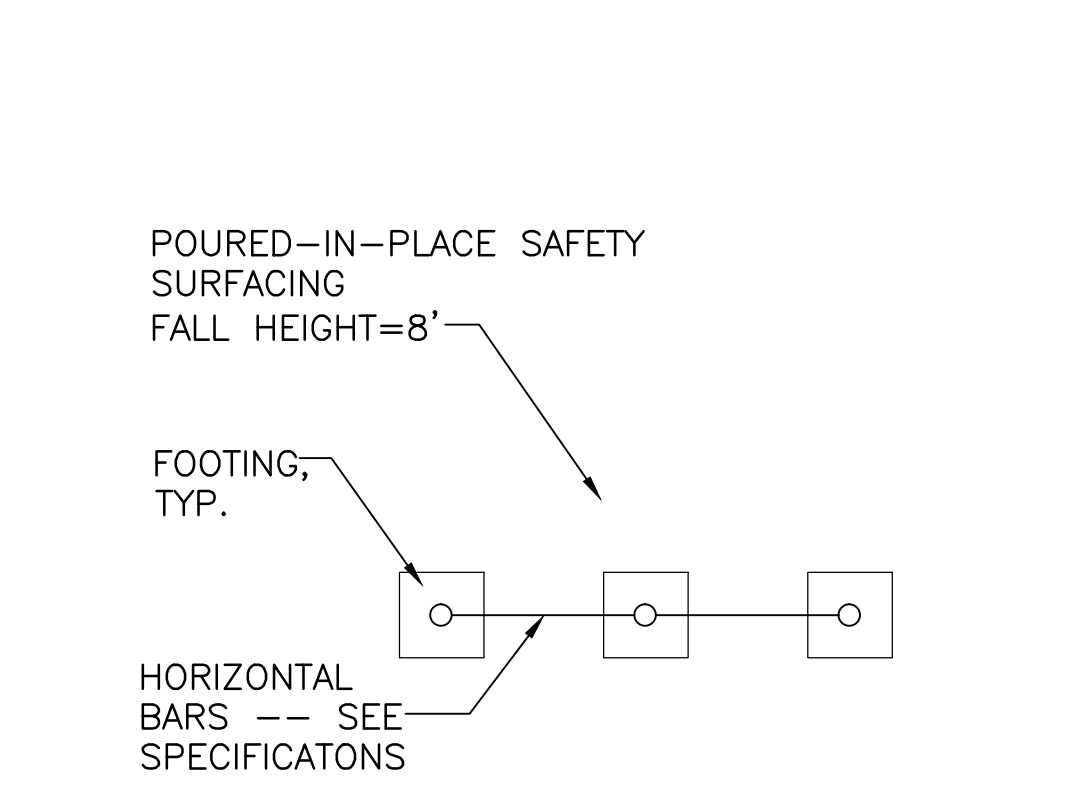
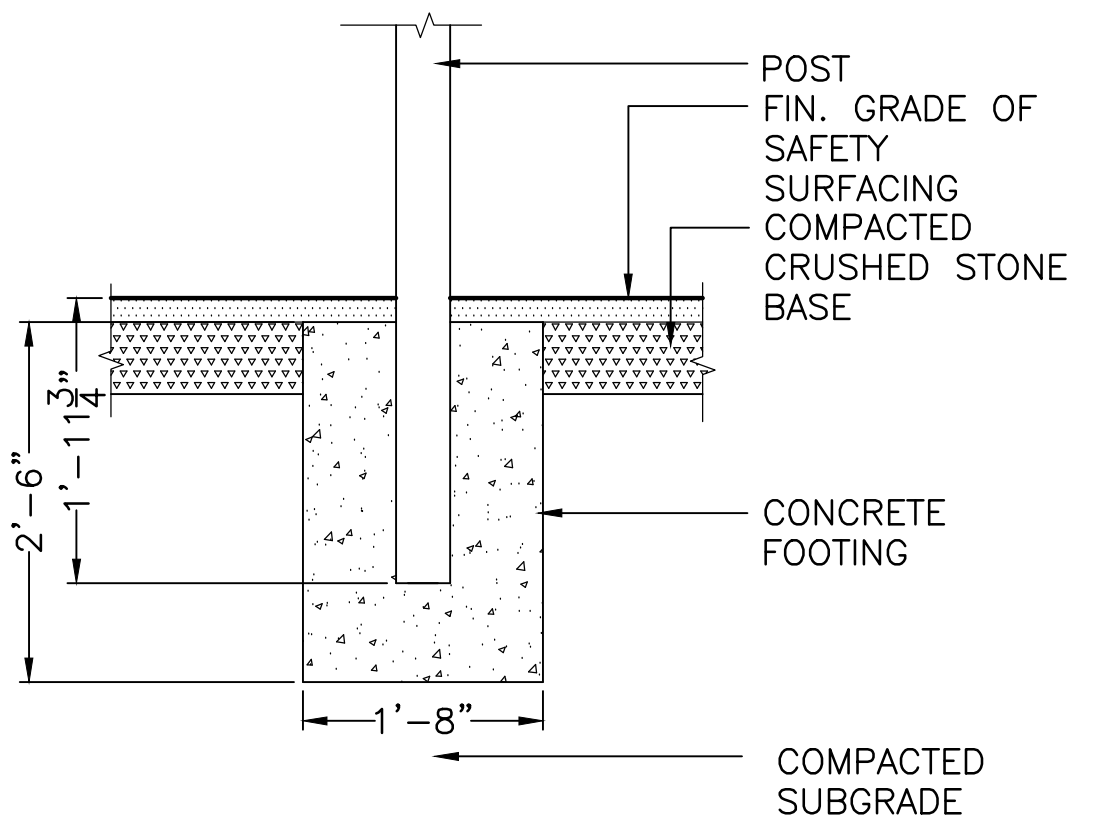
**1** EXERCISE STATION - BALANCE BEAM  
 1/4" = 1'-0"

**2** EXERCISE STATION - BALANCE BEAM FOOTINGS  
 3/4" = 1'-0"

**3** EXERCISE STATION - STRENGTH & STRETCH BARS  
 1/4" = 1'-0"

**4** EXERCISE STATION - STRENGTH & STRETCH BAR FTGS  
 3/4" = 1'-0"

**5** EXERCISE STATION - SIT UP BENCH  
 1/4" = 1'-0"



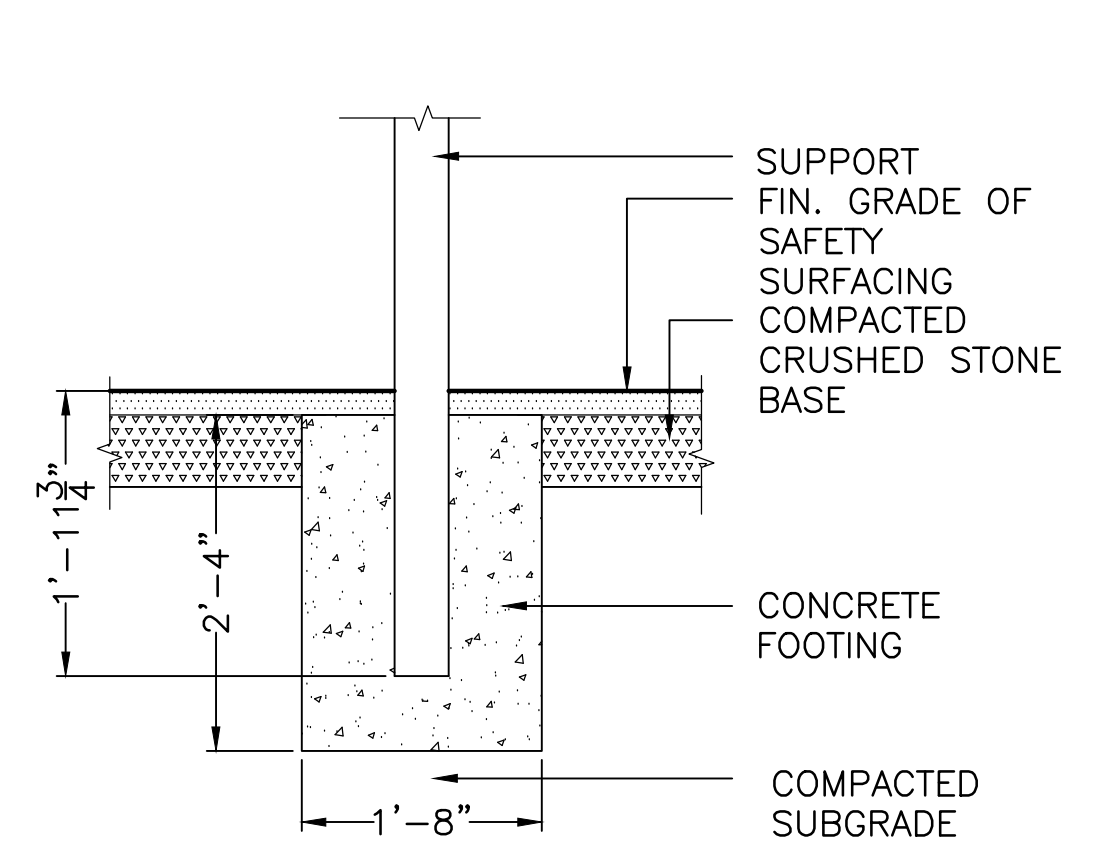
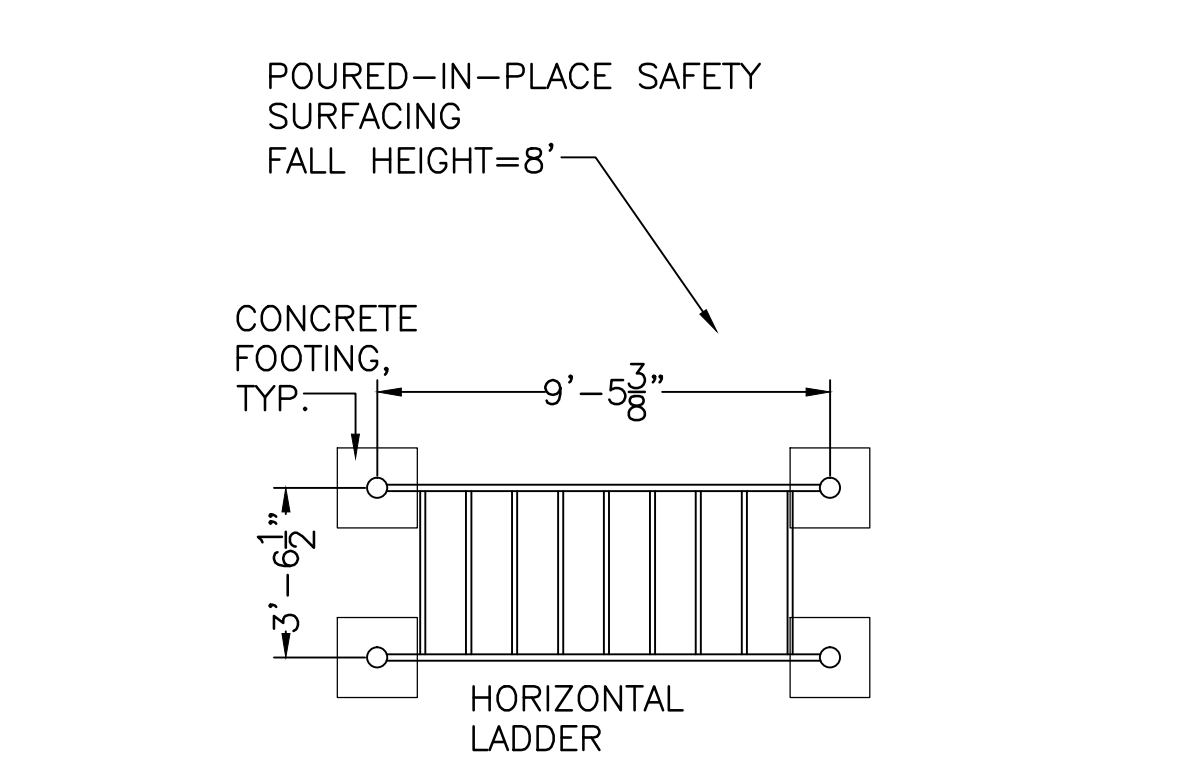
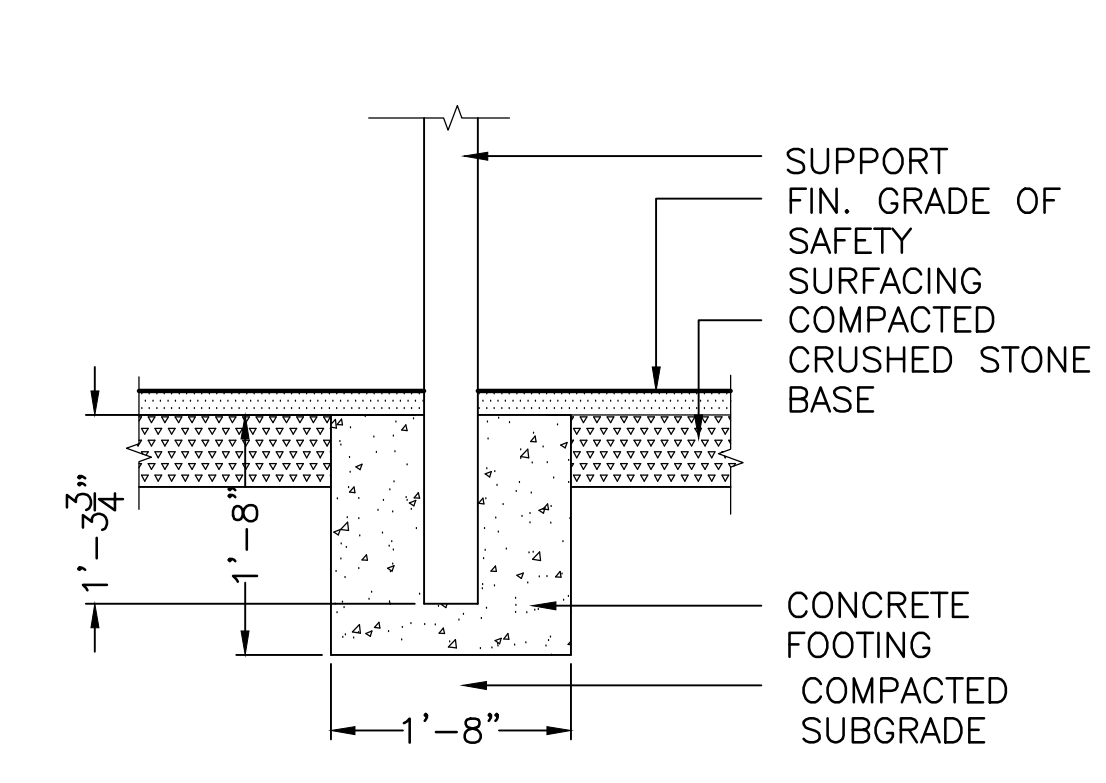
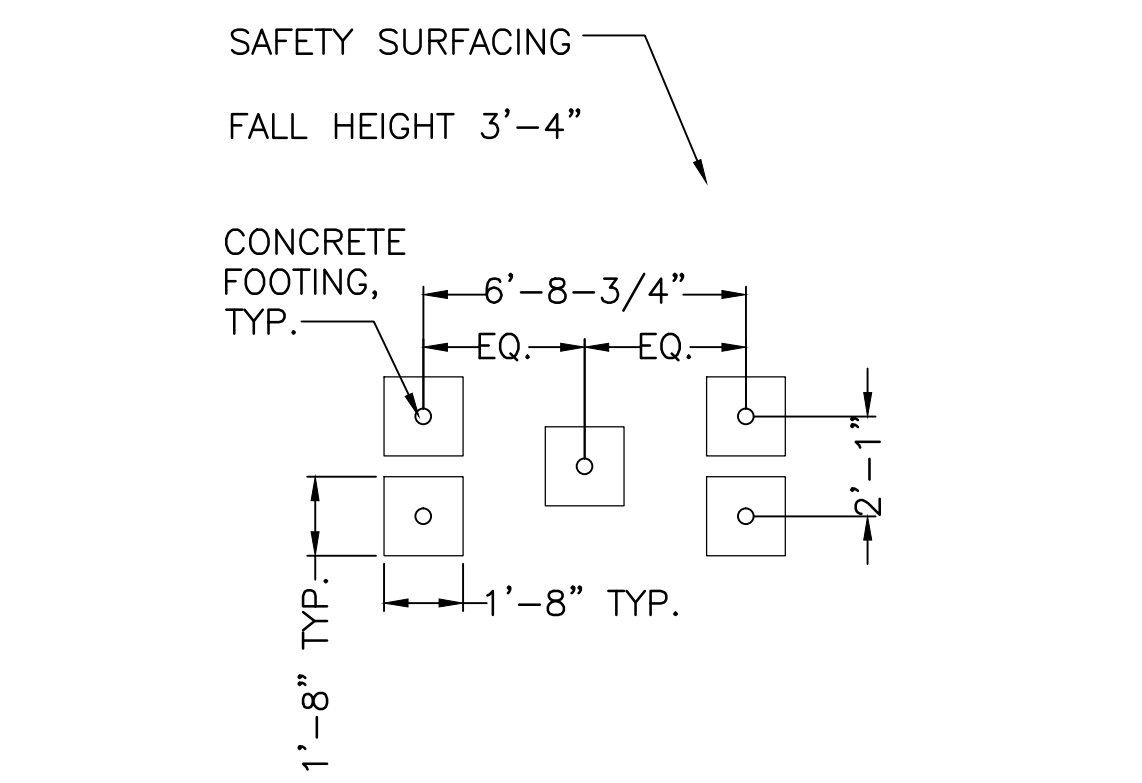
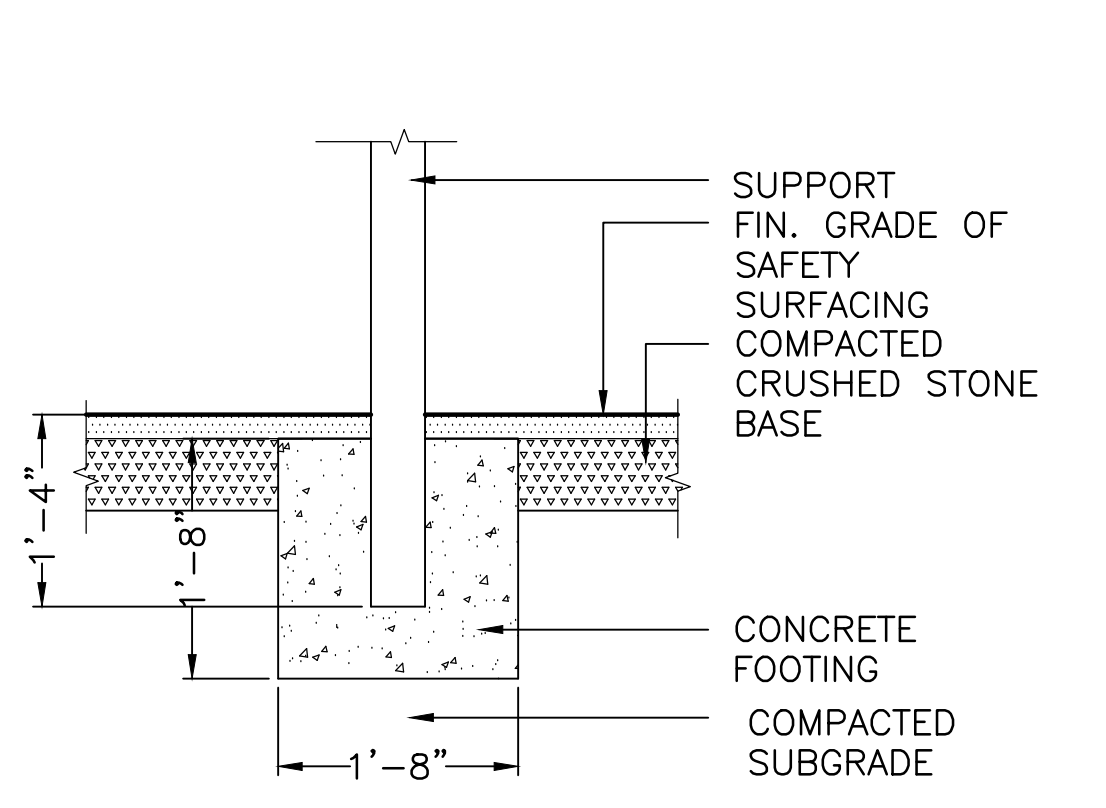
**6** EXERCISE STATION - SIT UP BENCH FOOTINGS  
 3/4" = 1'-0"

**7** EXERCISE STATION - HORIZONTAL BARS  
 1/4" = 1'-0"

**8** EXERCISE STATION - HORIZONTAL BARS - FTGS  
 3/4" = 1'-0"

**9** EXERCISE STATION - BACK EXTENSION  
 1/4" = 1'-0"

**10** EXERCISE STATION - BACK EXTENSION FTG  
 1" = 1'-0"



**11** EXERCISE STATION - PUSH UP BAR FOOTINGS  
 3/4" = 1'-0"

**12** EXERCISE STATIONS - POMMEL HORSE  
 1/4" = 1'-0"

**13** EXERCISE STATION - POMMEL HORSE FOOTING  
 3/4" = 1'-0"

**14** EXERCISE STATION - HORIZ. LADDER  
 1/4" = 1'-0"

**15** EXERCISE STATION - HORIZ. LADDER  
 1" = 1'-0"

No.	Description	Date

REVISIONS

No.	Description	Date



Project:  
**CITY OF WALTHAM  
 IMPROVEMENTS TO  
 PETER GILMORE PLAYGROUND  
 90 HALL STREET  
 WALTHAM, MA 02453**

Prepared For:  
**CITY OF WALTHAM  
 DEPARTMENT OF RECREATION  
 510 MOODY STREET  
 WALTHAM, MA 02453**

TITLE:  
**EXERCISE EQUIPMENT  
 DETAILS**

Scale AS NOTED Date MAR 21 2016  
 Drawn By CCC  
 Checked By DRB  
 Approved By VH  
 Project No. 1313.01

DWG No. **L.15**

**Carolyn Cooney & Associates**

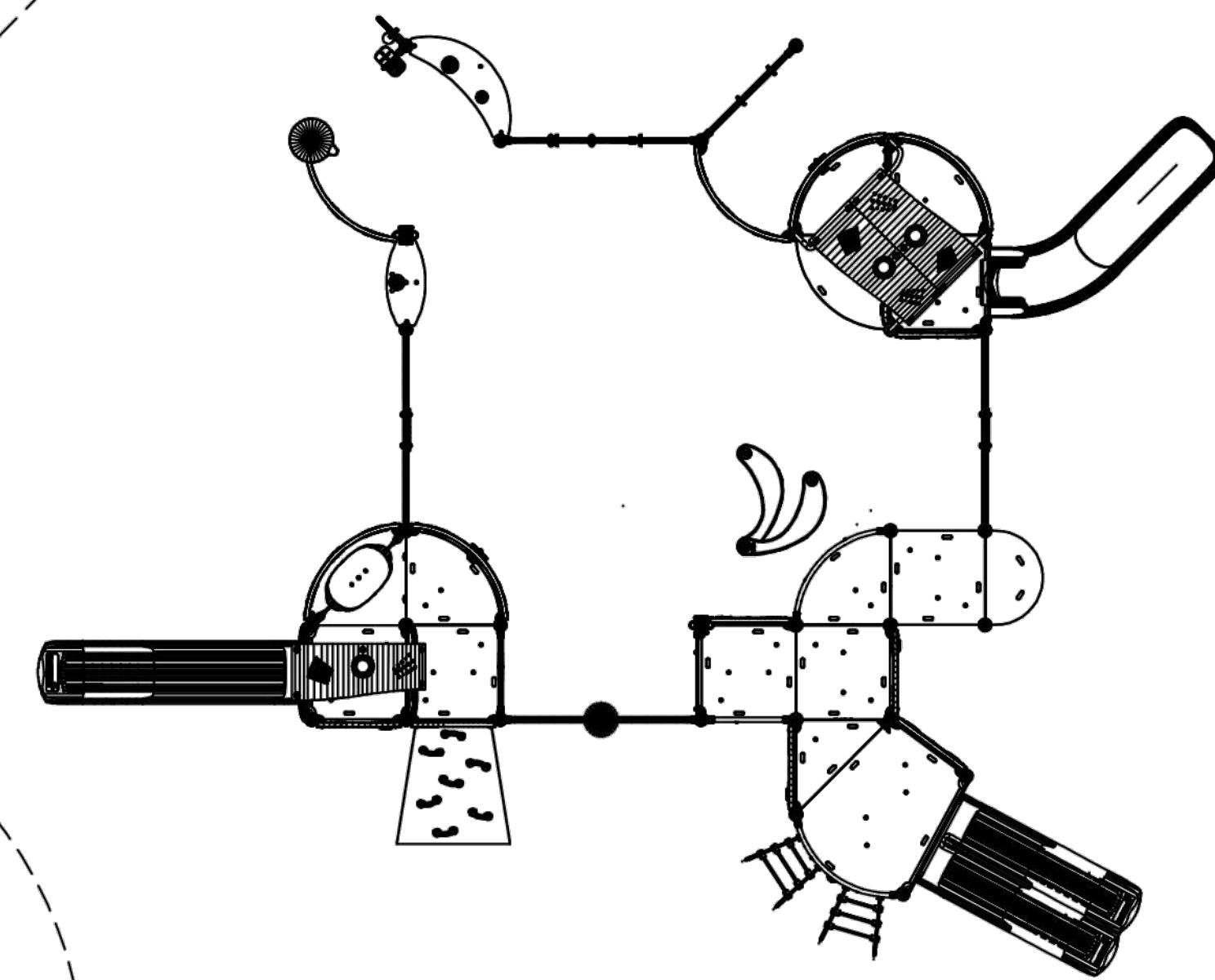
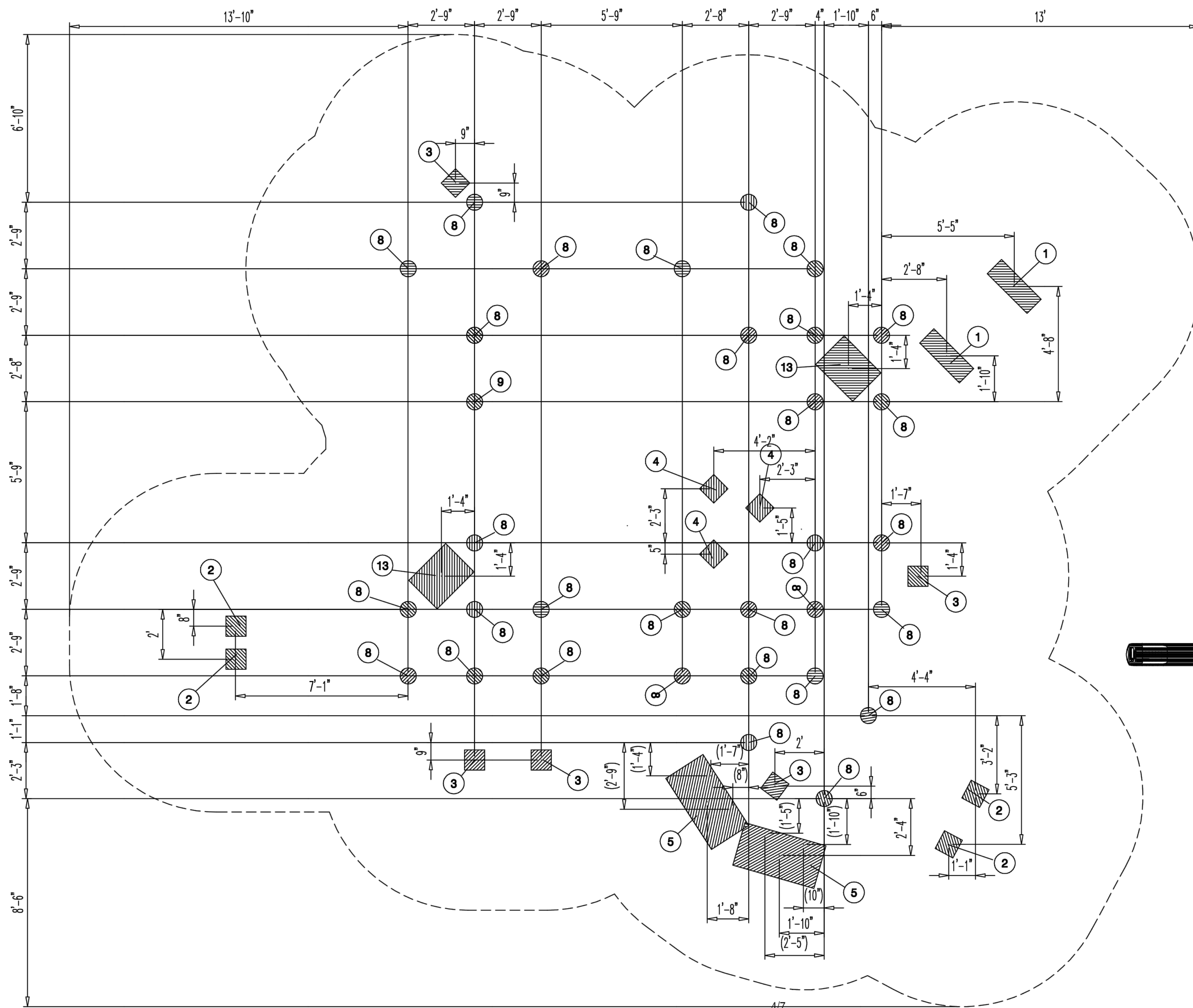
Landscape Architecture / Planning  
 13 Elm Street, Milford, MA 01757  
 Telephone 508 478 8426, Facsimile 508 478 8607

**Site Engineering Consultants, Inc.**  
 55 Grape Shot Road  
 Sharon, Massachusetts 02067  
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**KOMPAN!**  
 Playful Living  
**ELE400114**  
 20120510AP  
 1:1/4"  
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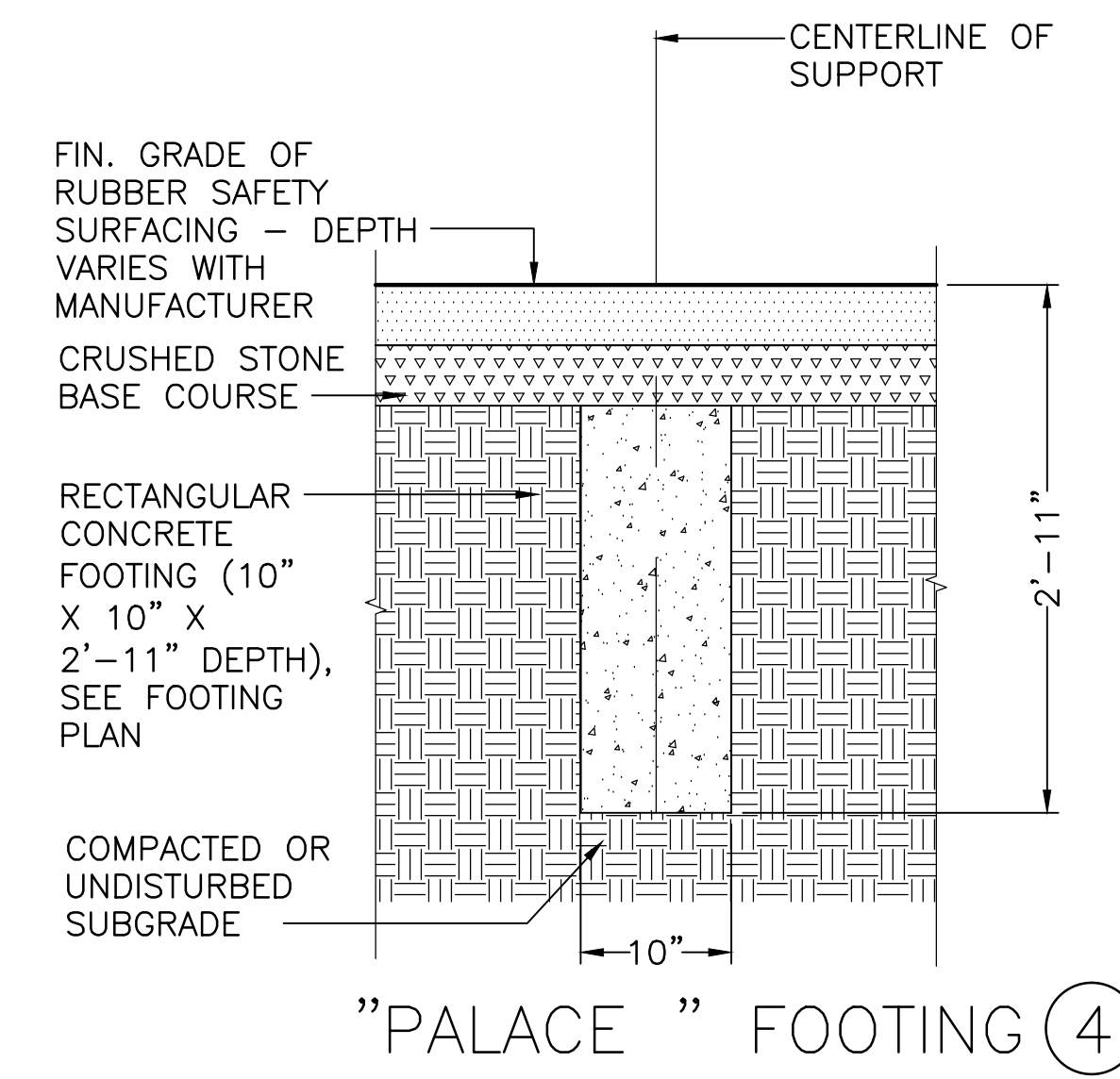
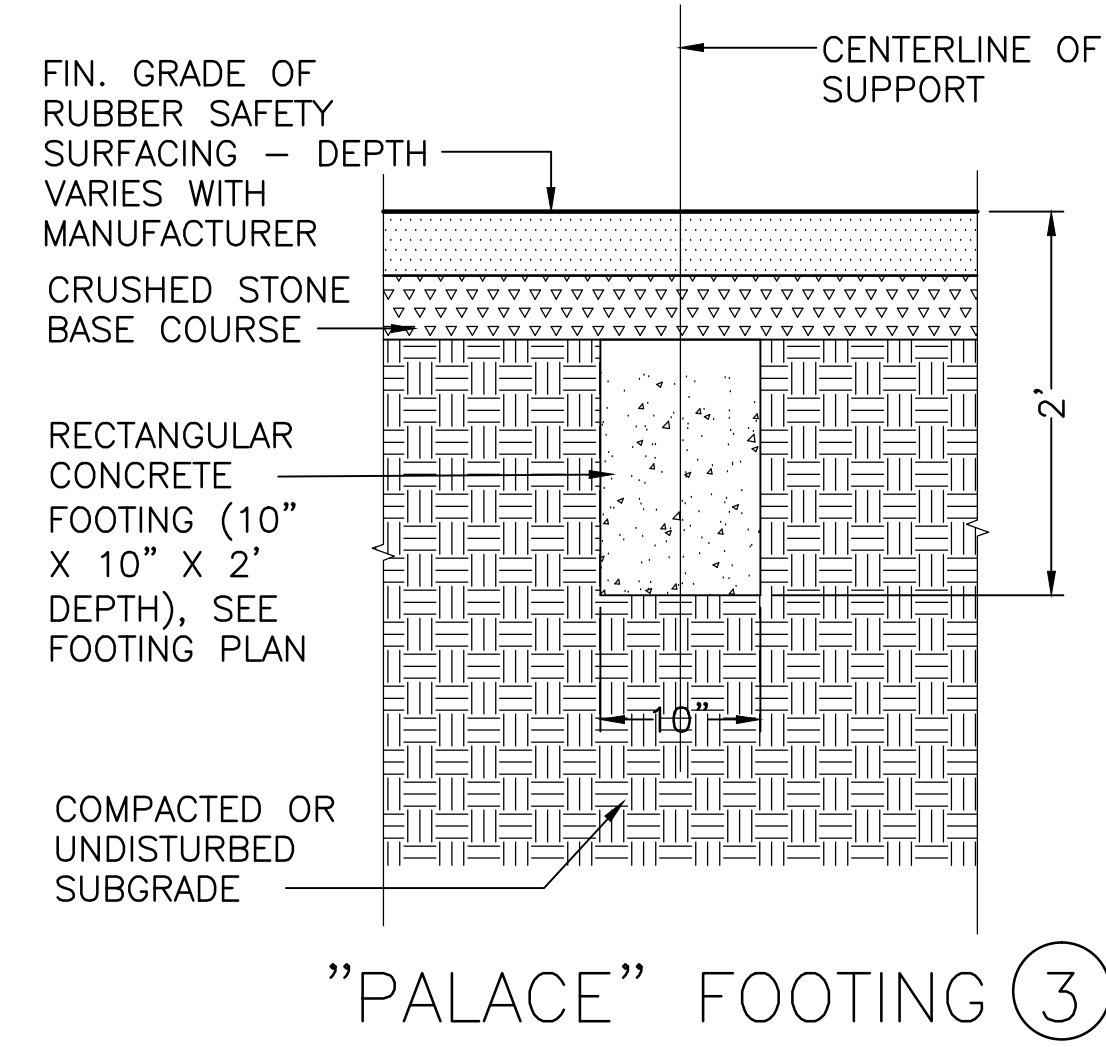
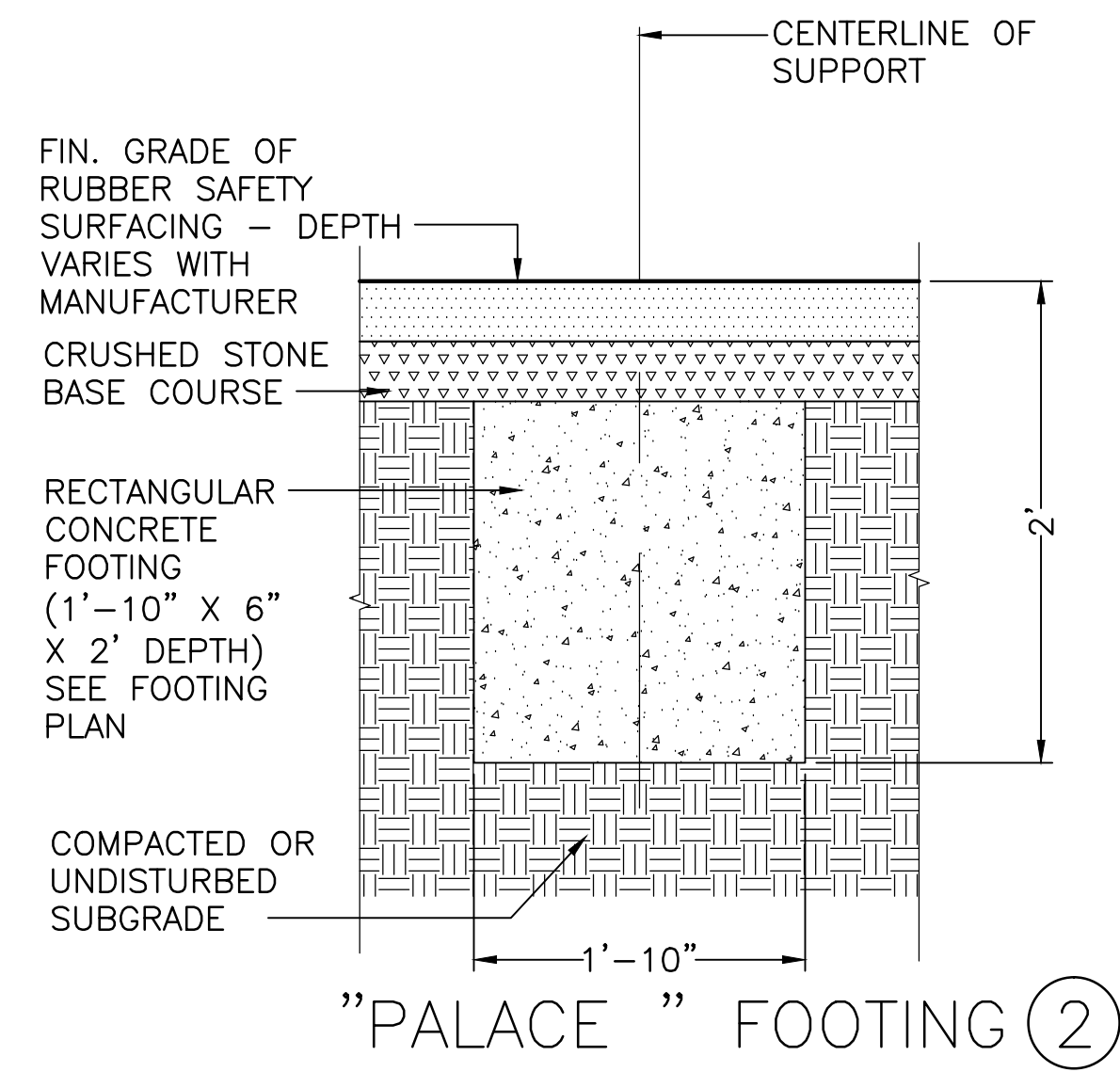
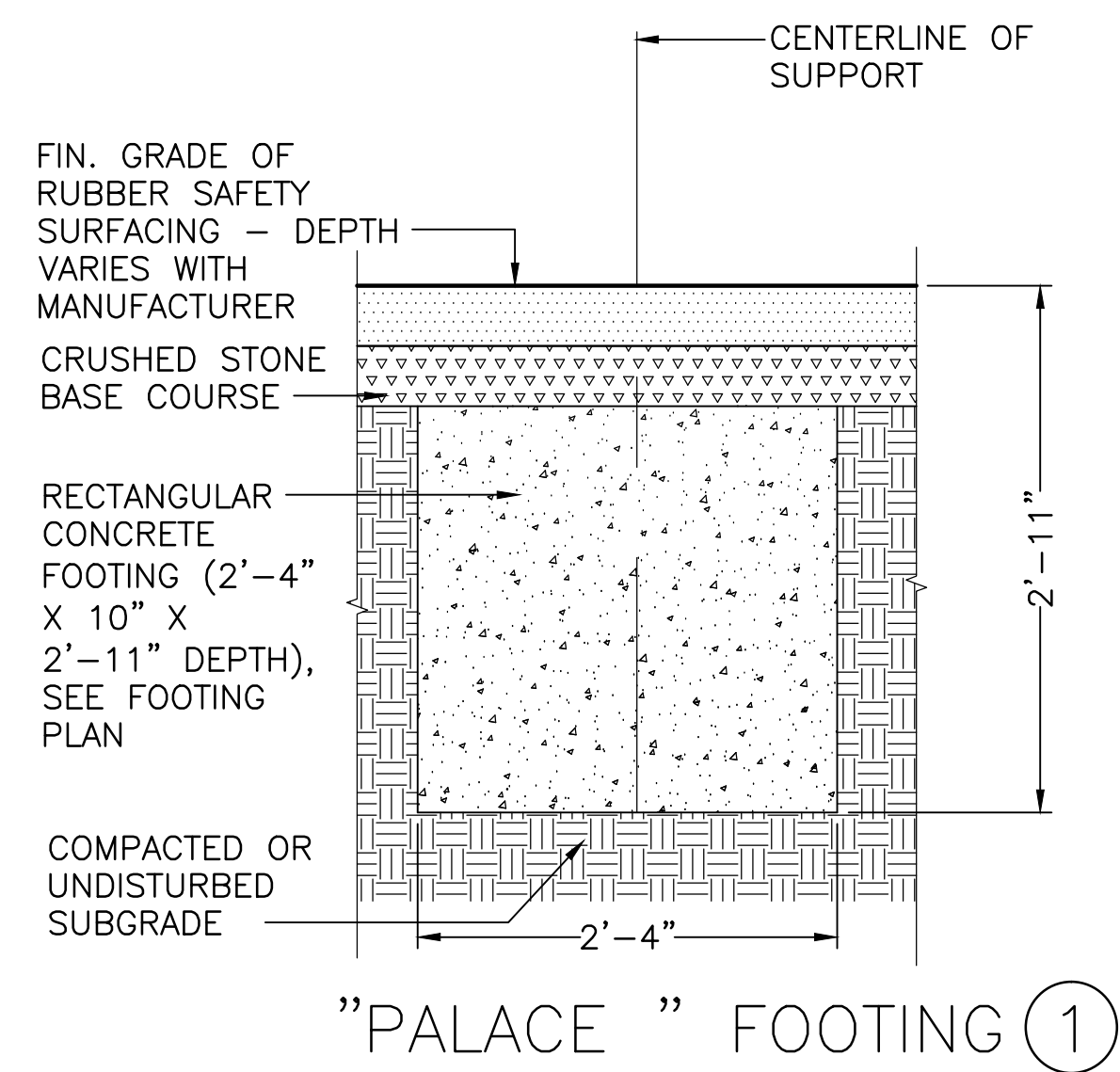
TITLE:

**PLAY EQUIPMENT  
 DETAILS I**

Scale AS NOTED Date MAR 21 2016  
 Drawn By CCC  
 Checked By DRB  
 Approved By VH  
 Project No. 1313.01

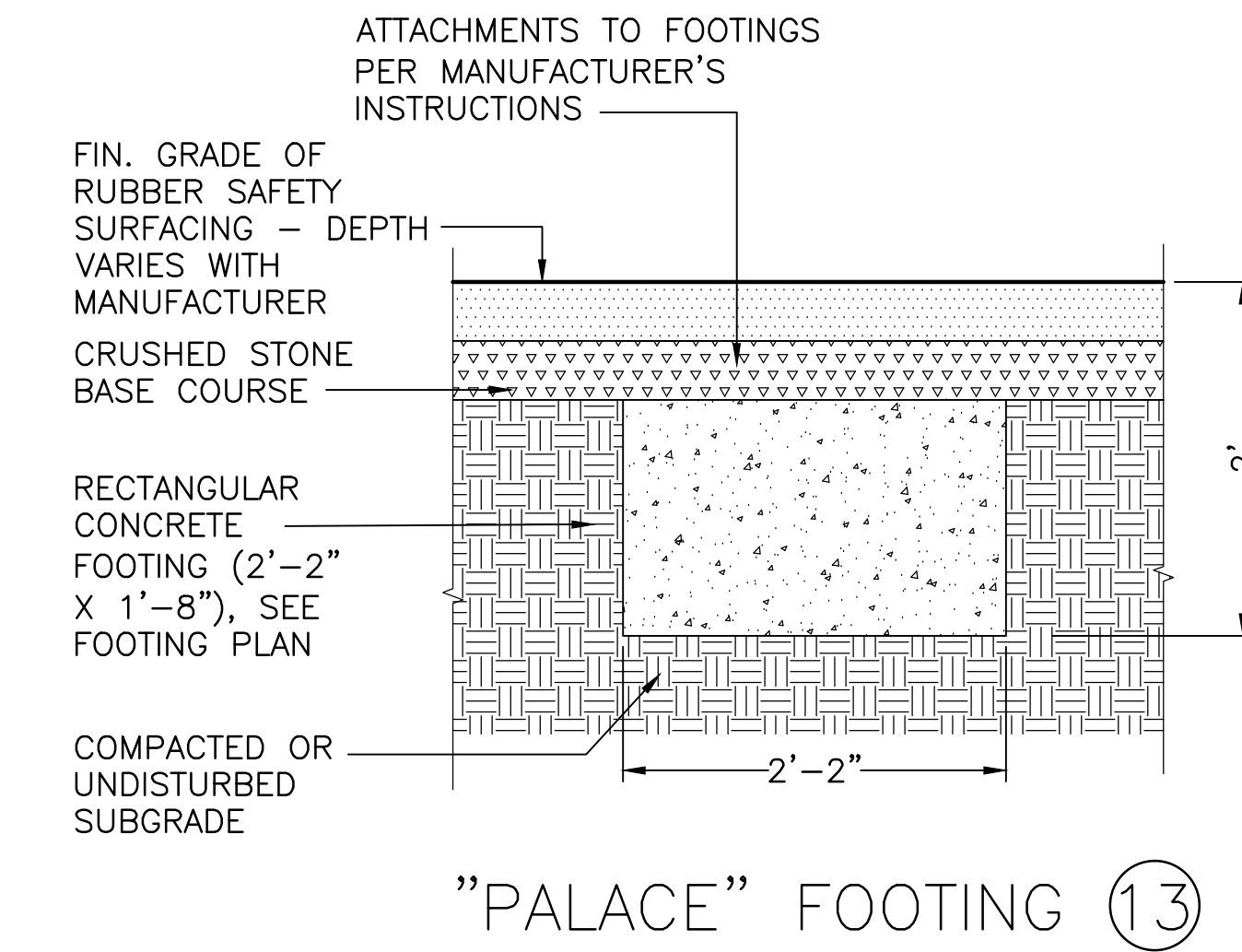
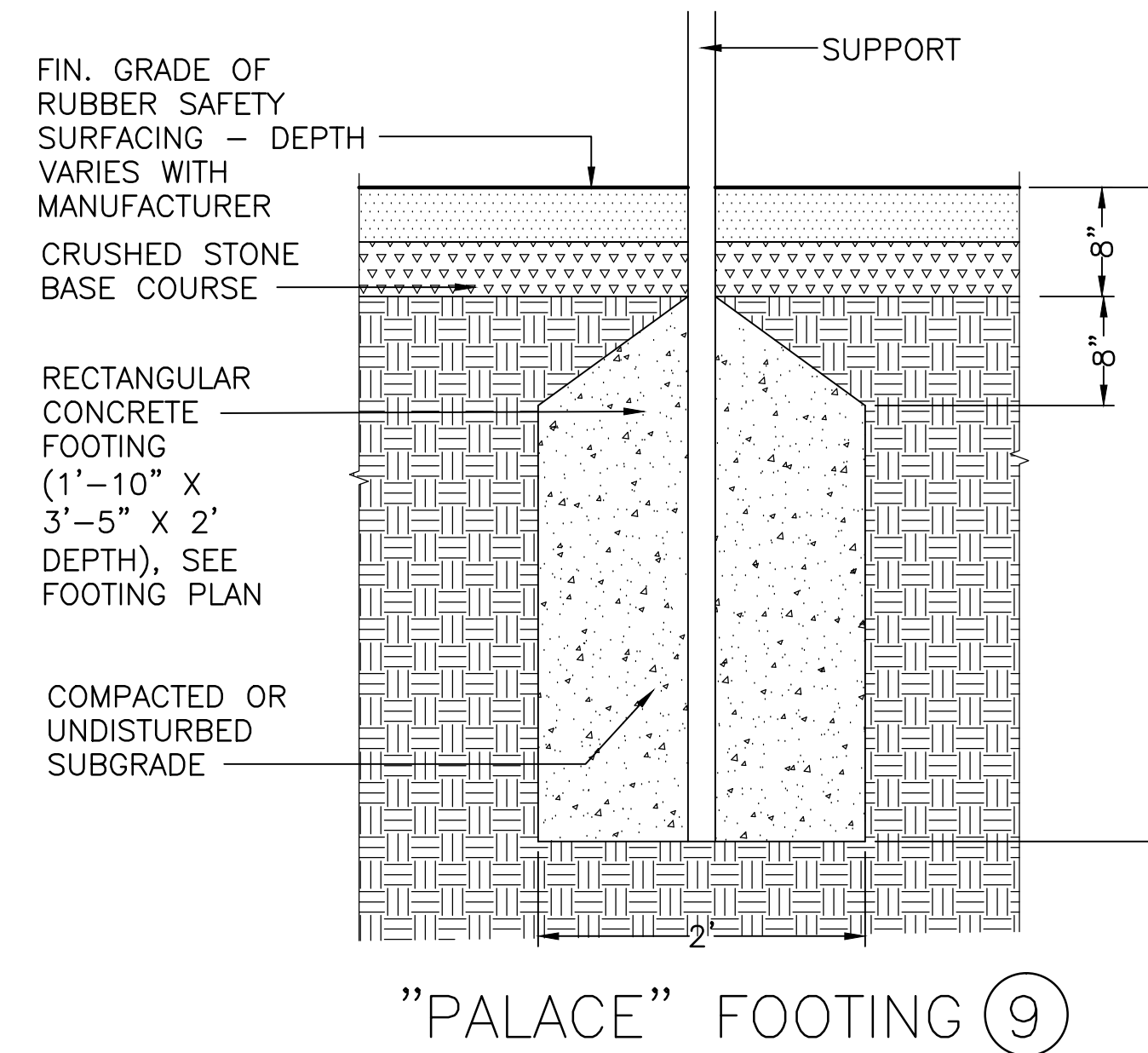
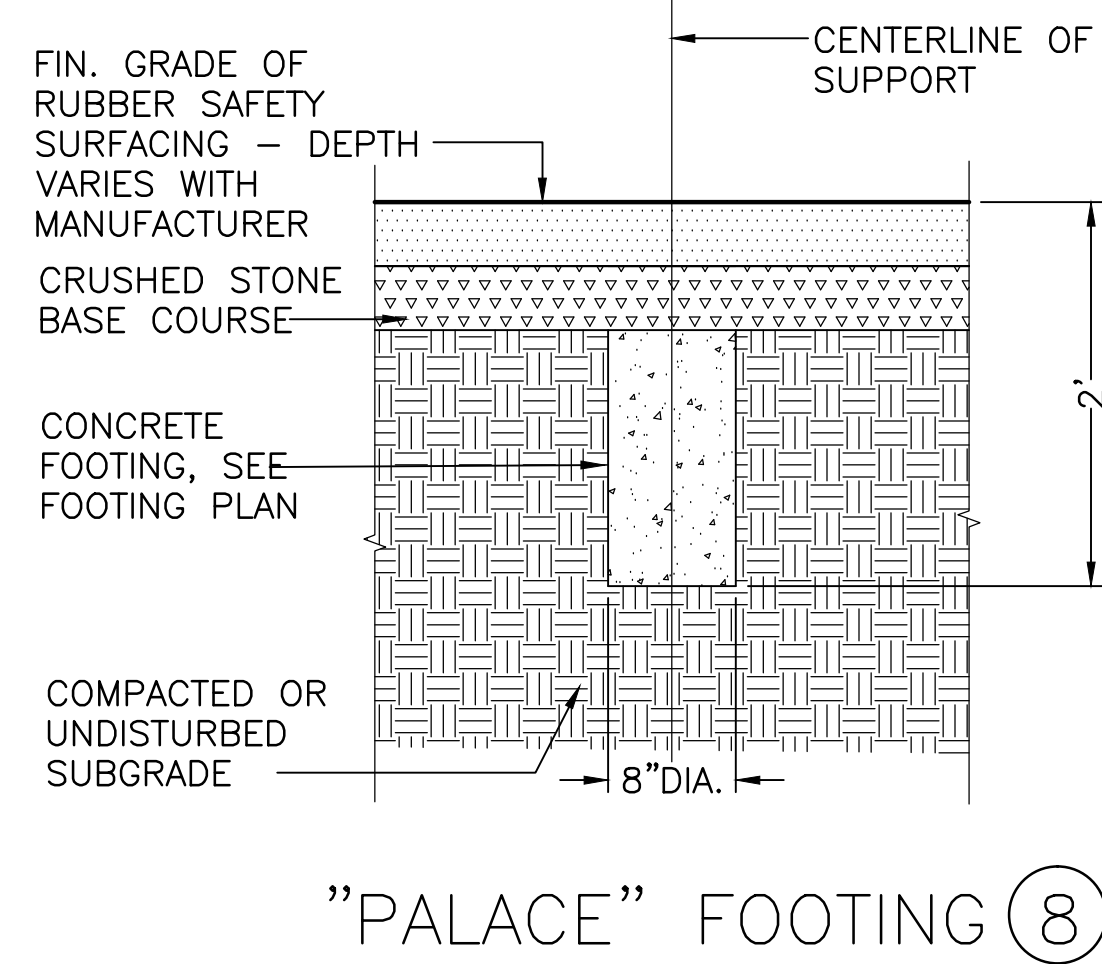
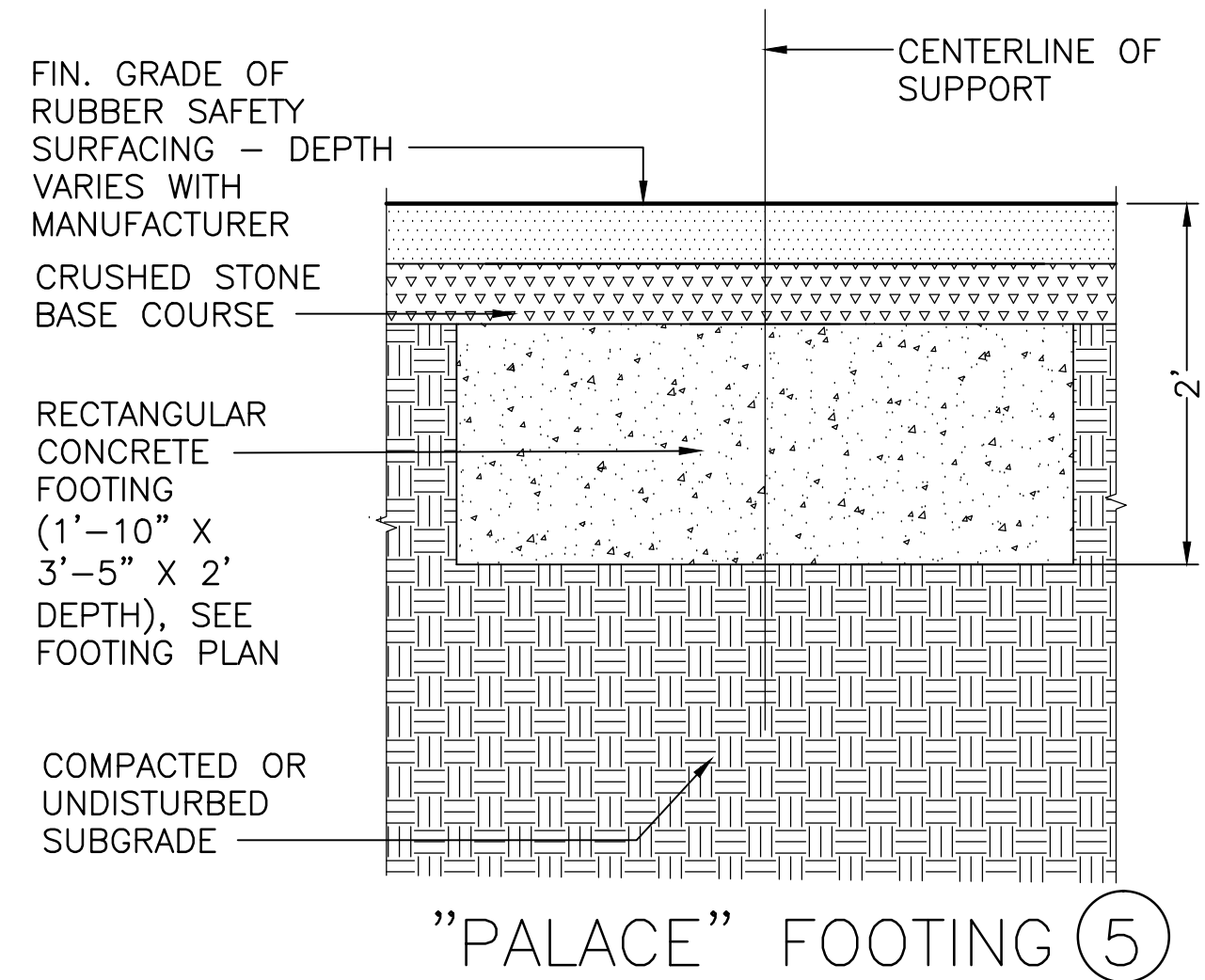
DWG No. **L.16**

1 KOMPAN PALACE - LAYOUT  
 N.T.S.



NOTE: ALL FOOTING NUMBERS ON THIS DETAIL REFER TO DETAIL 1/L.X FOR THE "PALACE".

NOTE: PRIOR TO FORMING FOOTINGS, CONFIRM FOOTING DETAILS WITH BOTH PLAYGROUND AND SAFETY SURFACING MANUFACTURER TO ENSURE CORRECT DEPTHS OF FOOTINGS AND BASE COURSE.



SECTION

1 KOMPAN "PALACE" FOOTING DETAILS

1" = 1'-0"

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Project:

CITY OF WALTHAM  
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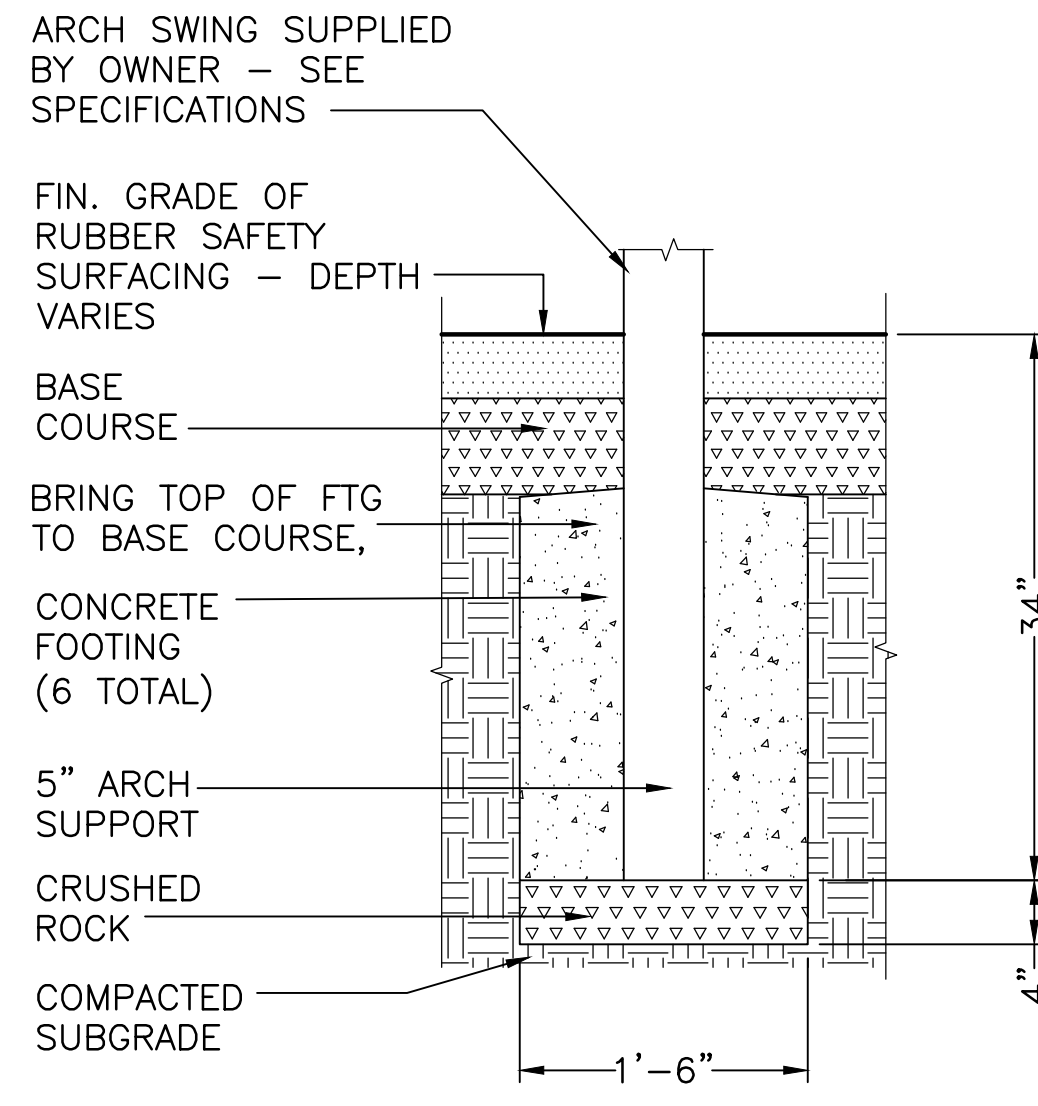
Prepared For:

CITY OF WALTHAM  
DEPARTMENT OF RECREATION  
50 MOODY STREET  
WALTHAM, MA 02453

TITLE:  
PLAY EQUIPMENT  
DETAILS II

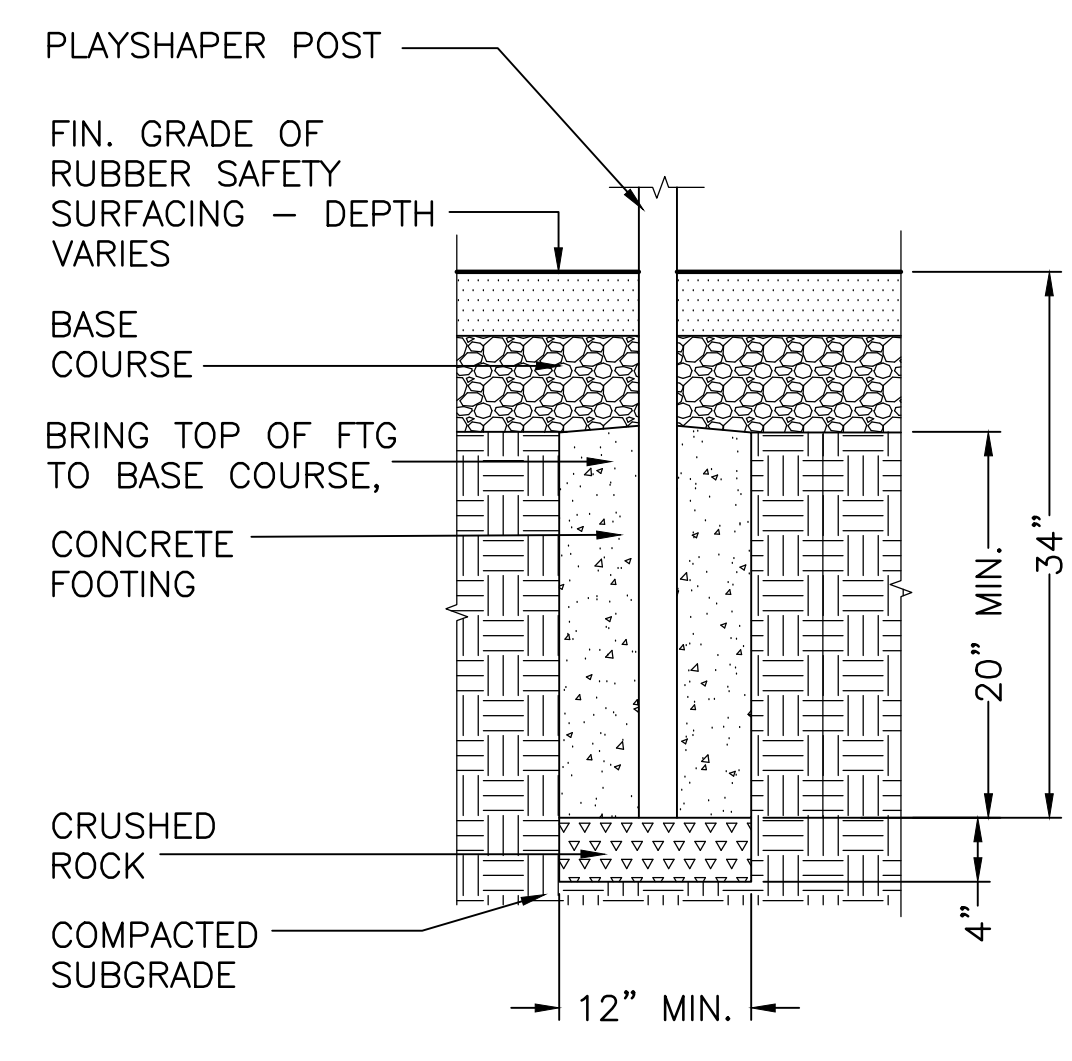
Scale AS NOTED Date MAR 21 2016  
Drawn By CCC  
Checked By DRB  
Approved By VH  
Project No. 1313.01

DWG No. L.17



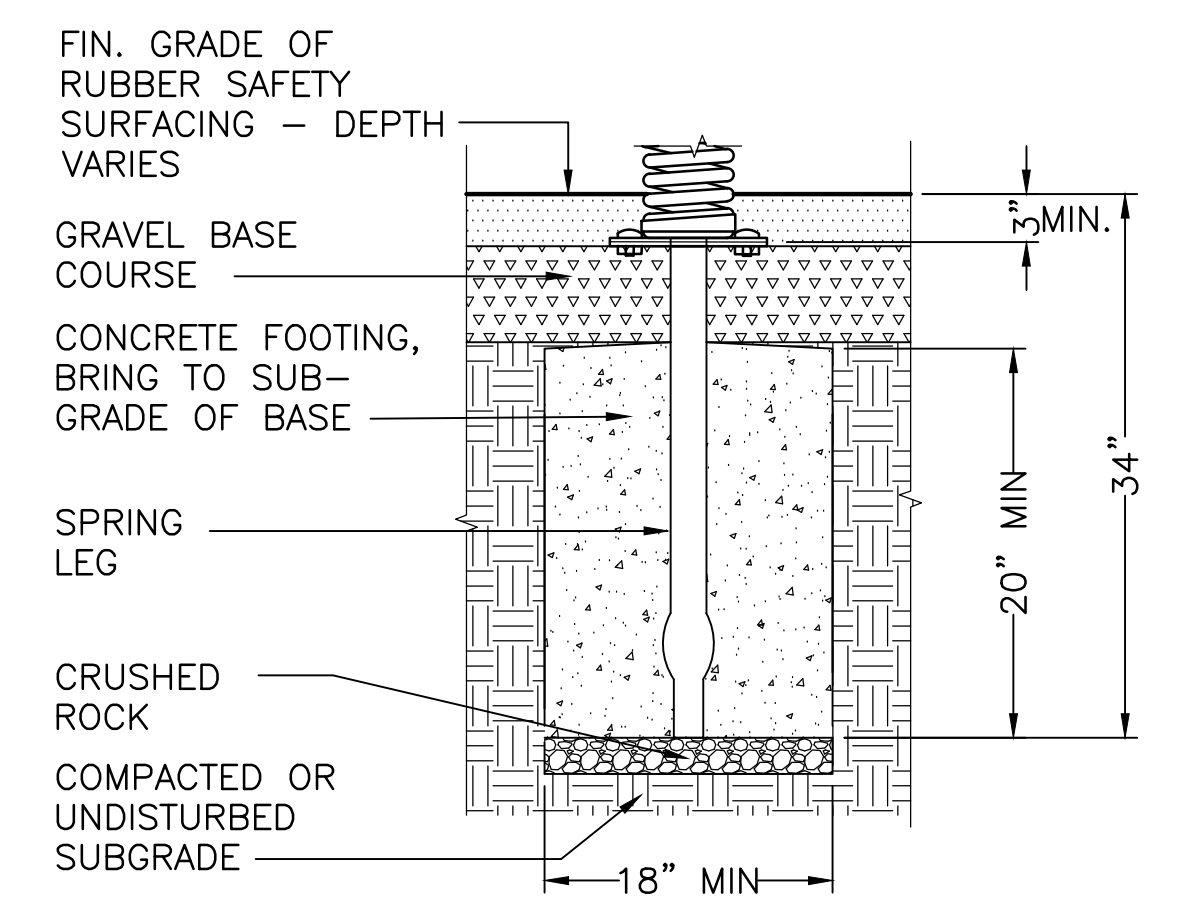
SECTION

**1** ARCH SWING FOOTING (6 REQUIRED)  
1" = 1'-0"



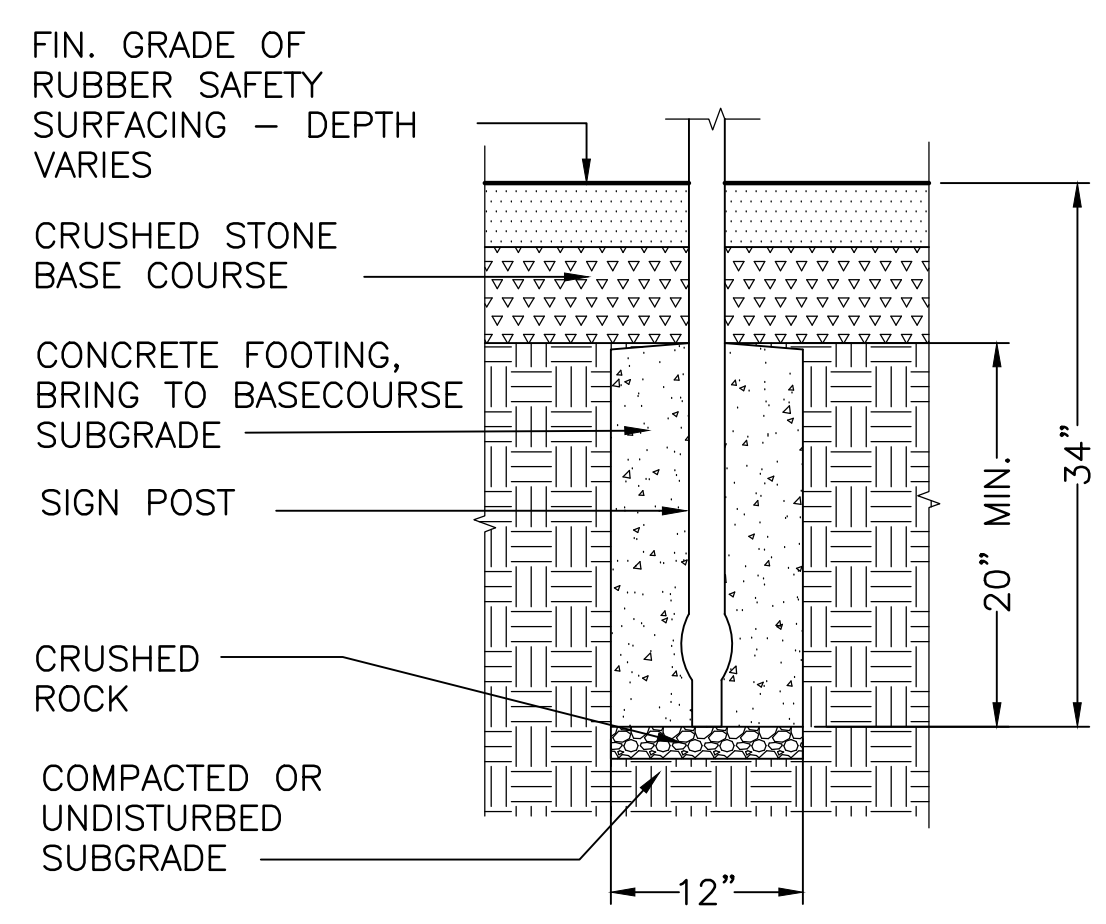
SECTION

**2** PLAYSHAPER POST FOOTING (9 REQUIRED)  
1" = 1'-0"



SECTION

**3** SPRING RIDER FOOTING (2 REQUIRED)  
1" = 1'-0"

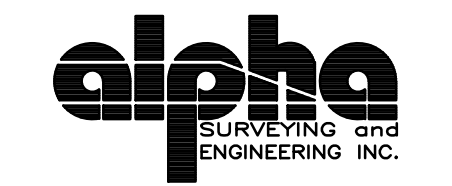


SECTION

**4** PLAYGROUND SIGN POST FOOTING (4 REQUIRED)  
1" = 1'-0"

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No.	Description	Date

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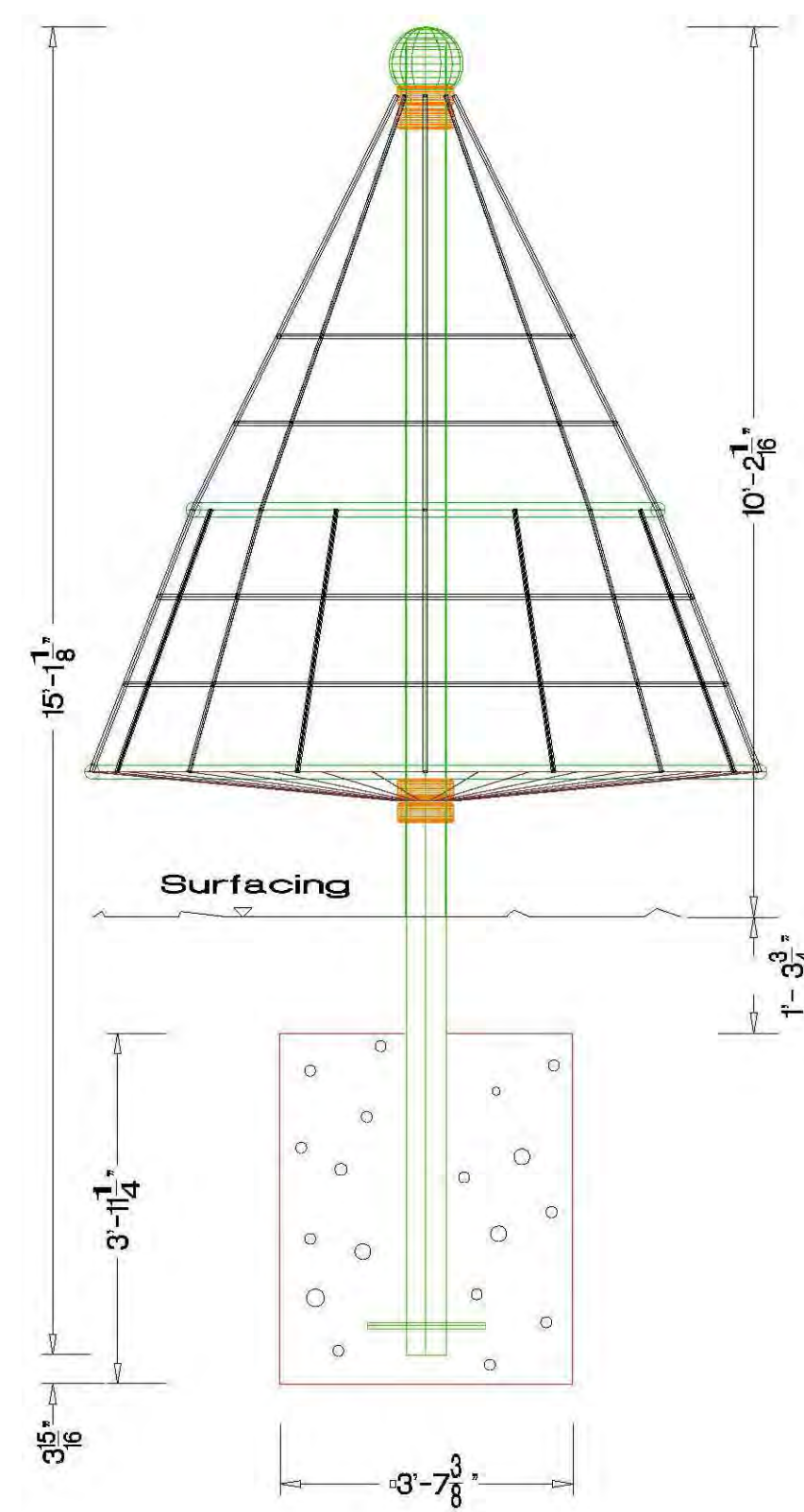
Project:  
**CITY OF WALTHAM  
IMPROVEMENTS TO  
PETER GILMORE PLAYGROUND  
90 HALL STREET  
WALTHAM, MA 02453**

Prepared For:  
**CITY OF WALTHAM  
DEPARTMENT OF RECREATION  
510 MOODY STREET  
WALTHAM, MA 02453**

TITLE:  
**PLAY EQUIPMENT  
DETAILS III**

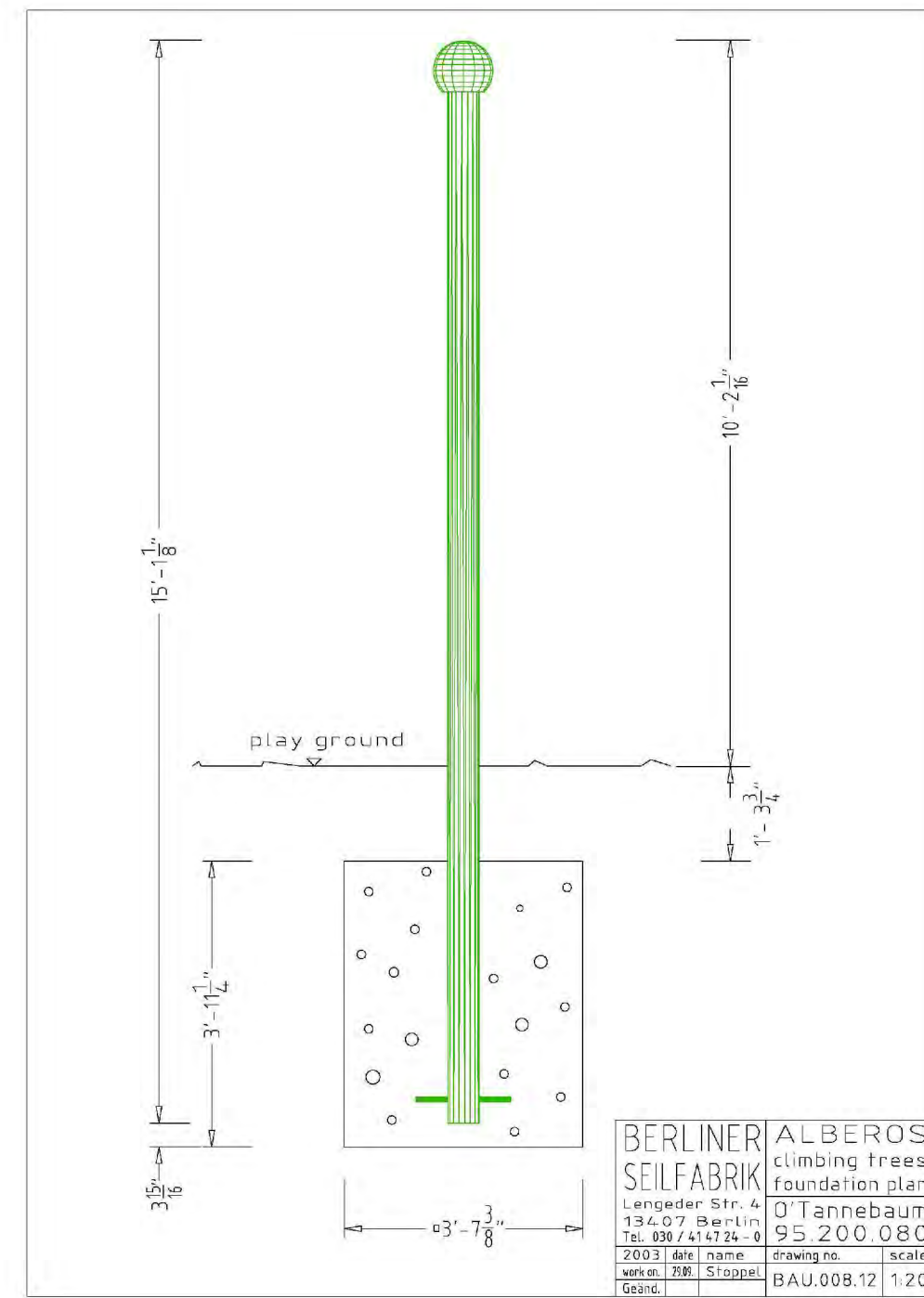
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Drawn By CCC  
Checked By DRB  
Approved By VH  
Project No. 1313.01

DWG No. **L.18**



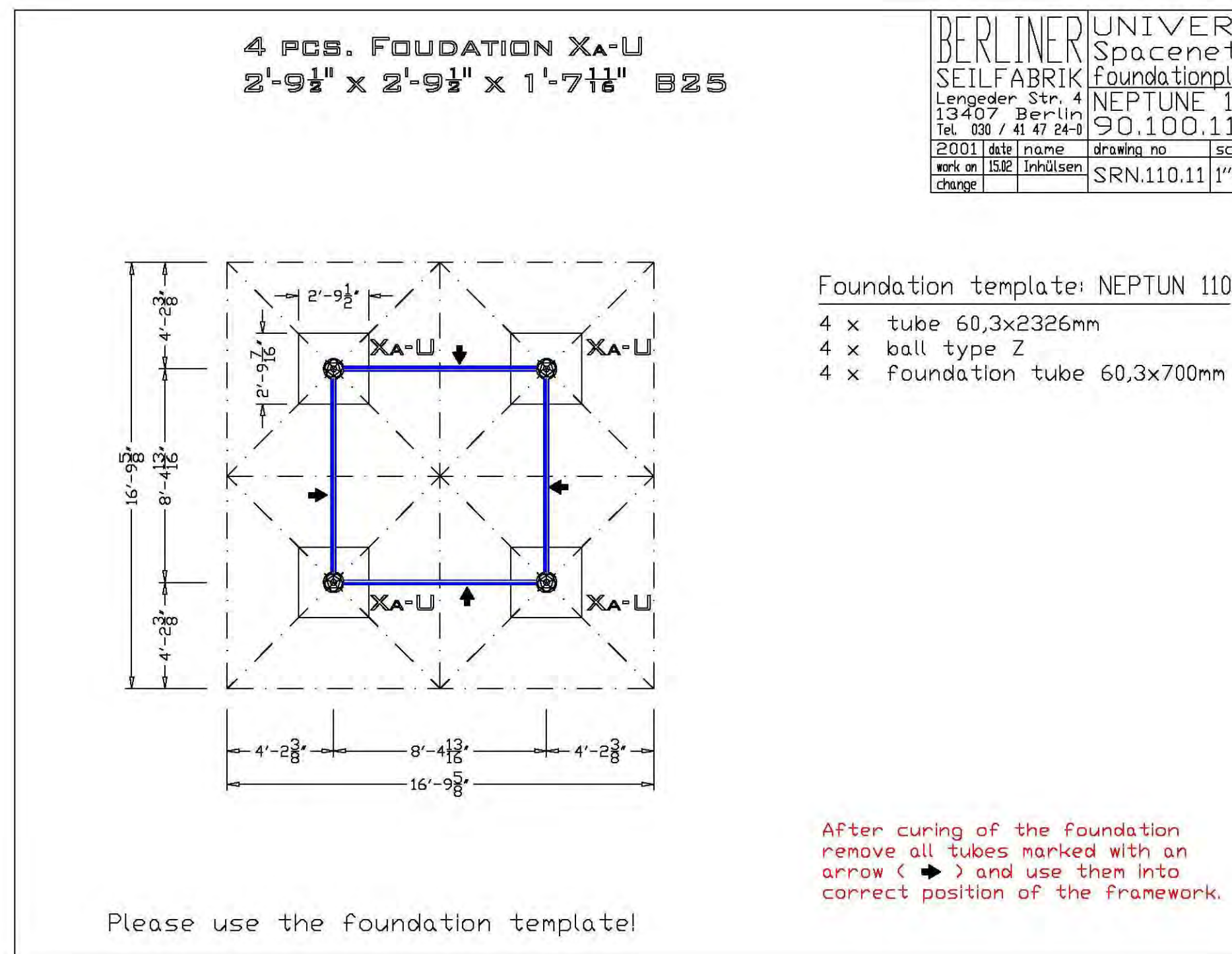
SECTION

**1** BERLINER TANNEBAUM INSTALLATION DETAILS  
N.T.S.



PLAN

**2** NEPTUNE FOOTING DETAILS  
N.T.S.



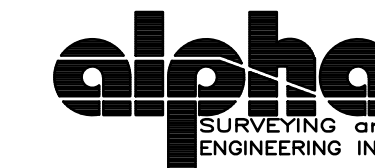
THE CONTRACTOR SHALL INCLUDE IN HIS BID FOR THE NEPTUNE STRUCTURE A CONCRETE VOLUME OF 4.04 SQUARE METERS, FOR 13 FOOTINGS TOTAL.

**2** NEPTUNE FOOTING DETAILS  
N.T.S.

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PETER GILMORE PLAYGROUND  
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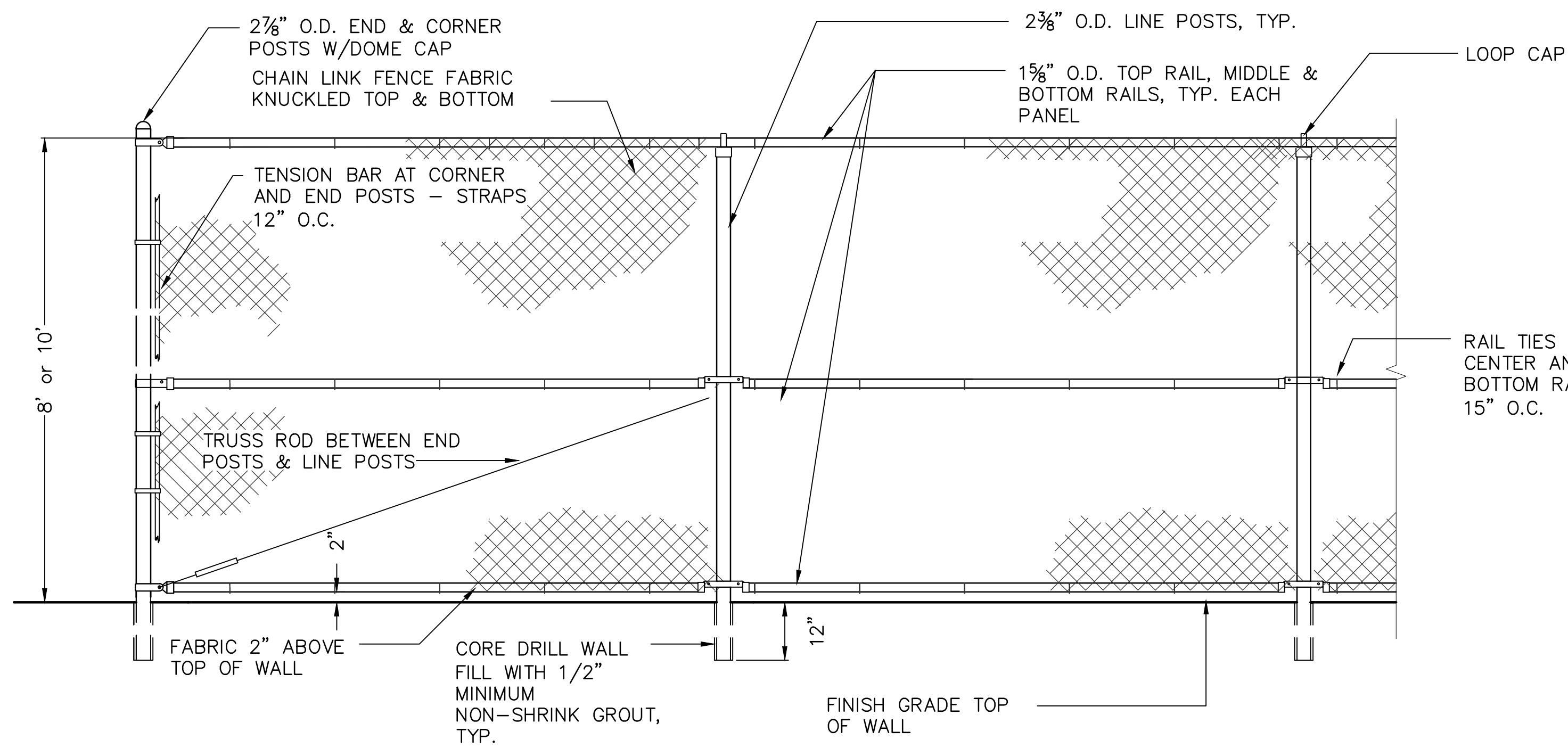
Prepared For:

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DEPARTMENT OF RECREATION  
510 MOODY STREET  
WALTHAM, MA 02453**

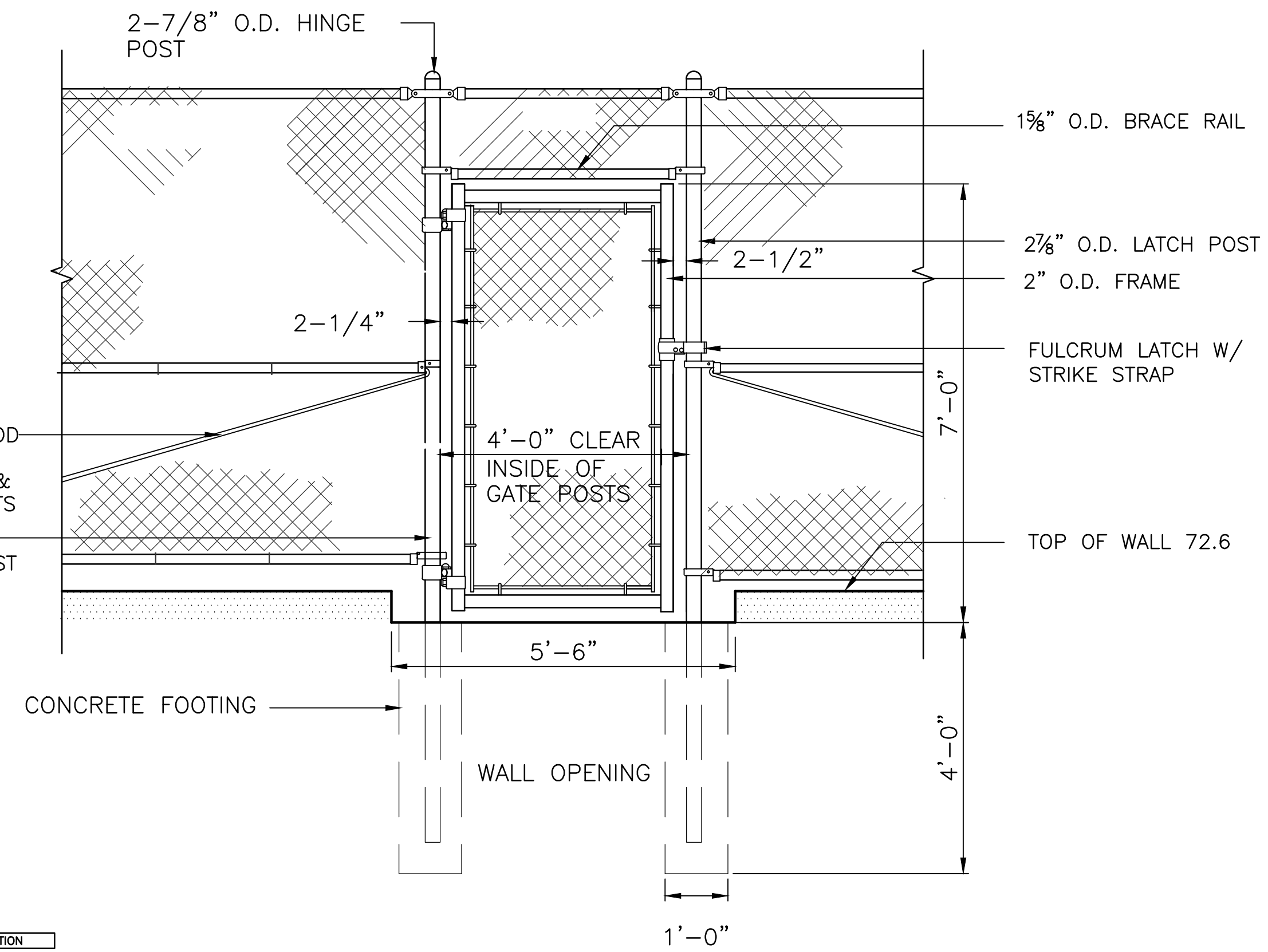
TITLE:  
**PLAY EQUIPMENT  
DETAILS IV**

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Project No. 1313.01

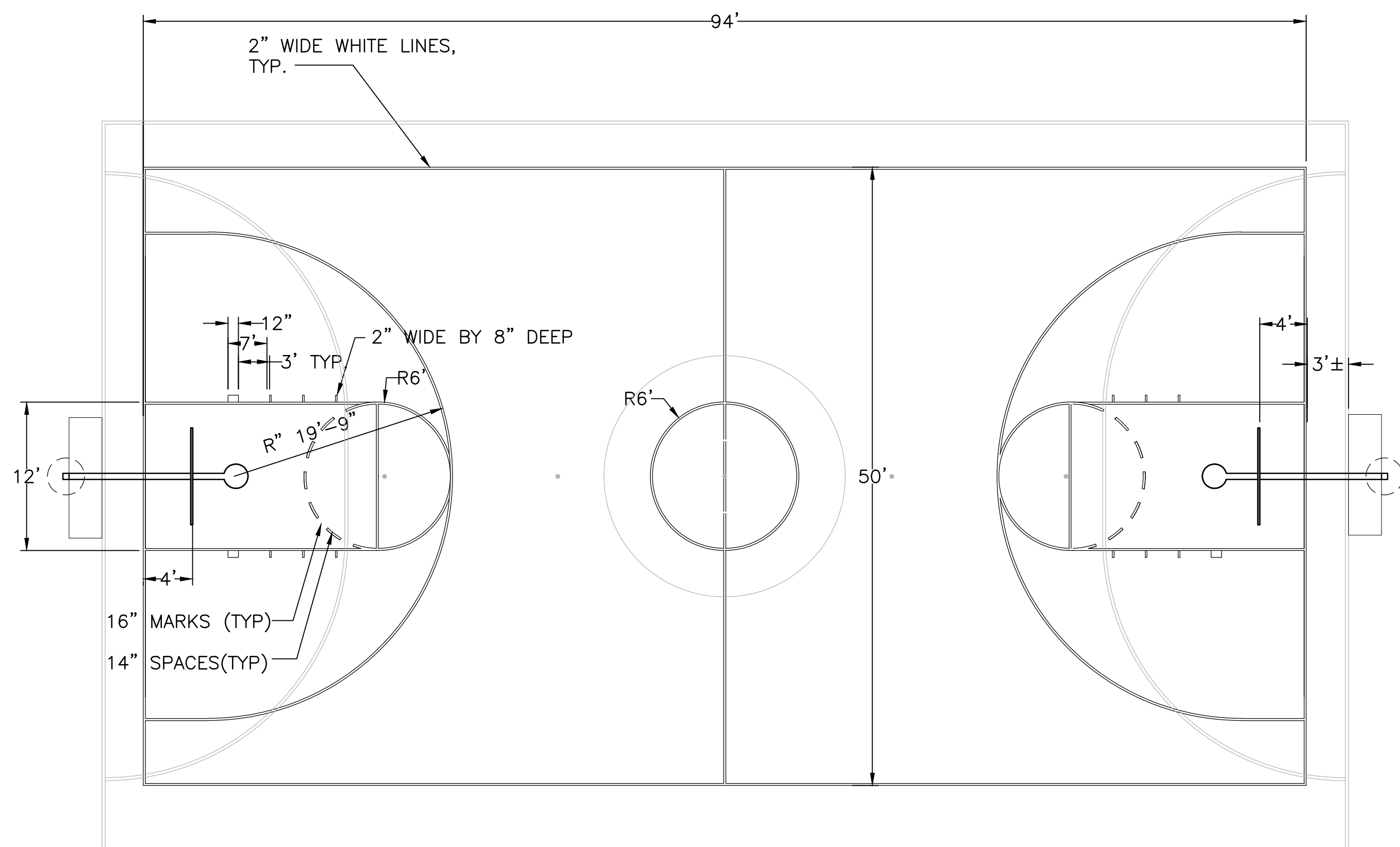
DWG No. **L.19**



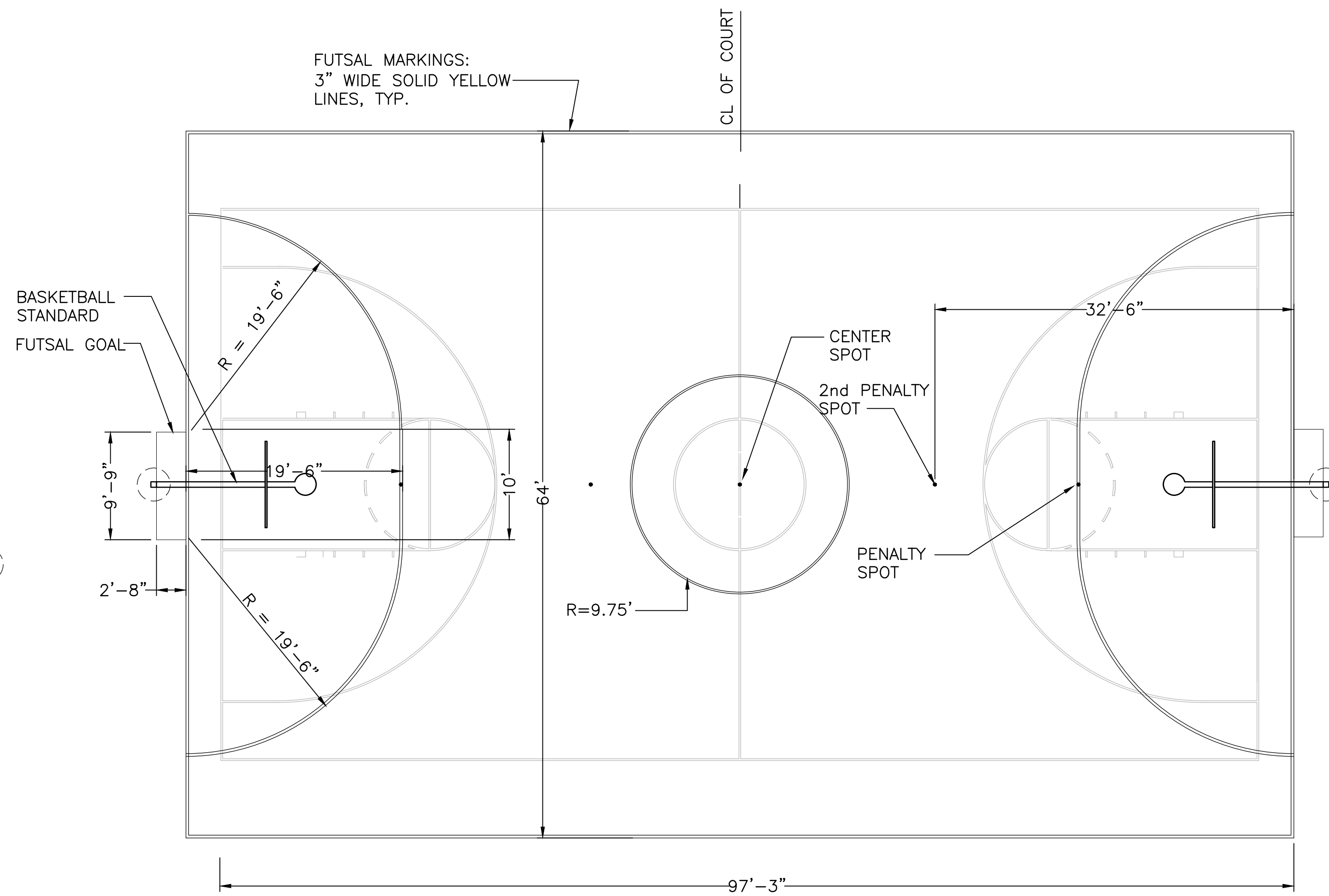
**SECTION**  
**1** CHAIN LINK FENCING AT COURT  
 1/2" = 1'-0"



**SECTION**  
**2** CHAIN LINK GATE AT COURT - 1 TOTAL  
 1/2" = 1'-0"



**SECTION**  
**3** COURT LINE PAINTING LAYOUT FOR BASKETBALL  
 1/8" = 1'-0"



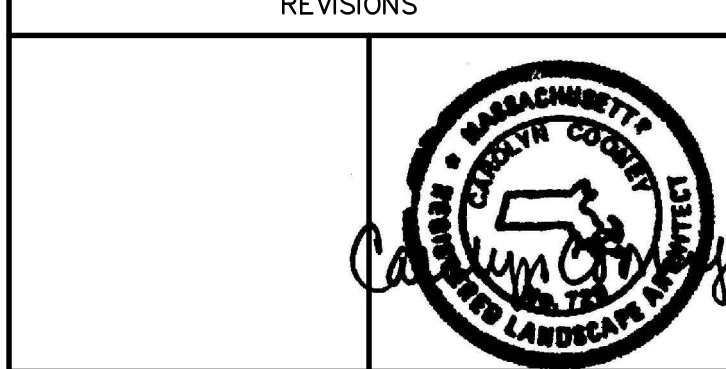
**SECTION**  
**4** COURT LINE PAINTING LAYOUT FOR FUTSAL  
 1/8" = 1'-0"

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No.	Description	Date



Project:  
**CITY OF WALTHAM  
 IMPROVEMENTS TO  
 PETER GILMORE PLAYGROUND  
 90 HALL STREET  
 WALTHAM, MA 02453**

Prepared For:  
**CITY OF WALTHAM  
 DEPARTMENT OF RECREATION  
 510 MOODY STREET  
 WALTHAM, MA 02453**

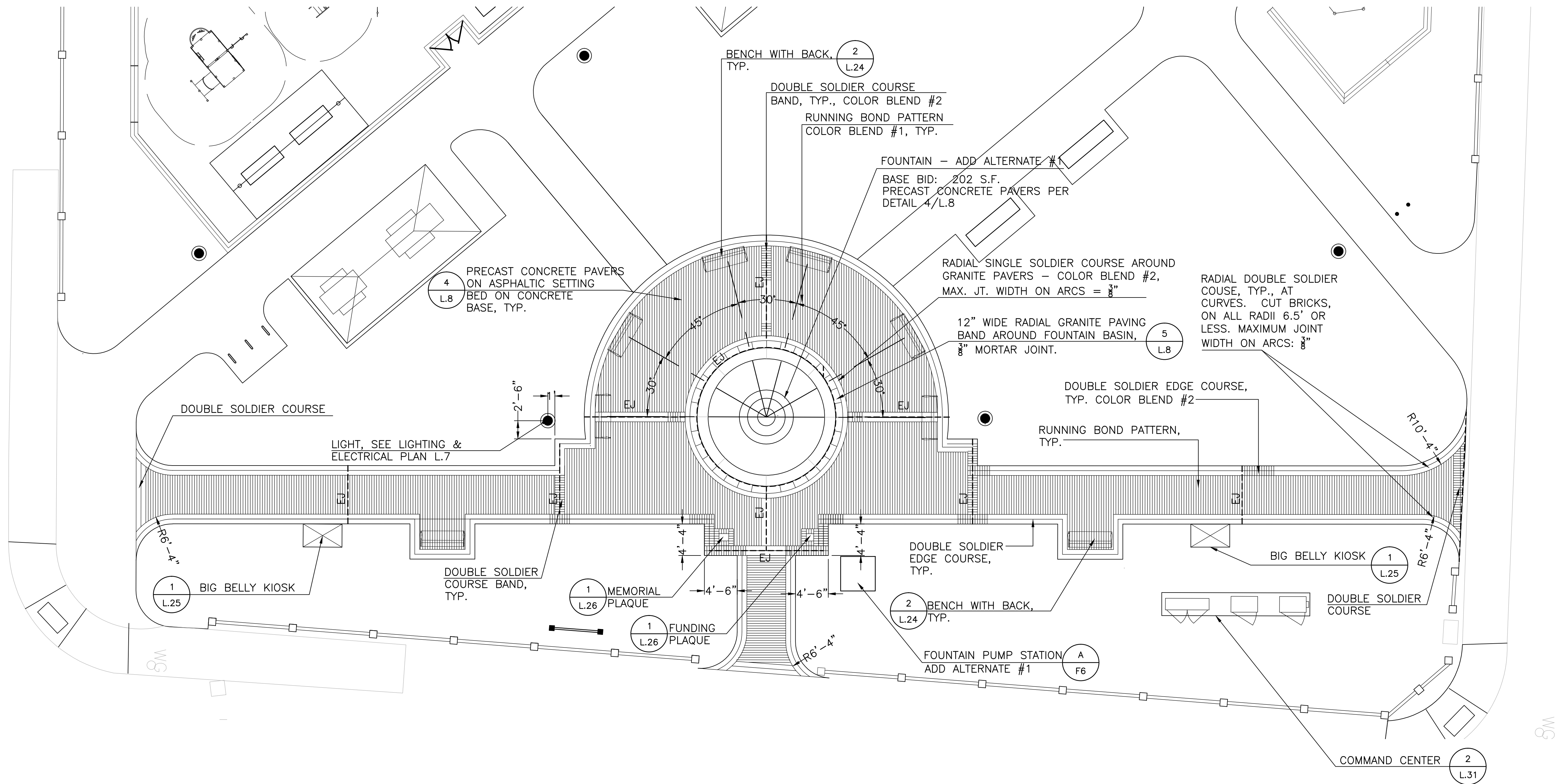
TITLE:  
**COURT  
 DETAILS**

Scale AS NOTED Date MAR 21 2016  
 Drawn By CCC  
 Checked By DRB  
 Approved By VH  
 Project No. 1313.01

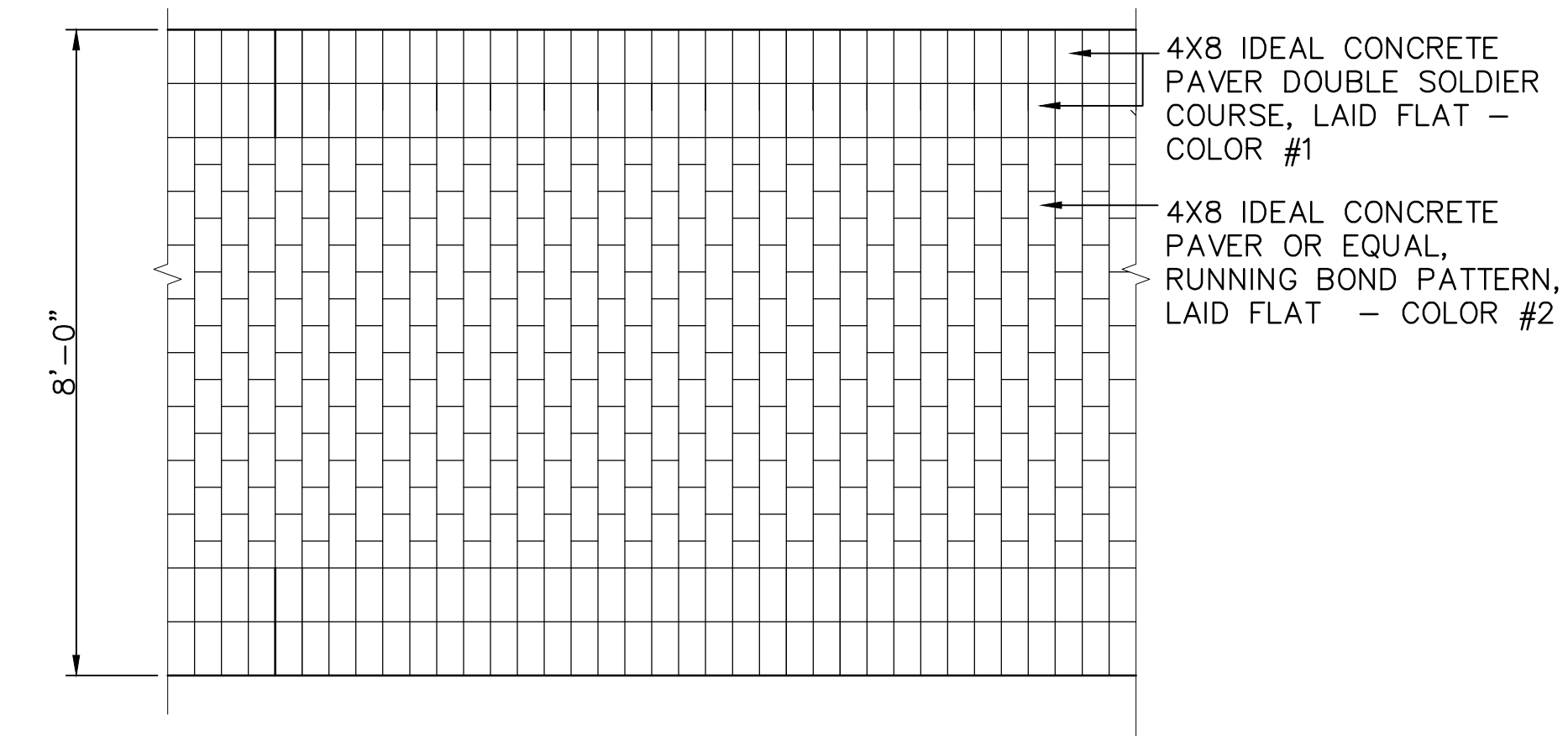
DWG No. **L.20**







**1** FOUNTAIN AREA ENLARGEMENT PLAN  
1/8" = 1'-0"

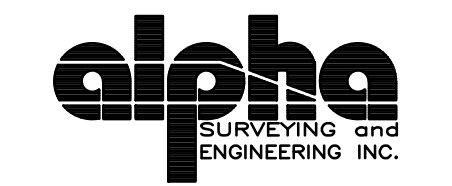


**2** WALKWAY PAVING PATTERN  
1/2" = 1'-0"

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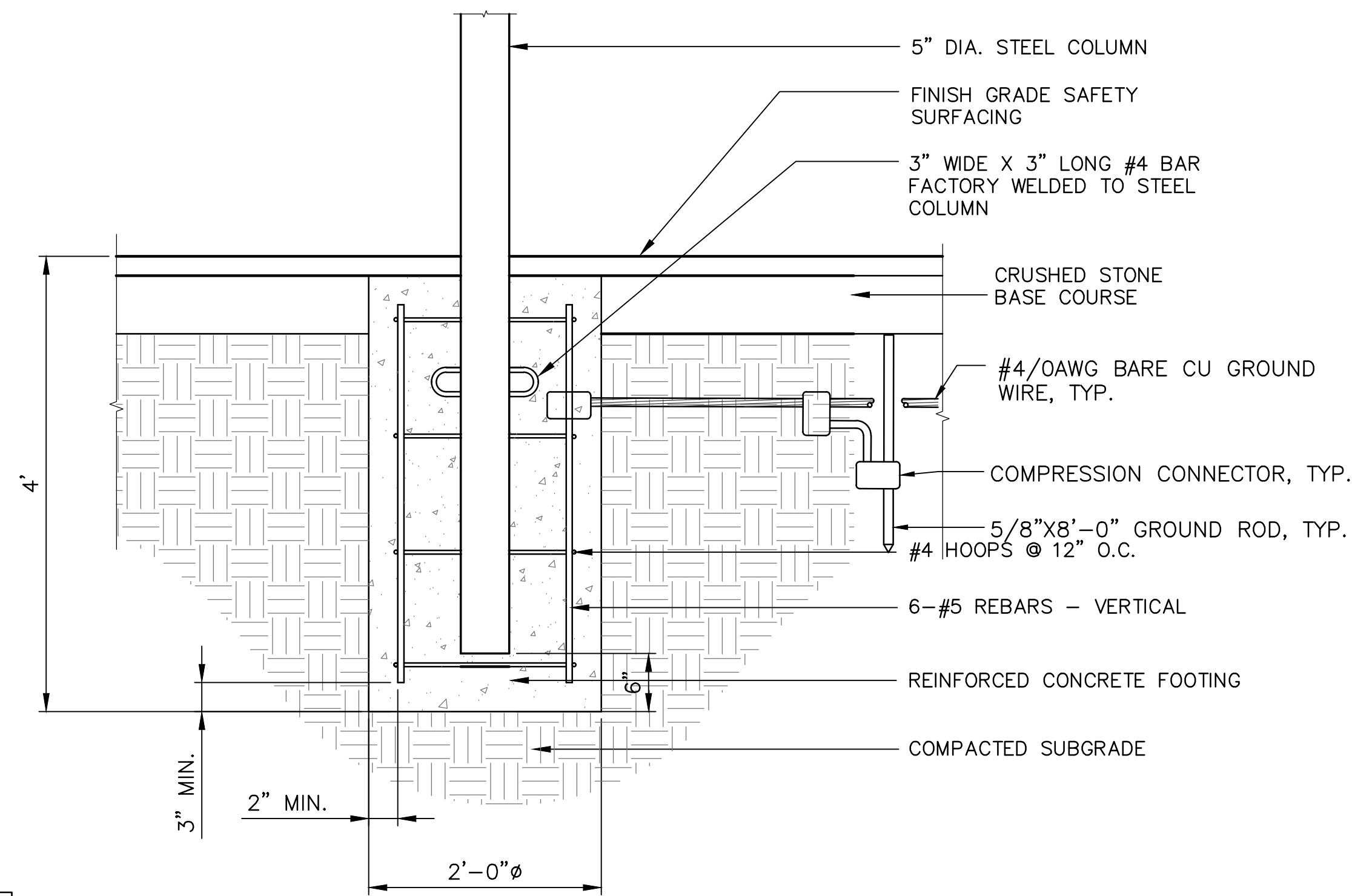
Project:  
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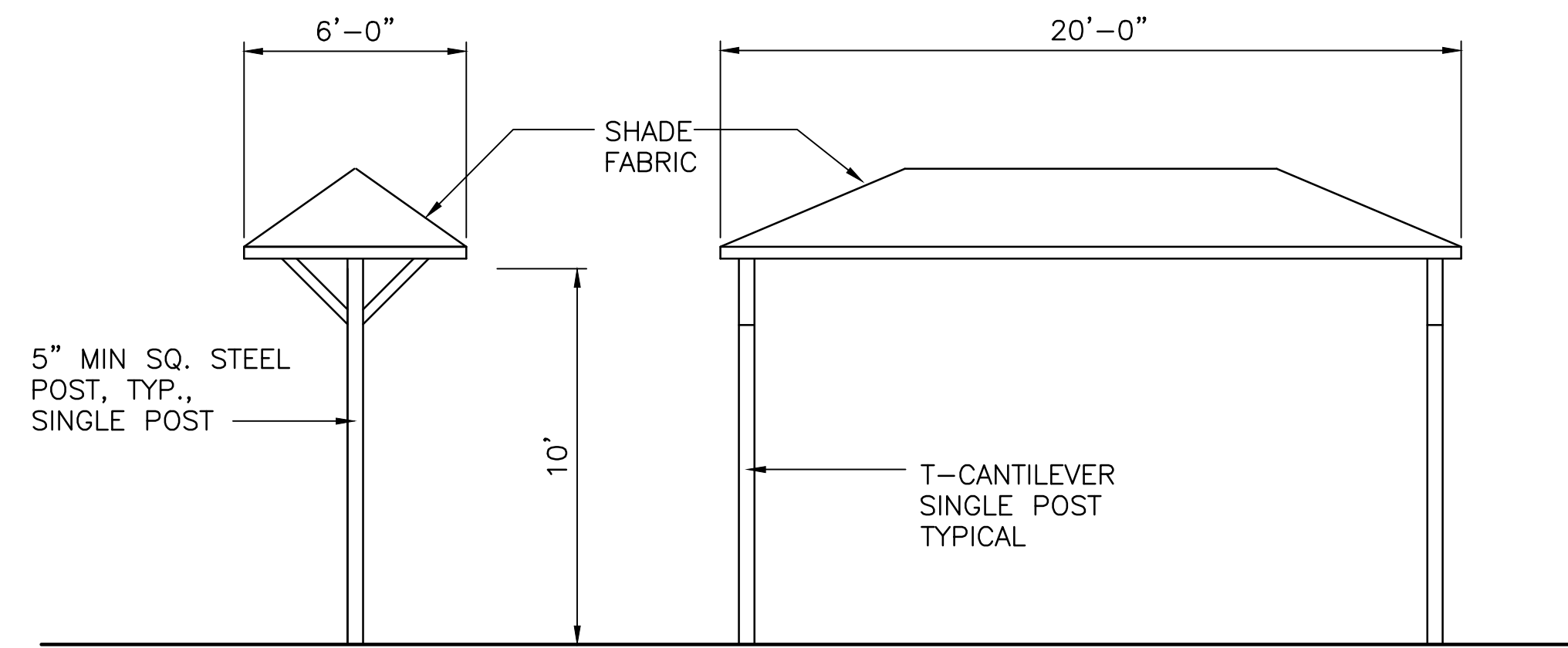
TITLE:  
**FOUNTAIN AREA  
ENLARGEMENT**

Scale AS NOTED Date MAR 21 2016  
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Checked By DRB  
Approved By VH  
Project No. 1313.01

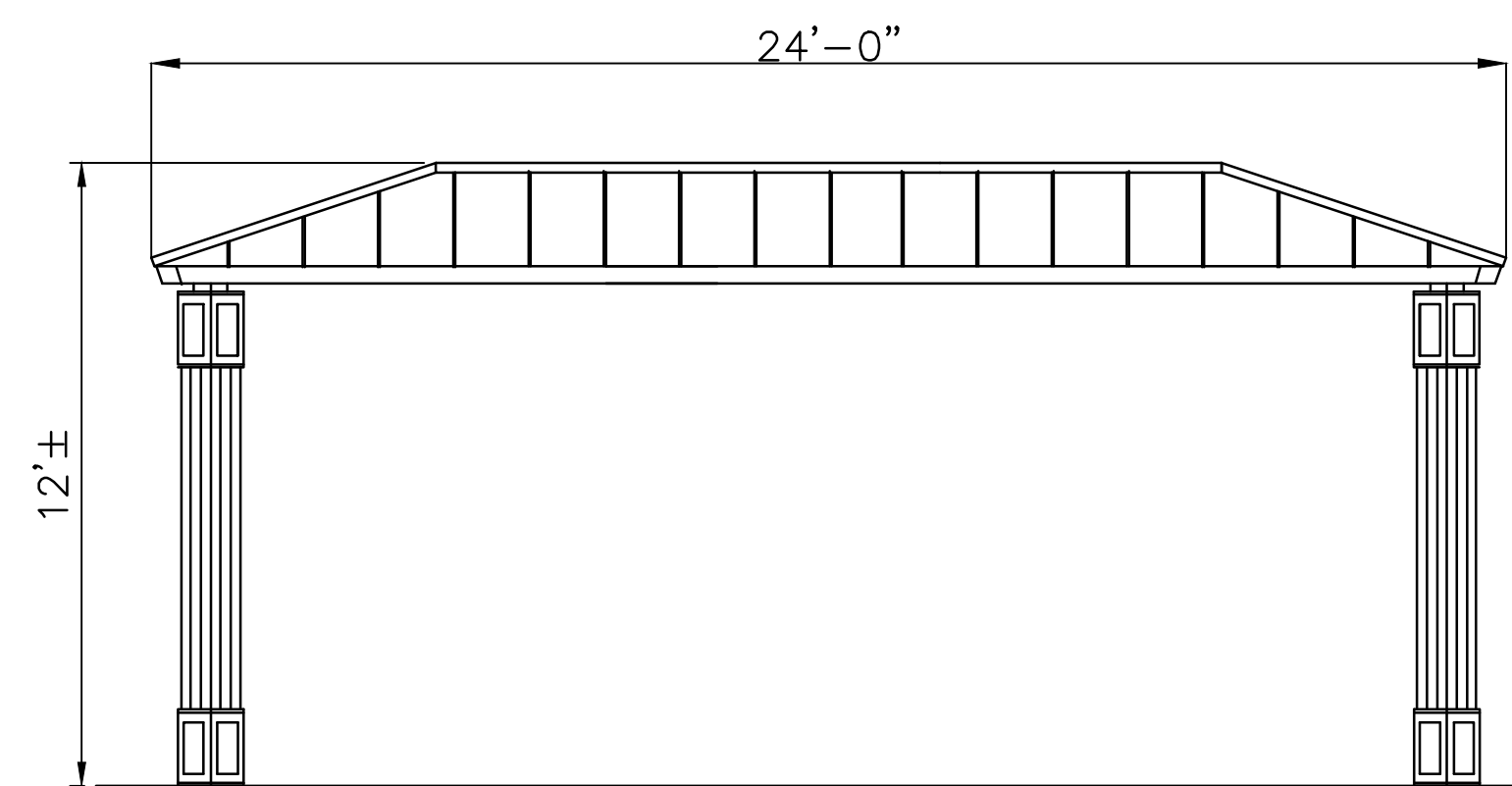
DWG No. **L.22**



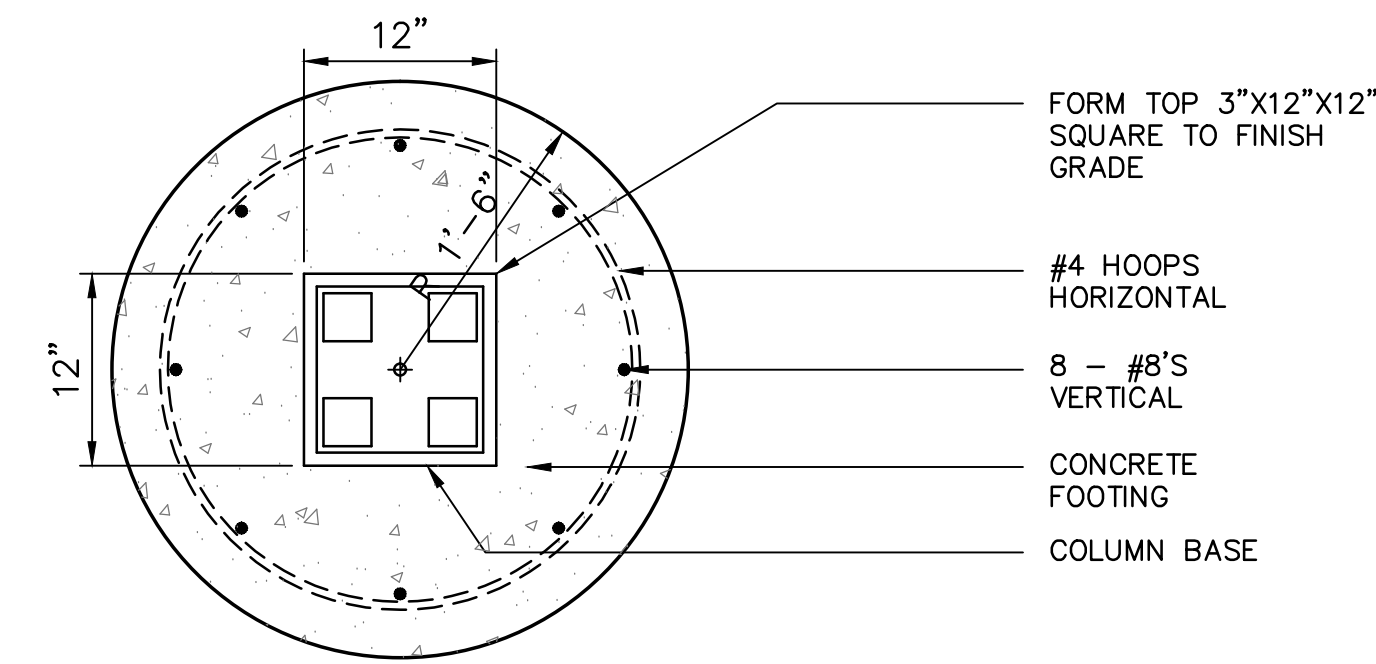
**SECTION**  
**1** FABRIC SHADE SHELTER – FOOTING DETAIL  
 SCALE 1/2"=1'-0"



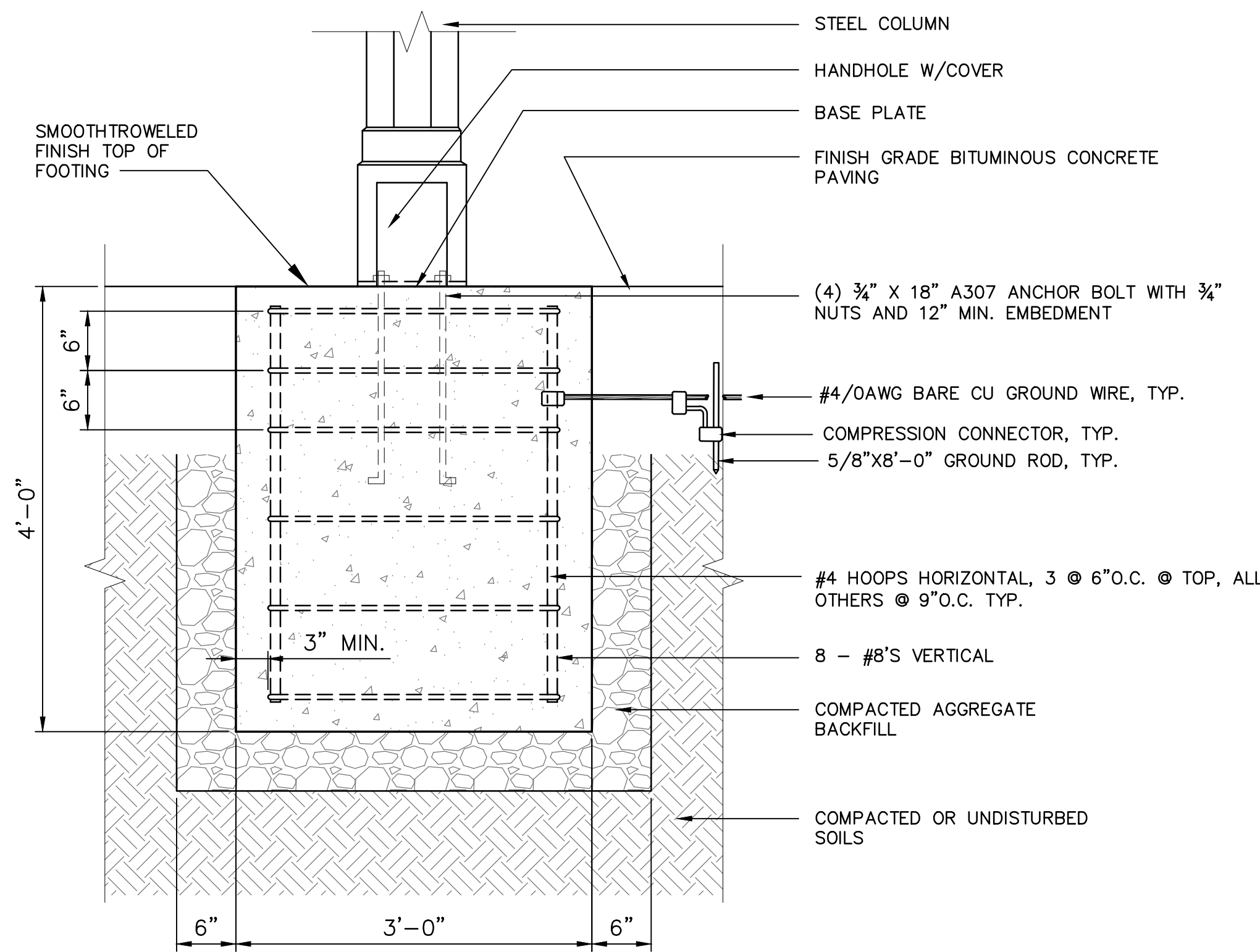
**2** FABRIC SHADE SHELTERS (2 TOTAL)  
 SCALE 1/4"=1'-0"



**4** 10' x 24' DECORATIVE HIP ROOF METAL SHADE STRUCTURE (2 TOTAL)  
 N.T.S.



**PLAN**



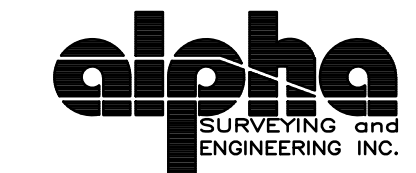
**SECTION**

**3** METAL SHADE STRUCTURE – FOOTING DETAIL  
 N.T.S.

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Prepared For:  
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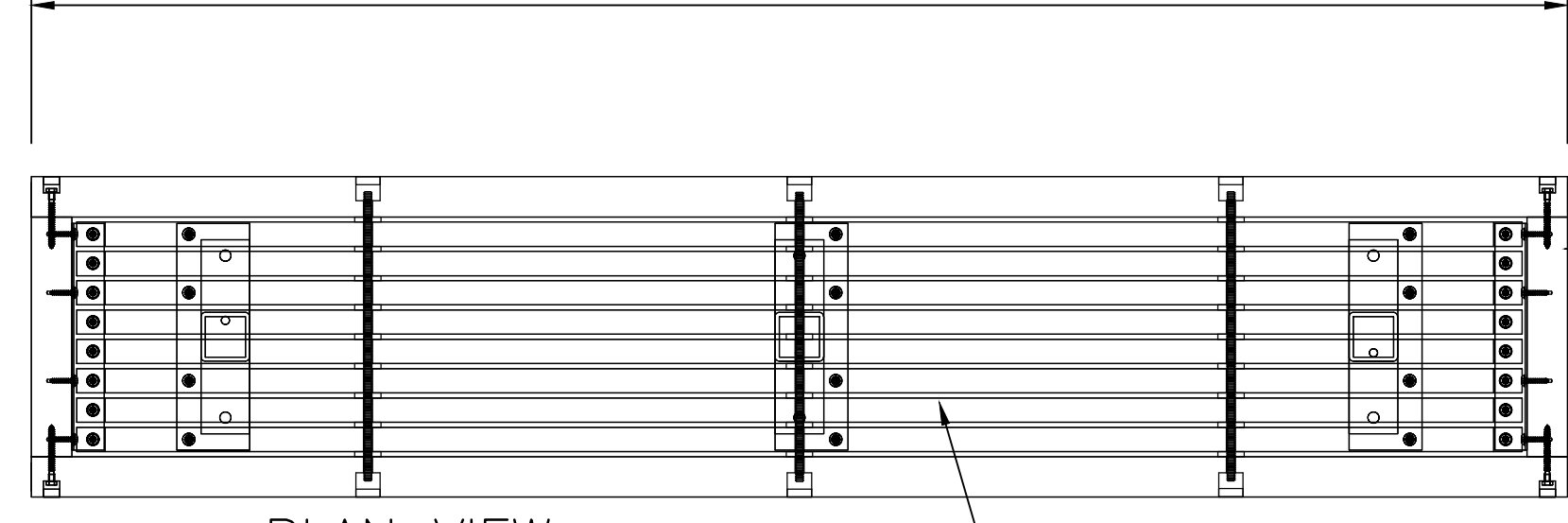
TITLE:  
**SHADE SHELTER  
 DETAILS**

Scale AS NOTED Date MAR 21 2016  
 Drawn By CCC  
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 Approved By VH  
 Project No. 1313.01

DWG No. **L.23**

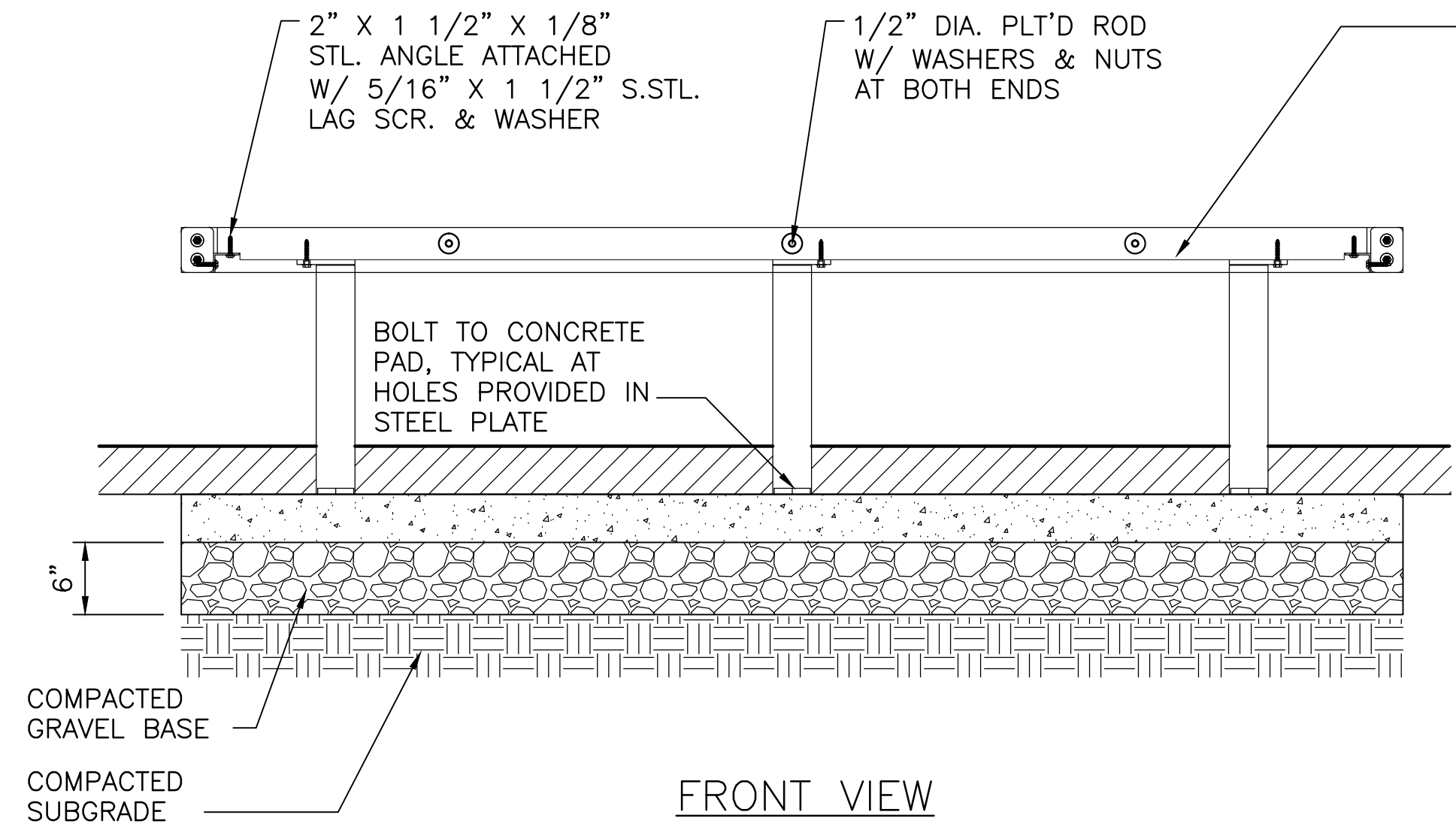
DUMOR MODEL 163 RECYLED PLASTIC BACKLESS BENCH SUPPLIED BY OWNER TO BE ASSEMBLED & INSTALLED BY THE CONTRACTOR

Five (5) - 8' LONG AND Four (4) - 6' LONG BENCHES

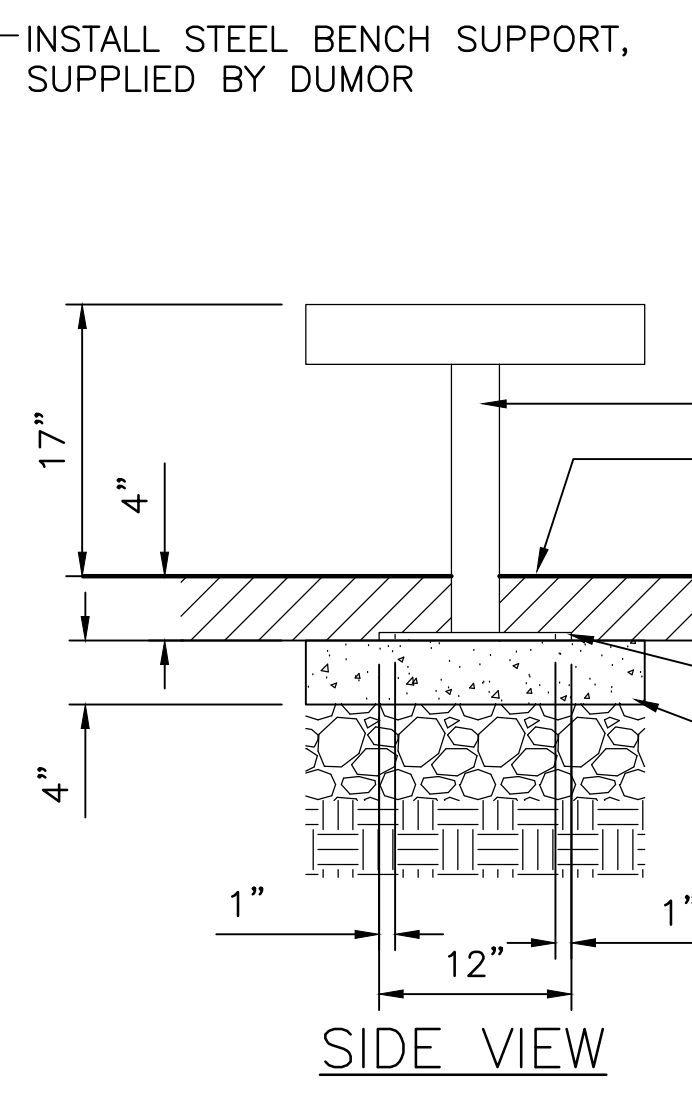


PLAN VIEW

PLAN VIEW



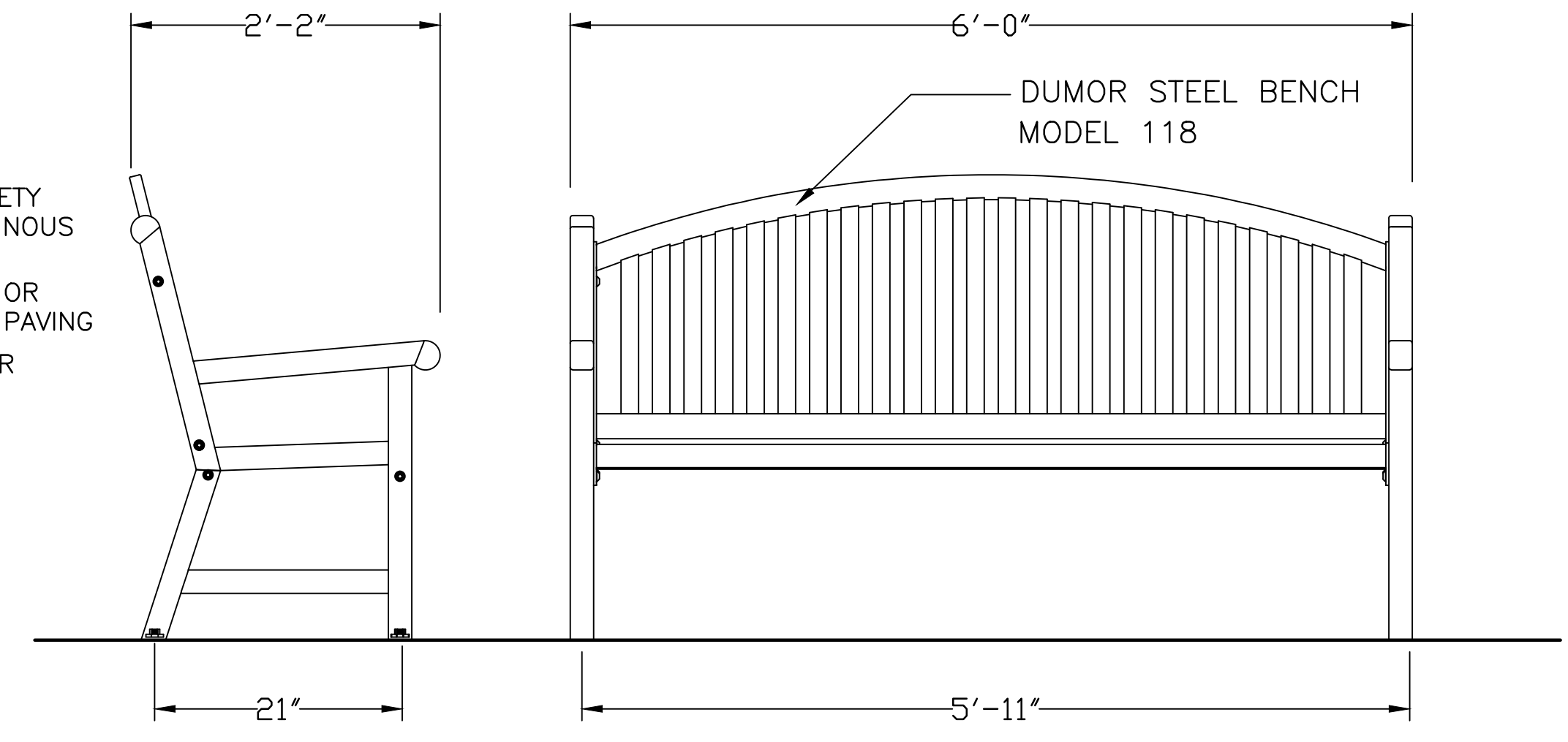
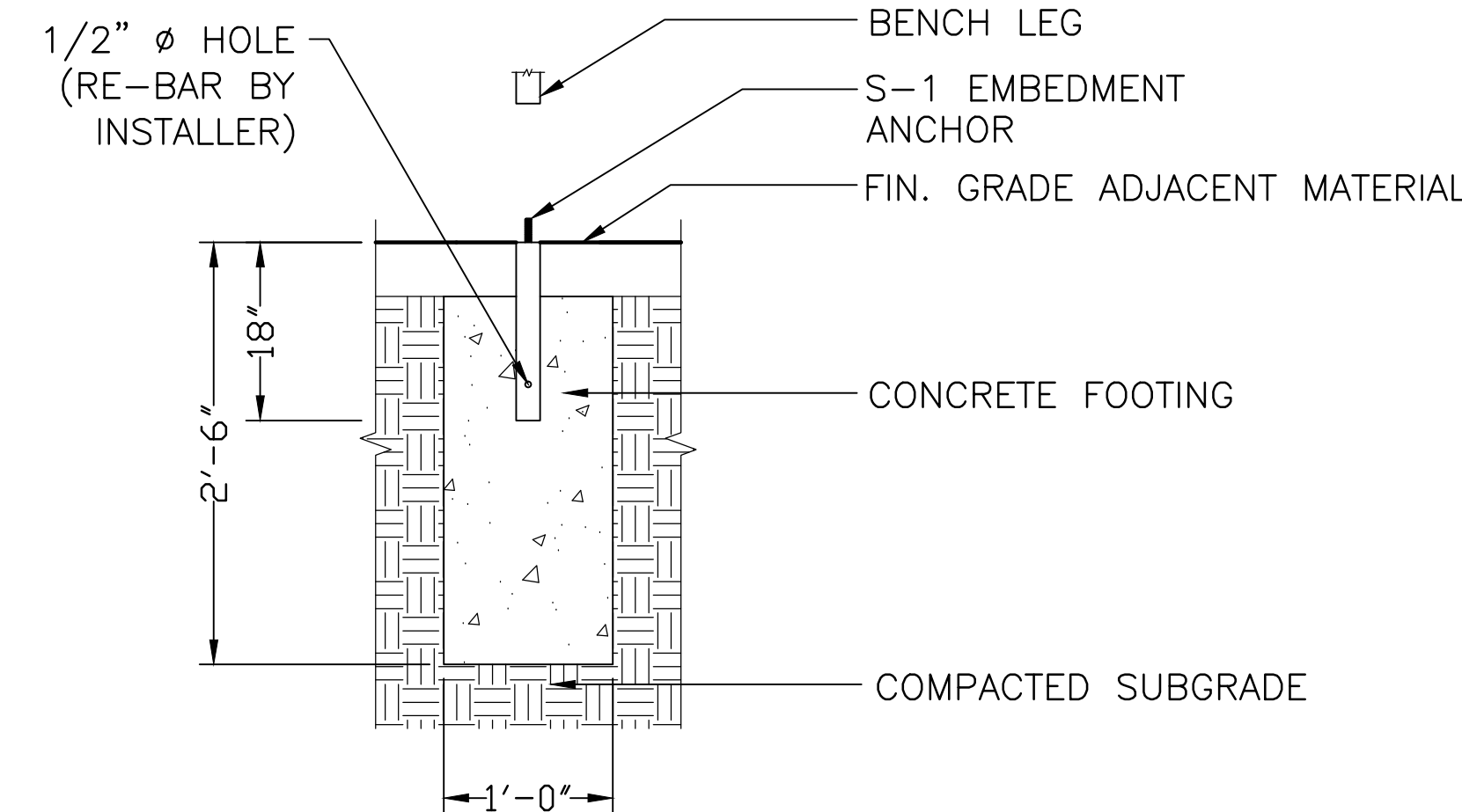
FRONT VIEW



SIDE VIEW

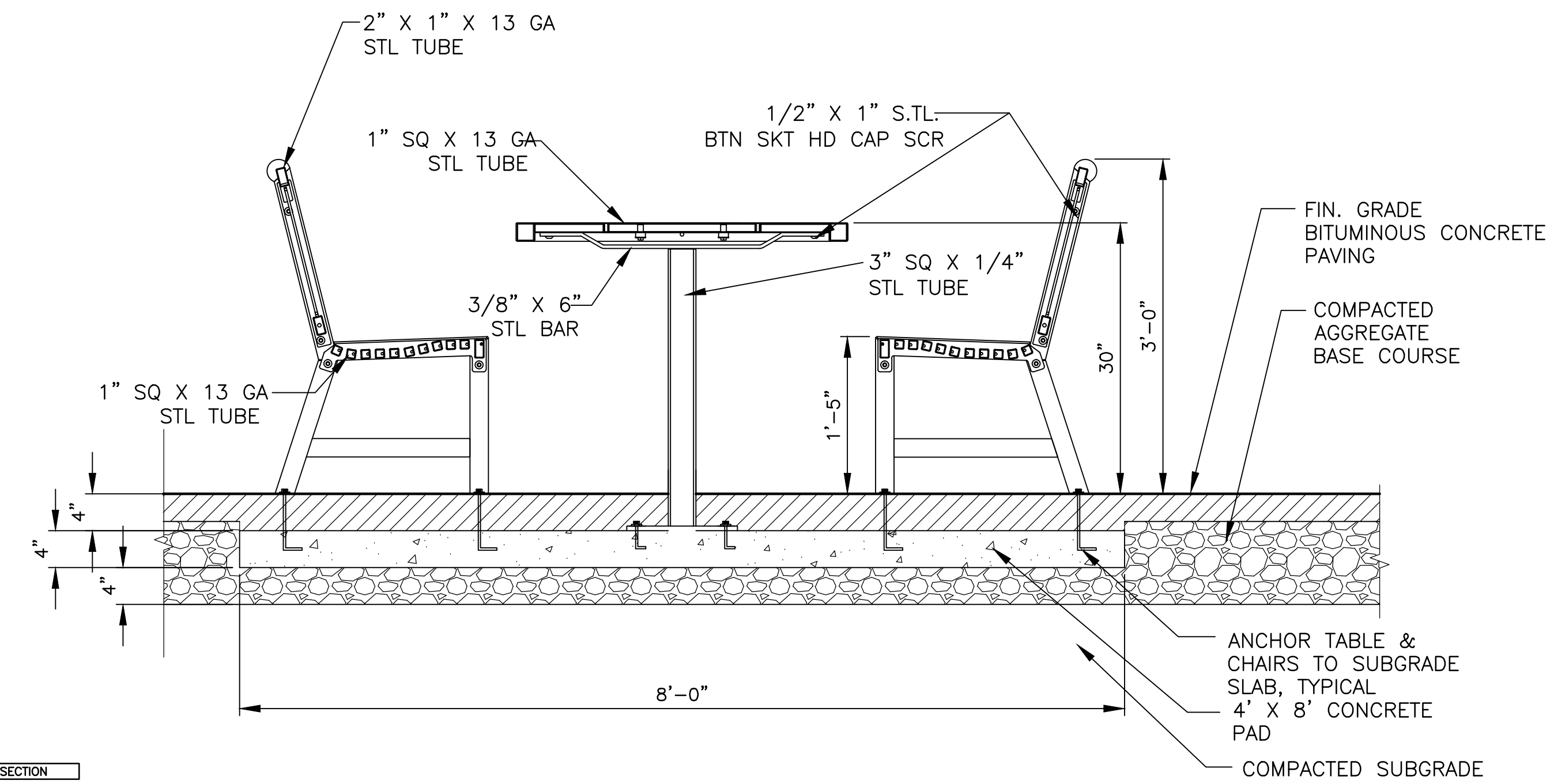
SECTION ELEVATION

1 DUMOR BACKLESS BENCH INSTALLATION DETAIL  
1" = 1'-0"



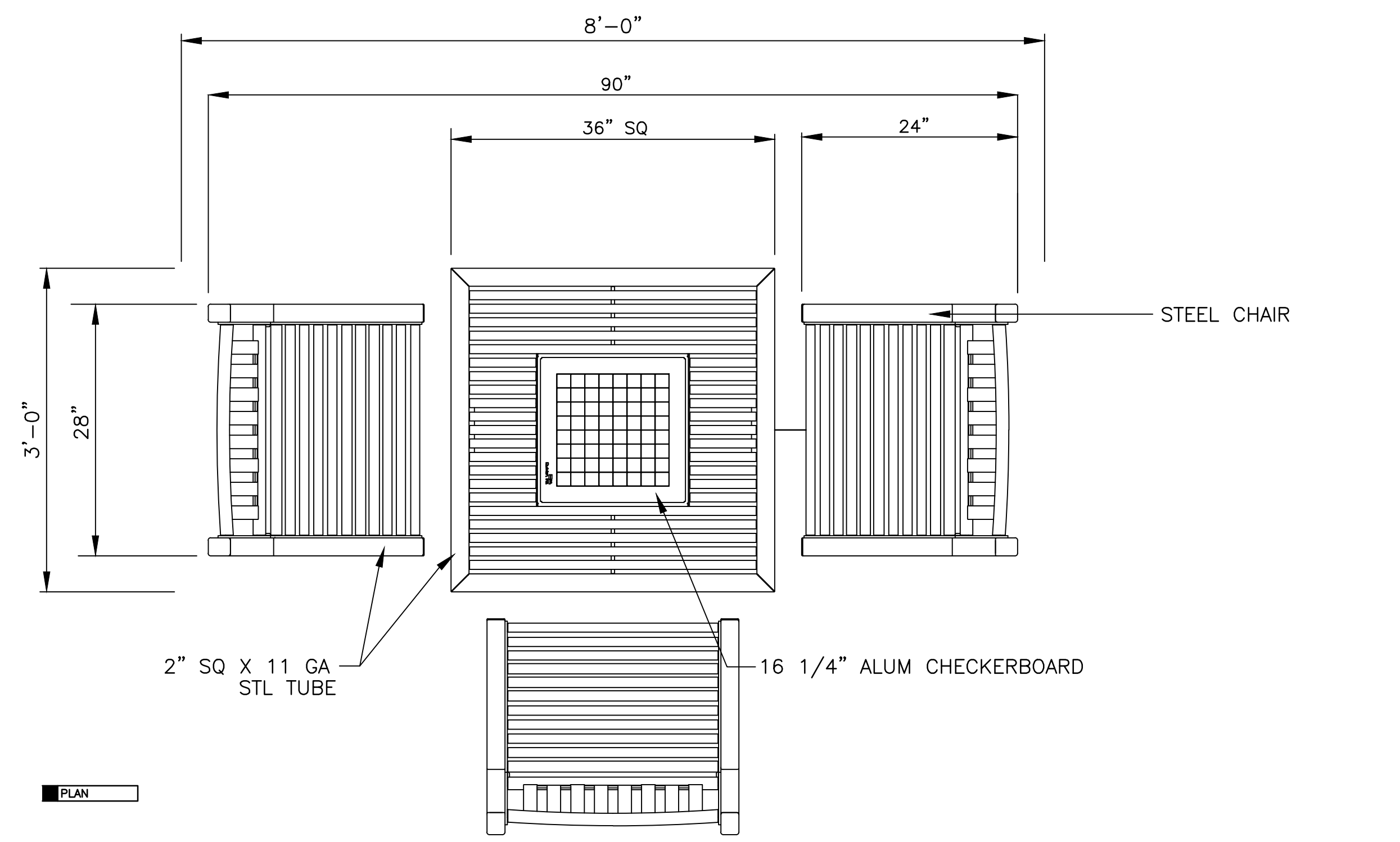
2 BENCH WITH BACK INSTALLATION DETAIL  
N.T.S.

DUMOR GAME TABLES SUPPLIED BY THE OWNER TO BE INSTALLED BY THE CONTRACTOR  
2 TABLES 5 CHAIRS TOTAL



SECTION

3 GAME TABLES  
1" = 1'-0"



PLAN

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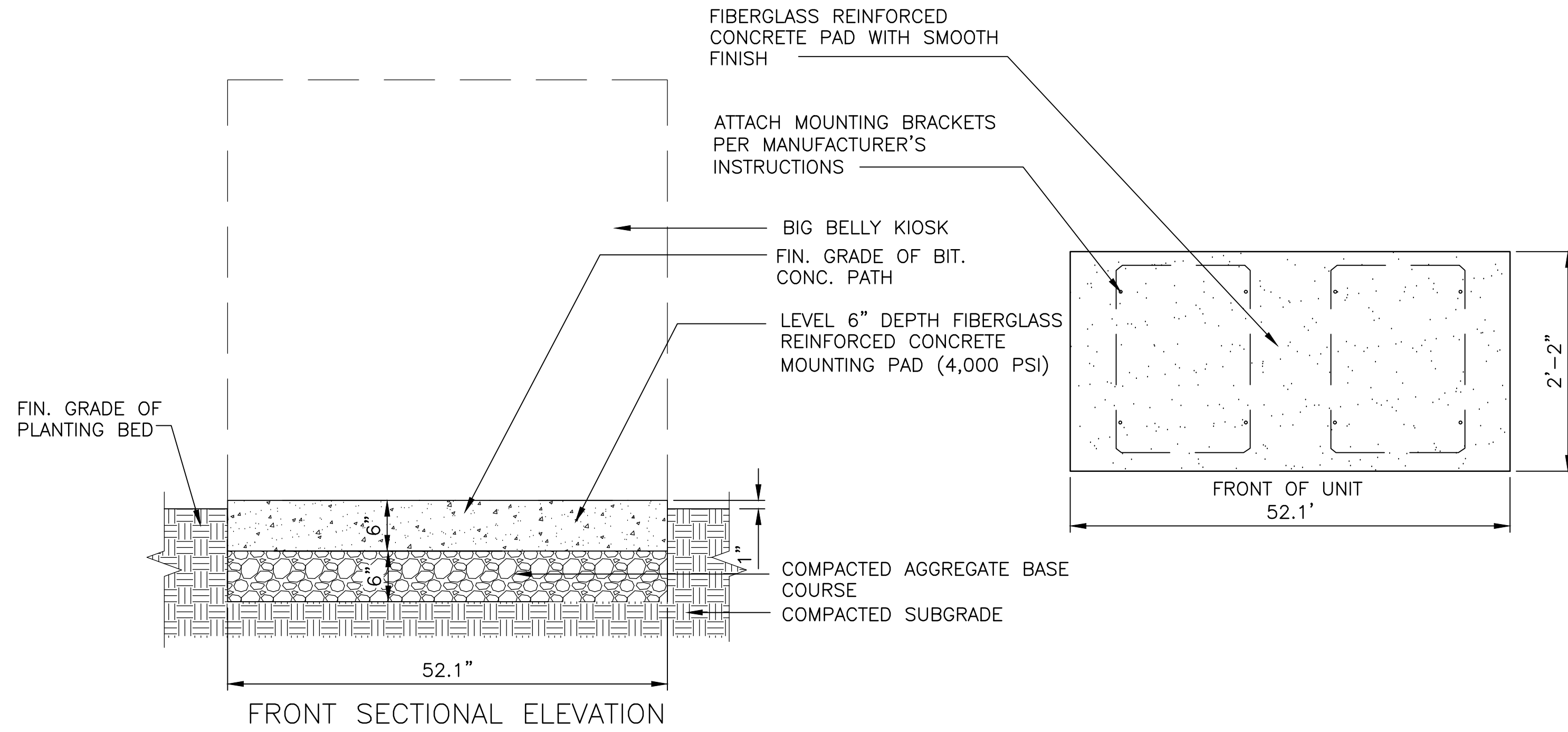
Prepared For:  
**CITY OF WALTHAM  
DEPARTMENT OF RECREATION  
50 MOODY STREET  
WALTHAM, MA 02453**

TITLE:  
**SITE FURNITURE  
DETAILS I**

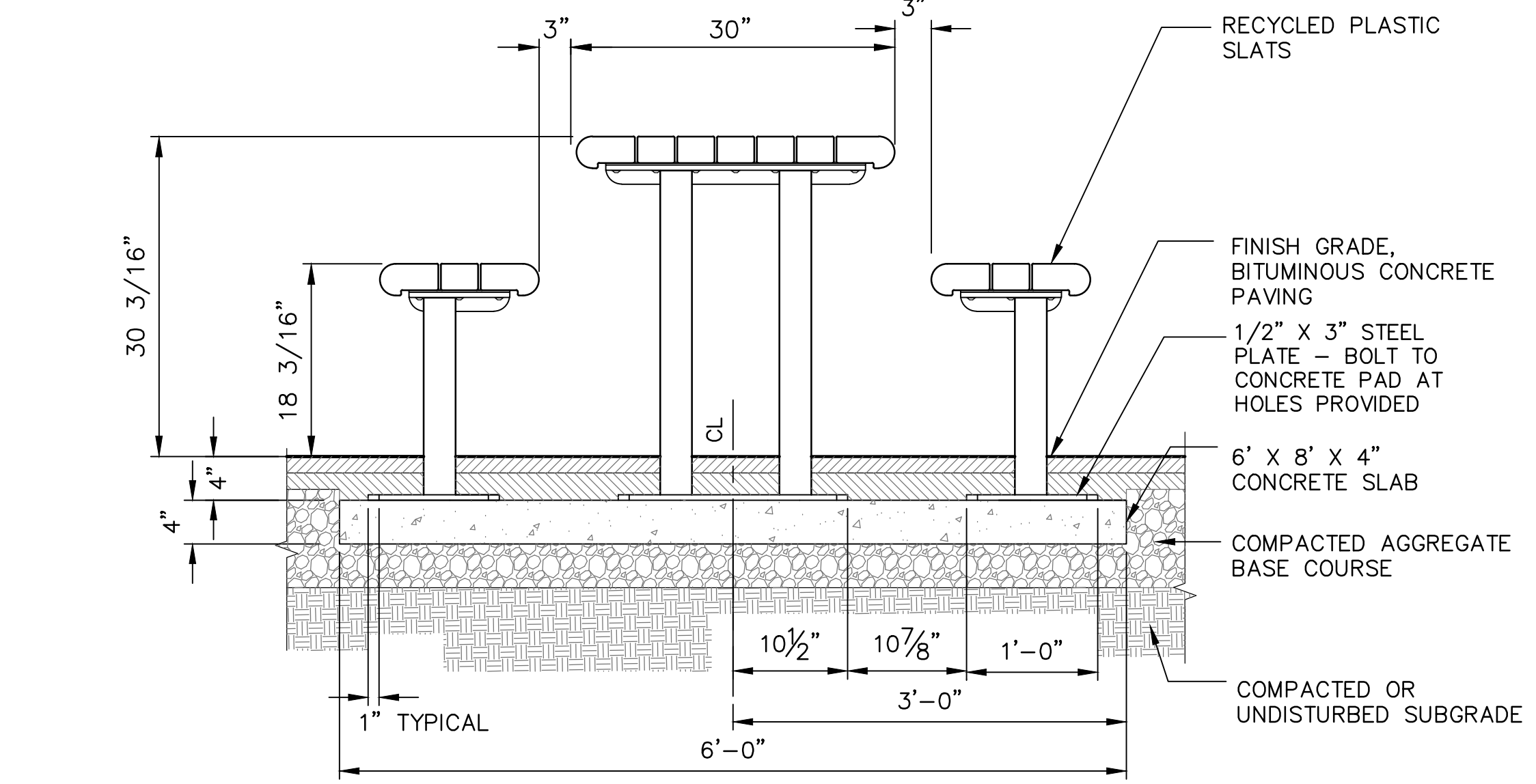
Scale EQUIPMENT DETAIL MAR 21 2016  
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Project No. 1313.01

DWG No. **L.24**

REINSTALL 2 EXISTING BIG BELLY KIOSKS -- PROVIDE AND INSTALL 1 ADDITIONAL KIOSK



DUMOR SERIES 100 RECYCLED PLASTIC AND STEEL FRAME PICNIC TABLES, SUPPLIED BY THE OWNER TO BE ASSEMBLED AND INSTALLED BY THE CONTRACTOR.



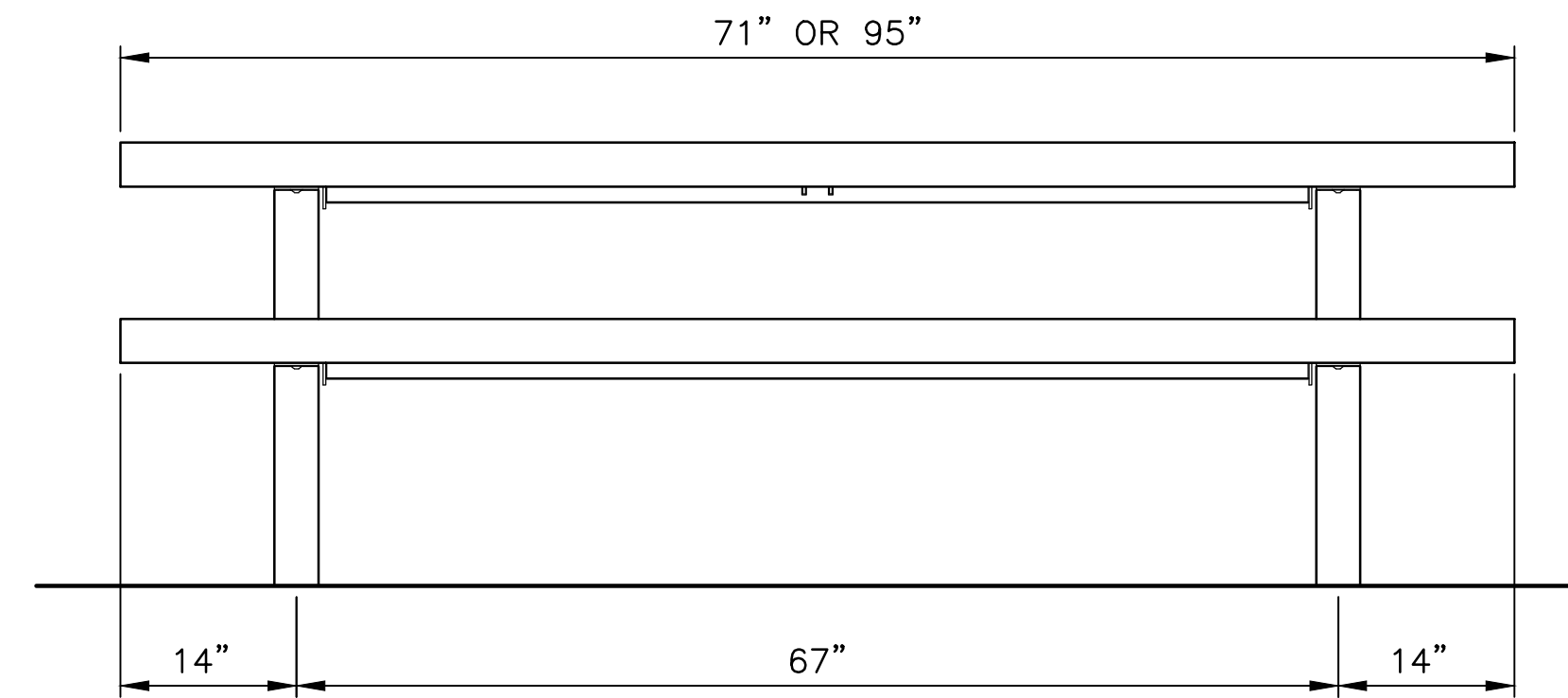
SECTION

PLAN

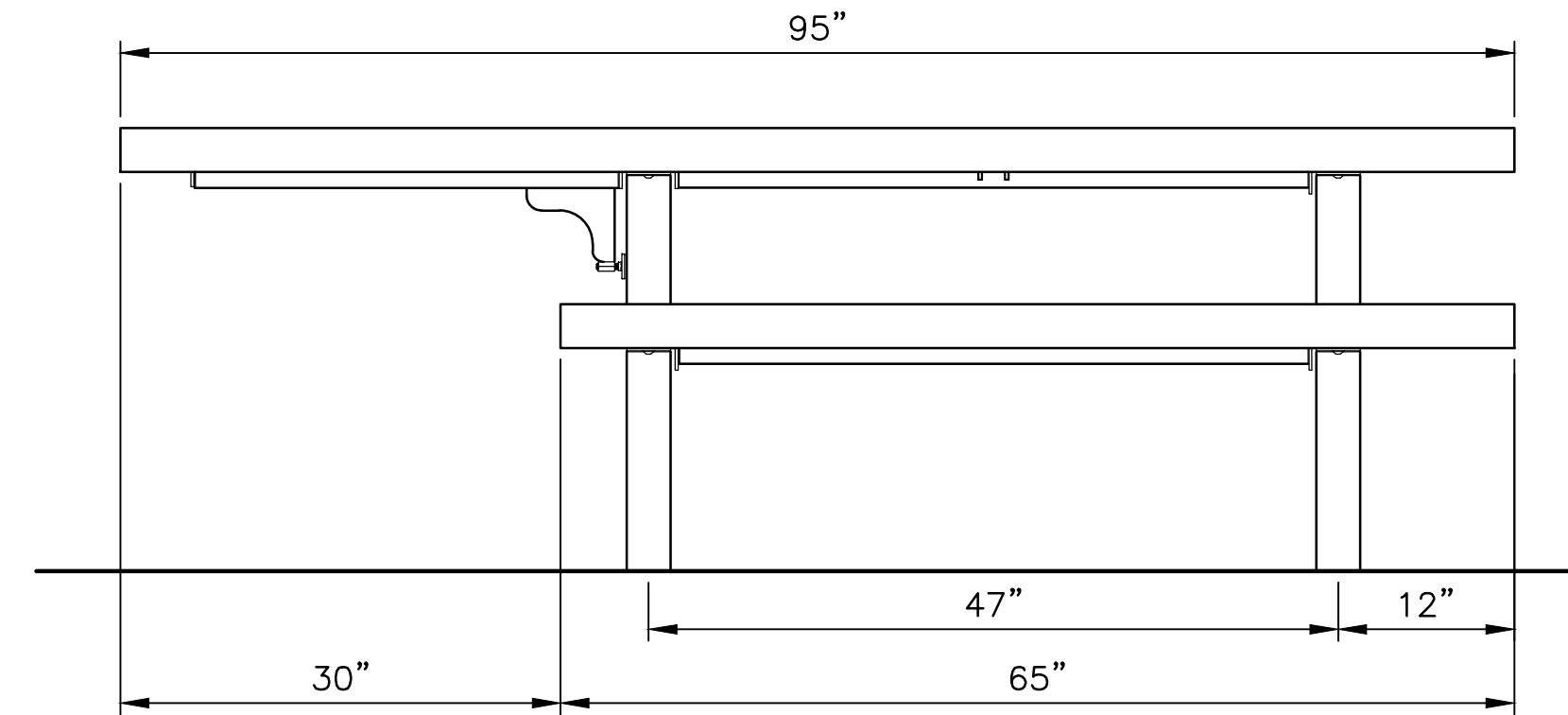
SECTION

ELEVATION

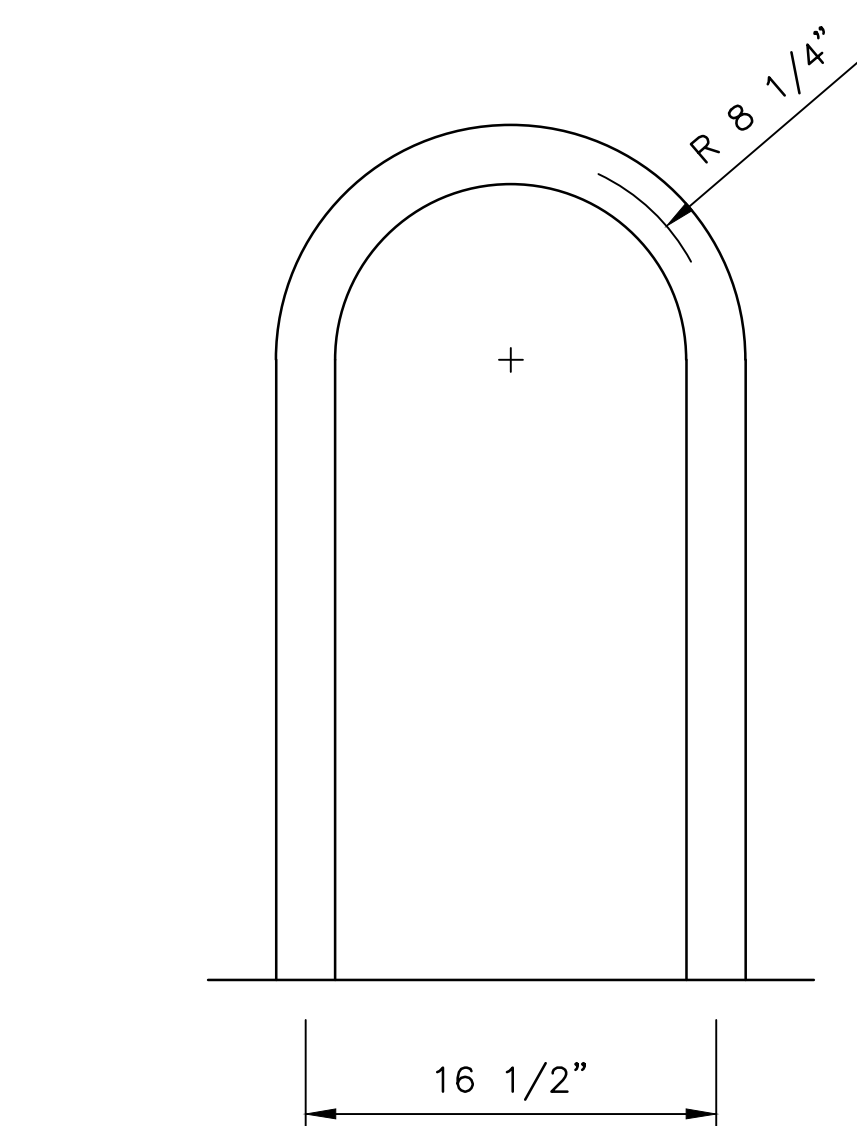
**1** BIG BELLY KIOSK (CONSTRUCT 3 CONCRETE PADS/INSTALL 2 KIOSKS)  
1" = 1'-0"



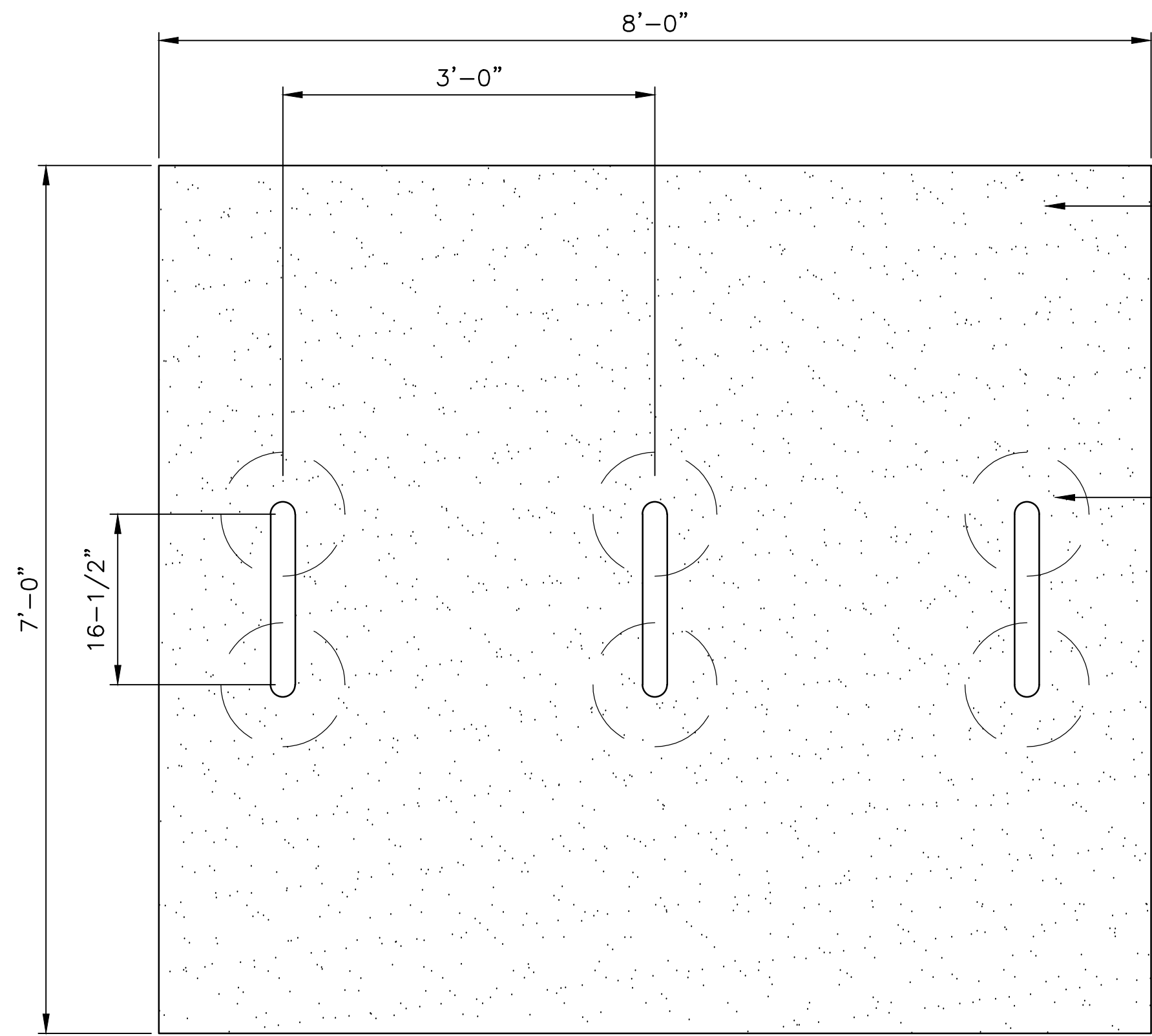
STANDARD 8'-0" PICNIC TABLE: 1 TOTAL  
STANDARD 6'-0" PICNIC TABLE: 1 TOTAL



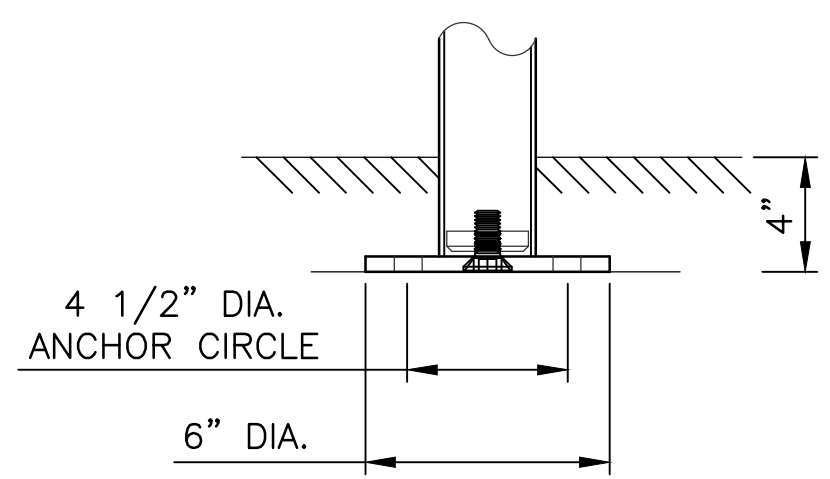
ADA COMPLIANT 8'-0" PICNIC TABLE: 2 TOTAL



ELEVATION



PLAN



SECTION SUBFLOOR ATTACHMENT  
NOT TO SCALE

**2** BIKE LOOPS  
1" = 1'-0"

**3** PICNIC TABLE INSTALLATION DETAIL -- SUBFLOOR MOUNT (4 TOTAL)  
1/2" = 1'-0"

**Carolyn Cooney & Associates**

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ENGINEERING INC.  
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No.	Description	Date

REVISIONS



Project:

**CITY OF WALTHAM  
IMPROVEMENTS TO  
PETER GILMORE PLAYGROUND  
90 HALL STREET  
WALTHAM, MA 02453**

Prepared For:

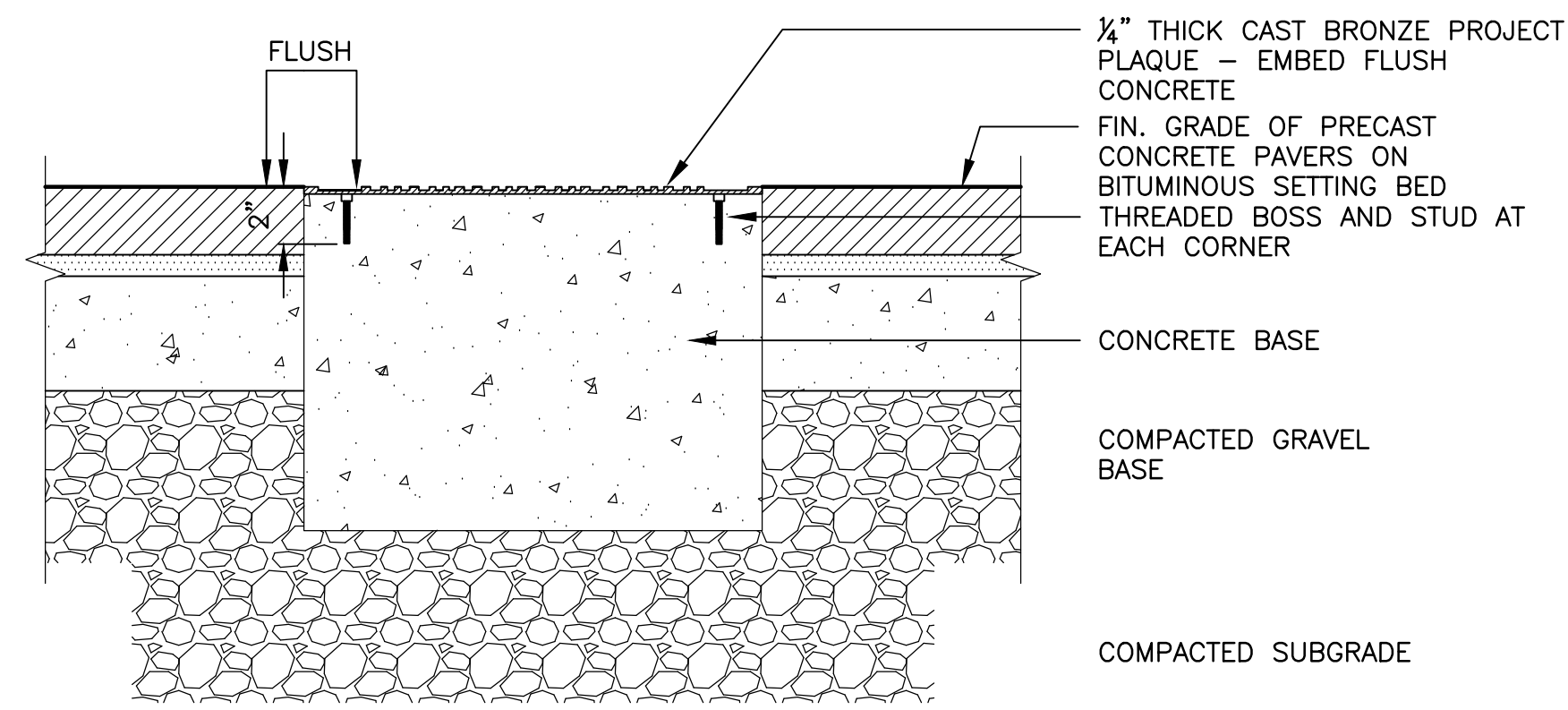
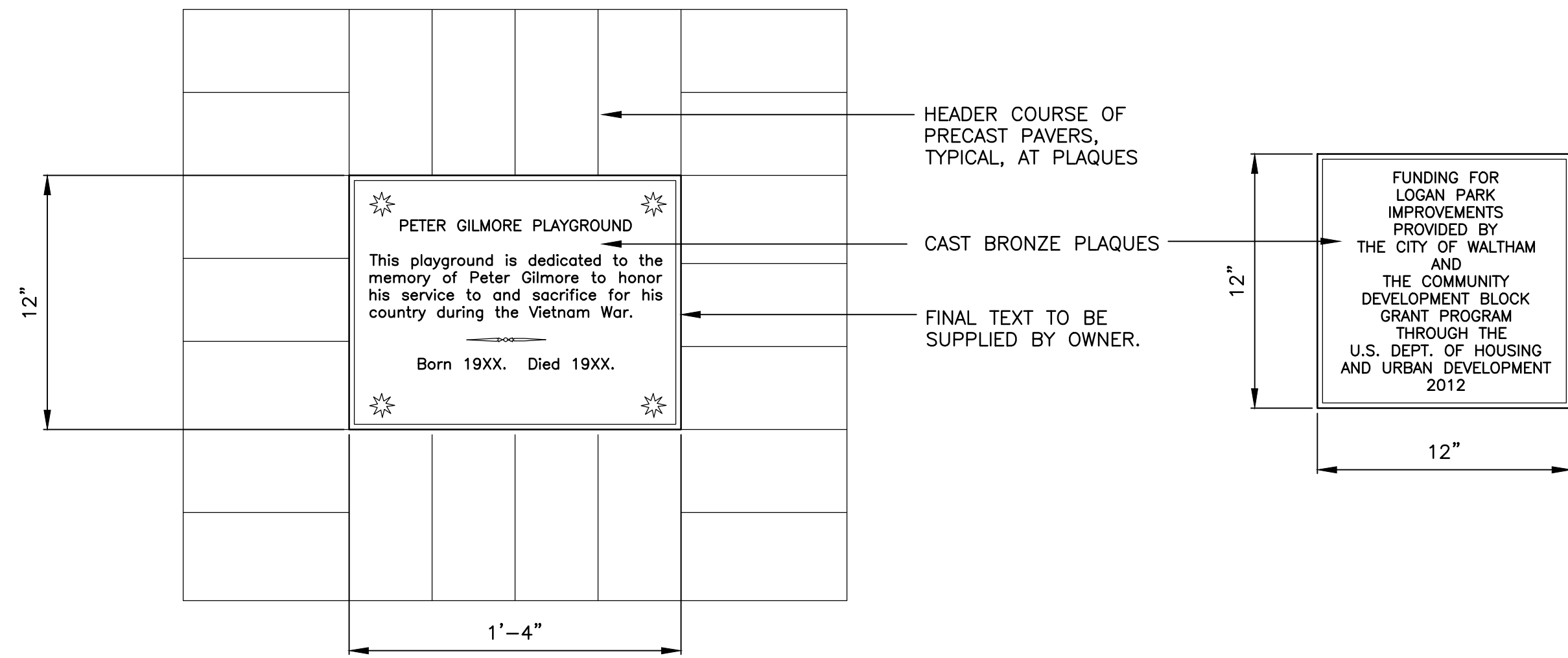
**CITY OF WALTHAM  
DEPARTMENT OF RECREATION  
510 MOODY STREET  
WALTHAM, MA 02453**

TITLE:

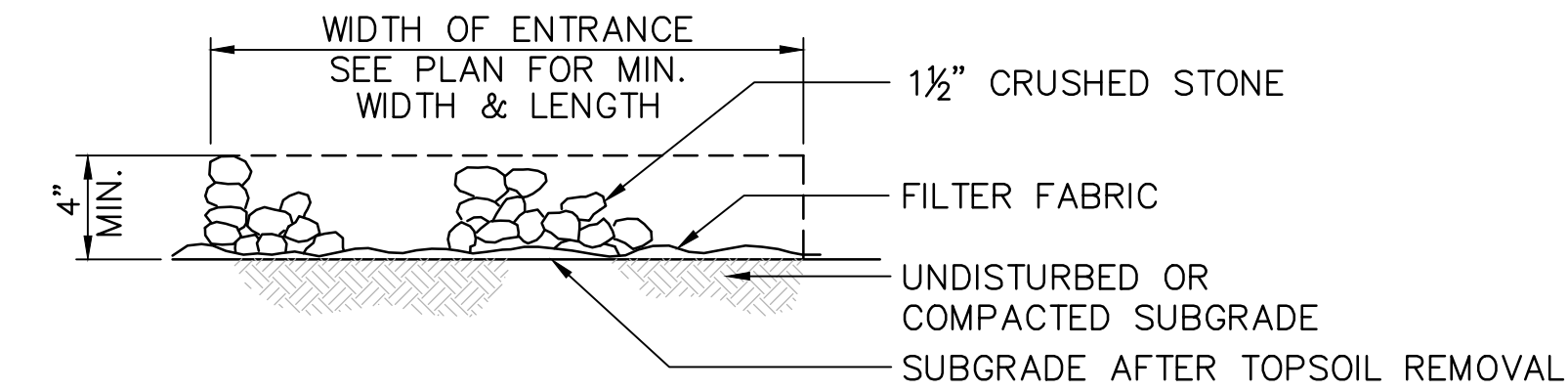
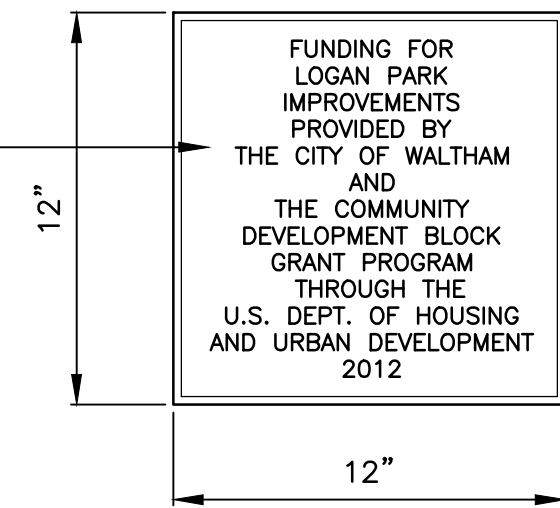
**SITE FURNITURE  
DETAILS II**

Scale AS NOTED Date MAR 21 2016  
Drawn By CCC  
Checked By DRB  
Approved By VH  
Project No. 1313.01

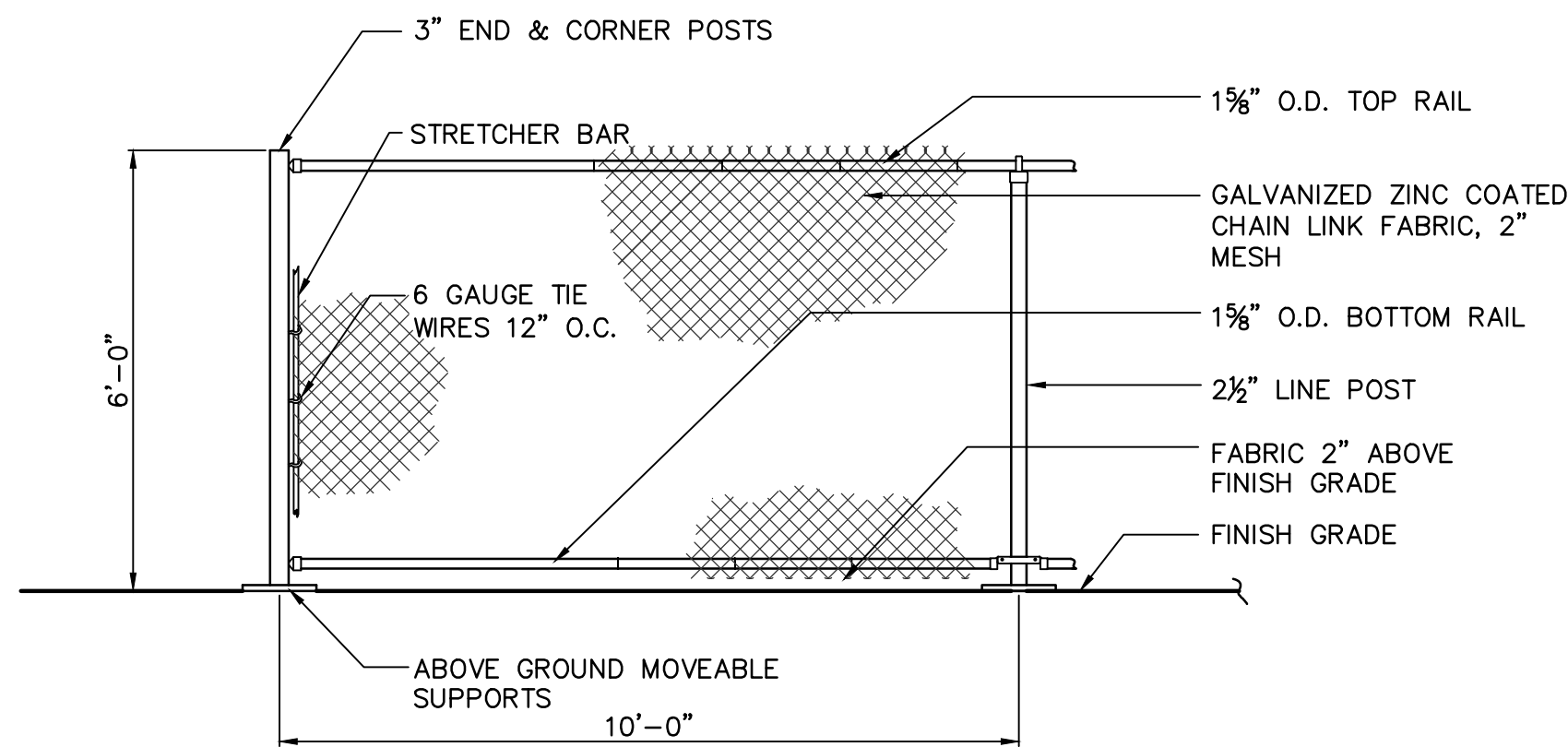
DWG No. **L.25**



**SECTION**  
**1** BRONZE PLAQUES (2 REQUIRED)  
 1" = 1'-0"



**ELEVATION**  
**3** STABILIZED CONSTRUCTION ENTRANCE  
 SCALE 1/2" = 1'-0"



**ELEVATION**  
**2** TEMPORARY CONSTRUCTION FENCE AND TREE PROTECTION FENCE  
 SCALE 1/2" = 1'-0"

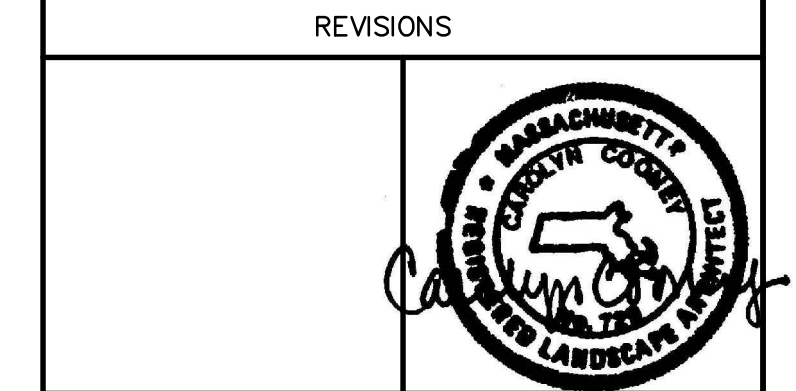
**Carolyn Cooney & Associates**  
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**Site Engineering Consultants, Inc.**  
 55 Grape Shot Road  
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No.	Description	Date



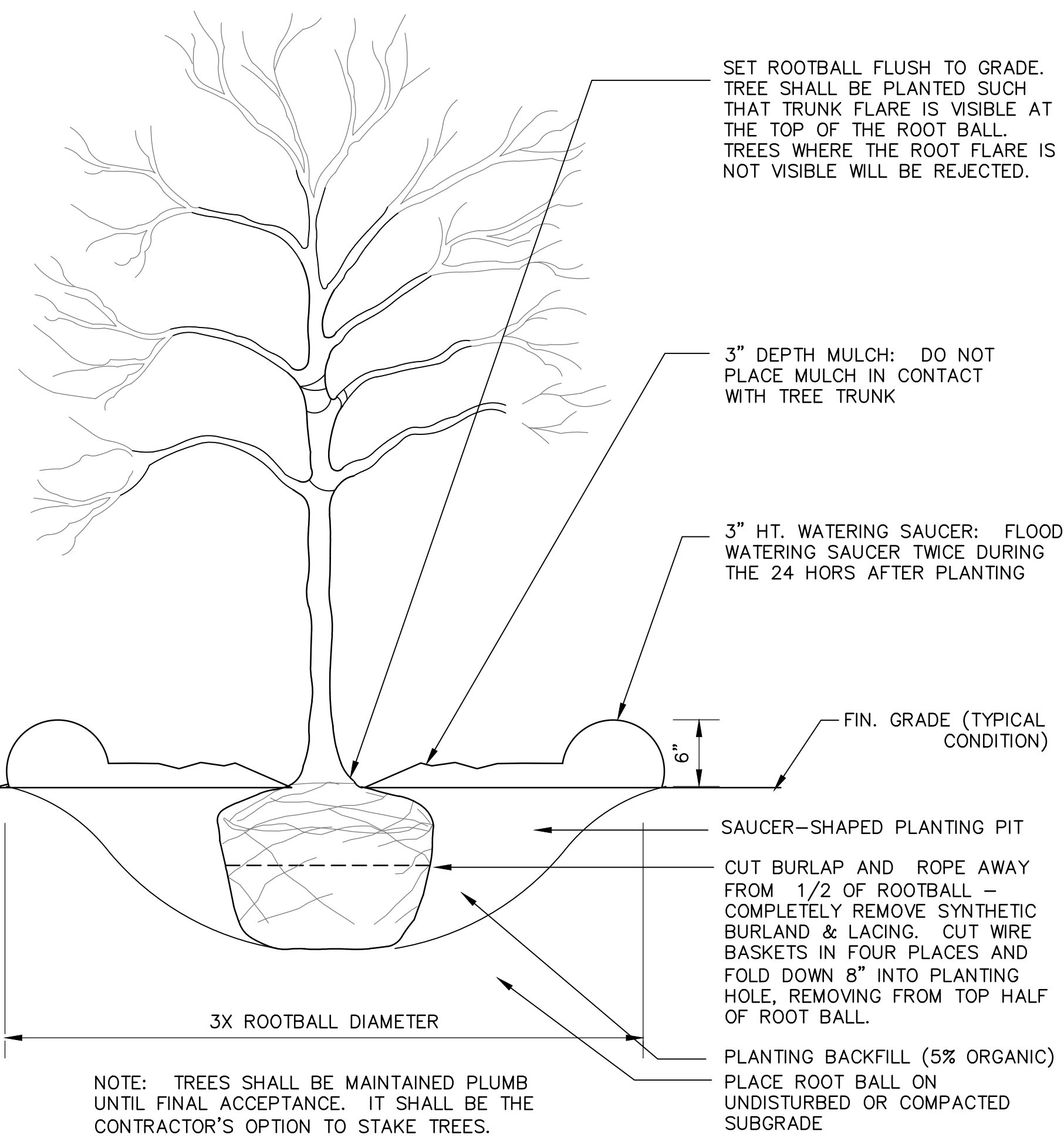
Project:  
**CITY OF WALTHAM  
 IMPROVEMENTS TO  
 PETER GILMORE PLAYGROUND  
 90 HALL STREET  
 WALTHAM, MA 02453**

Prepared For:  
**CITY OF WALTHAM  
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 510 MOODY STREET  
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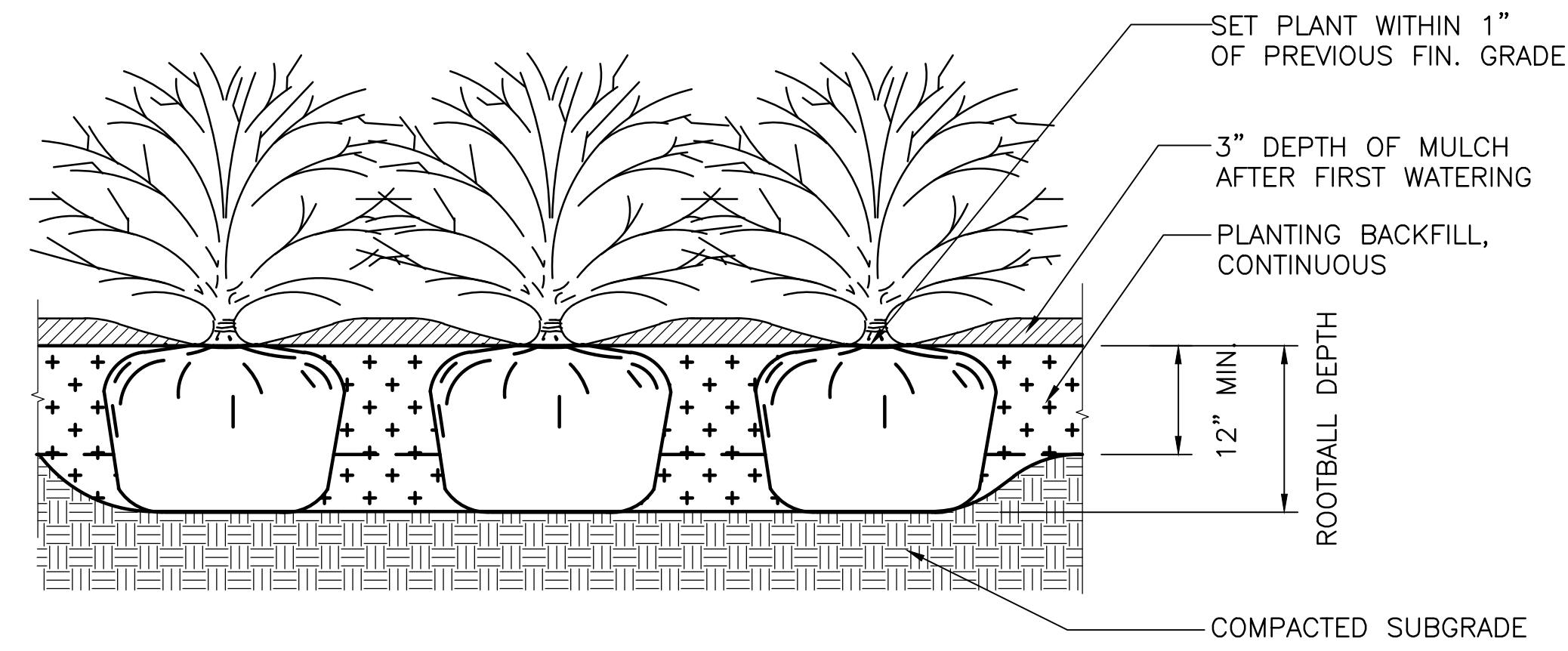
TITLE:  
**PLAQUE  
 DETAILS**

Scale AS NOTED Date MAR 21 2016  
 Drawn By CCC  
 Checked By DRB  
 Approved By VH  
 Project No. 1313.01

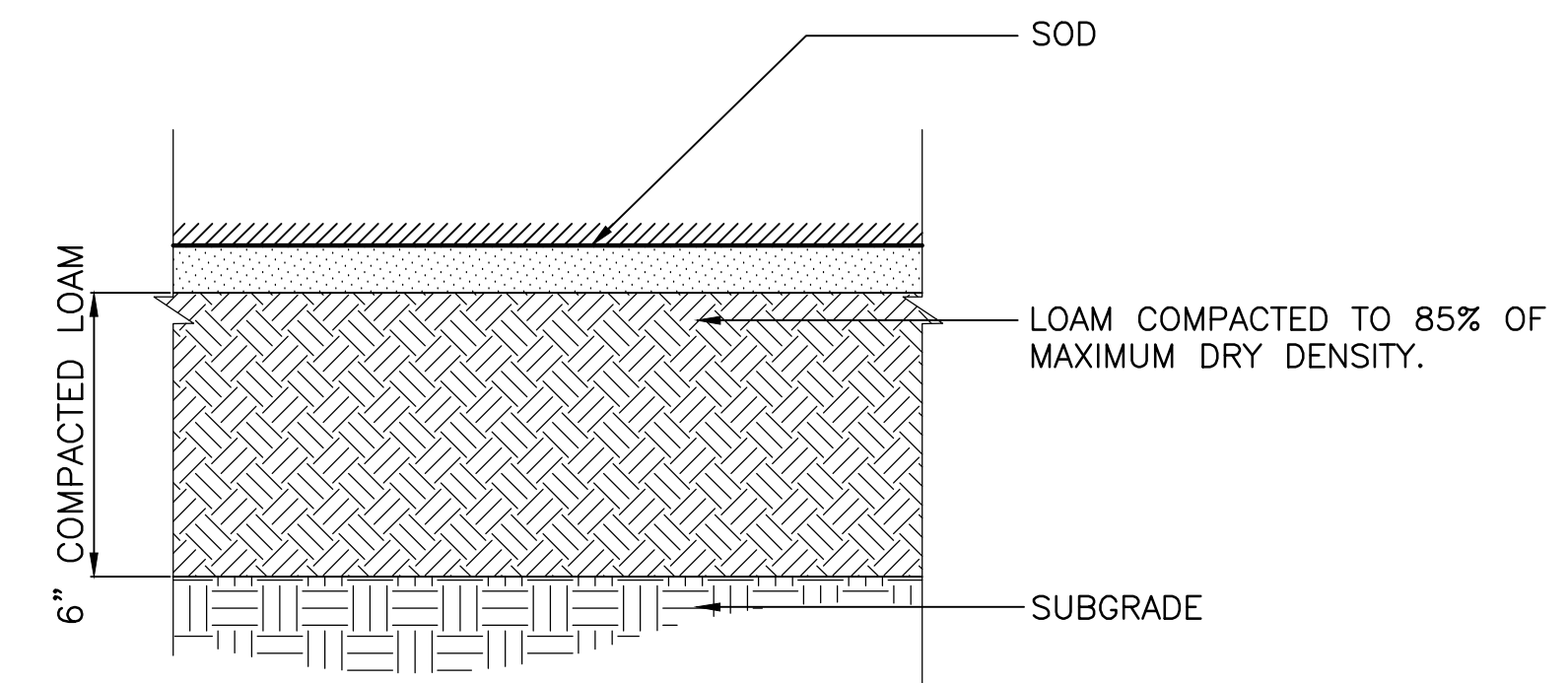
DWG No. **L.26**



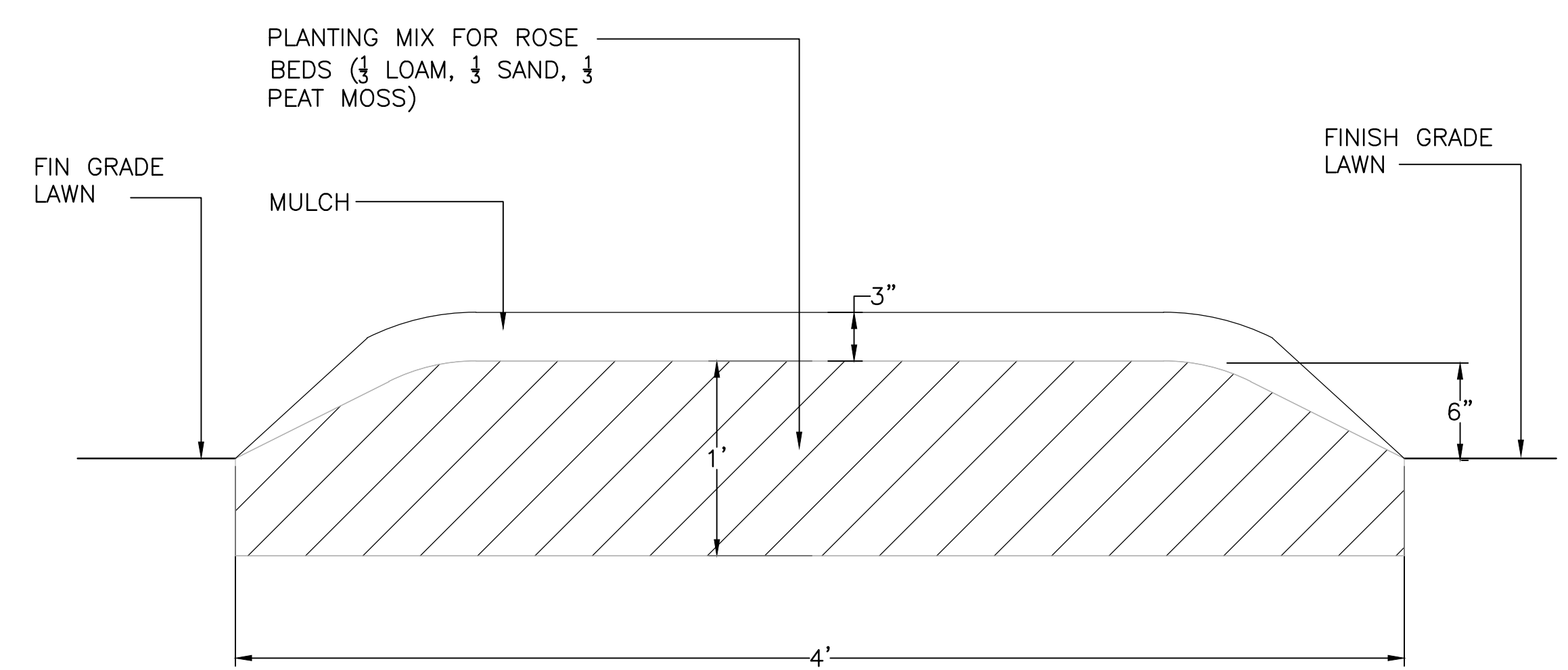
SECTION  
**1** DECIDUOUS TREE PLANTING DETAIL  
 N.T.S.



SECTION  
**2** CONTINUOUS PLANTING BED/SHRUB DETAIL  
 N.T.S.



SECTION  
**3** SOD DETAIL  
 N.T.S.



SECTION  
**4** CONTINUOUS PLANTING BED FOR ROSES  
 SCALE: 1/8" = 1'-0"

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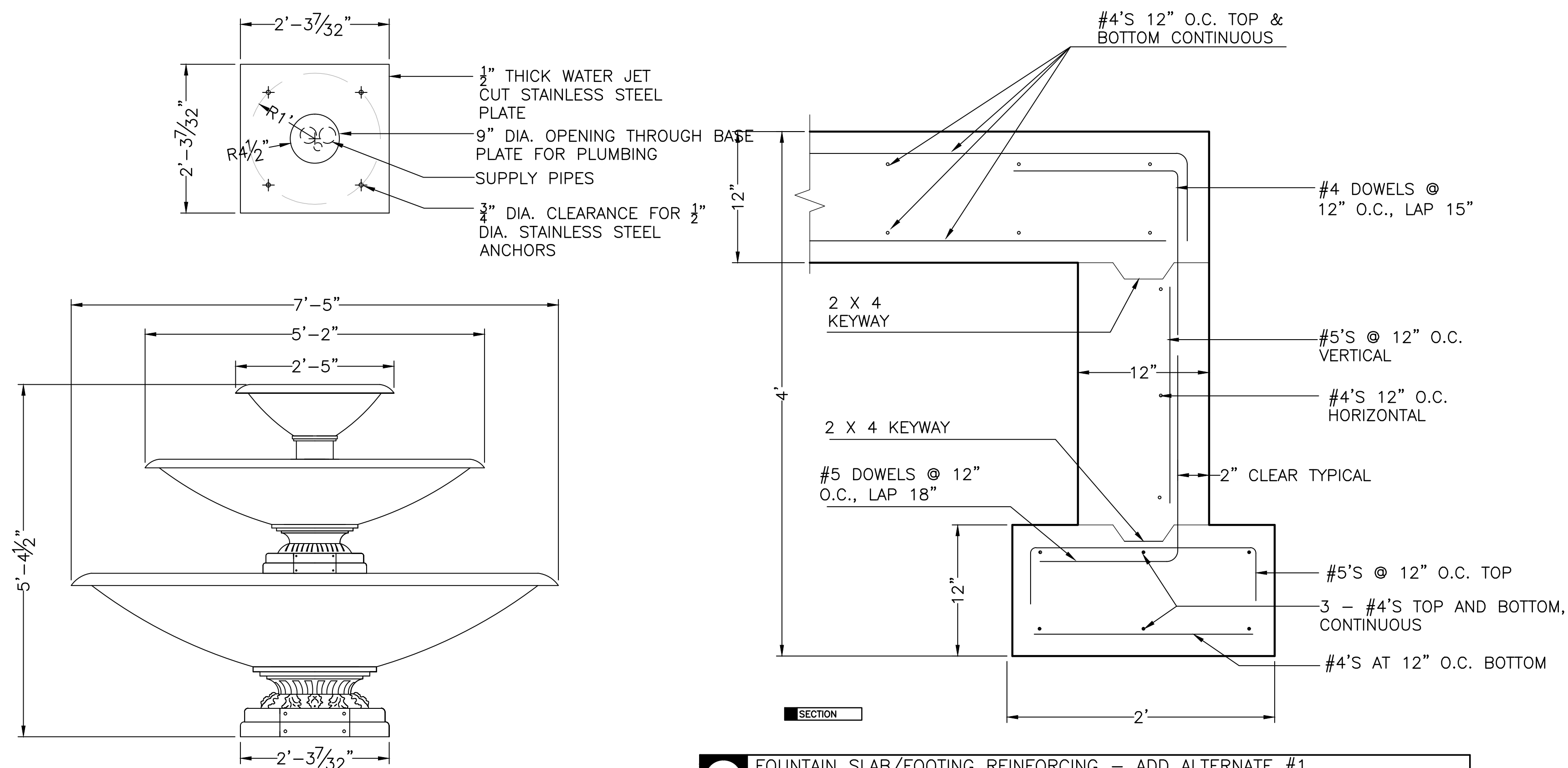
Project:  
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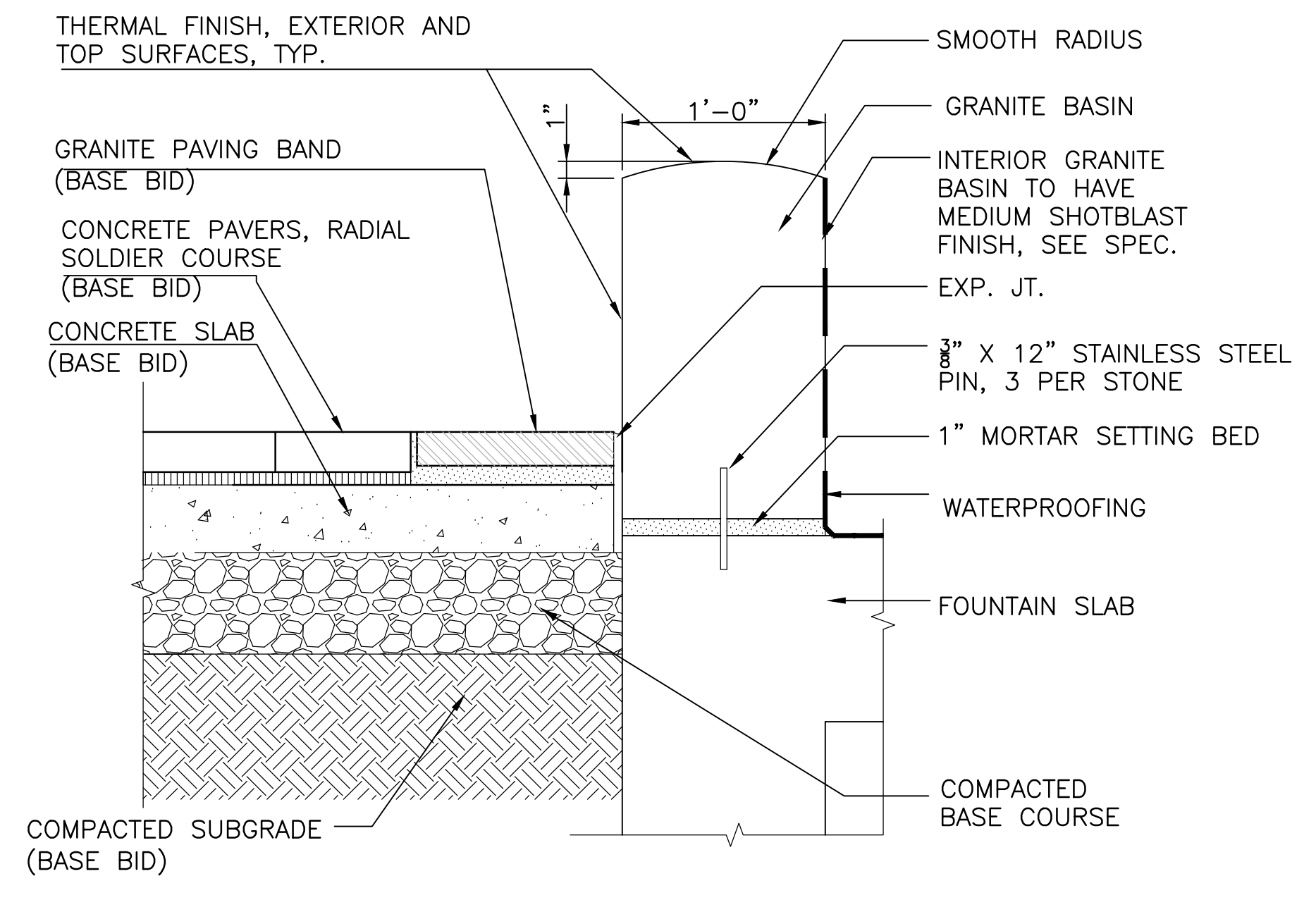
TITLE:  
**PLANTING  
 DETAILS**

Scale AS NOTED Date MAR 21 2016  
 Drawn By CCC  
 Checked By DRB  
 Approved By VH  
 Project No. 1313.01

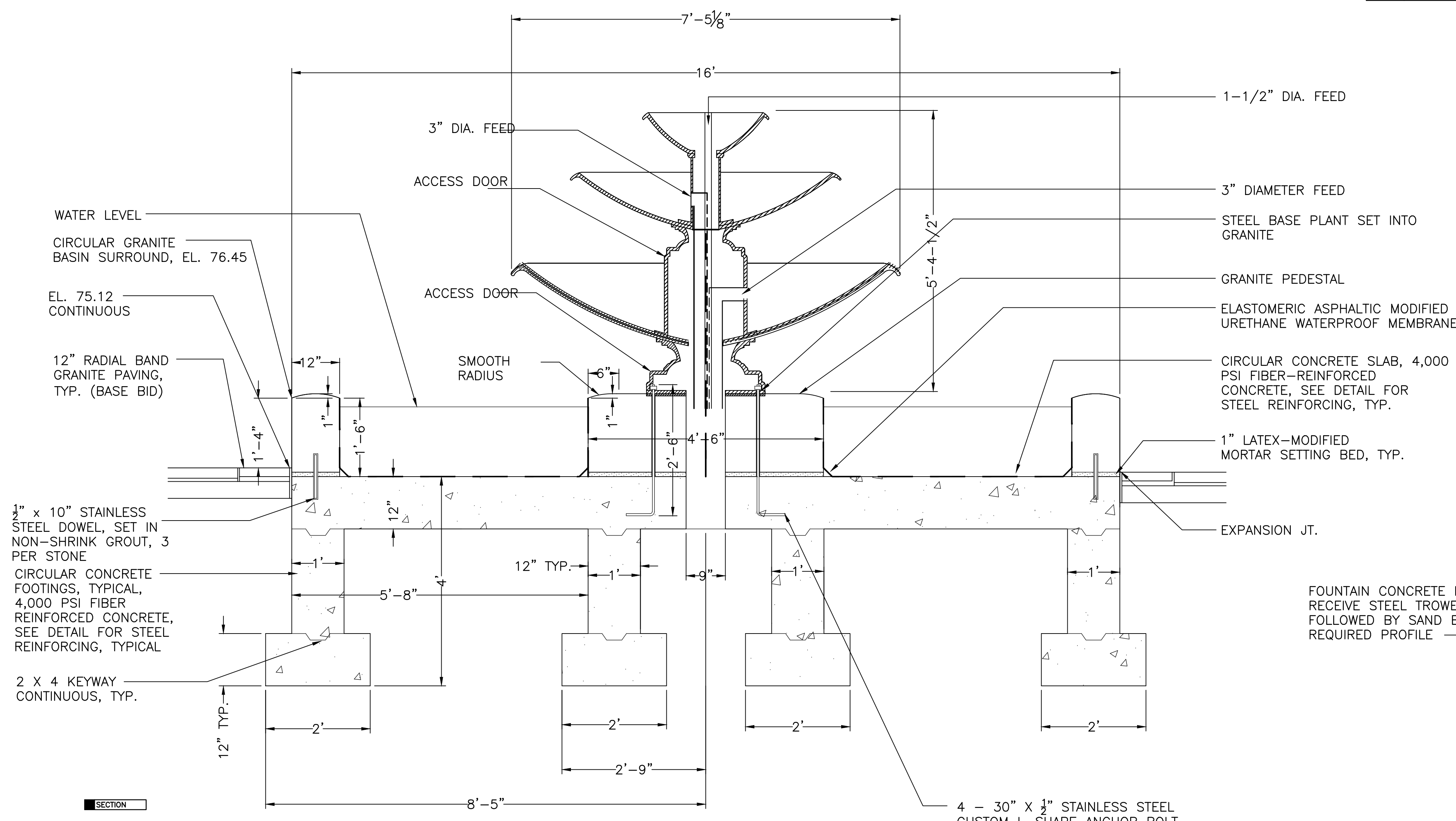
DWG No. **L.27**



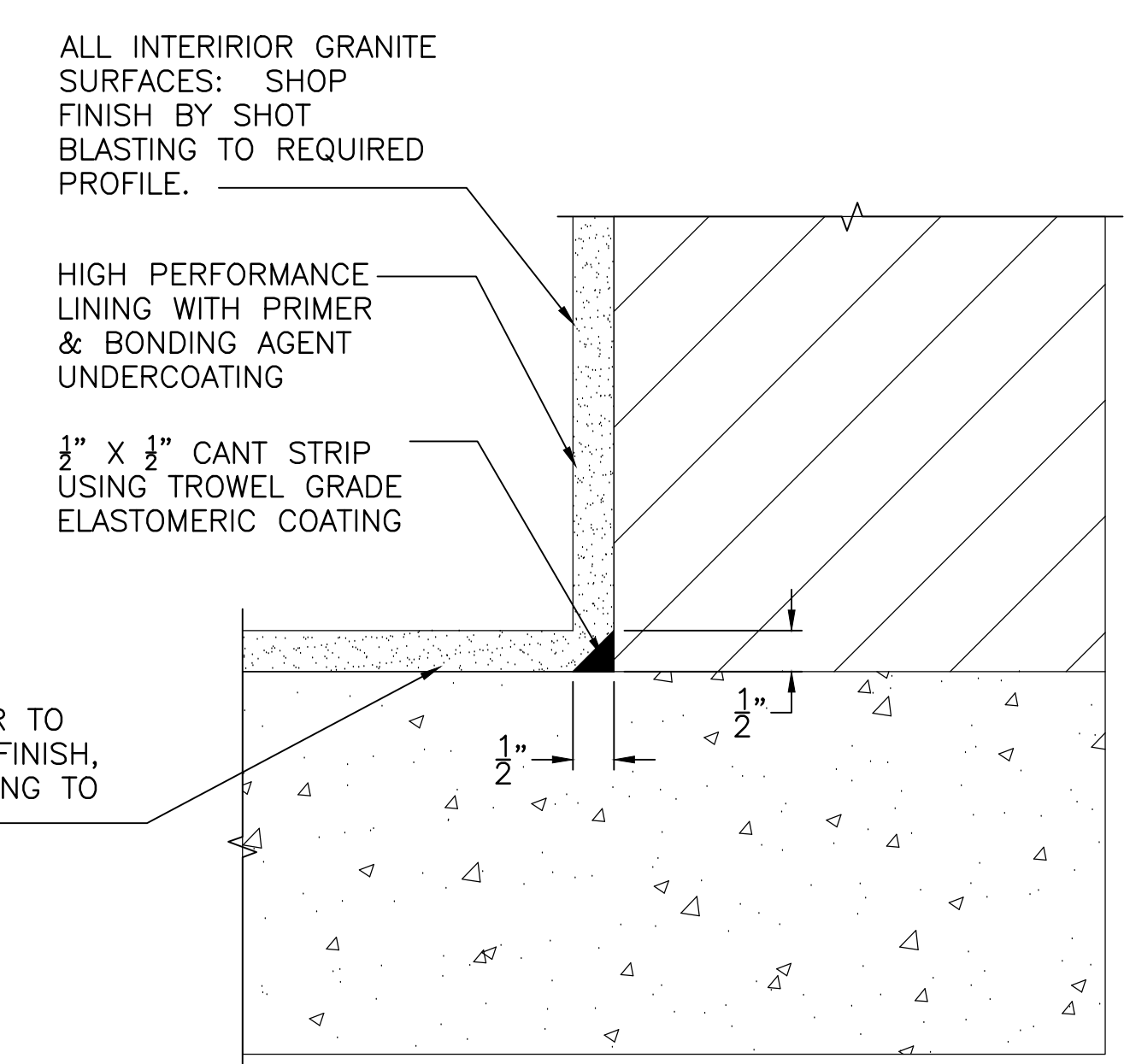
**2** FOUNTAIN SLAB/FOOTING REINFORCING - ADD ALTERNATE #1  
 1-1/2" = 1'-0"



**3** GRANITE FOUNTAIN BASIN - ADD ALTERNATE #1  
 SCALE: 1/2" = 1'-0"



**1** FOUNTAIN DETAILS - ADD ALTERNATE #1  
 3/4" = 1'-0"



**4** WATERPROOFING DETAIL - ADD ALTERNATE #1  
 HALF SCALE

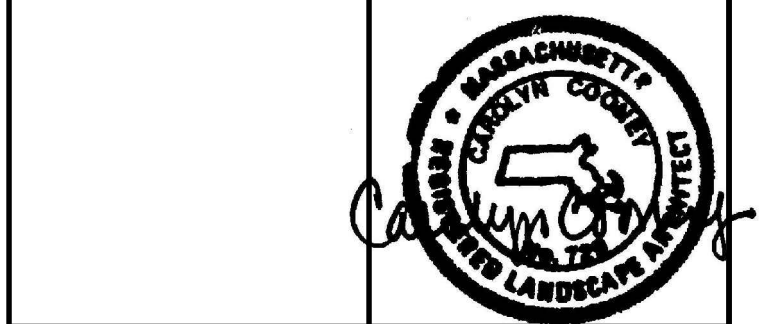
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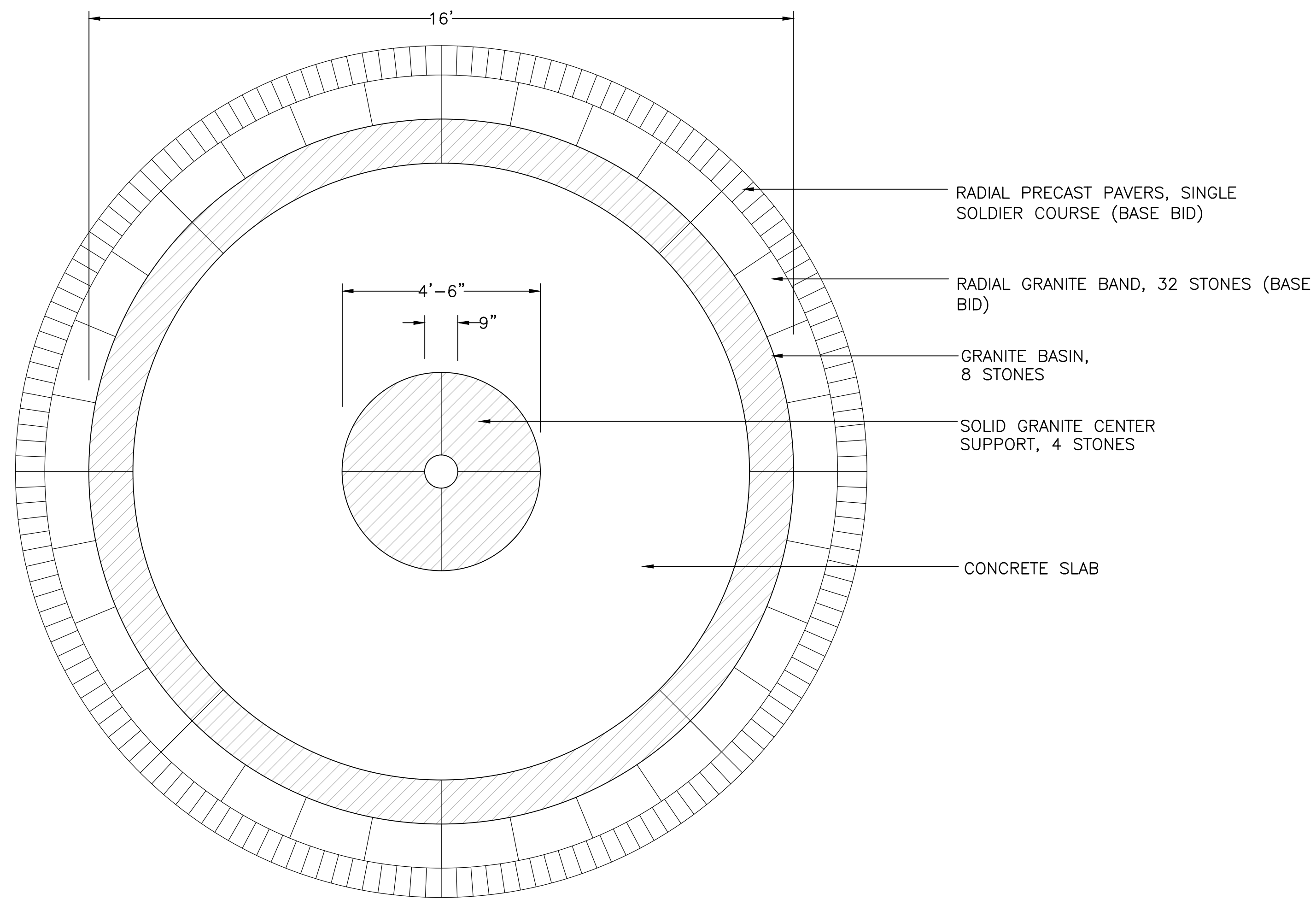
Project:  
**CITY OF WALTHAM  
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Prepared For:  
**CITY OF WALTHAM  
 DEPARTMENT OF RECREATION  
 50 MOODY STREET  
 WALTHAM, MA 02453**

TITLE:  
**FOUNTAIN BASIN  
 DETAILS I**

Scale AS NOTED Date MAR 21 2016  
 Drawn By CCC  
 Checked By DRB  
 Approved By VH  
 Project No. 1313.01

DWG No. **L.28**




PLAN

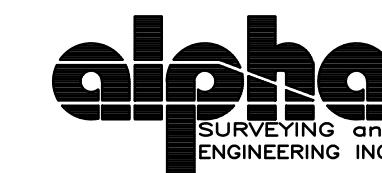
1 FOUNTAIN DETAILS -- ADD ALTERNATE #1  
1/2" = 1'-0"

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WALTHAM, MA 02453**

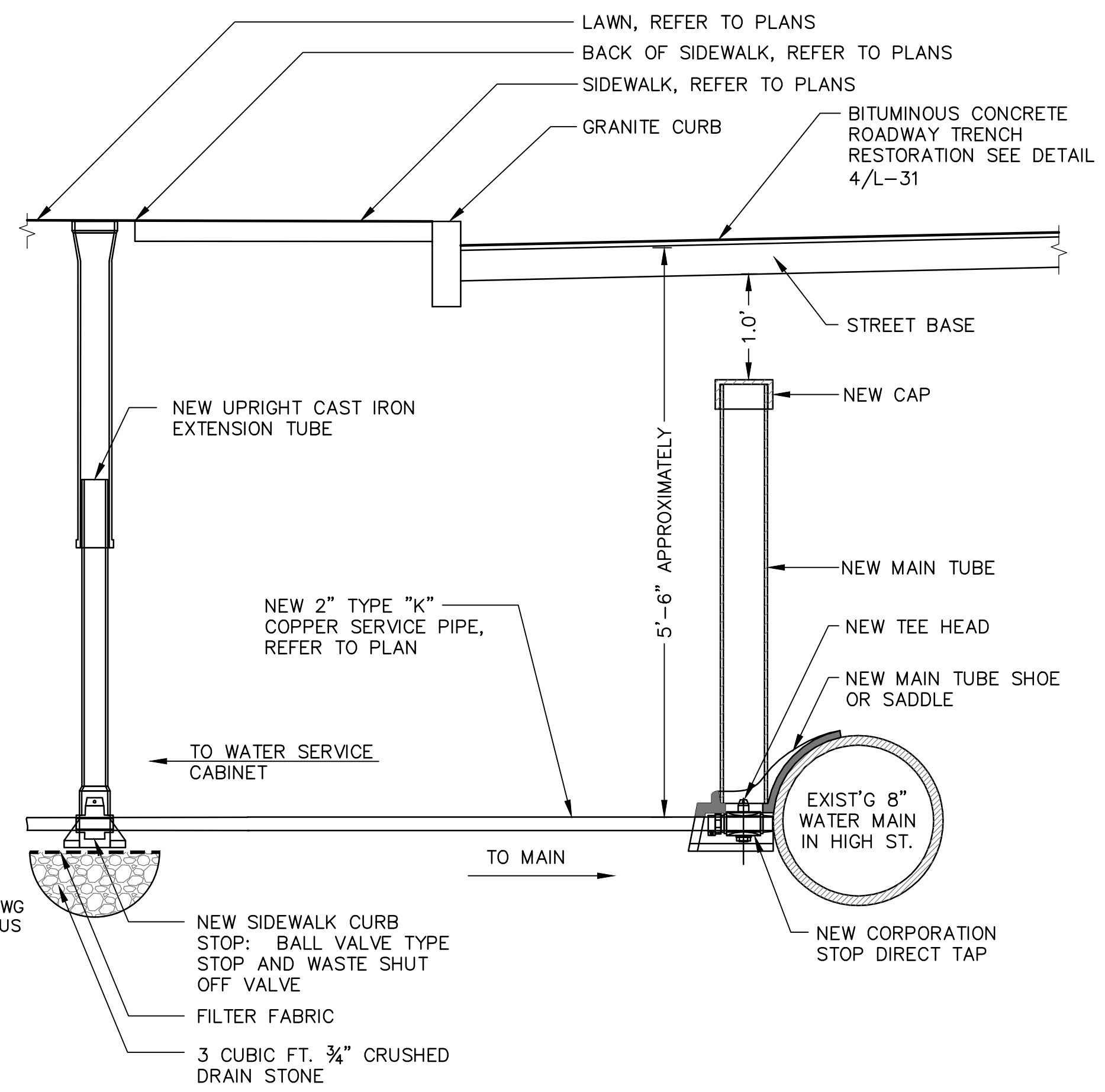
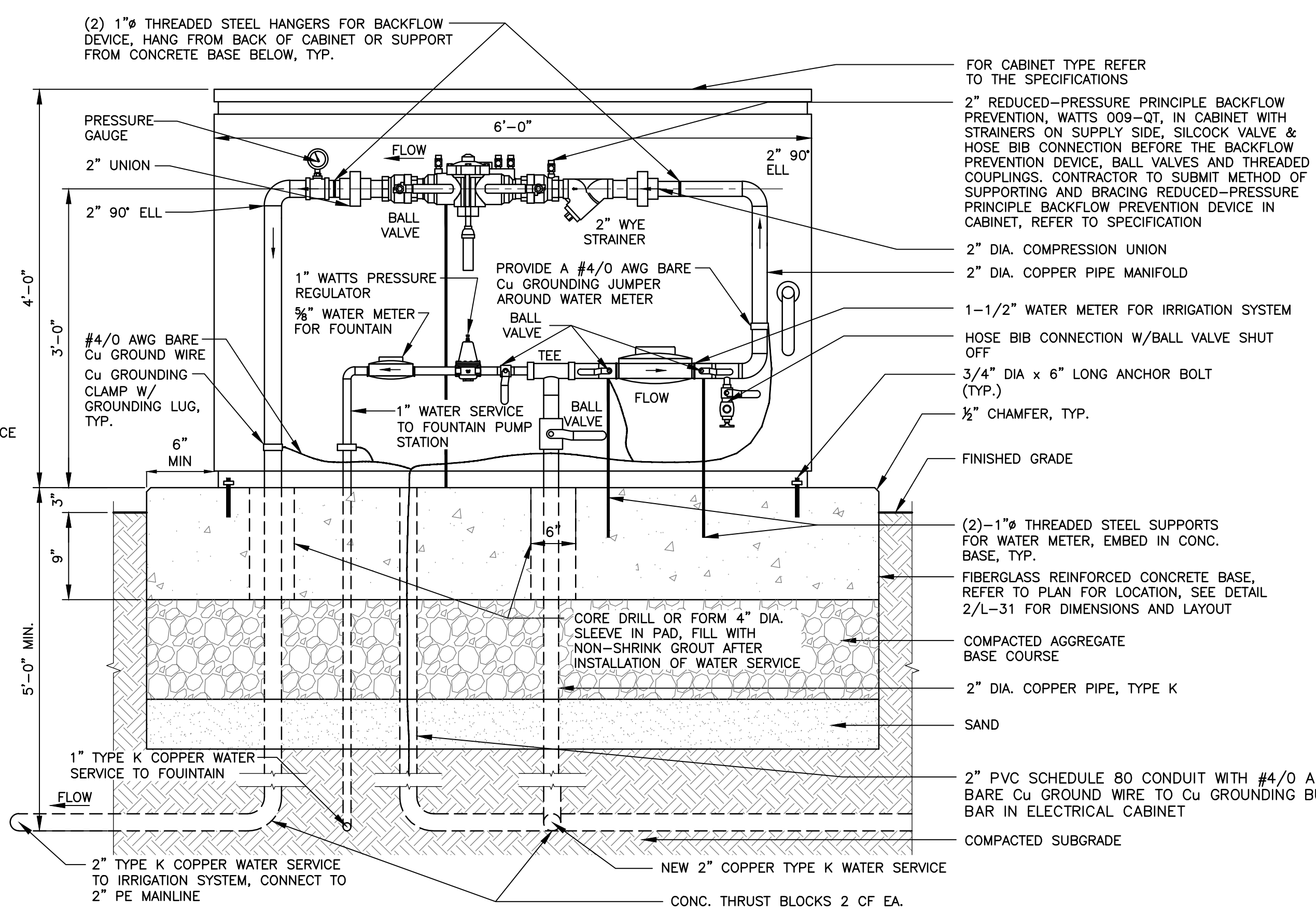
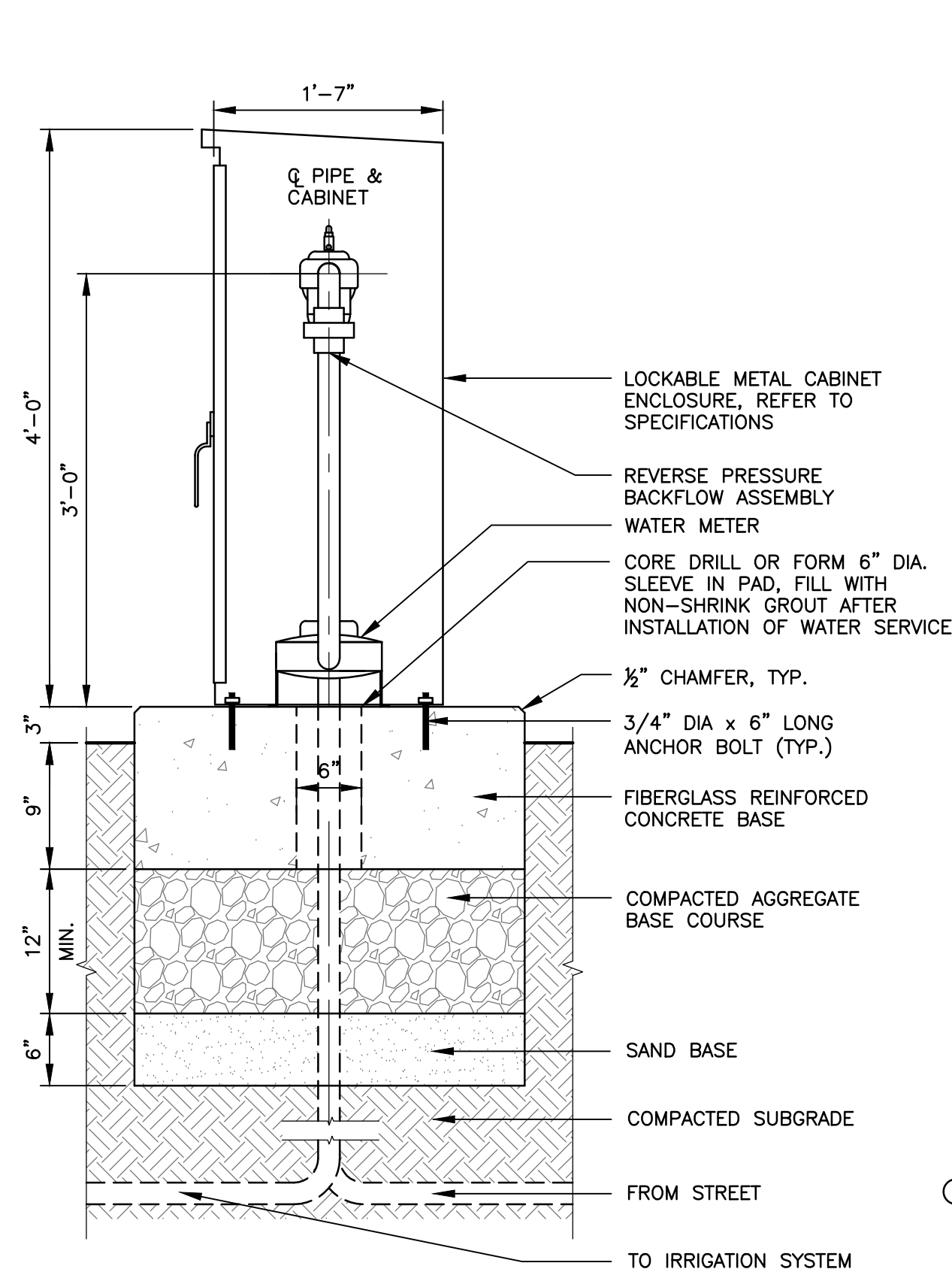
TITLE:

**FOUNTAIN BASIN  
DETAILS II**

Scale AS NOTED Date MAR 21 2016  
Drawn By CCC  
Checked By DRB  
Approved By VH  
Project No. 1313.01

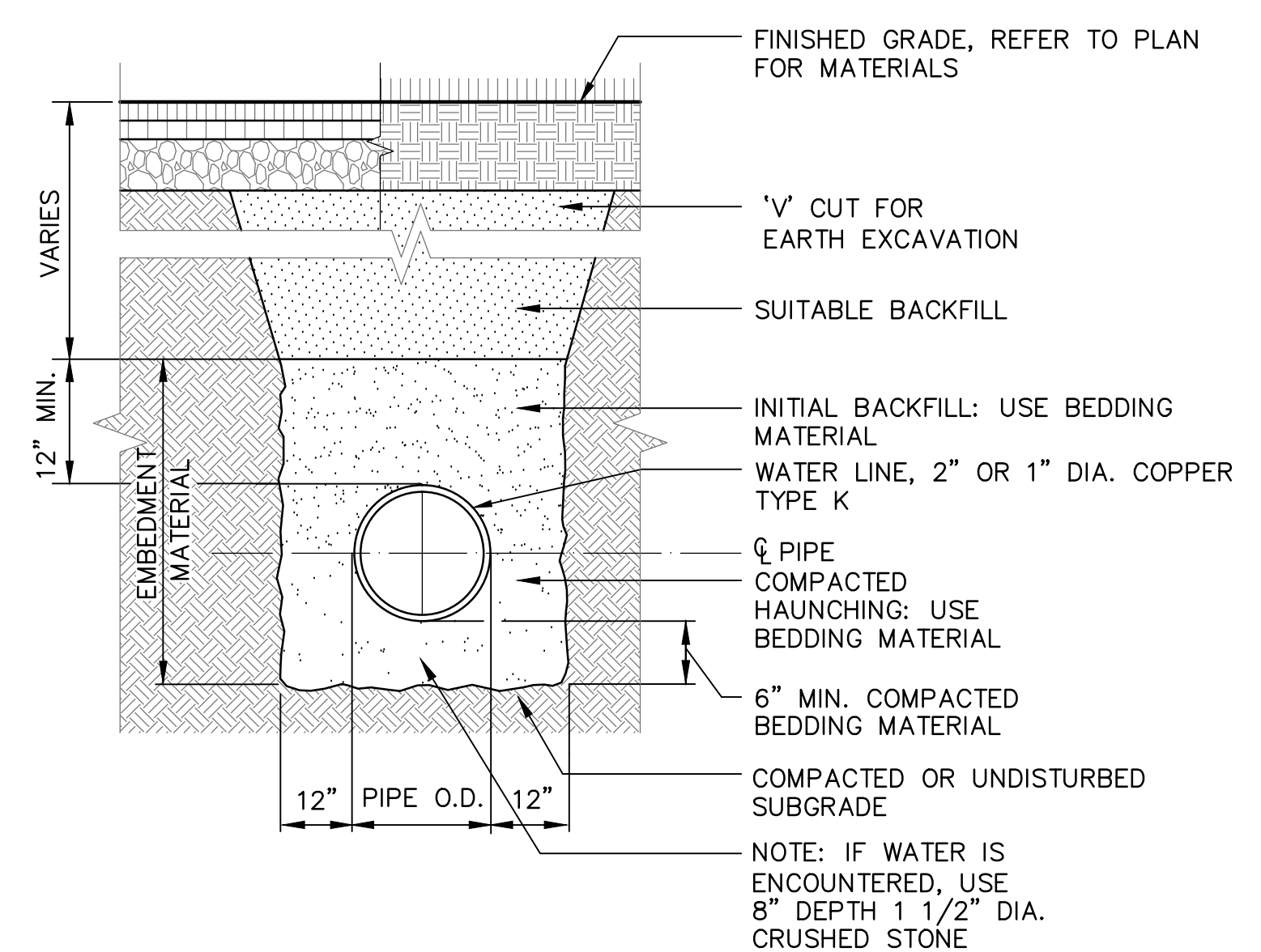
DWG No. **L.29**



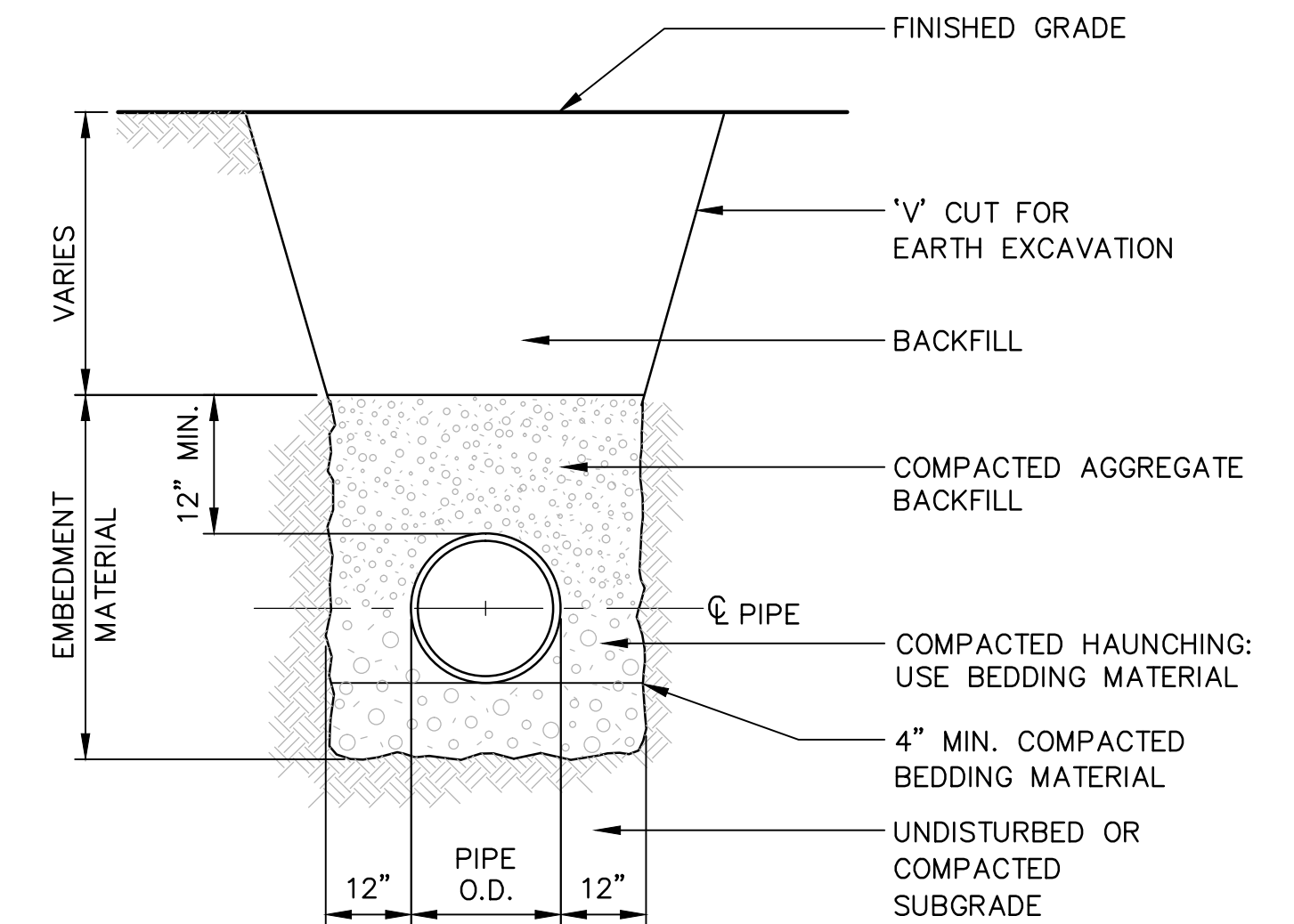


SECTION  
**1** REDUCED-PRESSURE PRINCIPLE BACKFLOW-PREVENTION DEVICE IN CABINET  
 N.T.S.

SECTION  
**2** WATER SERVICE TRENCH PROFILE DETAIL, TYP.  
 N.T.S.



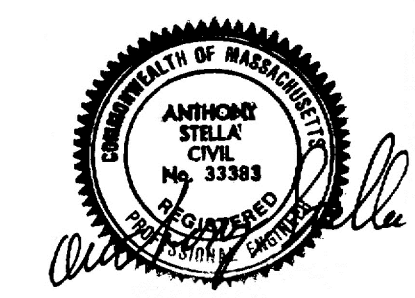
SECTION  
**3** WATERLINE TRENCH SECTION DETAIL, TYP.  
 N.T.S.



SECTION  
**4** UTILITY LINE TRENCH SECTION DETAIL, TYP.  
 N.T.S.

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No.	Description	Date

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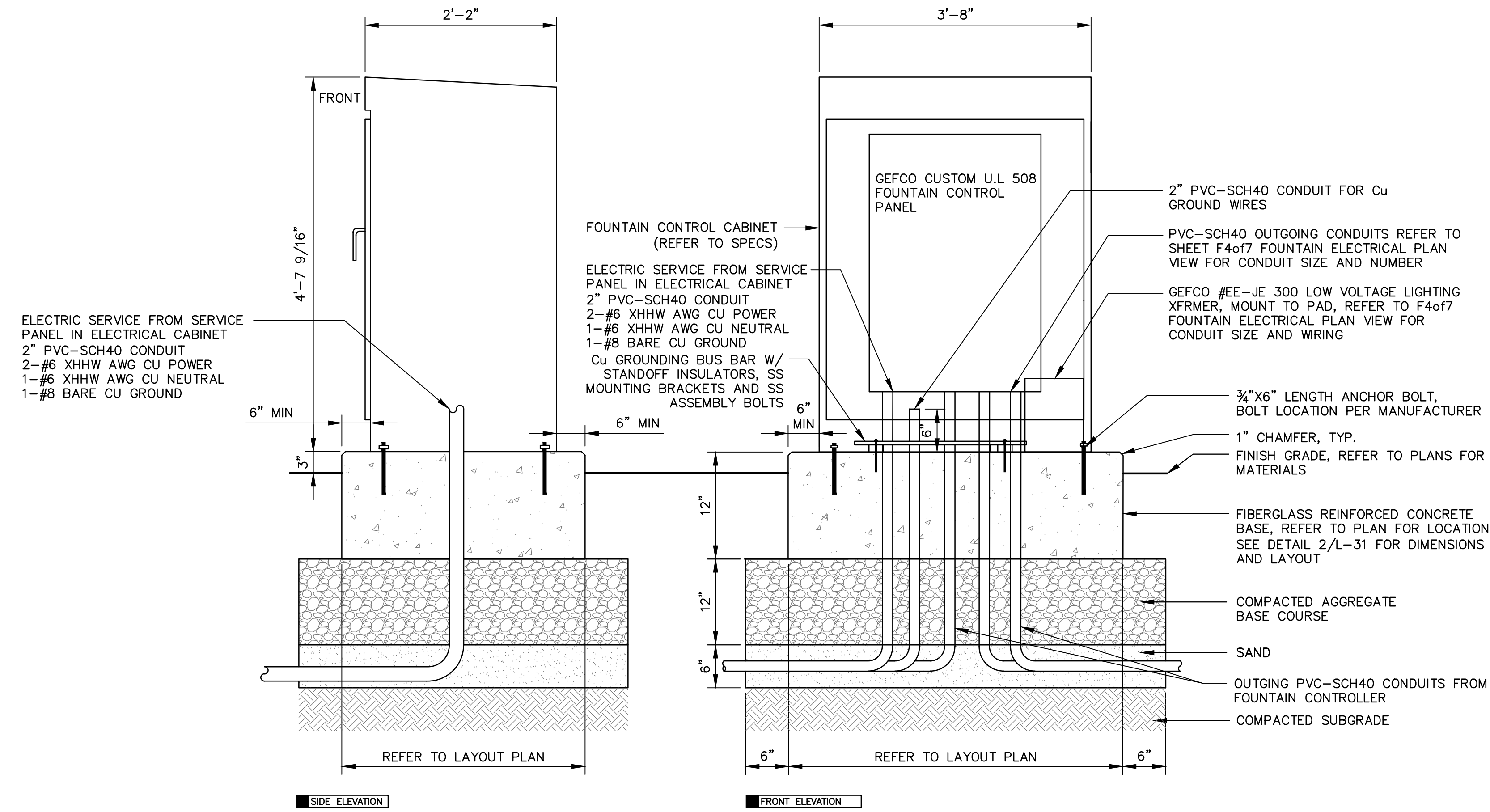
Project:  
**CITY OF WALTHAM  
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 90 HALL STREET  
 WALTHAM, MA 02453**

Prepared For:  
**CITY OF WALTHAM  
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 510 MOODY STREET  
 WALTHAM, MA 02453**

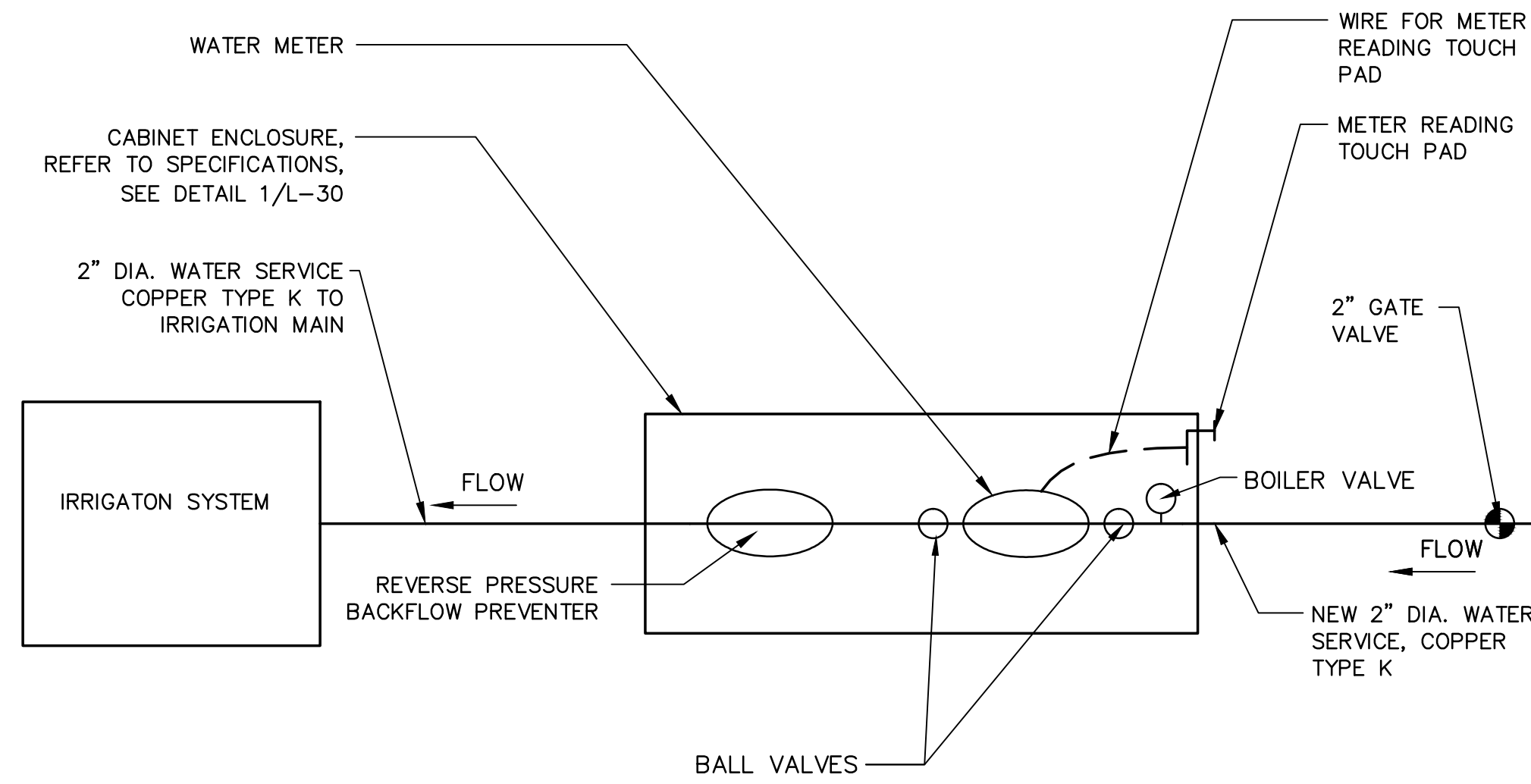
TITLE:  
**UTILITY DETAILS 1**

Scale AS NOTED Date MAR 21 2016  
 Drawn By DRB  
 Checked By CCC  
 Approved By AS  
 Project No. 1313.01

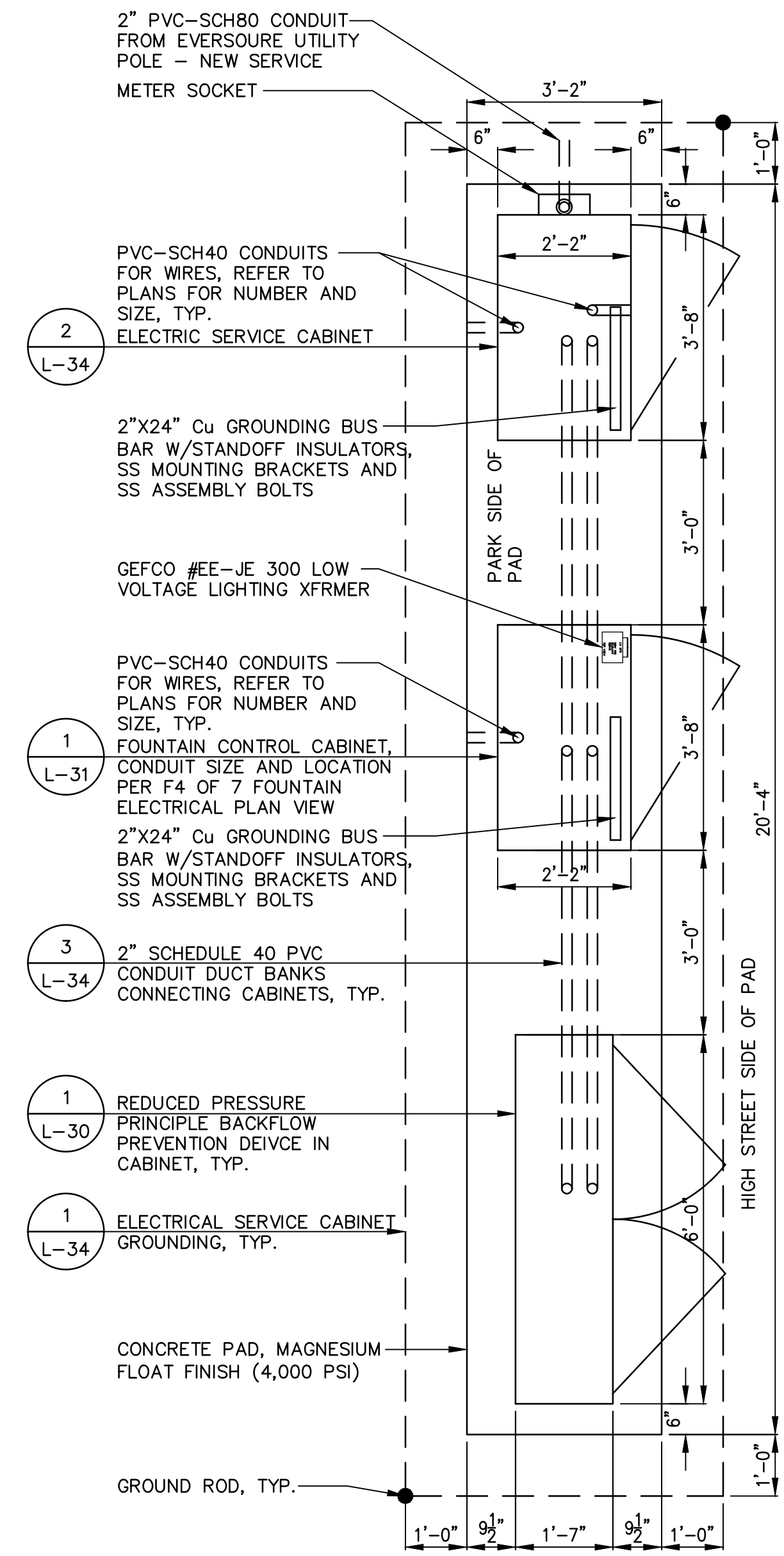
DWG No. **L.30**



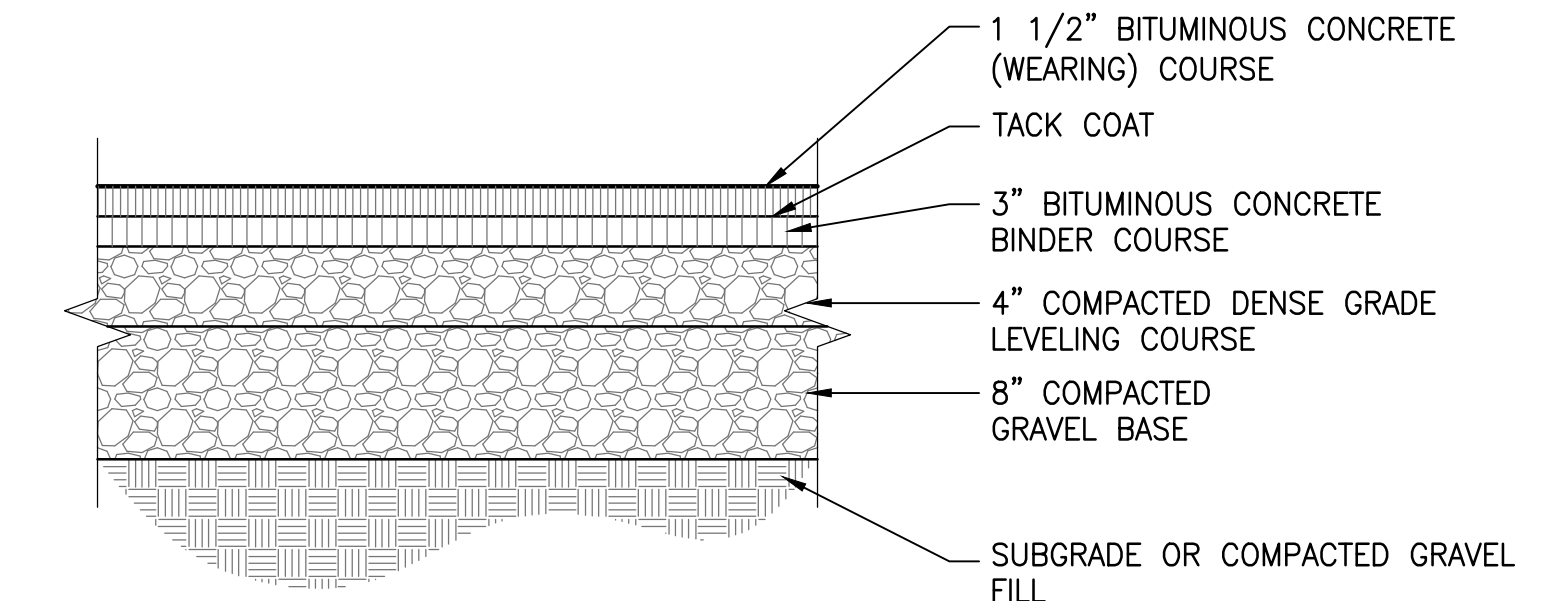
**1** FOUNTAIN CONTROL PANEL ENCLOSURE  
N.T.S.



**3** WATER SERVICE ONE LINE SCHEMATIC DIAGRAM  
N.T.S.



**2** COMMAND CENTER LAYOUT PLAN  
1/2" = 1'-0"



**4** BITUMINOUS CONCRETE ROADWAY TRENCH RESTORATION DETAIL, TYP.  
N.T.S.

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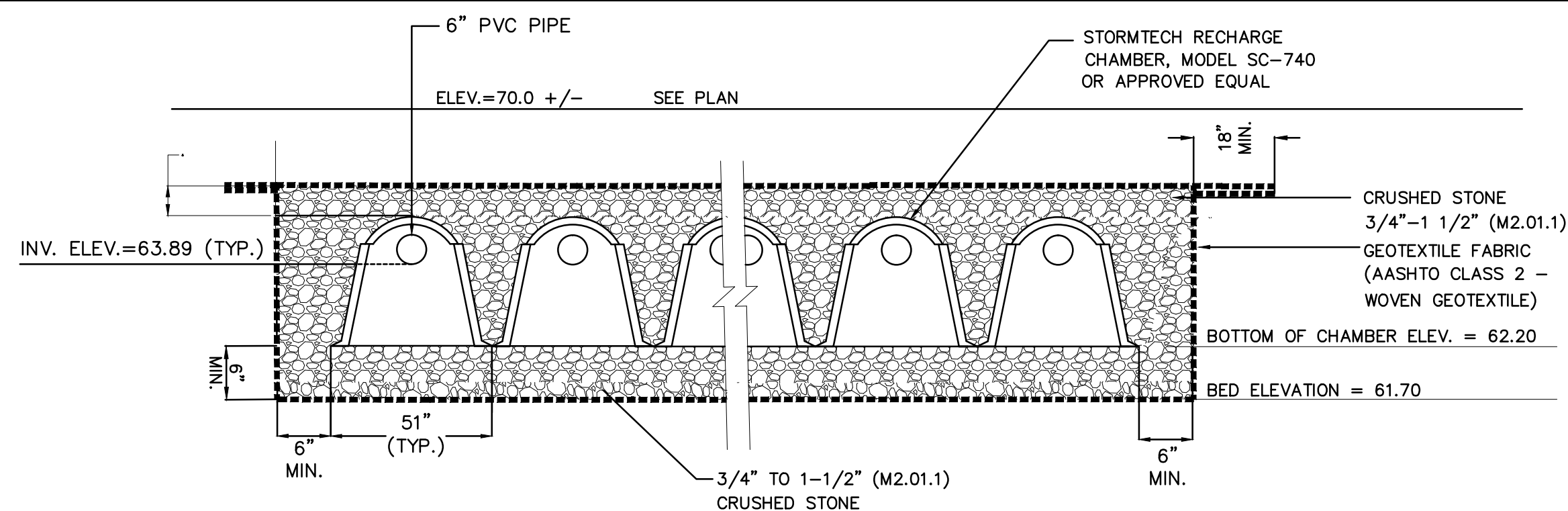
Project:  
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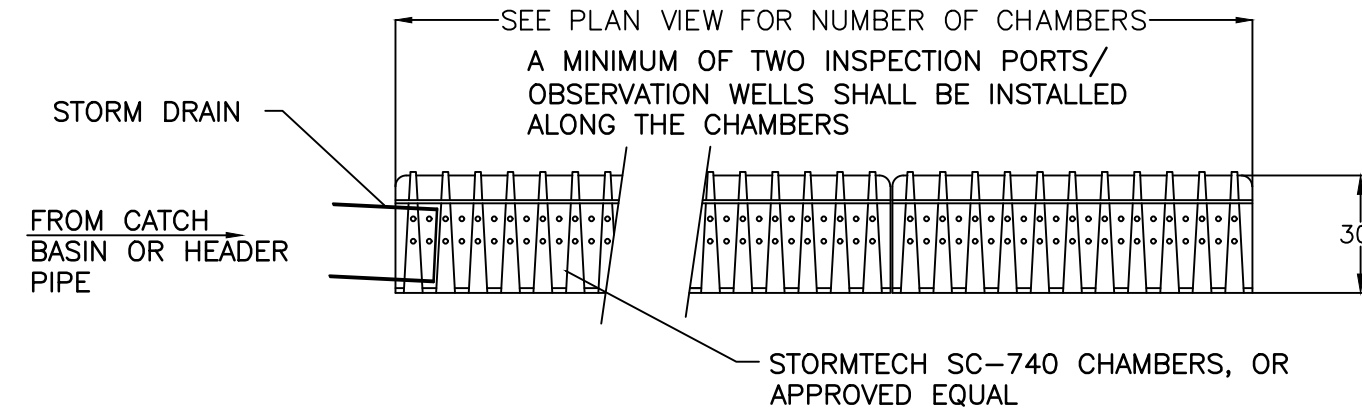
TITLE:  
**UTILITY DETAILS II**

Scale AS NOTED Date MAR 21 2016  
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Checked By CCC  
Approved By AS  
Project No. 1313.01

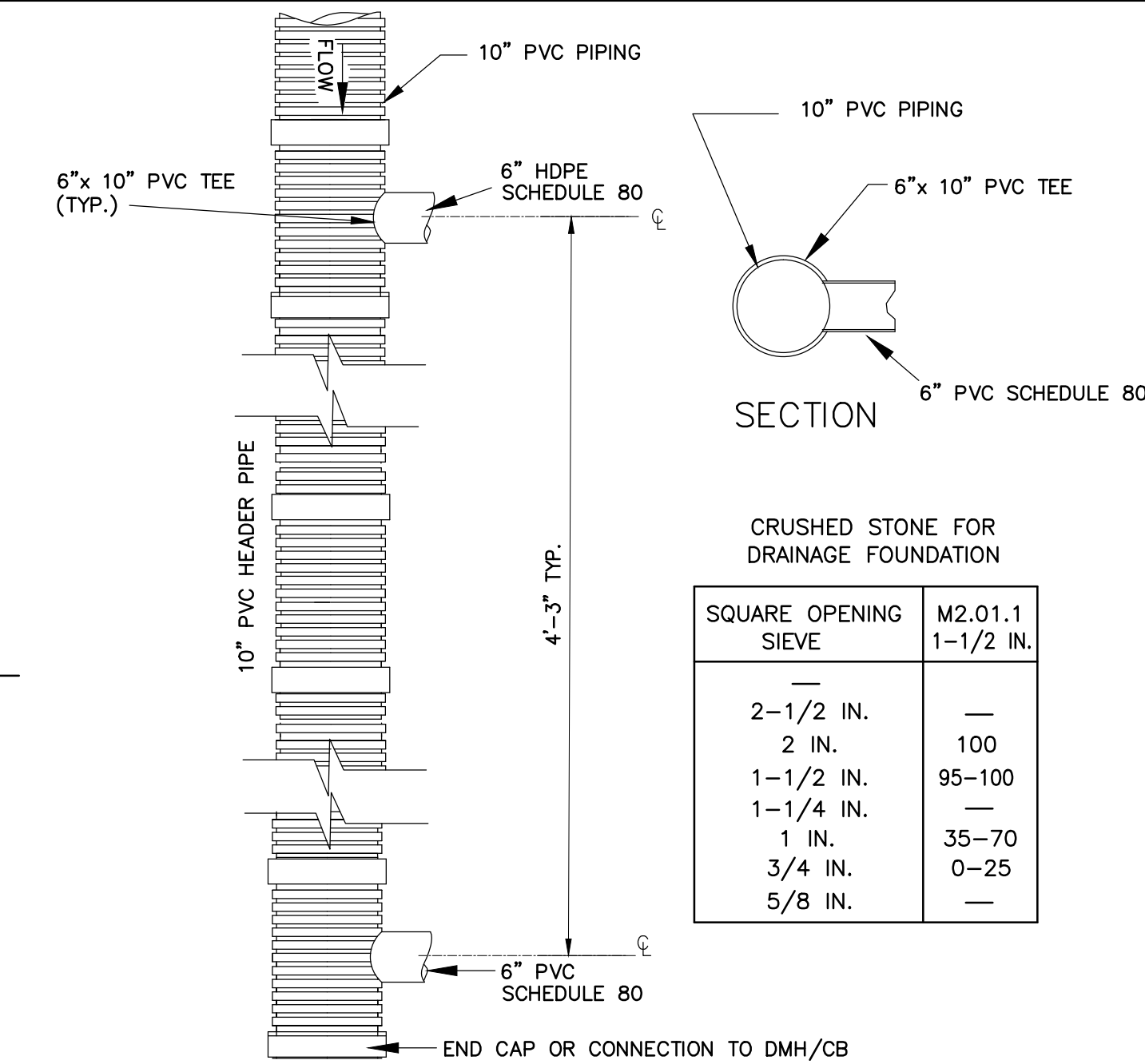
DWG No. **L.31**



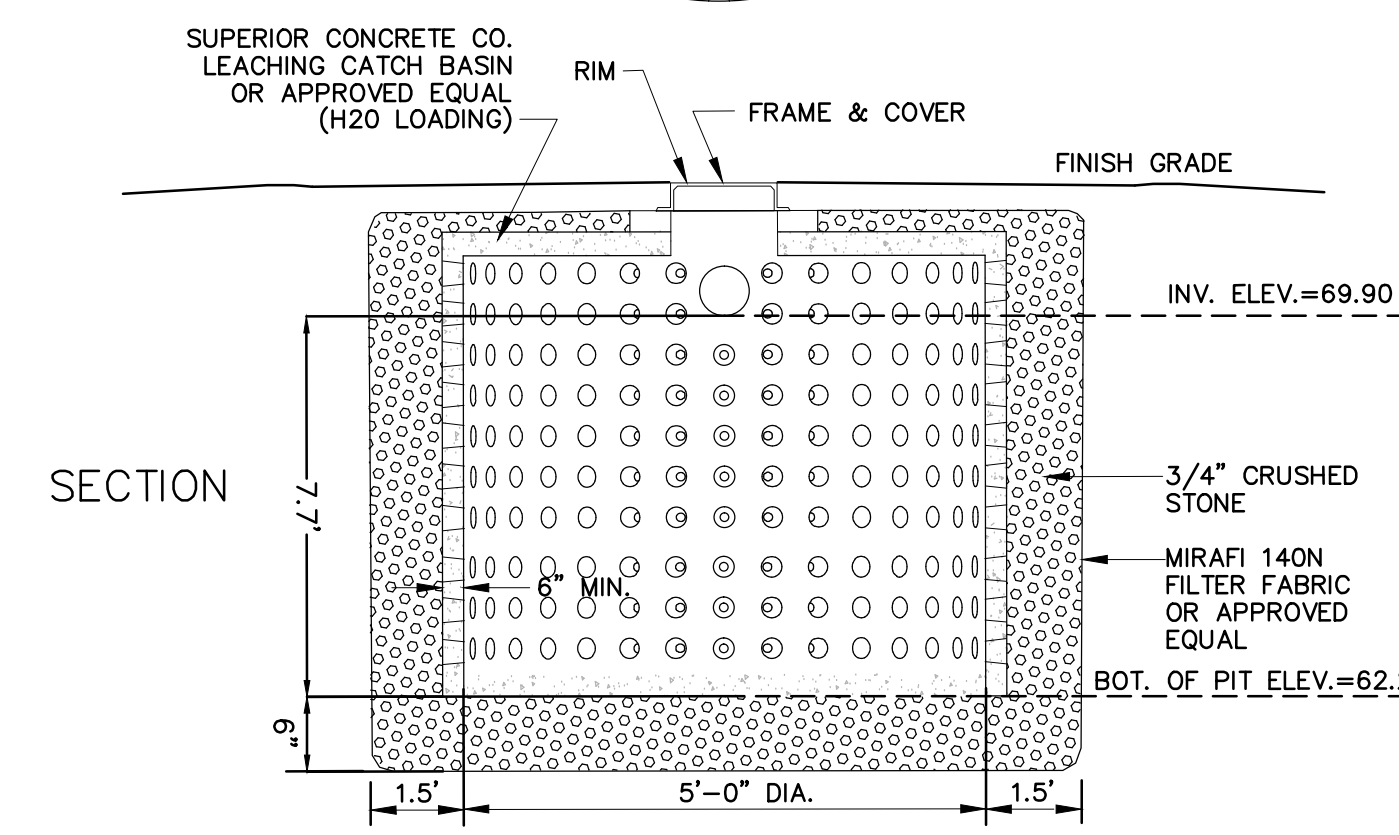
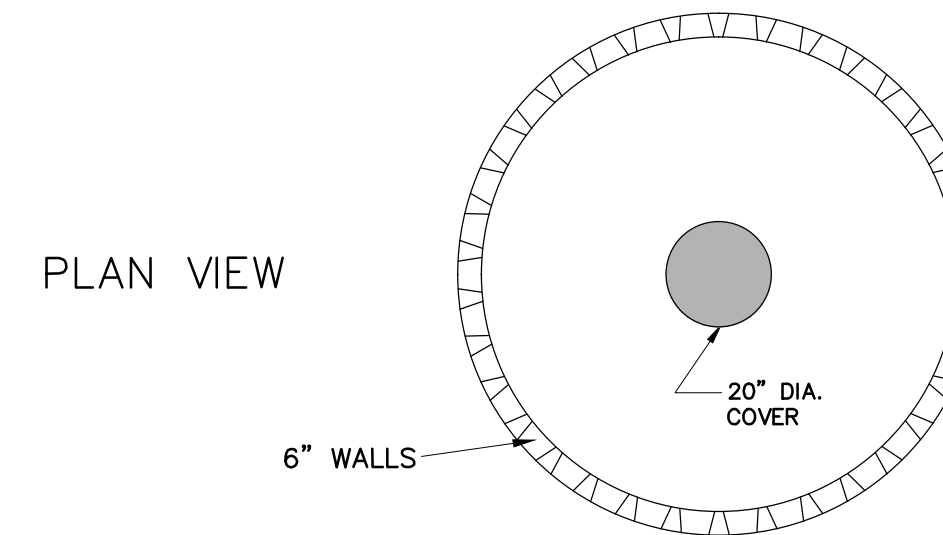
1 STORMWATER RECHARGE CROSS SECTION DETAIL, TYP.  
N.T.S.



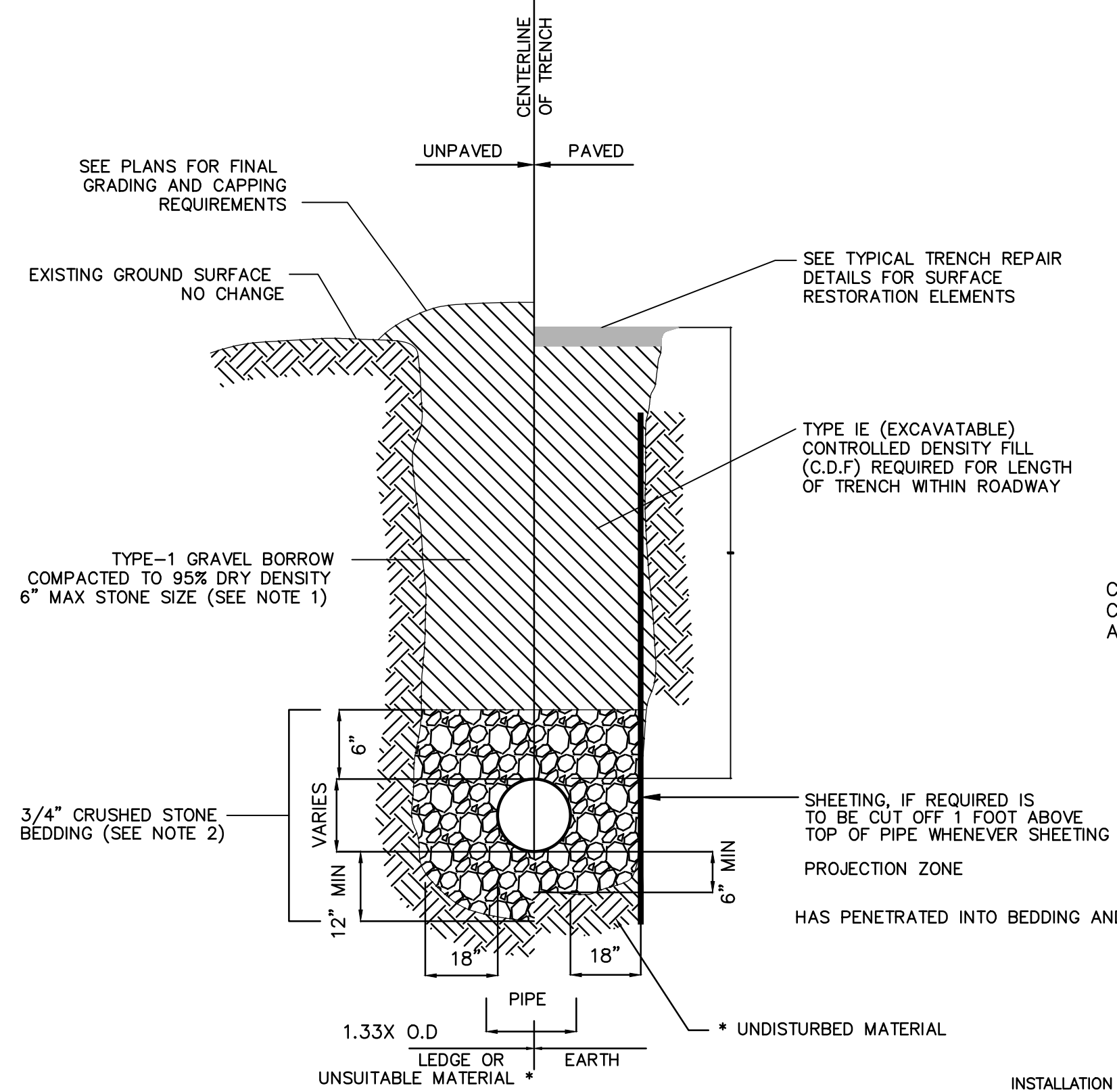
2 STORMWATER RECHARGE UNIT DETAIL, TYP.  
N.T.S.



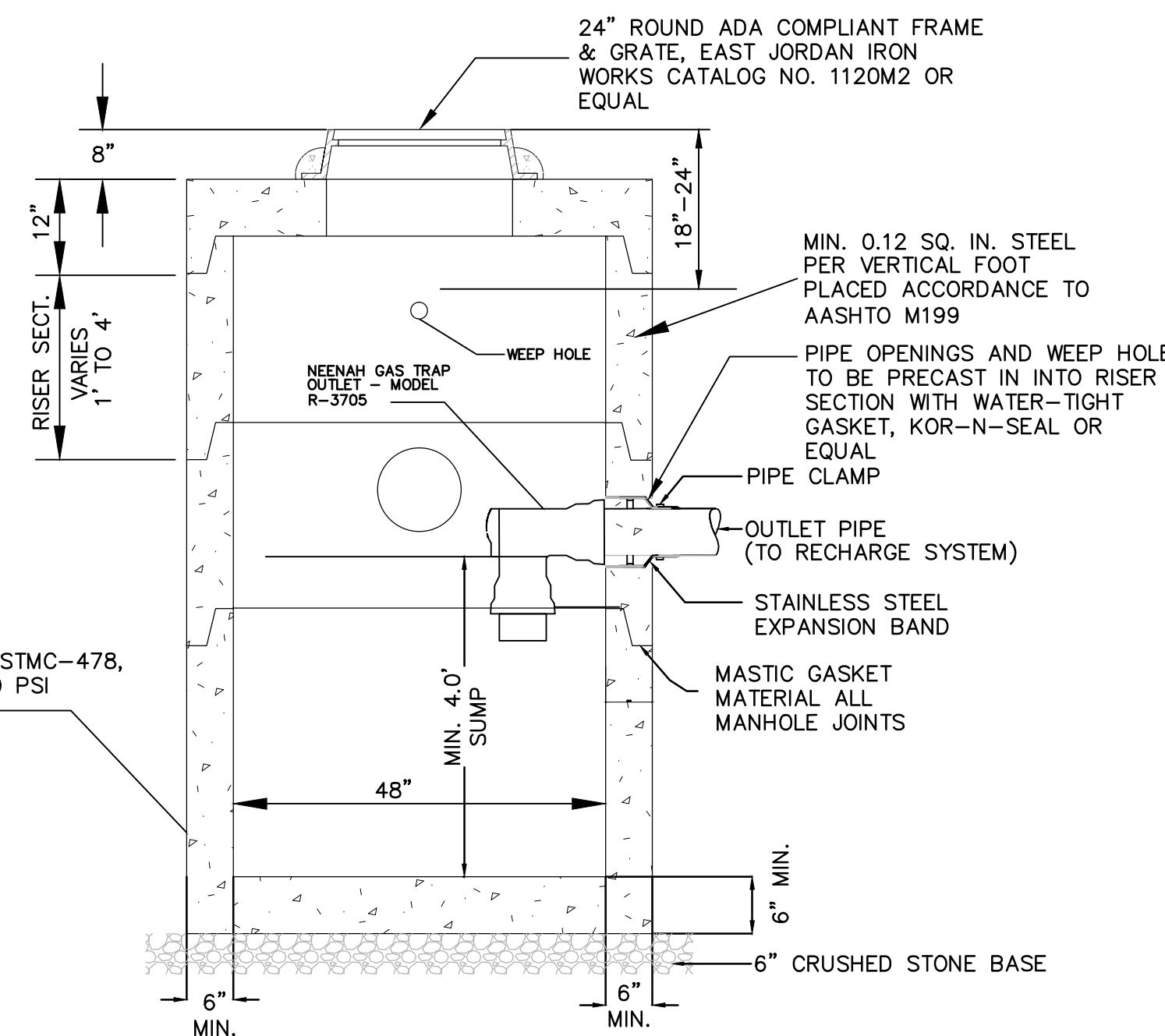
3 RECHARGE SYSTEM HEADER CONNECTOR  
N.T.S.



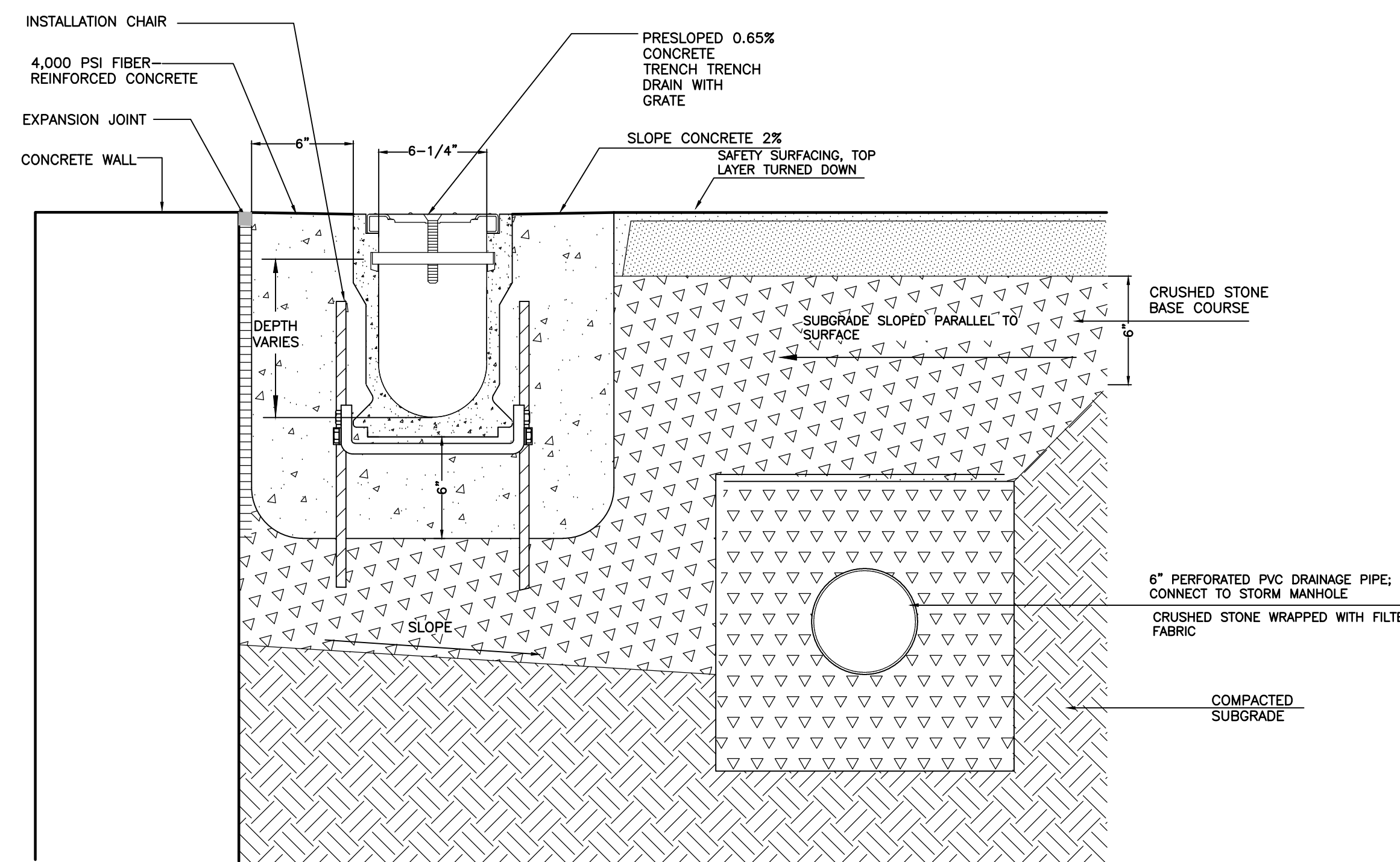
8 LEACHING BASIN DETAIL  
N.T.S.



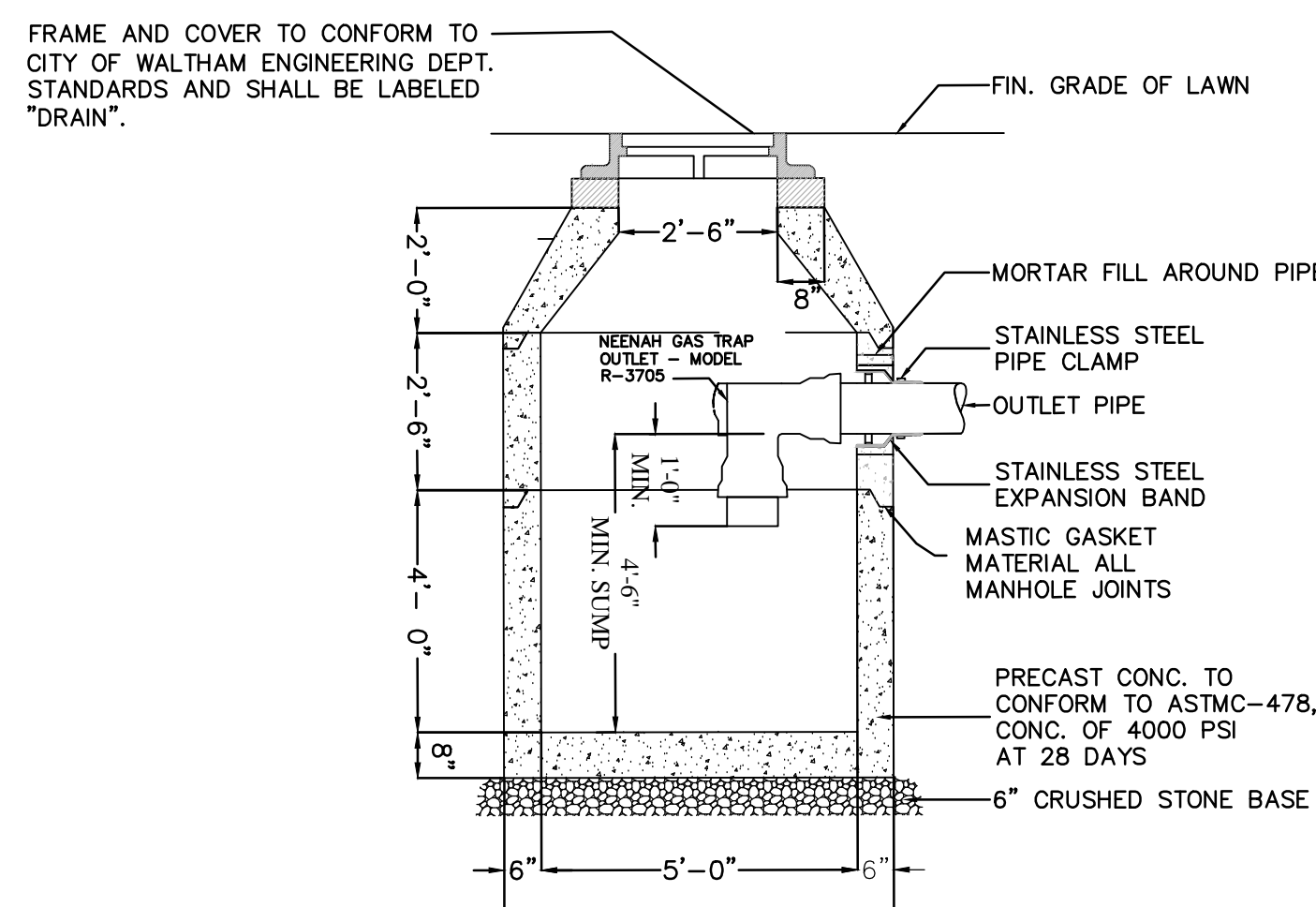
4 TRENCH SECTION DETAIL  
N.T.S.



5 CATCH BASIN DETAIL  
N.T.S.



7 TRENCH DRAIN & UNDERDRAIN DETAIL  
N.T.S.



6 STORM DRAIN MANHOLE DETAIL  
N.T.S.

CRUSHED STONE FOR DRAINAGE FOUNDATION

SQUARE OPENING SIEVE	M2.01.1 1-1/2 IN.
2-1/2 IN.	—
2 IN.	100
1-1/2 IN.	95-100
1-1/4 IN.	—
1 IN.	35-70
3/4 IN.	0-25
5/8 IN.	—

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No.	Description	Date

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Project:  
**CITY OF WALTHAM  
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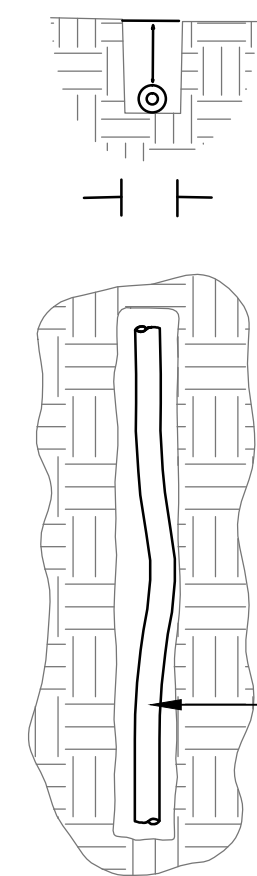
Prepared For:  
**CITY OF WALTHAM  
DEPARTMENT OF RECREATION  
510 MOODY STREET  
WALTHAM, MA 02453**

TITLE:  
**DRAINAGE DETAILS**

Scale AS NOTED Date MAR 21 2016  
Drawn By CCC  
Checked By DRB  
Approved By AS  
Project No. 1313.01

DWG No. **L.32**

PE PIPE

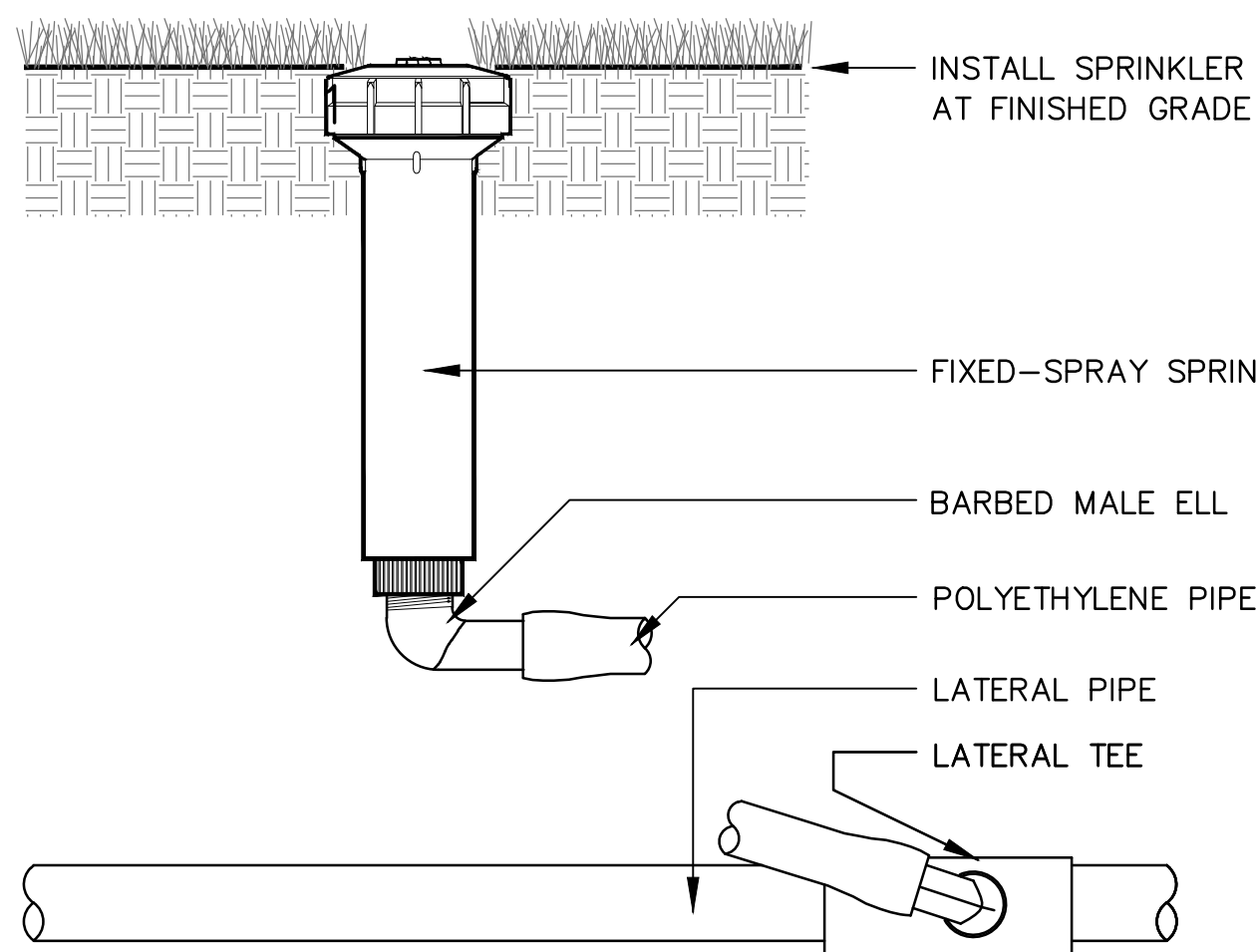


ALL PIPE TO BE INSTALLED IN TRENCHES AS SHOWN

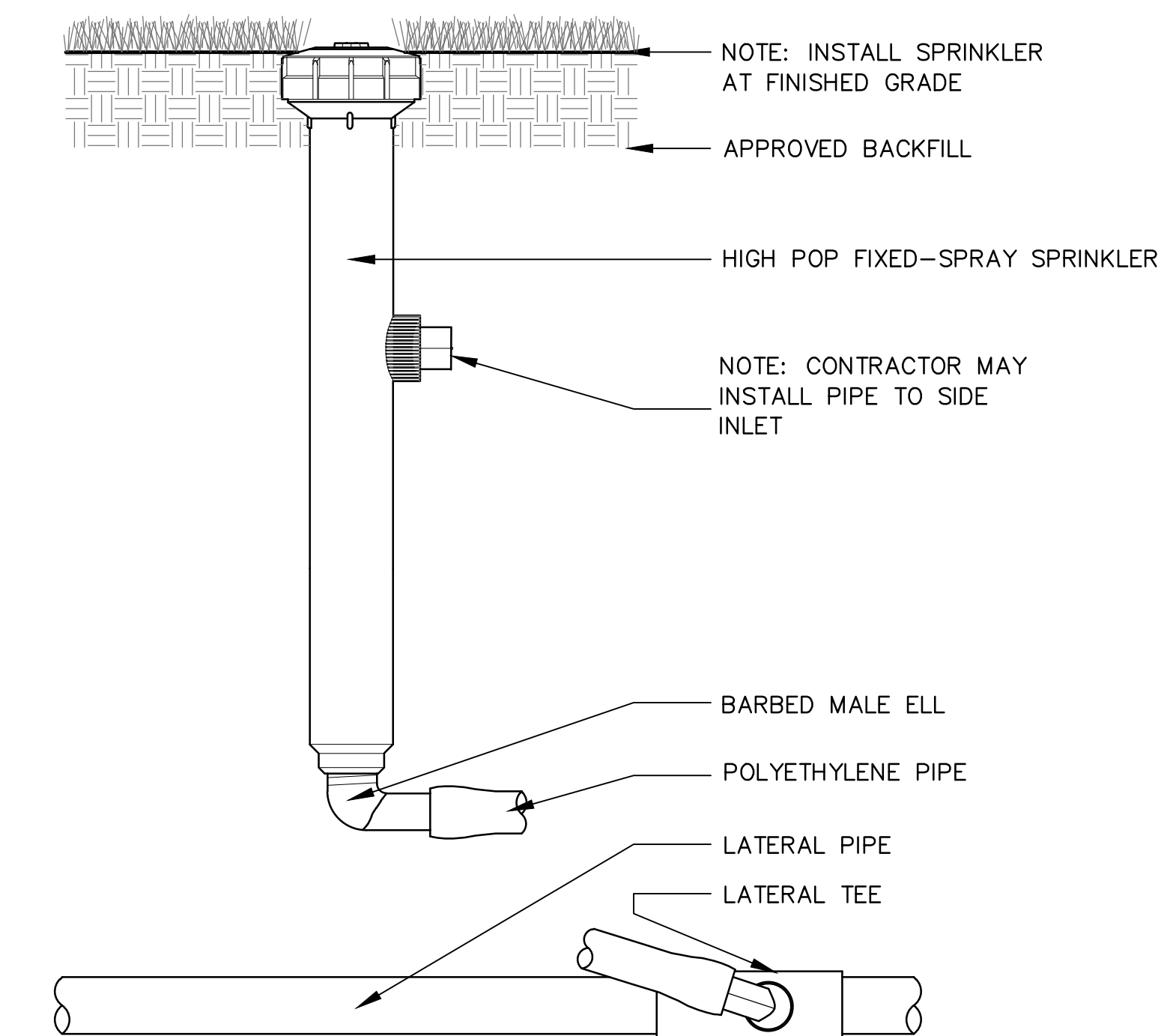
NOTE:

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.

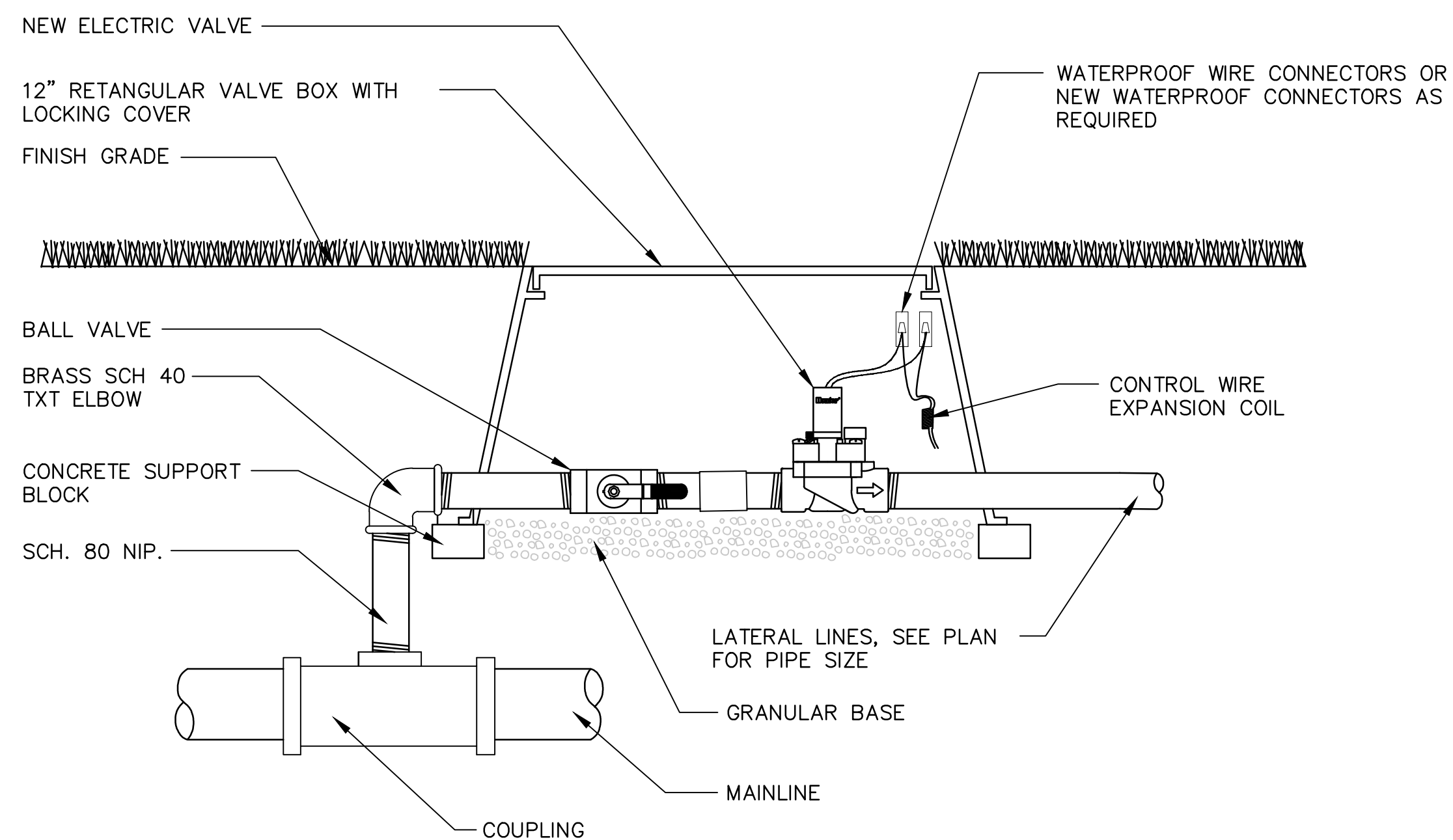
**1** TRENCH DETAIL, TYP.  
N.T.S.



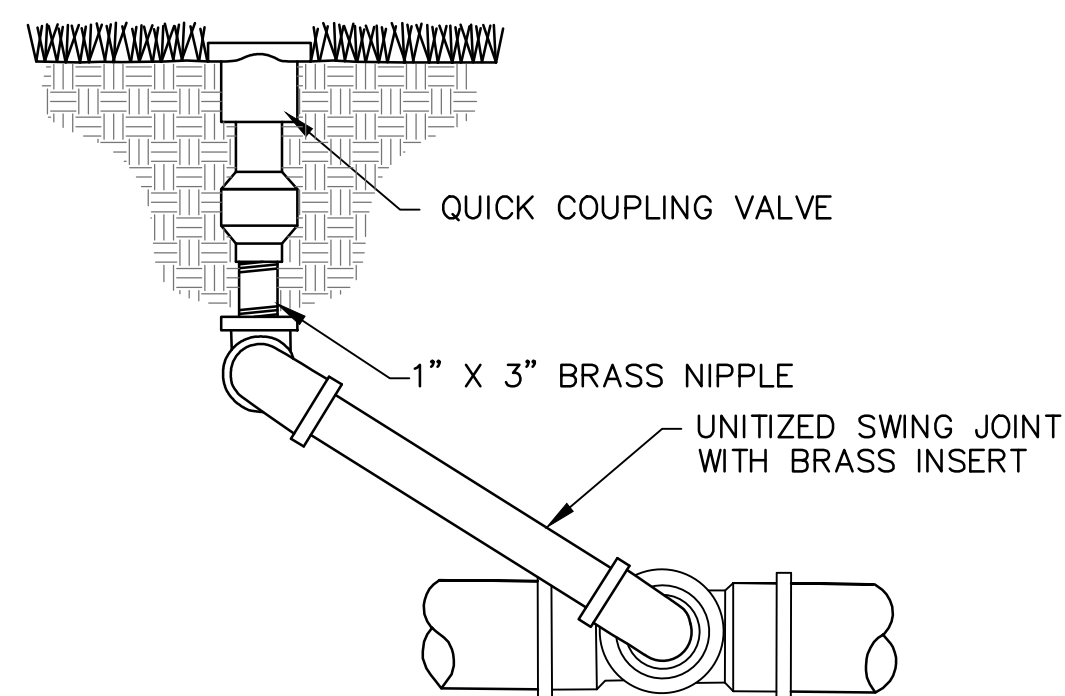
**2** SPRAY SPRINKLER DETAIL, TYP.  
N.T.S.



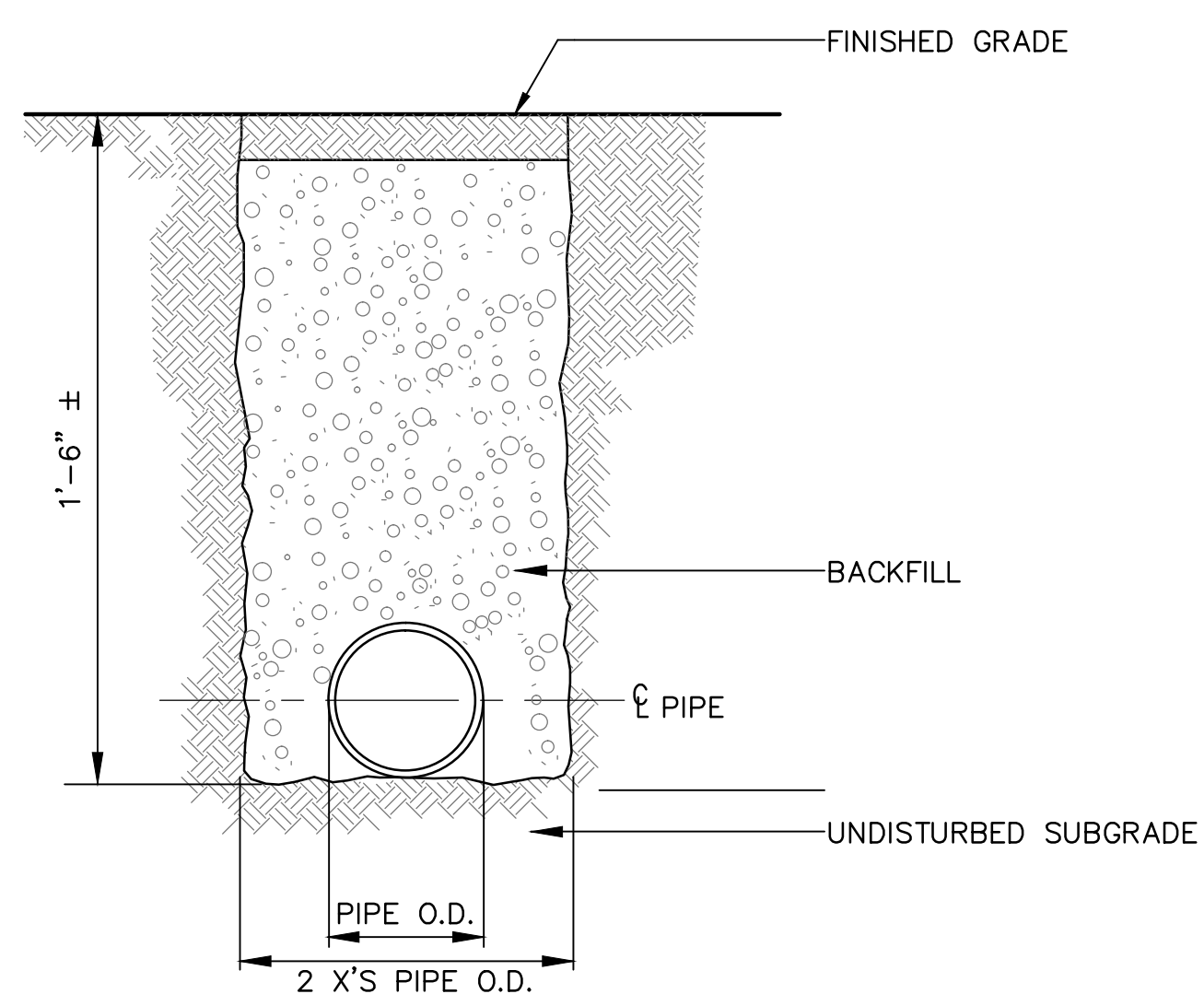
**3** 12" HP SHRUB STREAM SPRAY SPRINKLER DETAIL, TYP.  
N.T.S.



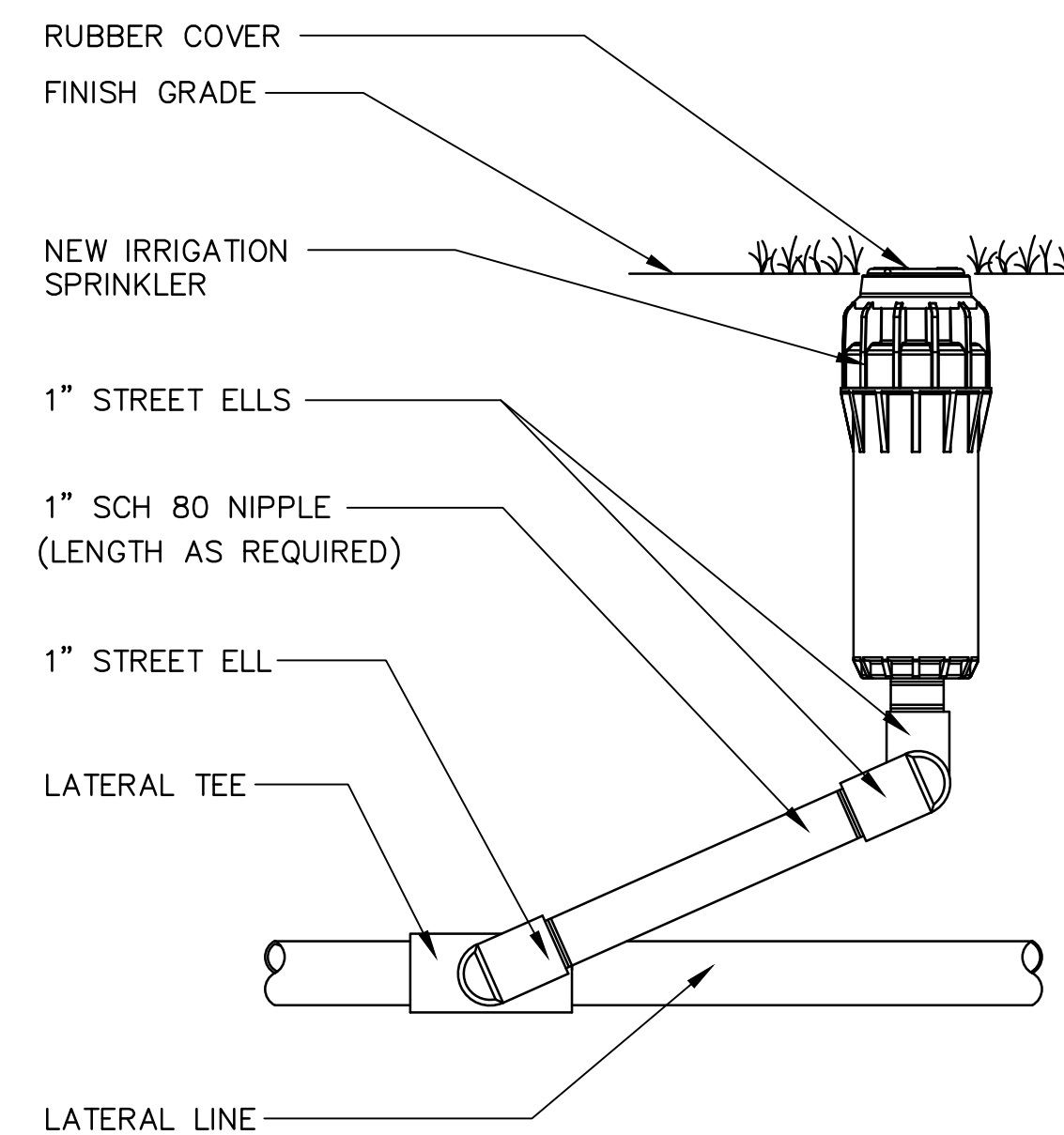
**4** AUTOMATIC CONTROL VALVE DETAIL, TYP.  
N.T.S.



**5** QUICK COUPLING VALVE DETAIL, TYP.  
N.T.S.



**6** PE MAINLINE TRENCH SECTION DETAIL, TYP.  
N.T.S.



**7** GEAR DRIVEN ROTARY IRRIGATION SPRINKLER INSTALLATION 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:

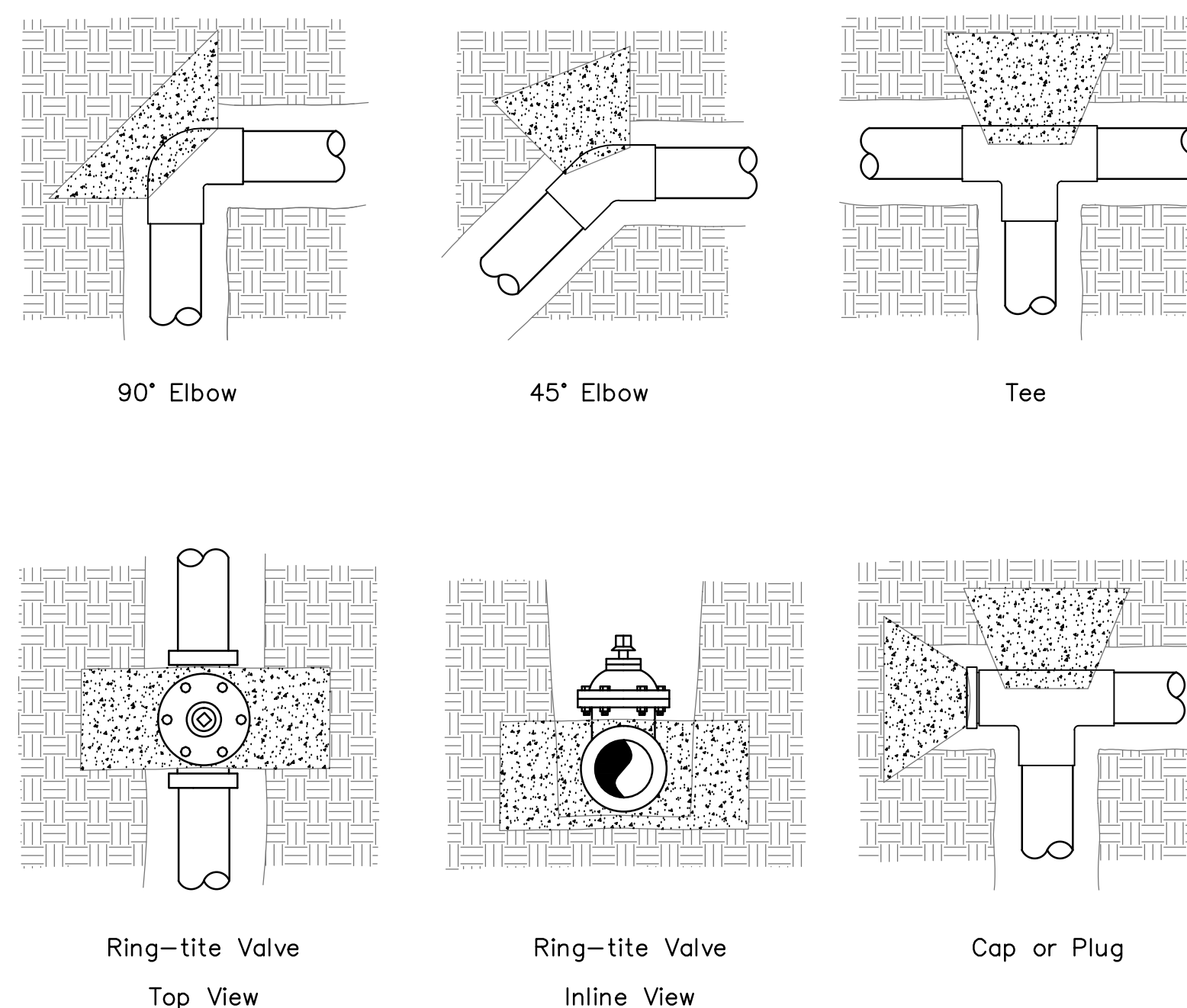
- CALCULATE THE THRUST BY SELECTING THE VALVE BY SIZE AND TYPE OF FITTING (TABLE 1), AND MULTIPLYING THAT VALUE BY THE MAXIMUM WORKING PRESSURE AT THE FITTING.
- DIVIDE THE TOTAL THRUST BY BEARING CAPACITY OF THE SOIL IN EXCAVATION (TABLE 2).
- THE RESULT IS THE TOTAL AREA (IN SQUARE FEET) OF THRUST BLOCK REQUIRED TO BE IN CONTACT WITH THE UNDISTURBED SOIL OF THE TRENCH WALL.

Table 1  
Fitting Thrust Factors

Size	Tee, Cap 90° or Valve Elbow	45° Elbow	22.5° Elbow
1 1/2	2.94	4.16	2.25
2	4.56	6.45	3.50
2 1/2	6.65	9.40	5.10
3	9.80	13.90	7.51
4	16.20	23.00	12.40
6	34.80	49.20	26.70
8	59.00	83.50	45.20
10	91.50	130.00	70.00
12	129.00	182.00	98.50

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



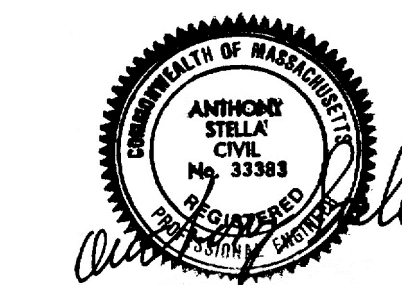
**8** THRUST BLOCKING DETAIL, TYP.  
N.T.S.

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SURVEYING and ENGINEERING INC.

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No.	Description	Date

REVISIONS

Project:  
**CITY OF WALTHAM  
IMPROVEMENTS TO  
PETER GILMORE PLAYGROUND  
90 HALL STREET  
WALTHAM, MA 02453**

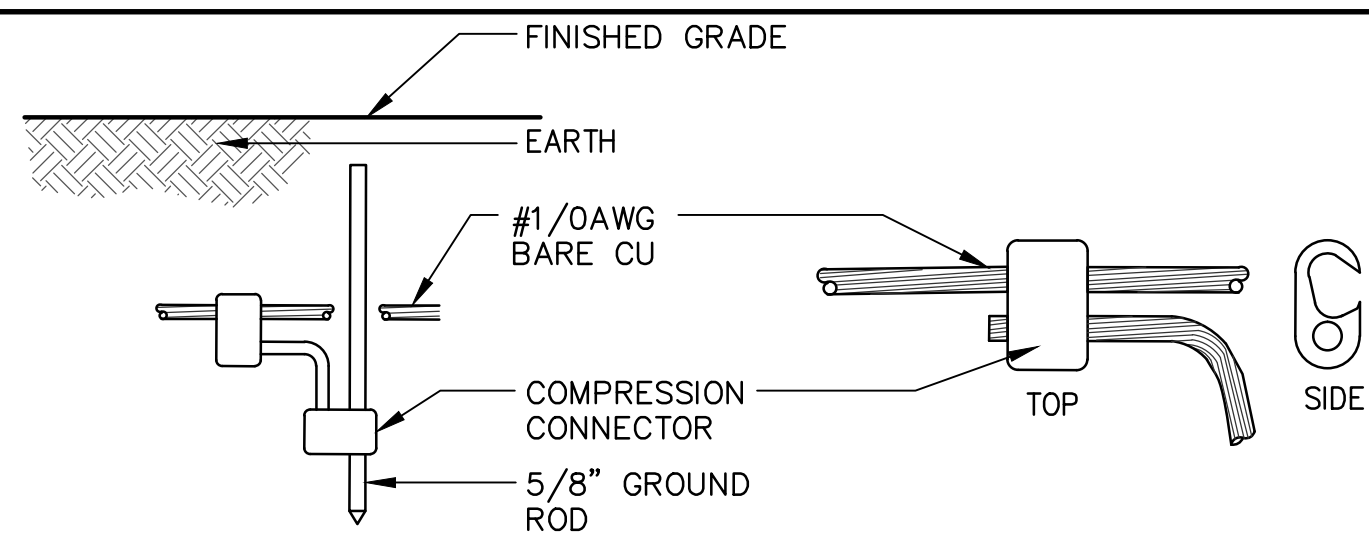
Prepared For:

**CITY OF WALTHAM  
DEPARTMENT OF RECREATION  
510 MOODY STREET  
WALTHAM, MA 02453**

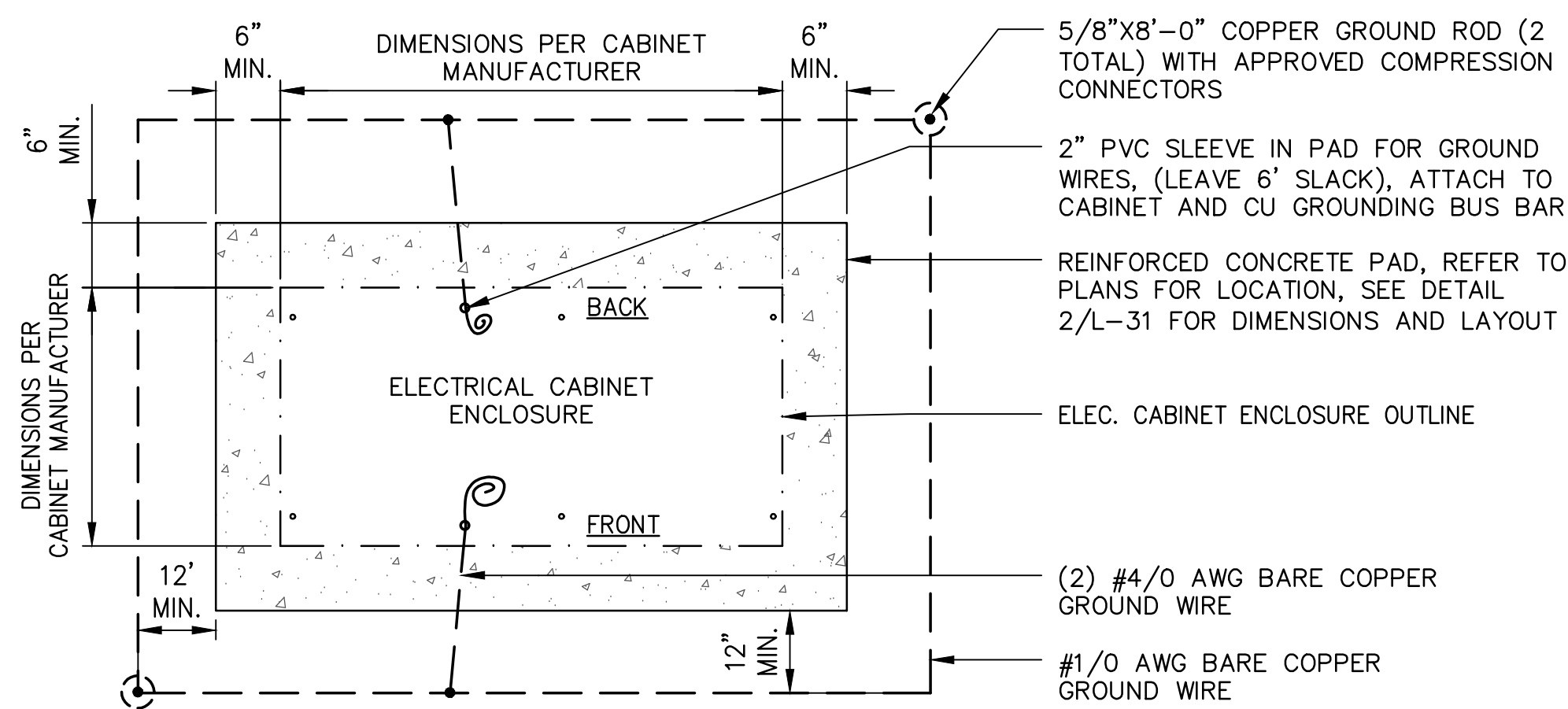
TITLE:  
**IRRIGATION  
DETAILS**

Scale AS NOTED Date MAR 21 2016  
Drawn By DRB  
Checked By MJB  
Approved By VH  
Project No. 1313.01

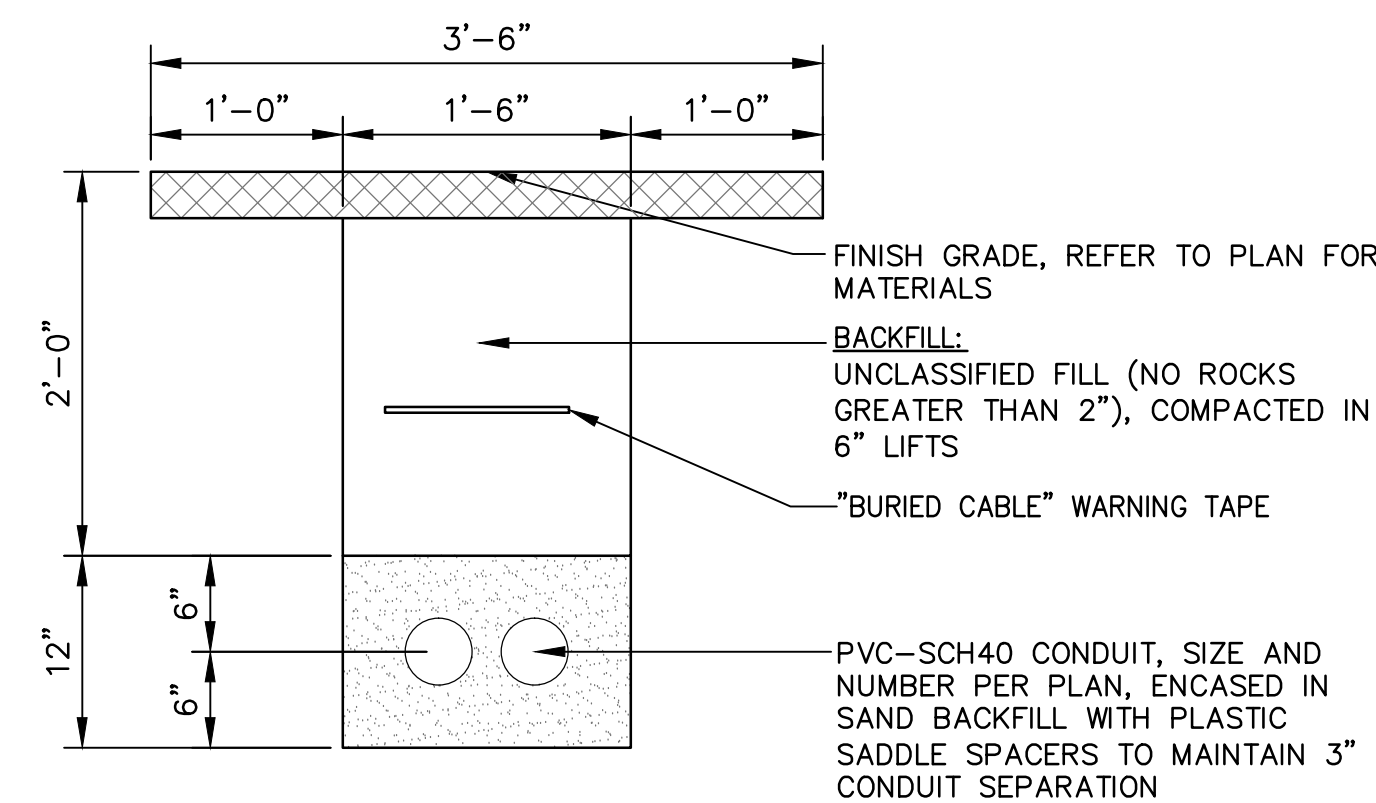
DWG No. **L.33**



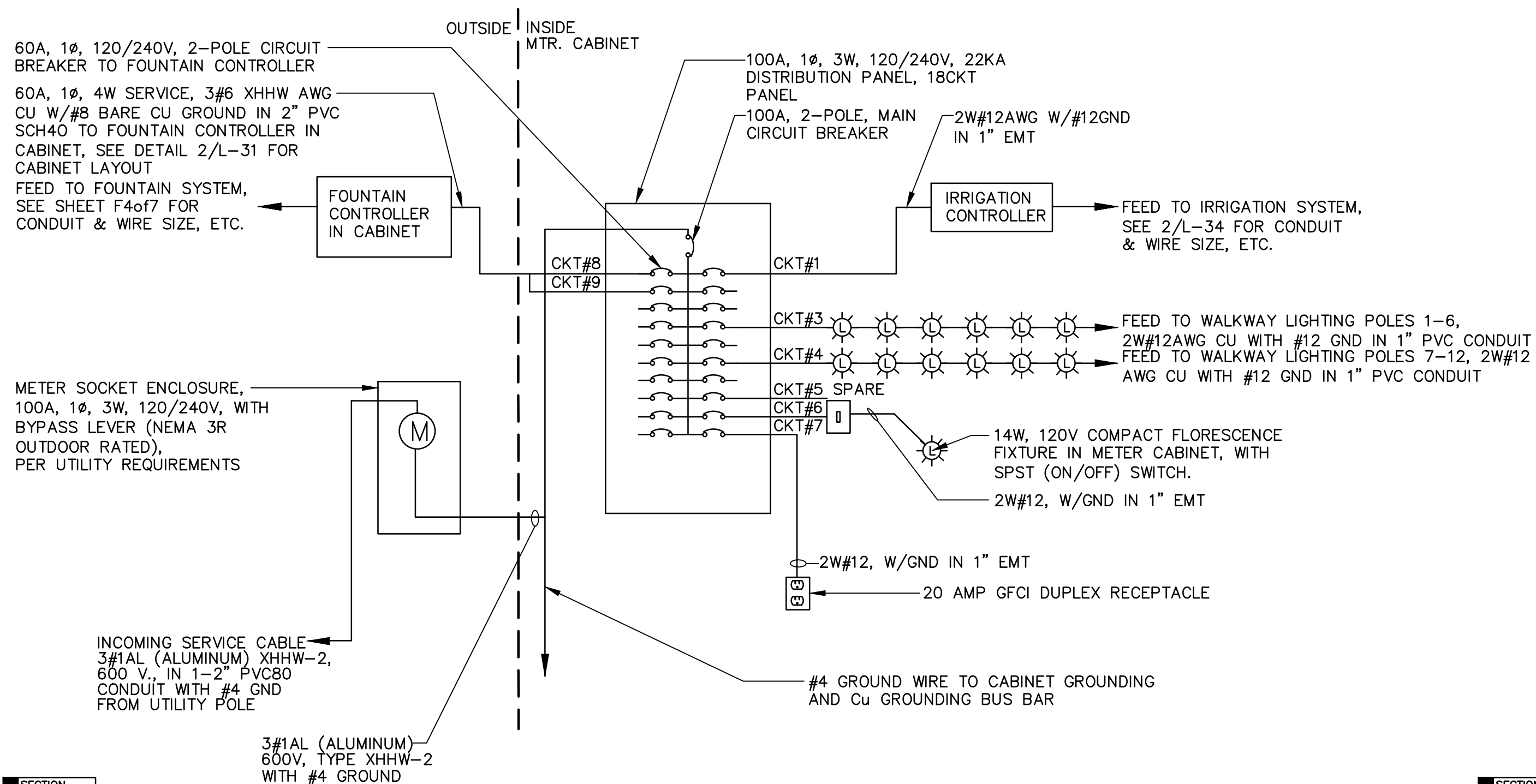
ROD TO CABLE CONNECTION      TAP CABLE CONNECTION



1 ELECTRICAL SERVICE CABINET GROUND PLAN, TYP. N.T.S.



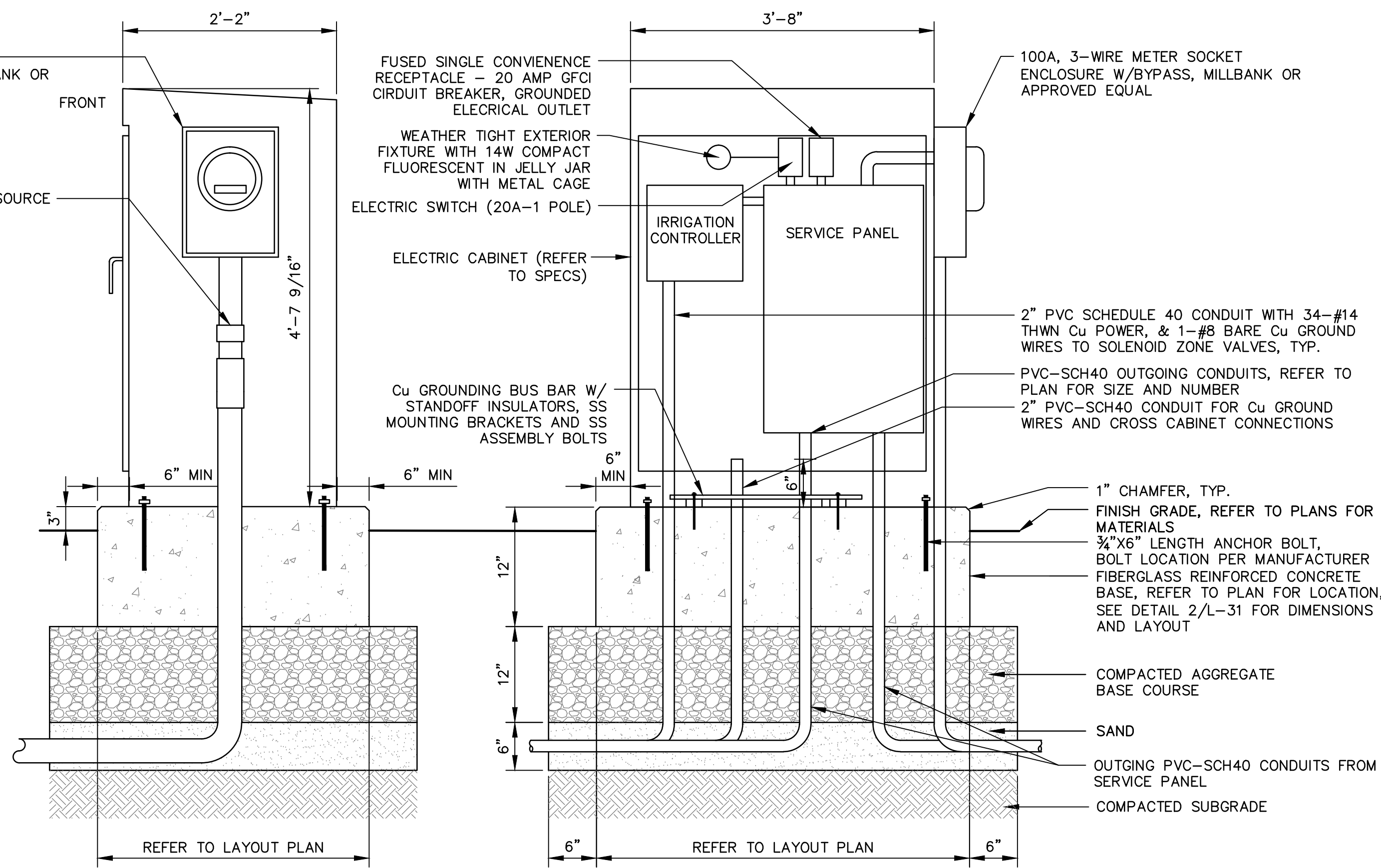
3 PVC CONDUIT DUCTBANK CROSS-SECTION DETAIL, TYP. N.T.S.



4 METERING CABINET RISER DIAGRAM DETAIL N.T.S.

100A, 3-WIRE METER SOCKET ENCLOSURE W/BYPASS, MILLBANK OR APPROVED EQUAL

ELECTRIC SERVICE FROM EVERSOURCE UTILITY POLE  
 2" PVC-SCH80 CONDUIT  
 2-#1 XHHW AL POWER  
 1-#1 XHHW AL NEUTRAL  
 1-#4 BARE AL GROUND



2 ELECTRICAL SERVICE CABINET ENCLOSURE DETAIL, TYP. N.T.S.

NEW SERVICE PANELBOARD - IN CABINET							
PHASE: 1      WIRES: 3      VOLTAGE: 120/240V      MAINS: 100A. MAIN C.B. (22KA - 18 CIRCUIT PANEL)							
CIRCUIT	FRAME	BREAKER POLES(N-NEUTRAL)	TRIP	DESCRIPTION OF LOAD	CABLE	CONDUIT	REMARKS
M	100	2P	100	MAIN CIRCUIT BREAKER	3W#1 AL & #4 AL GND	1-2" PVC	FROM POLE
1	20	1P	20	IRRIGATION CONTROLLER	2W#12 AWG CU & #12 GND	1-1" EMT	IN CABINET
2	20	1P	20	SPARE 1P/20A			
3	20	1P	20	80W LED WALKWAY LIGHT	2W#12 AWG CU & #12 GND	1-1" PVC	TO POLES 1-6
4	20	1P	20	80W LED WALKWAY LIGHT	2W#12 AWG CU & #12 GND	1-1" PVC	TO POLES 6-12
5	20	1P	20	SPARE 1P/20A			
6	20	1P	20 GFCI	SWITCH AND SERVICE LIGHT IN CABINET	2W#12 AWG CU & #12 GND	1-1" EMT	IN CABINET
7	20	1P	20	DUPLEX RECEPTACLE IN CABINET	2W#12 AWG CU & #12 GND	1-1" EMT	IN CABINET
8	60	2P	60	TO FOUNTAIN CONTROLLER IN CABINET	3W#6 AWG CU & #8 GND	1-2" PVC	TO FOUNTAIN CONTROL CABINET
9							
10	20	1P	20	SPARES 1P/20A (6 TOTAL)			
11		1P		SPACES 1P (6 TOTAL)			

BRANCH CIRCUITS SCHEDULE	
120 OR 277 VOLT 1Ø, 2W. CIRCUITS	
CIRCUIT BREAKER	CONDUCTOR
30A-1P	2#10+1#10 GND - 1°C
40A-1P	2#8+1#10 GND. - 1°C
50A-1P	2#6+1#10 GND. - 1°C
60A-1P	2#6+1#8 GND. - 2°C
208 VOLT 1Ø, 2W. CIRCUITS	
CIRCUIT BREAKER	CONDUCTOR
20A-2P	2#12+1#12 GND. - 1°C
30A-2P	2#10+1#10 GND. - 1°C
40A-2P	2#8+1#10 GND. - 1°C
50A-2P	2#6+1#10 GND. - 1°C
60A-2P	2#6+1#10 GND. - 1°C

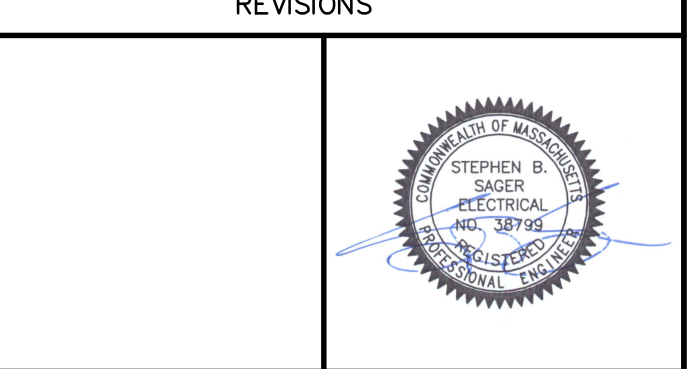
- ELECTRICAL NOTES:**
- ALL WORK TO BE COMPLETED IN ACCORDANCE WITH THE LATEST APPLICABLE STANDARDS OF ANSI, NEMA, UL, NFPA-70, AND THE MASSACHUSETTS ELECTRICAL CODE WITH REGARDS TO MATERIAL, DESIGN, AND CONSTRUCTION.
  - THIS DRAWING IS FOR INFORMATION ONLY. THE CONTRACTOR SHALL VERIFY ALL LOCATIONS, DEVICES, MATERIALS, AND EQUIPMENT, PRIOR TO THE START OF ANY WORK.
  - CONTRACTOR SHALL NOTIFY DIG SAFE AT 1-888-DIG-SAFE, AT LEAST 72 HOURS PRIOR TO BEGINNING ANY EXCAVATION.
  - PVC CONDUIT AND FITTINGS SHALL CONFORM TO ANSI/NEMA SPECIFICATIONS, TC-2, TC-3 AND UL-651.
  - CONTRACTOR SHALL OBTAIN ALL NECESSARY INSPECTIONS AND COORDINATE ALL WORK WITH THE OWNER AND THE CITY/TOWN TRENCHES SHALL BE INSPECTED PRIOR TO BACKFILLING.
  - LOCATIONS OF ALL UTILITIES ARE APPROXIMATE AND ARE PROVIDED FOR INFORMATION ONLY.
  - CONTRACTOR TO BALANCE THE NUMBER OF LIGHTING FIXTURES ON EACH CIRCUIT
  - CONTRACTOR TO LOCATE ALL ELECTRICAL EQUIPMENT AS DIRECTED BY THE OWNER, ARCHITECT & ENGINEER.
  - ALL POWER CABLES BELOW GRADE TO BE 600V, TYPE XHHW-2.

5 PANELBOARD SCHEDULE AND ELECTRICAL NOTES N.T.S.

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 695 WAREHAM STREET  
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No.	Description	Date



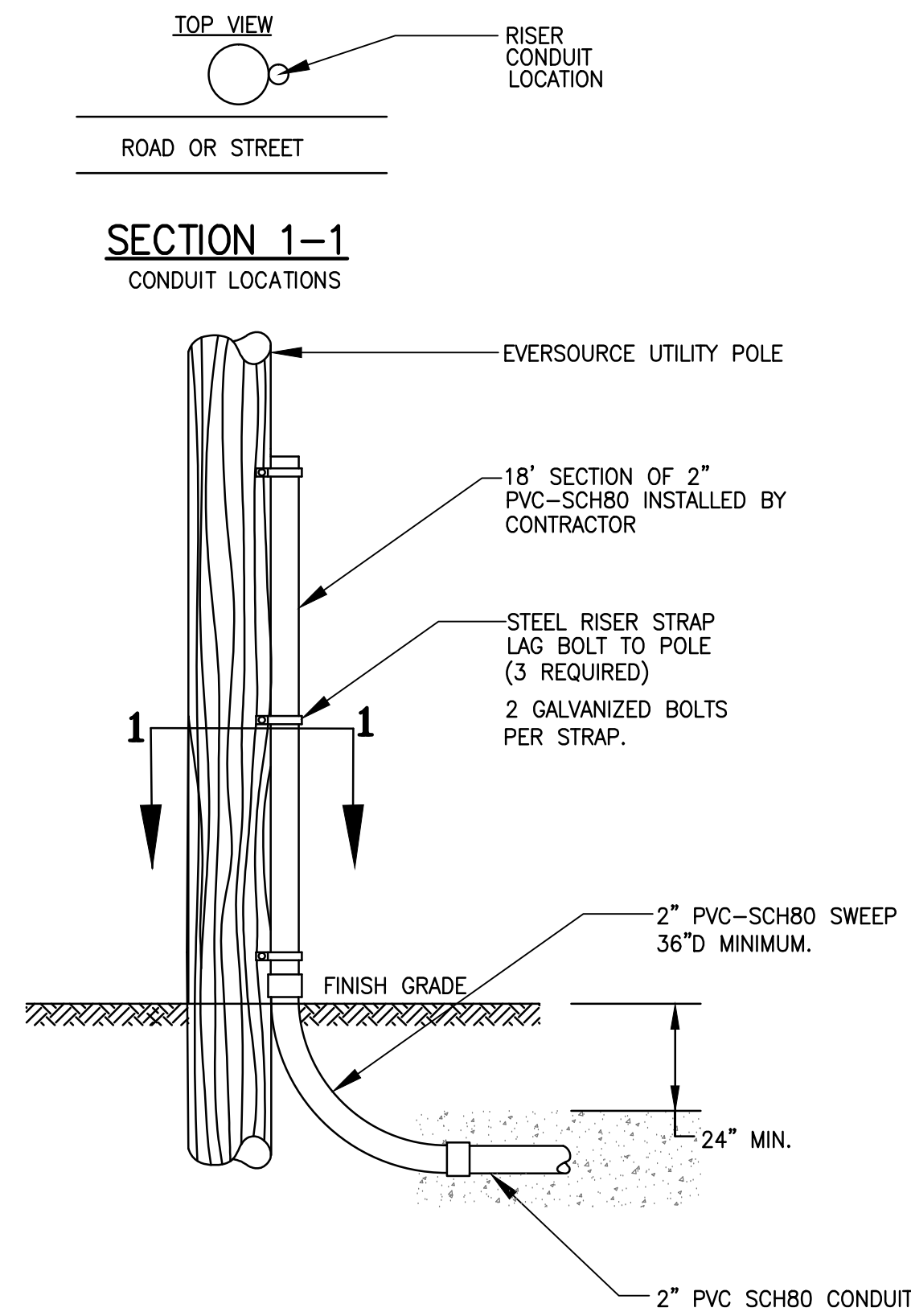
Project:  
**CITY OF WALTHAM  
 IMPROVEMENTS TO  
 PETER GILMORE PLAYGROUND  
 90 HALL STREET  
 WALTHAM, MA 02453**

Prepared For:  
**CITY OF WALTHAM  
 DEPARTMENT OF RECREATION  
 510 MOODY STREET  
 WALTHAM, MA 02453**

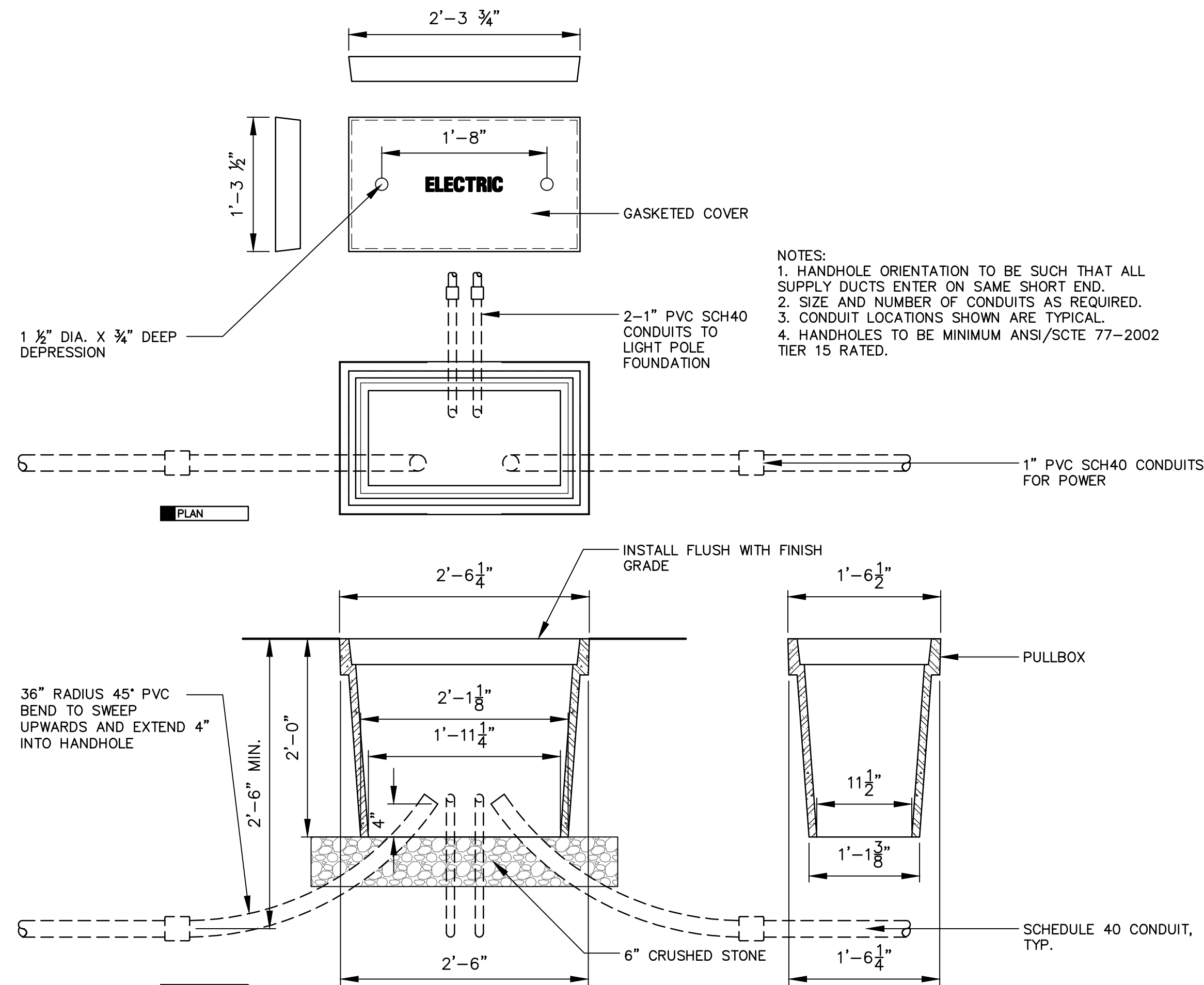
TITLE:  
**ELECTRICAL I  
 DETAILS**

Scale AS NOTED Date JAN 25, 2016  
 Drawn By DRB  
 Checked By CCC  
 Approved By CCC  
 Project No. 1313.01

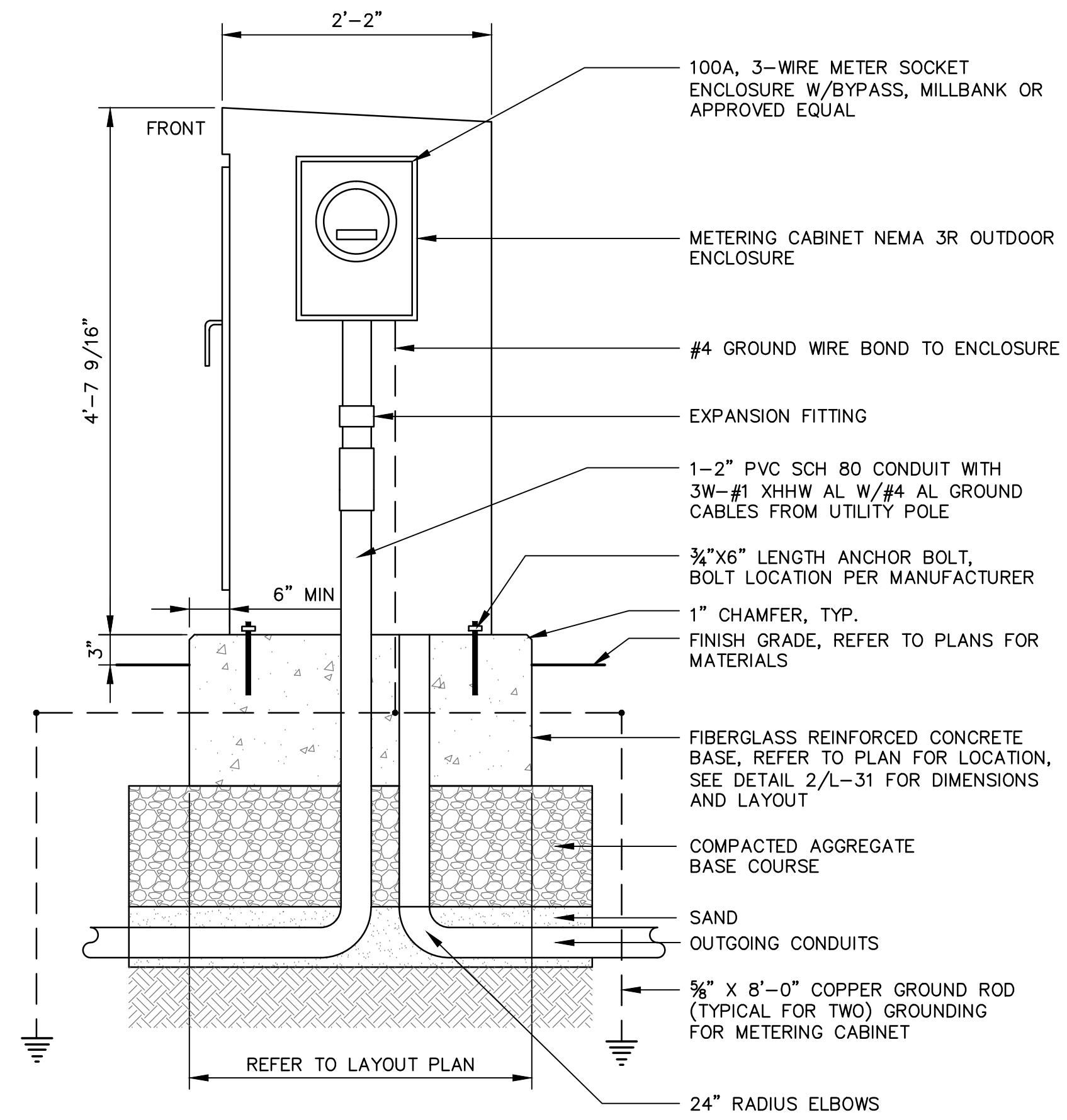
DWG No. **L.34**



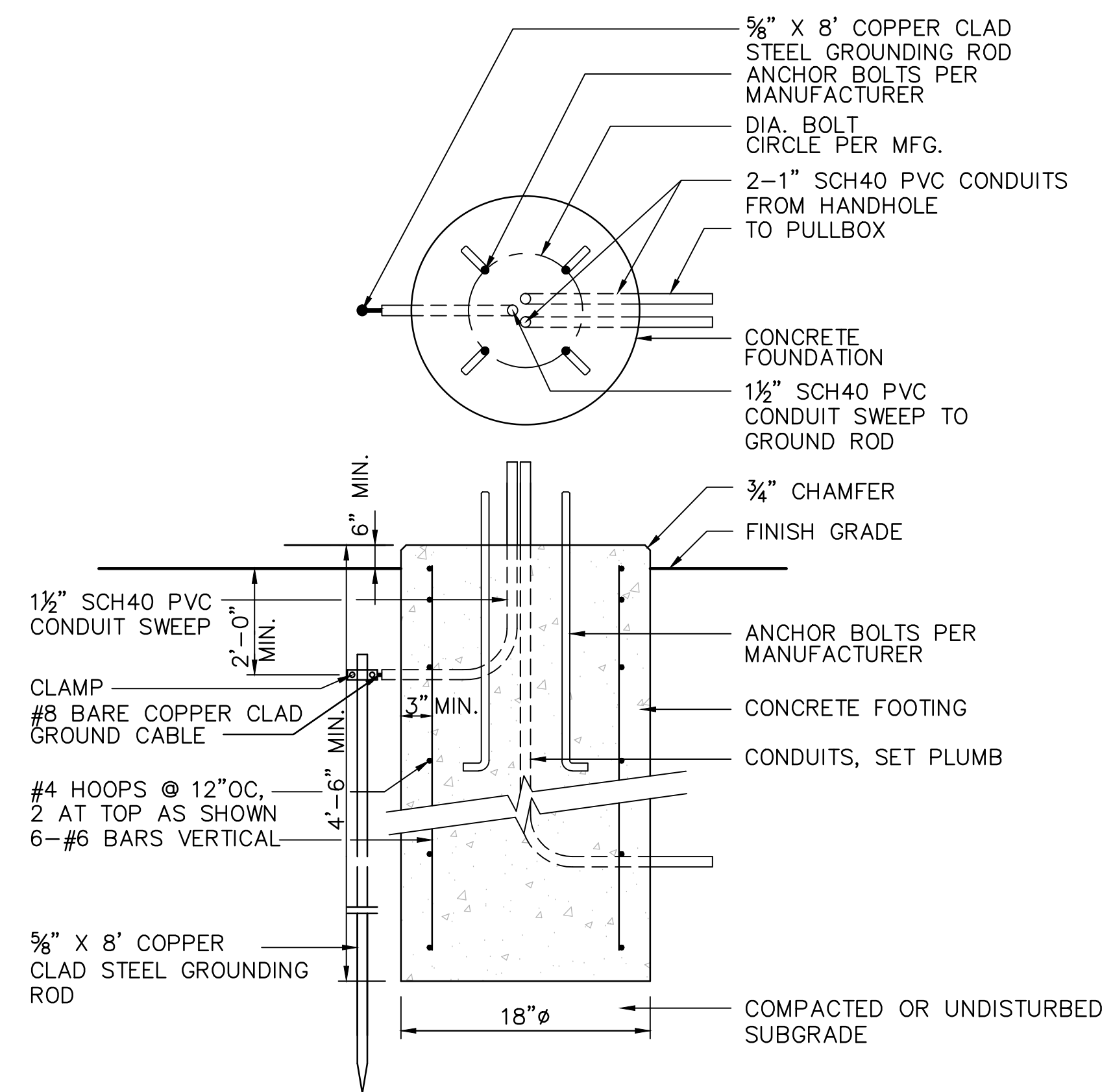
**SECTION 1**  
**1** RISER POLE FASTENING DETAIL, TYP.  
 N.T.S.



**SECTION 3**  
**3** TYPICAL HANDHOLE INSTALLATION DETAIL  
 N.T.S.



**SECTION 2**  
**2** METERING CABINET INSTALLATION DETAIL  
 N.T.S.



**SECTION 4**  
**4** LIGHT POLE FOUNDATION DETAIL, TYP.  
 N.T.S.

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No.	Description	Date

REVISIONS

No.	Description	Date

Project:  
**CITY OF WALTHAM  
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Prepared For:  
**CITY OF WALTHAM  
 DEPARTMENT OF RECREATION  
 510 MOODY STREET  
 WALTHAM, MA 02453**

TITLE:  
**ELECTRICAL  
 DETAILS II**

Scale AS NOTED Date JAN 25, 2016  
 Drawn By DRB  
 Checked By CCC  
 Approved By CCC  
 Project No. 1313.01

DWG No. **L.35**

**GENERAL CONTRACTOR NOTES**

- 1 \* indicates material provided by fountain equipment supplier, remainder by contractor.
- 2 CONTRACTOR SHALL INSURE THAT INSTALLATION COMPLIES WITH ALL APPLICABLE NATIONAL AND LOCAL CODES AND PROJECT SPECIFICATIONS.
- 3 G ALL POOLS SHALL BE WATERPROOFED BY SPECIFIED APPROVED MEANS.
- 4 G PRIOR TO ANY FINISHING MATERIALS (I.E. LIGHTS, JETS, COVER PLATES) BEING INSTALLED, POOL SHALL BE TESTED FOR LEAKS FOR A MINIMUM OF 72 HOURS AND ALL WATERPROOFING AND MASONRY WORK SHALL BE COMPLETED.
- 5 G REFER TO MECHANICAL AND ELECTRICAL NOTES FOR FURTHER INFORMATION.
- 6 G FIELD VERIFY ALL DIMENSIONS.
- 7 G CONSULT ARCHITECTURAL, STRUCTURAL, MECHANICAL AND ELECTRICAL DRAWINGS FOR ADDITIONAL DETAILS NOT SHOWN ON THESE DRAWINGS.
- 8 G ALL WEIRS SHALL BE INSTALLED WITH AN ACCURACY OF "+.1" OR "-.1" 1/16" OVER THE ENTIRE WEIR LENGTH. UNLESS OTHERWISE NOTED, REFER TO THE ARCHITECTURAL DRAWINGS FOR WEIR DETAILS.
- 9 G GENERAL CONTRACTOR SHALL PROVIDE ALL CONCRETE WORK AS REQUIRED BY ALL MECHANICAL AND ELECTRICAL FOUNTAIN EQUIPMENT REQUIREMENTS INCLUDING, BUT NOT LIMITED TO, HOUSE KEEPING PADS, LOCK-DOWN SLABS, THRUST BLOCKS. (SEE MECHL NOTES AND ALL DETAILS) WHERE INDICATED.
- 10 G GENERAL CONTRACTOR SHALL PROVIDE ALL UTILITIES SUCH AS POWER SUPPLIES, WATER SUPPLIES AND SEWER CONNECTIONS UNDER THE BUILDING CONTRACT UP TO THE FOUNTAIN CONTROLS, EQUIPMENT AND/OR POOL FITTINGS. (SEE MECHL NOTES AND ALL DETAILS) WHERE INDICATED.
- 11 G GENERAL CONTRACTOR SHALL PROVIDE AND IS RESPONSIBLE FOR ALL ELEVATION AND X-Y COORDINATES RELATING TO ALL FOUNTAIN EQUIPMENT INCLUDING VAULTS, POOL FLOORS AND PUMPS.
- 12 G GENERAL CONTRACTOR SHALL PROVIDE AND IS RESPONSIBLE FOR ALL REQUIRED EARTHWORK INCL. EXCAVATION & BACKFILL.
- # SYMBOL INDICATES FOUNTAIN POOL EQUIPMENT. DESCRIPTION IS LOCATED IN FOUNTAIN LEGEND ON RESPECTIVE SHEETS.
- # SYMBOL INDICATES FOUNTAIN RELATED PIPING AND CONDUITS. SIZE IS LOCATED IN FOUNTAIN LEGEND DESCRIPTION ON RESPECTIVE SHEETS.
- # SYMBOL INDICATES GENERAL NOTE. LETTER BESIDE SYMBOL INDICATES TYPE OF GENERAL NOTE. G REPRESENTS GENERAL CONSTRUCTION NOTE, M REPRESENTS MECHANICAL NOTE AND E REPRESENTS ELECTRICAL NOTE. SYMBOL WITHOUT LETTER INDICATES NOTE APPLIES TO MORE THAN ONE DISCIPLINE.
- # SYMBOL INDICATES FOUNTAIN SHEET REVISION NUMBER. REVISION DESCRIPTION IS LOCATED IN REVISION BLOCK OF TITLE BLOCK ON RESPECTIVE SHEETS. SYMBOL WITH REVISION NUMBER WILL APPEAR NEXT TO REVISIONS THAT HAVE BEEN MADE.

**MECHANICAL CONTRACTOR NOTES**

- 1 \* indicates material provided by fountain equipment supplier, remainder by designated contractor.
- 2 CONTRACTOR SHALL INSURE THAT INSTALLATION COMPLIES WITH ALL APPLICABLE NATIONAL AND LOCAL CODES AND PROJECT SPECIFICATIONS.
- 3 M ALL PIPING RUNS ARE DRAWN FOR CLARITY AND DO NOT NECESSARILY SHOW EXACT ROUTING. CONTRACTOR SHALL INSTALL PIPES WITH AS FEW CHANGES IN DIRECTION AS JOBSITE CONDITIONS WILL ALLOW.
- 4 M INDICATES CONNECTION POINT PROVIDED BY FOUNTAIN EQUIPMENT MANUFACTURER. ALL PIPING BETWEEN THIS POINT AND THE POOL EQUIPMENT TO BE PROVIDED BY THE CONTRACTOR.
- 5 M INDICATES MIDPOINT OF PIPES CONNECTING RESPECTIVE FOUNTAIN EQUIPMENT COMPONENTS.
- 6 M PRESSURE TESTING ON ALL PIPE RUNS BETWEEN THE PUMPING EQUIPMENT AND THE FOUNTAIN BASIN SHALL BE DONE BY THE CONTRACTOR AFTER "ROUGH INS" (PIPES LAID AND STUBBED UP) ARE COMPLETE AND AGAIN BEFORE ANY CONCRETE IS POURED. IT IS RECOMMENDED TO MAINTAIN ALL PIPING UNDER PRESSURE DURING CONSTRUCTION PHASE TO DETECT ANY DAMAGE EARLY ON. ALL TESTS SHALL USE WATER, NOT AIR.
- 7 M THE INCOMING WATER SUPPLY LINE PRESSURE MUST NOT EXCEED 50 PSI AND IS PART OF THE GENERAL CONTRACT WORK.
- 8 M CONTRACTOR SHALL OBTAIN ALL NECESSARY INSTALLATION PERMITS AND INSPECTIONS.
- 9 M ALL PIPING SHALL BE INSTALLED LEVEL OR WITH A DOWNWARD SLOPE FROM THE POOL TO THE PUMP ROOM.
- 10 M ALL PIPING BELOW 6" BETWEEN PUMP EQUIPMENT AND POOL EQUIPMENT SHALL BE SCHEDULE 40 PVC. ALL DISPLAY DISCHARGE PIPING 6" AND ABOVE SHALL BE SCHEDULE 80 PVC UNLESS OTHERWISE NOTED.
- 11 M G/C AND M/C ARE TO INSTALL CONCRETE THRUST BLOCKS AT ALL 90 DEGREE TURNS IN FOUNTAIN DISPLAY DISCHARGE PIPING 6" AND LARGER.
- 12 M ALL PIPING SHALL BE PRESSURE TESTED AFTER INSTALLATION IN ACCORDANCE WITH PROJECT TESTING STANDARDS (MINIMUM OF 50 PSI). TESTING SHALL NOT BE DONE BY COMPRESSED AIR. WATER SHALL BE USED FOR THESE TESTS.
- 13 M ALL WELDED PVC FITTINGS ABOVE 6" DIAMETER SHALL BE FIBERGLASS REINFORCED AND USED ONLY ON NON-PRESSURIZED LINES.
- 14 M ALL PIPING IN OPEN AREAS BELOW THE POOLS SHALL BE INSTALLED FREE HANGING FROM THE CEILING IN THE LEVEL BELOW WITH PIPE HANGERS/PER SPECIFICATIONS AND CODE.
- 15 M ALL PIPING PENETRATIONS THROUGH STRUCTURE WALLS INTO OPEN AREAS BELOW POOL STRUCTURE MUST HAVE THE NECESSARY ALLOWANCES MADE FOR SETTLEMENT.
- 16 M ALL PENETRATIONS THROUGH OUTSIDE WALLS TO BELOW GRADE SHALL BE SEALED PER BUILDING SPECIFICATIONS. USING "EASY-LINK SEALS" IS REQUIRED.
- 17 M SANITARY SEWER DRAIN LINE P-TRAPS AND CHECK VALVES TO BE INSTALLED BY PERMITTING CONTRACTOR PER CODE.

**ELECTRICAL CONTRACTOR NOTES**

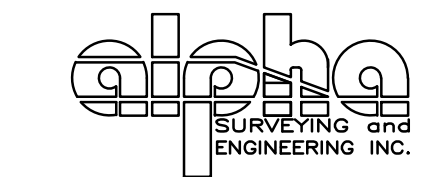
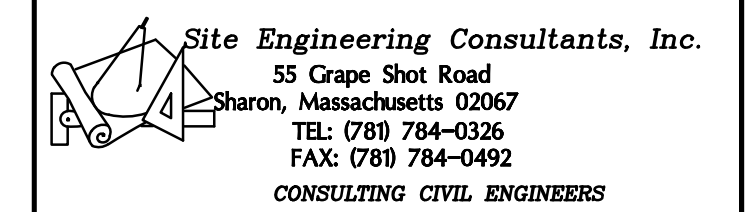
- 1 \* indicates material provided by fountain equipment supplier, remainder by contractor.
- 2 E CONTRACTOR SHALL INSURE THAT INSTALLATION COMPLIES WITH ALL APPLICABLE NATIONAL AND LOCAL CODES, ESPECIALLY 2014 N.E.C. SECTION 680 E, SECTION 682 (IF APPLICABLE), AND PROJECT SPECIFICATIONS.
- 3 E CONDUITS ARE DRAWN FOR CLARITY AND DO NOT NECESSARILY SHOW EXACT ROUTING. CONTRACTOR SHALL INSTALL CONDUITS WITH AS FEW CHANGES IN DIRECTION AS JOB SITE CONDITIONS WILL ALLOW.
- 4 E INDICATES CONNECTION POINT PROVIDED BY FOUNTAIN EQUIPMENT MANUFACTURER. ALL MATERIALS BETWEEN THIS POINT AND THE POOL EQUIPMENT TO BE PROVIDED BY THE CONTRACTOR.
- 5 E CONTRACTOR SHALL OBTAIN ALL NECESSARY PERMITS AND INSPECTIONS.
- 6 E ELECTRICAL CONDUIT INSIDE A STRUCTURE AREA TO BE EMT. ELECTRICAL CONDUIT UNDERGROUND TO BE PVC.
- 7 E CONTRACTOR TO INSURE THAT ALL BONDING CODES ARE COMPLIED WITH FOR ALL METAL POOL EQUIPMENT COMPONENTS AND REINFORCING STEEL.
- 8 E AFTER TESTING, JUNCTION BOXES SHALL BE SEALED WITH SCOTCH 3M RE-ENTERABLE COMPOUND OR OTHER APPROVED FILLING COMPOUND (SEE 2 ABOVE). THE USE OF PARAFFIN WAX IS PROHIBITED.
- 9 E WIRES FOR WATER LEVEL SENSORS MUST BE RUN IN A SEPARATE CONDUIT TO THE FOUNTAIN CONTROL PANEL.
- 10 E ALL CONDUIT PENETRATIONS THROUGH STRUCTURE WALLS INTO TRADE AREAS BELOW THE POOL STRUCTURE MUST HAVE THE NECESSARY ALLOWANCES MADE FOR SETTLEMENT.
- 11 E ALL CONDUIT INSTALLATION IN TRADE AREAS BELOW THE POOLS SHALL BE INSTALLED WITH E.M.T. IN THE LEVEL BELOW WITH E.M.T. STRAPS PER SPECIFICATIONS AND N.E.C.
- 12 E FLOOR MOUNTED MOTOR CONTROL CENTERS AND TRANSFORMERS FOR FOUNTAIN RELATED EQUIPMENT SHALL BE INSTALLED ON A 4" CONCRETE HOUSEKEEPING PAD IN EQUIPMENT ROOM.
- 13 E CONTRACTOR INSTALLING FOUNTAIN MANUFACTURER SUPPLIED DECK BOXES IN CONCRETE FOR FOUNTAIN LIGHTING IS TO INSURE THAT ALL OPEN CONDUIT PORTS ARE PLUGGED WATERTIGHT PRIOR TO SLAB POUR AROUND DECK BOXES.
- 14 E ALL PENETRATIONS THROUGH OUTSIDE WALLS OF BUILDINGS BELOW GRADE SHALL BE SEALED PER BUILDING SPECIFICATIONS. THE USE OF "EASY-LINK SEALS" IS REQUIRED.
- 15 E ALL CONNECTIONS IN THE BASIN / FOUNTAIN SHALL BE MADE WITH THE ASSISTANCE OF A PLUMBER USING TEFLON PASTE OR TEFLON TAPE. USE ONLY TAPERED (NPT) BRASS OR SST FITTINGS AND NIPPLES. THE USE OF GALVANIZED, BLACK OR STEEL PIPING IS PROHIBITED!!
- 16 E ALL PVC CONDUIT FITTINGS UNDERGROUND SHALL BE TYPE SCH80 PVC PRESSURE FITTINGS (MALE, FEMALE ADAPTERS & COUPLINGS). THE USE OF NORMAL ELECTRICAL PVC FITTINGS IS PROHIBITED! USE NORMAL PVC ELECTRICAL CONDUIT ONLY. USE COLOR CODED PRIMER, PVC GLUE & TEFLON PASTE FOR ALL PVC CONNECTIONS. THE USE OF NORMAL ELECTRICAL PVC FITTINGS IS PROHIBITED!

**DRAWING LEGEND**

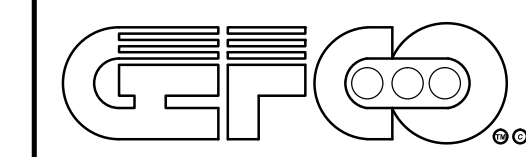
DWG.#	DESCRIPTION
F1	FOUNTAIN GENERAL NOTES / SYMBOLS
F2	FOUNTAIN SUCTION/ DRAIN PLAN VIEW
F3	FOUNTAIN DISCHARGE PLAN VIEW
F4	FOUNTAIN ELECTRICAL PLAN VIEW
F5	FOUNTAIN DIMENSIONS PLAN VIEW
F6	PUMP STATION DETAILS
F7	FOUNTAIN EQUIPMENT DETAILS

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Telephone: 508 478 8426, Facsimile: 508 478 8607



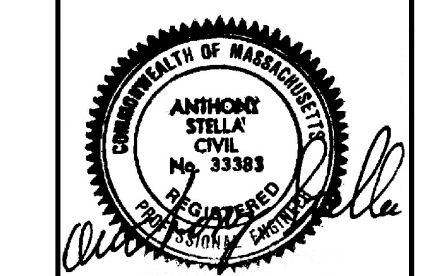
ALPHA SURVEYING AND ENGINEERING INC.  
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http://www.georgiafountain.com

No.	Description	Date

REVISIONS



Project:

**CITY OF WALTHAM IMPROVEMENTS TO PETER GILMORE PLAYGROUND 90 HALL STREET WALTHAM, MA 02453**

Prepared For:

**CITY OF WALTHAM DEPARTMENT OF RECREATION 510 MOODY STREET WALTHAM, MA 02453**

TITLE:  
**FOUNTAIN GENERAL NOTES**

Scale As Noted Date JAN 13, 2016  
Drawn By JAL  
Checked By MSF  
Approved By N/A  
Project No. 1313.01 GEFCO: #0915-998

DWG No. **F1** of 7

**FOUNTAIN PLAN PIPING SYMBOLS**

	GATE VALVE		FLANGED TEE
	BALL VALVE		FLANGED REDUCER
	BUTTERFLY VALVE (FLANGED)		NON-FLANGED REDUCER
	SWING CHECK VALVE		TEE (THIRD LEG OUT)
	FLANGED CHECK VALVE		TEE (THIRD LEG DOWN)
	MOTOR OPERATED VALVE		TEE (THIRD LEG UP)
	SOLENOID OR DIAPHRAM OPERATED VALVE		PIPE & FLOW DIRECTION
	ELECTRICAL CONDUIT NUMBER & SIZE OF WIRES		CHEMICAL PIPING
	THREADDED CONNECTION		AIR VENT PIPING
	SOCKET CONNECTION - PVC		FLOW, PRESSURE AND VACUUM SWITCH

**FOUNTAIN PLAN EQUIPMENT SYMBOLS**

	SURFACE SKIMMER		EQUIPMENT ROOM FLOOR DRAIN
	VACUUM FITTING		WATER LEVEL SENSOR
	EYEBALL FITTING		SMALL SUBMERSIBLE FREE-STANDING LIGHT FIXTURE
	2" SMALL POOL DRAIN		SUBMERSIBLE FREESTANDING LIGHT FIXTURE
	4" MAIN POOL DRAIN		SMALL SUBMERSIBLE NICHE LIGHT FIXTURE
	2" WALL NICHE OVERFLOW		SUBMERSIBLE NICHE LIGHT FIXTURE
	4" WALL NICHE OVERFLOW		SMALL JUNCTION BOX WITH CORD SEALS
	OVERFLOW DRAIN STANDPIPE		LARGE JUNCTION BOX WITH CORD SEALS
	8" DIAM. CYCOLAC SUMP		BRASS SLAB CONDUIT
	ABS SUMP; BTM. OUTLET		DECK BOX
	24" SQ. A-V PLATE		DISTRIBUTION BOX-PVC AND/OR AS LABELED OTHERWISE
	12" SQ. A-V PLATE		

**GEORGIA FOUNTAIN COMPANY - INTERACTIVE, ANIMATED & ARCHITECTURAL WATER FOUNTAINS**

TELEPHONE +1 770.934.3297

2513 ROYAL PLACE - TUCKER, GEORGIA 30084 USA

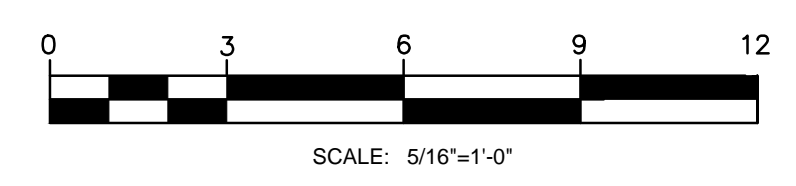
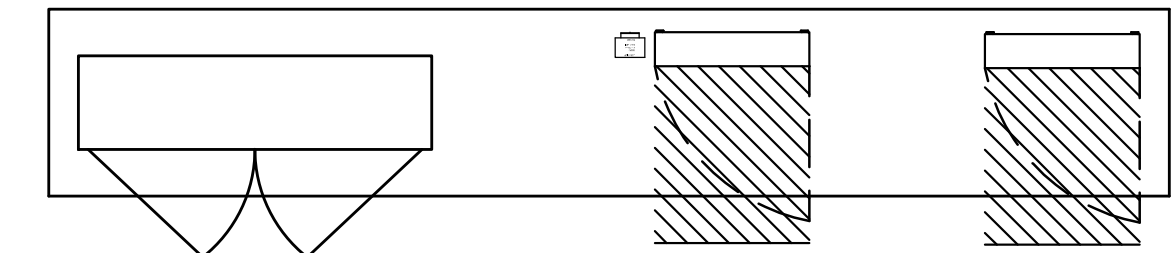
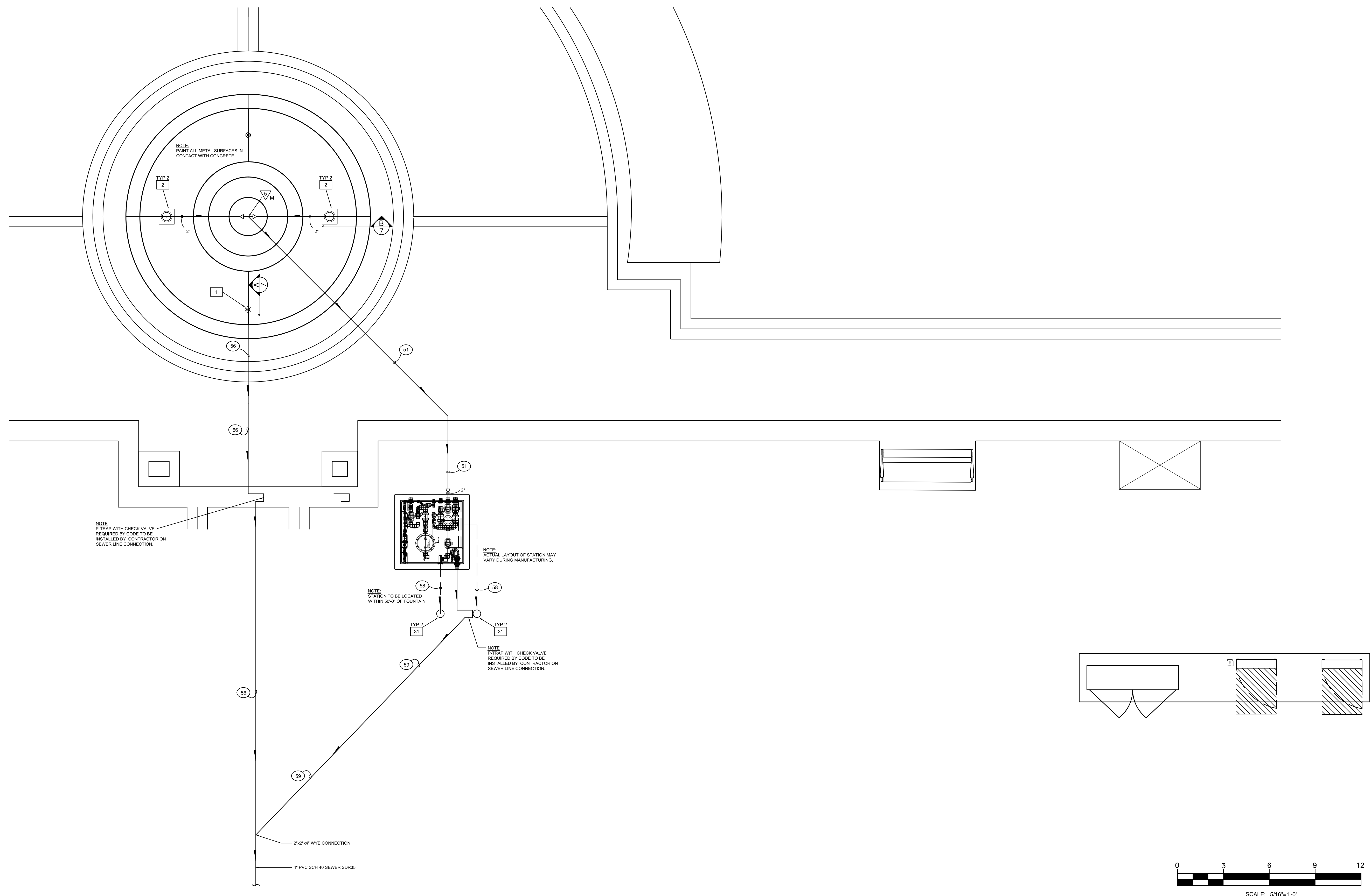
FAX. +1 770.934.8770

www.georgiafountain.com

GILMORE PLAYGROUND FOUNTAIN

SYMB	DETAIL	DESCRIPTION	FOUNTAIN EQUIPMENT LIST	QTY.
1	A-F7	GEFCO #PE106-20SP OVERFLOW/ DRAIN FITTING; 2" NPT CONNECTION, CPR & BRASS.		01
2	B-F7	GEFCO #PE107-09 SUCTION SUMP, 2" S CONN, PLASTIC, 12" SQ. SST AV PLATE.		02
3	C-F7	GEFCO #PE112 FLOOR INLET FITTING; 2" NPT CONNECTION, BRASS.		01
4	D-F7	GEFCO CUSTOM PE109-SP-BRS SLAB PENETRATION W/ 1X2", 1X1-1/2" + 1X 3/4" NPT TAKE-OFFS		01
5	E-F7	GEFCO SELECT #EE106-3 SUBM. JUNCTION BOX: 3x 1/2" S.T., 1x 3/4" B.T. NPT CONN, BRONZE.		02
6	E-F7	GEFCO SELECT #EE112-01 CORD SEAL: 1/2" NPT CONNECTION, BRASS.		06
7	E-F7	GEFCO SELECT #EE2123-C POTTING COMPOUND		02
8	E/F-F7	GEFCO #EE113-07 SLAB CONDUIT: 3/4" NPT CONN, BRASS.		03
9	E-F7	GEFCO #EE152-W27 SUBM. WHITE LED FREE STANDING LIGHT, 9FT 5#16 CABLE, 12VAC 27W		06
10	F-F7	GEFCO SELECT #EE131A CONDUIT MOUNT DUAL LEVEL SENSOR, 12VDC		03

SYMB	DESCRIPTION	QTY.
50	1" INCOMING WATER SUPPLY LINE TO AUTOMATIC FILL MANIFOLD (IN STATION) (50 PSI MAX.)	01
51	3" MAIN PUMP SUCTION FROM FOUNTAIN TO DISPLAY PUMP, PVC SCH 40	01
52	2" FILTER/FILL RETURN LINE FROM FILTER TO INLET FITTING, PVC SCH 80	01
53	3/4" DISCHARGE FROM DISPLAY PUMP TO UPPER BOWL CENTER JET, PVC SCH 80	01
54	1-1/2" DISCHARGE FROM DISPLAY PUMP TO MIDDLE BOWL, PVC SCH 80	01
55	2" DISCHARGE FROM DISPLAY PUMP TO LOWER BOWL BALLAST, PVC SCH 80	01
56	2" MAIN DRAIN/ OVERFLOW FROM FOUNTAIN TO SANITARY SEWER, PVC SCH 40	01
57	3/4" BOWL DRAIN (3/4" NPT PLUG)	03
58	2" STATION AIR VENTS TO ATMOSPHERE	02
59	2" STATION EMERGENCY DRAIN FROM SUMP PUMP TO SANITARY SEWER, PVC SCH 40	01



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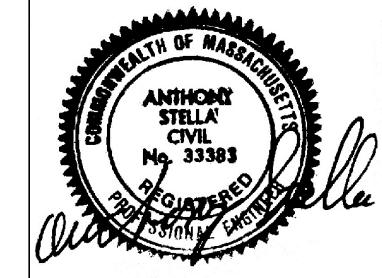
**Site Engineering Consultants, Inc.**  
 55 Grape Shot Road  
 Sharon, Massachusetts 02067  
 TEL: (781) 784-0326  
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No.	Description	Date

REVISIONS



Project:  
**CITY OF WALTHAM  
 IMPROVEMENTS TO  
 PETER GILMORE PLAYGROUND  
 90 HALL STREET  
 WALTHAM, MA 02453**

Prepared For:  
**CITY OF WALTHAM  
 DEPARTMENT OF RECREATION  
 510 MOODY STREET  
 WALTHAM, MA 02453**

TITLE:  
**FOUNTAIN SUCTION/ DRAIN  
 PLAN VIEW**

Scale 5/16"=1'-0" Date JAN 13, 2016  
 Drawn By JAL  
 Checked By MSF  
 Approved By N/A  
 Project No. 1313.01 GEFCO: #0915-998

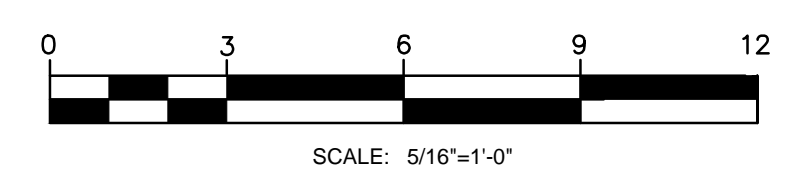
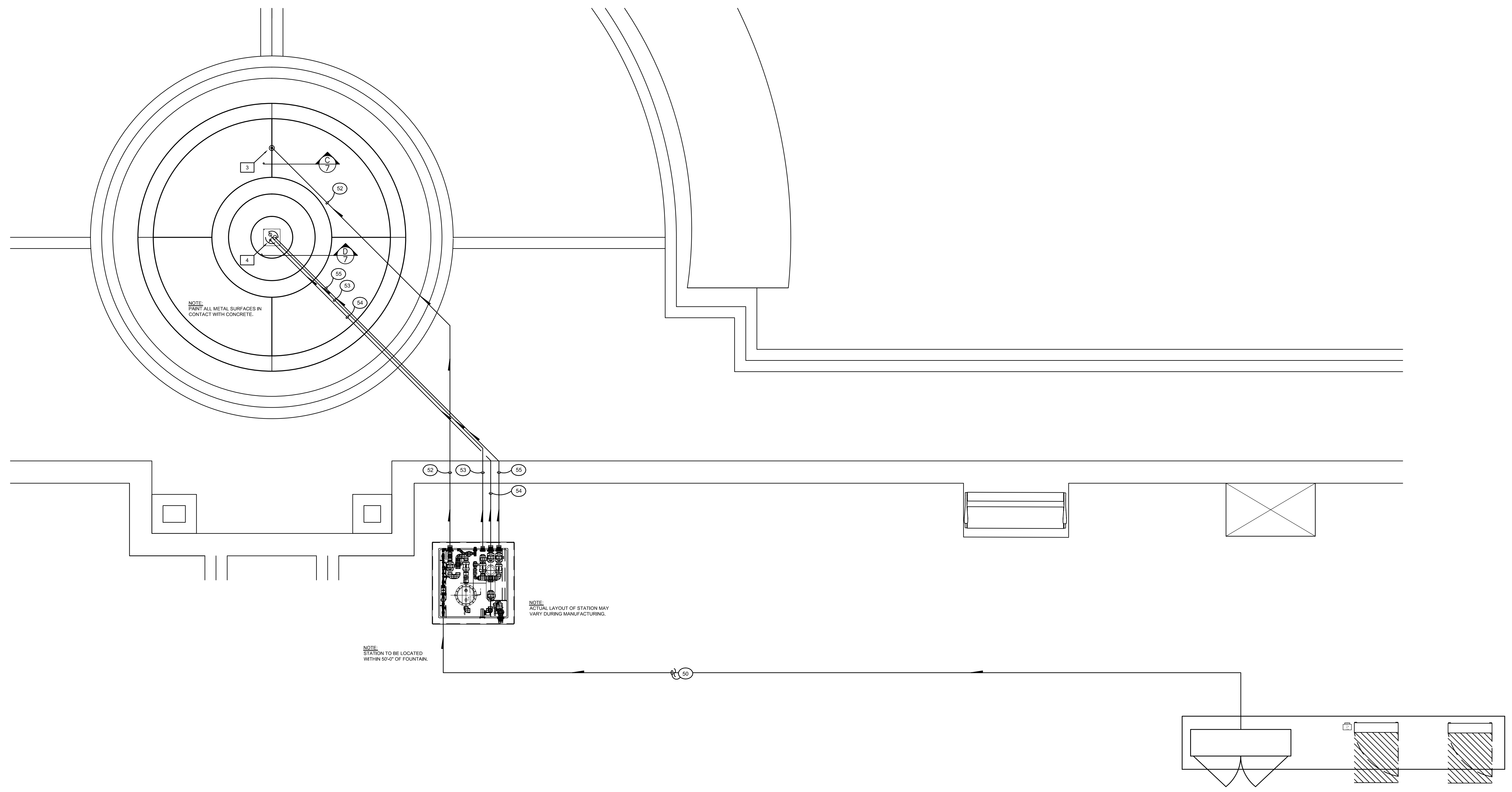
DWG No. **F2 of 7**



GILMORE PLAYGROUND FOUNTAIN

SYMB	DETAIL	DESCRIPTION	FOUNTAIN EQUIPMENT LIST	QTY.
1	A-F7	GEFCO #PE106-20SP OVERFLOW/ DRAIN FITTING: 2" NPT CONNECTION, CPR & BRASS.		01
2	B-F7	GEFCO #PE107-09 SUCTION SUMP, 2" S CONN, PLASTIC, 12" SQ. SST AV PLATE.		02
3	C-F7	GEFCO #PE112 FLOOR INLET FITTING: 2" NPT CONNECTION, BRASS.		01
4	D-F7	GEFCO CUSTOM PE109-SP-BRS SLAB PENETRATION W/ 1X2", 1X1-1/2" + 1X 3/4" NPT TAKE-OFFS		01
5	E-F7	GEFCO SELECT #EE106-3 SUBM. JUNCTION BOX: 3x 1/2" S.T., 1x 3/4" B.T. NPT CONN, BRONZE.		02
6	E-F7	GEFCO SELECT #EE112-01 CORD SEAL: 1/2" NPT CONNECTION, BRASS.		06
7	E-F7	GEFCO SELECT #EE2123-C POTTING COMPOUND		02
8	E/F-F7	GEFCO #EE113-07 SLAB CONDUIT: 3/4" NPT CONN, BRASS.		03
9	E-F7	GEFCO #EE152-W27 SUBM. WHITE LED FREE STANDING LIGHT, 9FT 5#16 CABLE, 12VAC 27W		06
10	F-F7	GEFCO SELECT #EE131A CONDUIT MOUNT DUAL LEVEL SENSOR, 12VDC		03

PIPING		QTY.
50	1" INCOMING WATER SUPPLY LINE TO AUTOMATIC FILL MANIFOLD (IN STATION) (50 PSI MAX.)	01
51	3" MAIN PUMP SUCTION FROM FOUNTAIN TO DISPLAY PUMP, PVC SCH 40	01
52	2" FILTER/FILL RETURN LINE FROM FILTER TO INLET FITTING, PVC SCH 80	01
53	3/4" DISCHARGE FROM DISPLAY PUMP TO UPPER BOWL CENTER JET, PVC SCH 80	01
54	1-1/2" DISCHARGE FROM DISPLAY PUMP TO MIDDLE BOWL, PVC SCH 80	01
55	2" DISCHARGE FROM DISPLAY PUMP TO LOWER BOWL BALLAST, PVC SCH 80	01
56	2" MAIN DRAIN/ OVERFLOW FROM FOUNTAIN TO SANITARY SEWER, PVC SCH 40	01
57	3/4" BOWL DRAIN (3/4" NPT PLUG)	03
58	2" STATION AIR VENTS TO ATMOSPHERE	02
59	2" STATION EMERGENCY DRAIN FROM SUMP PUMP TO SANITARY SEWER, PVC SCH 40	01



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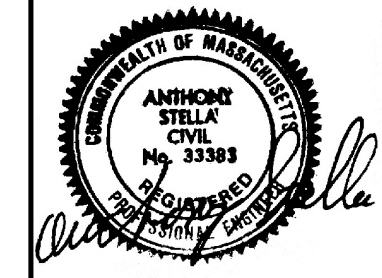
**Site Engineering Consultants, Inc.**  
 55 Grape Shot Road  
 Sharon, Massachusetts 02067  
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No.	Description	Date

REVISIONS



Project:  
**CITY OF WALTHAM  
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 WALTHAM, MA 02453**

Prepared For:  
**CITY OF WALTHAM  
 DEPARTMENT OF RECREATION  
 510 MOODY STREET  
 WALTHAM, MA 02453**

TITLE:  
**FOUNTAIN DISCHARGE  
 PLAN VIEW**

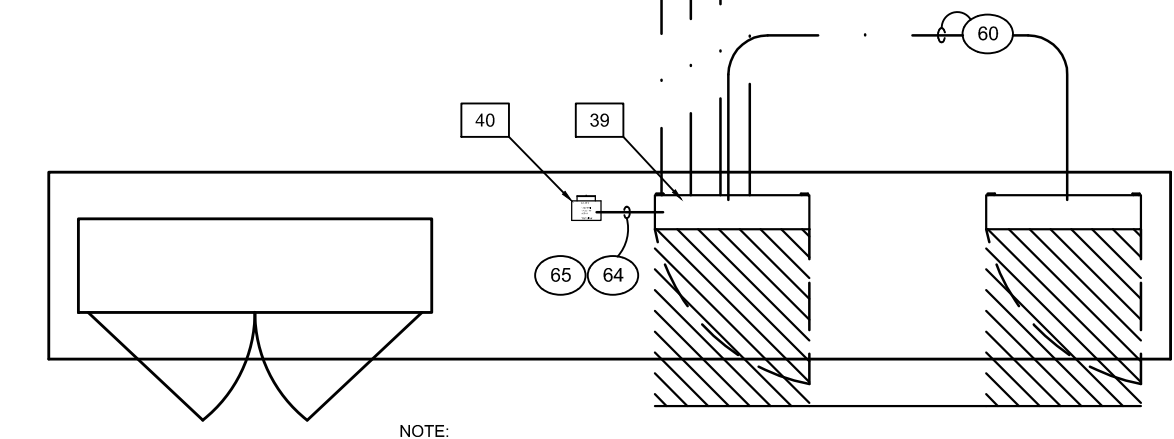
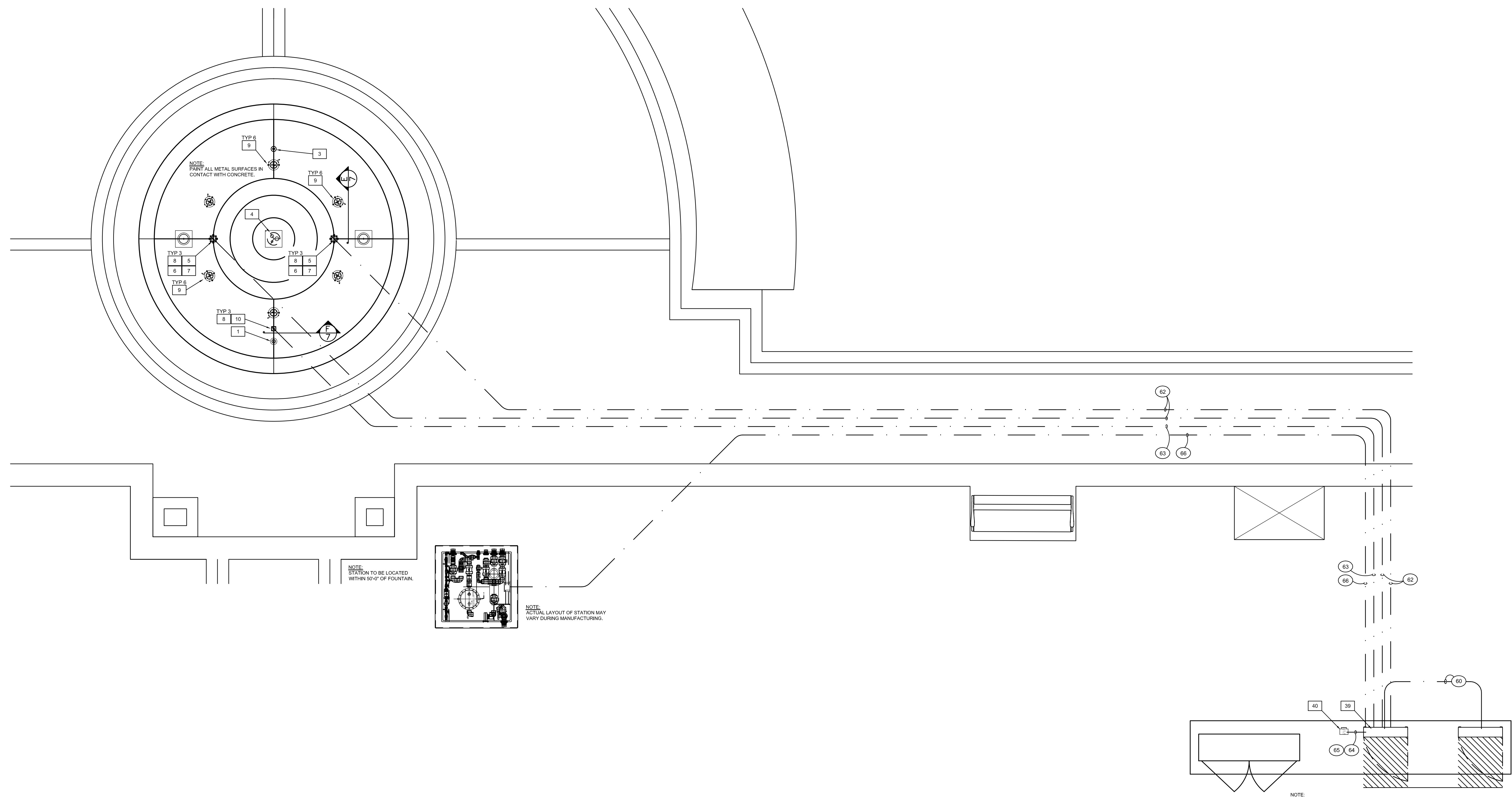
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 Drawn By JAL  
 Checked By MSF  
 Approved By N/A  
 Project No. 1313.01 GEFCO: #0915-998

DWG No. **F3 of 7**

GILMORE PLAYGROUND FOUNTAIN

SYMB	DETAIL	DESCRIPTION	FOUNTAIN EQUIPMENT LIST	QTY.
1	A-F7	GEFCO #PE106-20SP OVERFLOW/ DRAIN FITTING, 2" NPT CONNECTION, CPR & BRASS.		01
2	B-F7	GEFCO #PE107-09 SUCTION SUMP, 2" S CONN, PLASTIC, 12" SQ. SST AV PLATE.		02
3	C-F7	GEFCO #PE112 FLOOR INLET FITTING, 2" NPT CONNECTION, BRASS.		01
4	D-F7	GEFCO CUSTOM PE109-SP-BRS SLAB PENETRATION W/ 1X2", 1X1-1/2" + 1X 3/4" NPT TAKE-OFFS		01
5	E-F7	GEFCO SELECT #EE106-3 SUBM. JUNCTION BOX: 3x 1/2" S.T., 1x 3/4" B.T. NPT CONN, BRONZE.		02
6	E-F7	GEFCO SELECT #EE112-01 CORD SEAL: 1/2" NPT CONNECTION, BRASS.		06
7	E-F7	GEFCO SELECT #EE2123-C POTTING COMPOUND		02
8	E/F-F7	GEFCO #EE113-07 SLAB CONDUIT: 3/4" NPT CONN, BRASS.		03
9	E-F7	GEFCO #EE152-W27 SUBM. WHITE LED FREE STANDING LIGHT, 9FT 5#16 CABLE, 12VAC 27W		06
10	F-F7	GEFCO SELECT #EE131A CONDUIT MOUNT DUAL LEVEL SENSOR, 12VDC		03

SYMB	DESCRIPTION	QTY.
60	2" INCOMING POWER: 120/240V 1 Ø 3 WIRE 60A (3 #6 + #8 G)	01
61	NOT USED	01
62	3/4" CONDUIT FROM CONTROL PANEL TO LIGHT J.BOX (2 #8 + 1 #8G + 1 BELDEN CABLE #9842)	02
63	3/4" CONDUIT FROM CONTROL PANEL TO LEVEL SENSORS (6 #16 + 1 #16G)	01
64	1/2" CONDUIT FROM CONTROL PANEL TO LV TRANSFORMER (2 #14)	01
65	3/4" CONDUIT FROM LV TRANSFORMER CONTROL PANEL (2 #8 + 1 #8G)	01
66	1" CONDUIT FROM CONTROL PANEL PUMP STATION PULL BOX (2 #12 + 6#14 + 1 #8G)	01
67	#8 BARE COPPER BOND WIRE CONNECTION TO ALL METAL POOL PIPING PARTS AND REINFORCING STEEL PER ELECTRICAL INSPECTOR CITY OF WALTHAM	01



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No.	Description	Date

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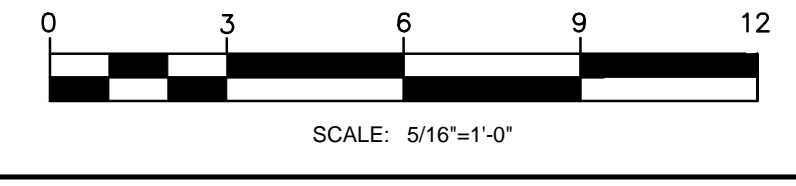
Project:  
**CITY OF WALTHAM  
 IMPROVEMENTS TO  
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 90 HALL STREET  
 WALTHAM, MA 02453**

Prepared For:  
**CITY OF WALTHAM  
 DEPARTMENT OF RECREATION  
 510 MOODY STREET  
 WALTHAM, MA 02453**

TITLE:  
**FOUNTAIN ELECTRICAL  
 PLAN VIEW**

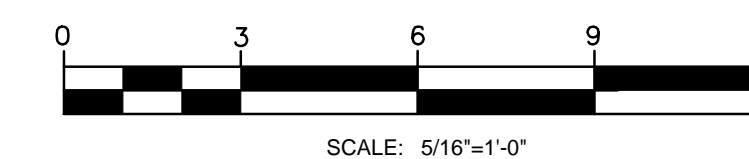
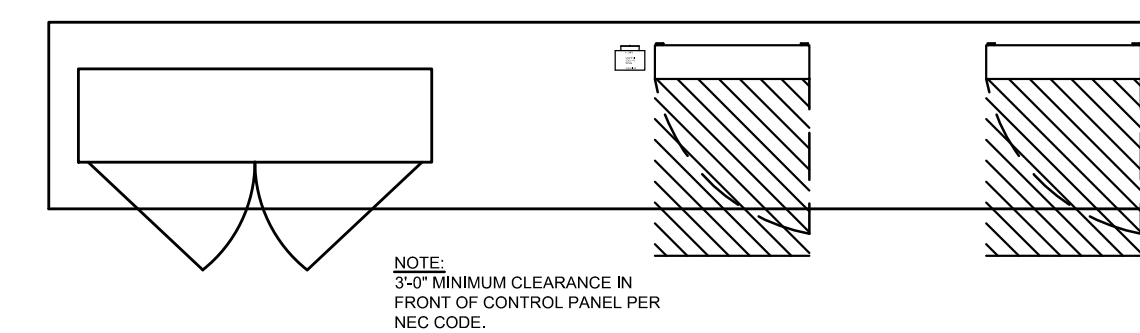
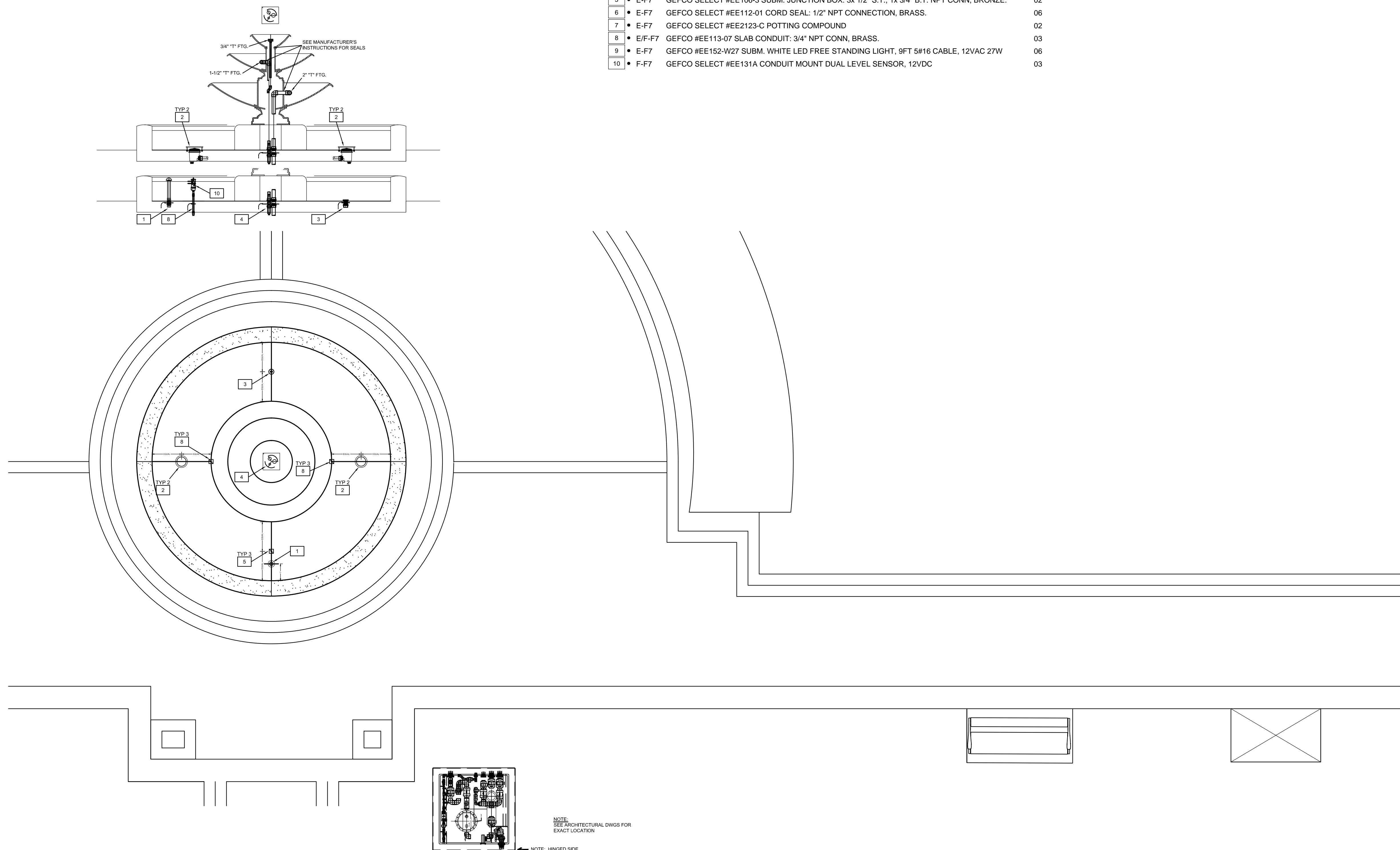
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 Drawn By JAL  
 Checked By MSF  
 Approved By N/A  
 Project No. 1313.00 GEFCO: #0915-998

DWG No. **F4 of 7**



GILMORE PLAYGROUND FOUNTAIN

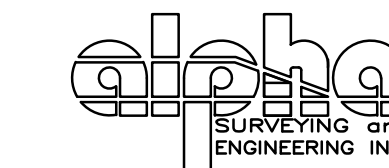
SYMB	DETAIL	DESCRIPTION	FOUNTAIN EQUIPMENT LIST	QTY.
1	A-F7	GEFCO #PE106-20SP OVERFLOW/ DRAIN FITTING; 2" NPT CONNECTION, CPR & BRASS.		01
2	B-F7	GEFCO #PE107-09 SUCTION SUMP, 2" S CONN, PLASTIC, 12" SQ. SST AV PLATE.		02
3	C-F7	GEFCO #PE112 FLOOR INLET FITTING; 2" NPT CONNECTION, BRASS.		01
4	D-F7	GEFCO CUSTOM PE109-SP-BRS SLAB PENETRATION W/ 1X2", 1X1-1/2" + 1X 3/4" NPT TAKE-OFFS		01
5	E-F7	GEFCO SELECT #EE106-3 SUBM. JUNCTION BOX; 3x 1/2" S.T., 1x 3/4" B.T. NPT CONN, BRONZE.		02
6	E-F7	GEFCO SELECT #EE112-01 CORD SEAL; 1/2" NPT CONNECTION, BRASS.		06
7	E-F7	GEFCO SELECT #EE2123-C POTTING COMPOUND		02
8	E/F-F7	GEFCO #EE113-07 SLAB CONDUIT; 3/4" NPT CONN, BRASS.		03
9	E-F7	GEFCO #EE152-W27 SUBM. WHITE LED FREE STANDING LIGHT, 9FT 5#16 CABLE, 12VAC 27W		06
10	F-F7	GEFCO SELECT #EE131A CONDUIT MOUNT DUAL LEVEL SENSOR, 12VDC		03



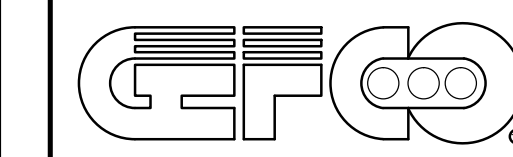
**Carolyn Cooney & Associates**

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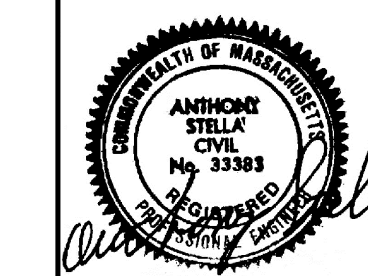
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No.	Description	Date

REVISIONS



Project:  
**CITY OF WALTHAM  
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 WALTHAM, MA 02453**

Prepared For:  
**CITY OF WALTHAM  
 DEPARTMENT OF RECREATION  
 510 MOODY STREET  
 WALTHAM, MA 02453**

TITLE:  
**FOUNTAIN DIMENSIONS  
 PLAN VIEW**

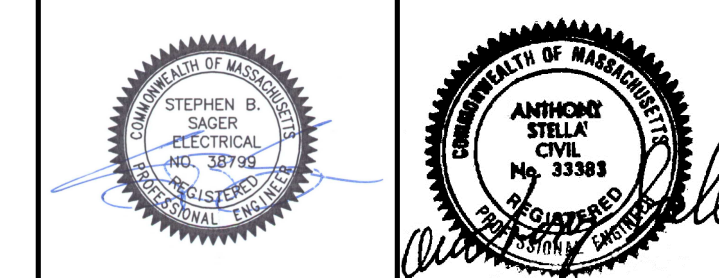
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 Checked By MSF  
 Approved By N/A  
 Project No. 1313.00 GEFCO: #0915-998

DWG No. **F5 of 7**



No.	Description	Date

REVISIONS



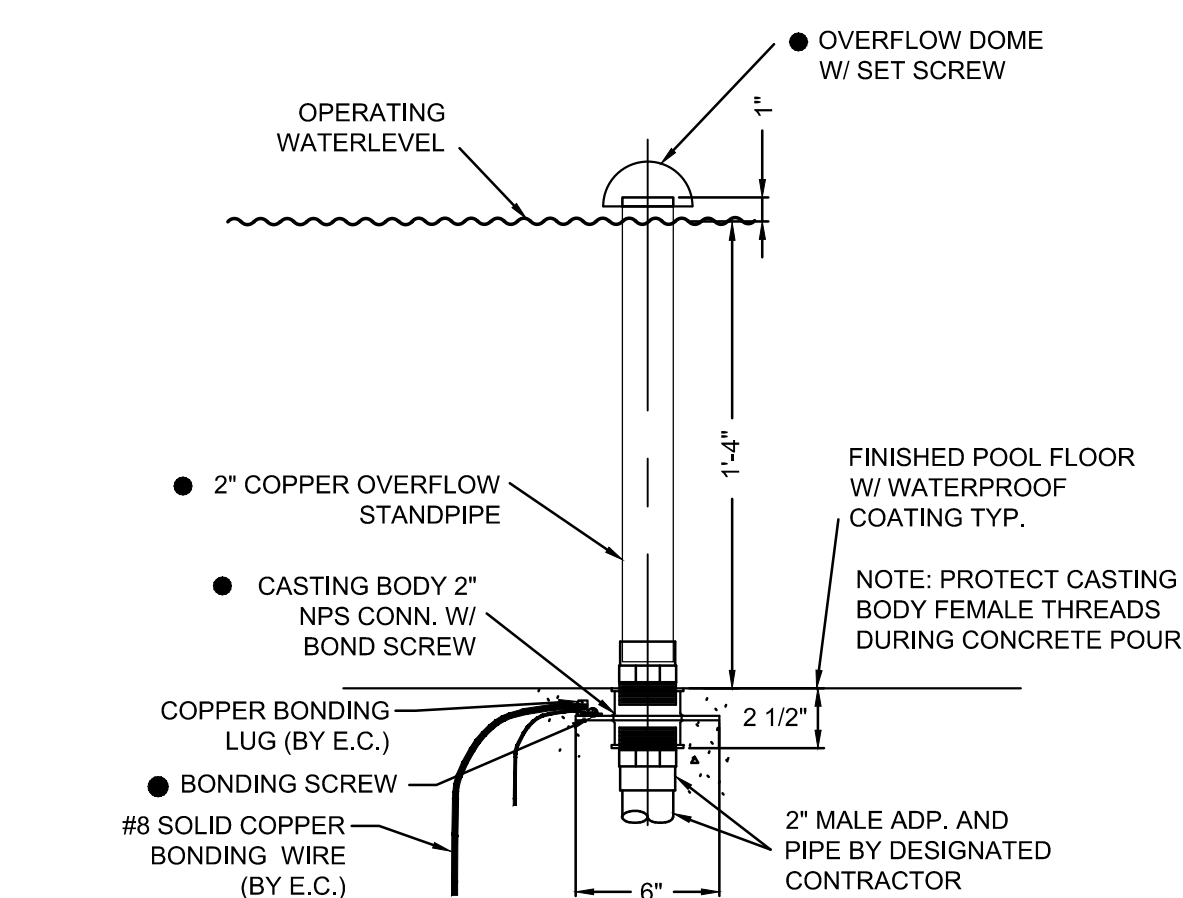
Project:  
**CITY OF WALTHAM  
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 WALTHAM, MA 02453**

Prepared For:  
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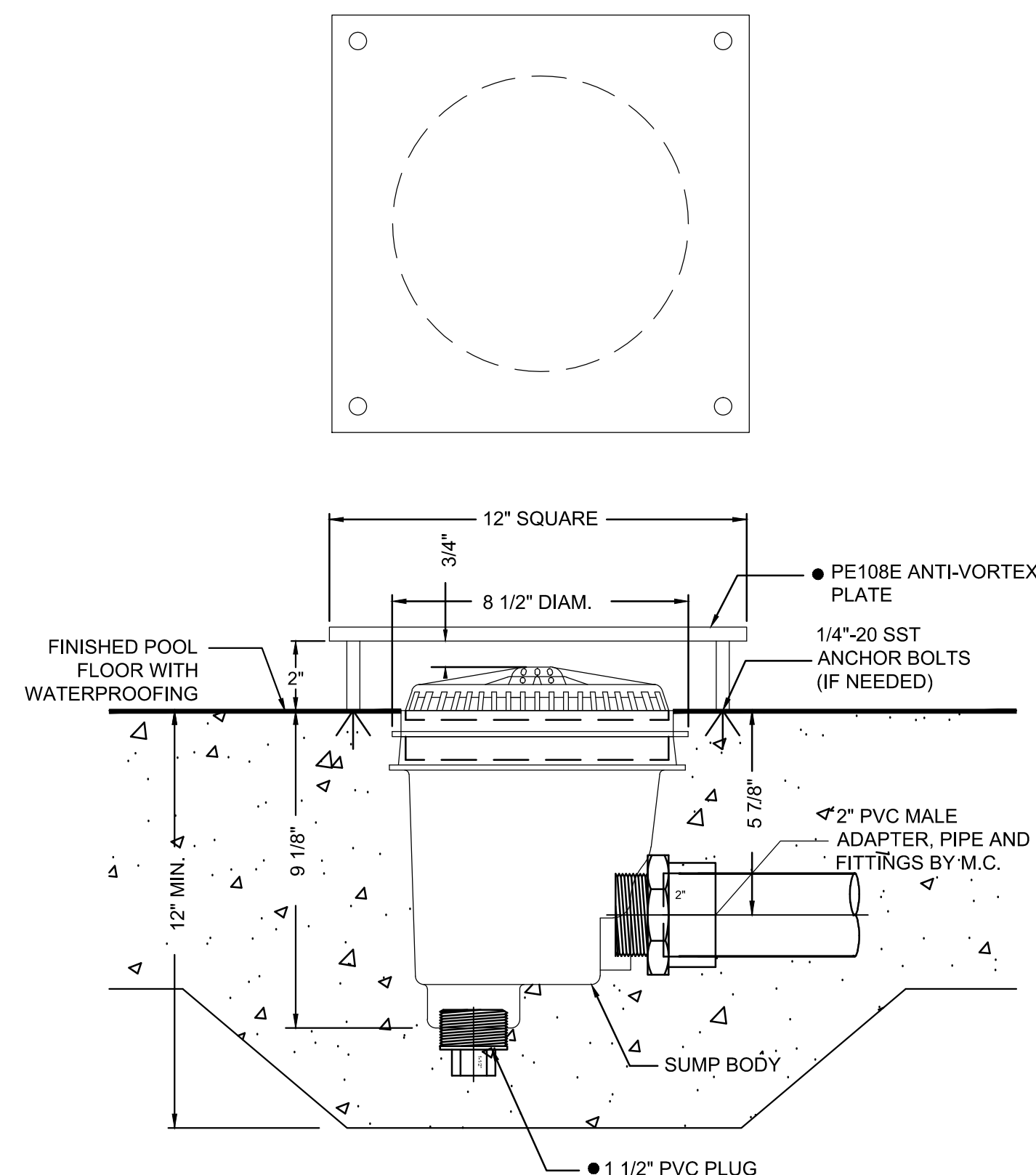
TITLE:  
**FOUNTAIN EQUIPMENT  
 DETAILS**

Scale As Noted Date JAN 13, 2016  
 Drawn By JAL  
 Checked By MSF  
 Approved By N/A  
 Project No. 1313.01 GEFCO: #0915-998

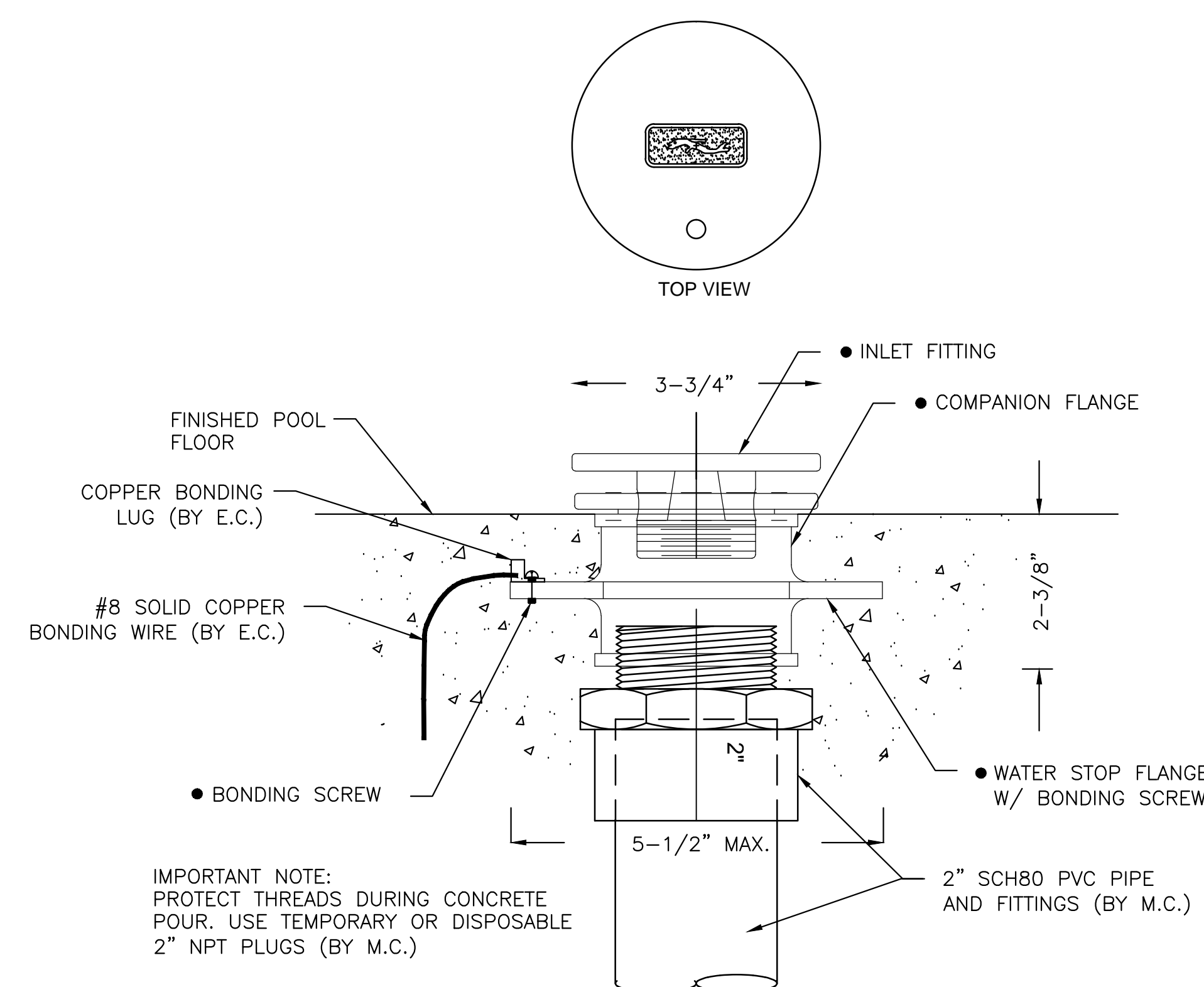
DWG No. **F7 of 7**



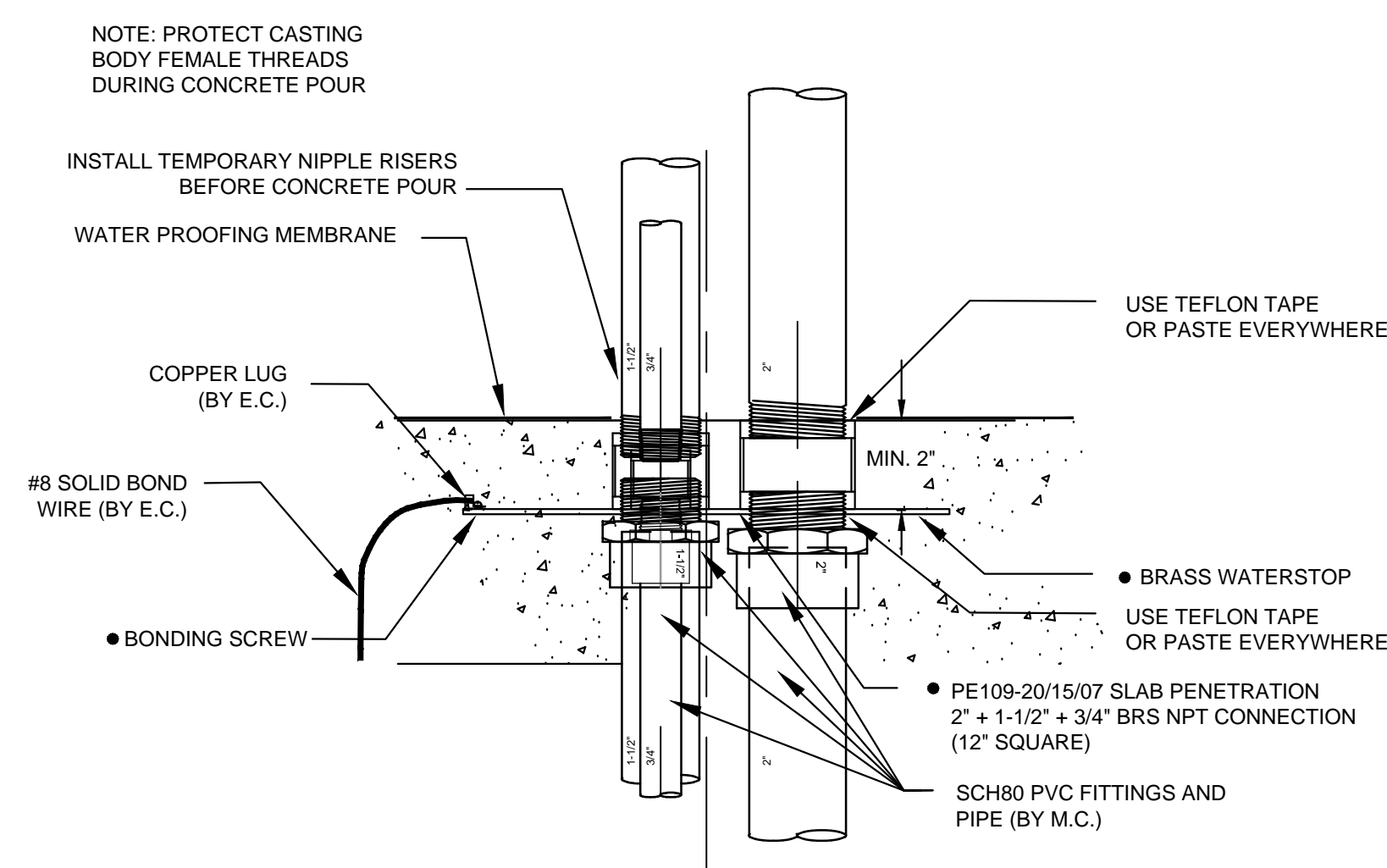
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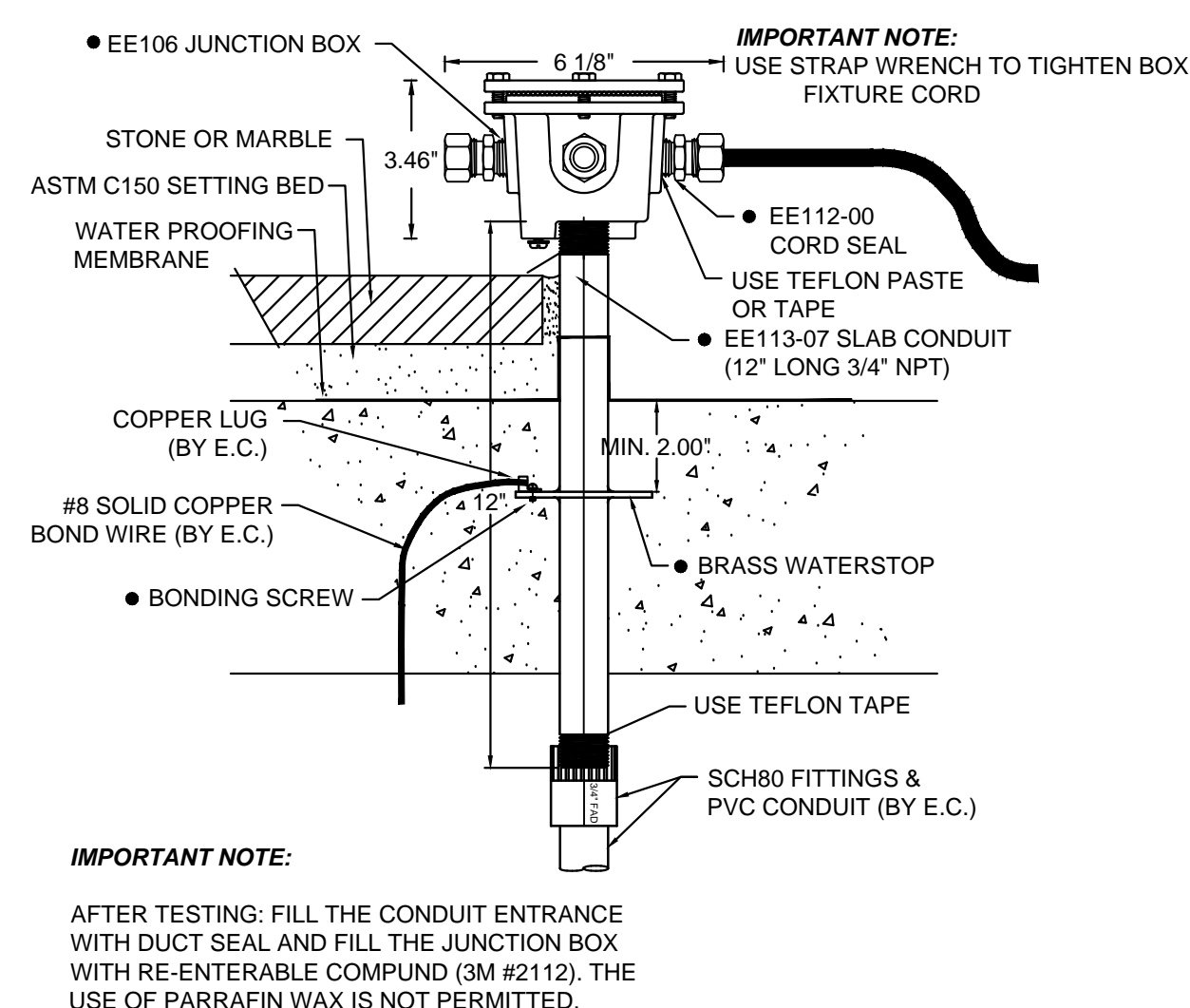
**B** GEFCO #PE107-09 SUCTION SUMP  
 SCALE: 3" = 1'-0"



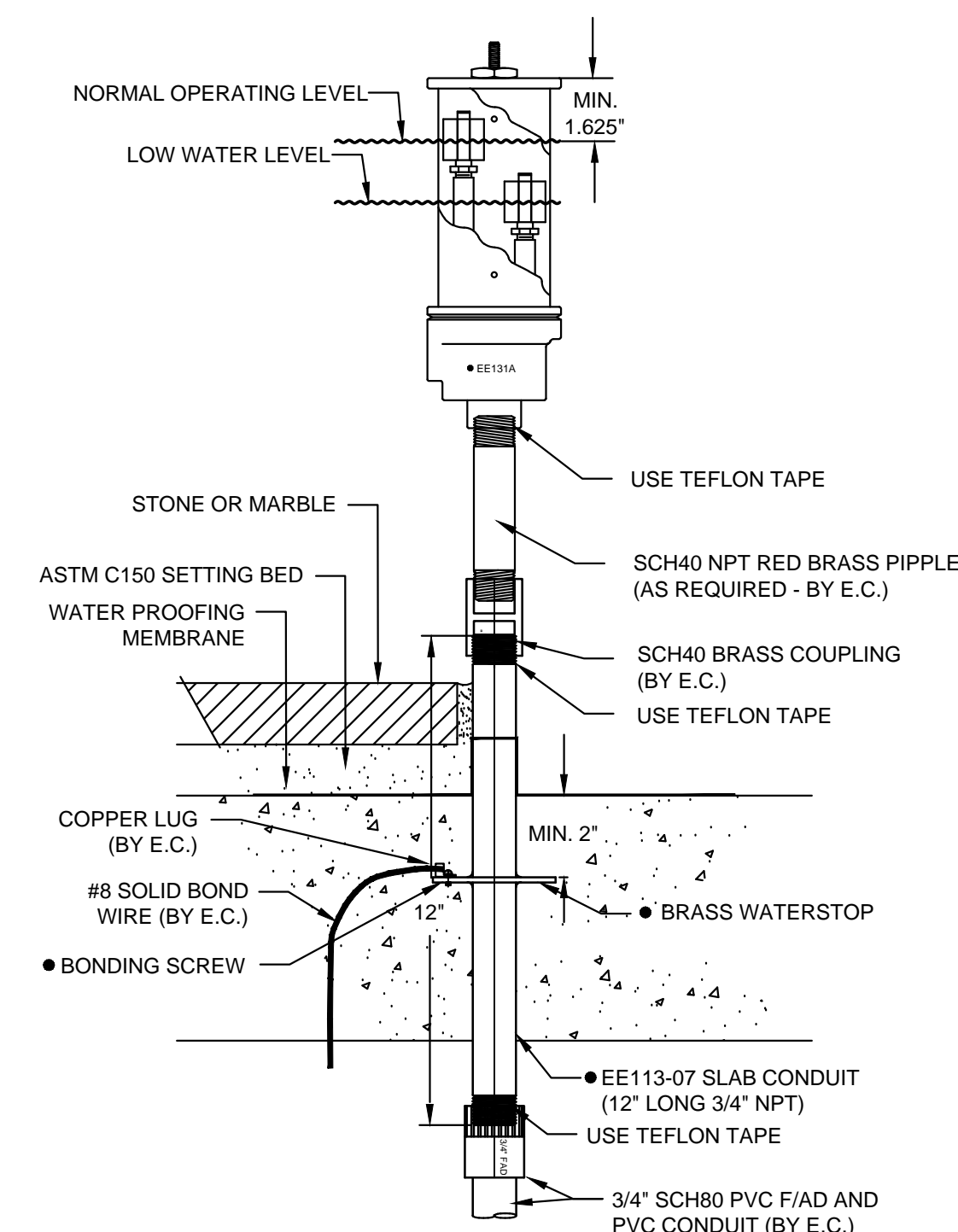
**C** GEFCO #PE112 INLET FITTING  
 SCALE: 1/2" = 1'



**D** GEFCO #PE109-20/15/07 SLAB PENETRATION  
 SCALE: 1-1/2" = 1'-0"



**E** GEFCO #EE106/112/113-07 JUNCTION BOX  
 SCALE: 3" = 1'-0"



**F** GEFCO #EE131A DUAL LEVEL SENSOR  
 SCALE: 1/2" = 1'