

## ADDENDUM #1

**To:** All Bidders  
**Prepared by:** Chris Huntress  
Huntress Associates, Inc.

**Project:** Blocksidge Field - Site Work  
**Date:** February 3, 2017

**Cc:** Gino Cresta, DPW Director  
**Issue No.** 1

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This is an Addendum to the original Construction Documents issued for the Blocksidge Field **Site Work** project, Dated January 15, 2017. In all other respects, the terms of the original documents will remain in full effect. However, if there is a conflict between this Addendum and the original specifications, the terms of this Addendum will prevail.

**This addendum must be acknowledged on the form for general bid.**

**1.0** The Date & Time for submission of bids has been changed. All bids for the above reference **project will be due on Thursday February 16, 2017 at 11:00am**. Bids will be received at Salem City Hall - Office of the Designated Purchasing Agent - 93 Washington Street, 2nd Floor - Salem, MA 01970

**2.0 Section 00 21 13 INSTRUCTIONS TO BIDDERS**

**REPLACE** paragraph 1.05 (9) with the following

9. General Bid Submission: Submit one copy of bid forms and bid deposit, in a sealed envelope. Clearly and boldly identify envelope with: 1) name of the project; 2) the name of the Awarding Authority; 3) the name, business address, and business telephone number of the bidder; and 4) "General Bid Enclosed". Submit bids as specified in the Advertisement to Bids.

**3.0 Section 26 00 00 ELECTRICAL**

**ADD** Section 26 00 00 ELECTRICAL Dated February 3, 2017 to the project specifications. (Attached)

**4.0 ADD Electrical Plans and Details to the record documents, including the sheets as identified below:**

1. Sheet E1 - Electrical Site Plan - Phase One (Base Bid)
2. Sheet E2 - Electrical Sports Lighting Details - Phase One (Base Bid)
3. Sheet E1A - Electrical Site Plan - Phase Two (Alternate)
4. Sheet E2A - Electrical Sports Lighting Details - Phase Two (Alternate)

**5.0 ADD** Section 33 40 00 STORM DRAINAGE SYSTEM Dated February 3, 2017 to the project specifications. (Attached)

**6.0 ADD** PARA 2.06 to Section 11 68 33 ATHLETIC EQUIPMENT as provided below:

2.06 FLAGPOLES (FIBERGLASS)

1. Furnish and install one (1) seamless fiberglass cone tapered flagpoles with internal halyards and all necessary fittings. Flagpole shall be ground set in concrete, 35' exposed height with min. 7" butt dia. and min. .188 wall thickness capable of withstanding 100 mph wind velocity with flag. Flagpole shall be designed for commercial installations. The surface shall be smooth and high gloss, white in color.
2. Provide flagpole as a complete unit produced by a single manufacturer, including all fittings and accessories.
3. Construct pole and ship to site in one piece. Spiral wrap flagpole with heavy Kraft paper or other protective wrapping and ship in hard fiber tubes or other protective containers.
4. Fittings:
  1. Finial 14 gauge spun aluminum ball, gold anodized finish with flush seam sized to match butt diameter of shaft.
  2. Truck cast aluminum stationary type with two cast nylon sheaves.
  3. Halyard One set of #10 white waterproof polypropylene, equipped with two chrome swivel-snaps to secure the flag.
  4. Cleat One internally mounted cam-action cleat with integral sheave, factory mounted.
  5. Fiberglass flash collar shall be approx. 20" dia. Finish of base shall match pole.
5. Provide one American flag for flagpole. Size for flag shall be 6' x 10'.
6. Flagpole shall be equivalent to those manufactured by:  
PLP Composite Technology, Inc. 57 Creamery Road, Fitzwilliam, New Hampshire 03447 Phone # 800-262-6075

**7.0 REPLACE** PARA 2.01 to Section 11 68 33 ATHLETIC EQUIPMENT as provided below:

2.01 SCOREBOARDS

Provide and install equipment for fully useable Multi-Sport Scoreboard, as follows:

1. Scoreboard: Daktronics, Inc. Model No: FB-2018 Multi-Sport Scoreboard. Provide & Install One (1). Color BLUE. Scoreboard to include Electronic Captions to change according to the sport mode. Supply and install wireless control system for the scoreboard. Approved products include the All Sport 5000 as manufactured by Daktronics (800) 325-8766, or approved equal. Product list for the equipment compatible with the scoreboard includes:  
Two (2) Daktronics 16 Column Driver  
One (1) AllSport 5010R-5 Radio Control Console  
One (1) AllSport Carrying Case

One (1) AllSport Rechargeable Battery Kit  
One (1) Scoreboard Radio Receiver Kit  
One (1) Scoreboard Border Stripe (White)  
Two (2) Logo/Sponsor Ad Copy  
One (1) 12V Horn  
Two (2) 24" x 16' Sponsor/ID Panels – ad copy included

Scope of work includes one (1) training session with the Owner to familiarize them with the operation of all new systems. See attachment for additional information.

2. Acceptable manufacturers whose products may be incorporated in the work shall include Daktronics, Inc. (888) 325-8463, or approved equal.

**8.0 REPLACE** Sheet L-6, dated 1.15.17 with the revised Sheet L-6, dated 2.3.17 (Attached)

**9.0 REPLACE** Sheet L-9, dated 1.15.17 with the revised Sheet L-9, dated 2.3.17 (Attached)

**10.0 Questions Received to Date:**

- Q1. Please indicate a manufacturer and model for the light fixtures on the shed.  
A2. Owner to provide and install light fixtures on shed building (NIC). GC to provide wiring as shown on electrical drawings.
- Q2. Can the logo be sand blasted into the granite piers, what is the size of it, does it need to be painted?  
A2. The logo can be sand blasted, the size is 18" square, the logo does not need to be painted.
- Q3. Can you specify a granite color for the granite piers?  
A3. Waterbury Grey
- Q4. Is there a foundation design for the Musco system?  
A4. The footing for the sports lighting shall be as recommended by the manufacturer. Manufacturer is to provide a structural drawing for the footing, stamped by a Registered Massachusetts Structural Engineer, upon submittal.
- Q5. Detail says panel drain at 20' oc, plan at 25'oc. Please confirm.  
A5. Spacing is 25' o.c., as per plan.
- Q6. Will pressbox slab be independent of grandstand slab?  
A6. Yes, Refer to revised sheet L-6, Detail # 1 & 3 for details. (Attached)
- Q7. What accommodation should be made if any for the future lift? Typically, that is in a recessed slab with drainage.  
A7. Refer to revised sheet L-6, Detail # 4 for details. (Attached)
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- Q8. Detail 5/L-7 for pavement thicknesses is in conflict with the spec. Please advise.  
A8. The depth of asphalt shall be as shown on the detail.
- Q9. Detail 2/L-7 states the 4' cfl is not included in the base bid. Is that correct?  
A9. That is correct, the installation of the 4' chain link fence in the concrete turf anchor will be carried by unit price, see specifications for details.
- Q10. The environmental report states that testing was done to a maximum depth of 14". They did not find the glass indicated in the AUL during this testing. The loam depths per the Geotech report are up to 2.1'. If glass is found in the loam below the 14" depth how will that be handled?
- A10. All excess loam is classified as "Urban Fill" in the LSP report and is able to be screened and *"used by the Town elsewhere without restriction as it is not considered to contain levels of contaminants under MCP regulations."* All excess loam is to be screened and delivered to the owner as outlined in the project specifications.

**END OF ADDENDUM**

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ELECTRICAL  
SECTION 26 00 00

PART 1 GENERAL

1.1 GENERAL PROVISIONS

- A. Attention is directed to the CONTRACT AND GENERAL CONDITIONS and all Sections within DIVISION 1 – GENERAL REQUIREMENTS, which are hereby made part of this section of the specification.

1.2 SCOPE OF WORK

- A. Provide all labor, materials, hoisting, plant, transportation, rigging, staging, appurtenances, and services necessary and/or incidental to properly complete all electric work as indicated on Drawings, as described in specifications or as reasonably inferred from either as being required in opinion of the Engineer.
- B. Work shall include but not be limit to the following:
  - 1. Pad Mounted Transformer (Phase II – Alternate)
  - 2. Dry type transformers (Phase II – Alternate)
  - 3. Disconnect Switches
  - 4. Panelboards (Phase II – Alternate)
  - 5. Conduits and Raceways
  - 6. Outlet boxes and accessories
  - 7. Pull boxes
  - 8. Wire & Cable
  - 9. Wireways
  - 10. Wiring devices

11. Wiring device plates.
  12. Sports and site lighting. (Phase I – Concrete Bases only; Phase II – Poles, lighting, and hardware)
  13. Certified test reports.
  14. Equipment connections.
  15. Existing electrical equipment and systems.
  16. Handholes.
  17. Nameplates.
  18. All staging, planking and scaffolding, hoisting and rigging required for Electrical Work.
  19. Testing.
  20. Operating and maintenance instructions and manuals.
  21. Record Drawings.
- C. As used in this Section, "provide" means "furnish and install." "Install" means "put in place and connect."
- D. Perform work and provide material and equipment as shown on Drawings and as specified in this Section. Coordinate work of this Section with work of other Sections to provide complete and functional installation.
- E. Where Drawings or Specifications indicate discrepancies, or are unclear, advise Engineer in writing before Award of Contract. Otherwise Engineer's interpretation of Contract Documents shall be final. No additional compensation will be approved because of discrepancies or lack of clarity thus unresolved.
- F. Provide work specified but not shown on Drawings, and work shown on Drawings but not specified, as though expressly required by both.
- G. Where Drawings or Specifications do not agree with manufacturer's recommendations, or with applicable codes and standards, alert Engineer in writing before installation. Otherwise, make necessary changes in installation as directed by Engineer within Contract Price.
- H. Drawings are diagrammatic and indicate general arrangement of systems and work included in Contract. Information and components shown on riser diagrams but not on plans, and vice versa, shall apply or shall be provided as though expressly required on both. It is not intended that every junction box, offset, fitting or component be specified or shown on Drawings; however, Contract Documents require provision of all components and materials necessary for complete and operational Electrical installation, whether or not indicated or specified.
- I. Prior to submitting bid, visit site and identify existing conditions and difficulties that will affect work of this Section.
- J. Prior to commencing work of this Section, examine site and conditions under which work will be performed. Determine exact locations of existing items shown diagrammatically on Drawings. Report in writing to Engineer conditions that might adversely affect work. Commencement of work shall constitute complete acceptance of existing conditions and preparatory work.

- K. Do not scale Drawings. Scale indicated on Drawings is for establishing reference points only. Actual field conditions shall govern all dimensions.
- L. Provide items referred to in singular number in Contract Documents in quantities necessary to complete Work of this Section.

#### 1.03 RELATED WORK

- A. Excavation, backfill and resurfacing required for underground electrical systems.
- B. Establishment of finished grades for site lighting and sports lighting.
- C. Concrete work required for electric systems to include concrete envelope for electric, and poured in place service transformer pad.
- D. Concrete filled steel pipe bollards.

#### 1.04 SHOP DRAWINGS

- A. Submit complete Shop Drawings in accordance with provisions of General Conditions (DIVISION 1).
- B. Submit, no later than three weeks after award of contract, a list of Shop Drawings to be submitted with the name of each manufacturer and supplier intended for major electrical equipment. Failure to provide this list will result in all alternative manufacturers not scheduled or listed in Contact Documents to be disallowed.
- C. Submit details of systems and equipment to Engineer for review within THIRTY days after award of Contract. Submit electronic documents in legible 'PDF' format containing Shop Drawings of following systems and equipment: Submission of illegible Shop Drawings will be considered cause for rejection with resubmission. Manufacturer's cut sheets with multiple choices shall be clearly flagged to indicate which item is being submitted.
- D. Shop Drawings shall include, but not necessarily be limited to, following items:
  - 1. Dry type transformers. (Phase II)
  - 2. Disconnect switches.
  - 3. Panelboards. (Phase II)
  - 4. Conduits and raceways.
  - 5. Wire and cable.
  - 6. Wiring devices.
  - 7. Wiring device plates.
  - 8. Certified test reports.
  - 9. Handholes.
  - 10. Sports lighting system and controls. (Phase II)
  - 11. Sports lighting equipment cabinet. (Phase II)

- E. Submit for review complete wiring diagrams of systems prepared by equipment manufacturer showing connections and equipment. Standard wiring diagrams shall be modified where necessary to specific system. Provide adequate conduit raceways for adapting wiring diagrams to conduit system.
  - F. Intent of Shop Drawings and Product Data review is to check for capacity, rating and certain construction features. Ensure that work meets requirements of Contract Documents regarding information that pertains to fabrication processes or means, methods, techniques, sequences and procedures of construction, and for coordination of work of this and other Sections.
  - G. Perform work in accordance with submittals marked "Reviewed" to extent that they agree with Contract Documents. Submittal review shall not diminish responsibility under this Contract for dimensional coordination, quantities, installation, wiring, supports, access, service and errors, nor for deviations from requirements of Contract Documents. Noting errors while overlooking others will not excuse proceeding in error. Requirements of Contract Documents are not limited, waived, nor superceded by Shop Drawing review.
  - H. Submittals of various systems shall indicate equipment supplier used and that all equipment of particular system is being furnished by same supplier. Supplier shall be qualified to supervise installation, connection, and testing of system and have competent maintenance service for respective systems.
  - I. Shop Drawings and samples will be reviewed with reasonable promptness and will be stamped indicating appropriate action as follows:
    - 1. "REVIEWED" means that fabrication, manufacture, or construction may proceed providing submittal complies with Contract Documents.
    - 2. "REVIEWED WITH COMMENTS" means that fabrication, manufacture, or construction may proceed providing submittal complies with Engineer's notations and Contract Documents. If, for any reason, notations cannot be complied with, resubmit as described for submittals stamped "RESUBMIT."
    - 3. "RESUBMIT" means that submittal does not comply with Contract Documents and that fabrication, manufacture, or construction shall not proceed. Resubmit in accordance with requirements of Contract Documents.
  - J. If manufacturer changes his product after system submittal has been approved, submit new system in its entirety for approval.
- 1.05 RECORD DRAWINGS
- A. Refer to General Conditions (DIVISION 1) for Record Drawing requirements and use.
- 1.06 CODES, PERMITS, AND STANDARDS
- A. Installation shall comply with electrical code, latest revisions, and prevailing local, federal, and state regulations.
  - B. Material and equipment shall be UL listed where standard has been established.
  - C. Manufacturer names and nomenclature facilitate description of certain materials and equipment and establish type, quality, and function.
  - D. Unless otherwise specified, furnish, install, and test work in accordance with latest editions of applicable publications and standards of following:
    - 1. ADA: Americans with Disabilities Act

2. ANSI: American National Standards Institute
3. ASTM: American Society for Testing and Materials
4. ICEA: Insulated Cable Engineers Association
5. IBC: International Building Code
6. IEEE: Institute of Electrical and Electronic Engineers
7. MSBC: Massachusetts State Building Code
8. MEC: Massachusetts Electrical Code
9. NEMA: National Electrical Manufacturers Association
10. NFPA: National Fire Protection Association
11. UL: Underwriters Laboratories, Inc.

- E. Reference made to codes and standards shall be interpreted as minimum requirements. Where referenced codes and/or standards conflict, the more stringent shall apply. Engineer may relax this requirement where such relaxation does not violate ruling of authorities that have jurisdiction. Approval for such relaxation shall be obtained in writing. Perform work in excess of codes and standards as indicated by Drawings or Specifications.
- F. Obtain necessary permits, licenses, or certificates of approval required. Pay fees required by and conforming to local and state laws and regulations. At conclusion of work, furnish certificates of inspection to Owner from authorities having jurisdiction.
- G. Perform tests required by Specifications, Engineer's instructions, laws, ordinances or public authorities, approvals, and give Engineer timely notice. Notify Engineer of dates for inspection by other authorities.
- H. Backcharges from electric and from town building and fire department shall be forwarded to Owner for payment.

#### 1.07 TEMPORARY FACILITIES

- A. Refer to requirements of DIVISION 1 regarding temporary facilities.

#### 1.08 SUBSTITUTION OF MATERIALS

- A. Deviations from Contract Documents and substitution of materials and equipment for those specified shall be requested individually and in writing. Submit proposed substitution prior to purchase and/or fabrication and within 30 days after Award of Contract.
- B. Submit comprehensive descriptive and technical data to establish quality. Do not submit for substitution material or equipment unless identical material or equipment has been operated successfully for at least three consecutive years.
- C. When substitution is permitted, coordinate fully with related changes to work of other Sections. Ensure that related changes necessary for coordination are made within Contract Price.

- D. Assume full responsibility for safety, operation, and performance of altered system.
- E. Proposed substitutions shall be subject to approval by Engineer.

1.09 GUARANTEE AND WARRANTIES

- A. In addition to specific guarantee requirements of General Conditions and Supplementary General Conditions obtain in Owner's name written equipment and material warranties offered in manufacturer's published product data without exclusion or limitation.
- B. Guarantee Work of this Section in writing for not less than one year from date of Final Notice of Acceptance. Repair or replace defective materials, equipment, workmanship, and installation that develop within this period, promptly and to Engineer's satisfaction and correct damage caused in making necessary repairs and replacements under guarantee within Contract Price.
- C. Replace material or equipment that requires excessive service during guarantee period, as defined and as directed by Engineer.
- D. Submit guarantee to Engineer before final payment.

1.10 QUALITY ASSURANCE

- A. Experience: Manufactured items shall have been installed and used, without modification, renovation or repair, on other projects for not less than three years prior to the date of bid opening for this Project.
- B. Experience List: Submit a list of installations where the following items have been in operation for not less than one year. Include project name and address, name and telephone number of owner's representative.

PART 2 - PRODUCTS

## 2.01 GENERAL

- A. Provide materials and equipment necessary to make installation complete in every detail under this Contract whether or not specifically shown on Drawings or specified herein. Materials and equipment shall be new.
- B. Intent of Specifications is that one manufacturer, not combination, be selected for particular classification of material. For example, wire of one manufacturer, switches of one manufacturer. Engineer may give specific exemption from this requirement.
- C. Where materials, equipment, apparatus, or other products are specified by manufacturer, brand name, type or catalogue number, such designation is only to establish standards of performance, quality, type and style.

## 2.02 WIREWAYS AND CHANNELS

- A. Wireways shall be code gauge galvanized steel with screw covers to match. Wireways shall be as required by MEC and/or job conditions, with steel barriers separating systems.
- B. Wireways shall be code gauge galvanized steel, manufactured standard sections and fittings, with combination hinged and screw covers.
- C. Steel channel supports shall be minimum 1-5/8 inch mild strip (stainless) steel with minimum 12 gauge (0.105 inch) wall thickness, Unistrut P1000, Kindorf, Husky Products, or equal. Loadings shall be per manufacturer's recommendations.

## 2.03 RACEWAYS

- A. Rigid steel conduit shall be hot-dipped galvanized steel conforming to ANSI C80.1 and UL 6. Conduit shall be as manufactured by Allied Tube and Conduit Co., Wheatland Tube Co., LTV Steel Tubular Co., or equal.
- B. Electric metallic tubing shall be hot-dipped galvanized steel conforming to ANSI C80.3 and UL 797. Tubing shall be as manufactured by Pyle National, Allied Tube and Conduit Corp., Wheatland Tube Company, or equal.
- C. Plastic conduit shall be Schedule 40 PVC 90°C conforming to NEMA Standard TC2. Plastic conduit shall be as manufactured by Carlon Electrical Products Co., Allied Tube and Conduit Company, Triangle Company or equal.
- D. Flexible metal conduit shall be galvanized steel with separate copper grounding conductor. Liquid-tight flexible metal conduit shall be similar, but with extruded moisture and oil-proof outer jacket of polyvinyl chloride plastic.
- E. Intermediate metal conduit fittings, couplings and connectors shall be threaded and galvanized or cadmium plated.
- F. Couplings and connectors for electric metallic tubing shall be galvanized steel set-screw.
- G. Steel support rods or support bolts for conduits shall be 1/8 inch diameter for each inch or fraction thereof of diameter of conduit size, but no rod or bolt shall be less than 1/4 inch in diameter. Support rods for steel channel shall not be less than 5/8 inch in diameter.

## 2.04 600 VOLT WIRE AND CABLE

- A. Provide wire and cables and associated connectors, splices, and terminations for wiring systems rated 600V and less. Wire and cable shall be as manufactured by American Insulated Wire Corporation, General Cable Corporation, or Southwire Company.
- B. Conductor material shall be soft drawn copper complying with NEMA WC 5. Wire size #12 AWG and larger shall be Class B stranded. Wire size smaller than #12 shall be solid.
- C. Single conductor insulation shall be 600V type THHN-THWN, THW, XHHW, UF, SO or USE complying with NEMA WC 5 or WC 7.
- D. Multiconductor cable shall be 600V metal-clad steel cable, type MC, #8 and smaller with THHN-THWN insulation type and full size insulated green ground conductor.
- E. Provide conductors and splices of size, ampacity rating, material, type, and strand class for application and service indicated. Manufacturers shall be AFC Cable Systems, AMP Incorporated, Hubbell, OZ Gedney or 3M Company.

## 2.05 WIRING DEVICES

- A. Provide wiring devices by Hubbell, Bryant, Copper, Pass & Seymour or Leviton. Catalog numbers are those of Hubbell Company except as noted. Color of devices shall be brown.
- B. Toggle switches shall be rated 20A, 120-277 VAC. Single pole shall be No. 1221.
- C. In damp locations, switches and receptacles shall be enclosed in Crouse-Hinds FS box with weather protective cover. In wet locations, provide weatherproof non-locking clear plastic cover, UL listed as weatherproof while in use.
- D. Receptacles shall conform to NEMA standards.
  - 1. Duplex receptacles with ground fault protection shall be 20A, 125V, Hubbell GFRST20, manufactured per UL 943.

## 2.06 WIRING DEVICE PLATES

- A. Provide Series NP1 high impact white nylon device plates as manufactured by Hubbell or equal.

## 2.07 NAMEPLATES

- A. Nameplates shall be two-ply, 1/16 inch thick, black phenolic material with 1/4 inch high white recessed letters and two mounting holes. Nameplates shall be securely attached to equipment with galvanized screws or rivets. Adhesives or cements shall not be permitted.

## 2.08 OUTLET BOXES AND ACCESSORIES

- A. Provide galvanized sheet steel outlet boxes for all outlets unless otherwise noted. Outlet boxes and accessories shall be as manufactured by Steel City, Appleton, Raco, or equal. Steel City catalog numbers are used for reference.
- B. Outlet boxes for weatherproof work and exposed rigid conduit work shall be suitable cast aluminum or cast iron, Crouse-Hinds Company, Appleton, or OZ Gedney, with threaded conduit hubs.

## 2.09 PANELBOARDS (PHASE II)

- A. Provide dead front panelboards with copper bus bars, arranged for 120/ 208V, three phase, four wire, solid neutral or 277/480V, three phase, four-wire, solid neutral as shown on Drawings. Panels shall meet or exceed all requirements of NEMA PB-1 and UL 67. Panels shall be minimum 20 inches wide.



- B. Provide full size for 120/208V panels with insulated neutral bus. Panels with feed-thru bussing shall not be used. Provide anti-turn, solderless lugs suitable for copper or aluminum wire.
- C. Provide separate equipment ground bus for each panel. Ground bus shall be bonded to enclosure.
- D. Provide "door-in-door" construction for each panel with heavy duty door continuously hinged vertically to box section of panel for access to wiring gutters.
- E. Provide galvanized code gauge steel surface metal boxes ready for painting. Provide two coats of factory-applied paint on trims of flush-mounted panels. Provide combination flush catch and lock with two keys. All keys to be keyed alike.
- F. Panel buswork and lugs shall be rated for minimum 225A, except panels with feeders 100A and less may be rated 100A.
- G. Provide bolt-on, molded case, circuit breakers with thermal-magnetic trips. Multi-pole breakers shall be single handle, common trip. Circuit breakers rated 125A or less shall be marked for 60 and 75 degrees C conductors.
- H. Provide fully rated circuit breakers equal to short circuit interrupting ratings as scheduled on Drawings.
- I. Provide full bussing and hardware for spaces for future breakers indicated on Schedules.
- J. Panel boxes, covers and interiors shall be by one manufacturer, Eaton, Square D, General Electric, or Siemens.

#### 2.10 DRY TYPE TRANSFORMERS

- A. Provide dry type electro-static shielded transformers. Transformers shall have separate primary and secondary windings. Transformers 15kVA and above shall be UL listed insulation systems of 220 degrees C., with 115 degrees C. temperature rise above 40 degree C. ambient, except sizes less than 10 kVA may be 185 degrees C., UL listed insulation system with 115 degrees C. temperature rise above an ambient of 40 degrees C. Transformers larger than 10 kVA shall be of ventilated type.
- B. Core and coil assembly shall be supported from enclosure base and shall have sound insulation pads between core and coil assembly and enclosure base. kVA and voltage ratings shall be as indicated on Drawings.
- C. Transformers shall be designed for natural draft cooling conforming to applicable ANSI and IEEE Standards. Six 2-1/2 percent full capacity taps shall be provided, two above and four below rated voltage. Shop Drawings shall include manufacturer's certification that dB levels of transformers supplied do not exceed dB levels shown.
- D. Sound levels as determined in accordance with NEMA standards shall not exceed following:  
0 - 50 kVA 45dB
- E. Provide energy efficient transformers 15 kVA and larger, certified to meet D.O.E. 2016 efficiency levels when tested in accordance with NEMA.
- F. Transformers shall be by one manufacturer, General Electric, Eaton, Square D, or Siemens.
- G. Transformer coils shall be wound of electrical grade copper conductors with continuous wound construction.

2.11 SPORTS LIGHTING AND CONTROL SYSTEM

A. Summary:

1. Work covered by this section of the specifications shall conform to the contract documents, engineering plans as well as state and local codes. Concrete bases only will be installed under Phase I, all other equipment shall be installed under Phase II.
2. The purpose of these specifications is to define the performance and design standards for Blocksidge Field Renovation, Swampscott MA. The manufacturer / contractor shall supply lighting equipment to meet or exceed the standards set forth in these specifications.
3. The sports lighting will be for the following fields:
  - a. Football
4. The primary goals of this sports lighting project are:
  - a. **Guaranteed Light Levels:** Selection of appropriate light levels impact the safety of the players and the enjoyment of spectators. Therefore light levels are guaranteed for a period of 25 years.
  - b. **Environmental Light Control:** It is the primary goal of this project to minimize spill light and glare, therefore external visors are required.
  - c. **Life-cycle Cost:** In order to reduce the operating budget, the preferred lighting system shall be energy efficient and cost effective to operate. All maintenance costs shall be eliminated, and the field(s) should be proactively monitored to detect luminaire outages over a 25 (10) year life-cycle. To allow for optimized use of labor resources and avoid unneeded operation of the facility, customer requires a remote on/off control system for the lighting system.
  - d. **Control and Monitoring:** To allow for optimized use of labor resources and avoid unneeded operation of the facility, customer requires a remote on/off control system for the lighting system. Field(s) should be proactively monitored to detect luminaire outages over a 25 year life-cycle.

B. Lighting Performance:

1. **Performance Requirements:** Playing surfaces shall be lit to an average constant light level and uniformity as specified in the chart below. Light levels shall be held constant for 25 years. Lighting calculations shall be developed and field measurements taken on the grid spacing with the minimum number of grid points specified below. Average illumination level shall be measured in accordance with the IESNA LM-5-04. Light levels shall be guaranteed from the first 100 hours of operation for the maximum warranty period.

Area of Lighting	Average Constant Light Levels	Maximum to Minimum Uniformity Ratio	Grid Points	Grid Spacing
Football	40 footcandles	2.0:1.0	72	30 feet x 30 feet

- a. **Lumen maintenance control strategy:** A constant light system shall use automatic power adjustments to achieve a lumen maintenance control strategy as described in the IESNA Lighting Handbook 10th Edition, Lighting Controls Section, page 16-8:

"Lumen maintenance involves adjusting lamp output over time to maintain constant light output as lamps age, and dirt accumulation reduces luminaire output. With lumen maintenance control, either lamps are dimmed when new, or the lamp's current is increased as the system ages."

- b. Independent Test Report: Manufacturers bidding any form of a constant light system must provide an independent test report certifying the system meets the lumen maintenance control strategy above and verifying the field performance of the system for the duration of the useful life of the lamp based on lamp replacement hours. Report shall be signed by a licensed professional engineer with outdoor lighting experience. If report is not provided at least 10 days prior to bid opening, the manufacturer shall provide the initial and maintained designs called for in this specification under Alternate Manufacturers, section 1.8.
  - c. Project References: Manufacturers bidding any form of a constant light system must provide a minimum of five (5) project references within the state of MA that have been completed within the last calendar year utilizing this exact technology. Manufacturer will include project name, project city, and if requested, contact name and contact phone number for each reference.
2. Mounting Heights: To ensure proper aiming angles for reduced glare and to provide better playability, the pole mounting heights from the playing field surface shall be 70 feet.
- C. Environmental Light Control:
1. Spill Light Control: Maximum horizontal footcandles at a distance of 150 feet from the perimeter of the field shall not exceed .5. Footcandle readings shall be taken at 30 feet intervals along the specified line. Average illumination level shall be measured in accordance with the IESNA LM-5-04 at the first 100 hours of operation.
- D. Life-Cycle Costs:
1. Energy Consumption: The average kW consumption for the field lighting system shall be 62.56 or less.
  2. Preventative and Spot Maintenance: Manufacturer shall provide all preventative and spot maintenance, including parts and labor for 25 years from the date of equipment shipment. Individual lamp outages shall be repaired when the usage of any field is materially impacted. Owner agrees to check fuses in the event of a luminaire outage.
  3. Remote Monitoring System: System shall monitor lighting performance, including on/off status, hours of usage and lamp outages. If luminaire outages that affect playability are detected, manufacturer shall contact owner so that maintenance can be proactively scheduled. The controller shall determine switch position (Manual or Auto) and contactor status (open or closed).
  4. Remote Lighting Control System: System shall allow owner and users with a security code to schedule on/off system operation via a web site, phone, fax or email up to ten years in advance. Manufacturer shall provide and maintain a two-way TCP/IP communication link. Trained staff shall be available 24/7 to provide scheduling support and assist with reporting needs.

The owner may assign various security levels to schedulers by function and/or fields. This function must be flexible to allow a range of privileges such as full scheduling capabilities for all fields, to only having permission to execute "early off" commands by phone.

Controller shall accept and store 7-day schedules, be protected against memory loss during power outages, and shall reboot once power is regained and execute any commands that would have occurred during outage.

5. Management Tools: Manufacturer shall provide a web-based database of actual field usage and provide reports by facility and user group.
6. Hours of Usage: Manufacturer shall provide a means of tracking actual hours of usage for the field lighting system that is readily accessible to the owner.
  - a. Cumulative hours: shall be tracked to show the total hours used by the facility
  - b. Current lamp hours: shall be tracked separately to reflect the amount of hours on the current set of lamps being used, so relamping can be scheduled accurately
7. Communication Costs: Manufacturer shall include communication costs for operating the control and monitoring systems for a period of 25 years.
8. 25-Year Life-cycle Cost: Manufacturer shall submit 25-year life-cycle cost calculations as follows. Equipment price and total life-cycle cost shall be entered separately on bid form.

a.	<b>Luminaire energy consumption</b> ___ luminaires x ___ kW demand per luminaire x .19 kWh rate x 100 annual usage hours x 25 years		
b.	<b>Demand charges, if applicable</b> [<Specifier to indicate at which point this applies, F11>]	+	
c.	<b>Cost for spot relamping and maintenance over 25 years</b> Assume 7.5 repairs at \$ 500 each if not included with the bid	+	
d.	<b>Cost to relamp all luminaires during 25 years</b> 200 annual usage hours x 25 years / <Enter lamp replacement hours specified in section 1.8, F11> hours x \$125 lamp & labor x ___ luminaires if not included with the bid	+	
e.	<b>Extra energy used without base bid automated control system</b> \$ Energy consumption in item a. x <Enter %, F11>% if control system not included with the bid	+	
f.	<b>Extra labor without base bid automated on/off operation</b> \$<\$, F11> per hour x <#, F11> hours per on/off cycle x <#, F11> cycles over 25 years if control system not included with the bid	+	
	<b>TOTAL 25-Year Life-cycle Operating Cost</b>	=	

E. Warranty and Guarantee:

1. 25 -Year Warranty: Each manufacturer shall supply a signed warranty covering the entire system for 25 years OR for the maximum hours of coverage based on the estimated annual usage, whichever occurs first. Warranty shall guarantee light levels; lamp replacements; system energy consumption; monitoring, maintenance and control services, spill light control, and structural integrity. Manufacturer shall maintain specifically-funded financial reserves to assure fulfillment of the warranty for the full term. Warranty may exclude fuses, storm damage, vandalism, abuse and unauthorized repairs or alterations. Group lamp replacements for constant light systems must occur in accordance with the independent test report provided by the manufacturer; alternate systems must relamp every 2100 hours.

F. Delivery Timing:

1. Equipment On-Site: The equipment must be on-site 4 to 6 weeks from receipt of approved submittals and receipt of complete order information.

G. Pre-Bid Submittal Requirements:

1. Approved Product: Musco’s Green Generation Lighting® sports lighting system is the approved product. All substitutions must provide a complete submittal package for approval as outlined in Submittal Information at the end of this section at least 10 days prior to bid. Special manufacturing to meet the standards of this specification may be required. An addendum will be issued prior to bid listing any other approved lighting manufacturers and designs.
2. Design Approval: The owner/engineer will review pre-bid shop drawings from the manufacturers to ensure compliance to the specification. If the design meets the design requirements of the specifications, a letter will be issued to the manufacturer indicating approval for the specific design submitted.

H. Alternate System Requirements:

1. Compliance to Specifications: Acceptance of a bid alternate does not negate the contractor and lighting manufacturer’s responsibility to comply fully with the requirements of these specifications. Any exceptions to the specifications must be clearly stated in the prior approval submittal documents.
2. Light Level Requirements: Manufacturer shall provide computer models guaranteeing light levels on the field over 25 years. If a constant light level cannot be provided, the specified maximum Recoverable Light Loss Factor and maintenance/group relamping schedule shall be provided in accordance with recommendations in the Pennsylvania State University report "Empirical Light Loss Factors for Sports Lighting", presented at the 2009 IESNA Annual Conference.

Lamp Replacement Interval (hours)	Recoverable Light Loss Factor (RLLF)
2100	0.69

3. For alternate systems, scans for both initial and maintained light levels are required.

Area of Lighting	Average Initial Light Levels	Average Target/Maintained Light Levels	Maximum to Minimum Uniformity Ratio	Grid Points	Grid Spacing
Football	57.97 foot-candles	40 foot-candles	2.0:1.0	72	30 feet x 30 feet

- I. Revised Electrical Distribution: Manufacturer shall provide revised electrical distribution plans to include changes to service entrance, panel, and wire sizing.

J. Lighting System Construction:

1. System Description: Lighting system shall consist of the following:
  - a. Galvanized steel poles on top of pre-stressed concrete bases for pole locations A1-A4.
  - b. All luminaires shall be constructed with a die-cast aluminum housing or external hail shroud to protect the luminaire reflector system.

- c. All luminaires, visors, and cross-arm assemblies shall withstand 150 mph winds and maintain luminaire aiming alignment.
  - d. Manufacturer will remote all ballasts and supporting electrical equipment in aluminum enclosures mounted on pole approximately 10 feet above grade. The enclosures shall be touch-safe, and include ballast, capacitor and fusing, with indicator lights on fuses to indicate when a fuse is to be replaced for each luminaire. Safety disconnect per circuit for each pole structure will be located in the enclosure.
  - e. Wire harness complete with an abrasion protection sleeve, strain relief and plug-in connections for fast, trouble-free installation for new poles, and wire harness complete with an abrasion protection sleeve and strain relief for retrofit applications.
  - f. Control and Monitoring Cabinet (NEMA Type 4) to provide on-off control and monitoring of the lighting system, constructed of aluminum. Communication method shall be provided by manufacturer. Cabinet shall contain custom configured contactor modules for 30, 60, and 100 amps, labeled to match field diagrams and electrical design. Manual off-on-auto selector switches shall be provided.
2. Manufacturing Requirements: All components shall be designed and manufactured as a system. All luminaires, wire harnesses, ballast and other enclosures shall be factory assembled, aimed, wired and tested.
  3. Durability: All exposed components shall be constructed of corrosion resistant material and/or coated to help prevent corrosion. All exposed carbon steel shall be hot dip galvanized per ASTM A123. All exposed aluminum shall be powder coated with high performance polyester or anodized. All exterior reflective inserts shall be anodized, coated, and protected from direct environmental exposure to prevent reflective degradation or corrosion. All exposed hardware and fasteners shall be stainless steel of 18-8 grade or better, passivated and coated with aluminum-based thermosetting epoxy resin for protection against corrosion and stress corrosion cracking. Structural fasteners may be carbon steel and galvanized meeting ASTM A153 and ISO/EN 1461 (for hot dipped galvanizing), or ASTM B695 (for mechanical galvanizing). All wiring shall be enclosed within the crossarms, pole, conduit, or electrical components enclosure.
  4. Lightning Protection
    - a. Poles
      - 1) Manufacturer shall provide integrated lightning grounding via concrete encased electrode grounding system as defined by NFPA 780 and be UL Listed per UL 96 and UL 96A.
      - 2) If grounding is not integrated into the structure, the manufacturer shall supply grounding electrodes, copper down conductors and exothermic weld kits. Electrodes and conductors shall be sized as required by NFPA 780. The grounding electrode shall be not less than 5/8 inch diameter and 8 feet long, with a minimum of 10 feet embedment. Grounding electrode shall be connected to the structure by a grounding electrode conductor with a minimum size of 2 AWG for poles with 75 feet mounting height or less, and 2/0 AWG for poles with more than 75 feet mounting height.
  5. Safety: All system components shall be UL Listed for the appropriate application.
  6. Electric Power Requirements for the Sports Lighting Equipment:
    - a. Electric power: 480 Volt, 3 Phase.

- b. Maximum total voltage drop: Voltage drop to the disconnect switch located on the poles shall not exceed three percent of the rated voltage.

K. Parameters for New Structures:

1. Wind Loads: Wind loads shall be based on the 2009 International Building Code. Wind loads to be calculated using ASCE 7-05, a design wind speed of 110, exposure category C.
2. Pole Structural Design: The stress analysis and safety factor of the poles shall conform to 2009 AASHTO Standard Specification for Structural Supports for Highway Signs, Luminaires, and Traffic Signals (LTS-5).
3. Foundation Design: The foundation design shall be based on soil parameters as outlined in the geotechnical report.

L. Soil Quality Control:

1. It shall be the Contractor's responsibility to notify the Owner if soil conditions exist other than those on which the foundation design is based, or if the soil cannot be readily excavated. Contractor may issue a change order request / estimate for the Owner's approval / payment for additional costs associated with:
  - a. Providing engineered foundation embedment design by a registered engineer in the State of Massachusetts for soils other than specified soil conditions.
  - b. Additional materials required to achieve alternate foundation.
  - c. Excavation and removal of materials other than normal soils, such as rock, caliche, etc.

M. Field Quality Control:

1. Illumination Measurements: Upon substantial completion of the project and in the presence of the Contractor, Project Engineer, Owner's Representative, and Manufacturer's Representative, illumination measurements shall be taken and verified. The illumination measurements shall be conducted in accordance with IESNA LM-5-04.
2. Correcting Non-Conformance: If, in the opinion of the Owner or his appointed Representative, the actual performance levels including footcandles, uniformity ratios, and maximum kilowatt consumptions are not in conformance with the requirements of the performance specifications and submitted information, the Manufacturer shall be liable to any or all of the following:
  - a. Manufacturer shall at his expense provide and install any necessary additional luminaires to meet the minimum lighting standards. The Manufacturer shall also either replace the existing poles to meet the new wind load (EPA) requirements or verify by certification by a licensed structural engineer that the existing poles will withstand the additional wind load.
  - b. Manufacturer shall minimize the Owner's additional long-term luminaire maintenance and energy consumption costs created by the additional luminaires by reimbursing the Owner the amount of \$1,000.00 (one thousand dollars) for each additional luminaire required.
  - c. Manufacturer shall remove the entire unacceptable lighting system and install a new lighting system to meet the specifications.

PART 3 - EXECUTION

## 3.01 GENERAL

- A. Unless specifically noted or shown otherwise, install all equipment and material specified in this Section or shown on Drawings whether or not specifically itemized herein. PART 3 covers particular installation methods and requirements peculiar to certain items and classes of material and equipment.

## 3.02 PANELBOARDS (PHASE II)

- A. Provide flush or surface mounted panelboards as shown on Drawings.
- B. Turn branch circuits and auxiliary system wiring out of wiring gutters at 90 degrees to circuit breakers and terminal lugs.

## 3.03 PULL BOXES AND WIREWAYS

- A. Provide bolts or galvanized steel rods to support pull boxes of minimum thickness equal to rod or bolt size required on largest size conduit entering pull box, as defined under "Raceways" paragraph in this Section.
- B. Identify conductors passing through pull boxes and wireways to indicate origin and termination. Provide nameplates for pull boxes.

## 3.04 RACEWAY WORK

- A. Install wire and cable in approved raceways as specified and by authorities having jurisdiction. Raceways shall be run concealed except as indicated on Drawings.
- B. Install wiring in electric metallic tubing, unless otherwise noted below.
- C. Minimum size plastic conduit shall be 3/4 inch trade size.
- D. Carefully clean and dry all conduit before installation of conductors. Plug conduit ends to exclude dust and moisture during construction. Lubricants or cleaning agents which might have deleterious effect on conductor coverings shall not be used for drawing conductors into raceways.
- E. Intermediate metal conduit ends shall be cut square, threaded and reamed to remove burrs and sharp edges. Field threads shall be of same type and same effective length as factory-cut threads. Turns in exposed conduit runs shall be made by use of factory-made bends, or field-made bends equivalent in radius and consistency with factory-made bends. In event of multiplicity of conduits making same turn, provide conduits or steel junction box with removable steel cover. Route conduits so as not to interfere with operation or maintenance of any equipment. Offsets and bends shall be made in concealed conduits by job conditions. Perform work in neat and workmanlike manner, approved by Engineer. Steel supports or racks shall be galvanized steel channel and fittings, Unistrut, Kindorf, Husky Products Company, or equal.
- F. Install conduit to keep exposed threads to an absolute minimum.
- G. Provide support rods and clamps to support conduits.
- H. Provide offsets prior to entrance into outlet boxes and other electrical equipment for proper adjustment to finished building surfaces. Exercise care when roughing-in conduits which turn up or down to surface mounted panelboards or cabinets, so that conduit extensions to cabinet will be fitted close to wall. Where possible, provide back entry into surface mounted boxes or equipment items.



- I. Conduit routing shown on Drawings is diagrammatic. Run conduits to coordinate with building structure. Concealed conduit shall be as short and direct as possible. Exposed conduit shall be run in straight lines parallel to walls, beams, and columns with right angle bends.
- J. Provide minimum 3/16 inch diameter twisted nylon fish cord in all empty raceways. Provide tag on each end indicating location of other end. Fish cord shall have minimum of 200 pounds tensile strength.
- K. Conduit bodies shall only be used for wire sizes No. 2 AWG and smaller.

3.05 WIRING METHODS

- A. Branch circuit conductors shall be THHN-THWN when installed indoors or run in raceways below floor slabs.
- B. If approved by local Authorities and where permitted by code, provide metal-clad cable for branch circuit wiring (except homeruns and emergency circuits) above accessible ceilings, within furred spaces or in hollow framed partitions, dry locations only.
- C. Provide color coding for secondary service, feeders and branch circuits as follows:

- 1. 208/120V, 3 phase, 4 wire, wye:

<u>PHASE</u>	<u>COLOR</u>
A	BLACK
B	RED
C	BLUE
NEUTRAL	WHITE
EQUIPMENT GROUND	GREEN

- 2. 480/277V, 3 phase, 4 wire, wye:

<u>PHASE</u>	<u>COLOR</u>
A	BROWN
B	ORANGE
C	YELLOW
NEUTRAL	GRAY
EQUIPMENT GROUND	GREEN

- 3. Make connections to terminals from left to right arranged Phase A, B, and C.
- 4. Color code wiring for signal systems differently from power wiring described above. White and green colored insulation shall only be used with color tracer. Provide one of following methods for single or multi-conductor cables:
  - a. Spiral or longitudinal color stripe (tracer), running full length of cable.
  - b. Printed numbers stamped every 12 inches on cable insulation.
  - c. Numbered wire markers, Brady or equal, at junction boxes and termination points.
- 5. Provide same color coding for switch legs as corresponding phase conductor.

6. Provide colored plastic tape of specified color code identification for large size conductors available only in black. Wrap tape three complete turns around conductor at ends and at connections and splices.
- D. Phase wires shall be connected to phase supply mains in proper rotation to assure balanced condition on panel. Circuit numbers assigned on Drawings are for convenience only.
- E. Splices and Terminations:
1. Make splices and terminations equivalent electrically and mechanically to conductor insulation.
  2. Make splices in branch circuit wiring with solderless, screw-on connectors Ideal, Scotchlok, T&B or equal, rated 600 V, of size and type required by manufacturer's recommendation, with temperature ratings equal to those of cable insulation. Insulate splices with integral covers or with plastic, rubber, or friction tape, Permacel, or equal, to maintain integrity of cable insulation.
  3. Make splices and terminations to conductors #8 and larger with corrosion-resistant, high conductivity, pressure indent, hex screw or bolt clamp connectors, with or without tongues, designed specifically for intended service. Connectors for cables 250 kcmil and larger shall have two clamping elements or compression indents. Terminals for bus connections shall have two bolt holes. Split bolt connectors, Burndy or equal, shall be acceptable for all splices of conductors #8 and larger.
  4. Make splices at motor junction boxes with pressure indent connectors or split-bolt connectors as specified herein.
  5. Provide standard bolt-on lugs with allen or cap screws to attach copper wire and cable to disconnect switches and other electrical equipment.
- F. Use manufacturer-approved pulling compound or lubricant where necessary; compound used must not deteriorate conductor or insulation. Do not exceed manufacturer's recommended maximum pulling tensions and sidewall pressure values.
- G. Use pulling means, including fish tape, cable, rope, and basket-weave wire/cable grips that will not damage cables or raceway.
- H. Tighten electrical connectors and terminals according to manufacturer's published torque-tightening values. If manufacturer's torque values are not indicated, use those specified in UL 486A and UL 486B.
- I. Make splices and taps that are compatible with conductor material and that possess equivalent or better mechanical strength and insulation ratings than unspliced conductors.
- J. Install conductors at each outlet with at least 6 inches of slack.
- 3.06 OPERATING AND MAINTENANCE INSTRUCTIONS
- A. Refer to requirements of DIVISION 1 for specific instructions relating to operating and maintenance instructions.
- B. At completion of work and at time acceptable to Engineer, furnish operation instruction brochures and parts manuals, keys to all systems, warranties, and instruct Owner's representative as to arrangement, locations and operation of equipment and systems. Furnish instruction brochures and parts manuals in duplicate, that describe operation and suggested maintenance program for all systems and equipment. Provide spare parts list and name, address and telephone number of manufacturer's representative and service company for each system or equipment category.

- C. Furnish copies of final amended Shop Drawings and catalog data sheets of electrical materials and equipment, with wattage and type lamp of each lighting fixture clearly shown. Shop Drawings shall reflect any revisions or changes as result of review process.

### 3.07 SPECIAL REQUIREMENTS

- A. Bundle wiring passing through pull boxes and panelboards in neat and orderly manner with plastic cable ties. Cable ties shall be Ty-Raps as manufactured by Thomas & Betts, Holub Industries, Inc., Quick-Wrap, Burndy Unirap, or equal.
- B. Mount duplex convenience and power receptacles vertically with grounding posts at top of device, except locate grounding post to left for horizontal mounting.
- C. Provide inserts, hangers, anchors and steel supports required for installation of electrical equipment.
- D. Where steel support channels are cut or unprotected steel is exposed, apply two coats of aluminum, zinc chromate or other approved rust preventive paint to bare surfaces after proper cleaning.
- E. Provide miscellaneous hardware and support accessories, including support rods, nuts, bolts, screws, and other such items, with galvanized or cadmium plated finish, or other approved rust inhibiting coatings.
- F. Provide approved insulation at terminal connection points for electrical conducting materials, such as transformer terminals, terminal studs, and other special locations as directed by Engineer.
- G. Unload electrical equipment and materials delivered to site. Pay costs for rigging, hoisting, lowering and moving electrical equipment on site, in building or on roof. During construction provide additional protection against moisture, dust accumulation and physical damage of electrical equipment.
- H. All equipment shall be cleaned and vacuumed. Equipment with damage to painted finish shall be repaired to satisfaction of Engineer.
- I. Provide typed directories in panelboards.

### 3.08 GROUNDING

- A. Provide complete grounding system in conformance with Massachusetts Electrical Code and any special rules which may govern such installation. Seal threads of feeder conduits to maintain conduit equipment grounding conductivity. Make joints of conduits mechanically tight.
- B. Provide separate green insulated equipment grounding conductor in feeder circuits, branch circuits and motor circuits.
- C. Connect grounding pole of receptacle devices to circuit equipment grounding conductor. Bond grounding conductor at outlet boxes, cabinets, panelboards and equipment to form continuous equipment ground of noncurrent-carrying electrically conductive parts.

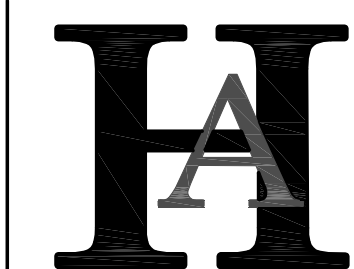
### 3.09 TESTING AND INSPECTION

- A. Test and inspect work of this Section according to Contract Documents, codes, standards and authorities that have jurisdiction, to satisfaction of Engineer. Tests specified in this Section shall be construed as minimum requirements. Notify Engineer and Authorities at least two working days prior to testing.
- B. Furnish Engineer with proof of megger tests of all branch circuits and feeders.

- C. Furnish Engineer with certificates of testing other than manufacturer of equipment, and inspection of electrical systems by independent testing company, indicating approval of Authorities having jurisdiction, and conformance to Specifications. Testing company shall perform all testing in accordance with National Electrical Testing Association (NETA) and test results shall be submitted on NETA forms. Test results shall indicate recommended test values as well as recommended action for below average test results. Testing data shall be certified by Registered Professional Engineer.
  - D. Perform all required adjustments and settings. Verify and correct deficiencies as necessary including voltages, tap settings, trip settings and phasing of equipment from distribution system to point of use. Voltage settings shall be tested and adjusted as necessary at locations of distribution system, when building is complete and operational.
  - E. Furnish necessary testing equipment.
  - F. Failure or defects in workmanship or materials revealed by tests shall be replaced and subsequently retested to satisfaction of Engineer.
  - G. Owner will not be responsible for material and equipment prior to testing and acceptance.
  - H. Test buswork, and connections for continuity and grounds by "megger" test.
  - I. Test 600V dry type transformers according to following minimum requirements:
    - 1. Resistance measurements of all windings.
    - 2. Ratio tests.
    - 3. Polarity and phase rotation.
    - 4. Insulation resistance.
  - J. Grounding:
    - 1. Main ground electrode system shall not exceed 5 ohms unless specified otherwise.
    - 2. Verify ground resistance by ground continuity test between main ground system and equipment frame system neutral and/or derived neutral point.
    - 3. Perform ground continuity test by passing minimum of ten amps DC between ground reference system and ground point. Calculate resistance by voltage drop method.
  - K. Receptacle Polarity and GFCI Test:
    - 1. Receptacle polarity connections shall be tested with appropriate testing device after energization.
    - 2. Test each GFCI by plugging test lamp into GFCI and pushing test button to verify 120V operation. Push reset button to verify lamp turns off. Replace GFCI and retest if above is not observed.
- 3.10 MAIN ELECTRIC SERVICE (PHASE II – NEW UNDERGROUND)
- A. Provide main electric service as herein specified, as indicated on Drawings and by NGRID Company requirements. Any reference to "Company" in this Section shall mean NGRID Company.
  - B. Electric service shall consist of new primary underground service which shall be from overhead services on Humphrey Street, to new utility company pad mounted transformer. Secondary service shall be 480/277 volts, three phase, four wire from pad mounted transformer to main circuit breaker.

- C. Metering will be at secondary voltage with meter located where required by Company.
- D. Company will provide:
  - 1. Pad mounted transformer.
  - 2. Meter and meter wiring.
  - 3. Primary service connections at transformer.
  - 4. Primary cables.
- E. Install following items furnished by Company:
  - 1. Current transformers.
  - 2. Test block.
  - 3. Test block cabinet.
- F. Provide following:
  - 1. Underground ductbanks as shown on Drawings.
  - 2. Complete equipment grid grounding system around perimeter of transformer pad, consisting of continuous copper cable and ground rods joined together by exothermic process. Leave slack cable leads above grade at transformer for equipment grounding connections by Company.
  - 3. Secondary service cables and conduits.
  - 4. Secondary service cable connections at transformer secondary under the direct on-site supervision of Company.
  - 5. Meter conduit.
  - 6. Lugs for terminating cables at transformer.
  - 7. Meter socket approved by utility company.
  - 8. Meter and CT's.
- G. Adapt all conduits to rigid steel before passing under transformer pad and prior to passing through building foundation wall.
- H. Consult with the Company regarding service and advise Company in writing as to when new permanent service will be required.

END OF SECTION 26 00 00



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MECHANICAL ELECTRICAL PLUMBING (MEP) PROFESSIONAL  
STRUCTURAL TECHNOLOGY COMMISSIONING

Project:

**BLOCKSIDE FIELD**

Swampscott, Massachusetts

Drawing Title:

**ELECTRICAL  
SITE PLAN  
PHASE I**

Revision \_\_\_\_\_ Date \_\_\_\_\_

Scale: 1"=30'-0" Drawing No.

Date: 8.26.2016

Job: 60-16-870 **E1**

File: 60-16-870-01-01-01.dwg

Drawn: AKL

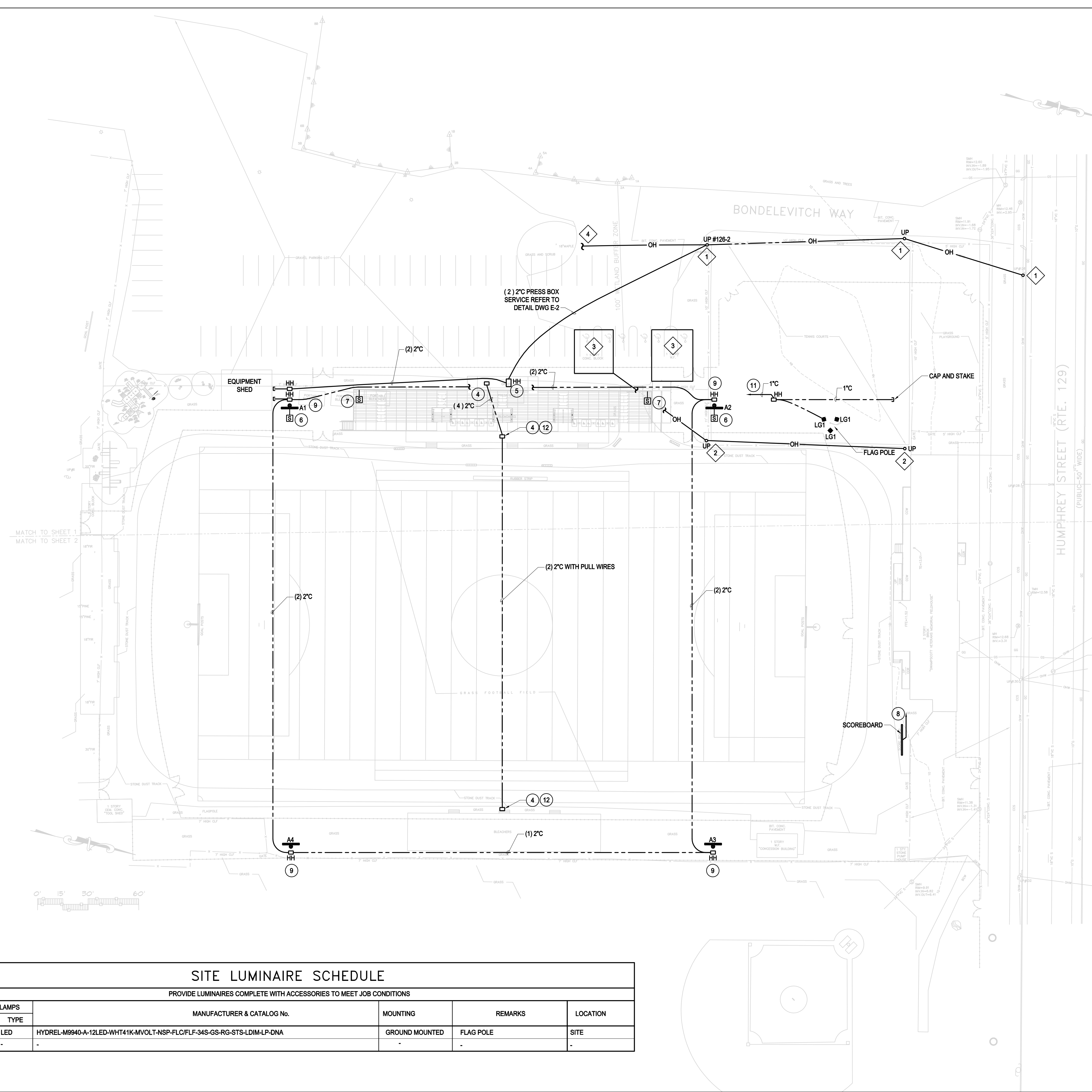
Checked: KJA SHEET 1 OF 2

**NOTES:**

- 1 NOT USED.
- 2 NOT USED.
- 3 NOT USED.
- 4 TURF FIELD COMBOX BY OTHERS.
- 5 PRESS BOX ELECTRIC SERVICE HANDHOLE. REFER TO DETAILS.
- 6 PROVIDE MOUNTING OF SOUND SYSTEM SPEAKER TO SPORTS LIGHTING POLE BASE.
- 7 PROVIDE MOUNTING OF SOUND SYSTEM SPEAKERS TO BLEACHER STRUCTURE. PROVIDE MINIMUM 2" DIAMETER, 10' LONG RIGID CONDUIT FOR SPEAKER MOUNTING. PROVIDE RIGID SUPPORT TO BLEACHERS. SOUND SYSTEM AND SPEAKERS PROVIDED BY OTHERS.
- 8 NEW SCOREBOARD. PROVIDE POWER FROM ADJACENT VETERANS MEMORIAL BUILDING. INCLUDE A 80A 2P CIRCUIT CONFIRM EXACT REQUIREMENTS WITH APPROVED SCOREBOARD SUBMITTALS
- 9 PROVIDE POWER AND LOW VOLTAGE CONDUITS FROM HANDHOLES TO WITHIN SPORTS LIGHTING POLE BASE ACCESS POINTS, COORDINATE WITH APPROVED SPORTS LIGHTING EQUIPMENT SUBMITTALS. REFER TO DETAIL DWG. E2.
- 10 ALL SPORTS LIGHTING POWER CONDUITS ARE 2" UNLESS NOTED OTHERWISE.
- 11 PROVIDE 1" C TO POWER SIDE OF COMBOX FOR ROUTING OF 20A 1P (#10 AWG) FOR VIA TIME SWITCH PRESS BOX LOAD CENTER FLAG POLE LIGHTING.
- 12 PROVIDE TWO 1" C IN COMBOX THIS LOCATION, PROVIDE 20A 1P CIRCUIT FROM PRESS BOX LOAD CENTER CIRCUITING SHALL BE #8AWG (EACH LOCATION SHALL HAVE A DEDICATED CIRCUIT).

**NOTES:**

- 1 EXISTING UTILITY POLES WITH OVERHEAD POWER AND TELEPHONE LINES TO BE MAINTAINED. COORDINATE WITH NGRID DISCONNECTING OVERHEAD / UNDERGROUND LINES TO POLES AND STRUCTURES BEING DEMOD.
- 2 EXISTING UTILITY POLES WITH FLOOD LIGHTING AND OVERHEAD LINES TO BE REMOVED COMPLETE INCLUDING OVERHEAD AND / OR UNDERGROUND LINES TO BUILDINGS BEING DEMOD CARRY ALL COSTS FOR A COMPLETE REMOVAL, COORDINATE ALL REQUIRED SHUTDOWNS WITH NGRID.
- 3 EXISTING BUILDING TO BE DEMOD, DISCONNECT AND REMOVE ALL OVERHEAD AND / OR UNDERGROUND UTILITY LINES.
- 4 EXISTING OVERHEAD POLE LINE TO REMAIN.

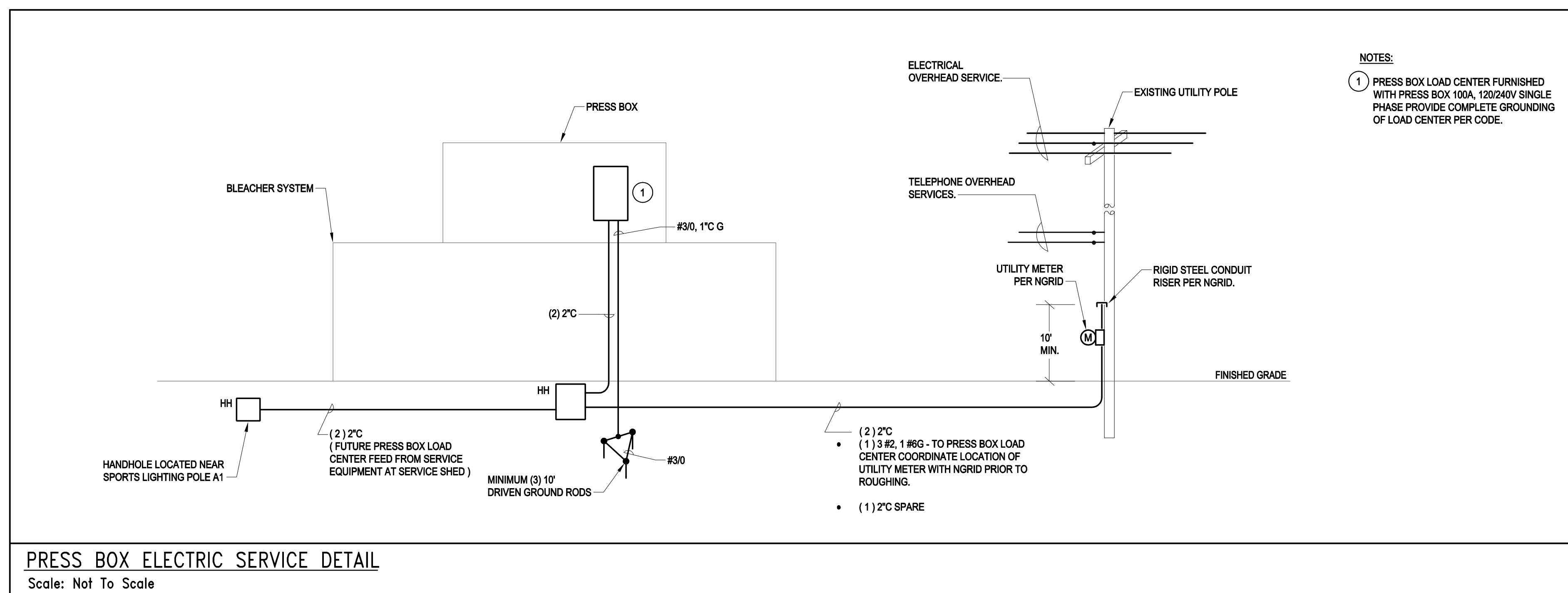


**SITE LUMINAIRE SCHEDULE**

PROVIDE LUMINAIRES COMPLETE WITH ACCESSORIES TO MEET JOB CONDITIONS

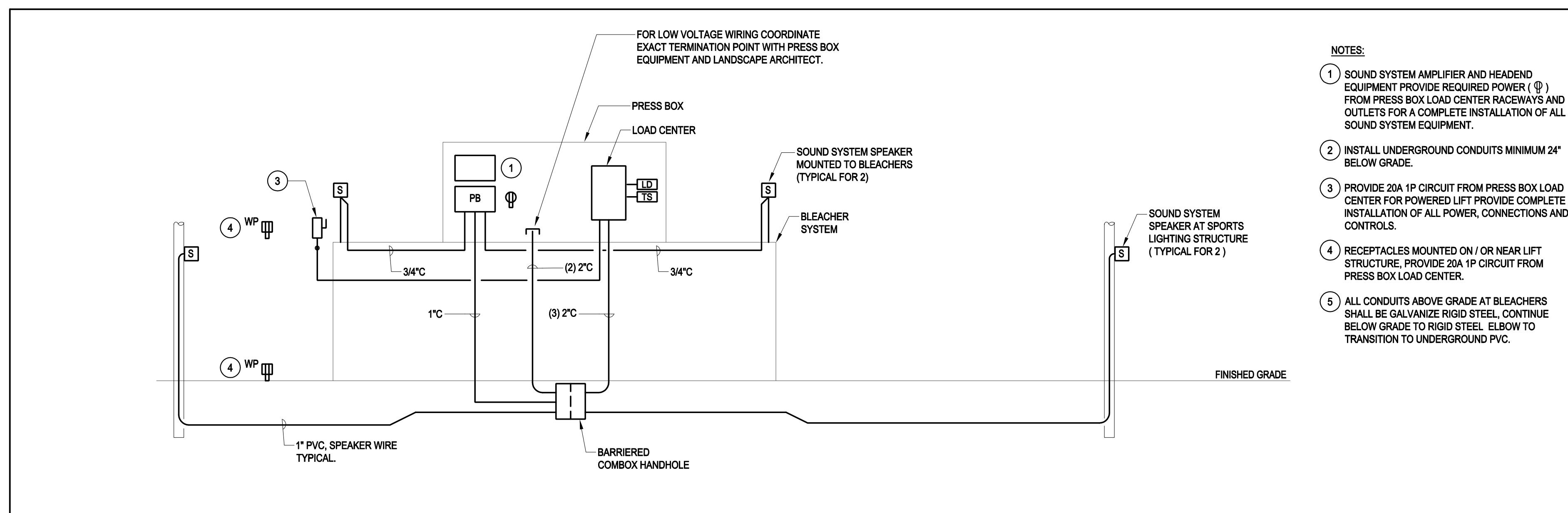
TYPE	LAMPS No. TYPE	MANUFACTURER & CATALOG No.	MOUNTING	REMARKS	LOCATION
LG1	LED	HYDREL-M9940-A-12LED-WHT41K-MVOLT-NSP-FLC/FLF-34S-GS-RG-ST5-LDIM-LP-DNA	GROUND MOUNTED	FLAG POLE	SITE

8.01 @ 12:00



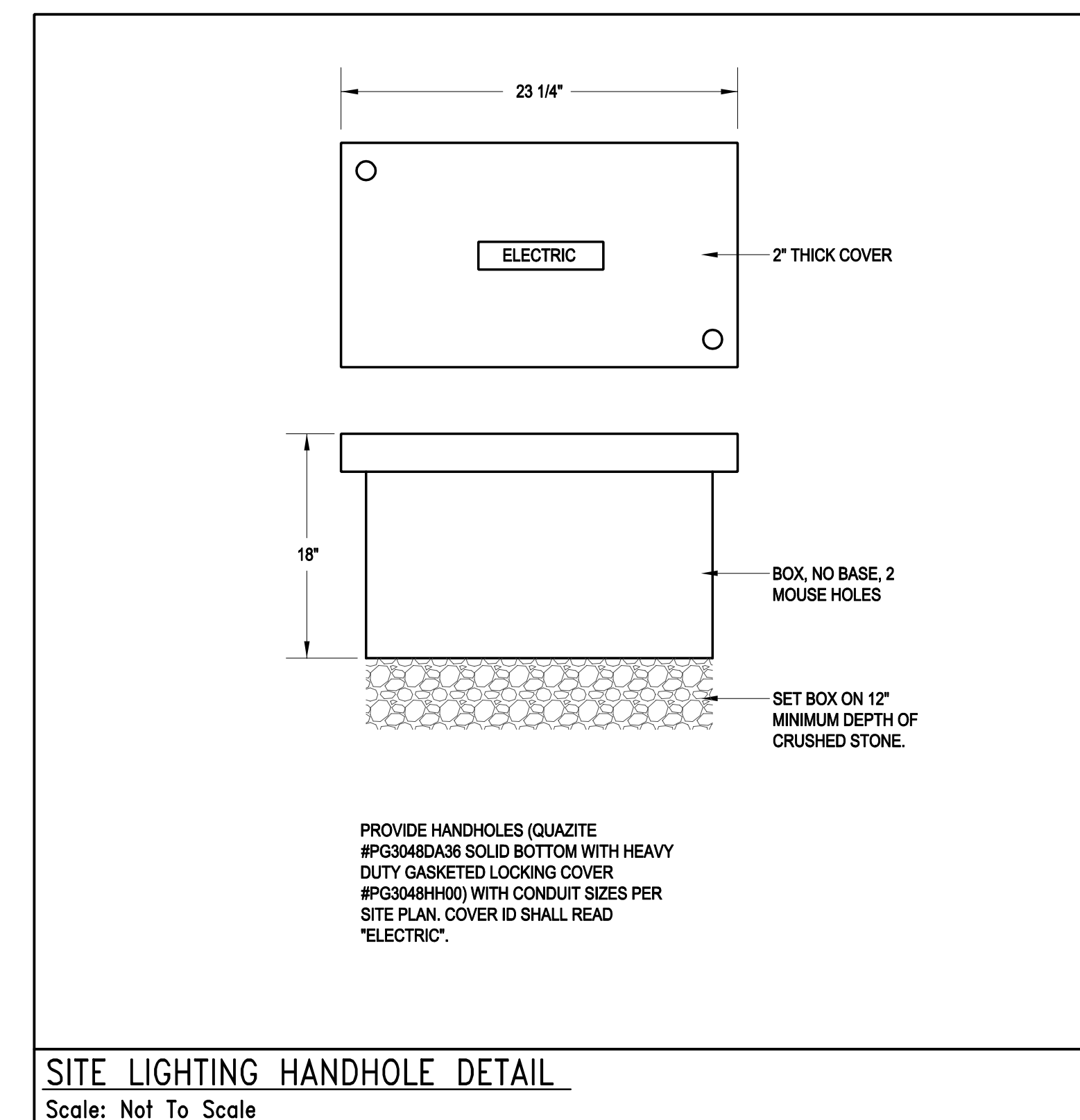
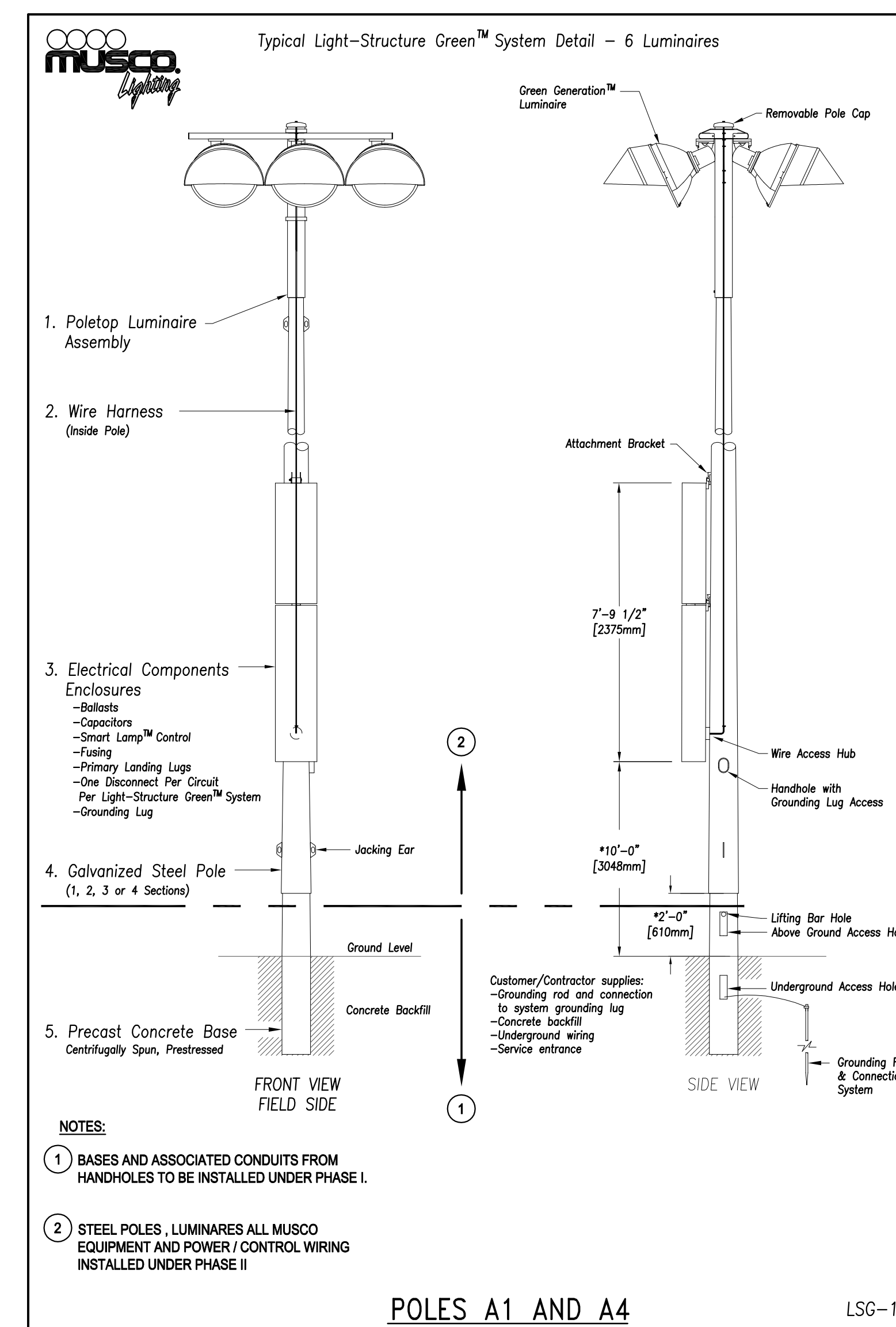
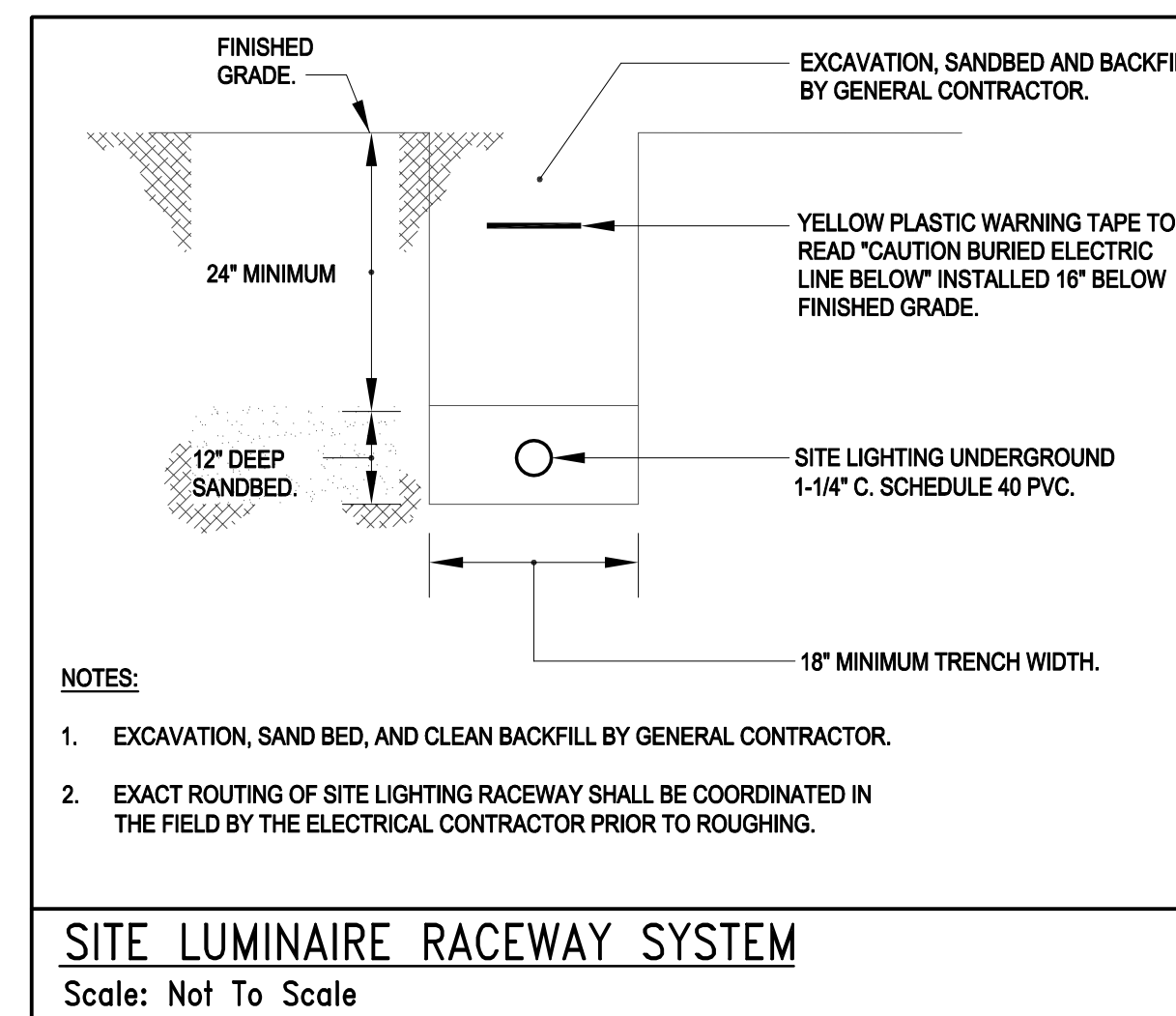
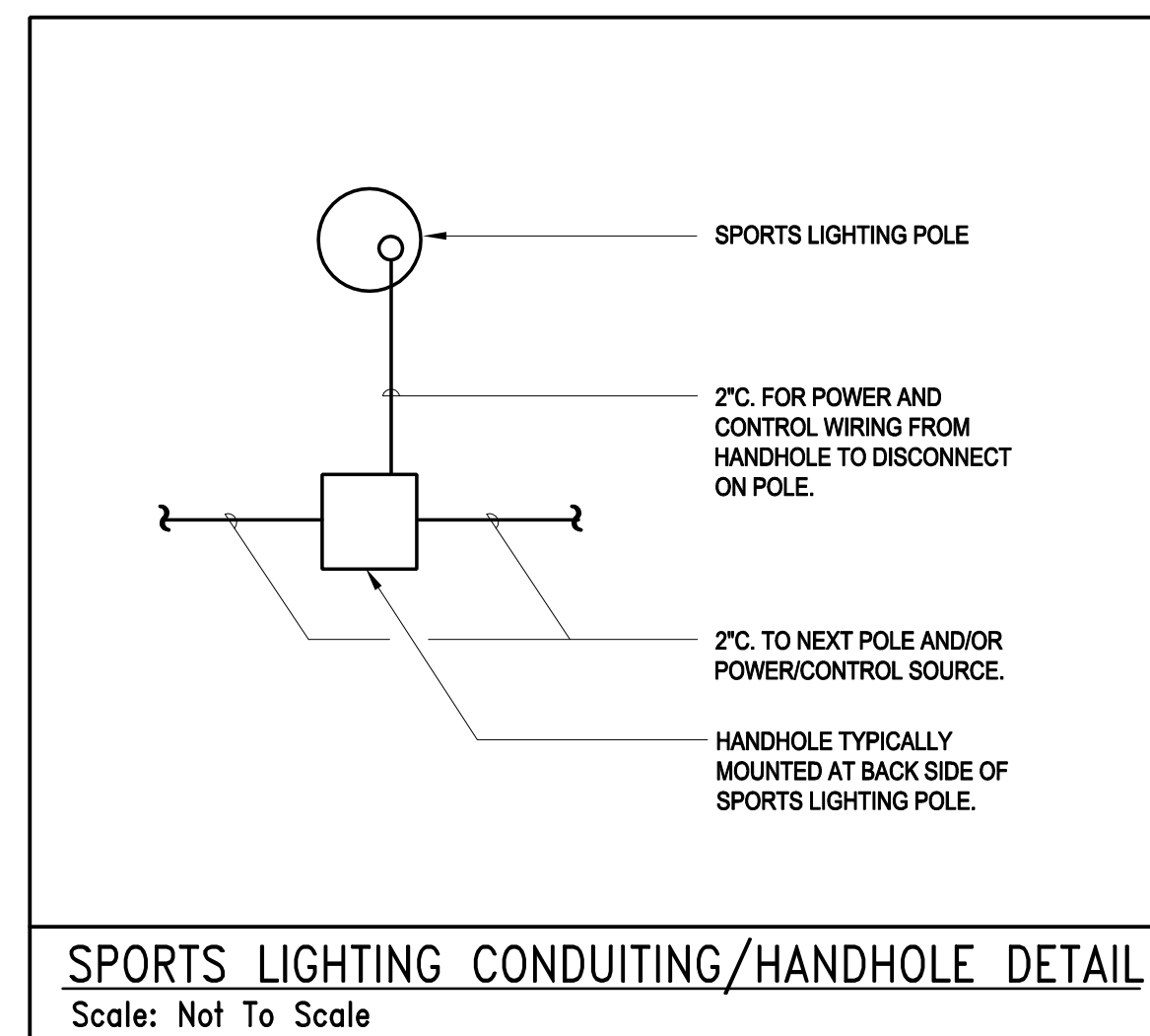
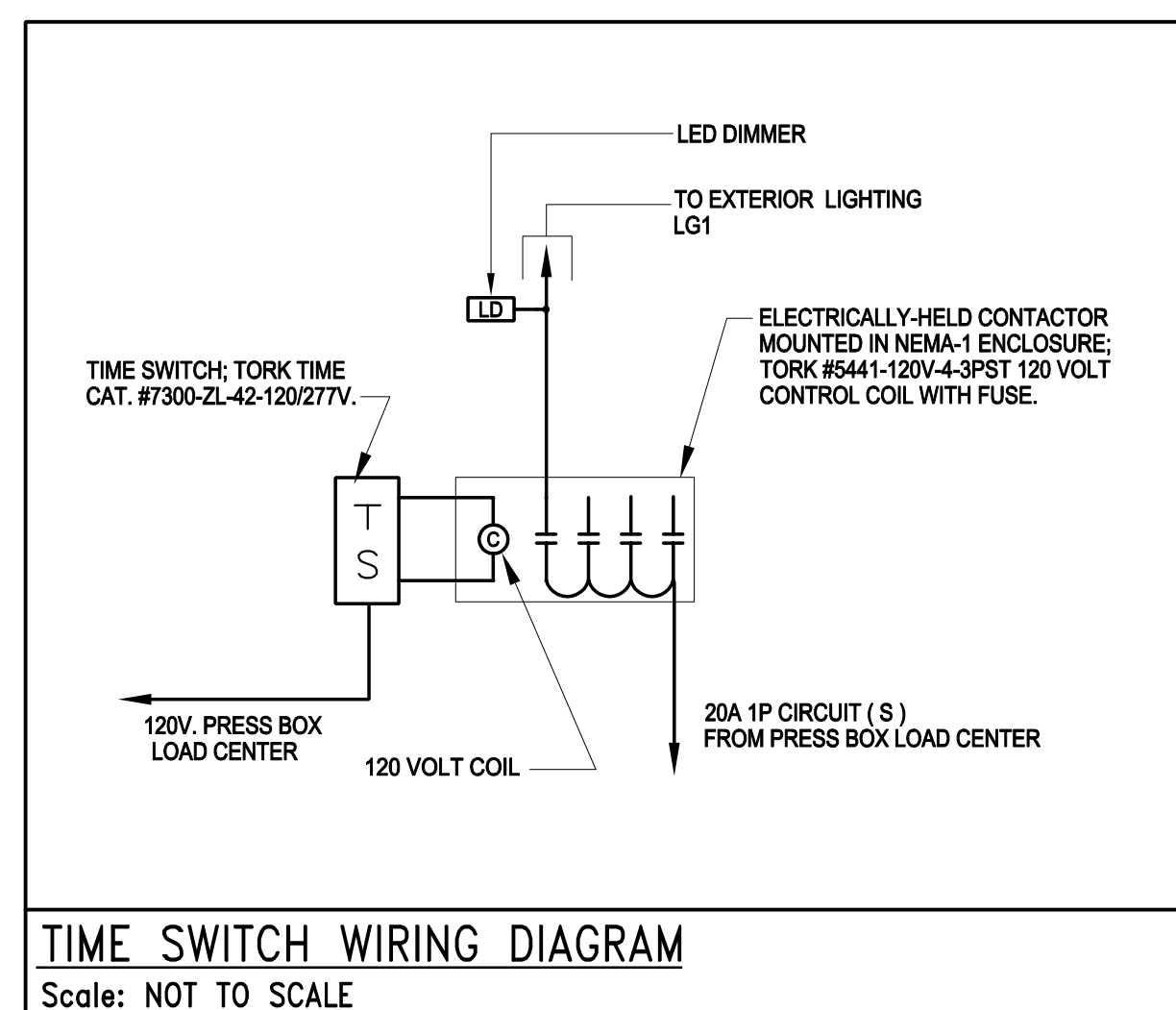
**PRESS BOX ELECTRIC SERVICE DETAIL**

Scale: Not To Scale



**PRESS BOX SOUND SYSTEM AND EQUIPMENT INSTALLATION DETAIL**

Scale: Not To Scale



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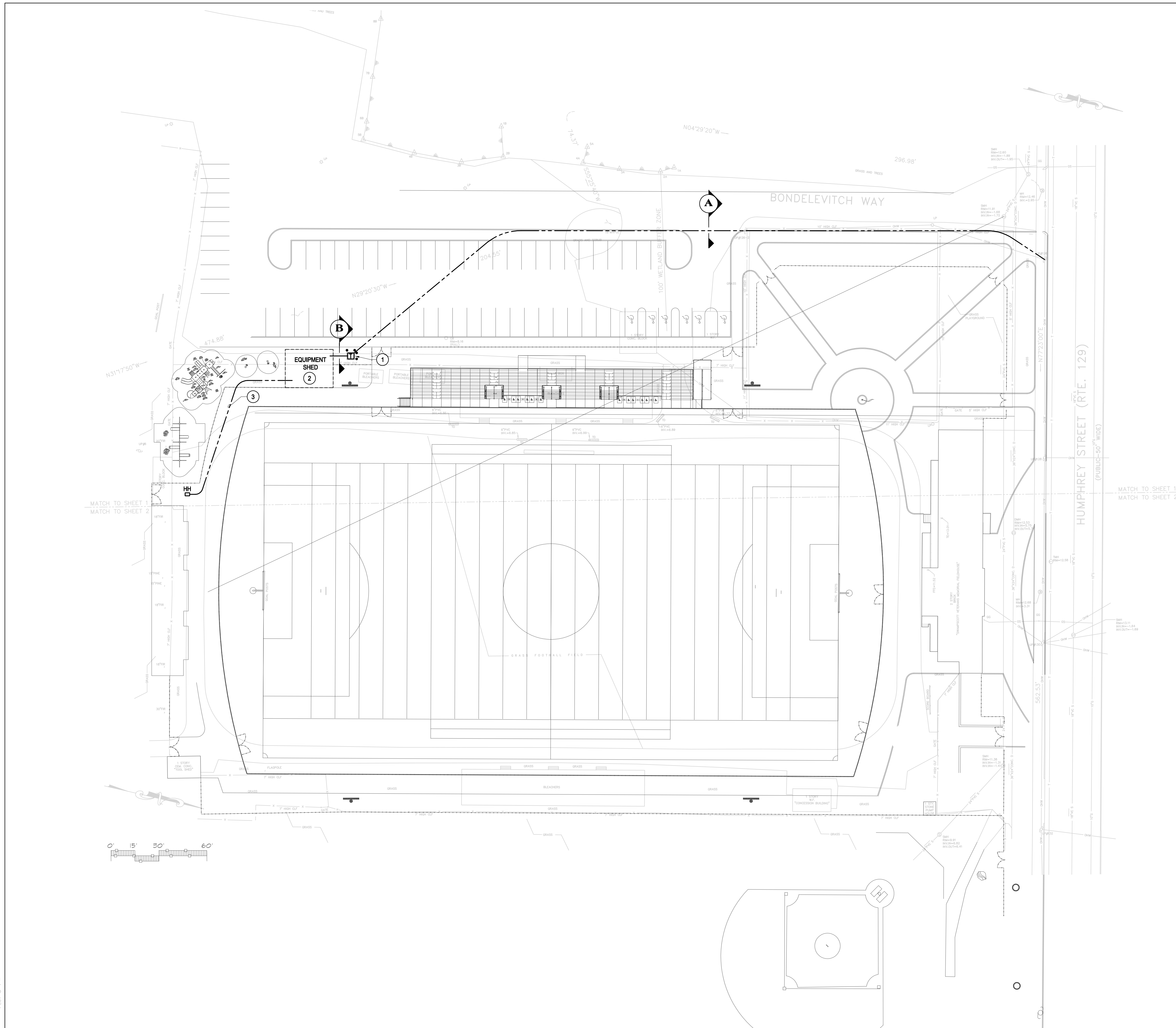
MECHANICAL | ELECTRICAL | PLUMBING | FIRE PROTECTION  
 STRUCTURAL | TECHNOLOGY | COMMUNICATIONS

**Project:**  
**BLOCKSIDE FIELD**  
 Swampscott, Massachusetts

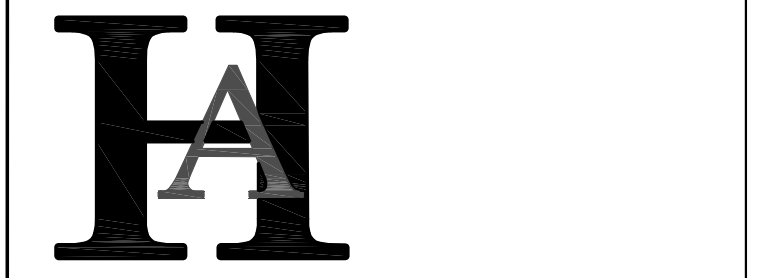
**Drawing Title:**  
**ELECTRICAL SPORTS LIGHTING DETAILS PHASE I**

Revision	Date

Scale: NONE      Drawing No. **E2**  
 Date: 8.26.2016  
 Job: 60-16-870  
 File: \\HPC\BDR\60-16-870\DWG\PHASE I  
 Drawn: AKL  
 Checked: KJA      SHEET 2 OF 2



- NOTES:**
- 1 PAD MOUNTED TRANSFORMER ON CONCRETE PAD PER NGRID. PROVIDE CONCRETE FILLED BOLLARDS PER NGRID.
  - 2 EQUIPMENT SHED, LOCATION OF DISTRIBUTION EQUIPMENT AND MUSCO LIGHTING CONTROLS, REFER TO ELECTRICAL DRAWING E2.
  - 3 (2) 2". FROM SHED TO HANDHOLE FOR FUTURE USE. COORDINATE EXACT LOCATION WITH LANDSCAPE ARCHITECT PRIOR TO ROUGHING.



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Project:  
**BLOCKSIDGE FIELD**

Swampscott, Massachusetts

Drawing Title:  
**ELECTRICAL  
 SITE PLAN  
 PHASE II**

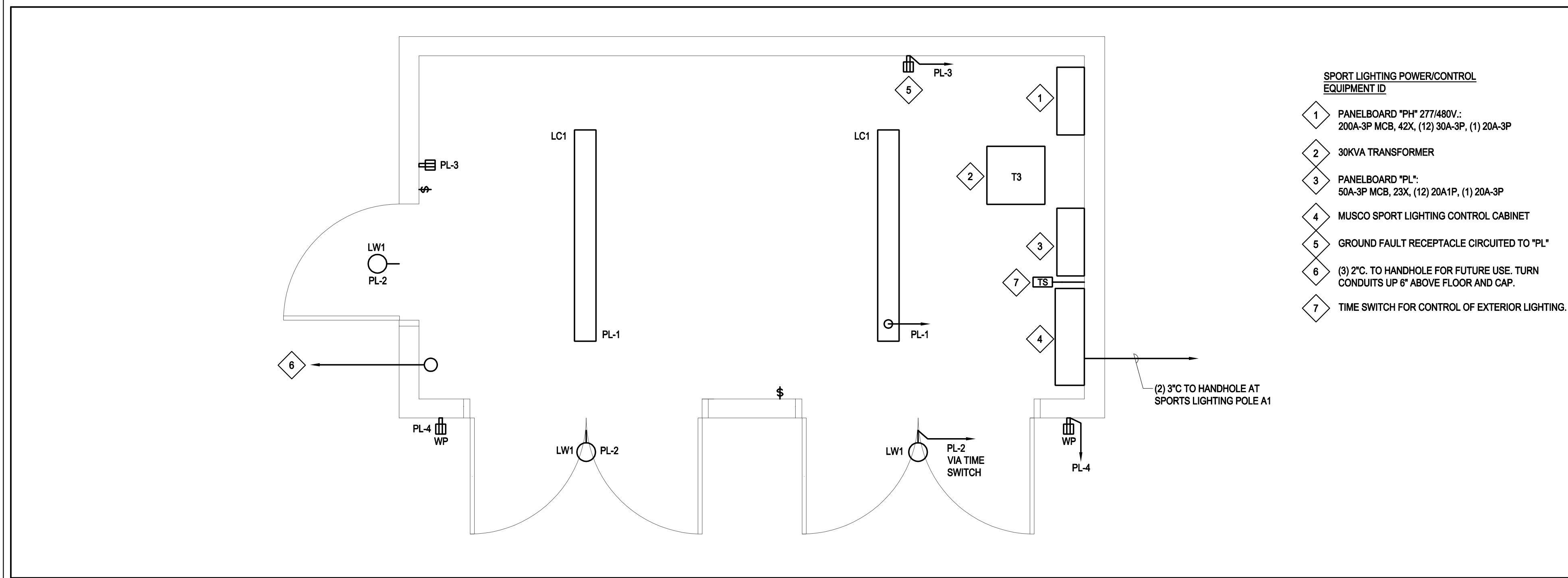
Revision	Date

Scale: 1"=30'-0"  
 Date: 8.26.2016  
 Job: 60-16-B70  
 File: 60-16-B70-ELECTRICAL-PLAN-PHASE II  
 Drawn: ERA  
 Checked: KJA

Drawing No.  
**E1A**  
 SHEET 1 OF 2

8/27/16 11:55:27



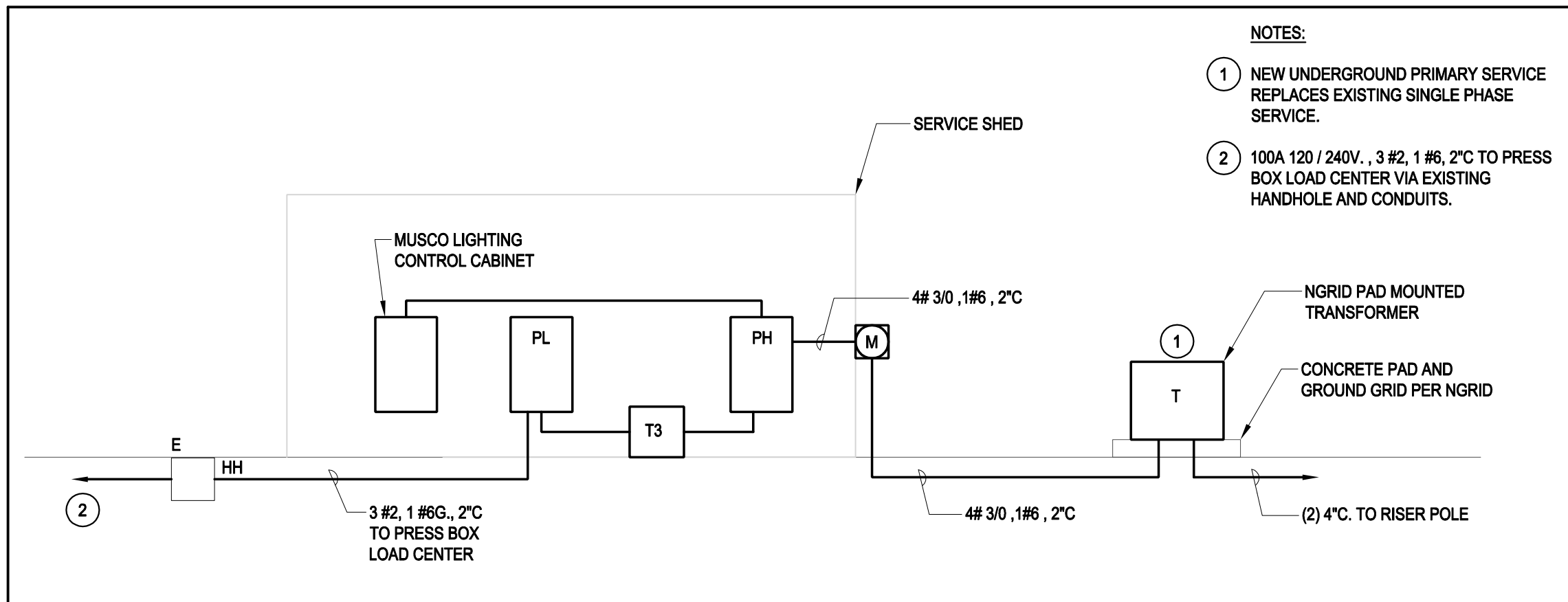


SHED SPORTS LIGHTING POWER/CONTROL EQUIPMENT

Scale: Not To Scale

SPORT LIGHTING POWER/CONTROL EQUIPMENT ID

- 1 PANELBOARD "PH" 277/480V:  
200A-3P MCB, 42X, (12) 30A-3P, (1) 20A-3P
- 2 30KVA TRANSFORMER
- 3 PANELBOARD "PL":  
50A-3P MCB, 23X, (12) 20A1P, (1) 20A-3P
- 4 MUSCO SPORT LIGHTING CONTROL CABINET
- 5 GROUND FAULT RECEPTACLE CIRCUITED TO "PL"
- 6 (3) 2" TO HANDHOLE FOR FUTURE USE. TURN CONDUITS UP 6" ABOVE FLOOR AND CAP.
- 7 TIME SWITCH FOR CONTROL OF EXTERIOR LIGHTING.

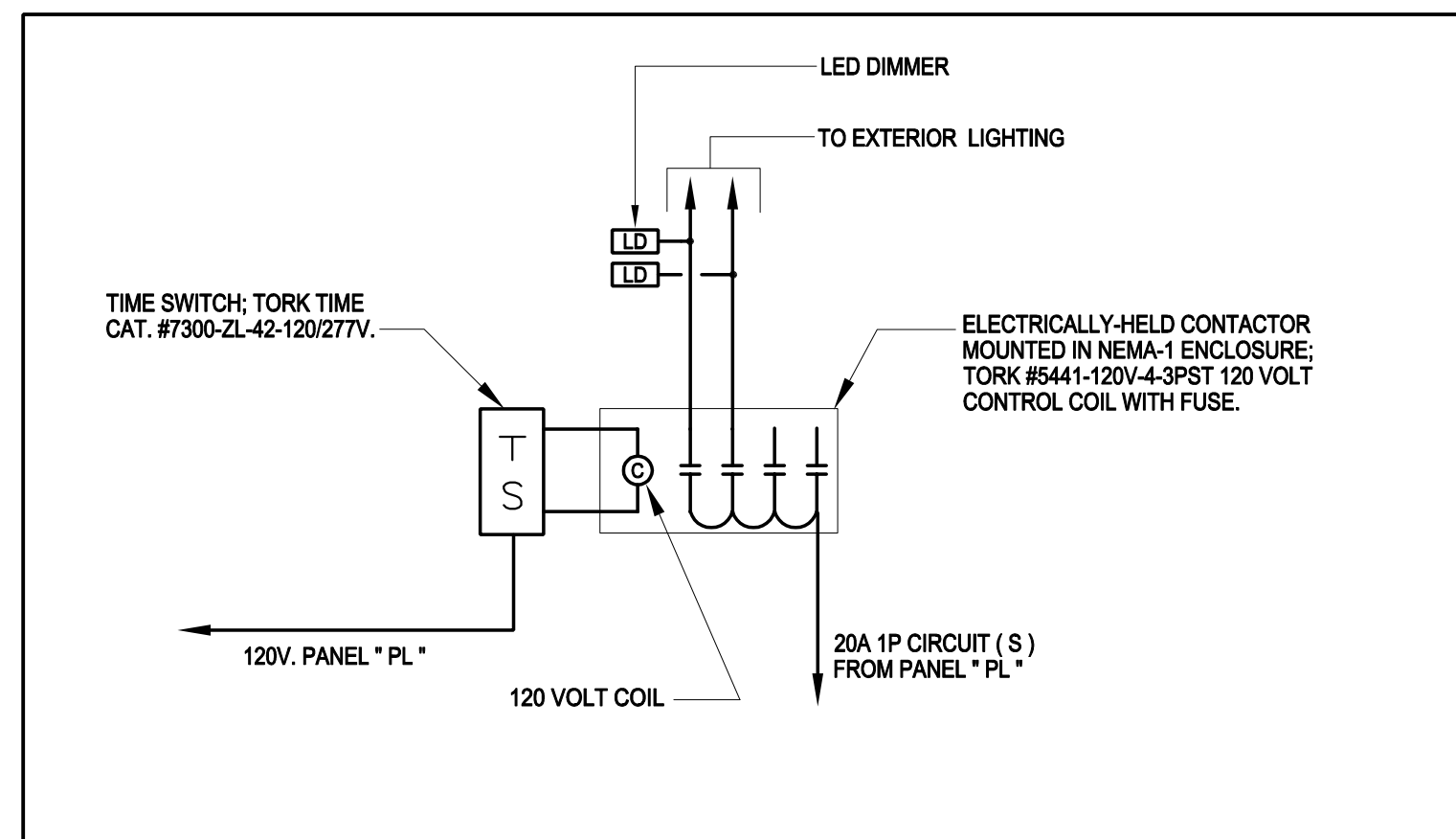


POWER RISER DIAGRAM

Scale: Not To Scale

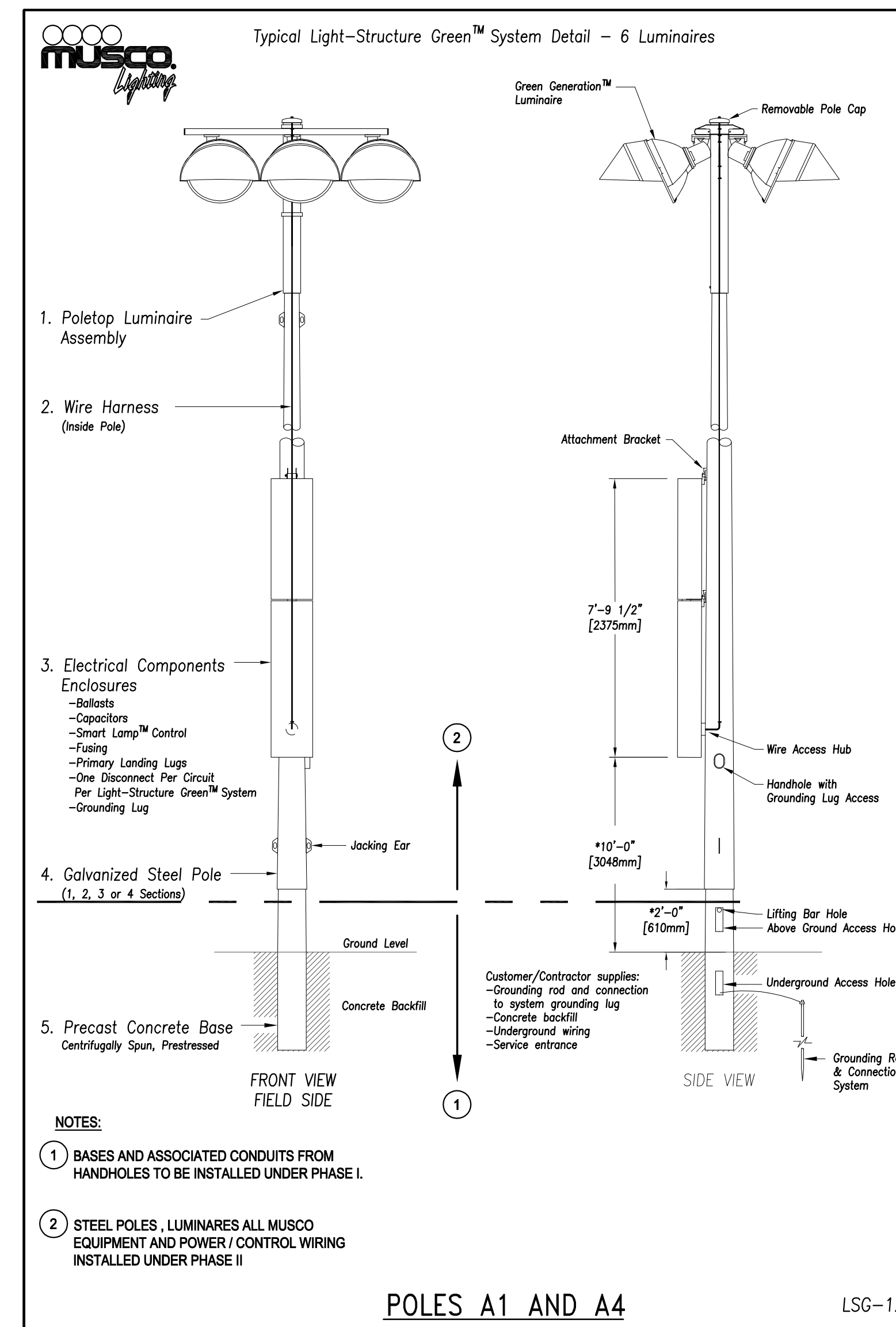
NOTES:

- 1 NEW UNDERGROUND PRIMARY SERVICE REPLACES EXISTING SINGLE PHASE SERVICE.
- 2 100A 120 / 240V., 3 #2, 1 #6, 2" TO PRESS BOX LOAD CENTER VIA EXISTING HANDHOLE AND CONDUITS.



TIME SWITCH WIRING DIAGRAM

Scale: NOT TO SCALE

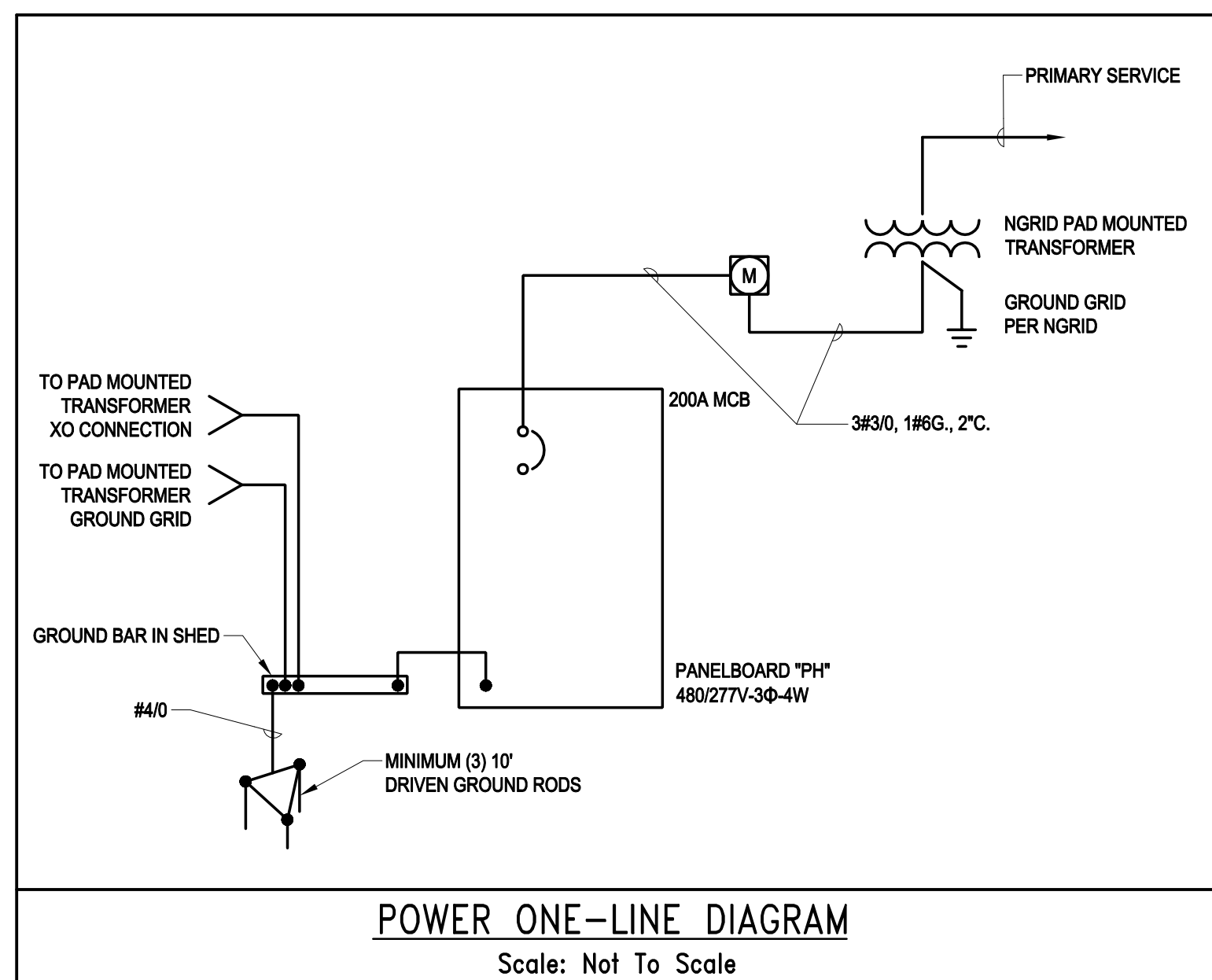


POLES A1 AND A4

LSG-12

NOTES:

- 1 BASES AND ASSOCIATED CONDUITS FROM HANDHOLES TO BE INSTALLED UNDER PHASE I.
- 2 STEEL POLES, LUMINAIRES ALL MUSCO EQUIPMENT AND POWER / CONTROL WIRING INSTALLED UNDER PHASE II



POWER ONE-LINE DIAGRAM

Scale: Not To Scale

Branch Panel: PL													
Location: [Blank]													
Supply From: [Blank]													
Mounting: Surface													
Enclosure: Type 1													
Volts: 120/208 Wye													
Phases: 3													
Wires: 4													
SPD													
A.I.C. Rating: 22													
Mains Type: [Blank]													
Mains Rating: 50 A													
MCB Rating: 50 A													
CKT	Circuit Description	Type	Trip	Poles	A	B	C	Poles	Trip	Type	Circuit Description	CKT	
1	LIGHTING		20 A	1	0 VA	0 VA		1	20 A		LIGHTING	2	
3	RECEPTACLES		20A	1		0 VA	0 VA		1	20A	RECEPTACLES	4	
5	SPARE		20 A	2			0 VA	0 VA	1	20 A	SPARE	6	
7					0 VA	0 VA		1	20		SPARE	8	
9	SPARE		30 A	2		0 VA	0 VA		1	20 A	SPARE	10	
11						0 VA	0 VA		1	20 A	SPARE	12	
13	SPARE		20 A	3	0 VA	0 VA		1	20 A		SPARE	14	
15						0 VA	0 VA		1	20 A	SPARE	16	
17						0 VA	0 VA		1	20 A	SPARE	18	
19	SPARE		20 A	1	0 VA	0 VA		1	20 A		SPARE	20	
21	SPARE		20 A	1		0 VA	0 VA		1	20 A	SPARE	22	
23	SPARE		20 A	1			0 VA	0 VA	1	20 A	SPARE	24	
25	SPACE AND HARDWARE			1	0 VA	0 VA			1		SPACE AND HARDWARE	26	
27	SPACE AND HARDWARE			1		0 VA	0 VA		1		SPACE AND HARDWARE	28	
29	SPACE AND HARDWARE			1			0 VA	0 VA	1		SPACE AND HARDWARE	30	

Branch Panel: PH													
Location: [Blank]													
Supply From: [Blank]													
Mounting: Surface													
Enclosure: Type 1													
Volts: 277/480 Wye													
Phases: 3													
Wires: 4													
SPD													
A.I.C. Rating: 22													
Mains Type: [Blank]													
Mains Rating: 200 A													
MCB Rating: 200 A													
CKT	Circuit Description	Type	Trip	Poles	A	B	C	Poles	Trip	Type	Circuit Description	CKT	
1	SPORT LIGHTING		30 A	3	0 VA	0 VA		3	30 A		SPORT LIGHTING	2	
3						0 VA	0 VA					4	
5						0 VA	0 VA					6	
7	SPORT LIGHTING		30 A	3	0 VA	0 VA		3	30 A		SPORT LIGHTING	8	
9						0 VA	0 VA					10	
11						0 VA	0 VA					12	
13	SPARE		30 A	3	0 VA	0 VA		3	30 A		SPARE	14	
15						0 VA	0 VA					16	
17						0 VA	0 VA					18	
19	SPARE		20 A	1	0 VA	0 VA		1	20 A		SPARE	20	
21	SPARE		20 A	1		0 VA	0 VA		1	20 A	SPARE	22	
23	SPARE		20 A	1			0 VA	0 VA	1	20 A	SPARE	24	
25	SPACE AND HARDWARE			1	0 VA	0 VA			1		SPACE AND HARDWARE	26	
27	SPACE AND HARDWARE			1		0 VA	0 VA		1		SPACE AND HARDWARE	28	
29	SPACE AND HARDWARE			1			0 VA	0 VA	1		SPACE AND HARDWARE	30	
31	SPACE AND HARDWARE			3	0 VA	0 VA		3			SPACE AND HARDWARE	32	
33						0 VA	0 VA					34	
35						0 VA	0 VA					36	
37	SPACE AND HARDWARE			3	0 VA	0 VA		3	50 A		TRANSFORMER	38	
39						0 VA	0 VA					40	
41						0 VA	0 VA					42	

**HA**  
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 STRUCTURAL, TECHNOLOGY CONSULTING  
 OF Base Consulting Engineers.

**BLOCKSIDE FIELD**

Swampscott, Massachusetts

**ELECTRICAL SPORTS LIGHTING DETAILS PHASE II**

33 40 00  
STORM DRAINAGE SYSTEM

PART 1 - GENERAL

1.01 GENERAL REQUIREMENTS

- A. Include GENERAL CONDITIONS and SUPPLEMENTARY CONDITIONS as part of this Section.
- B. Examine all other Sections of the Specifications for requirements which affect work of this Section whether or not such work is specifically mentioned in this Section.
- C. 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.

1.02 WORK INCLUDED

- 1. Site storm drainage piping, fittings and accessories and bedding.
- 2. Connection of drainage system to existing storm drainage system.
- 3. Catch basins, perimeter drains, paved area drainage, site surface and subsurface drainage.
- 4. Sub-drainage system for synthetic turf field.

1.03 RELATED WORK

- A. Site Preparation, Section 02100
- B. Earthwork, Section 02200.
- D. Paving, Section 02700
- F. Lawns, Section 02930

1.04 REFERENCES

- A. All work shall comply with the pertinent standards of the latest editions of the following Codes and Specifications, unless designated otherwise herein:
  - 1. ASTM D1785 - Poly(Vinyl Chloride) (PVC) Perforated Drainage Pipe and Fittings.
  - 2. American Society for Testing and Materials (ASTM), 1916 Race Street, Philadelphia, PA 19101.
  - 3. American National Standards Institute (ANSI), 1430 Broadway, New York, NY 10018.
  - 4. The Commonwealth of Massachusetts, Department of Public Works, Standard Specifications for Highways and Bridges, 1988, hereinafter designated in the test as the "Standard Specifications".
  - 5. American Association of State Highway and Transportation Officials (AASHTO).
  - 6.

1.05 SUBMITTALS

- 5. Accurately record actual horizontal and vertical locations of pipe runs, perimeter drains, connections to existing stormwater components, and rim and invert elevations stone rip rap, catch

basins and manholes,

6. Identify and describe unexpected variations to subsoil conditions or discovery of uncharted utilities.
7. Product Data: Provide data indicating pipe and pipe accessories, clean-outs, and perimeter drains, as required.

#### 1.06 REGULATORY REQUIREMENTS

1. All work under this Section of the Specifications shall be installed in accordance with the Laws, Ordinances, Rules and Regulations of all Local, State and Federal authorities having jurisdiction, the Rules and Regulations of the National Board of Fire Underwriters, and the Public Utility Companies.

#### 1.07 COORDINATION

1. Coordinate work under provisions of the applicable Sections of these Specifications.

#### 1.08 EXAMINATION OF CONDITIONS

1. The Contractor shall fully inform himself of existing conditions of the site before submitting his bid, and shall be fully responsible for carrying out all site 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.

### PART 2 - PRODUCTS

#### 2.01 STORM DRAIN PIPE MATERIALS AND ACCESSORIES

1. High Density Corrugated Polyethylene Pipe (HDPE) with smooth interior shall be per ASTM D3350 ("Hancor 'HI-Q' pipe" or A.D.S. N-12 approved equal). All pipe shall meet specifications for corrugated polyethylene drainage tubing per AASHTO M252.
2. Polyvinyl Chloride (PVC) plastic pipe and all fittings shall be Schedule 40 rated and meet ASTM D1785 specifications.
3. HDPE Joints and Fittings: Pipe joints and fittings shall conform to AASHTO M292 or AASHTO M294. Coupling bands shall be per manufacturer's specifications. Couplers shall cover not less than one corrugation on each section of pipe.
4. Filter Fabric: Non-biodegradable, non-woven, manufactured by Mirafi (Mirafi 140N) or approved equal.

#### 2.02 BEDDING AND COVER MATERIALS

5. Bedding: Crushed stone as specified in Section 02200, Earthwork
6. Cover: Gravel as specified in Section 02200, Earthwork

#### 2.03 MANHOLE

1. See plan for type and location of manholes.
2. Within the synthetic turf field Nyloplast Drain Manholes with cast iron frame and cover, the diameter and depth as detailed on the Drawings shall be utilized. As manufactured by ADS, or approved equal. Cast iron frames and grates shall conform to ASTM A48, latest issue, Class 30.

#### 2.04 SUB-DRAINAGE SYSTEM UNDER SYNTHETIC TURF FIELD.

1. See plan for size and location of collector pipes HDPE Collector –N-12 ST, perforated. Double wall, soil tight.
2. Under Drains – AdvanEDGE 12” panel drain system w/ geotech fabric wrap and end/side outlets to match, or approved equal. Coordinate and install as directed by manufacturer.
3. Products as manufactured by ADS, Advance Drainage Systems, Inc. All reference to a specific product is for quality control only. Equal products will be considered.

### PART 3 - EXECUTION

#### 3.01 EXAMINATION

1. Verify that perimeter cut and excavation base is ready to receive work and excavations, dimensions and elevations are as indicated on drawings.

#### 3.02 PREPARATION

1. Hand trim excavations to required elevations. Correct over excavation with coarse aggregate.
2. Remove large stones or other hard matter which could damage piping or impede consistent backfilling or compaction.

#### 3.03 PREPARATION BEDDING

1. Excavate pipe perimeter in accordance with Section 02200 for work of this Section. Hand trim excavation for accurate placement of pipe to elevations indicated.
2. Place bedding material at perimeter bottom, level materials in continuous layer not exceeding 6 inches compacted depth.
3. Maintain optimum moisture content of bedding material to attain required compaction density.

#### 3.04 INSTALLATION - PIPE

1. Install pipe, fittings and accessories in accordance with ASTM D232, manufacturer’s instructions and as shown on the Plans.
2. Place pipe on crushed stone bedding to depths indicated on drawings (minimum 6 in.).
3. Lay pipe to slope gradients noted on drawings with maximum variation from true slopes of 1/8 inch.

4. Install bedding at sides and over top of pipe. Provide top cover to minimum compacted thickness as indicated on drawings. Compact to 95%.
5. Refer to Section 02200 for perimetering requirements. Do not displace or damage pipe when compacting.

### 3.05 FIELD QUALITY CONTROL

1. Request inspection prior to, and immediately after, placing aggregate cover over pipe.
1. Compaction testing will be performed in accordance with ASTM D1557.
2. If tests indicate work does not meet specified requirements, remove work, replace and retest.

### 3.06 PROTECTION

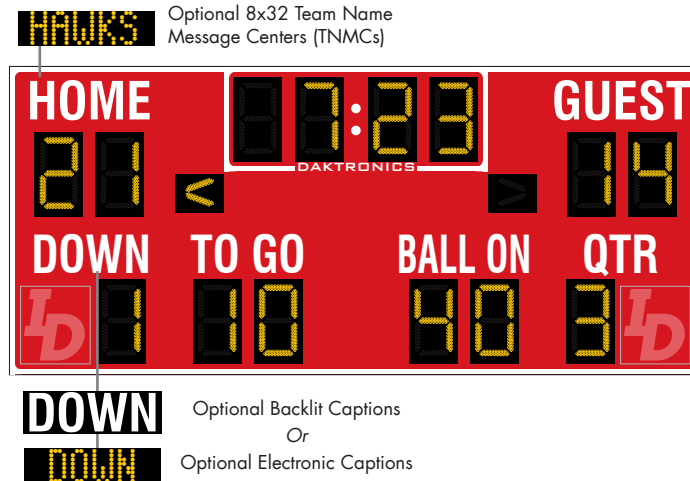
1. Protect finished work under provisions of applicable sections of these specifications.
2. Protect pipe and aggregate cover from damage or displacement until backfilling operation is in progress.

### 3.07 CLEANING

1. At the completion of the work, clean all piping, structures, as well as open drainage courses through and to which water from this construction is directed to the satisfaction of the Engineer.

END OF SECTION

# DAKTRONICS FB-2018 PRODUCT SPECIFICATIONS



This outdoor LED football scoreboard displays period time to 99:59, HOME and GUEST scores to 99 and DOWN/TO GO/BALL ON/QTR (quarter) information. T.O.L. (time outs left) to nine are optional. Arrows indicate possession. When period time is less than one minute, the scoreboard displays time to 1/10 of a second. Scoreboard shown with optional striping and amber PanaView® digits.

DIMENSIONS	# OF SECTIONS
<b>8'-0" H x 18'-0" W x 8" D</b> (2.44 m, 5.49 m, 203 mm)	<b>Two Total</b>
4'-0" H x 18'-0" W x 8" D (1.22 m, 5.49 m, 203 mm)	One Top & One Bottom

	VINYL CAPTIONS (STANDARD)	TNMCs & VINYL CAPTIONS	TNMCs & ELECTRONIC CAPTIONS	BACKLIT CAPTIONS
<b>POWER (120 VAC)*</b>	Red/Amber Digits	300 Watts, 2.5 Amps	570 Watts, 4.8 Amps	690 Watts, 5.8 Amps
	White Digits	635 Watts, 5.3 Amps	905 Watts, 7.6 Amps	1025 Watts, 8.6 Amps
<b>UNCRATED WEIGHT</b>	Top Section	288 lb (131 kg)	368 lb (167 kg)	328 lb (149 kg)
	Bottom Section	288 lb (131 kg)	288 lb (131 kg)	368 lb (167 kg)
	<b>Total</b>	<b>576 lb (261 kg)</b>	<b>656 lb (298 kg)</b>	<b>816 lb (370 kg)</b>

\*Scoreboard requires a dedicated circuit. Models with 240 VAC power at half the indicated amperage are also offered (International Use Only).

## DIGITS & INDICATORS

- All digits are 24" (610 mm) high. Optional T.O.L. digits are 15" (381 mm) high.
- Select red, amber, or white LED digits and indicators. Scoreboard may instead have mixed LED digit colors (see [DD1965467](#)).
- Scoreboard features robust weather-sealed digits (see [DD2495646](#)).
- Digits may be dimmed for night viewing.

## DISPLAY COLOR

Choose from 150+ colors (from Martin Senour® paint book) at no additional cost.

## OPERATING TEMPERATURES

- Display: -22° to 122° Fahrenheit (-30° to 50° Celsius)
- Console: 32° to 130° Fahrenheit (0° to 54° Celsius)

## CAPTIONS

- All captions are 12" (305 mm) high. Optional T.O.L. captions are 8" (203 mm) high.
- Standard captions are vinyl, applied to the display face.
- Optional backlit captions are 12" (305 mm) high and consist of white letters on a black background.
- Optional electronic captions change according to the sport mode, eliminating the need for caption panels. Electronic captions and TNMCs are 10.6" (269 mm) high.

## CONSTRUCTION

Alcoa aluminum alloy 5052 for excellent corrosion resistance

## PRODUCT SAFETY APPROVAL

ETL-listed to UL 48, tested to CSA standards, and CE-labeled

[WWW.DAKTRONICS.COM](http://WWW.DAKTRONICS.COM) E-MAIL: [SALES@DAKTRONICS.COM](mailto:SALES@DAKTRONICS.COM)

201 Daktronics Drive, PO Box 5128, Brookings, SD 57006  
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DD2167274 092716 Page 1 of 9



# DAKTRONICS FB-2018 PRODUCT SPECIFICATIONS

## CONTROL CONSOLE

**All Sport® 5000**  
(see [SL-03991](#))

## CONTROL OPTIONS

**Wired (standard):** One-pair shielded cable of 22 AWG minimum is required. A cover plate with mounted connector and standard 2" x 4" x 2" (51 mm x 102 mm x 51 mm) outlet box is provided. Connector mates with signal cable from control console.

**Wireless (optional):** 2.4 GHz spread spectrum radio features 64 non-interfering channels and 8 broadcast groups (see [SL-04370](#)).

## SEGMENT TIMER MODE

The segment timer mode is ideal for keeping practices on schedule. The horn at the end of a segment allows coaches and athletes to focus on the practice and to listen for the horn when it is time to change drills (see [SL-04004](#)).

## TIME OF DAY MODE

This scoreboard features a Time of Day (TOD) mode that allows it to act as a clock when the control console is unplugged or off. Refer to the scoreboard installation manual for instructions on how to enable the Time of Day mode.

## MOUNTING

Scoreboard is typically mounted on two vertical beams or poles. Hardware to mount scoreboard on two beams is included; hardware for more beams is at additional cost. Standard mounting uses I-beam clamps. Optional mounting method using angle brackets is also offered; maximum beam width is 12" (305 mm) and maximum beam depth is 22" (559 mm). Refer to attached drawings for more information on mounting methods.

## SERVICE ACCESS

Digit panels and electronics are serviced from the front of the scoreboard.

## GENERAL INFORMATION

Scoreboard provides scoring capabilities for two teams. 100% solid state electronics are housed in an all aluminum cabinet. Scoreboard is shipped in two sections. Scoreboard power is to be provided on a dedicated circuit to prevent loss of game information due to failure of another component on the circuit. Specifications and pricing are subject to change without notice.

## OPTIONS & ACCESSORIES

- Scoreboard border striping
- Multiple caption and striping colors (see [DD2101644](#))
- Team name caption in place of HOME
- Team names on changeable panels \*
- Programmable Team Name Message Centers (see [DD1696958](#))
- Backlit team name captions
- Backlit or electronic captions
- T.O.L. digits with captions
- Two 2'-0.25" (616 mm) tall x 1'-9.75" (552 mm) wide logo/sponsor panels (not available with T.O.L. digits). Copy is applied to removable panels.
- Baseball, lacrosse/field hockey and soccer captions on changeable panels
- LED colon
- Horn
- Individual digit protective screens (see [SL-04939](#))
- Protective netting (see [DD2690927](#))
- Optional angle bracket mounting method
- Advertising/identification panels
- Decorative accents
- Electronic message centers and video displays in multiple sizes

## ADVERTISING/IDENTIFICATION PANELS

### Backlit & Non-Backlit:

- 1'-6" H x 18'-0" W (457 mm, 5.49 m)
- 2'-0" H x 18'-0" W (610 mm, 5.49 m)
- 2'-6" H x 18'-0" W (762 mm, 5.49 m)
- 3'-0" H x 18'-0" W (914 mm, 5.49 m)
- 4'-0" H x 18'-0" W (1.22 m, 5.49 m)

For additional non-backlit panel sizes, see [SL-03761](#).

## FOR ADDITIONAL INFORMATION

- Installation Specifications: DWG-1157189 (attached)
- Standard I-beam Mounting: DWG-1052565 (attached)
- Optional Pole Mounting: DWG-1048184 (attached)
- Component Locations (Red/Amber Digits): DWG-1068840 (attached)
- Component Locations (White Digits): DWG-3025544 (attached)
- Architectural Specifications: See [SL-10093](#)

\* Not available with TNMCs or Backlit Team Names

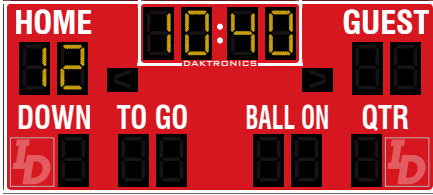
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DD2167274 092716 Page 2 of 9

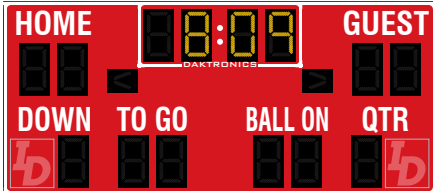


# DAKTRONICS FB-2018 PRODUCT SPECIFICATIONS

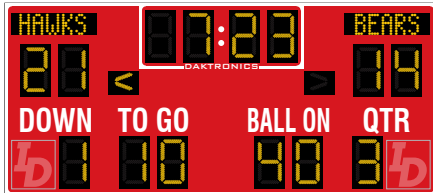
## ALTERNATE CAPTIONS & SCORING MODES



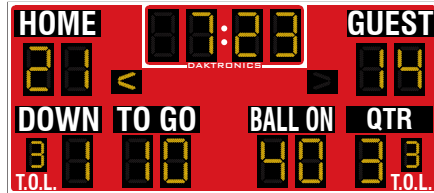
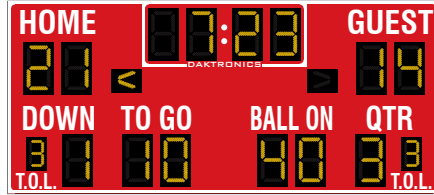
Segment Timer Mode



Standalone Time of Day Mode



Football Mode –  
Optional TNMCs shown



Football Mode with T.O.L. Option –  
vinyl, backlit & electronic captions shown  
(vinyl T.O.L. captions only)



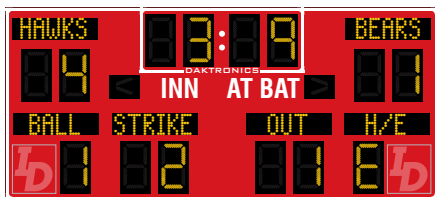
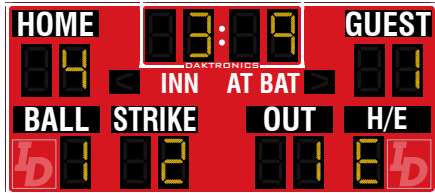
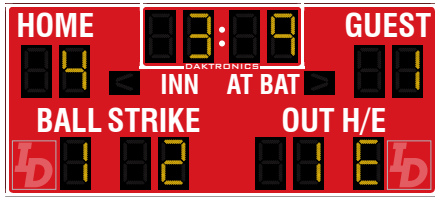
Soccer Mode –  
vinyl, backlit & electronic captions shown  
(SHOTS displayed with electronic captions)



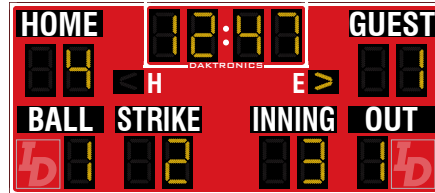
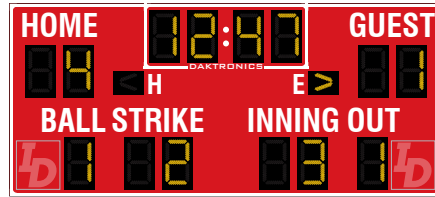
Lacrosse/Field Hockey Mode –  
vinyl, backlit & electronic captions shown  
(SHOTS & PER displayed with electronic captions)



# DAKTRONICS FB-2018 PRODUCT SPECIFICATIONS



Baseball Mode, without Clock –  
vinyl, backlit & electronic captions shown  
(10" vinyl INN/AT BAT captions only)



Baseball Mode, with Clock –  
vinyl, backlit & electronic captions shown  
(10" vinyl H/E captions only)

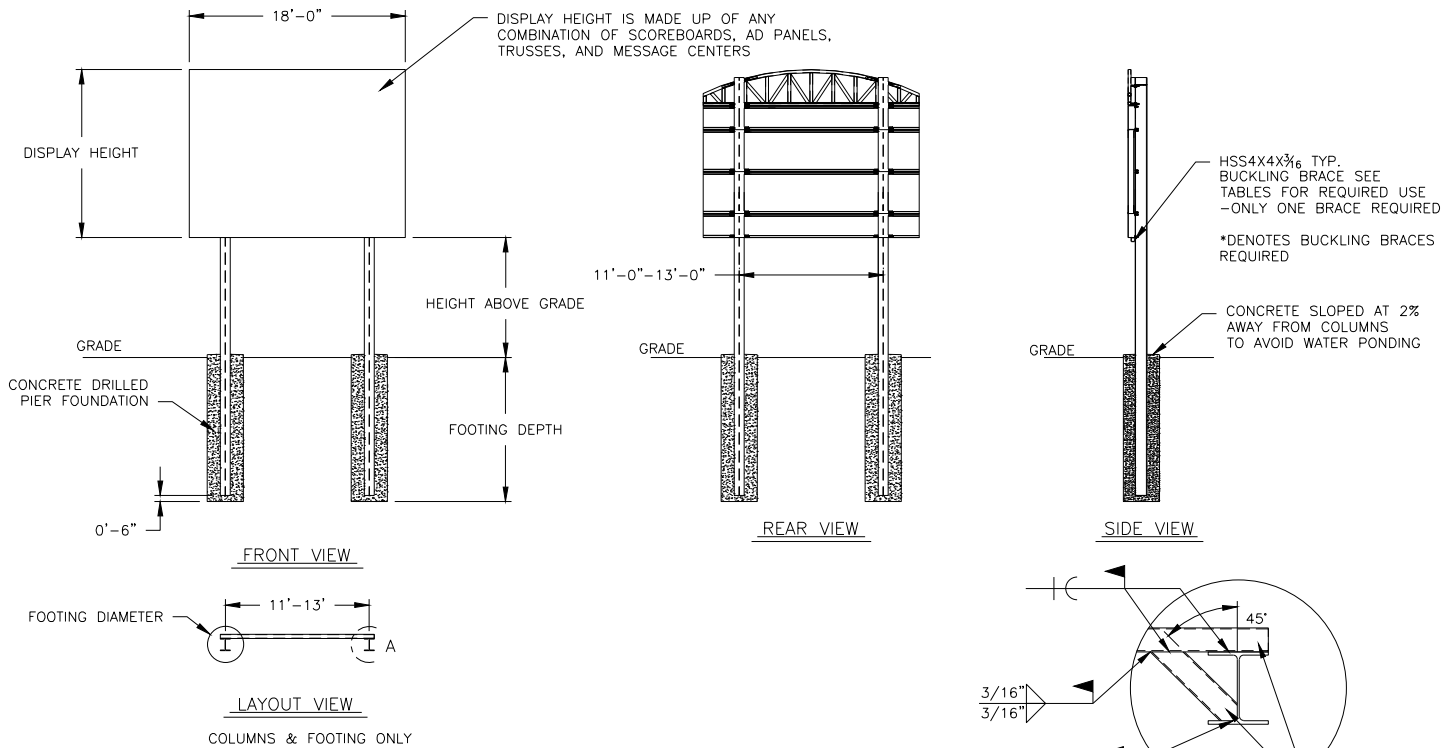


TABLE A - MOUNTING

EXPOSURE B

HEIGHT ABOVE GRADE = 10'						HEIGHT ABOVE GRADE = 15'					
DISPLAY HEIGHT (FT)		DESIGN WIND VELOCITY				DISPLAY HEIGHT (FT)		DESIGN WIND VELOCITY			
		115 MPH	130 MPH	150 MPH	170 MPH			115 MPH	130 MPH	150 MPH	170 MPH
8	COLUMN FOOTING	W8X24 2.0'X8.0'	W12X26 2.0'X9.0'	W10X30 2.0'X10.0'	W10X33 3.0'X9.5'	8	COLUMN FOOTING	W8X31 2.0'X9.0'	W10X33 3.0'X8.5'	W10X39 3.0'X9.5'	W16X36 3.0'X10.5'
10	COLUMN FOOTING	W8X28 2.0'X9.0'	W8X31 2.0'X10.0'	W12X26* 3.0'X9.5'	W14X30* 3.0'X11.0'	10	COLUMN FOOTING	W12X26* 3.0'X8.5'	W14X30* 3.0'X9.5'	W12X40 3.0'X11.0'	W14X48 3.0'X12.0'
12	COLUMN FOOTING	W8X31 2.0'X10.0'	W10X39 3.0'X9.5'	W12X30* 3.0'X11.0'	W14X34* 3.0'X12.0'	12	COLUMN FOOTING	W8X31 2.0'X9.5'	W16X36* 3.0'X11.0'	W14X43* 3.0'X12.0'	W21X48* 3.0'X13.0'
14	COLUMN FOOTING	W10X39 3.0'X9.5'	W12X30* 3.0'X10.0'	W14X34* 3.0'X12.0'	W16X40* 3.0'X13.0'	14	COLUMN FOOTING	W16X36* 3.0'X10.0'	W16X40* 3.0'X11.0'	W14X48* 3.0'X13.0'	W18X55* 3.0'X15.0'
16	COLUMN FOOTING	W12X30* 3.0'X10.0'	W14X34* 3.0'X11.0'	W16X40* 3.0'X12.0'	W21X44* 3.0'X14.0'	16	COLUMN FOOTING	W12X40* 3.0'X11.0'	W14X48* 3.0'X12.0'	W18X55* 3.0'X14.0'	W21X62* 3.0'X16.0'
18	COLUMN FOOTING	W14X30* 3.0'X10.5'	W16X36* 3.0'X12.0'	W21X44* 3.0'X14.0'	W21X48* 3.0'X16.0'	18	COLUMN FOOTING	W14X43* 3.0'X12.0'	W21X48* 3.0'X13.0'	W18X60* 3.0'X15.0'	W21X68* 3.0'X18.0'

FOOTING DIMENSIONS = DIAMETER X DEPTH  
\* DENOTES BUCKLING BRACE REQUIRED

EXPOSURE C

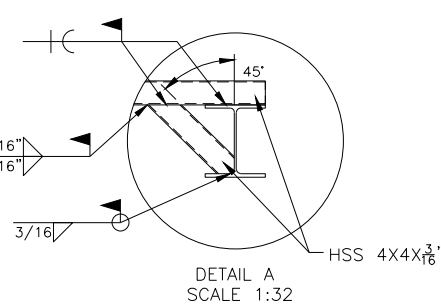
HEIGHT ABOVE GRADE = 10'				HEIGHT ABOVE GRADE = 15'			
DISPLAY HEIGHT (FT)		DESIGN WIND VELOCITY		DISPLAY HEIGHT (FT)		DESIGN WIND VELOCITY	
		115 MPH	140 MPH			115 MPH	140 MPH
8	COLUMN FOOTING	W12X26 3.0'X8.0'	W10X33 3.0'X9.5'	8	COLUMN FOOTING	W8X35 2.0'X11.0'	W16X36* 3.0'X11.0'
10	COLUMN FOOTING	W10X33 3.0'X9.0'	W12X30* 3.0'X10.5'	10	COLUMN FOOTING	W14X34* 3.0'X10.0'	W14X43* 3.0'X12.0'
12	COLUMN FOOTING	W12X26* 3.0'X10.0'	W14X34* 3.0'X12.0'	12	COLUMN FOOTING	W14X38* 3.0'X11.0'	W14X48* 3.0'X13.0'
14	COLUMN FOOTING	W14X30* 3.0'X10.5'	W16X40* 3.0'X12.0'	14	COLUMN FOOTING	W14X43* 3.0'X12.0'	W18X55* 3.0'X14.0'
16	COLUMN FOOTING	W14X34* 3.0'X11.5'	W21X44* 3.0'X14.0'	16	COLUMN FOOTING	W14X48* 3.0'X13.0'	W21X62* 3.0'X16.0'
18	COLUMN FOOTING	W16X40* 3.0'X12.0'	W21X48* 3.0'X15.0'	18	COLUMN FOOTING	W18X55* 3.0'X14.0'	W16X67* 3.0'X17.0'

FOOTING DIMENSIONS = DIAMETER X DEPTH  
\* DENOTES BUCKLING BRACE REQUIRED

NOTE:  
-REFER TO NOTE 7 FOR EXPOSURE CATEGORY DEFINITIONS.

NOTES:

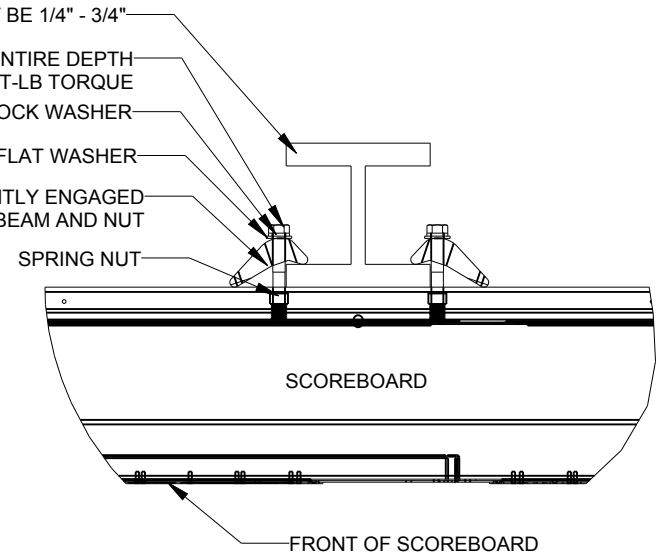
- FOOTING AND COLUMN SIZES ARE SUGGESTIONS ONLY, PROVIDED TO ASSIST WITH ESTIMATING INSTALLATION COSTS AND ARE NOT INTENDED FOR CONSTRUCTION PURPOSES. THE DESIGN MUST BE CERTIFIED BY A PROFESSIONAL ENGINEER LICENSED IN THE STATE OF THE INSTALLATION BEFORE THEY CAN BE USED FOR FABRICATION OR ERECTION.
- INTERNATIONAL BUILDING CODE 2012 USED IN DESIGN OF COLUMNS AND FOOTINGS WITH IMPORTANCE FACTOR=1, Kzt=1.0, Kd=0.85, G=0.85. SEISMIC DESIGN WAS NOT CONSIDERED.
- FOOTING DIMENSIONS ARE BASED ON ASSUMED SOIL CLASS 4 (ALLOWABLE LATERAL BEARING PRESSURE OF 150 psf).
- STRUCTURAL STEEL IS GRADE A992 (50 ksi) STEEL. CONCRETE SHALL HAVE A MINIMUM 28 DAY COMPRESSIVE STRENGTH OF 2500 psi.
- THE AVERAGE DISPLAY WEIGHT FOR A LAYOUT CAN NOT EXCEED 8 PSF.
- DAKTRONICS INC. IS NOT RESPONSIBLE FOR STRUCTURES DESIGNED AND INSTALLED BY OTHERS.
- LOCAL BUILDING OFFICIALS SHOULD BE CONTACTED TO DETERMINE THE WIND SPEED AND EXPOSURE CATEGORY FOR THE PROPOSED SIGN LOCATION. THE EXPOSURE CATEGORY C IS DEFINED AS:  
  
EXPOSURE B - URBAN AND SUBURBAN AREAS, OR OTHER TERRAIN WITH NUMEROUS SPACED OBSTRUCTIONS HAVING THE SIZE OF SINGLE-FAMILY DWELLINGS OR LARGER. THESE CONDITIONS MUST PREVAIL FOR A DISTANCE FROM THE SIGN OF AT LEAST 2,600 ft OR 20 TIMES THE SIGN HEIGHT, WHICHEVER IS GREATER  
  
EXPOSURE C - OPEN TERRAIN WITH SCATTERED OBSTRUCTIONS HAVING HEIGHTS GENERALLY LESS THAN 30 FT. THIS CATEGORY INCLUDES FLAT OPEN COUNTRY, GRASSLANDS, AND ALL WATER SURFACES IN HURRICANE PRONE REGIONS.
- FOR SPECIFIC PRODUCT DETAILS ON WEIGHT, MOUNTING, ETC. REFER TO THE INDIVIDUAL PRODUCT SPECIFICATION SHEETS.



<p>DAKTRONICS, INC. BROOKINGS, SD 57006</p>	<p>THE CONCEPTS EXPRESSED AND DETAILS SHOWN ON THIS DRAWING ARE CONFIDENTIAL AND PROPRIETARY. DO NOT REPRODUCE BY ANY MEANS WITHOUT THE EXPRESSED WRITTEN CONSENT OF DAKTRONICS, INC. COPYRIGHT 2011 DAKTRONICS, INC.</p>	
	<p>DO NOT SCALE DRAWING</p>	
<p>PROJ: OUTDOOR SCOREBOARD INSTALLATION</p>		
<p>TITLE: 18' WIDTH SCOREBOARD INSTALLATION SPECS</p>		
<p>DESIGN: RSCHWAR</p>	<p>DRAWN: RSCHWAR</p>	<p>DATE: 27 NOV 13</p>
<p>SCALE: 1/16" = 1'</p>	<p>SHEET</p>	<p>REV</p>
<p>02</p>	<p>02</p>	<p>JOB NO: P1647</p>
<p>AMP</p>	<p>TJT</p>	<p>FUNC-TYPE-SIZE</p>
<p>1157189</p>	<p>E-10-A</p>	<p>1157189</p>

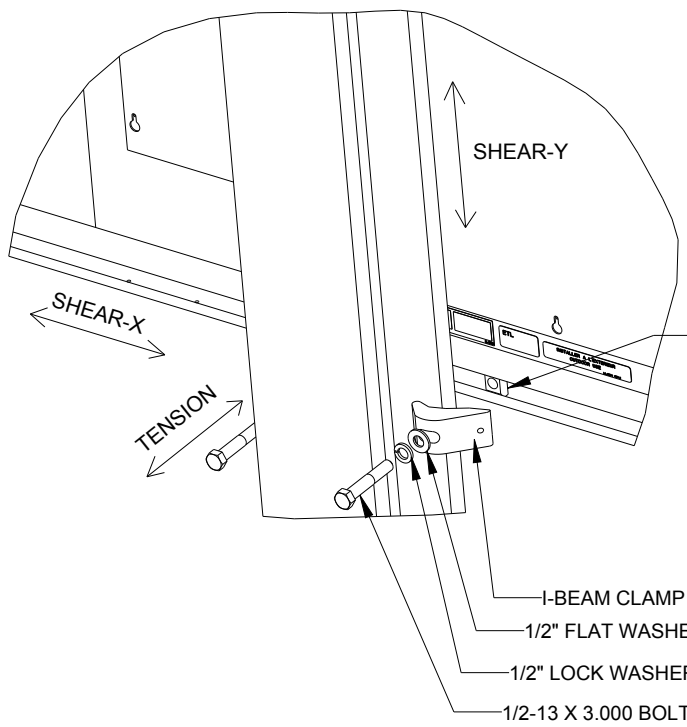
REV 02	DATE: 27 OCT 15	UPDATED WIDE FLANGE AND FOUNDATION VALUES	BY: AMP
REV 01	DATE: 23 JUL 14	UPDATED CLAMPS IN REAR AND SIDE VIEWS AND ADDED 170 MPH WIND SPEC COLUMN	BY: TJT

VERTICAL BEAM - FLANGE THICKNESS MUST BE 1/4" - 3/4"  
 1/2-13 X 3.000 BOLT - BOLT THREAD MUST ENGAGE ENTIRE DEPTH OF SPRING NUT. BOLT MUST BE TIGHTENED TO 40FT-LB TORQUE  
 1/2" LOCK WASHER  
 1/2" FLAT WASHER  
 I-BEAM CLAMP - ASSURE CLAMP IS TIGHTLY ENGAGED TO I-BEAM AND NUT



TOP VIEW

**\*\*\*CRITICAL\*\*\***  
 DO NOT USE ANY LUBRICANT ON ANY MOUNTING HARDWARE OR WARRANTY WILL BE VOIDED



EXPLODED REAR ISOMETRIC VIEW

SPRING NUT  
**\*\*\*CRITICAL\*\*\***  
 MAKE SURE SPRING NUT IS TURNED TO VERTICAL POSITION INSIDE SCOREBOARD CHANNEL

### STANDARD MOUNTING METHOD

- MOUNTING INSTRUCTIONS:
1. PLACE SPRING NUTS INTO SCOREBOARD CHANNEL IN APPROXIMATE LOCATION OF VERTICAL BEAMS
  2. LIFT SCOREBOARD INTO POSITION
  3. MAKE SURE THE 1/2-13 BOLTS ARE AS CLOSE TO THE I-BEAM FLANGES AS POSSIBLE
  4. WHEN SCOREBOARD IS ADJUSTED TO FINAL DESIRED POSITION, TIGHTEN BOLTS FIRMLY
  5. IF FLANGE THICKNESS IS MORE THAN 3/4" THICK LONGER BOLTS WILL BE REQUIRED AT THE CUSTOMER'S EXPENSE.

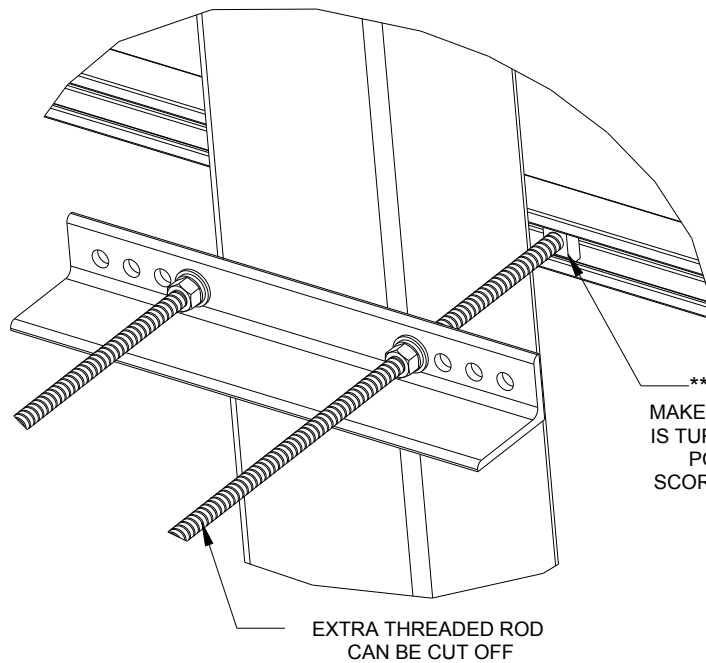
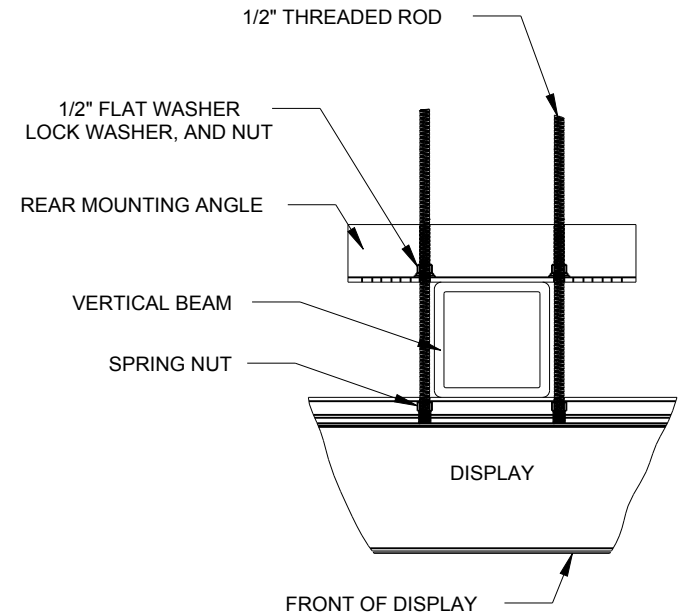
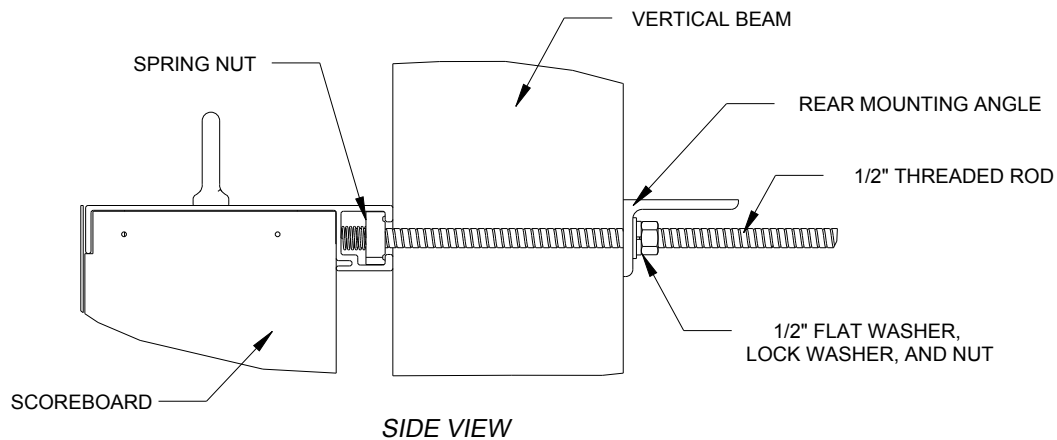
### STRUCTURAL NOTES

ALLOWABLE CAPACITY PER EACH CLAMP:  
 SHEAR = 160 LBS  
 TENSION = 2300 LBS

SHEAR AND TENSION LOAD DIRECTION ARE AS INDICATED ON REAR ISOMETRIC VIEW

05	22 DEC 15	ADDED LUBRICANT WARNING	PJS
04	06 JAN 14	ADDED ALLOWABLE TENSION AND SHEAR CAPACITY DETAILS	JAVA
03	23 OCT 13	PER EC-12382; CHANGED BOLT TORQUE FROM 30 FT-LB TO 40 FT-LB	NJM
02	07 MAR 12	ADDED STADNARD MOUNTING METHOD NOTES	KDD
01	21 FEB 12	CHANGED ROCKER TO I-BEAM	KDD
REV	DATE:		BY:

		<small>THE CONCEPTS EXPRESSED AND DETAILS SHOWN ON THIS DRAWING ARE CONFIDENTIAL AND PROPRIETARY. DO NOT REPRODUCE BY ANY MEANS WITHOUT THE EXPRESS WRITTEN CONSENT OF DAKTRONICS, INC. OR ITS WHOLLY OWNED SUBSIDIARIES. COPYRIGHT 2016 DAKTRONICS, INC. (USA)</small>			
PROJECT: OUTDOOR SCOREBOARD					
TITLE: P1647; I-BEAM CLAMP MOUNTING					
DATE: 22-DEC-15		DIM UNITS: INCHES [MILLIMETERS]		SHEET REV	
SCALE: 1/8		DO NOT SCALE DRAWING		1 OF 1 05	
DESIGN: MCARSRU		JOB NO. P1647		FUNC - TYPE - SIZE	
DRAWN: MCARSRU		E - 07 - A		1052565	



REAR ISOMETRIC VIEW

**STRUCTURAL NOTES:**  
 - BOLT TORQUE: 30 FT-LB

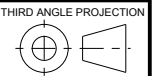
**NOTES:**  
 - THREADED RODS RUN ALONG BOTH SIDES OF BEAM  
 - RODS DO NOT PASS THROUGH THE FLANGES OF THE BEAM  
 - NO DRILLING NECESSARY  
 - MAKE SURE SPRING NUT IS PERPENDICULAR TO CHANNEL OPENING ON SCOREBOARD

**\*\*\*CRITICAL\*\*\*  
 DO NOT USE ANY LUBRICANT  
 ON ANY MOUNTING HARDWARE  
 OR WARRANTY WILL BE VOIDED**

04	22 DEC 15	ADDED LUBRICANT WARNING	PJS	
03	03 JULY 13	ADDED STRUCTURAL NOTE	TTF	
02	20 SEP 12	PER EC-7114; REMOVED CHAMFER FROM 0M-133259	LMG	
01	06 OCT 11	REPLACED VERTICAL I-BEAM WITH 6" X 6" SQUARE TUBE	JAVA	
REV	DATE:		BY:	



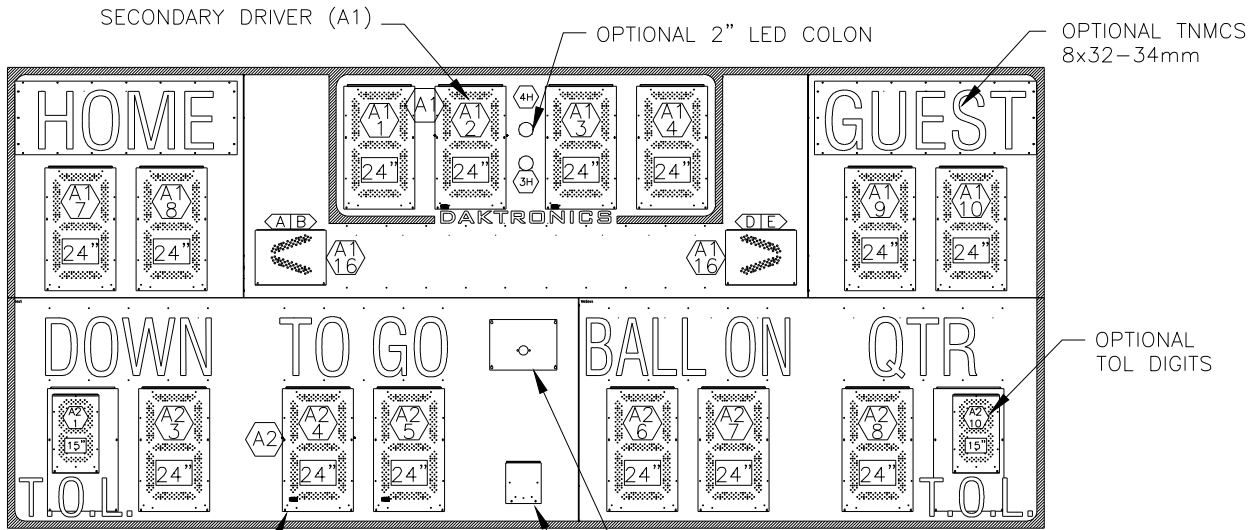
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PROJECT: OUTDOOR SCOREBOARDS				
TITLE: P1647; POLE MOUNTING OPTIONS				
DATE: 22-DEC-15	DIM UNITS: INCHES [MILLIMETERS]	SHEET	REV	
SCALE: 1/5	DO NOT SCALE DRAWING	1 OF 1	04	
DESIGN: DOPPELT	JOB NO. P1647	FUNC - TYPE - SIZE E - 10 - A	1048184	
DRAWN: DOPPELT				

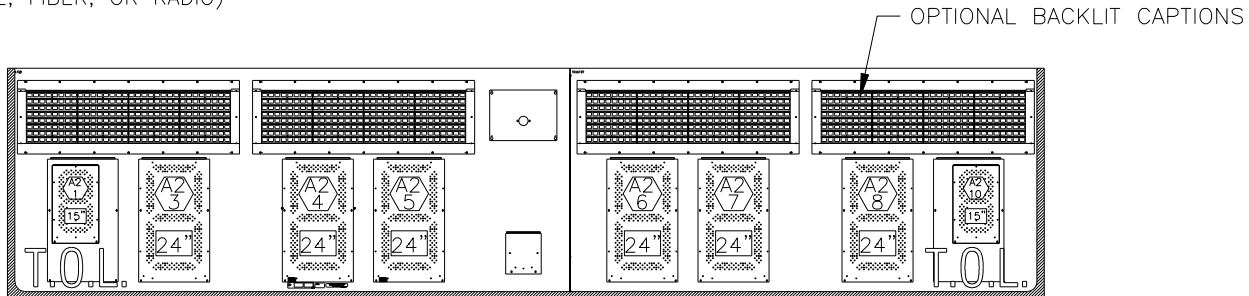
REV 01	DATE: 20 FEB 15	PER EG-1718, REMOVED DETAIL AND A AND B ADDED SIGNAL OPTION NOTE CHANGED SLAVE AND MASTER DRIVER NAME	BY: KOB
REV 01	DATE: 23 APR 13	PER EG-9747, UPDATED FB INDICATOR	BY: KOD

FB-2018-R/A



PRIMARY DRIVER (A2)  
 KNOCKOUTS FOR 1/2" CONDUIT  
 SIGNAL OPTION ON THIS DRIVER  
 (WIRE, FIBER, OR RADIO)

FRONT VIEW  
 TOP/BTM SHOWN WITH VINYL CAPTIONS



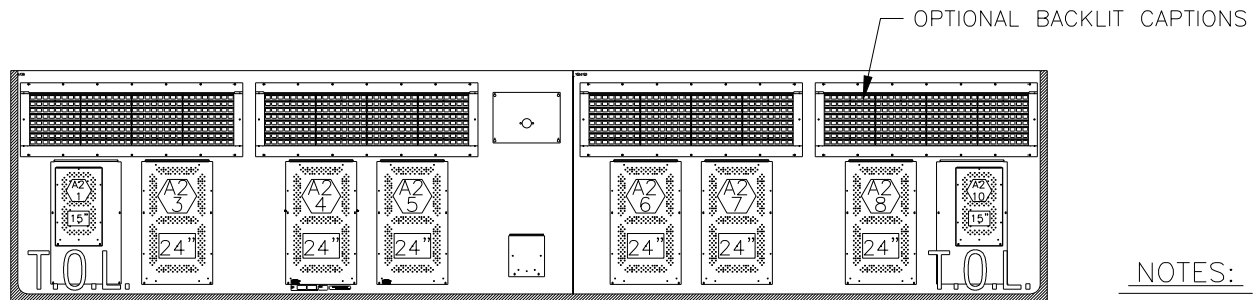
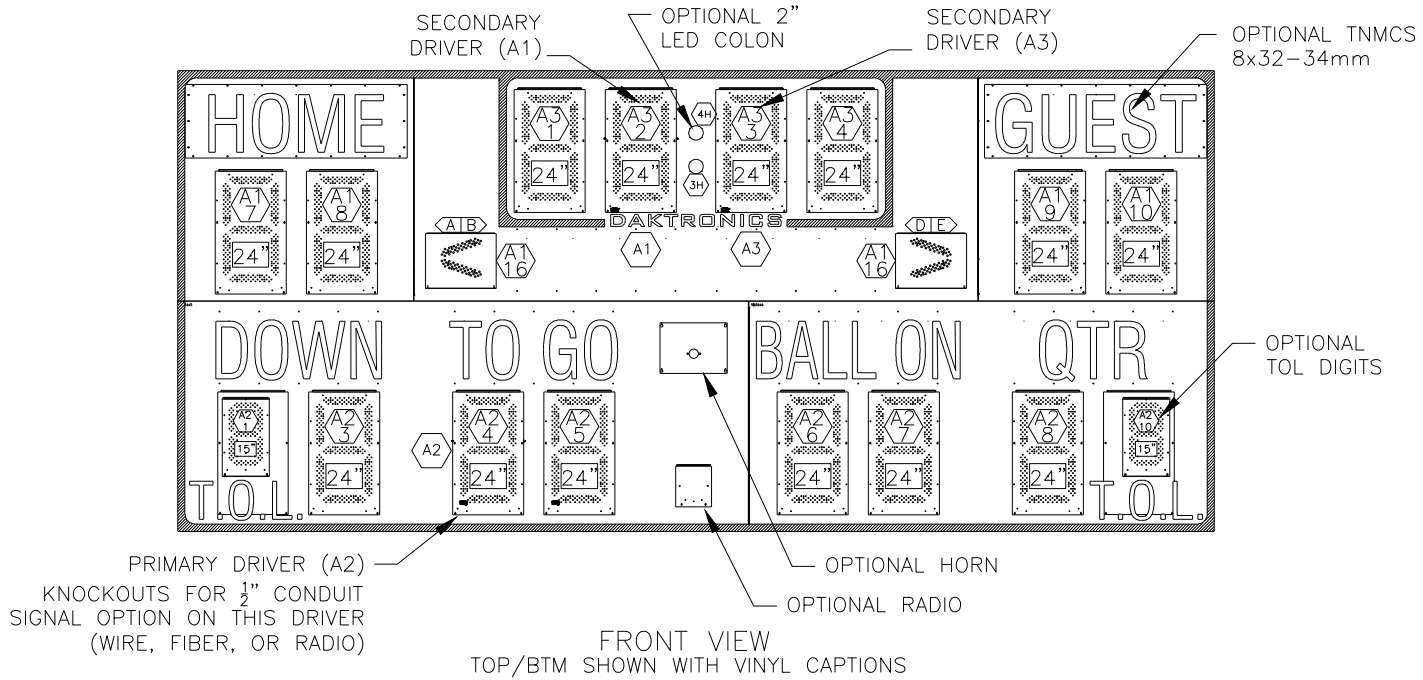
FRONT VIEW  
 BTM SHOWN WITH 8X32-34mm  
 ELECTRONIC CAPTIONS AND VINYL TOL

NOTES:





- = LED DRIVER NUMBER & LED DRIVER CONNECTOR WIRED TO THAT DIGIT.
- = DIGIT SIZE
- = SEGMENT DESIGNATIONS
- = DRIVER NUMBER


 DAKTRONICS, INC. BROOKINGS, SD 57006 <small>DO NOT SCALE DRAWING</small>		<small>THE CONCEPTS EXPRESSED AND DETAILS SHOWN ON THIS DRAWING ARE CONFIDENTIAL AND PROPRIETARY. DO NOT REPRODUCE BY ANY MEANS WITHOUT THE EXPRESSED WRITTEN CONSENT OF DAKTRONICS, INC. COPYRIGHT 2011 DAKTRONICS, INC.</small>	
		PROJECT: OUTDOOR EXTRUDED SCOREBOARDS TITLE: COMPONENT LOCATION: FB-2018-R/A DESIGN: MCARSRU DRAWN: JROBERS SCALE: 1=40 SHEET:	REV: 02 JOB NO: P1647 FUNC-TYPE-SIZE: R-08-A DATE: 13 SEPT 11
PER EG-1718, REMOVED DETAIL AND A AND B ADDED SIGNAL OPTION NOTE CHANGED SLAVE AND MASTER DRIVER NAME PER EG-9747, UPDATED FB INDICATOR		BY: KOB BY: KOD	1068840

FB-2018-W



NOTES:

-  = LED DRIVER NUMBER & LED DRIVER CONNECTOR WIRED TO THAT DIGIT.
-  = DIGIT SIZE
-  = SEGMENT DESIGNATIONS
-  = DRIVER NUMBER

 <p><b>DAKTRONICS, INC.</b> BROOKINGS, SD 57006</p>		<p>PROJ: OUTDOOR EXRUDED SCOREBOARDS</p>	
		<p>DO NOT SCALE DRAWING</p>	
<p>TITLE: COMPONENT LOCATION: FB-2018-W</p>		<p>DESIGN: MCARSRU      DRAWN: ZWODWA</p>	
<p>SCALE: 1=40</p>		<p>DATE: 23 MAR 15</p>	
<p>SHEET</p>		<p>JOB NO.</p>	
<p>REV</p>		<p>FUNC.-TYPE-SIZE</p>	
<p>00      P 1647</p>		<p>R - 08 - A</p>	
<p>3025544</p>			

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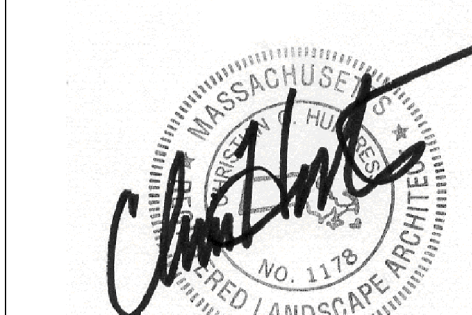
Project:

**BLOCKSIDE FIELD**

Swampscott, Massachusetts

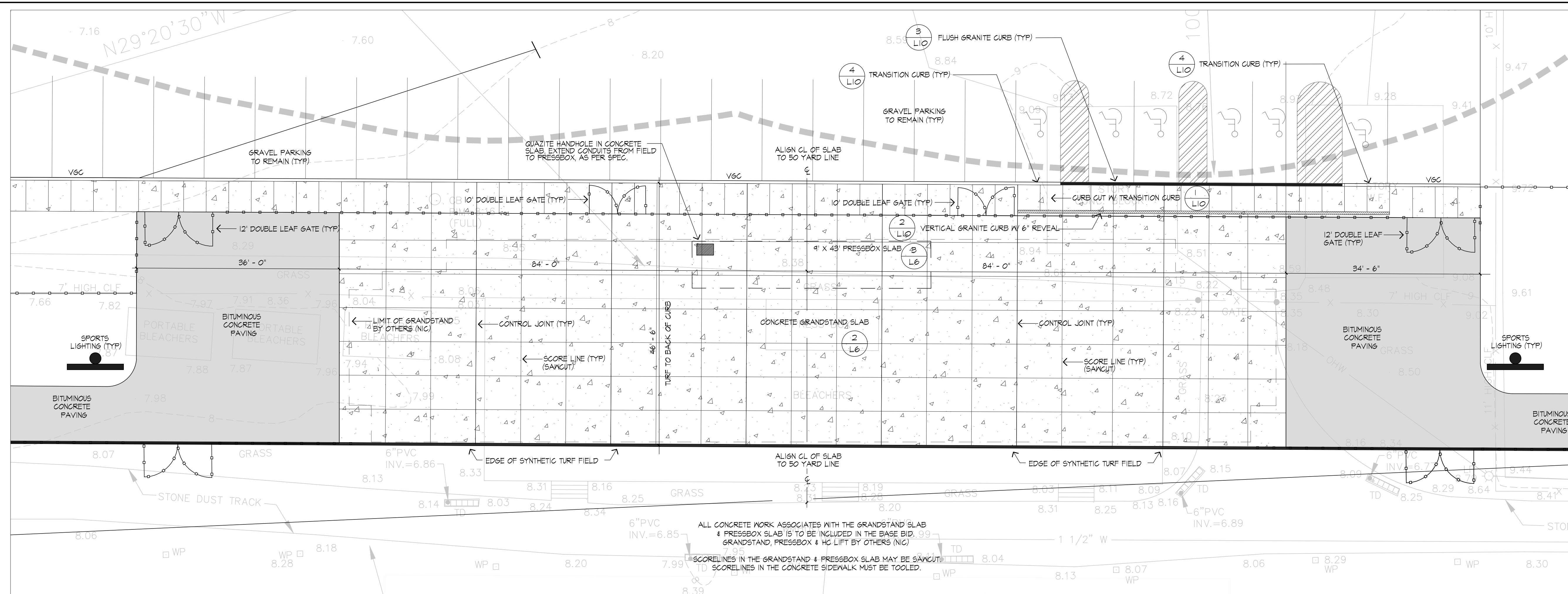
Drawing Title:

**Layout Plan  
 Enlargement**



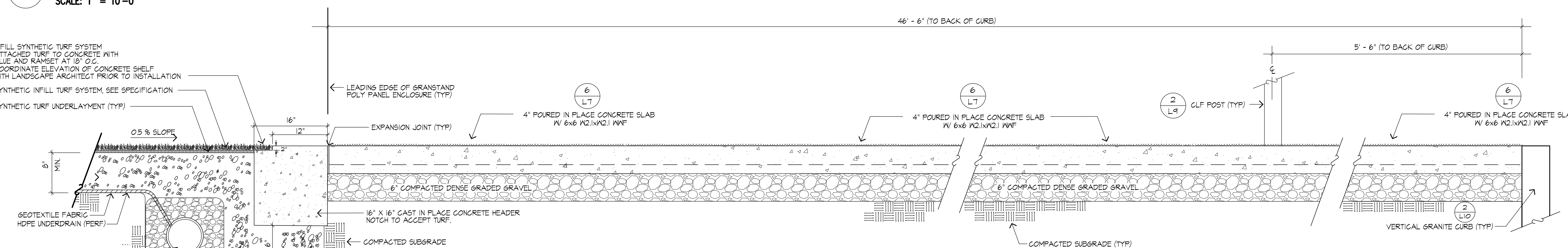
Revision	Date
CONCRETE SLAB REVISIONS	2.3.17

Scale:	as noted	Drawing No.	<b>L-6</b>
Date:	1.15.17		
Job:	00-107		
File:	PR-det		
Drawn:	CCH	of	
Checked:	--		<b>10</b>

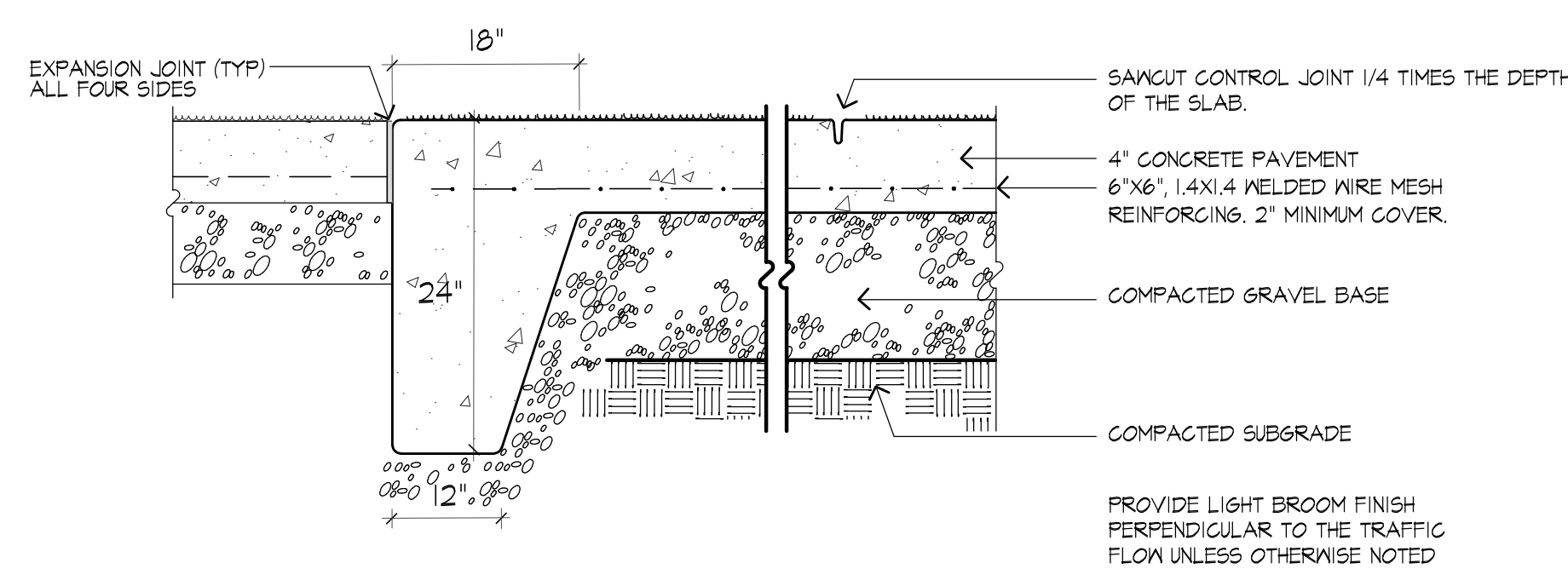


**1** GRANDSTAND SLAB - ENLARGEMENT  
 SCALE: 1" = 10'-0"

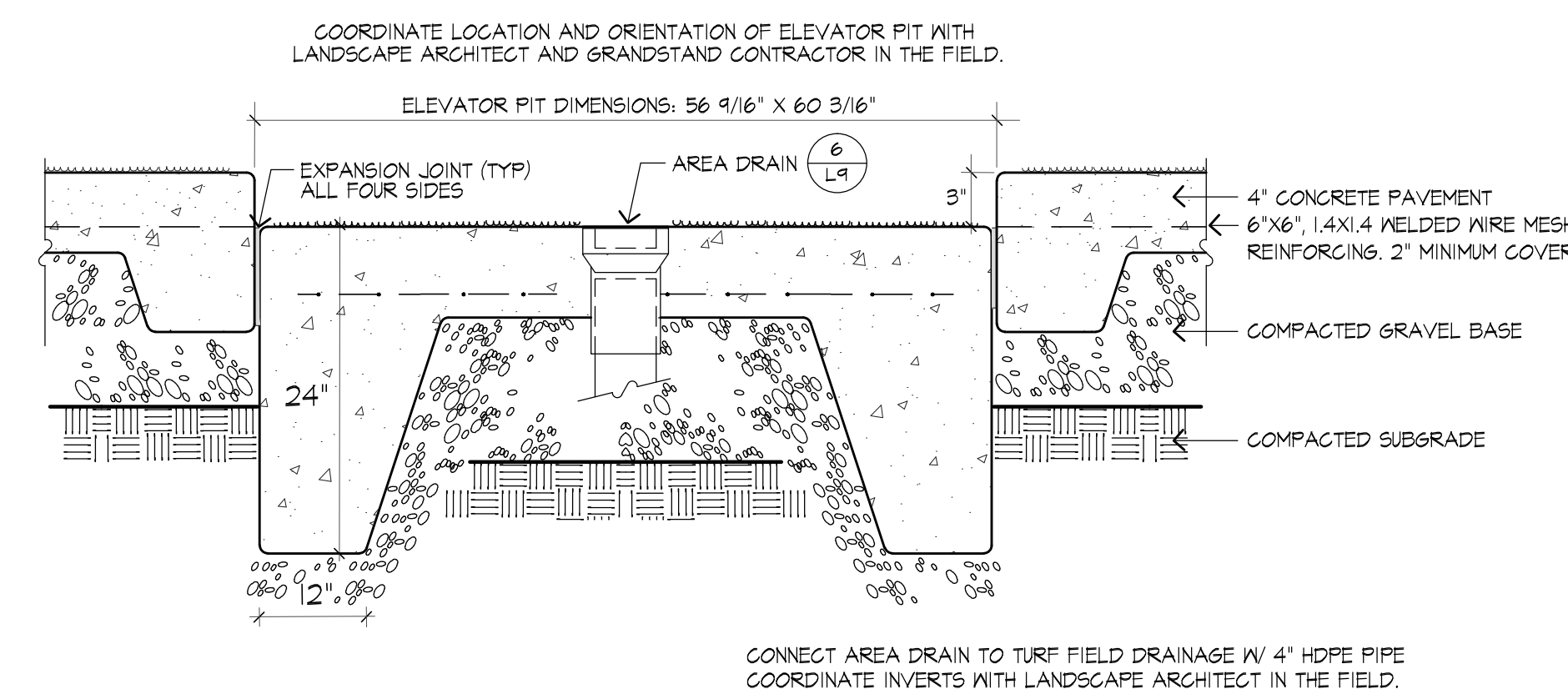
INFILL SYNTHETIC TURF SYSTEM ATTACHED TURF TO CONCRETE WITH GLUE AND RAMMET AT 18" O.C. COORDINATE ELEVATION OF CONCRETE SHELF WITH LANDSCAPE ARCHITECT PRIOR TO INSTALLATION  
 SYNTHETIC INFILL TURF SYSTEM, SEE SPECIFICATION  
 SYNTHETIC TURF UNDERLAYMENT (TYP)



**2** GRANDSTAND SLAB - CROSS-SECTION  
 SCALE: 1" = 1'-0"

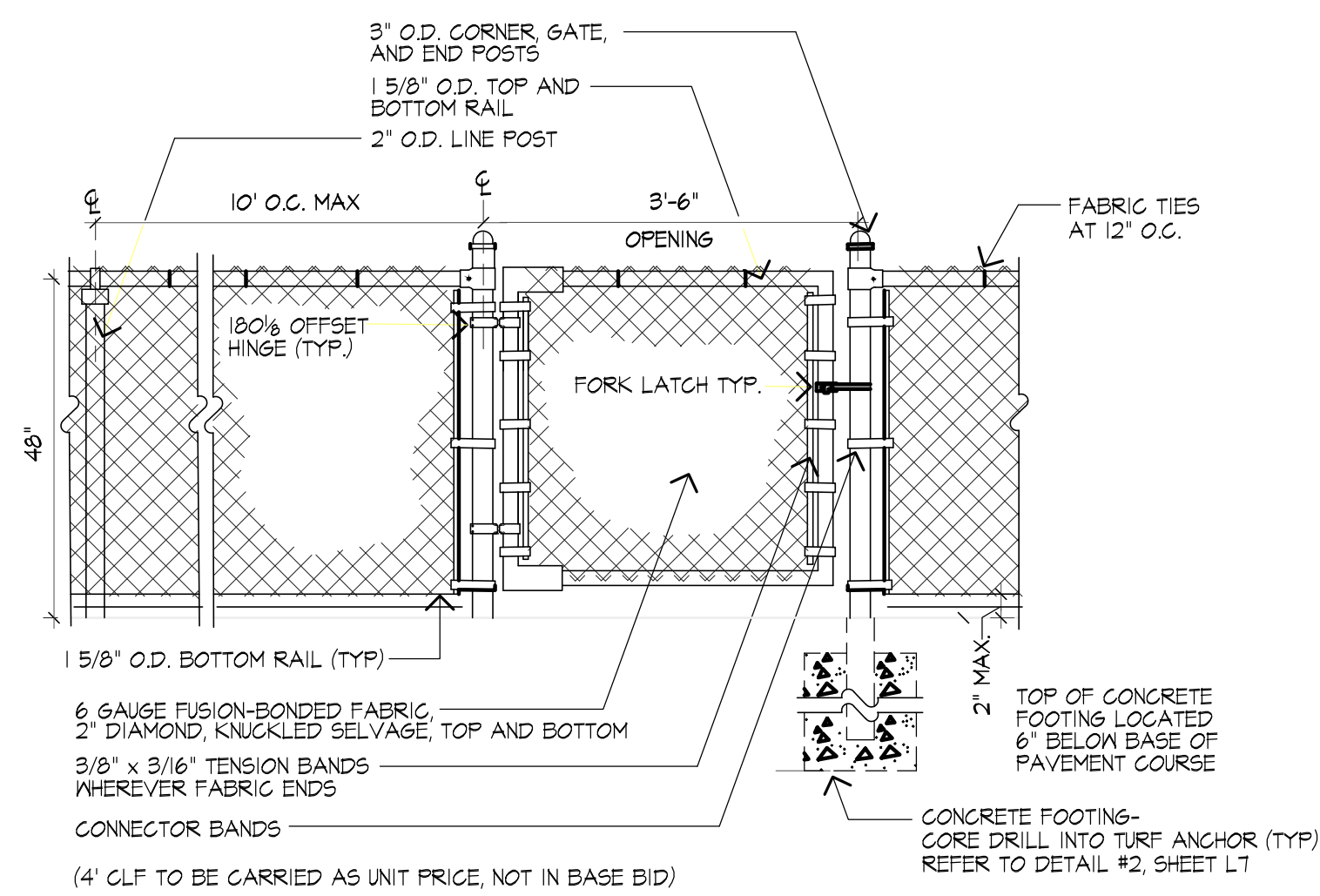


**3** PRESSBOX SLAB  
 SCALE: N.T.S.

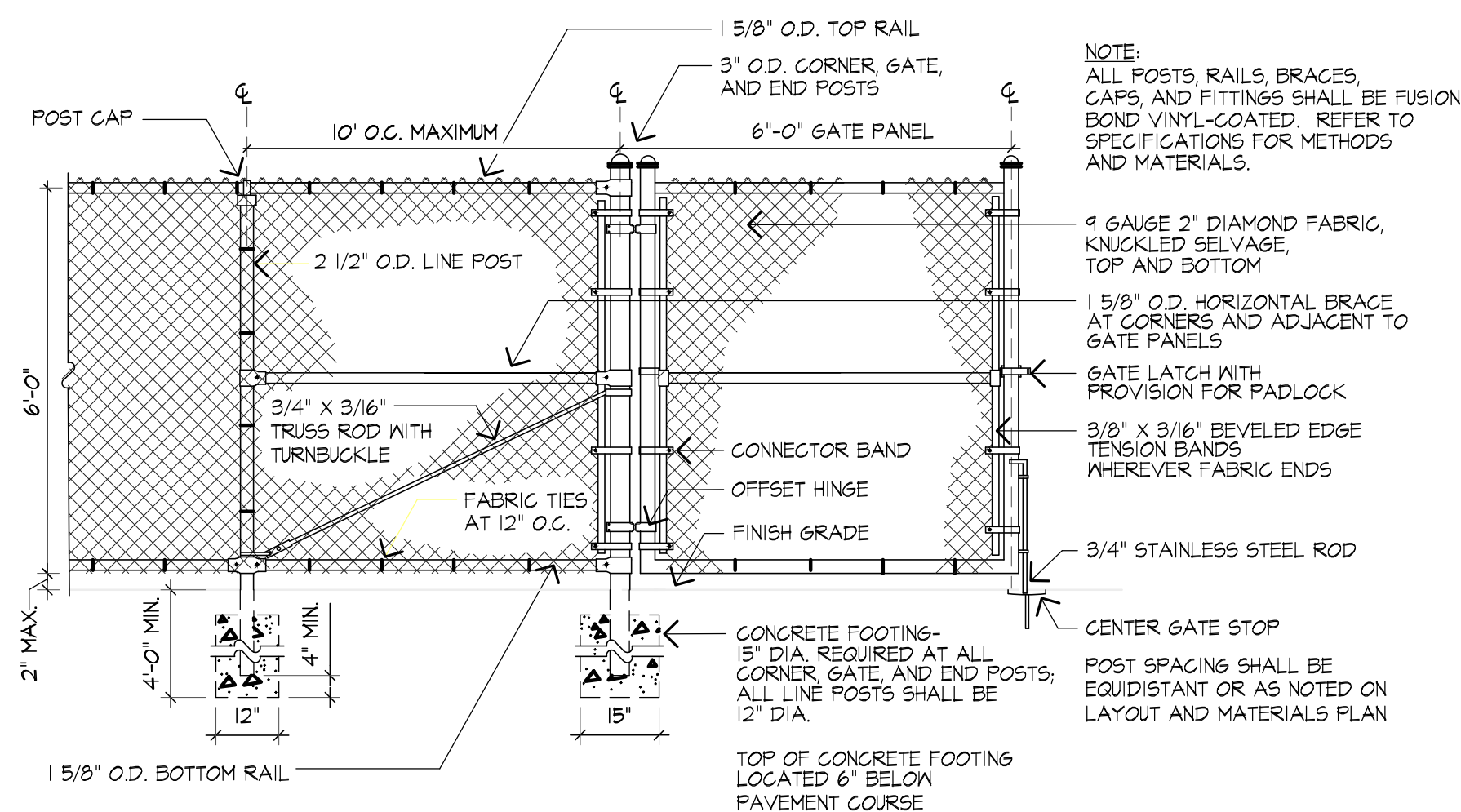


**4** ELEVATOR/LIFT SLAB  
 SCALE: N.T.S.

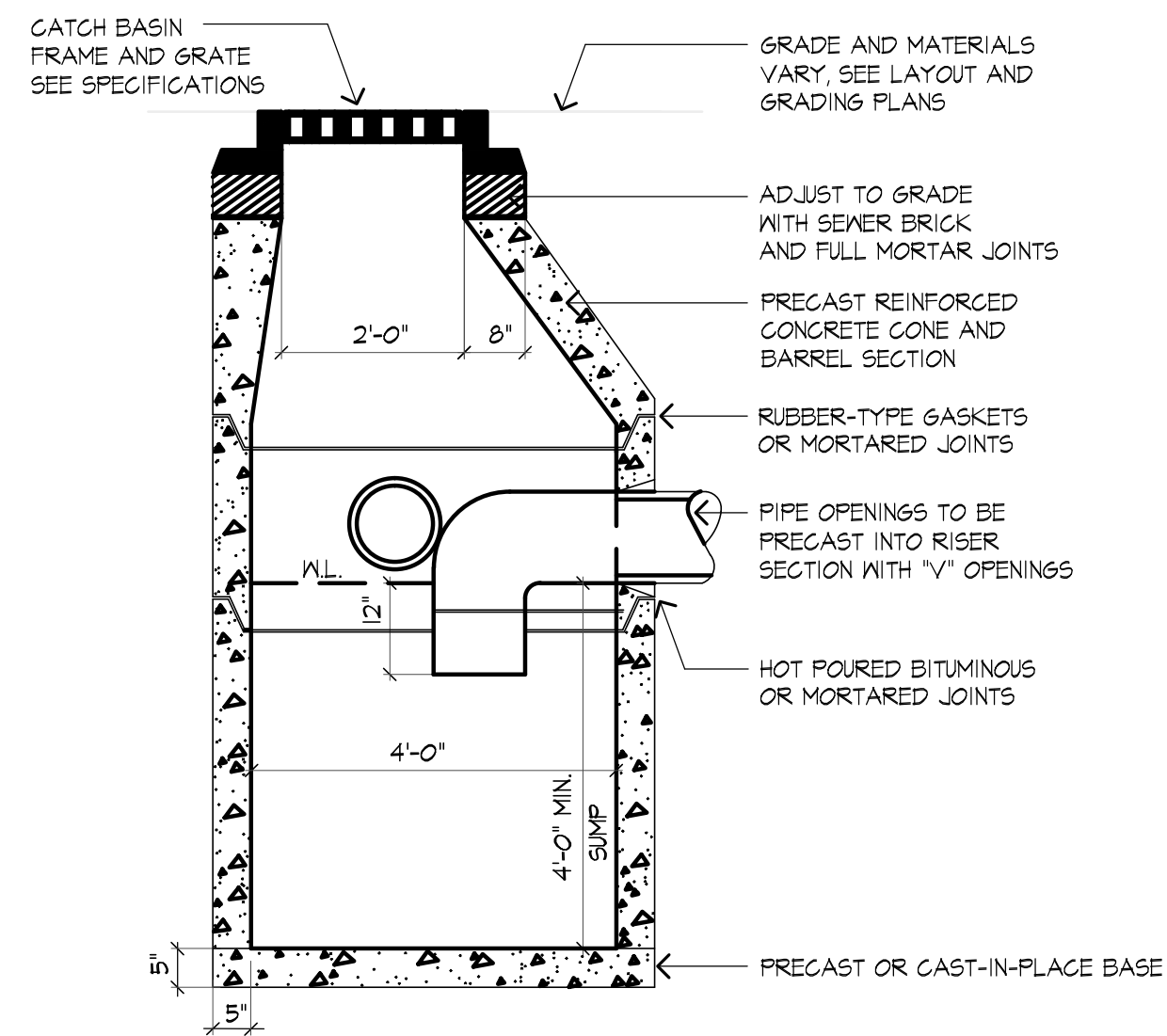




**1** 4' FUSION BOND CHAIN LINK FENCE AND GATE  
SCALE: N.T.S.

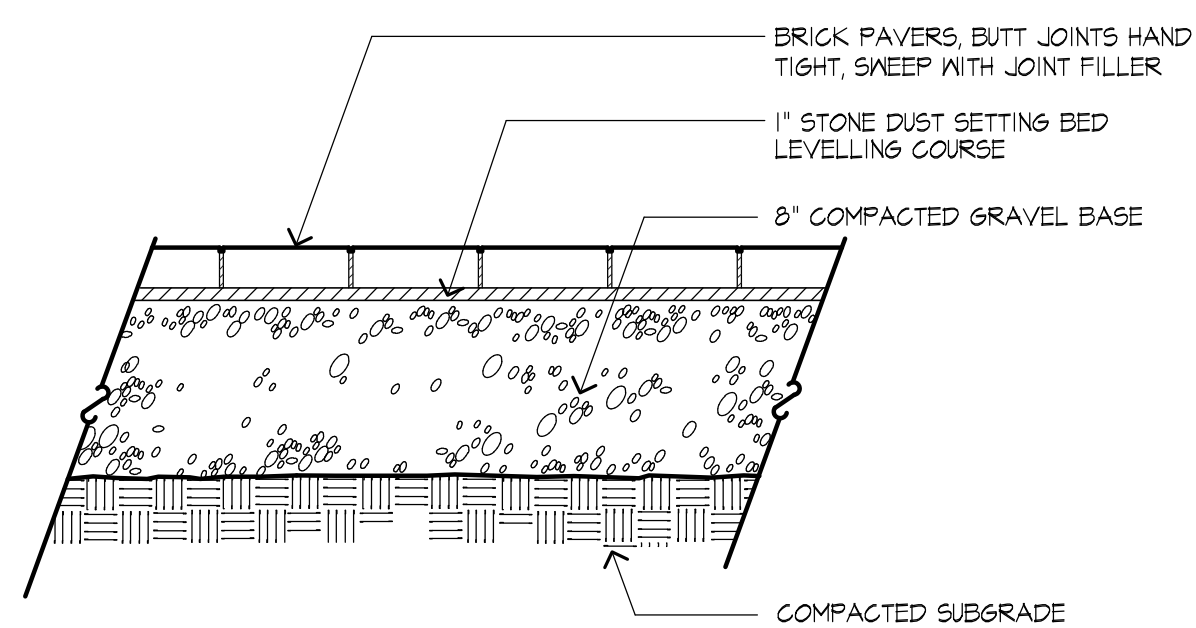


**2** 6'-0" FUSION BOND CHAIN LINK FENCE AND GATE  
SCALE: N.T.S.



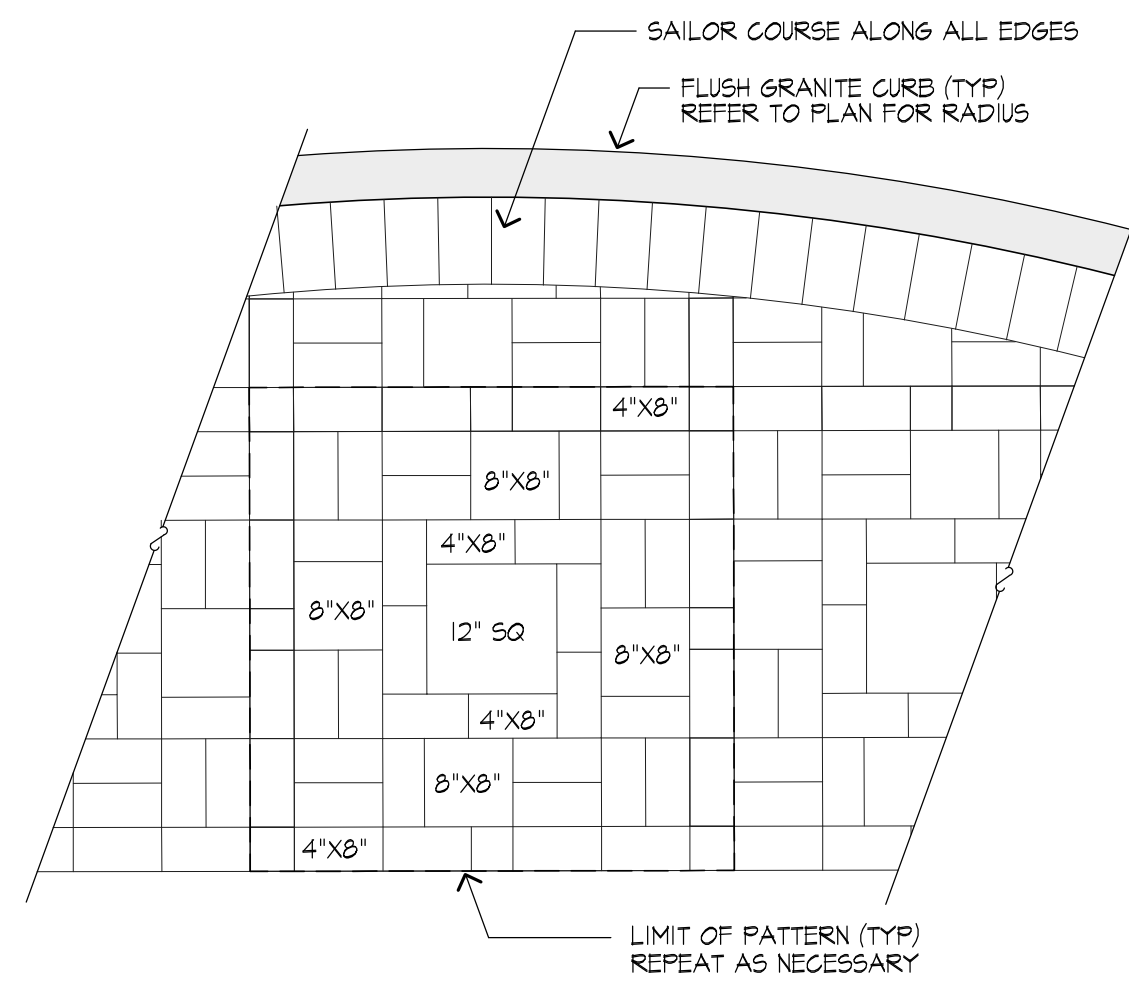
**3** GAS TRAP CATCH BASIN  
SCALE: 1/2"=1'-0"

CONTRACTOR TO PROVIDE AND INSTALL ALL REQUIRED CLAY BRICK. APPROVED PRODUCTS INCLUDE ADMIRAL RED FULL RANGE WITH CHAMFERED EDGE, AS MANUFACTURED BY BELDEN BRICK, INC., OR APPROVED EQUAL.



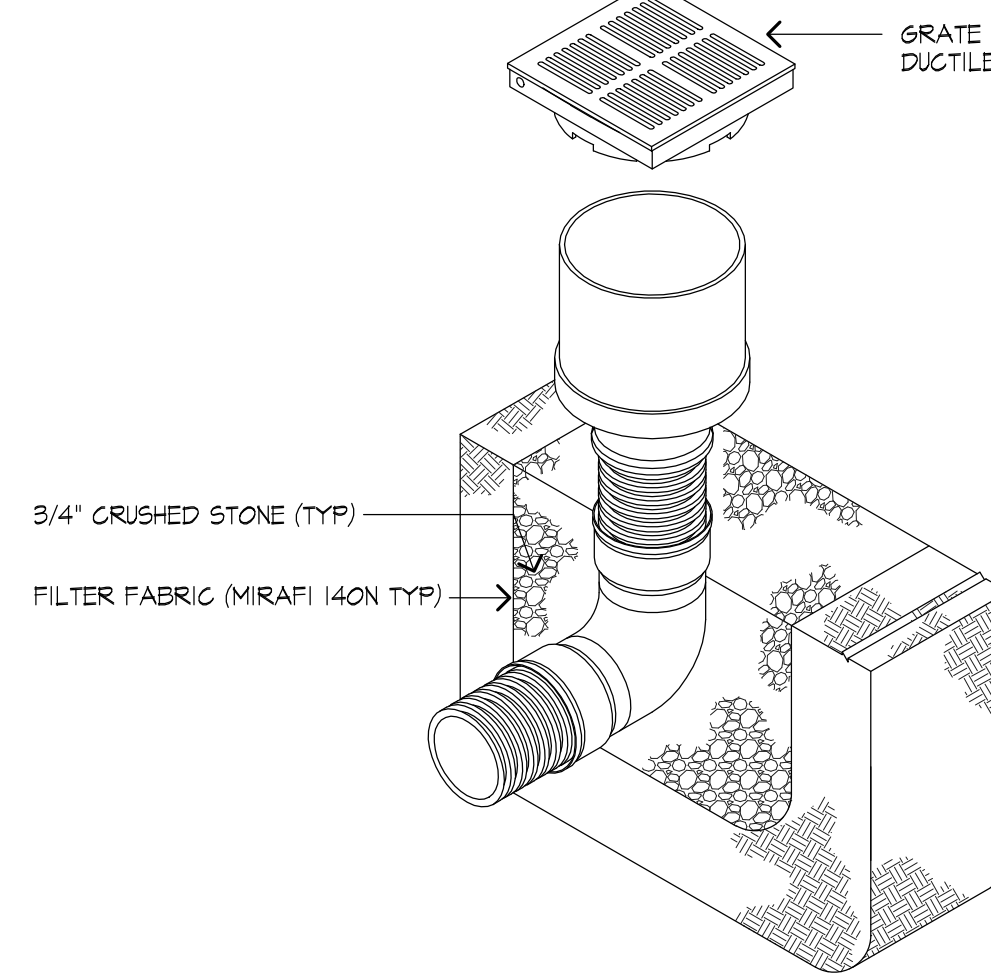
**4** WALKWAY PAVERS  
SCALE: N.T.S.

CONTRACTOR TO PROVIDE AND INSTALL ALL REQUIRED CLAY BRICK. APPROVED PRODUCTS INCLUDE ADMIRAL RED FULL RANGE WITH CHAMFERED EDGE, AS MANUFACTURED BY BELDEN BRICK, INC., OR APPROVED EQUAL.



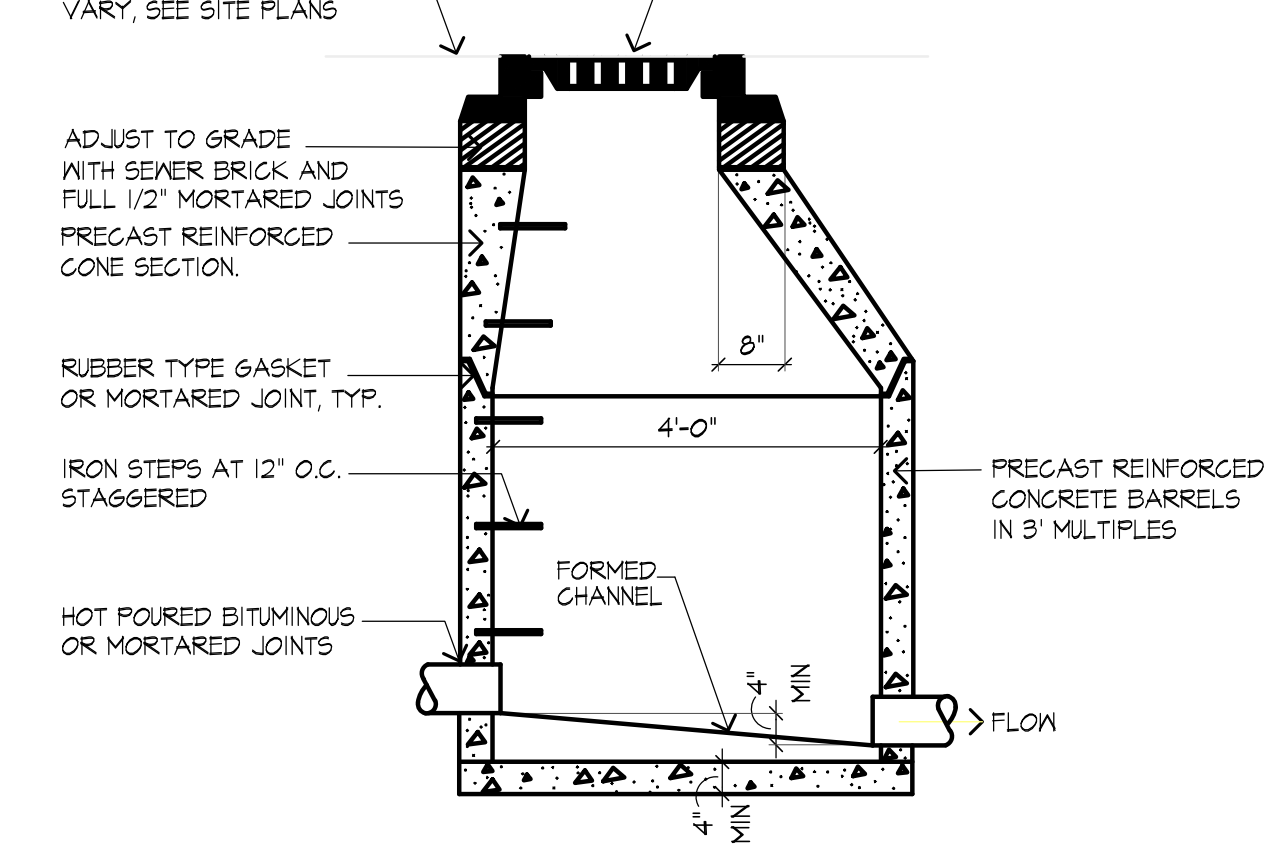
**5** PAVER PATTERN- PLAN VIEW  
SCALE: N.T.S.

SEE GRADING PLAN FOR INVERT. COORDINATE WITH LANDSCAPE ARCHITECT PRIOR TO INSTALLATION.

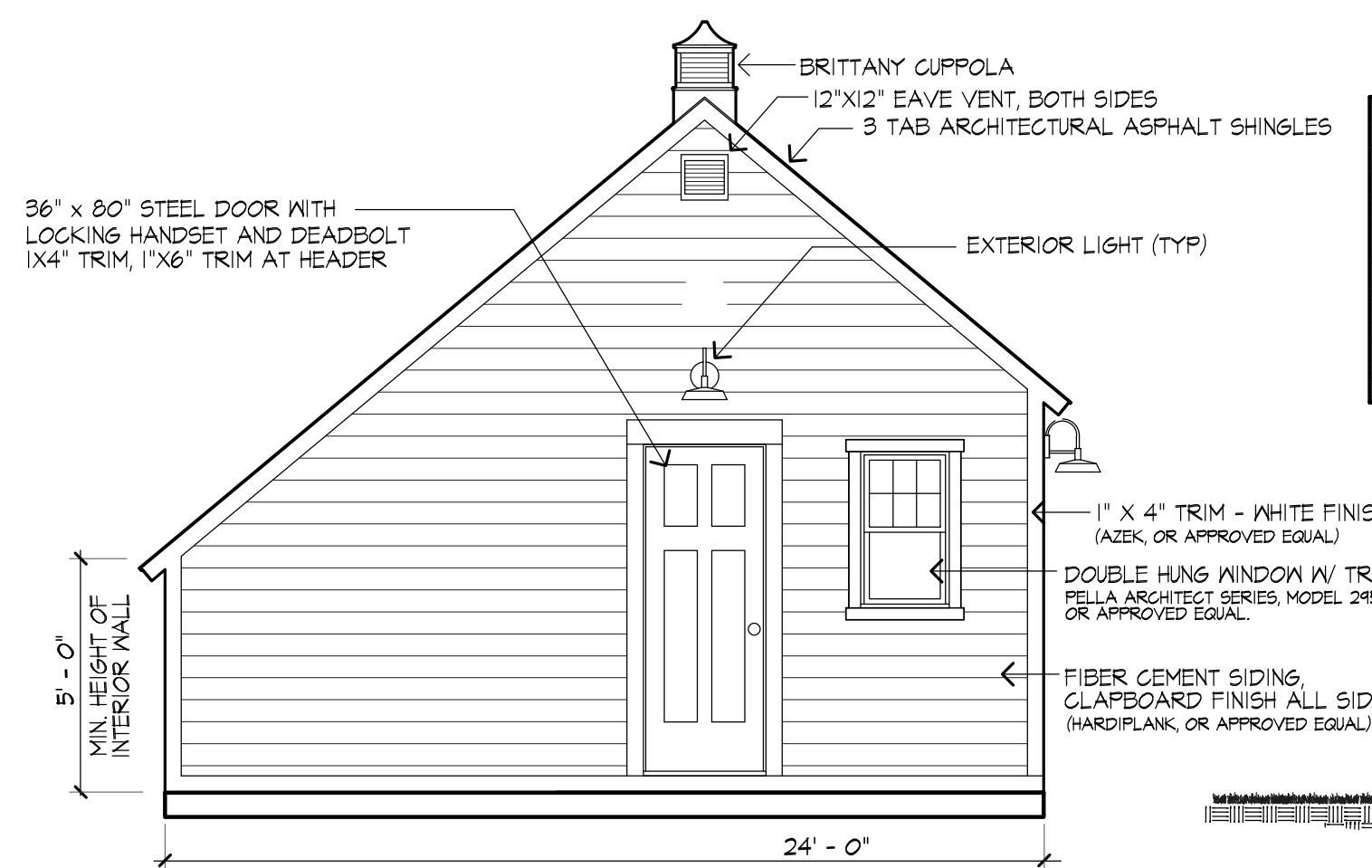


**6** 8" INLINE DRAIN WITH GRATE  
SCALE: N.T.S.

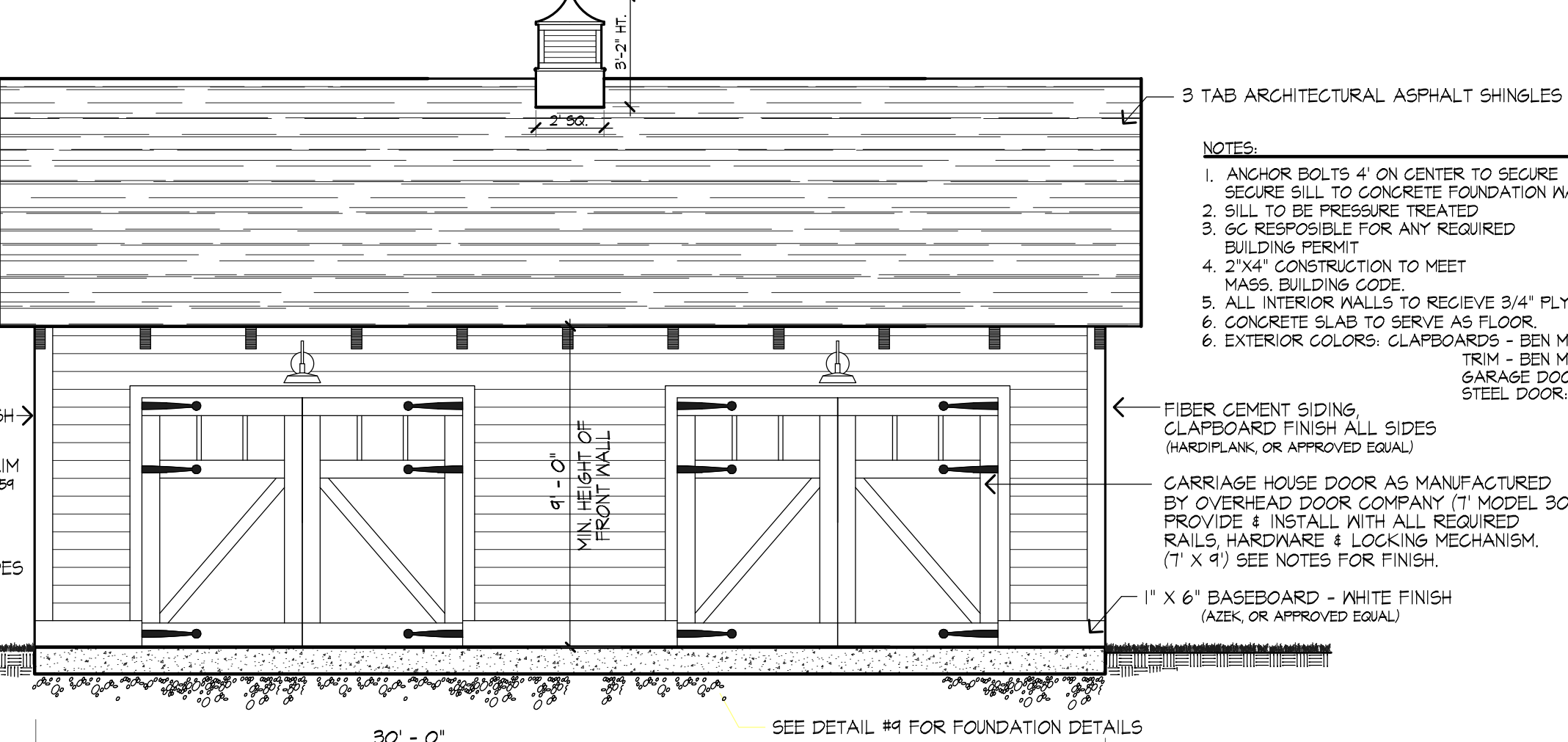
GRADE AND MATERIALS VARY, SEE SITE PLANS.



**7** MANHOLE  
SCALE: 1/2"=1'-0"



**8** EQUIPMENT STORAGE SHED (Alternate)  
SCALE: N.T.S.



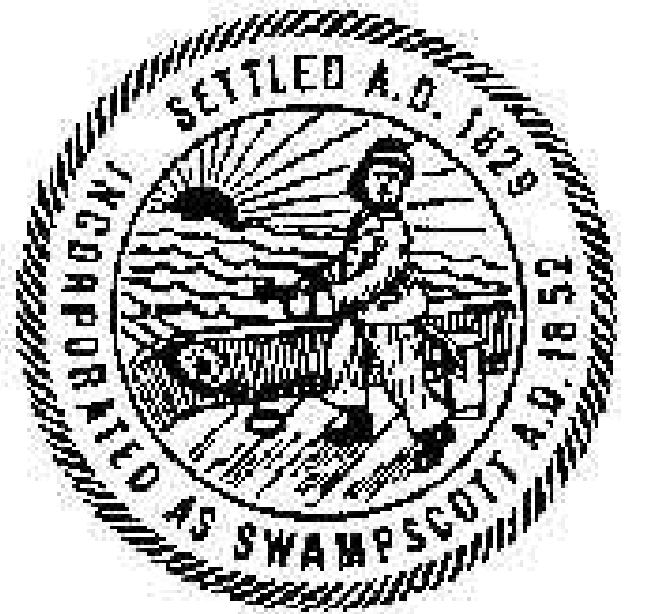
**9** TYPICAL FOUNDATION DETAIL (Alternate)  
SCALE: N.T.S.



Huntress Associates, Inc.

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Project:

**BLOCKSIDE FIELD**

Swampscott, Massachusetts

Drawing Title:

**Construction Details**



Revision	Date
STORAGE SHED DETAIL	2.3.17

Scale:	as noted	Drawing No.	<b>L-9</b>
Date:	1.15.17		
Job:	00-107		
File:	FR-det		
Drawn:	CCH		
Checked:	--		<b>10</b>