

**PROJECT MANUAL
FOR
North Eagleville Road
Area Infrastructure
Phase II**

**UNIVERSITY OF CONNECTICUT
STORRS CAMPUS
Storrs, Connecticut**

PROJECT #901954

UConn

UNIVERSITY OF CONNECTICUT

**April 23, 2015
ARCHITECT/ENGINEER OF RECORD:
AECOM**

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Sewer Replacement Storrs Road

Pump Station

Project #901675

Prequalified Contractors

1	All-Phase Enterprises, Inc. Stafford Springs, CT
2	Giordano Construction Co., Inc. Branford, CT
3	J. Iapaluccio, Inc. Brookfield, CT
4	Mather Corporation Bloomfield, CT
5	Milton C. Beebe & Sons, Inc. Storrs, CT
6	Ralph Camputaro & Son Excavating, Inc. North Branford, CT
7	Spazzarini Construction, Inc. Enfield, CT
8	VMS Construction Company Vernon, CT
9	W.M. Schultz Construction, Inc. Ballston Spa, NY

INSTRUCTIONS TO PREQUALIFIED BIDDERS

ARTICLE 1 GENERAL PROVISIONS

1.1 Connecticut Sales and Use Tax

- 1.1.1 The University of Connecticut is a tax-exempt institution. The Contractor shall be familiar with the current regulations of the Department of Revenue Service. The tax on materials or supplies exempted by such regulations shall not be included as part of the Bid. A Sales Tax Certificate is available from the Purchasing Department upon written request.

1.2 Contractor's Qualifications

In the Pre-Qualification to Bid Documents for this project, the University has reserved the right to request additional information from prospective Bidders beyond what may have been submitted in any Application and Statement of Qualifications in response to the Invitation to Pre-Qualify. The University has also reserved the right to find any Bidder to be non-responsible with respect to a specific project notwithstanding the fact that the Bidder may have previously been pre-qualified pursuant to the pre-qualification process. The University reaffirms these reservations of rights. In finding that a Bidder is non-responsible, the University may rely upon any information obtained prior to or subsequent to a finding that Bidder is pre-qualified.

- 1.2.1 CGS 4b-91 Requires each bid submitted shall include a copy of a prequalification certificate issued by the Commissioner of Administrative Services. The bid shall also be accompanied by an update bid statement in such form as the Commissioner of Administrative Services prescribes. The form for such update bid statement shall provide space for information regarding all projects completed by the bidder since the date the bidder's prequalification certificate was issued or renewed, all projects the bidder currently has under contract, including the percentage of work on such projects not completed, the names and qualifications of the personnel who will have supervisory responsibility for the performance of the contract, any significant changes in the bidder's financial position or corporate structure since the date the certificate was issued or renewed, any change in the contractor's qualification status as determined by the provisions of subdivision (6) of subsection (c) of section 4a-100 and such other relevant information as the Commissioner of Administrative Services prescribes. Any bid submitted without a copy of the prequalification certificate and an update bid statement shall be invalid and considered non-responsible.

1.3 Academic Schedule

- 1.3.1 It is important to the University, in order to maintain the integrity of its ongoing academic activities, that its rules and regulations and the requirements of the Contract Documents, regarding noise control, traffic control etc. and other matters which may affect its operations be strictly adhered to, and that its academic schedule be maintained. Therefore, all Bidders shall familiarize themselves with and comply with the academic schedule of the University, and its regulations regarding noise, traffic, etc. which are available from Architectural and Engineering Services. No noise generating work shall be allowed during exam periods where the noise will impact classroom functions. Examples of noise generating work include, but are not limited to, sawing, drilling, and hammering/jackhammering. The Contractor shall keep the

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University Representative informed as to the location of its operations to enable necessary precautions or co-ordination to be implemented.

1.4 Non-Discrimination and Affirmative Action Provisions

1.4.1 Non-discrimination. References in this section to "Contract" shall mean the execution of AIA 101 or Purchase Order Contract; and references to "Contractor" shall mean the person or entity who will be solely responsible for execution of the work.

(a) The following subsections are set forth here as required by section 4a-60 of the Connecticut General Statutes:

(1) The Contractor agrees and warrants that in the performance of the Contract such Contractor will not discriminate or permit discrimination against any person or group of persons on the grounds of race, color, religious creed, age, marital status, national origin, ancestry, sex, mental retardation, mental disability or physical disability, including, but not limited to, blindness, unless it is shown by such Contractor that such disability prevents performance of the work involved, in any manner prohibited by the laws of the United States or of the state of Connecticut. The Contractor further agrees to take affirmative action to insure that applicants with job-related qualifications are employed and that employees are treated when employed without regard to their race, color, religious creed, age, marital status, national origin, ancestry, sex, mental retardation, mental disability or physical disability, including, but not limited to, blindness, unless it is shown by such Contractor that such disability prevents performance of the work involved; (2) the Contractor agrees, in all solicitations or advertisements for employees placed by or on behalf of the Contractor, to state that it is an "affirmative action-equal opportunity employer" in accordance with regulations adopted by the commission; (3) the Contractor agrees to provide each labor union or representative of workers with which such Contractor has a collective bargaining agreement or other contract or understanding and each vendor with which such Contractor has a contract or understanding, a notice to be provided by the commission advising the labor union or workers' representative of the Contractor's commitments under this section, and to post copies of the notice in conspicuous places available to employees and applicants for employment; (4) the Contractor agrees to comply with each provision of this section and sections 46a-68e and 46a-68f and with each regulation or relevant order issued by said commission pursuant to sections 46a-56, 46a-68e and 46a-68f; (5) the Contractor agrees to provide the Commission on Human Rights and Opportunities with such information requested by the commission, and permit access to pertinent books, records and accounts, concerning the employment practices and procedures of the Contractor as relate to the provisions of this section and section 46a-56.

(b) If the Contract is a public works contract, the Contractor agrees and warrants that he will make good faith efforts to employ minority business enterprises as subcontractors and suppliers of materials on such public works project.

(c) "Minority business enterprise" means any small contractor or supplier of materials fifty-one per cent or more of the capital stock, if any, or assets of which is owned by a person or persons: (1) Who are active in the daily affairs of the enterprise, (2) who have the power to direct the management and policies of the enterprise and (3) who are members of a minority, as such term is defined in subsection (a) of section 32-9n; and "good faith" means that degree of diligence which a reasonable person would exercise in the performance of legal duties and obligations. "Good faith efforts" shall include, but not be limited to, those reasonable initial efforts necessary to comply with statutory or regulatory requirements and additional or substituted efforts when it is determined that such initial efforts will not be sufficient to comply with such requirements.

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- (d) Determination of the Contractor's good faith efforts shall include but shall not be limited to the following factors: The Contractor's employment and subcontracting policies, patterns and practices; affirmative advertising, recruitment and training; technical assistance activities and such other reasonable activities or efforts as the commission may prescribe that are designed to ensure the participation of minority business enterprises in public works projects.
- (e) The Contractor shall develop and maintain adequate documentation, in a manner prescribed by the commission, of its good faith efforts.
- (f) The Contractor shall include the provisions of sections (a) and (b) above in every subcontract or purchase order entered into in order to fulfill any obligation of a contract with the state and such provisions shall be binding on a subcontractor, vendor or manufacturer unless exempted by regulations or orders of the commission. The Contractor shall take such action with respect to any such subcontract or purchase order as the commission may direct as a means of enforcing such provisions including sanctions for noncompliance in accordance with section 46a-56; provided, if such Contractor becomes involved in, or is threatened with, litigation with a subcontractor or vendor as a result of such direction by the commission, the Contractor may request the state of Connecticut to enter into any such litigation or negotiation prior thereto to protect the interests of the state and the state may so enter.
- (g) The following subsections are set forth here as required by section 4a-60a of the Connecticut General Statutes:
 - (1) The Contractor agrees and warrants that in the performance of the Contract such Contractor will not discriminate or permit discrimination against any person or group of persons on the grounds of sexual orientation, in any manner prohibited by the laws of the United States or of the state of Connecticut, and that employees are treated when employed without regard to their sexual orientation; (2) the Contractor agrees to provide each labor union or representative of workers with which such Contractor has a collective bargaining agreement or other contract or understanding and each vendor with which such Contractor has a contract or understanding, a notice to be provided by the Commission on Human Rights and Opportunities advising the labor union or workers' representative of the Contractor's commitments under this section, and to post copies of the notice in conspicuous places available to employees and applicants for employment; (3) the Contractor agrees to comply with each provision of this section and with each regulation or relevant order issued by said commission pursuant to section 46a-56; and (4) the Contractor agrees to provide the Commission on Human Rights and Opportunities with such information requested by the commission, and permit access to pertinent books, records and accounts, concerning the employment practices and procedures of the Contractor which relate to the provisions of this section and section 46a-56.
- (h) The Contractor shall include the provisions of section (g) above in every subcontract or purchase order entered into in order to fulfill any obligation of a contract with the state and such provisions shall be binding on a subcontractor, vendor or manufacturer unless exempted by regulations or orders of the commission. The Contractor shall take such action with respect to any such subcontract or purchase order as the commission may direct as a means of enforcing such provisions including sanctions for noncompliance in accordance with section 46a-56; provided, if such Contractor becomes involved in, or is threatened with, litigation with a subcontractor or vendor as a result of such direction by the commission, the Contractor may request the state of Connecticut to enter into any such litigation or negotiation prior thereto to protect the interests of the state and the state may so enter.

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- (i) For the purposes of this entire Non-Discrimination section, "Contract" or "contract" includes any extension or modification of the Contract or contract, "Contractor" or "contractor" includes any successors or assigns of the Contractor or contractor, "marital status" means being single, married as recognized by the state of Connecticut, widowed, separated or divorced, and "mental disability" means one or more mental disorders, as defined in the most recent edition of the American Psychiatric Association's "Diagnostic and Statistical Manual of Mental Disorders", or a record of or regarding a person as having one or more such disorders. For the purposes of this section, "Contract" does not include a contract where each contractor is (1) a political subdivision of the state, including, but not limited to, a municipality, (2) a quasi-public agency, as defined in Conn. Gen. Stat. Section 1-120, (3) any other state, including but not limited to any federally recognized Indian tribal governments, as defined in Conn. Gen. Stat. Section 1-267, (4) the federal government, (5) a foreign government, or (6) an agency of a subdivision, agency, state or government described in the immediately preceding enumerated items (1), (2), (3), (4) or (5).

1.5 Union Labor

- 1.5.1 Attention is called to the fact that there may be construction work now being carried on at the site at which this construction is contemplated being done by UNION LABOR. This fact must be kept in mind by all Bidders submitting proposals for this work.

1.6 Labor Market Area

- 1.6.1 All Bidders shall have read Sections 31-52 and 31-52a of the Connecticut General Statutes, as amended. These references relate to the preference of State citizens, the preference of residents of the labor market area in which the work under the Contract is to be done and the penalties for violations.

1.7 Wage Rates

- 1.7.1 If this project involves new construction of a building or other structure or improvement, and the total cost of all Work to be performed by Contractors and Subcontractors is \$400,000.00 or more, or if the project involves remodeling, refurbishing, rehabilitation, alteration or repair of a building or other structure or improvement, and such total cost is \$100,000.00 or more, then:

- .1 The wages paid on an hourly basis to any mechanic, laborer or workman employed upon the work herein contracted to be done and the amount of payment or contribution paid or payable on behalf of each such employee to any employee welfare fund as defined in Subsection (h) of Section 31-53 of the Connecticut General Statutes, shall be at a rate equal to the rate customary or prevailing for the same work in the same trade or occupation in the town in which such project is being constructed. Any Contractor who is not obligated by agreement to make payment or contribution on behalf of such employees to any such employee welfare fund shall pay to each employee as part of his wages the amount of payment or contribution for his classification on each payday.

- 1.7.2 The State of Connecticut Labor Department Wage Rate Schedule, when required by the University, shall be provided with these documents or will be issued as part of the bid documents or by Bid Clarification/Addendum hereto and is deemed to reflect such customary

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or prevailing wages for this project, and is hereby incorporated and made a part of the Contract Documents.

- 1.7.3 Each contractor who is awarded a contract on or after October 1, 2002 shall be subject to provisions of the Connecticut General Statutes, Section 31-53 as amended by Public Act 02-69, "An Act Concerning Annual Adjustments to Prevailing Wages".
- 1.7.4 Wage Rates will be posted each July 1st on the Department of Labor Website: www.ctdol.state.ct.us. Such prevailing wage adjustment will not be considered a matter for an annual contract amendment.
- 1.7.5 Wage rates shall be paid pursuant to Section 31-53 and 31-54 of the Connecticut General Statutes, and any regulations issued hereunder.
- 1.7.6 **Sec. 31-53b. Construction safety and health course. New miner training program. Proof of completion required for mechanics, laborers and workers on public works projects. Enforcement. Regulations. Exceptions.** (a) Each contract for a public works project entered into on or after July 1, 2009, by the state or any of its agents, or by any political subdivision of the state or any of its agents, described in subsection (g) of section 31-53, shall contain a provision requiring that each contractor furnish proof with the weekly certified payroll form for the first week each employee begins work on such project that any person performing the work of a mechanic, laborer or worker pursuant to the classifications of labor under section 31-53 on such public works project, pursuant to such contract, has completed a course of at least ten hours in duration in construction safety and health approved by the federal Occupational Safety and Health Administration or, has completed a new miner training program approved by the Federal Mine Safety and Health Administration in accordance with 30 CFR 48 or, in the case of telecommunications employees, has completed at least ten hours of training in accordance with 29 CFR 1910.268. (b) Any person required to complete a course or program under subsection (a) of this section who has not completed the course or program shall be subject to removal from the worksite if the person does not provide documentation of having completed such course or program by the fifteenth day after the date the person is found to be in noncompliance.

ARTICLE 2 BIDDERS' REPRESENTATIONS

- 2.1 The amount of each Bid shall be deemed to include the entire cost and expense of every item of labor, material and overhead necessary to complete the work bid upon, as specified, in full detail ready for use. The risk of all such costs and expenses shall be deemed assumed by the successful Bidder. The University shall assign a University Representative to work with the successful Contractor as a liaison.
- 2.2 In performing its obligations under this Contract, the Contractor agrees to comply with all applicable states, laws, ordinances, regulations, codes, rules or orders of, or issued by, any governmental body having jurisdiction over the work, location of the work or contract.

ARTICLE 3 BIDDING DOCUMENTS

3.1 Bid Clarifications, Addenda and Interpretations

- 3.1.1 No interpretations of the meaning of the Drawings, specifications or other Contract Documents will be made orally to any Bidder. Every request for such interpretation must be

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made in writing to the University Office of Capital Project & Contract Administration, and to be given consideration shall be received at the specified date outlined within the invitation to bid and/or adjusted by a bid clarification/addenda.

- 3.1.2 Any and all such interpretations and any supplemental instructions will be in the form of written bid clarification/addenda which, if issued, will be posted on the University's Capital Projects and Contract Administration's Department website; www.cpcu.uconn.edu. for all prospective Bidders to access or for those without access to a computer you can obtain them through Joseph Merritt, no later than five (5) days prior to the date fixed for the opening of Bids. Failure of any Bidder to receive any such addendum or interpretation shall not release any Bidder from any obligations under his Bid as submitted, provided notice has been sent to the address furnished by such prospective Bidder for the transmittal of notices, addenda and interpretations. It shall be the Bidder's responsibility to make inquiry as to, and to obtain, the Addenda issued, if any.
- 3.1.3 The number of days shown in 3.1.1 and 3.1.2 may differ from the actual dates given in an Agenda for a Pre-Bid or Pre-Proposal Conference, if so, the number of days listed are, hereby, superseded by the Agenda dates, unless the Bid or Proposal is extended by Addendum, in which case the number of days will again apply unless stated differently in the Addendum.
- 3.1.4 Bidders shall promptly notify the University of any ambiguity, inconsistency or error which they may discover upon examination of these Contract Documents.

ARTICLE 4 BIDDING PROCEDURES

4.1 Requests for Information

- 4.1.1 Enclosed with this Invitation to Submit Proposals Manual is a Request for Information Form (RFI). All questions/clarifications must be submitted in writing on this form and before the prescribed RFI Deadline. No verbal questions will be answered. All answers to RFI's will be issued in a Bid Clarification/Addenda. Form is at the end of this document.

4.2 Form of Proposal

- 4.2.1 Enclosed with this Invitation to Submit Proposals Manual is a Form of Proposal. Bids shall be submitted on a copy of this form. Additional instructions to bidders including information on submission of bids and award and Contract appear on this form. All documents required by these Bid Documents must be returned with your Bid.

4.3 Bids and Rejection of Bids

- 4.3.1 General Bids shall be for the complete work as specified and shall include the names of any Subcontractors for the classes of work specified in the Form of Proposal, and for each other class of work for which the University has required a separate section and the dollar amounts of their subcontracts, and the General Contractor shall be selected on the basis of such general Bids. It shall be presumed that the general Bidder intends to perform with its own employees all work in such four classes and such other classes, for which no Subcontractor is named. The general Bidder's qualifications for performing such work shall be subject to review by the University pursuant to the Bid and the Contract Documents.

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- 4.3.2 Bids shall be submitted only on the forms furnished for the specific project, which shall include a completed Form of Proposal containing all information required on the Proposal form, executed with an original signature by a duly authorized officer or representative of the Bidder, and, in the case of a Joint Venture, by duly authorized representatives of each Joint Venture. In no event will Bids or changes in Bids made by telephone, email or fax be considered. Any Form of Proposal omitting or adding items, altering the form, containing conditional or alternative Bids, or without the original signature of the Bidder or its authorized representative, may be rejected.
- 4.3.3 Any Bids received after the scheduled closing time for the receipt of Bids will be returned to the Bidders unopened.
- 4.3.4 Any Bid once deposited with the University of Connecticut may only be withdrawn by letter of request, signed by the depositing Bidder and presented to the Office of Capital Project and Contract Administration, prior to the time of opening of any Bid for the project designated or identified project.
- 4.4 Bid Security
- 4.4.1 Each Bid must be accompanied by a certified check payable to the order of the University of Connecticut, or the Bid may be accompanied by a Bid Bond in the form required by the University, having as surety thereto such surety company or companies acceptable to the University and as are authorized to do business in this State, for an amount not less than 10 per cent of the Bid. All checks submitted by unsuccessful Bidders shall be returned to them after the Contract has been awarded. Bid Security is not required for projects under \$50,000.00.
- 4.4.2 Failure of the successful Bidder to file the required Performance and Labor & Material bonds shall be just cause for the amount of the security deposited with the Bid to be forfeited, any part of the whole of which may be used to make up the difference between the Bid of the defaulting Bidder and the Bid of the next lowest responsible qualified Bidder to whom the work is finally awarded. Failure to execute a contract after award as specified and Bid shall also result in the forfeiture of such Bid Bonds or Certified Check.
- 4.5 Subcontractors
- 4.5.1 The Contractor shall not contract with a person or entity who appears on the State of Connecticut Debarment List, the Federal Davis Bacon Act Debarment List, both of which are available through: <http://ctdol.state.ct.us> or the Federal List of Excluded Parties Listing System available through: <http://epls.arnet.gov>
- 4.5.2 The Bidder shall furnish, with his submitted Bid, as is set forth in the Proposal Form, in the space provided for such purpose, the names and prices of responsible and qualified Subcontractors who are actually to perform the following categories of work under the Base Bid, if their prices exceed \$25,000.00:
- .1 Masonry

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- .2 Electrical
 - .3 Mechanical other than HVAC
 - .4 HVAC
 - .5 Any other class of work identified in the Proposal Form for which a blank space has been provided.
- 4.5.3 The Bidder further agrees that each of the Subcontractors listed on the Proposal Form will be used for the work indicated at the amount stated unless a substitution is permitted by the University.
- 4.5.4 The Bidder further agrees and warrants that he has made good faith efforts to employ minority business enterprises as Subcontractors and suppliers of materials under such contract and shall provide the Commission on Human Rights and Opportunities with such information as is requested by the Commission concerning his employment practices and procedures as they relate to the provisions of the general statutes governing contract requirements.
- 4.5.5 Pursuant to Connecticut General Statutes Section 49-41a, for every contract with the University for the construction, alteration or repair of any building or work, (1) the Contractor, within 30 days after payment to the Contractor by the University, shall be required to pay any amounts due any Subcontractor, whether for labor performed or materials furnished, when the labor or materials have been included in a requisition submitted by the Contractor and paid by the University; (2) the Contractor shall include in each of its subcontracts a provision requiring each Subcontractor to pay any amounts due any of its Subcontractors, whether for labor performed or materials furnished, within 30 days after each Subcontractor receives a payment from the Contractor which encompasses labor or materials furnished by such Subcontractor.
- 4.5.6 Within five days after being notified of the award of a general Contract by the University, or, in the case of an approval of a substitute Subcontractor by the University, within five days after being notified of such approval, the general Bidder shall present to each listed or substitute Subcontractor:
- .1 A subcontract in the form set forth in Section 4b-96 of the Connecticut General Statutes and must be executed with all of your named subcontractors in your form of proposal.
 - .2 A notice of the time limit under this section for executing a subcontract. If a listed Subcontractor fails within five days, Saturdays, Sundays and legal holidays excluded, after presentation of a subcontract by the general Bidder selected as a General Contractor, to perform his agreement to execute a subcontract in the form hereinafter set forth with such general Bidder, contingent upon the execution of the general Contract, the General Contractor shall select another Subcontractor, with the approval of the University. When seeking approval for a substitute Subcontractor, the general Bidder shall provide the University with all documents showing (a) the general Bidder's proper presentation of a subcontract to the listed Subcontractor and, (b) communications to or from such Subcontractor after such presentation. The University shall adjust the Contract Price to reflect the difference between the amount of the price of the new Subcontractor and the amount of the price of the listed Subcontractor, if the

new Subcontractor's price is lower and may adjust such Contract Price, if the new Subcontractor's price is higher. The general Bidder shall, with respect to each listed Subcontractor or approved substitute Subcontractor, file with the University a copy of each executed subcontract within ten days, Saturdays, Sundays and legal holidays excluded, of presentation of a subcontract to such Subcontractor.

- .3 In the event of any conflict or inconsistency between the University of Connecticut's Subcontract form and the Contractor's standard Subcontract form, the provisions of the University of Connecticut's Subcontract form shall prevail. Any standard Subcontract form used will be attached as a supplement to the University of Connecticut's Subcontract form.

4.6 LIQUIDATED DAMAGES

- 4.6.1 Liquidated Damages of One Thousand Six Hundred and 00/100 Dollars (\$1,600.00) per calendar day shall be assessed if the Contractor fails to achieve Substantial Completion, or causes delay to the Substantial Completion of any portion of the Work within the Contract Time.

4.7 COMMISSION ON HUMAN RIGHTS AND OPPORTUNITIES CONTRACT COMPLIANCE REGULATIONS:

The contract to be awarded is subject to contract compliance requirements mandated by Sections 4a-60 and 4a-60a of the Connecticut General Statutes; and, when the awarding agency is the State, Sections 46a-71(d) and 81i(d) of the Connecticut General Statutes. There are Contract Compliance Regulations codified at Section-68j-21 through 43 of the Regulations of Connecticut State Agencies, which establish a procedure for awarding all contracts covered by Sections 4a-60 and 46a-71(d) of the Connecticut General Statutes. According to Section 46a-68j-30(9) of the Contract Compliance Regulations, every agency awarding a contract subject to the contract compliance requirements has an obligation to "aggressively solicit the participation of legitimate minority business enterprises as bidders, contractors, subcontractors and suppliers of materials." Minority business enterprise" is defined in Section 4a-60 of the Connecticut General Statutes as a business wherein fifty-one percent or more of the capital stock, or assets belong to a person or persons: "(1) Who are active in daily affairs of the enterprise; (2) who have the power to direct the management and policies of the enterprise; and (3) who are members of a minority, as such term is defined in subsection (a) of Section 32-9n." "Minority" groups are defined in Section 32-9n of the Connecticut General Statutes as "(1) Black Americans . . . (2) Hispanic Americans . . . (3) persons who have origins in the Iberian Peninsula . . . (4) Women . . . (5) Asian Pacific Americans and Pacific Islanders; (6) American Indians . . ." An individual with a disability is also a minority business enterprise as provided by Section 4a-60g of the Connecticut General Statutes. The above definitions apply to the contract compliance requirements by virtue of Section 46a-68j-21(11) of the Contract Compliance Regulations. The awarding agency will consider the following factors when reviewing the bidder's qualifications under the contract compliance requirements: (a) the bidder's success in implementing an affirmative action plan; (b) the bidder's success in developing an apprenticeship program complying with Sections 46a-68-1 to 46a-68-17 of the Administrative Regulations of Connecticut State Agencies, inclusive; (c) the bidder's promise to develop and implement a successful affirmative action plan; (d) the bidder's submission of employment statistics contained in the "Employment Information Form", indicating that the

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composition of its workforce is at or near parity when compared to the racial and sexual composition of the workforce in the relevant labor market area; and(e) the bidder's promise to set aside a portion of the contract for legitimate minority business enterprises. See Section 46a-68j-30(10)(E) of the Contract Compliance Regulations.

- 4.7.1 The following BIDDER CONTRACT COMPLIANCE MONITORING REPORT must be completed in full, signed, and submitted with the bid for this contract. The contract awarding agency and the Commission on Human Rights and Opportunities will use the information contained thereon to determine the bidders compliance to Sections 4a-60 and 4a-60a CONN. GEN. STAT., and Sections 46a-68j-23 of the Regulations of Connecticut State Agencies regarding equal employment opportunity, and the bidders __good faith efforts to include minority business enterprises as subcontractors and suppliers for the work of the contract.

1) Definition of Small Contractor:

Section 4a-60g CONN. GEN. STAT. defines a small contractor as a company that has been doing business under the same management and control and has maintained its principal place of business in Connecticut for a one year period immediately prior to its application for certification under this section, had gross revenues not exceeding ten million dollars in the most recently completed fiscal year, and at least fifty-one percent of the ownership of which is held by a person or persons who are active in the daily affairs of the company, and have the power to direct the management and policies of the company, except that a nonprofit corporation shall be construed to be a small contractor if such nonprofit corporation meets the requirements of subparagraphs (A) and (B) of subdivision 4a-60g CONN. GEN. STAT.

2) Description of Job Categories (as used in Part IV Bidder Employment Information)

MANAGEMENT: Managers plan, organize, direct, and control the major functions of an organization through subordinates who are at the managerial or supervisory level. They make policy decisions and set objectives for the company or departments. They are not usually directly involved in production or providing services. Examples include top executives, public relations managers, managers of operations specialties (such as financial, human resources, or purchasing managers), and construction and engineering managers.

BUSINESS AND FINANCIAL OPERATIONS: These occupations include managers and professionals who work with the financial aspects of the business. These occupations include accountants and auditors, purchasing agents, management analysts, labor relations specialists, and budget, credit, and financial analysts.

COMPUTER SPECIALISTS: Professionals responsible for the computer operations within a company are grouped in this category. Examples of job titles in this category include computer programmers, software engineers, database administrators, computer scientists, systems analysts, and computer support specialists

ARCHITECTURE AND ENGINEERING: Occupations related to architecture, surveying, engineering, and drafting are included in this category. Some of the job titles in this category include electrical and electronic engineers, surveyors, architects, drafters, mechanical engineers, materials engineers, mapping technicians, and civil engineers.

OFFICE AND ADMINISTRATIVE SUPPORT: All clerical-type work is included in this category. These jobs involve the preparing, transcribing, and preserving of written communications and records; collecting accounts; gathering and distributing information; operating office machines and electronic data processing equipment; and distributing mail. Job titles listed in this category include telephone operators, payroll clerks, bill and account collectors, customer

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service representatives, files clerks, dispatchers, shipping clerks, secretaries and administrative assistants, computer operators, mail clerks, and stock clerks.

BUILDING AND GROUNDS CLEANING AND MAINTENANCE:

This category includes occupations involving landscaping, housekeeping, and janitorial services. Job titles found in this category include supervisors of landscaping or housekeeping, janitors, maids, grounds maintenance workers, and pest control workers.

CONSTRUCTION AND EXTRACTION: This category includes construction trades and related occupations. Job titles found in this category include boilermakers, masons (all types), carpenters, construction laborers, electricians, plumbers (and related trades), roofers, sheet metal workers, elevator installers, hazardous materials removal workers, paperhangers, and painters. Paving, surfacing, and tamping equipment operators; drywall and ceiling tile installers; and carpet, floor and tile installers and finishers are also included in this category. First line supervisors, foremen, and helpers in these trades are also grouped in this category..

INSTALLATION, MAINTENANCE AND REPAIR: Occupations involving the installation, maintenance, and repair of equipment are included in this group. Examples of job titles found here are heating, ac, and refrigeration mechanics and installers; telecommunication line installers and repairers; heavy vehicle and mobile equipment service technicians and mechanics; small engine mechanics; security and fire alarm systems installers; electric/electronic repair, industrial, utility and transportation equipment; millwrights; riggers; and manufactured building and mobile home installers. First line supervisors, foremen, and helpers for these jobs are also included in the category.

MATERIAL MOVING WORKERS: The job titles included in this group are Crane and tower operators; dredge, excavating, and lading machine operators; hoist and winch operators; industrial truck and tractor operators; cleaners of vehicles and equipment; laborers and freight, stock, and material movers, hand; machine feeders and offbearers; packers and packagers, hand; pumping station operators; refuse and recyclable material collectors; and miscellaneous material moving workers.

3) Definition of Racial and Ethnic Terms (as used in Part IV Bidder Employment Information):
White (not of Hispanic Origin)- All persons having origins in any of the original peoples of Europe, North Africa, or the Middle East.

Black (not of Hispanic Origin)- All persons having origins in any of the Black racial groups of Africa.

Hispanic- All persons of Mexican, Puerto Rican, Cuban, Central or South American, or other Spanish culture or origin, regardless of race.

Asian or Pacific Islander- All persons having origins in any of the original peoples of the Far East, Southeast Asia, the Indian subcontinent, or the Pacific Islands. This area includes China, India, Japan, Korea, the Philippine Islands, and Samoa.

American Indian or Alaskan Native- All persons having origins in any of the original peoples of North America, and who maintain cultural identification through tribal affiliation or community recognition

ARTICLE 5 CONSIDERATION OF BIDS

5.1 Every general bid which is conditional or obscure, or which contains any addition not called for shall be invalid; and the University shall reject every such general Bid. The University shall be authorized to waive minor irregularities, which it considers in its best interest, provided the reasons for any such waiver are stated in writing by the University and made a part of the contract file. No such general Bid shall be rejected because of the failure to submit prices for, or information relating to, any item or

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- items for which no specific space is provided in the general Proposal Form furnished by the University, but this sentence shall not be applicable to any failure to furnish prices or information required by Articles 4.2.1 and 4.4.1 above to be furnished in the form provided by the University. The University also reserves the right to reject any and all bids and again advertise for bids, or to otherwise proceed as permitted under Connecticut General Statutes 10a-109a through 10a-109y.
- 5.2 General Bids shall be publicly opened and read by the University forthwith. The University may require in the Proposal Form that the General Contractor agree to perform a stated, minimum percentage of work with his own forces. The University may also require the General Contractor to set aside a portion of the contract for Subcontractors who are eligible for set aside contracts. The University shall not permit substitution of a Subcontractor for one named in accordance with the provisions of these Instructions or substitution of a Subcontractor for any designated subtrade work bid to be performed by the General Contractor's own forces, except for good cause. The term "good cause" includes but is not limited to a Subcontractor's or, where appropriate, a General Contractor's: (1) Death or physical disability, if the listed Subcontractor is an individual; (2) dissolution, if a corporation or partnership; (3) bankruptcy; (4) inability to furnish any performance and payment bond shown on the Proposal Form; (5) inability to obtain, or loss of, a license necessary for the performance of a particular category of work; (6) failure or inability to comply with a requirement of law applicable to Contractors, Subcontractors, on construction, alteration, or repair projects; (7) failure to perform his agreement to execute a subcontract under Connecticut General Statutes Section 4b-96.
- 5.3 The general Bid Price shall be the price set forth in the space provided on the general Proposal Form. No general Bid shall be rejected (1) because of error in setting forth the name of a Subcontractor as long as the Subcontractors designated are clearly identifiable, or (2) because the Drawings and specifications do not accompany the Bid or are not submitted with the Bid. **FAILURE TO CORRECTLY STATE A SUBCONTRACTOR'S PRICE MAY BE CAUSE FOR REJECTION OF THE GENERAL BIDDER'S BID.**
- 5.4 Any General Contractor who violates any provision of Connecticut General Statutes Section 4b-95 may be disqualified from bidding on other contracts that are subject to the provisions of Chapter 60 of the General Statutes for a period not to exceed twenty-four months, commencing from the date on which the violation is discovered, for each violation.
- 5.5 The University reserves the right to accept or reject any or all Bids within 90 calendar days of the Bid opening, and the Bidder agrees that it may not modify, withdraw, or cancel its Bid and that its Bid Price will be firm for this 90 day period. This 90 day period may be extended by mutual agreement between the University and the Bidder.
- 5.6 The project will be awarded to the responsible qualified Bidder submitting the lowest Bid in compliance with the Bid requirements and within the budget, subject to the provisions of Connecticut General Statutes 10a-109a through 10a-109y.
- 5.7 The University reserves the right to elect to implement some, all or none of the Alternates and/or Options set forth in the Proposal forms, as may be in the best interest of the University. The low Bid shall be determined by taking the Base Price set forth in the Proposal form as selected by the University, plus the Alternates and/or Options selected by the University.

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- 5.8 The Bidder agrees that if selected as General Contractor, he shall, within ten (10) days, Saturdays, Sundays and legal holidays excluded, after presentation thereof by the University, execute a contract in accordance with the terms of the general Bid.

ARTICLE 6 POST- BID INFORMATION

6.1 Affirmative Action

6.1.1 Pursuant to Connecticut General Statutes Section 46a-68d, if this project is estimated to cost more than \$50,000.00 then: In the event that the Bidder's Bid is accepted, after acceptance, but before a contract is awarded, the successful Bidder shall file and have approved by the Commission on Human Rights and Opportunities an Affirmative Action Plan. The Commission may provide for conditional acceptance of an Affirmative Action Plan provided written assurances are given by the Contractor that it will amend its plan to conform to affirmative action requirements. The University shall withhold 2% of the total Contract Price per month from any payment made to such Contractor until such time as the Contractor has developed an Affirmative Action Plan, and received the approval of the Commission. Notwithstanding the provisions of Connecticut General Statutes Section 46a-68d, a Contractor subject to the provisions of that Section may file a plan in advance of or at the same time as its Bid.

6.1.2 The University shall not enter into a contract with any Bidder or prospective Contractor unless the Bidder or prospective Contractor has satisfactorily complied with the provisions of Sections 4a-60, 32-9e, 46a-56 and 46a-68c to 46a-68f, inclusive of the Connecticut General Statutes, or submits a program for compliance acceptable to the Commission on Human Rights and Opportunities.

6.1.3 The Contractor shall designate an "Equal Opportunity Contract Compliance Officer" for the project. The Contractor designee, in addition to any other duties assigned by the Contractor, shall have the following responsibilities for the implementation of the Contractor Affirmative Action Plan (AAP) that is required for the project pursuant to Connecticut General Statutes Section's 46a-68c and 46a-68d.

- .1 Maintain a project EEO file to include all records, correspondence and other documentation related to the project AAP.
- .2 Communicate to and inform all project Contractors and Subcontractors, regardless of tier, and labor referral organizations (if applicable) about project equal opportunity and AAP expectations and performance requirements.
- .3 Compile all on-site Contractor MONTHLY EMPLOYMENT UTILIZATION REPORTS (form CHRO cc-257) and submit a cumulative report for the project each month to report on contractor compliance to project AAP hiring goals. The cumulative report shall be submitted to the contract awarding agency and to the Commission on Human Rights and Opportunities by the 15th day following the end of each calendar month during the pendency of the on-site construction work of the project.
- .4 Attach a copy of your transmittal letter to CHRO as a document to be submitted with your invoice.

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- .5 Compile and submit a QUARTERLY SMALL CONTRACTOR AND MINORITY BUSINESS ENTERPRISE PAYMENT STATUS REPORT (form CHRO cc-258) to report on the participation of such Contractors identified to participate on the project. The report shall be submitted to the contract awarding agency and to the Commission on Human Rights and Opportunities by the 15th day following the end of each calendar quarter during the pendency of the on-site construction work of the project.
- .6 Attach a copy of your transmittal letter to CHRO as a document to be submitted with your invoice.
- .7 Participate in project job meetings to inform project Contractors about project equal opportunity and AAP performance.
- .8 Coordinate "External Communication" section (employment outreach) of contractor AAP for all employment opportunities resultant during the course of the project from all project Contractors and maintain documentation of all contacts and responses.

6.2 Tax Identification

6.2.1 The Contractor shall furnish to the Owner, at the time of execution of the Contract, the following information

- .1 The identity and addresses of all subcontractors performing work on the project.
- .2 The Connecticut tax registration numbers of the Contractor and all subcontractors.
- .3 The Federal Social Security account numbers, or Federal Employer Identification numbers, or both, if applicable, for the Contractor and all subcontractors.

6.2.2 The aforementioned information shall be continuously updated by the Contractor to reflect any additions or changes to the previously identified subcontractors. Any final additions or changes to this information shall be submitted to the Owner with the Contractor's application for final payment.

ARTICLE 7 PERFORMANCE AND PAYMENT BONDS AND CERTIFICATE OF COMPLIANCE.

7.1 Performance Bond

7.1.1 Prior to execution of the Contract, the successful Bidder shall substitute for the check or Bid Bond accompanying his Bid, an executed University of Connecticut Performance Bond, in the amount of 100 per cent of the Contract Price, conditioned upon the faithful performance of the Contract. See Form of Proposal for the appropriate form to be executed.

7.2 Labor and Material Payment Bond

7.2.1 Prior to execution of the Contract, the Bidder shall submit a University of Connecticut Labor and Material Payment Bond in the sum of not less than 100 per cent of the Contract Price, containing the condition that the Contractor will promptly pay for all material furnished and labor, supplied or performed in the prosecution of the work whether or not said material or labor is involved and/or becomes a component part of the structure or structures to be erected. Such additional bond shall be held for the use of each party who, as Subcontractor or

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otherwise, shall have furnished material or supplies or shall have performed labor in the prosecution of the work as herein provided and who has not been paid therefore. Such additional bond shall provide specifically that any person may bring suit thereon in the name of the person suing, prosecute the same to the final judgment and have execution thereon for such sum or sums as may be justly due. The State shall not be liable to furnish counsel nor for the payment of any costs or expenses of any such suit. This bond is to be furnished pursuant to Section 49-41 of the General Statutes of Connecticut, and claims thereon shall be subject to the provisions of Connecticut General Statutes Section 49-42. Such forms will be provided with the Letter of Intent to award to be executed.

7.3 Nonresident Contractor Certificate of Compliance

7.3.1 Prior to execution of the Contract, the Bidder shall submit proof that ensures they and all subcontractors being contracted to perform work under the awarded bid; are State of Connecticut resident contractors. Such proof shall be in a form on the awarding Contractor's letter head signed by the owner or principle of the company having authority to ensure that all agreements entered into under this contract are in-state resident contractors. Should the awarding Contractor and/or subcontractors who will perform work under this contract, are nonresident of the State of Connecticut, the awarding Contractor must provide a Certificate of Compliance from the Department of Revenue Services (DRS) for those nonresident firms who will be under contract. This Certificate of Compliance is pursuant to Statue 12-430 as amended by 2005 Connecticut Public Acts 260, 6; Connecticut Agencies Regulations 12-430 (7)-1.

7.4 General Provisions Regarding Bonds

7.4.1 The aforementioned Performance and Payment bonds shall be provided in the forms required by the University, samples of which are appended hereto. If the Contractor is a Joint Venture, all such bonds shall name all joint ventures as principals. The Contractor shall require the attorney-in-fact who executes the required bonds on behalf of the surety to affix thereto a certified and current copy of the power of attorney. The above bonds shall be required for awards for which the total estimated cost of labor and materials under the Contract is at least \$100,000.00. The above bonds shall be acceptable to the University and, as a minimum, issued through a bonding company licensed to transact such business in the State of Connecticut and named on the current list of "Surety Companies Acceptable on Federal Bonds" as published in the "Treasury Department Circular 570."

ARTICLE 8 AFFIDAVITS/ETHICS AFFIRMATIONS

8.1 Affidavits/Ethics Affirmations to be completed in accordance with the instructions provided on the OPM website for each Affidavits/Ethics Affirmations.

Form 5. Consulting Agreement Affidavit (for contract values >\$50,000)

Form 6. Affirmation of Receipt of State Ethics Laws Summary (for contract values >\$500,000)

8.2 With regard to a State contract as defined in P.A. 07-1 having a value in a calendar year of \$50,000 or more or a combination of series of such agreements or contracts having a value of \$100,000 or more, the authorized signatory to this submission in response to the State's solicitation expressly state contractors of state campaign contribution and solicitation prohibitions, and will inform its principals of the contents of the notice. See attached **SEEC Form 11.**

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Obtain OPM has posted the approved Forms on the OPM Web site -
<http://www.opm.state.ct.us/secr/forms/ContractAffidavitRequirements.htm>

ARTICLE 9 CONTRACT

9.1 A draft of the contract has been provided with the bid documents. The University reserves the right to modify the contract or wave any informality as it deems to be in the best interest of the University. By submitting a bid the Contractor accepts the contract and any modifications that the University deems necessary to it without exception. Exceptions to the contract submitted by the Contractor at any time will not be considered.

REQUEST FOR INFORMATION FORM

PLEASE TYPE -OR- PRINT / SEE INVITATION AND ADDENDA'S FOR RFI DEADLINE

TO: The University of Connecticut.
Fax (860) 486-1953

FROM: _____
(Name of Bidding Firm)

ATTN: Walt Dalia

Contact Name: _____

RFI Deadline: See Invitation /Bid Clarifications Phone # : _____ Fax # : _____

Specification Section: _____ **Drawing No. / Drawing Date:** _____

QUESTION (Please be specific): _____

RESPONSE : _____

Signature : _____

Date: _____

NOTE: All questions must be submitted in writing before the prescribed RFI Deadline. No verbal questions will be answered. All questions must be submitted in writing on this RFI Form. All answers to RFI's will be issued in a Bidder's Clarification.

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STATE OF CONNECTICUT
STATE ELECTIONS ENFORCEMENT COMMISSION
20 Trinity Street Hartford, Connecticut 06106—1628

SEEC FORM 11

NOTICE TO EXECUTIVE BRANCH STATE CONTRACTORS AND PROSPECTIVE STATE CONTRACTORS OF CAMPAIGN CONTRIBUTION AND SOLICITATION BAN

This notice is provided under the authority of Connecticut General Statutes 9-612(g)(2), as amended by P.A. 07-1, and is for the purpose of informing state contractors and prospective state contractors of the following law (italicized words are defined below):

Campaign Contribution and Solicitation Ban

No state contractor, prospective state contractor, principal of a state contractor or principal of a prospective state contractor, with regard to a state contract or state contract solicitation with or from a state agency in the executive branch or a quasi-public agency or a holder, or principal of a holder of a valid prequalification certificate, shall make a contribution to, or solicit contributions on behalf of (i) an exploratory committee or candidate committee established by a candidate for nomination or election to the office of Governor, Lieutenant Governor, Attorney General, State Comptroller, Secretary of the State or State Treasurer, (ii) a political committee authorized to make contributions or expenditures to or for the benefit of such candidates, or (iii) a party committee;

In addition, no holder or principal of a holder of a valid prequalification certificate, shall make a contribution to, or solicit contributions on behalf of (i) an exploratory committee or candidate committee established by a candidate for nomination or election to the office of State senator or State representative, (ii) a political committee authorized to make contributions or expenditures to or for the benefit of such candidates, or (iii) a party committee.

Duty to Inform

State contractors and prospective state contractors are required to inform their principals of the above prohibitions, as applicable, and the possible penalties and other consequences of any violation thereof.

Penalties for Violations

Contributions or solicitations of contributions made in violation of the above prohibitions may result in the following civil and criminal penalties:

Civil penalties—\$2000 or twice the amount of the prohibited contribution, whichever is greater, against a principal or a contractor. Any state contractor or prospective state contractor which fails to make reasonable efforts to comply with the provisions requiring notice to its principals of these prohibitions and the possible consequences of their violations may also be subject to civil penalties of \$2000 or twice the amount of the prohibited contributions made by their principals.

Criminal penalties—Any knowing and willful violation of the prohibition is a Class D felony, which may subject the violator to imprisonment of not more than 5 years, or \$5000 in fines, or both.

Contract Consequences

Contributions made or solicited in violation of the above prohibitions may result, in the case of a state contractor, in the contract being voided.

Contributions made or solicited in violation of the above prohibitions, in the case of a prospective state contractor, shall result in the contract described in the state contract solicitation not being awarded to the prospective state contractor, unless the State Elections Enforcement Commission determines that mitigating circumstances exist concerning such violation.

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The State will not award any other state contract to anyone found in violation of the above prohibitions for a period of one year after the election for which such contribution is made or solicited, unless the State Elections Enforcement Commission determines that mitigating circumstances exist concerning such violation.

Additional information and the entire text of P.A 07-1 may be found on the website of the State Elections Enforcement Commission, www.ct.gov/seec. Click on the link to "State Contractor Contribution Ban."

Definitions:

"State contractor" means a person, business entity or nonprofit organization that enters into a state contract. Such person, business entity or nonprofit organization shall be deemed to be a state contractor until December thirty-first of the year in which such contract terminates. "State contractor" does not include a municipality or any other political subdivision of the state, including any entities or associations duly created by the municipality or political subdivision exclusively amongst themselves to further any purpose authorized by statute or charter, or an employee in the executive or legislative branch of state government or a quasi-public agency, whether in the classified or unclassified service and full or part-time, and only in such person's capacity as a state or quasi-public agency employee.

"Prospective state contractor" means a person, business entity or nonprofit organization that (i) submits a response to a state contract solicitation by the state, a state agency or a quasi-public agency, or a proposal in response to a request for proposals by the state, a state agency or a quasi-public agency, until the contract has been entered into, or (ii) holds a valid prequalification certificate issued by the Commissioner of Administrative Services under section 4a-100. "Prospective state contractor" does not include a municipality or any other political subdivision of the state, including any entities or associations duly created by the municipality or political subdivision exclusively amongst themselves to further any purpose authorized by statute or charter, or an employee in the executive or legislative branch of state government or a quasi-public agency, whether in the classified or unclassified service and full or part-time, and only in such person's capacity as a state or quasi-public agency employee.

"Principal of a state contractor or prospective state contractor" means (i) any individual who is a member of the board of directors of, or has an ownership interest of five per cent or more in, a state contractor or prospective state contractor, which is a business entity, except for an individual who is a member of the board of directors of a nonprofit organization, (ii) an individual who is employed by a state contractor or prospective state contractor, which is a business entity, as president, treasurer or executive vice president, (iii) an individual who is the chief executive officer of a state contractor or prospective state contractor, which is not a business entity, or if a state contractor or prospective state contractor has no such officer, then the officer who duly possesses comparable powers and duties, (iv) an officer or an employee of any state contractor or prospective state contractor who has *managerial or discretionary responsibilities with respect to a state contract*, (v) the spouse or a *dependent child* who is eighteen years of age or older of an individual described in this subparagraph, or (vi) a political committee established or controlled by an individual described in this subparagraph or the business entity or nonprofit organization that is the state contractor or prospective state contractor.

"State contract" means an agreement or contract with the state or any state agency or any quasi-public agency, let through a procurement process or otherwise, having a value of fifty thousand dollars or more, or a combination or series of such agreements or contracts having a value of one hundred thousand dollars or more in a calendar year, for (i) the rendition of services, (ii) the furnishing of any goods, material, supplies, equipment or any items of any kind, (iii) the construction, alteration or repair of any public building or public work, (iv) the acquisition, sale or lease of any land or building, (v) a licensing arrangement, or (vi) a grant, loan or loan guarantee. "State contract" does not include any agreement or contract with the state, any state agency or any quasi-public agency that is exclusively federally funded, an education loan or a loan to an individual for other than commercial purposes.

"State contract solicitation" means a request by a state agency or quasi-public agency, in whatever form issued, including, but not limited to, an invitation to bid, request for proposals, request for information or request for quotes, inviting bids, quotes or other types of submittals, through a competitive procurement process or another process authorized by law waiving competitive procurement.

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“Managerial or discretionary responsibilities with respect to a state contract” means having direct, extensive and substantive responsibilities with respect to the negotiation of the state contract and not peripheral, clerical or ministerial responsibilities.

“Dependent child” means a child residing in an individual’s household who may legally be claimed as a dependent on the federal income tax of such individual.

“Solicit” means (A) requesting that a contribution be made, (B) participating in any fund-raising activities for a candidate committee, exploratory committee, political committee or party committee, including, but not limited to, forwarding tickets to potential contributors, receiving contributions for transmission to any such committee or bundling contributions, (C) serving as chairperson, treasurer or deputy treasurer of any such committee, or (D) establishing a political committee for the sole purpose of soliciting or receiving contributions for any committee. Solicit does not include: (i) making a contribution that is otherwise permitted by Chapter 155 of the Connecticut General Statutes; (ii) informing any person of a position taken by a candidate for public office or a public official, (iii) notifying the person of any activities of, or contact information for, any candidate for public office; or (iv) serving as a member in any party committee or as an officer of such committee that is not otherwise prohibited in this section.

END OF INSTRUCTION TO BIDDERS

BID SUBMISSION
FOR
North Eagleville Road
Area Infrastructure
Phase II

UNIVERSITY OF CONNECTICUT
STORRS CAMPUS
Storrs, Connecticut

PROJECT NUMBER: #901954

UConn

UNIVERSITY OF CONNECTICUT

Proposal Submission Checklist

The following documents and information shall be submitted and included as your bid proposal. All documents must be submitted in a sealed envelope reflecting the submitting firm's name and address; addressed to CPCA attention to the appropriate purchasing agent, clearly stating the project name and project number. All required documents are to be included and executed in their original condition as issued.

- Ethics Forms 5 (if contract value is > \$50,000) and 6 (if contract value is > \$500,000).
- Bid Bond
- Fully executed Form of Proposal
- Copies of prequalification certificate and an updated statement as prescribed by Commissioner of Administrative Services for the State of Connecticut.
- How did you learn about this Project?
 - Hartford Courant
 - Waterbury Republican
 - Norwich Bulletin
 - DAS
 - CPCA Website
 - Other _____

Contractors Certification

By submitting a bid proposal, the bidder is attesting to the review, reading, understanding, and acceptance of the information and requirements of the project contained within the bid documents without exception. By submitting a bid proposal, the Bidder represents that they have examined the site, and accept the conditions under which the work will be performed and we have read, evaluated, understand, and accepted all the Contract Documents, including those documents provided for on the Disk, and their content in their entirety and have included all provisions necessary to accomplish all work according to the information and requirements prescribed therein without exception.

SUBMITTED BY:

Firm: _____

Date: _____

Address: _____

SUBMITTED BY: _____

Print Name: _____

Title: _____

Telephone: _____

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FORM OF PROPOSAL

University of Connecticut
Walt Dalia, Purchasing Agent II
Capital Project & Contract Administration
3 North Hillside Road, Unit 6047
Storrs, Connecticut 06269-6047

Dear Mr. Dalia:

1. In accordance with Connecticut General Statutes Sections 10a-109a through 10a-109y and pursuant to, and in compliance with your Invitation to Bid, the Notice and Instructions to Bidders, the Form of Contract, including the conditions thereto, the form of required bond, I (we) propose to furnish the labor and/or materials installed as required for the project named and numbered on the FORM OF PROPOSAL of this proposal to the extent of the Proposal submitted herein, furnishing all necessary equipment, machinery, tools, labor and other means of construction, and all materials specified in the manner and at the time prescribed strictly in accordance with the provisions of the Contract including specifications and/or drawings together with all addenda issued and received prior to the scheduled closing time for the receipt of the bids, and in conformity with requirements of the University of Connecticut and any laws or departmental regulations of the State of Connecticut or of the United States which may affect the same, for and in consideration of the price(s) stated on the said FORM OF PROPOSAL, hereof.

2. The Lump Sum Base Bid by me (us) on the FORM OF PROPOSAL includes all work indicated on the drawings and/or described in the specifications (including the furnishing and installing of all required materials, labor, equipment and allowances where applicable), except:
 - A. Work covered by Alternates as may be listed on the FORM OF PROPOSAL.
 - B. Contingent work covered by Unit Prices as may be listed on the FORM OF PROPOSAL.
 - C. Work covered by Options as may be listed on the FORM OF PROPOSAL.

3. This proposal is submitted subject to and in compliance with the foregoing and following conditions and/or information.
 - A. AWARD: All proposals shall be subject to the provisions and requirements of the Bid Documents and for purpose of award, consideration shall be given only to proposals submitted by qualified and responsible bidders.
 - B. COMMENCEMENT AND COMPLETION OF WORK: Contractor shall commence and complete the work in accordance with the requirements of the Contract Documents.
 - C. If the Contractor fails to complete the work within the time required by the Contract Documents, the University shall have the right to assess liquidated damages as provided in Paragraph 9.11 of the General Conditions.
 - D. CONTRACTORS INSURANCE REQUIRED:
 1. The limits of liability and coverages shall be those set forth in Article 11 of the General Conditions included with this bid package (or as previously executed with the on-call trade contract).
 - E. REQUIRED PERCENTAGES OF WORK AND SET-ASIDES

FORM OF PROPOSAL

- .1 If awarded this contract, we (I) as the General Contractor on this Project shall be required to perform not less than 10% of the completed dollar value of the Work with its own forces.
- .2 We (I) as the General Contractor on this project shall award not less than 25% of the total Contract Price to subcontractors who are certified and eligible to participate under the State of Connecticut Small Business Set Aside Program, of which 6.25% (of the total Contract) must be awarded to Women Owned or Minority Businesses. This requirement must be met even if the General Contractor is certified and eligible to participate in the Small Business Set Aside Program. To facilitate compliance with this requirement for set aside subcontractors, submit a list of certified set aside contractors to be used on this project along with the dollar amounts to be paid to each, on the form provided, and a copy of their current certification must be attached. This information will be considered as part of your bid proposal and failure to comply with any portion of this requirement, including but not limited to failure to list or meet the necessary dollar amount of percentage of the bid price will be cause to reject your bid.

F. NONDISCRIMINATION & LABOR RECRUITMENT:

We (I) agree that the Contract awarded for this project shall be subject to the Executive Orders No. Three and Seventeen, promulgated June 16, 1971 and February 15, 1973 respectively and to the Guidelines and Rules of the State Labor Department implementing Executive Order No. Three and further agree to submit reports of Compliance Staffing on Labor Department Form E.O.3-1, when and as requested.

G. FEDERAL & STATE WAGE DETERMINATIONS AND PRICING CONSIDERATION:

- .1 Each contractor who is awarded a contract on or after October 1, 2002 shall be subject to provisions of the Connecticut General Statutes, Section 31-53 as amended by Public Act 02-69, "An Act Concerning Annual Adjustments to Prevailing Wages".
- .2 In determining bid price, consideration should be given to Section 31-53 of the General Statutes of Connecticut as amended by Public Act 02-69, "An Act Concerning Annual Adjustments to Prevailing Wages". Such prevailing wage adjustment will not be considered a basis for an annual contract adjustment.
- .3 The State of Connecticut Labor Department Wage Schedule where required, shall be provided with these documents, typically with the Bidders' Convenience Package, or will be incorporated in the Contract Documents as an Addendum. At the time of bidding, the bidder agrees to accept the current prevailing wage scale, as well as any annual adjustment to the prevailing wage scale, as provided by the Connecticut Department of Labor. Wage Rates will be posted each July 1st on the Department of Labor website: www.ctdol.state.ct.us . Such prevailing wage adjustment will not be considered a basis for an annual contract amendment.

H. CERTIFICATION OF BIDDER REGARDING EQUAL EMPLOYMENT OPPORTUNITY & NON-SEGREGATED FACILITIES:

We (I) acknowledge that we (I) and our subcontractors are obligated to fill out the forms provided by the University of Connecticut Office of Capital Project and Contract Administration and to agree to certify to the compliance of non-segregated facilities.

FORM OF PROPOSAL

I. NOTICE TO EXECUTIVE BRANCH STATE CONTRACTORS AND PROSPECTIVE STATE CONTRACTORS OR CAMPAIGN CONTRIBUTION AND SOLICITATION BAN.

With regard to a State contract as defined in P.A. 07-1 having a value in a contract year of \$50,000 or more or a combination or series of such agreements or contracts having a value of \$100,000 or more, the authorized signatory to this submission in response to the State's solicitation expressly acknowledges receipt of the State Elections Enforcement Commission's notice advertising prospective principals of the contents of the notice. See Attachment SEEC Form 11.

4. ACCOMPANYING THIS PROPOSAL IS:

A. A CERTIFIED CHECK drawn to the order of the University of Connecticut in the amount of 10% of the Bid, i.e.:

_____ DOLLARS \$ _____

and drawn on the _____
(STATE BANK & TRUST COMPANY)

_____ located at _____
(A NATIONAL BANKING ASSOCIATION) (CITY & STATE)

which is understood shall be cashed and the proceeds thereof used so far as may be necessary to reimburse the State of Connecticut for losses and damages arising by virtue of my (our) failure to file the required Bonds and execute the required contract in this proposal as accepted by the University of Connecticut.

OR;

B. A BID BOND having as surety thereto a Surety Company for Companies authorized to transact business in the State of Connecticut and made out in the penal sum of 10% of the bid, (Bids \$50,000 and greater) i.e.:

_____ DOLLARS \$ _____

If the bidder is a joint venture, the Bid Bond shall specifically identify and include each joint venturer as a principal.

C. If the bidder is a joint venture, a copy of the executed Joint Venture Agreement shall be submitted along with the bid materials.

5. We (I), the undersigned, hereby declare that I am (we are) the only person(s) interested in the proposal and that it is without any connection with any other person making any bid for the same work. No person acting for, or employed by, the State of Connecticut is directly interested in this proposal, or in any contract which may be made under it, or in expected profits to arise therefrom. This proposal is made without directly or indirectly influencing or attempting to influence any other person or corporation to bid or refrain from bidding or to influence the amount of the bid of any other person or corporation. This proposal is made in good faith without collusion or connection with any other person bidding for the same work and this proposal is made with distinct reference and relation to the plans and specifications prepared for this Contract. I (We) further declare that in regard to the conditions affecting the work to be done and the labor

FORM OF PROPOSAL

and materials needed, this proposal is based solely on my (our) investigation and research and not in reliance upon any representations of any employee, officer or agent of the State.

6. Each class of work set forth in a separate Section of the Specifications and designated as a subtrade in Item 2A of the proposal pages shall be the matter of a subcontract made in accordance with the procedures set forth in the Bid and Contract Documents.
7. The undersigned agrees that, if selected as General Contractor, he shall, within ten (10) days, Saturdays, Sundays and legal holidays excluded, after presentation thereof by the University of Connecticut, execute a contract in accordance with the terms of this general bid.
8. The undersigned agrees and warrants that he has made good faith efforts to employ minority business enterprises as subcontractors and suppliers of materials under such contract and shall provide the Commission on Human Rights and Opportunities with such information as is requested by the Commission concerning his employment practices and procedures as they relate to the provisions of the Connecticut General Statutes governing contract requirements.
9. The undersigned acknowledges that should their submitted Form of Proposal fail to have included a copy of your firms prequalification certificate and an updated statement accompany their bid submission, that their bid will be invalid and considered non-responsive. Per CGS 4b-91 amended.

**UNIVERSITY OF CONNECTICUT
NORTH EAGLEVILLE ROAD AREA INFRASTRUCTURE PHASE II
#901954**

FORM OF PROPOSAL

A. STANDARD BID BOND:

NOW ALL MEN BY THESE PRESENTS,

That we, _____ hereinafter called the principal, of _____, as principal, and _____, hereinafter called the Surety, a corporation organized and existing under the laws of the State of _____, and duly authorized to transact a surety business in the State of Connecticut, as Surety, are held and firmly bound unto the State of Connecticut, as obligee, in the penal sum of ten (10) percent of the amount of the bid set forth in a proposal hereinafter mentioned, _____, in lawful money of the United States of America, for the payment of which sum, well and truly to be made to the Obligee, the Principal and the Surety bind, themselves, their heirs, executors, administrators, successors and assigns, jointly and severally, firmly by these presents.

THE CONDITION OF THIS OBLIGATION IS SUCH,

That, whereas the Principal has submitted or is about to submit a proposal the other obligee related to a contract for the Project Referenced above.

NOW, THEREFORE, if the said contract be awarded to the Principal and the Principal shall, within such time as may be specified, enter in the said contract in writing with the State of Connecticut and give the required bonds, with surety acceptable to the Obligee, or if the Principal shall fail to do so, pay to Obligee the damages which the Obligee may suffer by reason of such failure not exceeding the penal sum of this bond, then this obligation shall be void, otherwise to remain in full force and effect.

SIGNED, SEALED AND DATED this _____ day of _____, 20__

_____ Witness	_____ Surety	_____ Witness	_____ Principal
	_____ Title		_____ Title

B. The undersigned proposes to furnish all labor and material required for:

**NORTH EAGLEVILLE ROAD AREA INFRASTRUCTURE PHASE II
#901954**

**University of Connecticut
Storrs, CT**

in accordance with the accompanying Drawings and Specifications prepared by:

AECOM

The Contract Price specified below subject to additions and deductions according to the terms of the Contract Documents.

C. BID CLARIFICATIONS:

The undersigned acknowledges receipt of the following Bid Clarifications issued during the bidding period and has included all changes therein in the above base bid amount.

Clarifications/Addenda # _____, Dated _____
Clarifications/Addenda # _____, Dated _____
Clarifications/Addenda # _____, Dated _____
Clarifications/Addenda # _____, Dated _____

D. PROPOSED BASE CONTRACT PRICE:

Having carefully examined the Bid Documents for the above reference project, and having visited the project site and examined all conditions affecting the work, the undersigned, upon written notice of award of contract, agrees to provide all labor, supervision, materials, tools, construction equipment, services, safety, insurance, bonds, and to pay all applicable taxes, and other costs necessary or required to complete the Work of this Bid in full accordance with all Bid Documents and within the required timeframe as indicated by the proposed schedule for the Lump Sum Bid of:

_____ **US Dollars**

(\$ _____) (which incorporates all allowances as may be listed in the plans and specifications)

(Show the amount in both words and figures. In case of discrepancy, amount shown in words will govern.)

The University reserves the right to elect to implement some, all or none of the Alternates and/or Options set forth in the Proposal forms, as may be in the best interest of the University. The low Bid shall be determined by taking the Base Price set forth in the Proposal form as selected by the University, plus the Alternates and/or Options selected by the University.

E. SCHEDULE OF ALTERNATES:

Provide Alternate Prices which reflect the work of the bid package under which this bid proposal was submitted and shall remain **valid for the life of the project** and include **all costs** for a complete installation. All pricing is inclusive of all costs of wages, applicable taxes, benefits, and applicable insurance. The Prices herein shall remain valid for the life of the project and include all costs for a complete installation. Alternate prices are good for both adds and deducts.

Alternate No. 1 : Steam Vault Manhole Covers

- 1. Base Bid: The base bid includes Steam Vault manhole frames and covers manufactured of cast iron as specified in Section 03420 2.02.**
- 2. Alternate: The alternate bid includes Steam Vault watertight manhole frames and covers manufactured of fiberglass as specified in Section 03420 2.03.**

Add/Deduct (circle one): \$ _____

Alternate No. 2 : Steam Vault Waterproofing System

- 1. Base Bid: The base bid includes Steam Vault bituminous waterproofing system as specified in Section 03420 2.04.**
- 2. Alternate 2A: The alternate bid includes Steam Vault HDPE Membrane waterproofing system as specified in Section 03420 2.05.**

2A - Add/Deduct (circle one): \$ _____

- 3. Alternate 2B: The alternate bid includes Steam Vault Bentonite membrane waterproofing system as specified in Section 03420 2.06.**

2B - Add/Deduct (circle one): \$ _____

END OF ALTERNATES

F. SCHEDULE OF UNIT PRICES:

All rates are inclusive of all costs of wages, applicable taxes, benefits, applicable insurance. The rates provided will be negotiated and included as part of the contract and of your subcontracts. The Unit Prices herein shall remain valid for the life of the project and include all costs for a complete installation. Unit prices are good for both adds and deducts.

Unit Price 1: "Removal Of Unsatisfactory Soil And Replacement With Satisfactory Soil Material"

Description: Unsatisfactory soil excavation and disposal off site and replacement with satisfactory fill material or engineered fill from off site, as required, according to Section 02221 "Trench Excavation, Backfilling and Compaction". Replacement materials shall be "Compacted Granular Fill" in accordance with Section 02234.

Per Cubic Yard: \$ _____ (See Allowance #1 – 500 cubic yards are to be carried in Base Bid)

Unit Price No. 2: "Rock Excavation And Replacement With Satisfactory Soil Material"

Description: Classified rock excavation and disposal off site and replacement with satisfactory fill material or engineered fill from off site, as required, according to Section 02221 "Trench Excavation, Backfilling and Compaction". Replacement materials shall be "Compacted Granular Fill" in accordance with Section 02234.

Per Cubic Yard: \$ _____ (See Allowance #2 – 500 cubic yards are to be carried in Base Bid)

Unit Price No. 3: "Turf Establishment By Means Of Sodding"

Description: Turf establishment by means of sodding, if requested by the Owner, according to Section 02936 "Turfs And Grasses".

Per Square Yard: \$ _____ (See Allowance #3 – 7,500 square yards are to be carried in Base Bid)

Unit Price No. 4: "Concrete Walkway"

Description: Replacement of concrete walkways beyond the limits of work identified on the Contract Drawings, if requested by the Owner, according to Section 02511 "Concrete Walkway". Price includes removal and disposal of existing concrete walkways to be replaced. Concrete walkway details shall be in accordance with the concrete sidewalk details on Sheet C-27.

Per Square Yard: \$ _____ (See Allowance #6 – 100 square yards are to be carried in Base Bid)

Unit Price No. 5: "Process Aggregate Base"

Description: Replacement of process aggregate base beyond the limits of the Contract Drawings, if requested by the Owner, according to Section 02235 "Process Aggregate Base".

Per Cubic Yard: \$ _____ (See Allowance #7 – 100 cubic yards are to be carried in Base Bid)

Unit Price No. 6: “Bituminous Pavement”

Description: Replacement of bituminous pavement beyond the limits of the Contract Drawings, if requested by the Owner, according to Section 02500 “Bituminous Concrete”. Price includes removal and disposal of existing bituminous pavement to be replaced. Pavement section shall be in accordance with permanent trench pavement detail for Town Roads on Sheet C-27.

Per Square Yard: \$_____ (See Allowance #8 – 500 square yards are to be carried in Base Bid)

Unit Price No. 7: “Mulch”

Description: Placement of mulch beyond the limits of the Contract Drawings, if requested by the Owner, according to Section 02938 “Planting”. Price includes edging, removal and disposal of turf in the area of mulch placement.

Per Square Yard: \$_____ (See Allowance #9 – 50 square yards are to be carried in Base Bid)

End of Unit Prices

G. SCHEDULE OF LABOR RATES:

The following are hourly wage rates for all tradesmen associated with this project for performing extra work. These rates are fully loaded (including benefits, applicable taxes, and worker compensation insurance) and are in accordance with the prevailing wages of the trade having jurisdiction in areas where the work is performed. The wage rates shall be valid for the life of the project. ***NOTE: Further, no mark-up shall be allowed on the premium time portion of the wage rate. At the request of the University, the Contractor will submit labor rate summary sheets, which justify all submitted labor rates. All rates are subject to thorough analysis and subject to reduction if deemed inaccurate by The University of Connecticut.***

TRADE: _____

Attachments: Y / N

Submit one sheet for each Labor Trade (Division) used on project. Copy as needed.

<u>Foreman</u>	Straight <u>Time</u>	Time and <u>One Half</u>	Double <u>Time</u>
_____	\$ _____	\$ _____	\$ _____
_____	\$ _____	\$ _____	\$ _____
_____	\$ _____	\$ _____	\$ _____
_____	\$ _____	\$ _____	\$ _____

<u>Journeyman</u>	Straight <u>Time</u>	Time and <u>One Half</u>	Double <u>Time</u>
_____	\$ _____	\$ _____	\$ _____
_____	\$ _____	\$ _____	\$ _____
_____	\$ _____	\$ _____	\$ _____
_____	\$ _____	\$ _____	\$ _____

<u>Apprentice</u>	Straight <u>Time</u>	Time and <u>One Half</u>	Double <u>Time</u>
_____	\$ _____	\$ _____	\$ _____
_____	\$ _____	\$ _____	\$ _____
_____	\$ _____	\$ _____	\$ _____
_____	\$ _____	\$ _____	\$ _____
_____	\$ _____	\$ _____	\$ _____

<u>Laborer</u>	Straight <u>Time</u>	Time and <u>One Half</u>	Double <u>Time</u>
_____	\$ _____	\$ _____	\$ _____
_____	\$ _____	\$ _____	\$ _____
_____	\$ _____	\$ _____	\$ _____
_____	\$ _____	\$ _____	\$ _____
_____	\$ _____	\$ _____	\$ _____

End Labor Rates

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H. SCHEDULE OF VALUES:

The undersigned agrees that the Schedule of Values submitted with this Bid is a true representation of the distribution of the costs of this project and equals the Stipulated Sum shown above. The Schedule of Values is an integral part of this proposal. Please indicate N/A for those divisions of work not applicable. The costs provided below include the complete cost for furnishing and installing of materials, labor, and equipment required to provide the complete scope of work for each specified division (includes the costs of applicable taxes, insurance, bonds, overhead, profit, small tools, travel, parking, supervision, etc.). The "TOTAL" price must equal your total lump sum bid proposal.

Division	Group	
01	General Conditions	\$
02	Existing Conditions	\$
03	Concrete	\$
04	Masonry	\$
05	Metals	\$
06	Wood, Plastics, Composites	\$
07	Thermal & Moisture Protection	\$
08	Openings	\$
09	Finishes	\$
10	Specialties	\$
11	Equipment	\$
12	Furnishings	\$
13	Special Construction	\$
14	Conveying Equipment	\$
*21	Fire Suppression	\$
22	Plumbing	\$
*23	HVAC Heating, Ventilating, Air Conditioning	\$
25	Integrated Automation	\$
26	Electrical	\$
27	Communications	\$
28	Electronic Safety and Security	\$
*31	Earthwork	\$
32	Exterior Improvements	\$
33	Utilities	\$
34	Transportation	\$
35	Waterway and Marine Construction	\$
*40	Process Integration	\$
41	Material Process & Handling Equipment	\$
42	Process Heating, Cooling & Drying Equipment	\$
43	Process Gas & Liquid Handling, Purification & Storage Eqmt.	\$
44	Pollution & Waste Control Equipment	\$
45	Industry Specific Manufacturing Equipment	\$
46	Water & Wastewater Equipment	\$
*48	Electrical Power Generation	\$
Insurance		\$
Bonds		\$
Allowances	(where applicable)	\$
TOTAL		\$

*Gap in numerical sequence, reserved for future expansion

FORM OF PROPOSAL

I. The subdivision of Work in the proposed Contract Price is as follows:

ITEM 1 WORK BY GENERAL CONTRACTOR:

For all work other than that to be done by subcontractors included in Item 2A and Item 2B.

\$ _____ **(ITEM 1)**

Note: In accordance with paragraph 3.E.1 this amount, together with work by the general contractor as listed in Item 2A below, must be at least 10% of the total bid price.

ITEM 2A WORK BY SUBCONTRACTORS NAMED:

Subcontractors and prices for the following trades must be listed (if such prices exceed \$25,000). However, the general bidder may list himself together with his price if he customarily performs any of the trades specified. If the general contractor requires a performance and/or labor & material payment bond then the general contractor must indicate below which of the subcontractors are subject to this requirement. The amount (%) shall not exceed the subcontractor's price listed below.

DESCRIPTION	NAME OF SUBCONTRACTOR	DOLLAR AMOUNT	LABOR & MATERIAL BOND	PERFORMANCE BOND
MASONRY				
ELECTRICAL				
MECHANICAL WITHOUT HVAC				
HVAC				

A copy of the executed agreement between the successful bidder and the named subcontractors above must be presented to the Office of CPCA at time of contract signing. The contract may not be executed until copies of executed agreements are received by CPCA.

ITEM 2B WORK BY SUBCONTRACTORS NOT NAMED:

\$ _____
(INCLUDES ALL SUBCONTRACT WORK NOT LISTED IN ITEM 2A)

The undersigned agrees that each of the subcontractors listed on this FORM OF PROPOSAL will be used for the work indicated at the amount stated, unless a substitution is permitted by the University.

J. SET-ASIDE CONTRACTOR SCHEDULE

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In accordance with Section 5.2 of our Notice and Instructions to Bidders, it is a requirement to list below the names of each currently certified set aside contractor anticipated to be used for this project, along with the dollar amount to be paid each contractor.

The responsibility for listing a qualified and certified set aside contractor, Women Owned Businesses or Minority Businesses, rests solely with the proposer and not the State. **We acknowledge that listing a subcontractor who does not qualify shall be considered the same as not listing one at all and the proposal may be considered non-responsive and subject to rejection.**

<u>Name</u>	<u>Address</u>	<u>Amount</u>
_____	_____	_____
_____	_____	_____
_____	_____	_____
_____	_____	_____

The amount is NOT LESS THAN 25% of the proposed base contract price as stated on the Form of Proposal, Section D.

**CERTIFICATE OF ELIGIBILITY HAS BEEN OBTAINED THROUGH THE FOLLOWING WEBSITE;
<https://www.biznet.ct.gov/SupplierDiversity/SDSearch.aspx>
FOR EACH OF THE NAMED CONTRACTORS AND IS BEING SUBMITTED WITH THIS FORM.**

The Undersigned agrees that each of the subcontractors listed on the proposal form will be used for the work indicated at the amount stated, unless a substitution is permitted by the awarding authority.

Authorized Signature

Title

Company Name

K. BIDDER CONTRACT COMPLIANCE MONITORING REPORT

PART I - Bidder Information

Company Name Street Address City & State Chief Executive	Bidder Federal Employer Identification Number _____ Or Social Security Number _____
Major Business Activity (brief description)	Bidder Identification (response optional/definitions in Instruction to Bidders page 18) -Bidder is a small contractor. Yes__ No__ -Bidder is a minority business enterprise Yes__ No__ (If yes, check ownership category) Black__ Hispanic__ Asian American__ American Indian/Alaskan Native ____ Iberian Peninsula__ Individual(s) with a Physical Disability__ Female__
Bidder Parent Company(If any)	-Bidder is certified as above by State of CT Yes__ No__ -
Other Locations in Ct. (If any)	DAS Certification Number _____

PART II - Bidder Nondiscrimination Policies and Procedures

<p>1. Does your company have a written Affirmative Action/Equal Employment Opportunity statement posted on company bulletin boards? Yes__ No__</p>	<p>7. Do all of your company contracts and purchase orders contain non-discrimination statements as required by Sections 4a-60 & 4a-60a Conn. Gen. Stat.? Yes__ No__</p>
<p>2. Does your company have the state-mandated sexual harassment prevention in the workplace policy posted on company bulletin boards? Yes__ No__</p>	<p>8. Do you, upon request, provide reasonable accommodation to employees, or applicants for employment, who have physical or mental disability? Yes__ No__</p>
<p>3. Do you notify all recruitment sources in writing of your company's Affirmative Action/Equal Employment Opportunity employment policy? Yes__ No__</p>	<p>9. Does your company have a mandatory retirement age for all employees? Yes__ No__</p>
<p>4. Do your company advertisements contain a written statement that you are an Affirmative Action/Equal Opportunity Employer? Yes__ No__</p>	<p>10. If your company has 50 or more employees, have you provided at least two (2) hours of sexual harassment training to all of your supervisors? Yes__ No__ NA__</p>
<p>5. Do you notify the Ct. State Employment Service of all employment openings with your company? Yes__ No__</p>	<p>11. If your company has apprenticeship programs, do they meet the Affirmative Action/Equal Employment Opportunity requirements of the apprenticeship standards of the Ct. Dept. of Labor? Yes__ No__ NA__</p>
<p>6. Does your company have a collective bargaining agreement with workers? Yes__ No__ 6a. If yes, do the collective bargaining agreements contain non-discrimination clauses covering all workers? Yes__ No__ 6b. Have you notified each union in writing of your commitments under the nondiscrimination requirements of contracts with the state of Ct? Yes__ No__</p>	<p>12. Does your company have a written affirmative action Plan? If no, please explain. Yes__ No__</p>
	<p>13. Is there a person in your company who is responsible for equal employment opportunity? Yes__ No__ If yes, give name and phone number. _____ _____ _____</p>

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Part III - Bidder Subcontracting Practices

1. Will the work of this contract include subcontractors or suppliers? Yes__ No__
 1a. If yes, please list all subcontractors and suppliers and report if they are a small contractor and/or a minority business enterprise as defined on page 1 / use additional sheet if necessary)
 1b. Will the work of this contract require additional subcontractors or suppliers other than those identified in 1a? Yes__ No__

Part IV – Bidder Employment Information

Date:

JOB CATEGORY	OVERALL TOTALS	WHITE (not of Hispanic origin)		BLACK (not of Hispanic origin)		HISPANIC		ASIAN or PACIFIC ISLANDER		AMERICAN INDIAN or ALASKAN NATIVE	
		Male	Female	Male	Female	Male	Female	Male	Female	Male	Female
Management											
Business & Financial Ops											
Computer Specialists											
Architecture/Engineering											
Office & Admin Support											
Bldg/ Grounds Cleaning/Maintenance											
Construction & Extraction											
Installation, Maintenance & Repair											
Material Moving Workers											
TOTALS ABOVE											
Total One Year Ago											
FORMAL ON THE JOB TRAINEES (ENTER FIGURES FOR THE SAME CATEGORIES AS ARE SHOWN ABOVE)											
Apprentices											
Trainees											

PART V - Bidder Hiring and Recruitment Practices

1. Which of the following recruitment sources are used by you? (check yes or not and report percent used)				2. Check (x) any of the below listed requirements that you use as a hiring qualification		3. Describe below any other practices or actions that you take which show that you hire, train, and promote employees without discrimination?
SOURCE	YES	NO	% of applicants provided by source	(x)		
State Employment Service					Work Experience	
Private Employment Agencies					Ability To Speak Or Write English	
Schools And Colleges					Written Tests	
Newspaper Advertisements					High School Diploma	
Walk Ins					College Degree	
Present Employees					Union Membership	
Labor Organizations					Personal Recommendations	
Minority/Community Organizations					Height Or Weight	
Others Please Identify					Car Ownership	
					Arrest Record	
					Wage Garnishments	

Certification (Read this form and check your statements on it CAREFULLY before signing).

I certify that the statements made by me on this BIDDER CONTRACT COMPLIANCE MONITORING REPORT are complete and true to the best of my knowledge and belief, and are made in good faith. I understand that if I knowingly make any misstatements of facts, I am subject to be declared in non-compliance with Section 4a-60, 4a-60a, and related sections of the CONN. GEN. SAT.

 Signature)

 (Date Signed)

 (Title)

 (Telephone)

Connecticut Economic Impact Form

This form is intended to gather general Connecticut economic impact information from prospective suppliers. This form shall be updated with each solicitation. This form is for informational gathering purposes only and will not be used in the evaluation of a prospective supplier's qualifications.

Date: _____

Company Name: _____

Location (City, State) of Principal Place of Business: _____

Date Registered to do Business in Connecticut: _____

Number of Connecticut Locations: _____

Number of Connecticut Employees: _____

Annual Payroll Paid to Connecticut State Residents: _____

Annual Taxes, Licenses, Fees Paid to Connecticut (this may be payroll, franchise, service taxes, etc.): _____

Annual Rent Paid within Connecticut or value of Real Property: _____

Annual Utilities Paid within Connecticut: _____

Amount paid to Major partners or suppliers in Connecticut: _____

CODE OF CONDUCT FOR UNIVERSITY OF CONNECTICUT VENDORS

The University of Connecticut (“UConn”) has a longstanding commitment to the protection and advancement of socially responsible practices that reflect respect for fundamental human rights and the dignity of all people. UConn strives to promote basic human rights and appropriate labor standards for all people throughout its supply chain. Promoting these values in concrete practice is the central charge of the President’s Committee on Corporate Social Responsibility (<http://csr.uconn.edu/>).

UConn is also committed to building a safe, healthy and sustainable environment through the conservation of natural resources, increasing its use of environmentally responsible products, materials and services (including renewable resources), and preventing pollution and minimizing waste through reduction, reuse and recycling. UConn is proactive about purchasing products that have these environmental attributes or meet recognized environmental standards, when practicable, and buying from entities committed to the support of campus sustainability goals. The University seeks to partner and contract with vendors that demonstrate a similar commitment to these values. Selected vendors may be required to provide a comprehensive summary report of their corporate social and environmental practices.

Principal Expectations

The principal expectations set forth below reflect the minimal standards UConn’s vendors are required to meet.

Nondiscrimination. It is expected that vendors will not discriminate in hiring, employment, salary, benefits, advancement, discipline, termination or retirement on the basis of race, color, religion, gender, nationality, ethnicity, alienage, age, disability or marital status, and will comply with all federal nondiscrimination laws and state nondiscrimination laws¹, including Chapter 814c of the Connecticut General Statutes (Human Rights and Opportunities), as applicable, and further will provide equal employment opportunity irrespective of such characteristics, including complying, if applicable, with Federal Executive Order 1124b, and the Rehabilitation Act of 1973.

Freedom of Association and Collective Bargaining. It is expected that vendors will respect their employees’ rights of free association and collective bargaining, including, if applicable, complying with the National Labor Relations Act, and, if applicable, Chapters 561 and 562 of the Connecticut General Statutes (Labor Relations Act, Labor Disputes) and Chapters 67 and 68 of the Connecticut General Statutes (State Personnel Act, Collective Bargaining for State Employees).

Labor Standard Regarding Wages, Hours, Leaves and Child Labor. It is expected that vendors will respect their employees’ rights regarding minimum and prevailing wages, payment of wages, maximum hours and overtime, legally mandated family, child birth and medical leaves, and return to work thereafter, and limitations on child labor, including, if applicable, the

¹ Wherever this code refers to compliance with federal or state laws, that term includes compliance with any regulations duly promulgated pursuant to such laws.

rights set forth in the Federal Fair Labor Standards Act, the Federal Family and Medical Leave Act, the Federal Davis-Bacon Act and Chapters 557 and 558 of the Connecticut General Statutes (Employment Regulation, Wages).

Health and Safety. It is expected that vendors will provide safe and healthful working and training environments in order to prevent accidents and injury to health, including reproductive health, arising out of or related to or occurring during the course of the work vendors perform or resulting from the operation of vendors' facilities. Accordingly, it is expected that vendors and their subcontractors will perform work pursuant to UConn contracts in compliance with, as applicable, the Federal Occupational Safety and Health Act and Chapter 571 of the Connecticut General Statutes (Occupational Safety and Health Act).

Forced Labor. It is expected that vendors will not use or purchase supplies or materials that are produced using any illegal form of forced labor.

Harassment or Abuse. It is expected that vendors will treat all employees with dignity and respect, and that no employee will be subjected to any physical, sexual, psychological or verbal abuse or harassment. It is further expected that vendors will not use or tolerate the use of any form of corporal punishment.

Environmental Compliance. It is expected that vendors will comply with all applicable federal and state environmental laws and Executive Orders, including but not limited to Titles 22a and 25 of the Connecticut General Statutes (Environmental Protection and Water Resources protection) and Executive Order 14 (concerning safe cleaning products and services). UConn expects vendors will employ environmentally responsible practices in the provision of their products and services.

Preferential Standards

The preferential standards set forth below reflect UConn's core values. UConn will seek to uphold these values by considering them as relevant factors in selecting vendors.

Living Wages. UConn recognizes and affirms that reasonable living wages are vital to ensuring that the essential needs of employees and their families can be met, and that such needs include basic food, shelter, clothing, health care, education and transportation. UConn seeks to do business with vendors that provide living wages so as to meet these basic needs, and further recognizes that compensation may need to be periodically adjusted to ensure maintenance of such living wages. Vendors are encouraged to demonstrate that they pay such living wages.

International Human Rights. For UConn, respect for human rights is a core value. UConn seeks to do business with vendors who do not contribute to or benefit from systemic violations of recognized international human rights and labor standards, as exemplified by the Universal Declaration of Human Rights.

Foreign Law. UConn encourages vendors and vendors' suppliers operating under foreign law to comply with those foreign laws that address the subject matters of this code, provided such foreign laws are consistent with this code. Vendors and their suppliers operating under foreign law are similarly encouraged to comply with the provisions of this code to the extent they can do so without violating the foreign law(s) they operate under.

Environmental Sustainability. UConn will prefer products and services that conserve resources, save energy and use safer chemicals, such as recycled, recyclable, reusable, energy efficient, carbon-neutral, organic, biodegradable or plant-based, in addition to products that are durable and easily repairable, and that meet relevant certification standards above and beyond those required by law. While UConn is not legally bound to comply with Connecticut General Statutes 4a-67a through 4a-67h concerning environmental sustainability standards in purchasing, it will nevertheless consider vendors' ability to meet those standards in rendering its purchasing decisions. Vendors are encouraged to demonstrate their commitment to environmental sustainability.

Compliance Procedures

Anyone who believes a vendor doing business with UConn has not complied or is not complying with this code may report such concerns to UConn's Office of Audit, Compliance and Ethics (OACE) at 1-888-685-2637 or <https://www.compliance-helpline.com>.

OACE has the authority to investigate such matters, and if warranted, recommend remedial action to the UConn administration.

Please review the material listed and per the signature of the authorized Company Official, all Expectations, Standards, and Procedures listed above will be in compliance in regards to this Contract.

Name of Company

Signature of Authorized Company Official

Date

L. PROPOSER'S QUALIFICATION/RESPONSIBILITY STATEMENT

The Proposer shall have already completed and submitted the Questionnaire and other submission required by the University in its Invitation to Pre-Qualify, regarding the Proposer's qualifications. If changed circumstances arising since the initial submission, or other facts have occurred which would result in a material change to any of the Proposer's initial responses or submissions, the Proposer shall provide any such supplementary, or revised information at this time, along with its Proposal.

1. State, identify any such changed circumstances or other facts and provide any such supplementary or revised information as described above, identifying specifically, by number and content, each prior question, response to the Questionnaire, or information changed, supplemented or revised. (Attach a separate sheet if necessary)

2. State "NONE" if there are no changes to be made. _____

Please note that if the end date of the time period covered by the information submitted during your pre-qualification is three or more months old, please provide current financial documentation demonstrating that your present financial position has remained the same, or showing and identifying any changes in any way, in relation to the audited financial statement you submitted with your pre-qualified application on this proposal.

Dated at	this	day of	20
Name of Organization:			
Signature:			
Print Name:			
Title:			
<u>Notary Statement:</u>			
Mr./Mrs./Ms.		being duly sworn deposes and says that he/she	
is the	of	and that the	
(Position or Title)		(Firm Name)	
answers to the foregoing questions and all statements therein contained are true and correct.			
Subscribed and sworn to before me this		day of	20
Notary Public:			
My Commission Expires:		20	

FORM OF PROPOSAL

M. ETHICS FORMS - A duly authorized representative of the company must sign these forms

- √ **These forms must be notarized and clearly show notary seal or acknowledged by a Commissioner of the Superior Court.**
- √ ALL REQUIRED forms, **must be completed, signed and returned** by the bidder/proposer as part of the bid/proposal/RFQ response package.
- √ Failure to submit ALL REQUIRED forms constitutes grounds for rejection of your bid/proposal/RFQ.
- √ If it is determined by the University of Connecticut and/or State of Connecticut that **any information requested was not referenced and submitted** with this bid/proposal/RFQ/LOI, and then such determination **will be just cause for disqualification of the bid/proposal/RFQ.**

OPM Ethics Form 5
Rev. 10-01-11



**STATE OF CONNECTICUT
CONSULTING AGREEMENT AFFIDAVIT**

Affidavit to accompany a bid or proposal for the purchase of goods and services with a value of \$50,000 or more in a calendar or fiscal year, pursuant to Connecticut General Statutes §§ 4a-81(a) and 4a-81(b). For sole source or no bid contracts the form is submitted at time of contract execution.

INSTRUCTIONS:

If the bidder or vendor has entered into a consulting agreement, as defined by Connecticut General Statutes § 4a-81(b)(1): Complete all sections of the form. If the bidder or contractor has entered into more than one such consulting agreement, use a separate form for each agreement. Sign and date the form in the presence of a Commissioner of the Superior Court or Notary Public. **If the bidder or contractor has not entered into a consulting agreement, as defined by Connecticut General Statutes § 4a-81(b)(1):** Complete only the shaded section of the form. Sign and date the form in the presence of a Commissioner of the Superior Court or Notary Public.

Submit completed form to the awarding State agency with bid or proposal. For a sole source award, submit completed form to the awarding State agency at the time of contract execution.

This affidavit must be amended if there is any change in the information contained in the most recently filed affidavit not later than (i) thirty days after the effective date of any such change or (ii) upon the submittal of any new bid or proposal, whichever is earlier.

AFFIDAVIT: [Number of Affidavits Sworn and Subscribed On This Day: _____]

I, the undersigned, hereby swear that I am a principal or key personnel of the bidder or contractor awarded a contract, as described in Connecticut General Statutes § 4a-81(b), or that I am the individual awarded such a contract who is authorized to execute such contract. I further swear that I have not entered into any consulting agreement in connection with such contract, **except for the agreement listed below:**

_____ Consultant's Name and Title		_____ Name of Firm (if applicable)
_____ Start Date	_____ End Date	_____ Cost
Description of Services Provided: _____		

Is the consultant a former State employee or former public official? YES NO

If YES: _____
Name of Former State Agency Termination Date of Employment

Sworn as true to the best of my knowledge and belief, subject to the penalties of false statement.

_____ Printed Name of Bidder or Contractor	_____ Signature of Principal or Key Personnel	_____ Date
_____ Printed Name (of above)		_____ Awarding State Agency

Sworn and subscribed before me on this _____ day of _____, 20____.

**Commissioner of the Superior Court
or Notary Public**

OPM Ethics Form 6
Rev. 10-01-11



STATE OF CONNECTICUT
AFFIRMATION OF RECEIPT OF STATE ETHICS LAWS SUMMARY

Written or electronic affirmation to accompany a large State construction or procurement contract, having a cost of more than \$500,000, pursuant to Connecticut General Statutes §§ 1-101mm and 1-101qq

INSTRUCTIONS:

Complete all sections of the form. Submit completed form to the awarding State agency or contractor, as directed below.

CHECK ONE:

- I am a person seeking a large State construction or procurement contract. I am submitting this affirmation to the awarding State agency with my bid or proposal. [Check this box if the contract will be awarded through a competitive process.]
- I am a contractor who has been awarded a large State construction or procurement contract. I am submitting this affirmation to the awarding State agency at the time of contract execution. [Check this box if the contract was a sole source award.]
- I am a subcontractor or consultant of a contractor who has been awarded a large State construction or procurement contract. I am submitting this affirmation to the contractor.
- I am a contractor who has already filed an affirmation, but I am updating such affirmation either (i) no later than thirty (30) days after the effective date of any such change or (ii) upon the submittal of any new bid or proposal, whichever is earlier.

IMPORTANT NOTE:

Within fifteen (15) days after the request of such agency, institution or quasi-public agency for such affirmation contractors shall submit the affirmations of their subcontractors and consultants to the awarding State agency. Failure to submit such affirmations in a timely manner shall be cause for termination of the large State construction or procurement contract.

AFFIRMATION:

I, the undersigned person, contractor, subcontractor, consultant, or the duly authorized representative thereof, affirm (1) receipt of the summary of State ethics laws* developed by the Office of State Ethics pursuant to Connecticut General Statutes § 1-81b and (2) that key employees of such person, contractor, subcontractor, or consultant have read and understand the summary and agree to comply with its provisions.

* The summary of State ethics laws is available on the State of Connecticut's Office of State Ethics website.

Signature

Date

Printed Name

Title

Firm or Corporation (if applicable)

Street Address

City State Zip

Awarding State Agency



**STATE OF CONNECTICUT
 NONDISCRIMINATION CERTIFICATION – Affidavit
 By Entity
 For Contracts Valued at \$50,000 or More**

Documentation in the form of an affidavit signed under penalty of false statement by a chief executive officer, president, chairperson, member, or other corporate officer duly authorized to adopt corporate, company, or partnership policy that certifies the contractor complies with the nondiscrimination agreements and warranties under Connecticut General Statutes §§ 4a-60(a)(1) and 4a-60a(a)(1), as amended

INSTRUCTIONS:

For use by an entity (corporation, limited liability company, or partnership) when entering into any contract type with the State of Connecticut valued at \$50,000 or more for any year of the contract. Complete all sections of the form. Sign form in the presence of a Commissioner of Superior Court or Notary Public. Submit to the awarding State agency prior to contract execution.

AFFIDAVIT:

I, the undersigned, am over the age of eighteen (18) and understand and appreciate the obligations of

an oath. I am _____ of _____, an entity
 Signatory's Title Name of Entity

duly formed and existing under the laws of _____.
 Name of State or Commonwealth

I certify that I am authorized to execute and deliver this affidavit on behalf of

_____ and that _____
 Name of Entity Name of Entity

has a policy in place that complies with the nondiscrimination agreements and warranties of Connecticut

General Statutes §§ 4a-60(a)(1) and 4a-60a(a)(1), as amended.

 Authorized Signatory

 Printed Name

Sworn and subscribed to before me on this _____ day of _____, 20_____.

**Commissioner of the Superior Court/
 Notary Public**

Commission Expiration Date



STATE OF CONNECTICUT

Written or electronic PDF copy of the written certification to accompany a large state contract pursuant to P.A. No. 13-162 (Prohibiting State Contracts With Entities Making Certain Investments In Iran)

Respondent Name: _____

INSTRUCTIONS:

- CHECK ONE:** Initial Certification
 Amendment or renewal

A. Who must complete this certification pursuant to P.A. No. 13-162. Prior to submitting a bid proposal, or, if there was no bid process, prior to executing a contract, for all large state contracts, this certification must be completed by any corporation, general partnership, limited partnership, limited liability partnership, joint venture, nonprofit organization or other business organization **whose principal place of business is located outside of the United States** ("Respondent"). United States subsidiaries of foreign corporations are exempt. For purposes of this Certification, a "foreign corporation" is one that is organized and incorporated outside the United States of America.

Check applicable box:

- Respondent's principal place of business is within the United States or Respondent is a United States subsidiary of a foreign corporation. Respondents who check this box **are not required to complete the remainder of the certification**, but must submit this certification with its Invitation to Bid ("ITB"), Request for Proposal ("RFP") or contract package if there was no bid process.
- Respondent's principal place of business is outside the United States and it is not a United States subsidiary of a foreign corporation. **CERTIFICATION required.** Please complete the remainder of the certification and submit it with the ITB or RFP response or contract package if there was no bid process.

B. Additional definitions.

- 1) "Large State Contract" has the same meaning as provided in section 4-250 of the Connecticut General Statutes; and
- 2) "State agency" and "quasi-public agency" have the same meanings as provided in section 1-79 of the Connecticut General Statutes.

C. Certification requirements.

No state agency or quasi-public agency shall enter into any large state contract, or amend or renew any such contract with any Respondent unless the Respondent has submitted this certification.

Complete all sections of this certification and sign and date it, under oath, in the presence of a Commissioner of the Superior Court, a Notary Public or a person authorized to take an oath in another state.

CERTIFICATION:

I, the undersigned, am the official authorized to execute contracts on behalf of the Respondent. I certify that:

Respondent has made no direct investments of twenty million dollars or more in the energy sector of Iran on or after October 1, 2013, as described in Section 202 of the Comprehensive Iran Sanctions, Accountability and Divestment Act of 2010.

Respondent has either made direct investments of twenty million dollars or more in the energy sector of Iran on or after October 1, 2013, as described in Section 202 of the Comprehensive Iran Sanctions, Accountability and Divestment Act of 2010, or Respondent made such an investment prior to October 1, 2013 and has now increased or renewed such an investment on or after said date, or both.

Sworn as true to the best of my knowledge and belief, subject to the penalties of false statement.

Printed Respondent Name

Printed Name of Authorized Official

Signature of Authorized Official

Subscribed and acknowledged before me this __day of _____, 20__.

Commissioner of the Superior Court (or Notary Public)

FORM OF PROPOSAL

All pages within the Form of Proposal must be completed, signed by a duly authorized representative of the firm and returned as part of the bid/proposal/RFQ response package. NO FACSIMILE SIGNATURE PERMITTED

- √ **If the form of proposal is being submitted by a Joint Venture, each Joint Venture shall sign the Proposal, and each Joint Venture agrees to be bound by the terms and conditions thereof.**
- √ **Failure to submit ALL REQUIRED forms constitutes grounds for rejection of your bid/proposal/RFQ.**
- √ **If it is determined by the University of Connecticut and/or State of Connecticut that any information requested but not referenced and submitted with this bid/proposal; such determination will be just cause for disqualification of the bid/proposal.**

(TO BE FILLED IN AND SIGNED BY THE BIDDER)

Signed the _____ day of _____ 20____.

Firm Name: _____
Street: _____
City/State/Zip Code: _____
Telephone Number: _____
Fax Number: _____
Duly Authorized/Title: _____

(TO BE FILLED IN AND SIGNED BY JOINT VENTURE IF APPLICABLE)

Firm Name: _____
Street: _____
City/State/Zip Code: _____
Telephone Number: _____
Fax Number: _____
Duly Authorized/Title: _____
Duly Authorized/Title: _____

End of Form of Proposal



Opportunity * Guidance * Support



THIS IS A PUBLIC WORKS PROJECT

Covered by the

PREVAILING WAGE LAW

CT General Statutes Section 31-53

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

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

Section 31-53b

Sec. 31-53b. Construction safety and health course. New miner training program. Proof of completion required for mechanics, laborers and workers on public works projects. Enforcement. Regulations. Exceptions. (a) Each contract for a public works project entered into on or after July 1, 2009, by the state or any of its agents, or by any political subdivision of the state or any of its agents, described in subsection (g) of section 31-53, shall contain a provision requiring that each contractor furnish proof with the weekly certified payroll form for the first week each employee begins work on such project that any person performing the work of a mechanic, laborer or worker pursuant to the classifications of labor under section 31-53 on such public works project, pursuant to such contract, has completed a course of at least ten hours in duration in construction safety and health approved by the federal Occupational Safety and Health Administration or, has completed a new miner training program approved by the Federal Mine Safety and Health Administration in accordance with 30 CFR 48 or, in the case of telecommunications employees, has completed at least ten hours of training in accordance with 29 CFR 1910.268. (b) Any person required to complete a course or program under subsection (a) of this section who has not completed the course or program shall be subject to removal from the worksite if the person does not provide documentation of having completed such course or program by the fifteenth day after the date the person is found to be in noncompliance. The Labor Commissioner or said commissioner's designee shall enforce this section. (c) Not later than January 1, 2009, the Labor Commissioner shall adopt regulations, in accordance with the provisions of chapter 54, to implement the provisions of subsections (a) and (b) of this section. Such regulations shall require that the ten-hour construction safety and health courses required under subsection (a) of this section be conducted in accordance with federal Occupational Safety and Health Administration Training Institute standards, or in accordance with Federal Mine Safety and Health Administration Standards or in accordance with 29 CFR 1910.268, as appropriate. The Labor Commissioner shall accept as sufficient proof of compliance with the provisions of subsection (a) or (b) of this section a student course completion card issued by the federal Occupational Safety and Health Administration Training Institute, or such other proof of compliance said commissioner deems appropriate, dated no earlier than five years before the commencement date of such public works project. (d) This section shall not apply to employees of public service companies, as defined in section 16-1, or drivers of commercial motor vehicles driving the vehicle on the public works project and delivering or picking up cargo from public works projects provided they perform no labor relating to the project other than the loading and unloading of their cargo.

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

History: P.A. 08-83 amended Subsec. (a) by making provisions applicable to public works project contracts entered into on or after July 1, 2009, replacing provision re total cost of work with reference to Sec. 31-53(g), requiring proof in certified payroll form that new mechanic, laborer or worker has completed a 10-hour or more construction safety course and adding provision re new miner training program, amended Subsec. (b) by substituting "person" for "employee" and adding "or program", amended Subsec. (c) by adding "or in

accordance with Federal Mine Safety and Health Administration Standards" and setting new deadline of January 1, 2009, deleted former Subsec. (d) re "public building", added new Subsec. (d) re exemptions for public service company employees and delivery drivers who perform no labor other than delivery and made conforming and technical changes, effective January 1, 2009.

Informational Bulletin

THE 10-HOUR OSHA CONSTRUCTION SAFETY AND HEALTH COURSE, PROGRAM OR TRAINING

(Applicable to public works contracts as described by Conn. Gen. Stat. § 31-53(g) entered into *on or after July 1, 2009*)

- (1) This requirement was created by Public Act No. 08-83, which is codified in Section 31-53b of the Connecticut General Statutes;
- (2) The course, program or training is required for public works contracts as described by Conn. Gen. Stat. § 31-53(g) entered into on or after July 1, 2009;
- (3) It is required of private workers (not state or municipal workers) and apprentices who perform the work of a mechanic, laborer or worker pursuant to the classifications of labor under Conn. Gen. Stat. § 31-53 on a public works project as described by Conn. Gen. Stat. § 31-53(g);
- (4) The ten-hour construction safety and health course, program or training pertains to the ten-hour Outreach Course conducted in accordance with federal OSHA Training Institute standards, a new mining training program approved by the Federal Mine Safety and Health Administration in accordance with 30 C.F. R. 48, or, for telecommunications workers, a ten-hour training course conducted in accordance with federal OSHA standard, 29 CFR 1910.268;
- (5) The internet website for the federal OSHA Training Institute is http://www.osha.gov/fso/ote/training/edcenters/fact_sheet.html;
- (6) The statutory language leaves it to the contractor and its employees to determine who pays for the cost of the ten-hour Outreach Course;
- (7) Proof of course, program or training completion shall be demonstrated through the presentation of a “completion document” (card, document, certificate or other written record issued by federal OSHA or by the Federal Mine Safety and Health Administration) as defined by Conn. State Agencies Regs. § 31-53b-1(2).
- (8) Any completion document with an issuance date more than 5 years prior to the commencement date of the public works project shall not constitute proof of compliance with § 31-53b;
- (9) For each person who performs the duties of a mechanic, laborer or worker on a public works project, the contractor shall affix a copy of the completion document

to the certified payroll required to be submitted to the contracting agency for such project on which such worker's name first appears;

- (10) Any mechanic, laborer or worker on a public works project found to be in non-compliance shall be subject to removal from the project if such employee does not provide satisfactory proof of course completion to the Labor Commissioner by the fifteenth day after the date the employee is determined to be in noncompliance;
- (11) Any such employee who is determined to be in noncompliance may continue to work on a public works project for a maximum of fourteen consecutive calendar days while bringing his or her status into compliance;
- (12) The statute provides the minimum standards required for the completion of a construction safety and health course, program or training by employees on public works contracts; any contractor can exceed these minimum requirements.;
- (13) Regulations pertaining to § 31-53b are located at Conn. State Agencies Regs. §31-53b-1 *et seq.*, and are effective May 5, 2009. The regulations are posted on the CTDOL website;
- (14) Any questions regarding this statute or the regulations may be directed to the Wage and Workplace Standards Division of the Connecticut Labor Department via the internet website of <http://www.ctdol.state.ct.us/wgwkstnd/wgemenu.htm>; or by telephone at (860)263-6790.

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

November 29, 2006

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

The Connecticut Labor Department Wage and Workplace Standards Division is empowered to enforce the prevailing wage rates on projects covered by the above referenced statute. Over the past few years the Division has withheld enforcement of the rate in effect for workers who operate a forklift on a prevailing wage rate project due to a potential jurisdictional dispute. The rate listed in the schedules and in our Occupational Bulletin (see enclosed) has been as follows:

Forklift Operator:

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

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

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

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

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

STATUTE 31-55a

- SPECIAL NOTICE -

**To: All State and Political Subdivisions, Their Agents, and Contractors
Connecticut General Statute 31-55a - Annual adjustments to wage rates by
contractors doing state work.**

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

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


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

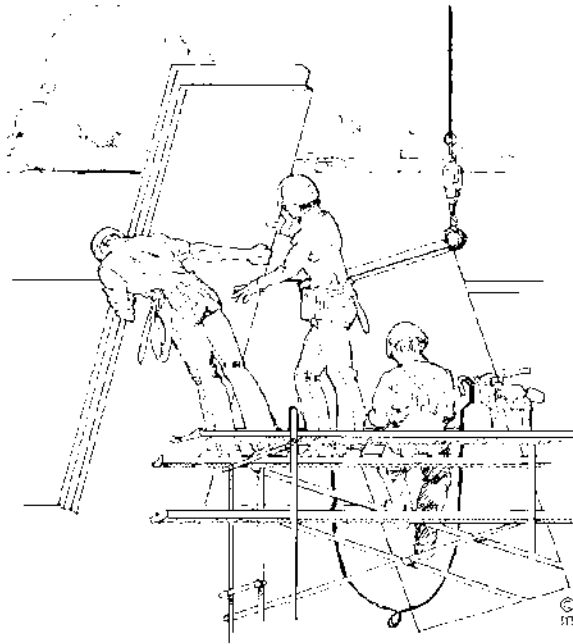
~NOTICE~

TO ALL CONTRACTING AGENCIES

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

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

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



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

CONTRACTING AGENCY CERTIFICATION FORM

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

for _____, located at _____,
contracting agency address

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

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

CONTRACTOR INFORMATION

Name: _____

Address: _____

Authorized Representative: _____

Approximate Starting Date: _____

Approximate Completion Date: _____

Signature

Date

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

Date Issued: _____

CONNECTICUT DEPARTMENT OF LABOR
WAGE AND WORKPLACE STANDARDS DIVISION

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

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

do hereby certify that the _____
Company Name

Street

City

and all of its subcontractors will pay all workers on the

Project Name and Number

Street and City

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

Signed

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

Notary Public

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

Rate Schedule Issued (Date): _____

CERTIFIED PAYROLL FORM WWS - CPI

In accordance with [Connecticut General Statutes, 31-53](#) Certified Payrolls with a statement of compliance shall be submitted monthly to the contracting agency.

Note: Once you have downloaded these forms and are ready to print them out, set the print function on your PC to the horizontal print orientation.

Note2: Please download both the Payroll Certification for Public Works Projects **and** the Certified Statement of Compliance for a complete package. The Certified Statement of Compliance appears on the same page as the Fringe Benefits Explanation page.

Announcement: The Certified Payroll Form WWS-CPI can now be completed on-line!

- [Certified Payroll Form WWS-CPI](#) (PDF, 727KB)
- [Sample Completed Form](#) (PDF, 101KB)

[New] In accordance with Section 31-53b(a) of the C.G.S. each contractor shall provide a copy of the OSHA 10 Hour Construction Safety and Health Card for each employee, to be attached to the first certified payroll on the project.

In accordance with Connecticut General Statutes, 31-53 Certified Payrolls with a statement of compliance shall be submitted monthly to the contracting agency.											PAYROLL CERTIFICATION FOR PUBLIC WORKS PROJECTS					Connecticut Department of Labor Wage and Workplace Standards Division 200 Folly Brook Blvd. Wethersfield, CT 06109					
CONTRACTOR NAME AND ADDRESS:											SUBCONTRACTOR NAME & ADDRESS					WORKER'S COMPENSATION INSURANCE CARRIER					
PAYROLL NUMBER		Week-Ending Date		PROJECT NAME & ADDRESS							POLICY #					EFFECTIVE DATE: EXPIRATION DATE:					
PERSON/WORKER, ADDRESS and SECTION	APPR RATE %	MALE/FEMALE AND RACE*	WORK CLASSIFICATION	DAY AND DATE						Total ST Hours	BASE HOURLY RATE	TOTAL FRINGE BENEFIT PLAN CASH	TYPE OF FRINGE BENEFITS Per Hour 1 through 6 (see back)	GROSS PAY FOR ALL WORK PERFORMED THIS WEEK	TOTAL DEDUCTIONS				GROSS PAY FOR THIS PREVAILING RATE JOB	CHECK # AND NET PAY	
				S	M	T	W	TH	F						S	FICA	FEDERAL WITH-HOLDING	STATE WITH-HOLDING			LIST OTHER
				HOURS WORKED EACH DAY											Total O/T Hours						
										\$	1. \$										
										\$	2. \$										
										\$	3. \$										
										\$	4. \$										
										\$	5. \$										
										\$	6. \$										
										\$	1. \$										
										\$	2. \$										
										\$	3. \$										
										\$	4. \$										
										\$	5. \$										
										\$	6. \$										

***FRINGE BENEFITS EXPLANATION (P):**

Bona fide benefits paid to approved plans, funds or programs, except those required by Federal or State Law (unemployment tax, worker’s compensation, income taxes, etc.).

Please specify the type of benefits provided:

- 1) Medical or hospital care _____ 4) Disability _____
- 2) Pension or retirement _____ 5) Vacation, holiday _____
- 3) Life Insurance _____ 6) Other (please specify) _____

CERTIFIED STATEMENT OF COMPLIANCE

For the week ending date of _____,

I, _____ of _____, (hereafter known as Employer) in my capacity as _____ (title) do hereby certify and state:

Section A:

1. All persons employed on said project have been paid the full weekly wages earned by them during the week in accordance with Connecticut General Statutes, section 31-53, as amended. Further, I hereby certify and state the following:

- a) The records submitted are true and accurate;
- b) The rate of wages paid to each mechanic, laborer or workman and the amount of payment or contributions paid or payable on behalf of each such person to any employee welfare fund, as defined in Connecticut General Statutes, section 31-53 (h), are not less than the prevailing rate of wages and the amount of payment or contributions paid or payable on behalf of each such person to any employee welfare fund, as determined by the Labor Commissioner pursuant to subsection Connecticut General Statutes, section 31-53 (d), and said wages and benefits are not less than those which may also be required by contract;
- c) The Employer has complied with all of the provisions in Connecticut General Statutes, section 31-53 (and Section 31-54 if applicable for state highway construction);
- d) Each such person is covered by a worker’s compensation insurance policy for the duration of his employment which proof of coverage has been provided to the contracting agency;
- e) The Employer does not receive kickbacks, which means any money, fee, commission, credit, gift, gratuity, thing of value, or compensation of any kind which is provided directly or indirectly, to any prime contractor, prime contractor employee, subcontractor, or subcontractor employee for the purpose of improperly obtaining or rewarding favorable treatment in connection with a prime contract or in connection with a prime contractor in connection with a subcontractor relating to a prime contractor; and
- f) The Employer is aware that filing a certified payroll which he knows to be false is a class D felony for which the employer may be fined up to five thousand dollars, imprisoned for up to five years or both.

2. OSHA~The employer shall affix a copy of the construction safety course, program or training completion document to the certified payroll required to be submitted to the contracting agency for this project on which such persons name first appears.

_____ (Signature) _____ (Title) _____ Submitted on (Date)

**Weekly Payroll Certification For
Public Works Projects (Continued)**

PAYROLL CERTIFICATION FOR PUBLIC WORKS PROJECTS

Week-Ending Date:
Contractor or Subcontractor Business Name:

WEEKLY PAYROLL

PERSON/WORKER, ADDRESS and SECTION	APPR RATE %	MALE/ FEMALE AND RACE*	WORK CLASSIFICATION Trade License Type & Number - OSHA 10 Certification Number	DAY AND DATE							Total ST Hours	BASE HOURLY RATE	TYPE OF FRINGE BENEFITS Per Hour 1 through 6 (see back)	GROSS PAY FOR ALL WORK PERFORMED THIS WEEK	TOTAL DEDUCTIONS				GROSS PAY FOR THIS PREVAILING RATE JOB	CHECK # AND NET PAY	
				S	M	T	W	TH	F	S		TOTAL FRINGE BENEFIT PLAN CASH			FICA	WITH- HOLDING	WITH- HOLDING	OTHER			
				HOURS WORKED EACH DAY							Total O/T Hours										
												\$ Base Rate	1. \$ 2. \$ 3. \$								
												\$ Cash Fringe	4. \$ 5. \$ 6. \$								
												\$ Base Rate	1. \$ 2. \$ 3. \$								
												\$ Cash Fringe	4. \$ 5. \$ 6. \$								
												\$ Base Rate	1. \$ 2. \$ 3. \$								
												\$ Cash Fringe	4. \$ 5. \$ 6. \$								
												\$ Base Rate	1. \$ 2. \$ 3. \$								
												\$ Cash Fringe	4. \$ 5. \$ 6. \$								

*IF REQUIRED

OCCUPATIONAL CLASSIFICATION BULLETIN

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

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

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

- **ASBESTOS WORKERS**
 - Applies all insulating materials, protective coverings, coatings and finishes to all types of mechanical systems.
- **ASBESTOS INSULATOR**
 - Handle, install apply, fabricate, distribute, prepare, alter, repair, dismantle, heat and frost insulation, including penetration and fire stopping work on all penetration fire stop systems.
- **BOILERMAKERS**
 - Erects hydro plants, incomplete vessels, steel stacks, storage tanks for water, fuel, etc. Builds incomplete boilers, repairs heat exchanges and steam generators.
- **BRICKLAYERS, CEMENT MASONS, CEMENT FINISHERS, MARBLE MASONS, PLASTERERS, STONE MASONS, PLASTERERS. STONE MASONS, TERRAZZO WORKERS, TILE SETTERS**
 - Lays building materials such as brick, structural tile and concrete cinder, glass, gypsum, terra cotta block. Cuts, tools and sets marble, sets stone, finishes concrete, applies decorative steel, aluminum and plastic tile, applies cements, sand, pigment and marble chips to floors, stairways, etc.
- **CARPENTERS, MILLWRIGHTS. PILEDIVERMEN. LATHERS. RESILEINT FLOOR LAYERS, DOCK BUILDERS, DIKERS, DIVER TENDERS**
 - Constructs, erects, installs and repairs structures and fixtures of wood, plywood and wallboard. Installs, assembles, dismantles, moves industrial machinery. Drives piling into ground to provide foundations for structures such as buildings and bridges, retaining walls for earth embankments, such as cofferdams. Fastens wooden, metal or rockboard lath to walls, ceilings and partitions of buildings, acoustical tile layer, concrete form builder. Applies firestopping materials on fire resistive joint systems only. Installation of curtain/window walls only where attached to wood or metal studs. Installation

of insulated material of all types whether blown, nailed or attached in other ways to walls, ceilings and floors of buildings. Assembly and installation of modular furniture/furniture systems. Free-standing furniture is not covered. This includes free standing: student chairs, study top desks, book box desks, computer furniture, dictionary stand, atlas stand, wood shelving, two-position information access station, file cabinets, storage cabinets, tables, etc.

- **CLEANING LABORER**

- The clean up of any construction debris and the general cleaning, including sweeping, wash down, mopping, wiping of the construction facility, washing, polishing, dusting, etc., prior to the issuance of a certificate of occupancy falls under the *Labor classification*.

- **DELIVERY PERSONNEL**

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

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

- **ELECTRICIANS**

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

- **ELEVATOR CONSTRUCTORS**

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

- **FORK LIFT OPERATOR**

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

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

- **GLAZIERS**

- Glazing wood and metal sash, doors, partitions, and 2 story aluminum

storefronts. Installs glass windows, skylights, store fronts and display cases or surfaces such as building fronts, interior walls, ceilings and table tops and metal store fronts. Installation of aluminum window walls and curtain walls is the "joint" work of glaziers and ironworkers which requires either a blended rate or equal composite workforce.

- **IRONWORKERS**

- Erection, installation and placement of structural steel, precast concrete, miscellaneous iron, ornamental iron, metal curtain wall, rigging and reinforcing steel. Handling, sorting, and installation of reinforcing steel (rebar). Metal bridge rail (traffic), metal bridge handrail, and decorative security fence installation. Installation of aluminum window walls and curtain walls is the "joint" work of glaziers and ironworkers which requires either a blended rate or equal composite workforce. Insulated metal and insulated composite panels are still installed by the Ironworker.

- **INSULATOR**

- Installing fire stopping systems/materials for "Penetration Firestop Systems": transit to cables, electrical conduits, insulated pipes, sprinkler pipe penetrations, ductwork behind radiation, electrical cable trays, fire rated pipe penetrations, natural polypropylene, HVAC ducts, plumbing bare metal, telephone and communication wires, and boiler room ceilings. Past practice using the applicable licensed trades, Plumber, Sheet Metal, Sprinkler Fitter, and Electrician, is not inconsistent with the Insulator classification and would be permitted.

- **LABORERS**

- Acetylene burners, asphalt rakers, chain saw operators, concrete and power buggy operator, concrete saw operator, fence and guard rail erector (except metal bridge rail (traffic), metal bridge handrail, and decorative security fence installation.), hand operated concrete vibrator operator, mason tenders, pipelayers (installation of storm drainage or sewage lines on the street only), pneumatic drill operator, pneumatic gas and electric drill operator, powermen and wagon drill operator, air track operator, block paver, curb setters, blasters, concrete spreaders.

- **PAINTERS**

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

- **LEAD PAINT REMOVAL**

- Painter's Rate

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

- Laborer's Rate

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

- **PLUMBERS AND PIPEFITTERS**

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

- **POWER EQUIPMENT OPERATORS**

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

- **ROOFERS**

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

- **SHEETMETAL WORKERS**

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

and composite lockers and shelving, kitchen equipment, and walk-in coolers.

- **SPRINKLER FITTERS**

- Installation, alteration, maintenance and repair of fire protection sprinkler systems. ***License required per Connecticut General Statutes: F-1,2,3,4.**

- **TILE MARBLE AND TERRAZZO FINISHERS**

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

- **TRUCK DRIVERS**

- **Definitions:**

- 1) “Site of the work” (29 Code of Federal Regulations (CFR) 5.2(l)(b) is the physical place or places where the building or work called for in the contract will remain and any other site where a significant portion of the building or work is constructed, provided that such site is established specifically for the performance of the contract or project;

- (a) Except as provided in paragraph (l) (3) of this section, job headquarters, tool yards, batch plants, borrow pits, etc. are part of the “site of the work”; provided they are dedicated exclusively, or nearly so, to the performance of the contract or project, and provided they are adjacent to “the site of work” as defined in paragraph (e)(1) of this section;

- (b) Not included in the “site of the work” are permanent home offices, branch plant establishments, fabrication plants, tool yards etc, of a contractor or subcontractor whose location and continuance in operation are determined wholly without regard to a particular State or political subdivision contract or uncertain and indefinite periods of time involved of a few seconds or minutes duration and where the failure to count such time is due to consideration justified by industrial realities (29 CFR 785.47)

- 2) “Engaged to wait” is waiting time that belongs to and is controlled by the employer which is an integral part of the job and is therefore compensable as hours worked. (29 CFR 785.15)

- 3) “Waiting to be engaged” is waiting time that an employee can use effectively for their own purpose and is not compensable as hours worked. (29 CFR 785.16)

- 4) “De Minimus” is a rule that recognizes that unsubstantial or insignificant periods of time which cannot as a practical administrative matter be precisely recorded for payroll purposes, may be disregarded. This rule applies only where there are uncertain and indefinite periods of time involved of a short duration and where the failure to count such

time is due to consideration justified by worksite realities. For example, with respect to truck drivers on prevailing wage sites, this is typically less than 15 minutes at a time.

○ **Coverage of Truck Drivers on State or Political subdivision Prevailing Wage Projects**

- Truck drivers **are covered** for payroll purposes under the following conditions:
 - Truck Drivers for time spent working on the site of the work.
 - Truck Drivers for time spent loading and/or unloading materials and supplies on the site of the work, if such time is not de minimus
 - Truck drivers transporting materials or supplies between a facility that is deemed part of the site of the work and the actual construction site.
 - Truck drivers transporting portions of the building or work between a site established specifically for the performance of the contract or project where a significant portion of such building or work is constructed and the physical places where the building or work outlined in the contract will remain.

For example: Truck drivers delivering asphalt are covered under prevailing wage while "engaged to wait" on the site and when directly involved in the paving operation, provided the total time is not "de minimus"

- Truck Drivers **are not** covered in the following instances:
 - Material delivery truck drivers while off "the site of the work"
 - Truck Drivers traveling between a prevailing wage job and a commercial supply facility while they are off the "site of the work"
 - Truck drivers whose time spent on the "site of the work" is de minimus, such as under 15 minutes at a time, merely to drop off materials or supplies, including asphalt.

These guidelines are similar to U.S. Labor Department policies. The application of these guidelines may be subject to review based on factual considerations on a case by case basis.

For example:

- Material men and deliverymen are not covered under

prevailing wage as long as they are not directly involved in the construction process. If, they unload the material, they would then be covered by prevailing wage for the classification they are performing work in: laborer, equipment operator, etc.

- Hauling material off site is not covered provided they are not dumping it at a location outlined above.
- Driving a truck on site and moving equipment or materials on site would be considered covered work, as this is part of the construction process.

Any questions regarding the proper classification should be directed to:

*Public Contract Compliance Unit
Wage and Workplace Standards Division
Connecticut Department of Labor
200 Folly Brook Blvd, Wethersfield, CT 06109
(860) 263-6543*

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

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

- Benefits to be paid at the appropriate prevailing wage rate for the listed occupation.
- If the “Benefits” section for the occupation lists only a dollar amount, disregard the information below.

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

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

Elevator Constructors: Mechanics

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

Glaziers

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

Power Equipment Operators

(Heavy and Highway Construction & Building Construction)

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

Ironworkers

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

Laborers (Tunnel Construction)

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

Roofers

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

Sprinkler Fitters

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

Truck Drivers

(Heavy and Highway Construction & Building Construction)

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

Standard Form of Agreement Between Owner and Contractor
where the basis of payment is a Stipulated Sum

Editing Template

CAUTION: Take care not to remove or otherwise edit Project Data fill-point areas (Basic Information, Contract Details and Project Team) when making edits to this document.

The following document is the AIA 101 – Standard Form of Agreement Between Owner and Contractor as modified by the University of Connecticut. Modification Date: December 1, 2014

AGREEMENT made as of the « » day of « » in the year « »
(In words, indicate day, month and year)

BETWEEN the Owner:
(Name, address and other information)

« »« »
« »
« »
« »

and the Contractor:
(Name, address and other information)

« »« »
« »
« »
« »

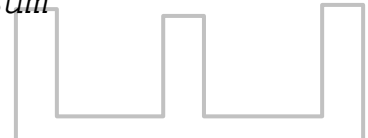
for the following Project:
(Name, location and description)

« »
« »
« »

The Architect:
(Name, address and other information)

« »« »
« »
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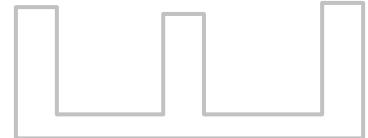
The Owner and Contractor agree as follows.



ADDITIONS AND DELETIONS:
The author of this document has added information needed for its completion. The author may also have revised the text of the original AIA standard form. An *Additions and Deletions Report* that notes added information as well as revisions to the standard form text is available from the author and should be reviewed.

This document has important legal consequences. Consultation with an attorney is encouraged with respect to its completion or modification.

AIA Document A201™-2007, General Conditions of the Contract for Construction, is adopted in this document by reference. Do not use with other general conditions unless this document is modified.



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- 7 TERMINATION OR SUSPENSION
- 8 MISCELLANEOUS PROVISIONS
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ARTICLE 1 THE CONTRACT DOCUMENTS

The Contract Documents consist of this Agreement, as amended, the AIA A201-2007 General Conditions, as amended, Drawings, Specifications, Bid Clarifications and Addenda issued prior to execution of this Agreement, other documents listed in this Agreement and Modifications issued after execution of this Agreement, all of which form the Contract, and are as fully a part of the Contract as if attached to this Agreement or repeated herein. The Contract represents the entire and integrated agreement between the parties hereto and supersedes prior negotiations, representations or agreements, either written or oral. An enumeration of the Contract Documents, other than a Modification, appears in Article 9.

ARTICLE 2 THE WORK OF THIS CONTRACT

The Contractor shall fully execute the Work described in the Contract Documents, except as specifically indicated in the Contract Documents to be the responsibility of others. The Contractor shall furnish and install all materials, labor and equipment required to provide ***** as set forth in the Contract Documents enumerated in Article 9.

ARTICLE 3 DATE OF COMMENCEMENT AND SUBSTANTIAL COMPLETION

§ 3.1 The date of commencement of the Work shall be the date of this Agreement unless a different date is stated below or provision is made for the date to be fixed in a notice to proceed issued by the Owner.

Date of Commencement shall be fixed in the Notice to Proceed.

§ 3.2 The Contract Time shall be measured from the date of commencement.

§ 3.3 The Contractor shall achieve Substantial Completion of the entire Work not later than « » (« ») days from the date of commencement, subject to adjustments of this Contract Time as provided in the Contract Documents.

Liquidated Damages of _____ and 00/100 Dollars (\$ _____) per calendar day shall be assessed as provided in Paragraph 9.11 of the AIA A201-2007 General Conditions, as amended.

ARTICLE 4 CONTRACT SUM

§ 4.1 The Owner shall pay the Contractor the Contract Sum in current funds for the Contractor's performance of the Contract. The Contract Sum shall be « » (\$ « »), subject to additions and deductions as provided in the Contract Documents.

§ 4.2 The Contract Sum is based upon the following alternates, if any, which are described in the Contract Documents, and are hereby accepted by the Owner. The Contract Sum is the amount set forth in Section 4.1 and includes the amounts for the following alternates, if any, accepted by the Owner.

Alternate prices which reflect the work of the bid package under which this bid proposal was submitted shall remain valid for the life of the project, unless otherwise noted in the Contract Documents and include all costs for a complete installation. All pricing is inclusive of all costs of wages, applicable taxes, benefits, applicable insurance, overhead and profit. Alternate prices are good for both adds and deducts.

« »

§ 4.3 Unit prices, if any are as follows:

All rates are inclusive of all costs of wages, applicable taxes, benefits, applicable insurance, overhead and profit. The rates provided will be negotiated and included as part of a subcontract. The Unit Prices herein shall remain valid for the life of the project and include all costs for a complete installation. Unit prices are good for both adds and deducts.

Item	Units and Limitations	Price Per Unit (\$ 0.00)
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§ 4.4 Allowances included in the Contract Sum, if any:

(Identify allowance and state exclusions, if any, from the allowance price.)

Item	Price
------	-------

ARTICLE 5 PAYMENTS

§ 5.1 PROGRESS PAYMENTS

§ 5.1.1 Based upon Applications for Payment submitted to the Architect by the Contractor and Certificates for Payment issued by the Architect, the Owner shall make progress payments on account of the Contract Sum to the Contractor as provided below and elsewhere in the Contract Documents.

§ 5.1.2 The period covered by each Application for Payment shall be one calendar month ending on the last day of the month.

§ 5.1.3 The Owner shall make payments to the Contractor on each Application of Payment within 45 days of the Owner Representative's receipt of a properly submitted, correct and accepted Application, in accordance with the provisions of the AIA A201-2007 General Conditions, Article 9, as amended. The "Owner Representative" shall be as defined in AIA A201-2007 Paragraph 2.1.1.1.

§ 5.1.4 Each Application for Payment shall be based on the most recent schedule of values submitted by the Contractor in accordance with the Contract Documents. The schedule of values shall allocate the entire Contract Sum among the various portions of the Work. The schedule of values shall be prepared in such form and supported by such data to substantiate its accuracy as the Architect may require. This schedule, unless objected to by the Architect, shall be used as a basis for reviewing the Contractor's Applications for Payment.

§ 5.1.5 Applications for Payment shall show the percentage of completion of each portion of the Work as of the end of the period covered by the Application for Payment.

§ 5.1.6 Subject to other provisions of the Contract Documents, the amount of each progress payment shall be computed as follows:

- .1 Take that portion of the Contract Sum properly allocable to completed Work as determined by multiplying the percentage completion of each portion of the Work by the share of the Contract Sum allocated to that portion of the Work in the schedule of values, less retainage of Seven and One Half Percent (7.5%). Pending final determination of cost to the Owner of changes in the Work, amounts not in dispute shall be included as provided in Section 7.3.9 of AIA Document A201™-2007, General Conditions of the Contract for Construction;

- .2 Add that portion of the Contract Sum properly allocable to materials and equipment delivered and suitably stored at the site for subsequent incorporation in the completed construction (or, if approved in advance by the Owner, suitably stored off the site at a location agreed upon in writing), less retainage of Seven and One Half Percent (7.5%);
- .3 In addition, if the State Commission on Human Rights and Opportunities (“CHRO”) authorizes the award or execution of this contract in advance of CHRO’s approval of the Affirmative Action Plan required to be submitted by the Contractor pursuant to Connecticut General Statutes Section 46a-68d, the Owner will withhold an additional two percent (2%) of the total contract price per month from any payment made to such Contractor, until such time as the Contractor has received approval from CHRO of the Affirmative Action Plan. Moreover, if CHRO determines through its complaint procedure and the hearing process provided in Connecticut General Statutes Section 46a-56(c) that a contractor or subcontractor is not complying with anti-discrimination statutes or contract provisions required under Connecticut General Statutes Section 4a-60 or 4a-60(a) or the provisions of Connecticut General Statutes Section 46a-68c to 46a-68f, inclusive, and if so ordered by the presiding officer after such hearing and upon a finding of noncompliance, the University shall retain two percent (2%) of the total contract price per month on the contract with the Contractor.
- .4 Subtract the aggregate of previous payments made by the Owner; and
- .5 Subtract amounts, if any, for which the Owner Representative has withheld or nullified a Certificate for Payment as provided in Section 9.5 of AIA Document A201–2007.

§ 5.1.7 The progress payment amount determined in accordance with Section 5.1.6 shall be further modified under the following circumstances:

- .1 Add, upon Substantial Completion of the Work, a sum sufficient to increase the total payments to the full amount of the Contract Sum, less such amounts as the Owner Representative shall determine for incomplete Work, retainage applicable to such work and unsettled claims; and
(Section 9.8.5 of AIA Document A201–2007 requires release of applicable retainage upon Substantial Completion of Work with consent of surety, if any.)
- .2 Add, if final completion of the Work is thereafter materially delayed through no fault of the Contractor, any additional amounts payable in accordance with Section 9.10.3 of AIA Document A201–2007.

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

(If it is intended, prior to Substantial Completion of the entire Work, to reduce or limit the retainage resulting from the percentages inserted in Sections 5.1.6.1 and 5.1.6.2 above, and this is not explained elsewhere in the Contract Documents, insert here provisions for such reduction or limitation.)

N/A

§ 5.1.9 Except with the Owner’s prior approval, the Contractor shall not make advance payments to suppliers for materials or equipment which have not been delivered and stored at the site.

§ 5.2 FINAL PAYMENT

§ 5.2.1 Final payment, constituting the entire unpaid balance of the Contract Sum, shall be made by the Owner to the Contractor when

- .1 the Contractor has fully performed the Contract except for the Contractor’s responsibility to correct Work as provided in Section 12.2.2 of AIA Document A201–2007, and to satisfy other requirements, if any, which extend beyond final payment; and
- .2 a final Certificate for Payment has been issued by the Architect.

§ 5.2.2 The Owner’s final payment to the Contractor shall be made no later than 30 days after the issuance of the Architect’s final Certificate for Payment, subject to the provisions of the AIA A201-2007 General Conditions, Article 9, as amended.

ARTICLE 6 DISPUTE RESOLUTION

§ 6.1 INITIAL DECISION MAKER

The University Master Planner and Chief Architect for Planning, Architectural & Engineering Services for the Owner and in the case of a project for UCONN Health (“UCH”), its Associate Vice President for Facilities

Development & Operations will serve as Initial Decision Maker pursuant to Section 15.2 of AIA Document A201–2007, unless the parties appoint below another individual, not a party to this Agreement, to serve as Initial Decision Maker.

§ 6.2 BINDING DISPUTE RESOLUTION
NOT USED.

ARTICLE 7 TERMINATION OR SUSPENSION

§ 7.1 The Contract may be terminated by the Owner or the Contractor as provided in Article 14 of AIA Document A201–2007.

§ 7.2 The Work may be suspended by the Owner as provided in Article 14 of AIA Document A201–2007.

ARTICLE 8 MISCELLANEOUS PROVISIONS

§ 8.1 Where reference is made in this Agreement to a provision of AIA Document A201–2007 or another Contract Document, the reference refers to that provision as amended or supplemented by other provisions of the Contract Documents.

§ 8.2 NOT USED.

§ 8.3 NOT USED.

§ 8.4 NOT USED.

§ 8.5 The Contractor's representative shall not be changed without ten days written notice to the Owner.

§ 8.6 Other provisions:

The Contractor is hereby specifically cautioned that unless specifically authorized, in writing, by the University's Interim Executive Vice President for Administration and Chief Financial Officer, or in the case of UCHC its Chief Administrative Officer, on a case by case basis, the Contractor shall have no right to use, and shall not use, in any manner, the name of the University of Connecticut, its officials or employees, or the Seal of the University:

- (a) in any advertising, publicity, promotion, nor;
- (b) to express or to imply any endorsement of Contractor's work product or services.

§ 8.7 ETHICS AND COMPLIANCE

In accordance with the University's compliance program, the University has in place an anonymous ethics and compliance reporting hotline service – 1-888-685-2637. Any person who is aware of unethical practices, fraud, violation of state laws or regulations or other concerns relating to University policies and procedures can report such matters anonymously. Such persons may also directly contact the University's compliance office at: Office of Audit, Compliance, and Ethics, 9 Walters Avenue, Unit 5084, Storrs, CT 06269-5084; Phone 860-486-4526; Fax 860-486-4527. As a provider of goods and/or services to the University, you are hereby required to notify your employees, as well as any subcontractors, who are involved in the implementation of this contract, of this reporting mechanism.

§ 8.8 Joint Venture

§ 8.8.1 If the Contractor is a joint venture, each joint venture partner shall be jointly, severally and individually responsible to the Owner for the performance of any and all obligations of the Contractor encompassed by this contract or as required by applicable law, and each joint venture partner shall be jointly, severally and individually liable to the Owner for any failures to perform such obligations in accordance with the contract or applicable law. In its dealings with the Owner, each joint venture partner shall have full authority to act in behalf of and bind the joint venture and any other joint venture partner. Each joint venture partner shall be considered to be the agent of the joint venture and of any other joint venture partner.

ARTICLE 9 ENUMERATION OF CONTRACT DOCUMENTS

§ 9.1 The Contract Documents, except for Modifications issued after execution of this Agreement, are enumerated in the sections below.

§ 9.1.1 The Agreement is this executed AIA Document A101–2007, Standard Form of Agreement Between Owner and Contractor.

§ 9.1.2 The General Conditions are AIA Document A201–2007, General Conditions of the Contract for Construction, as amended and attached hereto.

§ 9.1.3 NOT USED.

§ 9.1.4 The Specifications are those contained in the Project Manual dated _____ and are as follows:

Table of Contents – Exhibit A

§ 9.1.5 The Drawings are dated _____ and are as follows:

List of Drawings – Exhibit B

§ 9.1.6 The Bid Clarifications or Addenda, Exhibit C, if any, are as follows:

Number	Date	Pages

Portions of Bid Clarifications or Addenda relating to bidding requirements are not part of the Contract Documents unless the bidding requirements are also enumerated in this Article 9.

§ 9.1.7 Additional documents, if any, forming part of the Contract Documents are as follows:

- The Invitation to Bid dated _____
- Notice and Instructions to Bidders _____
- Contractor’s Proposal Form dated _____
- Contractor’s Schedule of Labor Rates approved by the Owner attached as Exhibit D
- Contractor’s Critical Path Method (“CPM”) Schedule approved by the Owner attached as Exhibit E
- Project Manual dated _____
- Owner’s Contractor Environmental, Health & Safety Manual
- Payment and Performance Bonds

ARTICLE 10 INSURANCE AND BONDS

The Contractor shall purchase and maintain insurance and provide bonds as set forth in Article 11 of AIA Document A201–2007.

This Agreement is entered into as of the day and year first written above and is executed in at least three originals, of which one is to be delivered to the Contractor, one to the Architect for use in the administration of the Contract, and the remainder to the Owner.

OWNER (Signature)
 _____, Executive VP for
 Administration & CFO

Duly Authorized: CGS §§ 10a-104 and 10a-108
 (Printed name and title)

CONTRACTOR (Signature)

« Duly Authorized »« »
 (Printed name and title)

Date: _____

Date: _____

APPROVED AS TO FORM:

Assistant/Associate Attorney General

Date Signed: _____

W
T
A
L
P
M
W
T

General Conditions of the Contract for Construction

Editing Template

CAUTION: Take care not to remove or otherwise edit Project Data fill-point areas (Basic Information, Contract Details and Project Team) when making edits to this document.

The following document is the AIA A201 – General Conditions of the Contract for Construction as modified by the University of Connecticut.

Modification Date: December 1, 2014

for the following PROJECT:

(Name and location or address)

<< >>>

THE OWNER:

(Name and address)

<< >>< >
<< >

THE CONTRACTOR:

(Name and address)

<< >>< >
<< >

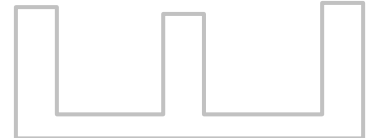
THE ARCHITECT:

(Name and address)

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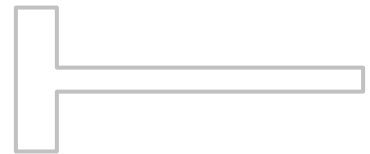
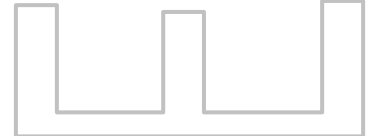
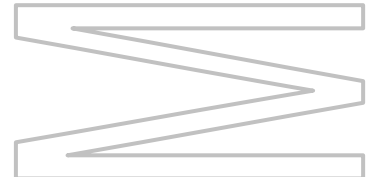
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- 3 CONTRACTOR
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- 5 SUBCONTRACTORS
- 6 CONSTRUCTION BY OWNER OR BY SEPARATE CONTRACTORS
- 7 CHANGES IN THE WORK
- 8 TIME



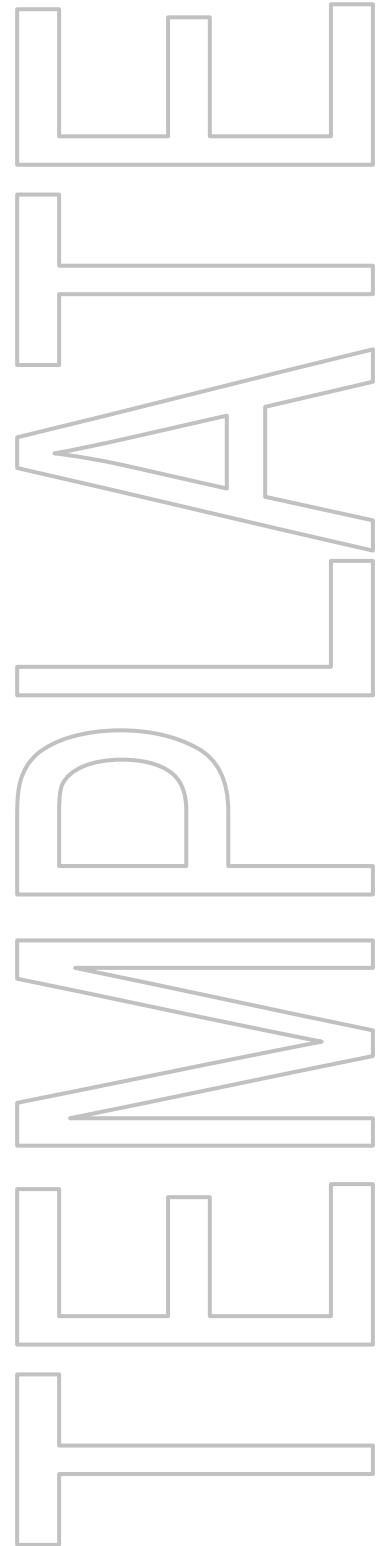
ADDITIONS AND DELETIONS:
The author of this document has added information needed for its completion. The author may also have revised the text of the original AIA standard form. An *Additions and Deletions Report* that notes added information as well as revisions to the standard form text is available from the author and should be reviewed.

This document has important legal consequences. Consultation with an attorney is encouraged with respect to its completion or modification.



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12 UNCOVERING AND CORRECTION OF WORK
13 MISCELLANEOUS PROVISIONS
14 TERMINATION OR SUSPENSION OF THE CONTRACT
15 CLAIMS AND DISPUTES



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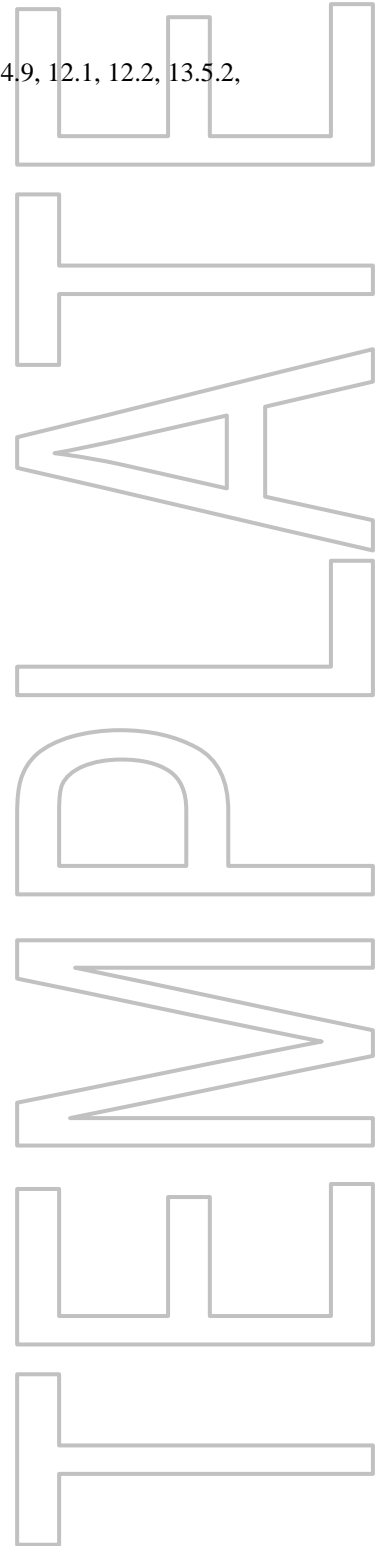
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ARTICLE 1 GENERAL PROVISIONS

§ 1.1 BASIC DEFINITIONS

§ 1.1.1 THE CONTRACT DOCUMENTS

The Contract Documents consist of these General Conditions, as amended, the AIA A101-2007, as amended, Drawings, Specifications, Bid Clarifications and/or Addenda issued prior to execution of this Contract, other documents listed in this Contract and Modifications issued after execution of this Contract, all of which form the Contract, and are as fully a part of the Contract as if attached to this Contract or repeated herein. An enumeration of the Contract Documents, other than a Modification, appears in Article 9 of the AIA A101-2007. A Modification is (1) a written amendment to the Contract signed by both parties, (2) a Change Order, or (3) a written order for a minor change in the Work issued by the Architect.

§ 1.1.1.1 Whenever the words, “directed”, “required”, “ordered”, “designated”, “prescribed”, or words of like import are used, it shall be understood that the direction”, “requirement”, “order”, “designation”, or “prescription” of the Owner Representative is intended and similarly the words “approved”, “acceptable”, “satisfactory”, or words of like import shall mean, “approved by”, or “acceptable to”, or “satisfactory to” the Owner Representative unless otherwise expressly state. The “Owner Representative” shall be as defined in the AIA A201-2007 Section 2.1.1.1.

§ 1.1.1.2 Where “as shown”, “as indicated”, “as detailed”, or words of similar import are used, it shall be understood that the reference is made to the Contract Documents accompanying this Contract unless stated otherwise. The word “provided” as used herein shall be understood to mean “provide complete in place” that is, “furnished and installed”.

§ 1.1.1.3 All personal pronouns used in this Contract, whether used in the masculine, feminine, or neuter gender, shall include all other genders; and the singular shall include the plural and vice versa. Title of Articles and Sections are for convenience only, and neither limit or amplify the provisions of this Contract in itself. The use herein of the word “including”, when following any general statement, term, or matter, shall not be construed to limit such statement, term, or matter to the specific items or matters set forth immediately following such word or to similar items or matters, whether or not non-limiting language (such words as “without limitation”, or “but not limited to”, or words of similar import) is used with reference thereto, but rather shall be deemed to refer to all other items or matters that could reasonably fall within the broadest possible scope of such general statement, term or matter.

§ 1.1.2 THE CONTRACT

The Contract Documents form the Contract for Construction. The Contract represents the entire and integrated agreement between the parties hereto and supersedes prior negotiations, representations or agreements, either written or oral. The Contract may be amended or modified only by a Modification. The Contract Documents shall not be construed to create a contractual relationship of any kind (1) between the Contractor and the Architect or the Architect’s consultants, (2) between the Owner and a Subcontractor or a Sub-subcontractor, (3) between the Owner and the Architect or the Architect’s consultants or (4) between any persons or entities other than the Owner and the Contractor. The Architect shall, however, be entitled to performance and enforcement of obligations under the Contract intended to facilitate performance of the Architect’s duties.

§ 1.1.3 THE WORK

The term “Work” means the construction and services required by the Contract Documents, whether completed or partially completed, and includes all other labor, materials, equipment and services provided or to be provided by the Contractor to fulfill the Contractor’s obligations. The Work may constitute the whole or a part of the Project, whether on or off the site of the Project, and including all labor, materials, equipment and services provided or to be provided by subcontractors, sub-subcontractors, material suppliers or any other entity for whom the Contractor is responsible under or pursuant to the Contract Documents.

§ 1.1.4 THE PROJECT

The Project is the total construction of which the Work performed under the Contract Documents may be the whole or a part and which may include construction by the Owner and by separate contractors.

§ 1.1.5 THE DRAWINGS

The Drawings are the graphic and pictorial portions of the Contract Documents showing the design, location and dimensions of the Work, generally including plans, elevations, sections, details, schedules and diagrams.

§ 1.1.6 THE SPECIFICATIONS

The Specifications are that portion of the Contract Documents consisting of the written requirements for materials, equipment, systems, standards and workmanship for the Work, and performance of related services.

§ 1.1.7 THE PROJECT MANUAL

The Project Manual is a volume assembled for the Work, which may include the bidding requirements, sample forms, Conditions of the Contract and Specifications.

§ 1.1.8 INSTRUMENTS OF SERVICE

Instruments of Service are representations, in any medium of expression now known or later developed, of the tangible and intangible creative work performed by the Architect and the Architect's consultants under their respective professional services agreements. Instruments of Service may include, without limitation, studies, surveys, models, sketches, drawings, specifications, and other similar materials.

§ 1.1.9 INITIAL DECISION MAKER

The Initial Decision Maker is the person identified in the AIA A101-2007 Contract Section 6.1 to render initial decisions on Claims in accordance with Section 15.2 and certify termination of the Contract under Section 14.2.2.

§ 1.2 CORRELATION AND INTENT OF THE CONTRACT DOCUMENTS

§ 1.2.1 The intent of the Contract Documents is to include all items necessary for the proper execution and completion of the Work by the Contractor. The Contract Documents are complementary, and what is required by one shall be as binding as if required by all; performance by the Contractor shall be required only to the extent consistent with the Contract Documents and reasonably inferable from them as being necessary to produce the indicated results.

§ 1.2.1.1 In the event of inconsistencies within or between parts of the Contract Documents or between the Contract documents and applicable standards, codes, and ordinances, the Contractor shall: 1) provide the better quality or greater quantity of work, or 2) comply with the more stringent requirement; either or both in accordance with the Owner Representative's interpretation. The terms and conditions of this Section 1.2.1 however, shall not relieve the Contractor of any of the obligations set forth in Sections 3.2 and 3.7.

§ 1.2.1.1.1 Before ordering any materials or doing any Work, the Contractor and each Subcontractor shall verify measurements at the project site and shall be responsible for the correctness of such measurements. Any difference which may be found shall be submitted to the Architect for resolution before proceeding with the Work.

§ 1.2.1.1.2 If a minor change in the Work is found necessary due to actual field conditions, the Contractor shall submit detailed drawings of such departure for approval by the Architect before making the change.

§ 1.2.2 Organization of the Specifications into divisions, sections and articles, and arrangement of Drawings shall not control the Contractor in dividing the Work among Subcontractors or in establishing the extent of Work to be performed by any trade.

§ 1.2.3 Unless otherwise stated in the Contract Documents, words that have well-known technical or construction industry meanings are used in the Contract Documents in accordance with such recognized meanings.

§ 1.2.4 In performing its obligations under this contract, the Contractor shall comply with all applicable statutes, laws, ordinances, regulations, codes, rules or orders of, or issued by any governmental body having jurisdiction over the Work, location of the Work, or the Contract.

§ 1.2.5 If any item, material, product or equipment is found to be specified in more than one Division Section or Article of the Specifications, the Contractor shall be responsible for determining which subcontractor or supplier shall provide the item.

§ 1.2.5.1 When applied to materials and equipment, the words "furnish", "install", and "provide" shall mean the following:

The word “provide” shall mean to furnish, pay for, deliver, install, adjust, clean and otherwise make materials and equipment fit for their intended use, as specified in Section 3.5 of the General Conditions.

The word “furnish” shall mean to secure, pay for, deliver to site, unload, uncrate and store materials.

The word “install” shall mean to place in position, incorporate in the work, adjust, clean, make fit for use, and perform all services specified in General Conditions Section 3.5 except those included under the definition of the word “furnish” above.

The phrase “furnish and install” shall be equivalent to the word “provide”.

§ 1.2.5.2 The phrase “match existing” shall mean the following:

Where Contract Documents call for exact matching, match existing work exactly in quality and appearance.

§ 1.3 CAPITALIZATION

Terms capitalized in these General Conditions include those that are (1) specifically defined, (2) the titles of numbered articles or (3) the titles of other documents published by the American Institute of Architects.

§ 1.4 INTERPRETATION

In the interest of brevity the Contract Documents frequently omit modifying words such as “all” and “any” and articles such as “the” and “an,” but the fact that a modifier or an article is absent from one statement and appears in another is not intended to affect the interpretation of either statement.

§ 1.5 EXECUTION OF CONTRACT

Execution of the Contract by the Contractor is a representation that the Contractor has visited the site, become generally familiar with local conditions under which the Work is to be performed and correlated personal observations with requirements of the Contract Documents.

§ 1.6 OWNERSHIP AND USE OF DRAWINGS, SPECIFICATIONS AND OTHER INSTRUMENTS OF SERVICE

§ 1.6.1 For the purposes of this Contract only, the Drawings, Specifications and other documents, including those in electronic form, prepared by the Architect and the Architect's consultants are Instruments of Service through which the Work to be executed by the Contractor is described. The Contractor may retain one record set. Neither the Contractor nor any Subcontractor, Sub-subcontractor or material or equipment supplier shall own or claim a copyright in the Drawings, Specifications and other documents prepared by the Architect or the Architect's consultants, and unless otherwise indicated the Architect and the Architect's consultants shall be deemed the authors. The Owner will retain all common law, statutory and other reserved rights, including copyrights unless the Contract between the Owner and Architect provides otherwise. All copies of Instruments of Service, except the Contractor's record set, shall be returned or suitably accounted for to the Architect, on request, upon completion of the Work. The Drawings, Specifications and other documents prepared by the Architect and the Architect's consultants, and copies thereof furnished to the Contractor, are for use solely with respect to this Project. They are not to be used by the Contractor or any Subcontractor, Sub-subcontractor or material or equipment supplier on other projects or for additions to this Project outside the scope of the Work without the specific written consent of the Owner, Architect and the Architect's consultants.

§ 1.6.2 The Contractor, Subcontractors, Sub-subcontractors and material or equipment suppliers are authorized to use and reproduce applicable portions of the Drawings, Specifications and other documents prepared by the Architect and the Architect's consultants appropriate to and for use in the execution of their Work under the Contract Documents. All copies made under this authorization shall bear the statutory copyright notice, if any, shown on the Drawings, Specifications and other documents. Submittal or distribution to meet official regulatory requirements or for other purposes in connection with this Project is not to be construed as publication in derogation of the Architect's or Architect's consultants' rights.

§ 1.7 TRANSMISSION OF DATA IN DIGITAL FORM

If the parties intend to transmit Instruments of Service or any other information or documentation in digital form, they shall endeavor to establish necessary protocols governing such transmissions, unless otherwise already provided in the Contract or the Contract Documents.

§ 1.8 PROVISIONS REQUIRED BY LAW DEEMED INSERTED

§ 1.8.1 Each and every provision of law and clause required by law to be inserted in this Contract shall be deemed to be inserted herein and the Contract shall be read and enforced as though it were included herein, and if through mistake or otherwise any such provision is not inserted, or is not correctly inserted, then upon the application of either party, the Contract shall forthwith be physically amended to make such insertion.

ARTICLE 2 OWNER

§ 2.1 GENERAL

§ 2.1.1 The Owner is the person or entity identified as such in the Contract and is referred to throughout the Contract Documents as if singular in number. Except as otherwise provided in Section 4.2.1, the Architect does not have any authority to act on behalf of the Owner. The term "Owner" means the Owner or the Owner's authorized representative.

§ 2.1.1.1 A staff member of the Owner shall be designated as the "Owner Representative". All contact and communication with the Owner shall be through the Owner Representative, or his or her designee. The Owner, on certain projects, may also retain the services of an outside Construction Administrator, who may be authorized to exercise certain contractual powers of the Owner Representative and/or the Architect. Should this occur, the Contractor will be advised in writing, as appropriate, of the scope and nature of this Construction Administrator's role pursuant to these Contract Documents.

§ 2.1.2 NOT USED.

§ 2.2 INFORMATION AND SERVICES REQUIRED OF THE OWNER

§ 2.2.1 NOT USED.

§ 2.2.2 Except for permits and fees that are the responsibility of the Contractor under the Contract Documents, including those required under Section 3.7.1, the Owner shall secure and pay for necessary approvals, easements, assessments and charges required for construction, use or occupancy of permanent structures or for permanent changes in existing facilities.

§ 2.2.3 The Owner shall furnish surveys describing physical characteristics, legal limitations and utility locations for the site of the Project, and a legal description of the site. The Contractor shall exercise proper precautions relating to the safe performance of the Work. Contractor shall review all such information and notify the Owner of any inaccuracies within twenty (20) days of its receipt.

§ 2.2.3.1 Data concerning site, size, access to site, staging and storing, present obstructions on or near the site, conditions of existing adjacent structures, locations and depths of sewers, conduits or pipes, gas lines, position of sidewalks, curbs and pavements, and other data concerning site conditions, has been obtained from sources Owner believes reliable. Accuracy of such data, however, is not guaranteed and is furnished solely for accommodation of Contractor. Use of such data is made at Contractor's sole risk and expense.

§ 2.2.4 The Owner shall furnish information or services required of the Owner by the Contract Documents with reasonable promptness. The Owner shall also furnish any other information or services under the Owner's control and relevant to the Contractor's performance of the Work with reasonable promptness after receiving the Contractor's written request for such information or services.

§ 2.2.5 The Contractor shall purchase such copies of Drawings and Project Manuals as are reasonably necessary for execution of the Work.

§ 2.3 OWNER'S RIGHT TO STOP THE WORK

If the Contractor fails to correct Work that is not in accordance with the requirements of the Contract Documents as required by Section 12.2 or repeatedly fails to carry out Work in accordance with the Contract Documents, the Owner may issue a written order to the Contractor to stop the Work, or any portion thereof, until the cause for such order has been eliminated; however, the right of the Owner to stop the Work shall not give rise to a duty on the part of the Owner to exercise this right for the benefit of the Contractor or any other person or entity, except to the extent

required by Section 6.1.3. This right shall be in addition to and not in restriction or derogation of the Owner's rights under Article 14 hereof.

§ 2.4 OWNER'S RIGHT TO CARRY OUT THE WORK

If the Contractor defaults or neglects to carry out the Work in accordance with the Contract Documents and fails within a seven-day period after receipt of written notice from the Owner to commence and continue correction of such default or neglect with diligence and promptness, the Owner may, after such seven (7) day period give the Contractor a second written notice to correct such deficiencies within a three (3) day period. If the Contractor within such three-day period after receipt of such second notice fails to commence and continue to correct any deficiencies, the Owner may, without prejudice to other remedies, correct such deficiencies. In such case an appropriate Change Order shall be issued deducting from payments then or thereafter due the Contractor the reasonable cost of correcting such deficiencies, including Owner's expenses and compensation for the Architect's additional services made necessary by such default, neglect or failure. Such action by the Owner and amounts charged to the Contractor are both subject to prior approval of the Architect. If payments then or thereafter due the Contractor are not sufficient to cover such amounts, the Contractor shall pay the difference to the Owner.

§2.5 EXTENT OF OWNER RIGHTS

§2.5.1 The rights stated in Article 2 and elsewhere in the Contract Documents are cumulative and not in limitation of any rights of the Owner (1) granted in the Contract Documents, (2) at law or (3) in equity.

§2.5.2 In no event shall the Owner have control over, charge of, or any responsibility for construction means, methods, techniques, sequences or procedures for safety precautions and programs in connection with the Work, notwithstanding any of the rights and authority granted the Owner in the Contract Documents.

ARTICLE 3 CONTRACTOR

§ 3.1 GENERAL

§ 3.1.1 The Contractor is the person or entity identified as such in the Contract and is referred to throughout the Contract Documents as if singular in number. The Contractor shall be lawfully licensed, if required in the jurisdiction where the Project is located. The Contractor shall designate in writing a representative who shall have express authority to bind the Contractor with respect to all matters under this Contract. The term "Contractor" means the Contractor or the Contractor's authorized representative. The Contractor shall not replace the Contractor's representative without the prior written consent of the Owner.

§ 3.1.2 The Contractor shall perform the Work in accordance with the Contract Documents.

§ 3.1.3 The Contractor shall not be relieved of obligations to perform the Work in accordance with the Contract Documents either by activities or duties of the Architect in the Architect's administration of the Contract, or by tests, inspections or approvals required or performed by persons or entities other than the Contractor.

§ 3.1.4 The Contractor represents and warrants the following to the Owner (in addition to the other representations and warranties contained in the Contract Documents) as an inducement to the Owner to execute the Contract Documents, which representations and warranties shall survive the execution and delivery of the Contract Documents and the final completion of the Work;

- (a) That it is financially solvent, able to pay its debts as they mature and possesses sufficient working capital to complete the Work and perform its obligations under the Contract Documents;
- (b) That it, through its Subcontractors or otherwise, is able to furnish the plant, tools, materials, supplies, equipment and labor required to complete the Work and perform its obligations hereunder and has sufficient experience and competence to do so;
- (c) That it is authorized to do business in the State where the Project is located and properly licensed by all necessary governmental and public and quasi-public authorities having jurisdiction over it and over the Work and the site of the Project;
- (d) That its execution of the Contract Documents and its performance thereof have been duly authorized by all necessary corporate action; and
- (e) That its duly authorized representative has visited the site of the Work, familiarized himself with the local conditions under which the Work is to be performed and correlated his observations with the requirements of the Contract Documents.

§ 3.2 REVIEW OF CONTRACT DOCUMENTS AND FIELD CONDITIONS BY CONTRACTOR

§ 3.2.1 Execution of the Contract by the Contractor is a representation that the Contractor and all Subcontractor tiers have visited the site, become familiar with all existing conditions under which the Work is to be performed and correlated personal observations with requirements of the Contract Documents.

§ 3.2.2 The Contractor and all Subcontractors shall visit the Project site and become acquainted with all existing conditions and conduct all tests, examinations or inspections including, but not necessarily limited to any subsurface investigations they deem necessary or as required by law, at their sole expense, to satisfy themselves as to existing conditions on the site, including sub-surface conditions. No such tests, examinations or inspections shall be conducted without the Owner's prior written approval and the Owner shall approve of any engineer or consultant engaged to perform such test, examination or inspection.

§ 3.2.3 Because the Contract Documents are complementary, the Contractor shall, before starting each portion of the Work, carefully study and compare the various Contract Documents relative to that portion of the Work, as well as the information furnished by the Owner pursuant to Section 2.2.3, shall take field measurements of any existing conditions related to that portion of the Work, and shall observe any conditions at the site affecting it. These obligations are for the purpose of facilitating coordination and construction by the Contractor and are not for the purpose of discovering errors, omissions, or inconsistencies in the Contract Documents; however, the Contractor shall promptly report to the Architect and Owner Representative any errors, inconsistencies or omissions discovered or which should have been discovered by or made known to the Contractor as a request for information in such form as the Architect and Owner Representative may require. It is recognized that the Contractor's review is made in the Contractor's capacity as a contractor and not as a licensed design professional, unless otherwise specifically provided in the Contract Documents. After reporting to the Architect any error, inconsistency, or omission which the Contractor may discover in the Contract Documents, the Contractor is not to proceed with any work so affected without the Architect's written response and or clarifications and, if required, Owner approval of Contract adjustments.

§ 3.2.4 The Contractor is not required to ascertain that the Contract Documents are in accordance with applicable laws, statutes, ordinances, building codes, rules and regulations, or lawful orders of public authorities, but the Contractor shall promptly report to the Architect and Owner Representative any nonconformity discovered, or which should have been discovered, by or made known to the Contractor as a request for information in such form as the Architect may require.

§ 3.2.5 If the Contractor believes that additional cost or time is involved because of clarifications or instructions the Architect issues in response to the Contractor's notices or requests for information pursuant to Sections 3.2.2 or 3.2.3, the Contractor shall make Claims as provided in Article 15. If the Contractor fails to perform the obligations of Sections 3.2.2 or 3.2.3, the Contractor shall pay such costs and damages to the Owner as would have been avoided if the Contractor had performed such obligations. If the Contractor performs those obligations, the Contractor shall not be liable to the Owner or Architect for damages resulting from errors, inconsistencies or omissions in the Contract Documents, for differences between field measurements or conditions and the Contract Documents, or for nonconformities of the Contract Documents to applicable laws, statutes, ordinances, codes, rules and regulations, and lawful orders of public authorities unless the Contractor recognized, or should have recognized, such error, inconsistency, omission or difference and knowingly failed to report it to the Architect and Owner Representative immediately.

§ 3.2.6 No compensation will be allowed by reason of any difficulties which the Contractor could have discovered or reasonably anticipated, prior to execution of the Contract by visiting the project site and observing existing conditions and/or comparing these to the Contract Documents at the time of shop drawings and/or submittals.

§ 3.3 SUPERVISION AND CONSTRUCTION PROCEDURES

§ 3.3.1 The Contractor shall supervise and direct the Work, using the Contractor's best skill and attention. The Contractor shall be solely responsible for, and have control over, construction means, methods, techniques, sequences and procedures and for coordinating all portions of the Work under the Contract, unless the Contract Documents give other specific instructions concerning these matters. The Contractor shall schedule and perform the Work so as not to interfere with any other related work being performed by the Owner in or about the Project site. If the Contract Documents give specific instructions concerning construction means, methods, techniques, sequences

or procedures, the Contractor shall evaluate the jobsite safety thereof and, except as stated below, shall be fully and solely responsible for the jobsite safety of such means, methods, techniques, sequences or procedures. If the Contractor determines that such means, methods, techniques, sequences or procedures may not be safe, the Contractor shall give timely written notice to the Owner and Architect and shall not proceed with that portion of the Work without further written instructions from the Architect. If the Contractor is then instructed to proceed with the required means, methods, techniques, sequences or procedures without acceptance of changes proposed by the Contractor, the Owner shall be solely responsible for any loss or damage arising solely from those Owner-required means, methods, techniques, sequences or procedures.

§ 3.3.2 The Contractor shall be responsible to the Owner for any damages, losses, costs and expenses resulting from the acts and omissions of the Contractor's employees, Subcontractors and their agents and employees, and other persons or entities performing portions of the Work for, or on behalf of, the Contractor or any of its Subcontractors.

§ 3.3.3 The Contractor shall be responsible for inspection of portions of Work already performed to determine that such portions are in proper condition to receive subsequent Work.

§ 3.3.4 The Contractor shall send its qualified representative to periodic progress meetings held at such time and at such place as Architect or the Owner shall designate in accordance with the Contract Documents.

§ 3.4 LABOR AND MATERIALS

§ 3.4.1 Unless otherwise provided in the Contract Documents, the Contractor shall provide and pay for labor, materials, equipment, tools, construction equipment and machinery, water, heat, utilities, transportation, and other facilities and services necessary for proper execution and completion of the Work, whether temporary or permanent and whether or not incorporated or to be incorporated in the Work.

§ 3.4.2 Except in the case of minor changes in the Work authorized by the Architect in accordance with Sections 3.12.8 or 7.4, the Contractor may make substitutions only with the consent of the Owner, after evaluation by the Architect and in accordance with a Change Order or Construction Change Directive.

§ 3.4.2.1 In connection with any requests for substitutions, the Contractor:

- .1 represents that the Contractor and Subcontractor or any applicable tier have personally investigated the proposed substitute product and determined that it is equal or superior in all respects to that specified;
- .2 represents that the Contractor and proposed manufacturer will provide the same or superior warranty coverage for the substitution that the Contractor would for that specified;
- .3 certifies that the cost data presented is complete and includes all related costs under this Contract except the Architect's redesign costs, and waives all claims for additional costs related to the substitution which subsequently become apparent;
- .4 shall coordinate the installation of the accepted substitution, making such changes as may be required for the Work to be complete in all respects;
- .5 shall make requests for substitutions within fifteen (15) days after Contract award or at the preconstruction meeting; and
- .6 shall reimburse and compensate the Owner for any costs incurred in connection with, and/or the value of, any services performed by the Architect and/or the Owner Representative associated with addressing the request for substitution.

§ 3.4.3 The Contractor shall enforce strict discipline and good order among the Contractor's employees and other persons carrying out the Work. The Contractor shall not permit employment of unfit persons or persons not properly skilled in tasks assigned to them.

§ 3.4.3.1 The Contractor shall neither permit nor suffer the use of offensive language on or about the Work embraced in this Contract.

§ 3.4.3.2 The Contractor shall neither permit nor suffer lewd conduct on or about the Work embraced in this Contract.

§ 3.4.3.3 All of Owner's buildings are smoke-free buildings. Additionally, the Contractor shall not permit outdoor smoking, where it creates a hazard, nor the introduction or use of drugs, spirituous or intoxicating liquors, on or about the Owner's property.

§ 3.4.3.4 The Contractor shall be fully responsible to the Owner for the acts of his Subcontractors, and of persons either directly or indirectly employed by them, as he is for the acts of persons directly employed by him.

§ 3.4.3.5 The Contractor shall familiarize himself and act in compliance with the current "President's Policy on Harassment" including its provisions prohibiting sexual harassment.

§ 3.4.3.6 The Contractor is hereby specifically cautioned that unless specifically authorized in writing by the Owner's Interim Executive Vice President for Administration and Chief Financial Officer or in the case of a University of Connecticut Health Center project, the Chief Administrative Officer, on a case by case basis, the Contractor shall have no right to use and shall not use, in any manner, the name of the Owner, its officials or employees, or the Seal of the Owner: (a) in any advertising, publicity, promotion; nor (b) to express or to imply any endorsement of Contractor's work product or services.

§ 3.4.4 Directions, specifications and recommendations by manufacturers for installation, handling, storing, adjustment, and operation of their materials or equipment shall be complied with, but the Contractor shall nonetheless have the responsibility of determining whether such directions, specifications, and recommendations may safely and suitably be employed in the Work, and of notifying the Architect in advance in writing of any deviation or modification necessary for installation safety or proper operation of the item.

§ 3.5 WARRANTY

The Contractor warrants to the Owner and Architect that materials and equipment furnished under the Contract will be of good quality and new unless the Contract Documents require or permit otherwise. The Contractor further warrants that the Work will conform to the requirements of the Contract Documents and will be free from defects, except for those inherent in the quality of the Work the Contract Documents require or permit. Work, materials, or equipment not conforming to these requirements, including substitutions not properly approved and authorized, may be considered defective. The Contractor's warranty excludes remedy for damage or defect caused by abuse, alterations to the Work not executed by the Contractor, improper or insufficient maintenance, improper operation, or normal wear and tear and normal usage. If required by the Architect, the Contractor shall furnish satisfactory evidence as to the kind and quality of materials and equipment.

§ 3.6 TAXES

The Owner is a tax-exempt institution. The Contractor shall be familiar with the current regulations of the Department of Revenue Service. The tax on materials or supplies exempted by such regulations shall not be included as part of the Contract Sum, or any Application for Payment, or request for Change Order or other compensation. A Sales Tax Certificate is available from the Owner's Purchasing Department upon written request.

§ 3.7 PERMITS, FEES, NOTICES, AND COMPLIANCE WITH LAWS

§ 3.7.1 Unless otherwise provided in the Contract Documents, the Contractor shall secure and pay for the building permit as well as for other permits, fees, licenses, and inspections by government agencies necessary for proper execution and completion of the Work that are customarily secured after execution of the Contract and legally required at the time bids are received or negotiations concluded.

§ 3.7.2 The Contractor shall comply with and give notices required by applicable laws, statutes, ordinances, codes, rules and regulations, and lawful orders of public authorities applicable to performance of the Work.

§ 3.7.3 If the Contractor performs Work knowing it to be contrary to applicable laws, statutes, ordinances, codes, rules and regulations, or lawful orders of public authorities, the Contractor shall assume appropriate responsibility for such Work and shall bear the costs attributable to correction.

§ 3.7.4 If any governmental body having jurisdiction over the Work requires licenses or registrations for the performance of the Work, or any part thereof, the Contractor shall hold such valid licenses or registrations as may be required by law to prosecute the Work to completion. If any part of the Work for which such a license or registration is required to be performed by Subcontractors of any tier, the Contractor shall ensure that any such

Subcontractor holds such valid licenses or registrations as may be required by law to prosecute said Work to completion.

§ 3.7.5 Concealed or Unknown Conditions. See Section 15.1.8.

§ 3.7.6 If, in the course of the Work, the Contractor encounters human remains or recognizes the existence of burial markers, archaeological sites or wetlands not indicated in the Contract Documents, the Contractor shall immediately suspend any operations that would affect them and shall notify the Owner and Architect. Upon receipt of such notice, the Owner shall promptly take any action necessary to obtain governmental authorization required to resume the operations. The Contractor shall continue to suspend such operations until otherwise instructed by the Owner but shall continue with all other operations that do not affect those remains or features. Requests for adjustments in the Contract Sum and Contract Time arising from the existence of such remains or features may be made as provided in Article 15.

§ 3.8 ALLOWANCES

§ 3.8.1 The Contractor shall include in the Contract Sum all allowances stated in the Contract Documents. Items covered by allowances shall be supplied for such amounts and by such persons or entities as the Owner may direct, but the Contractor shall not be required to employ persons or entities to whom the Contractor has reasonable objection.

§ 3.8.2 Unless otherwise provided in the Contract Documents,

- .1 allowances shall cover the cost to the Contractor of materials and equipment delivered at the site and all required taxes, less applicable trade discounts;
- .2 Contractor's costs for unloading and handling at the site, labor, installation costs, overhead, profit and other expenses contemplated for stated allowance amounts shall be included in the Contract Sum but not in the allowances, except when installation is specified as part of the allowance in Division 1 Specifications; and
- .3 whenever costs are more than or less than allowances, the Contract Sum shall be adjusted accordingly by Change Order. The amount of the Change Order shall reflect (1) the difference between actual costs and the allowances under Section 3.8.2.1 and (2) changes in Contractor's costs under Section 3.8.2.2, except when installation is specified as part of the allowance in the General Requirements (Division 1 of the Specifications).

§ 3.8.3 Materials and equipment under an allowance shall be selected by the Owner with reasonable promptness.

§ 3.9 SUPERINTENDENT AND PROJECT MANAGER

§ 3.9.1 The Contractor shall employ a competent full time superintendent(s) and necessary assistants who shall be in attendance at the Project site during performance of the Work for the duration of the entire Project. The superintendent shall be satisfactory to the Owner and the Contractor shall not replace the superintendent without the prior written consent of the Owner. The superintendent shall represent the Contractor, and communications given to the superintendent shall be as binding as if given to the Contractor. Important communications shall be confirmed in writing. Other communications shall be similarly confirmed on written request in each case.

§ 3.9.2 If not already identified as part of the Owner's pre-qualification process, the Contractor, as soon as practicable after award of the Contract, shall furnish in writing to the Owner's Representative and Architect the name, qualifications and references of the proposed superintendent(s).

§ 3.9.3 The superintendent(s) shall be satisfactory to the Owner and the Contractor shall not employ a proposed superintendent to whom the Owner or Architect has made reasonable and timely objection. If for any reason the superintendent(s) is unsatisfactory, upon request of Owner, other qualified representatives shall be substituted. The Contractor shall not change the superintendent without the Owner's written consent, which shall not unreasonably be withheld or delayed.

§ 3.9.4 The Contractor shall employ a competent project manager and necessary assistants who shall be in attendance at the Project site during performance of the Work for the duration of the entire Project. The project manager shall be satisfactory to the Owner and the Contractor shall not replace the project manager without the prior written consent of the Owner. The project manager shall represent the Contractor, and communications given to the project manager shall be as binding as if given to the Contractor. Important communications shall be confirmed in writing. Other communications shall be similarly confirmed on written request in each case.

§ 3.9.5 If not already identified as part of the Owner's pre-qualification process, the Contractor, as soon as practicable after award of the Contract, shall furnish in writing to the Owner through the Architect the name, qualifications and references of the proposed project manager.

§ 3.9.6 The project manager shall be satisfactory to the Owner and the Contractor shall not employ a proposed project manager to whom the Owner or Architect has made reasonable and timely objection. If for any reason the project manager is unsatisfactory, upon request of Owner, other qualified representatives shall be substituted. The Contractor shall not replace the project manager without the prior written consent of the Owner.

§ 3.9.7 Additional key personnel may be required for this project. The Contractor shall provide additional personnel as required to ensure proper project coordination.

§ 3.10 CONTRACTOR'S CONSTRUCTION SCHEDULES

§ 3.10.1 The Contractor, within ten (10) days of the date reflected on the Letter of Intent to Award, shall prepare and submit for the Owner's and Architect's information a Contractor's construction schedule for the Work. The schedule shall be in such format, and contain such information as the Owner may request or outlined in Division 1 of the Specifications. The schedule shall not exceed time limits current under the Contract Documents, shall, with the prior review and approval of the Owner and Architect, be revised at appropriate intervals as required by the conditions of the Work and Project, shall be related to the entire Project to the extent required by the Contract Documents, and shall provide for expeditious and practicable execution of the Work.

§ 3.10.2 The Contractor shall prepare a submittal schedule, promptly after being awarded the Contract and thereafter as necessary to maintain a current submittal schedule, and shall submit the schedule(s) for simultaneous review and approval by the Owner and Architect. The Owner and Architect's approval shall not be unreasonably delayed or withheld. The submittal schedule shall (1) be coordinated with the Contractor's construction schedule, and (2) allow the Architect reasonable time to review submittals. If the Contractor fails to submit a submittal schedule, the Contractor shall not be entitled to any increase in Contract Sum or extension of Contract Time based on the time required for review of submittals.

§ 3.10.3 The Contractor shall perform the Work in general accordance with the most recent schedules submitted to the Owner and Architect.

§ 3.11 DOCUMENTS AND SAMPLES AT THE SITE

The Contractor shall maintain at the site for the Owner one copy of the Drawings, Specifications, Bid Clarifications and/or Addenda, Change Orders and other Modifications, in good order and marked currently to indicate field changes and selections made during construction, and one copy of approved Shop Drawings, Product Data, Samples and similar required submittals. These shall be available to the Architect and shall be delivered to the Architect for submittal to the Owner upon completion of the Work as a record of the Work as constructed.

§ 3.11.1.1 In addition, the Contractor shall indicate on the drawings, as best as possible, all new and existing pipe and conduit runs which are concealed in the floor slabs, walls, ceilings, etc. The Contractor shall indicate on the drawing the electrical distribution panel and circuit number supplying each item installed or reconnected, with diagrammatic lines showing sequence of connections. All changes shall be identified and circled on the Architect's and Engineer's drawings at the time they occur for each such field change.

§ 3.12 SHOP DRAWINGS, PRODUCT DATA AND SAMPLES

§ 3.12.1 Shop Drawings are drawings, diagrams, schedules and other data specially prepared for the Work by the Contractor or a Subcontractor, Sub-subcontractor, manufacturer, supplier or distributor to illustrate some portion of the Work.

§ 3.12.2 Product Data are illustrations, standard schedules, performance charts, instructions, brochures, diagrams and other information furnished by the Contractor to illustrate materials or equipment for some portion of the Work.

§ 3.12.3 Samples are physical examples that illustrate materials, equipment or workmanship and establish standards by which the Work will be judged.

§ 3.12.4 Shop Drawings, Product Data, Samples and similar submittals are not Contract Documents. Their purpose is to demonstrate the way by which the Contractor proposes to conform to the information given and the design concept expressed in the Contract Documents for those portions of the Work for which the Contract Documents require submittals. Review by the Architect is subject to the limitations of Section 4.2.7. Informational submittals upon which the Architect is not expected to take responsive action may be so identified in the Contract Documents. Submittals that are not required by the Contract Documents may be returned by the Architect without action.

§ 3.12.5 The Contractor shall review for compliance with the Contract Documents, approve and submit to the Architect Shop Drawings, Product Data, Samples and similar submittals required by the Contract Documents in accordance with the submittal schedule approved by the Architect or, in the absence of an approved submittal schedule, with reasonable promptness and in such sequence as to cause no delay in the Work or in the activities of the Owner or of separate contractors. Submittals which are not marked as reviewed for compliance with the Contract Documents and approved by the Contractor may be returned by the Architect or Engineer without action. Such action will not be grounds for time extension to the Contract.

§ 3.12.6 By submitting Shop Drawings, Product Data, Samples and similar submittals, the Contractor represents to the Owner and Architect that the Contractor has (1) reviewed and approved them, (2) determined and verified materials, field measurements and field construction criteria related thereto, or will do so and (3) checked and coordinated the information contained within such submittals with the requirements of the Work and of the Contract Documents.

§ 3.12.7 The Contractor shall perform no portion of the Work for which the Contract Documents require submittal and review of Shop Drawings, Product Data, Samples or similar submittals until the respective submittal has been approved by the Architect.

§ 3.12.8 The Work shall be in accordance with approved submittals except that the Contractor shall not be relieved of responsibility for deviations from requirements of the Contract Documents by the Architect's approval of Shop Drawings, Product Data, Samples or similar submittals unless the Contractor has specifically informed the Architect and the Owner Representative in writing of such deviation at the time of submittal and (1) the Owner Representative has given written approval to the specific deviation as a minor change in the Work, or (2) a Change Order or Construction Change Directive has been issued authorizing the deviation. The Contractor shall not be relieved of responsibility for errors or omissions in Shop Drawings, Product Data, Samples or similar submittals by the Architect's approval thereof.

§ 3.12.9 The Contractor shall direct specific attention, in writing or on resubmitted Shop Drawings, Product Data, Samples or similar submittals, to revisions other than those requested by the Architect on previous submittals. In the absence of such written notice, the Architect's approval of a resubmission shall not apply to such revisions.

§ 3.12.10 The Contractor shall not be required to provide professional services that constitute the practice of architecture or engineering unless such services are specifically required by the Contract Documents for a portion of the Work or unless the Contractor needs to provide such services in order to carry out the Contractor's responsibilities for construction means, methods, techniques, sequences and procedures. The Contractor shall not be required to provide professional services in violation of applicable law. If professional design services or certifications by a design professional related to systems, materials or equipment are specifically required of the Contractor by the Contract Documents, the Owner and the Architect will specify all performance and design criteria that such services must satisfy. The Contractor shall cause such services or certifications to be provided by a properly licensed design professional, whose signature and seal shall appear on all drawings, calculations, specifications, certifications, Shop Drawings and other submittals prepared by such professional. Shop Drawings and other submittals related to the Work designed or certified by such professional, if prepared by others, shall bear such professional's written approval when submitted to the Architect. The Owner and the Architect shall be entitled to rely upon the adequacy, accuracy and completeness of the services, certifications and approvals performed or provided by such design professionals, provided the Owner and Architect have specified to the Contractor all performance and design criteria that such services must satisfy. Pursuant to this Section 3.12.10, the Architect will review, approve or take other appropriate action on submittals only for the limited purpose of checking for conformance with information given and the design concept expressed in the Contract Documents. The Contractor shall not be responsible for the adequacy of the performance and design criteria specified in the Contract Documents.

§ 3.12.11 See Specifications for additional information on Shop Drawings.

§ 3.13 USE OF SITE

§ 3.13.1 The Contractor shall confine operations at the site to areas permitted by applicable laws, statutes, ordinances, codes, rules and regulations, and lawful orders of public authorities and the Contract Documents and shall not unreasonably encumber the site with materials or equipment.

§ 3.13.2 Nothing contained in the Contract Documents shall be interpreted as giving the Contractor exclusive use of the premises where the Work is to be performed.

§ 3.13.3 The Work in this Contract should not interfere with normal, continuous and safe operation of the buildings and site. If interference appears possible because of new connections to existing work or other reasons, the Work involved must be done at a time and in a manner approved by the Owner Representative as a part of the Contract.

§ 3.13.4 The Contractor shall comply with the following procedures when working in occupied areas including classrooms, hallways, and office spaces:

§ 3.13.4.1 Notification: The Contractor shall notify the Owner Representative and the Building Safety Committee Representative two (2) days prior to commencing work in occupied office, classroom and other areas. This notification shall include detailed description of proposed work.

§ 3.13.4.2 Overhead Work: There shall be no overhead work, (e.g. demolition, HVAC ductwork, and/or electrical) performed directly over occupied spaces.

§ 3.13.5 The Contractor shall produce a site mobilization plan for the Owner Representative's review and approval before beginning operations on site. This document shall be updated and submitted monthly. No deviations will be allowed without the prior approval of the Owner.

§ 3.14 CUTTING AND PATCHING

§ 3.14.1 The Contractor shall be responsible for cutting, fitting or patching required to complete the Work or to make its parts fit together properly. All areas requiring cutting, fitting and patching shall be restored to the condition existing prior to the cutting, fitting and patching, unless otherwise required by the Contract Documents.

§ 3.14.2 The Contractor shall not damage or endanger a portion of the Work or fully or partially completed construction of the Owner or separate contractors by cutting, patching or otherwise altering such construction, or by excavation. The Contractor shall not cut or otherwise alter such construction by the Owner or a separate contractor except with written consent of the Owner and of such separate contractor; such consent shall not be unreasonably withheld. The Contractor shall not unreasonably withhold from the Owner or a separate contractor the Contractor's consent to cutting or otherwise altering the Work.

§ 3.14.3 Written permission shall be obtained from the Architect/Engineer before cutting beams, arches, lintels or other structural members.

§ 3.14.4 See Specifications for additional information on Cutting and Patching.

§ 3.15 CLEANING UP

§ 3.15.1 The Contractor shall keep the premises and surrounding area free from accumulation of waste materials or rubbish caused by operations under the Contract. At completion of the Work, the Contractor shall remove waste materials, rubbish, the Contractor's tools, construction equipment, machinery and surplus materials and shall clean and/or remove all stains, spots, marks, blemishes, foreign matter and dirt from surfaces of the Work and from other surfaces not a part of the Work but where such conditions resulted from the Contractor's operations from and about the Project.

§ 3.15.2 If the Contractor fails to clean up as provided in the Contract Documents, the Owner may do so and Owner shall be entitled to reimbursement from the Contractor.

§ 3.16 ACCESS TO WORK

The Contractor shall provide the Owner and Architect access to the Work in preparation and progress wherever located.

§ 3.17 ROYALTIES, PATENTS AND COPYRIGHTS

The Contractor shall pay all royalties and license fees. The Contractor shall defend suits or claims for infringement of copyrights and patent rights and shall hold the Owner and Architect harmless from loss on account thereof, but shall not be responsible for such defense or loss when a particular design, process or product of a particular manufacturer or manufacturers is required by the Contract Documents, or where the copyright violations are contained in Drawings, Specifications or other documents prepared by the Owner or Architect. However, if the Contractor has reason to believe that the required design, process or product is an infringement of a copyright or a patent, the Contractor shall be responsible for such loss unless such information is promptly furnished to the Architect. In the event of legal action arising out of such infringement for which the Contractor is responsible and which action has the effect of stopping the Work, the Owner may require the Contractor to substitute other products of like kind as will make it possible to pursue and complete the Work. Costs and expenses caused thereby shall be borne by the Contractor.

§ 3.18 INDEMNIFICATION

§ 3.18.1 To the fullest extent permitted by law the Contractor shall defend, indemnify and hold harmless the Owner, Architect, Architect's consultants, and agents and employees of any of them from and against claims, damages, losses and expenses, including but not limited to attorneys' fees, arising out of or resulting from performance of the Work, provided that such claim, damage, loss or expense is attributable to bodily injury, sickness, disease or death, or to injury to or destruction of tangible property (other than the Work itself), but only to the extent caused by the willful, wanton or negligent acts or omissions of the Contractor, a Subcontractor, anyone directly or indirectly employed by them or anyone for whose acts they may be liable, regardless of whether or not such claim, damage, loss or expense is caused in part by a party indemnified hereunder. Such obligation shall not be construed to negate, abridge, or reduce other rights or obligations of indemnity which would otherwise exist as to a party or person described in this Section 3.18. Nothing in this Section shall be construed as obligating the Contractor to indemnify or hold harmless any of the parties indemnified hereunder against liability for damage arising out of bodily injury to persons or damage to property caused by or resulting from the sole negligence of any such indemnified party, or such party's agents or employees.

§ 3.18.2 In claims against any person or entity indemnified under this Section 3.18 by an employee of the Contractor, a Subcontractor, anyone directly or indirectly employed by them or anyone for whose acts they may be liable, the indemnification obligation under Section 3.18.1 shall not be limited by a limitation on amount or type of damages, compensation or benefits payable by or for the Contractor or a Subcontractor under workers' compensation acts, disability benefit acts or other employee benefit acts.

§ 3.18.3 The Contractor further agrees to obtain and maintain at its expense such general liability insurance coverage as will insure the provisions of this Section and other contractual indemnity obligations assumed by the Contractor in this Contract.

§ 3.18.4 The Contractor shall defend, indemnify and hold harmless the Owner, the Architect, and the Architect's consultants and their agents and employees from and against all claims, damages, losses, including, but not limited to, attorneys fees, arising out of or resulting from any type of pollution and/or environmental impairment into or upon the land, the atmosphere, or any course or body of water that is above or below ground, which is caused by any negligent or willful or wanton act or omission of the Contractor, subcontractors, or anyone directly or indirectly employed by any of them or anyone for whose acts any of them may be liable. The Contractor shall further indemnify and hold harmless the Owner, the Architect, and the Architect's consultants, and the agents and employees of any of them, as set out above for any acts that are outside of the contract specifications, and without the supervision or direction of the Owner, its Architects and Engineers; additionally this same indemnification shall apply to the misuse or malfunction of any equipment rented, owned, or leased by the Contractor, subcontractor, or anyone directly or indirectly employed by any of them or anyone for whose acts they may be liable. Nothing in this Section shall be construed as obligating the Contractor to indemnify or hold harmless any of the parties indemnified hereunder against liability for damage arising out of bodily injury to persons or damage to property caused by or resulting from the sole negligence of any such indemnified party, or such party's agents or employees.

The Owner assumes no responsibility or liability from loss or damage to the Contractor's equipment, materials, or supplies.

ARTICLE 4 ARCHITECT

§ 4.1 GENERAL

§ 4.1.1 The Owner shall retain an architect lawfully licensed to practice architecture or an entity lawfully practicing architecture in the jurisdiction where the Project is located. That person or entity is identified as the Architect in the Contract and is referred to throughout the Contract Documents as if singular in number.

§ 4.1.2 Duties, responsibilities and limitations of authority of the Architect as set forth in the Contract Documents shall not be restricted, modified or extended without written consent of the Owner, Contractor and Architect. Consent shall not be unreasonably withheld.

§ 4.1.3 If the employment of the Architect is terminated, the Owner shall employ a successor architect as to whom the Contractor has no reasonable objection and whose status under the Contract Documents shall be that of the Architect.

§ 4.2 ADMINISTRATION OF THE CONTRACT

§ 4.2.1 The Architect will provide administration of the Contract as described in the Contract Documents and will be an Owner's representative during construction until the date the Architect issues the final Certificate For Payment. The Architect will have authority to act on behalf of the Owner only to the extent provided in the Contract Documents.

§ 4.2.2 The Architect will visit the site at intervals appropriate to the stage of construction, or as otherwise agreed with the Owner, to become generally familiar with the progress and quality of the portion of the Work completed, and to determine in general if the Work observed is being performed in a manner indicating that the Work, when fully completed, will be in accordance with the Contract Documents. However, the Architect will not be required to make exhaustive or continuous on-site inspections to check the quality or quantity of the Work. The Architect will not have control over, charge of, or responsibility for, the construction means, methods, techniques, sequences or procedures, or for the safety precautions and programs in connection with the Work, since these are solely the Contractor's rights and responsibilities under the Contract Documents, except as provided in Section 3.3.1.

§ 4.2.2.1 Where it is stated in the Contract Documents that the Contractor shall pay for or reimburse the Owner for services of the Architect, such payment shall be at a rate of two and one half (2.5) times the Architect's Direct Personnel Expense plus any expenses incurred in providing such services. Direct Personnel Expense is defined as the direct salaries of the architect's personnel engaged on the Project and the portion of the cost of their mandatory and customary contributions and benefits related thereto, such as employment taxes and other statutory employee benefits, insurance, sick leave, holidays, vacations, pensions and similar contribution and benefits.

§ 4.2.3 On the basis of the site visits, the Architect will keep the Owner reasonably informed about the progress and quality of the portion of the Work completed, and report to the Owner (1) known deviations from the Contract Documents and from the most recent construction schedule submitted by the Contractor, and (2) defects and deficiencies observed in the Work. The Architect will not be responsible for the Contractor's failure to perform the Work in accordance with the requirements of the Contract Documents. The Architect will not have control over or charge of and will not be responsible for acts or omissions of the Contractor, Subcontractors, or their agents or employees, or any other persons or entities performing portions of the Work.

§ 4.2.4 COMMUNICATIONS FACILITATING CONTRACT ADMINISTRATION

Except as otherwise provided in the Contract Documents or when direct communications have been specially authorized, the Owner and Contractor shall endeavor to communicate with each other through the Architect about matters arising out of or relating to the Contract. Communications by and with the Architect's consultants shall be through the Architect. Communications by and with Subcontractors and material suppliers shall be through the Contractor. Communications by and with separate contractors shall be through the Owner.

§ 4.2.5 Based on the Architect's evaluations of the Contractor's Applications for Payment, the Architect will review and certify the amounts due the Contractor and will issue Certificates for Payment in such amounts.

§ 4.2.6 The Owner Representative has authority to reject Work that does not conform to the Contract Documents. Whenever the Owner Representative considers it necessary or advisable for implementation of the intent of the Contract Documents, the Owner Representative will have authority to require additional inspection or testing of the Work in accordance with Sections 13.5.2 and 13.5.3, whether or not such Work is fabricated, installed or completed. The Architect shall advise and assist the Owner Representative in performing any of the functions set forth in this Section.

§ 4.2.7 The Architect will review and approve, or take other appropriate action upon, the Contractor's submittals such as Shop Drawings, Product Data and Samples, but only for the limited purpose of checking for conformance with information given and the design concept expressed in the Contract Documents. The Architect's action will be taken in accordance with the submittal schedule approved by the Architect or, in the absence of an approved submittal schedule, with reasonable promptness while allowing sufficient time in the Architect's professional judgment to permit adequate review. Review of such submittals is not conducted for the purpose of determining the accuracy and completeness of other details such as dimensions and quantities, or for substantiating instructions for installation or performance of equipment or systems, all of which remain the responsibility of the Contractor as required by the Contract Documents. The Architect's review of the Contractor's submittals shall not relieve the Contractor of the obligations under Sections 3.3, 3.5 and 3.12. The Architect's review shall not constitute approval of safety precautions or, unless otherwise specifically stated by the Architect, of any construction means, methods, techniques, sequences or procedures. The Architect's approval of a specific item shall not indicate approval of an assembly of which the item is a component.

§ 4.2.8 The Owner Representative or the Architect will prepare Change Orders and Construction Change Directives and may authorize minor changes in the Work as provided in Section 7.4..

§ 4.2.9 The Architect will conduct inspections to determine the date or dates of Substantial Completion and the date of final completion; issue Certificates of Substantial Completion pursuant to Section 9.8; receive and forward to the Owner, for the Owner's review and records, written warranties and related documents required by the Contract and assembled by the Contractor pursuant to Section 9.10; and issue a final Certificate for Payment pursuant to Section 9.10. The undertaking of any inspections by the Architect is not to be construed as supervision of actual construction, nor to make the Architect responsible for providing a safe place for the performance of work by the Contractor of the Contractor's employees, or those of suppliers of subcontractors for access, visits, work, travel, or occupancy by any person.

§ 4.2.10 NOT USED.

§ 4.2.11 The Architect will interpret and decide matters concerning performance under, and requirements of, the Contract Documents on written request of either the Owner or Contractor. The Architect's response to such requests will be made in writing within any time limits agreed upon or otherwise with reasonable promptness. If no agreement is made concerning the time within which interpretations required of the Architect shall be furnished in compliance with this Section 4.2, then delay shall not be recognized on account of failure by the Architect to furnish such interpretations until fifteen (15) days after written request is made for them.

§ 4.2.12 Interpretations and decisions of the Architect will be consistent with the intent of, and reasonably inferable from, the Contract Documents and will be in writing or in the form of drawings. When making such interpretations and decisions, the Architect will endeavor to secure faithful performance by both Owner and Contractor, will not show partiality to either and will not be liable for results of interpretations or decisions rendered in good faith.

§ 4.2.13 The decisions of the Owner Representative, with the advice and consultation of the Architect on matters relating to aesthetic effect will be final if consistent with the intent expressed in the Contract Documents.

§ 4.2.14 The Architect will review and respond to requests for information about the Contract Documents. The Architect's response to such requests will be made in writing within any time limits agreed upon or otherwise with reasonable promptness. If appropriate, the Architect will prepare and issue supplemental Drawings and Specifications in response to the requests for information.

ARTICLE 5 SUBCONTRACTORS

§ 5.1 DEFINITIONS

§ 5.1.1 A Subcontractor is a person or entity who has a direct contract with the Contractor to perform a portion of the Work at the site. The term "Subcontractor" is referred to throughout the Contract Documents as if singular in number and means a Subcontractor or an authorized representative of the Subcontractor. The term "Subcontractor" does not include a separate contractor or subcontractors of a separate contractor.

§ 5.1.2 A Sub-subcontractor is a person or entity who has a direct or indirect contract with a Subcontractor to perform a portion of the Work at the site. The term "Sub-subcontractor" is referred to throughout the Contract Documents as if singular in number and means a Sub-subcontractor or an authorized representative of the Sub-subcontractor.

§ 5.2 AWARD OF SUBCONTRACTS AND OTHER CONTRACTS FOR PORTIONS OF THE WORK

§ 5.2.1 Unless otherwise stated in the Contract Documents or the bidding requirements, the Contractor, as soon as practicable from the date of the Letter of Intent to Award, shall furnish in writing to the Owner through the Architect the names of persons or entities (including those who are to furnish materials or equipment fabricated to a special design) proposed for each principal portion of the Work. The Architect may reply within fourteen (14) days to the Contractor in writing stating (1) whether the Owner or the Architect has reasonable objection to any such proposed person or entity or (2) that the Architect requires additional time for review. Failure of the Owner or Architect to reply within the 14 day period shall constitute notice of no reasonable objection. The Contractor shall submit the list of the subcontractors along with their CT registration number and FEIN or social security number if no FEIN number is available, within ten (10) days of the Letter of Intent to Award.

§ 5.2.2 The Contractor shall not contract with a proposed person or entity to whom the Owner or Architect has made reasonable and timely objection. The Contractor shall not be required to contract with anyone to whom the Contractor has made reasonable objection.

§ 5.2.2.1 The Contractor shall not contract with a person or entity who appears on the State of Connecticut Debarment List, the Federal Davis Bacon Act Debarment List, both of which are available through:

<http://www.ctdol.state.ct.us/>

or the Federal List of Excluded Parties Listing System available through <http://epls.arnet.gov/>

or who is party to a legal dispute with the State of Connecticut.

§ 5.2.3 If the Owner or Architect has reasonable objection to a person or entity proposed by the Contractor, the Contractor shall propose another to whom the Owner or Architect has no reasonable objection. If the proposed but rejected Subcontractor was reasonably capable of performing the Work and is not ineligible to be contracted with in accordance with Section 5.2.2.1, the Contract Sum and/or Contract Time shall be increased or decreased by the difference, if any, occasioned by such change, and an appropriate Change Order shall be issued before commencement of the substitute Subcontractor's Work. However, no increase in the Contract Sum or Contract Time shall be allowed for such change unless the Contractor has acted promptly and responsively in submitting names as required.

§ 5.2.4 The Contractor shall not substitute a Subcontractor, person or entity (including those who are to furnish materials or equipment fabricated to a special design) previously selected if the Owner or Architect makes reasonable objection to such substitution.

§ 5.2.5 As set forth more fully in the Notice and Instructions to Proposers, if the value of the masonry, electrical, mechanical (other than HVAC) and HVAC work each exceeds \$25,000, the Contractor may be required to list the names and prices of Subcontractors for masonry, electrical, mechanical other than HVAC, and HVAC work, as well as other Subcontractors or as may be required by the Bid Documents. Substitution of a Subcontractor for one named in the Bid Document, or substitution of a Subcontractor for any designated sub trade work bid to be performed by the Contractor's own forces, shall not be permitted, except for good cause. The term "good cause" includes but is not limited to a Subcontractor's or where appropriate, Contractor's: (1) death or physical disability, if the listed Subcontractor is an individual; (2) dissolution, if a corporation or partnership; (3) bankruptcy; (4) inability to furnish any performance and payment bonds shown on the Proposal Form; (5) inability to obtain, or loss of, a license

necessary for the performance of a particular category of work; (6) failure or inability to comply with a requirement of law applicable to Contractors, Subcontractors, or construction, alteration, or repair projects; and (7) failure to perform its agreement to execute a Subcontract, as set forth in the Bid Documents.

§ 5.3 SUBCONTRACTUAL RELATIONS

§ 5.3.1 By appropriate agreement, written where legally required for validity, the Contractor shall require each Subcontractor, to the extent of the Work to be performed by the Subcontractor, to be bound to the Contractor by terms of the Contract Documents, and to assume toward the Contractor all the obligations and responsibilities, including the responsibility for safety of the Subcontractor's Work, which the Contractor, by these Documents, assumes toward the Owner and Architect. Each subcontract agreement shall preserve and protect the rights of the Owner and Architect under the Contract Documents with respect to the Work to be performed by the Subcontractor so that subcontracting thereof will not prejudice such rights, and shall allow to the Subcontractor, unless specifically provided otherwise in the subcontract agreement, the benefit of all rights, remedies and redress against the Contractor that the Contractor, by the Contract Documents, has against the Owner. Where appropriate, the Contractor shall require each Subcontractor to enter into similar agreements with Sub-subcontractors. The Contractor shall make available to each proposed Subcontractor, prior to the execution of the subcontract agreement, copies of the Contract Documents to which the Subcontractor will be bound, and, upon written request of the Subcontractor, identify to the Subcontractor terms and conditions of the proposed subcontract agreement that may be at variance with the Contract Documents. Subcontractors will similarly make copies of applicable portions of such documents available to their respective proposed Sub-subcontractors.

§ 5.3.2 Any Subcontract must be in the form as provided by the Owner in accordance with Section 4b-96 of the Connecticut General Statutes. Supplements or other forms of Subcontracts are permitted as long as all the basic elements of the Connecticut General Statutes Section 4b-96 form are covered. In the event of any conflict or inconsistency between the Connecticut General Statutes Section 4b-96 Subcontract form as provided by the Owner and the Contractor's standard Subcontract form, the provisions of the Connecticut General Statutes Section 4b-96 Subcontract form shall prevail. Any standard Subcontract form used will be attached as a supplement to the Connecticut General Statutes Section 4b-96 Subcontract form as provided by the Owner.

Within five days after being notified of an award of a general contract by the University or, in the case of an approval of a substitute Subcontractor by the Owner, within five days after being notified of such approval, the Contractor shall present to each listed and approved Subcontractor, or approved Substitute Subcontractor, which will be performing masonry, electrical, mechanical other than HVAC, or HVAC work, or which will be performing other subcontract work which the Owner has designated in the Bid Documents as applicable to the following requirements:

1. A Subcontract in the form as described above.
2. A notice of the time limit under this section for executing a Subcontract.

If such Subcontractor fails within five days, Saturdays, Sundays and legal holidays excluded after presentation of a Subcontract by the Contractor to execute a Subcontract in the form hereinafter set forth, the Contractor shall propose another Subcontractor for the Owner's consideration and approval. When seeking approval for a substitute Subcontractor, the Contractor shall provide the University with all documents showing (A) the Contractor's proper presentation of a Subcontract to the listed Subcontractor and (B) communications to or from such Subcontractor after such presentation. The Owner shall adjust the Contract Price to reflect the difference between the amount of the price of the new Subcontractor and the amount of the price of the prior Subcontractor if the new Subcontractor's price is lower and may adjust such Contract Price if the new Subcontractor's price is higher. The Contractor shall, with respect to each such Subcontractor or approved substitute Subcontractor, file with the Owner a copy of each executed subcontract within ten days, Saturdays, Sundays and legal holidays excluded, of presentation of a Subcontract to such Subcontractor.

§ 5.4 CONTINGENT ASSIGNMENT OF SUBCONTRACTS

§ 5.4.1 Each subcontract agreement for a portion of the Work is assigned by the Contractor to the Owner, provided that

- .1 assignment is effective only after termination of the Contract by the Owner for cause pursuant to Section 14.2 and only for those subcontract agreements that the Owner accepts by notifying the Subcontractor and Contractor in writing; and

- .2 assignment is subject to the prior rights of the surety, if any, obligated under bond relating to the Contract.

When the Owner accepts the assignment of a subcontract agreement, the Owner assumes the Contractor's rights and obligations under the subcontract. Contractor agrees to execute any and all other documents reasonably required to effect the assignment.

§ 5.4.2 Upon such assignment, if the Work has been suspended for more than thirty (30) days, the Subcontractor's compensation shall be equitably adjusted for increases in cost resulting from the suspension.

§ 5.4.3 Upon such assignment to the Owner under this Section 5.4, the Owner may further assign the subcontract to a successor contractor or other entity. If the Owner assigns the subcontract to a successor contractor or other entity, the Owner shall nevertheless remain legally responsible for all of the successor contractor's obligations under the subcontract.

§ 5.5 The Contractor shall promptly advise the Owner in writing of any claim or demand by a Subcontractor claiming that any amount is due to such Subcontractor or claiming any default by the Contractor in any of its obligations to such Subcontractor.

ARTICLE 6 CONSTRUCTION BY OWNER OR BY SEPARATE CONTRACTORS

§ 6.1 OWNER'S RIGHT TO PERFORM CONSTRUCTION AND TO AWARD SEPARATE CONTRACTS

§ 6.1.1 The Owner reserves the right to perform construction or operations related to the Project with the Owner's own forces, and to award separate contracts in connection with other portions of the Project or other construction or operations on the site under Conditions of the Contract identical or substantially similar to these including those portions related to insurance and waiver of subrogation. If the Contractor claims that delay or additional cost is involved because of such action by the Owner, the Contractor shall make such Claim as provided in Article 15.

§ 6.1.2 When separate contracts are awarded for different portions of the Project or other construction or operations on the site, the term "Contractor" in the Contract Documents in each case shall mean the Contractor who executes each separate Owner-Contractor Agreement.

§ 6.1.3 The Owner shall provide for coordination of the activities of the Owner's own forces and of each separate contractor with the Work of the Contractor, who shall cooperate with them. The Contractor shall participate with other separate contractors and the Owner in reviewing their construction schedules and construction requirements. The Contractor shall make any revisions to the construction schedule deemed necessary after a joint review and mutual agreement between the Owner and Contractor. The construction schedules shall then constitute the schedules to be used by the Contractor, separate contractors and the Owner until subsequently revised.

§ 6.1.4 Unless otherwise provided in the Contract Documents, when the Owner performs construction or operations related to the Project with the Owner's own forces, the Owner shall be deemed to be subject to the same obligations and to have the same rights that apply to the Contractor under the Conditions of the Contract, including, without excluding others, those stated in Article 3, this Article 6 and Articles 10, 11 and 12.

§ 6.2 MUTUAL RESPONSIBILITY

§ 6.2.1 The Contractor shall afford the Owner and separate contractors reasonable opportunity for introduction and storage of their materials and equipment and performance of their activities, and shall connect and coordinate the Contractor's construction and operations with theirs as required by the Contract Documents.

§ 6.2.2 If part of the Contractor's Work depends for proper execution or results upon construction or operations by the Owner or a separate contractor, the Contractor shall, prior to proceeding with that portion of the Work, promptly report to the Architect apparent discrepancies or defects in such other construction that would render it unsuitable for such proper execution and results. Failure of the Contractor so to report shall constitute an acknowledgment that the Owner's or separate contractor's completed or partially completed construction is fit and proper to receive the Contractor's Work, except as to defects not then reasonably discoverable. If any part of a Contractor's work depends on proper and timely execution or relies upon the interphasing or coordinating of the work of any other separate Contractor, or the Owner, the Contractor shall allow for this interrelationship in the planning and performance of his work, without interference to any other contractor.

§ 6.2.3 The Contractor shall reimburse the Owner for costs the Owner incurs that are payable to a separate contractor because of the Contractor's delays, improperly timed activities or defective construction. The Owner shall be responsible to the Contractor for costs the Contractor incurs because of a separate contractor's delays, improperly timed activities, damage to the Work or defective construction.

§ 6.2.4 The Contractor shall promptly remedy damage the Contractor wrongfully causes to completed or partially completed construction or to property of the Owner or separate contractors as provided in Section 10.2.5.

§ 6.2.5 The Owner and each separate contractor shall have the same responsibilities for cutting and patching as are described for the Contractor in Section 3.14.

§ 6.3 OWNER'S RIGHT TO CLEAN UP

If a dispute arises among the Contractor, separate contractors and the Owner as to the responsibility under their respective contracts for maintaining the premises and surrounding area free from waste materials and rubbish, the Owner may clean up and the Owner Representative will allocate the cost among those responsible.

ARTICLE 7 CHANGES IN THE WORK

§ 7.1 GENERAL

§ 7.1.1 Changes in the Work may be accomplished after execution of the Contract, and without invalidating the Contract, by Change Order, Construction Change Directive or order for a minor change in the Work, subject to the limitations stated in this Article 7 and elsewhere in the Contract Documents.

§ 7.1.2 A Change Order shall be based upon agreement among the Owner, Contractor and Architect; a Construction Change Directive requires agreement by the Owner and Architect and may or may not be agreed to by the Contractor. All changes to the Work shall be approved by the Owner Representative. Except as permitted in Section 7.3, a change in the Contract Sum or the Contract Time shall be accomplished only by Change Order. Accordingly, no course of conduct or dealings between the parties, nor express or implied acceptance of alterations or additions to the Work, and no claim that the Owner has been unjustly enriched by any alterations or additions to the Work, whether or not there is, in fact, any unjust enrichment shall be the basis for any claim for an increase in any amounts due under the Contract Documents or a change in any time period provided for the Contract Documents..

§ 7.1.3 Changes in the Work shall be performed under applicable provisions of the Contract Documents, and the Contractor shall proceed promptly, unless otherwise provided in the Change Order, Construction Change Directive or order for a minor change in the Work.

§ 7.2 CHANGE ORDERS

§ 7.2.1 A Change Order is a written instrument prepared by the Owner or Architect and signed by the Owner, Contractor and Architect stating their agreement upon all of the following:

- .1 The change in the Work;
- .2 The amount of the adjustment, if any, in the Contract Sum; and
- .3 The extent of the adjustment, if any, in the Contract Time.

There shall be no extension in the Contract time unless the Contractor can effectively demonstrate that the Work delayed is on the critical path of the Project Schedule in accordance with Section 8.3.

The signature of the Architect signifies that he has reviewed the change proposed, with accompanied breakdowns and subcontractors change proposals for appropriate quantities and unit costs and recommends the change. However, if the Contractor and the Owner Representative have signed the change order, the Architect's signature is not necessary in order for the Change Order to constitute a modification to the Contract which binds the Owner and the Contractor.

§ 7.2.2 CHANGE ORDER COST COMPONENTS

The contractor's proposal for a change in the Work shall be itemized completely, submitted in a detailed format acceptable to the Owner and shall include the following itemized cost components, as appropriate:

§ 7.2.2.1 Engineered Equipment and Materials:

Engineered Equipment shall be defined as equipment specified by the contract from a single manufacturer. **Material** (bulk materials) shall be defined as permanent construction materials that become part of the completed installation. Engineered Equipment and Material costs shall be considered all-inclusive of the purchase cost of the equipment including all freight costs, purchasing services, expediting, and inspections and shall be substantiated by manufacturer quotes subject to review and approval by the Owner's representative, with the advice of the Architect.

§ 7.2.2.2 Direct Field Labor Hours:

Direct labor work hours for change orders shall be itemized indicating the estimated direct labor to be expended in the actual installation of equipment and materials that will become a permanent part of the finished project. The quantity of hours shall be based upon the contractor's estimate to complete the work based upon actual field conditions subject to review and approval by the Owner's representative, with the advice of the Architect.

§ 7.2.2.3 Direct Field Labor Costs:

Direct field labor costs are defined as cost of the direct labor estimated in the actual installation of equipment and materials that will become a permanent part of the finished project. Direct field labor may include hourly labor classifications for foremen, journeymen, apprentices, laborers, etc. Direct field labor costs may include contractor's direct labor payroll costs including social security, unemployment (federal and state), workers' compensation insurance, fringe benefits, and any other identified costs directly related to direct labor subject to review and approval by the Owner's representative, with the advice of the Architect.

The contractor's direct labor rates as outlined above are to be substantiated by a detailed direct labor cost breakdown with associated back-up support in a form acceptable to the Owner.

If the project is subject to prevailing wage rates, no wage above the prevailing rate shall be allowed unless such rate is substantiated by documentation of actual wages paid in the proposed amount or subject to labor rates submitted and accepted by the Owner as part of the contract documents.

§ 7.2.2.4 Construction Equipment and Tool Rental:

Contractor owned or rented equipment and major tools costs are allowed as part of the cost of a Change Order if it is demonstrated to the Owners satisfaction that such costs are valid and related to the change in work. Major tools shall be defined as non-hand held tools. Pricing rates for equipment and major tools shall be acceptable if agreed to by the Owner. In such cases, equipment costs shall be submitted for review and approval by the Owner, with the advice of the Architect. Changes that require specialized equipment not already on site shall have costs shown separately and shall include justification.

§ 7.2.2.5 Field Overheads (Indirects):

Field overhead (indirect) labor shall include field (onsite) supervision (superintendent, general foremen, field engineers)

Field overhead (Indirects) are allowed as part of a cost of a Change Order if it is demonstrated to the Owners satisfaction that such costs are valid and related to the change in work. In such cases additional costs of supervision and directly attributable to the change based on supporting data additional shall be submitted for review and approval by the Owner, with the advice of the Architect. The hourly rate for such personnel shall be based upon rates submitted to and approved by the Owner with the advice of the Architect. Changes that require specialized personnel or additional staff shall have costs shown separately and shall include justification.

Field Facilities shall include the following classifications, as applicable:

1. Temporary offices (office furniture, copiers, computers, printers, other office equipment and supplies)
2. Temporary material storage (storage vans and containers, warehouse rental)
3. Utilities (electricity, phones, data lines, restroom facilities)

Field Facilities costs are not allowed as part of the costs of a Change Order except in the event that a change involving an adjustment in contract time is submitted and approved in accordance with Section 8.3 or for changes that do not impact the critical path, it is demonstrated to the Owners satisfaction that such incremental costs are valid and related to the change in work. In such cases, Field Facilities costs shall be submitted for review and approval by the Owner, with the advice of the Architect.

§ 7.2.2.6 As noted in Section 3.6, the Owner is a tax exempt institution. The tax on materials or supplies exempted by the current regulations of the Department of Revenue Services shall not be included as a cost component of any Change Order or Change Order request/proposal.

§ 7.2.2.7 Subcontractors:

Subcontractors shall adhere to the same contract requirements and shall utilize change order pricing methodology that is consistent with the general contractor’s contractual agreement with the owner. Include detailed Subcontractor cost proposals as backup to all subcontractor pricing.

§ 7.2.2.8 General and Administrative Overhead (Home Office) Costs and Profit (Overhead and Profit):

Overhead and Profit shall be applied as a percentage to the total cost of the change and shall include:

1. All home office expenses;
2. Safety related items, including safety equipment, safety administration, and all related costs associated with the contractor’s safety program;
3. Small tools, which are defined as construction tools with a value of up to \$500;
4. Consumable materials, which are normally used in the execution of the work and as may be further defined in the general conditions section of the specifications;
5. Indirect costs as related to field administrative personnel (project manager, field safety supervisor, planners, estimators, office manager, secretarial services, document control);
6. Indirect costs as related to support staff;
7. Commercial General, Automobile, Umbrella, Aircraft and Contractor’s Pollution Liability Insurance as described in Section 11.1.2;
8. Parking;
9. Safety;
10. Commissioning Requirements;
11. Such other items as are commonly considered part of home office overhead;
12. Company vehicle, gas, mileage and travel time;
13. Union-related contributions, fees, expenses and costs;
14. Any training; and
15. Licenses.

§ 7.2.2.9 The determination of overhead and profit allowance for a contract change shall be based on the total direct cost of the work including material, labor, and equipment cost, as appropriate, utilizing the Contractor/Subcontractor Combined Overhead and Profit Markup Table as follows:

Contractor/Subcontractor Combined Overhead and Profit Markup Table:	
Contractor markup on self performed work	15%
Contractor markup on subcontractor work.	5%
Subcontractor markup on self performed work.	15%
Subcontractor markup on first tier sub-subcontractor work.	5%
Sub-subcontractor markup on self performed work.	10%
Subcontractor markup on Sub-subcontractor subtier work	0%
Sub-subcontractor markup on subtier work.	0%

§ 7.2.2.10 Upon computing of the direct costs and applying the Section 7.2.2.9 mark ups to the direct costs on a compounded basis, the aggregate allowance for overhead and profit on any contract change shall not exceed twenty percent (20%).

§ 7.2.2.11 Overtime, when specifically authorized by the Owner and not as an Extraordinary Measure (as defined in Section 8.2.3.2), shall be paid for by the Owner on the basis of premium payment only, plus the cost of insurance and taxes based on the premium payment period.

§ 7.2.2.12 The amount of credit to be allowed by the Contractor to the Owner for a deletion or change that results in a net decrease in the Contract Sum shall be actual net cost as confirmed by the Owner Representative. When both additions and credits covering related Work or substitutions are involved in a change, the allowance for overhead and profit shall be figured on the basis of net increase, if any, with respect to that change.

§ 7.2.2.13 If the Contractor does not expeditiously proceed with the work in dispute, the Owner may, in its sole discretion, cause the work to be performed by other forces, and may issue a Change Order deducting the actual cost of the work to the Owner from the Contract Sum.

§ 7.2.2.14 Bond Costs: Actual additional bonding costs associated with the value of the Change Order will be compensable only when supported by written documentation by the bonding company that the Change Order requires an increase to the original Performance, Payment, Labor or Material Bond. Such Bond Costs will be adjusted as a final Change Order to the Contractor with no additional fee or mark-up.

§ 7.2.3 The Contractor shall submit cost proposals only on "Change Order Proposal Request Form" provided in Division 1 of the Specifications or on a form and in a format acceptable to the Owner. In order to facilitate checking of quotations for extras or credits, all proposals, except those so minor that their propriety can be seen by inspection, shall be accompanied by a complete itemization of costs including labor, materials, unit prices, and Subcontracts. Subcontract proposals included in any work shall also be itemized.

§ 7.2.4 Alternates awarded by Change Order after Contract execution are not subject to Contractor, Subcontractor or Subcontractor tiers overhead and profit mark-up.

§ 7.2.5 Agreement upon and execution of any Change Order shall constitute a final settlement of all matters relating to the change in the Work which is the subject of the Change Order, including, but not limited to, all direct and indirect costs associated with such change and any and all adjustments to the Contract Sum and the construction schedule. In the event a Change Order increases the Contract Sum, Contractor shall include the Work covered by such Change Orders in Application for Payment as if such Work were originally part of the Contract Documents.

§ 7.2.6 Any percentage referred to hereafter for General Conditions, and/or Overhead and Profit included in the adjustment to the Contract Sum shall be applied to the costs of performing the work attributable to the change as stated in 7.3.7.1 through 7.3.7.6. No markup shall be allowed for premiums on bonds and insurance.

§ 7.3 CONSTRUCTION CHANGE DIRECTIVES

§ 7.3.1 A Construction Change Directive is a written order prepared by the Owner Representative or Architect and signed by the Owner and Architect, directing a change in the Work prior to agreement on adjustment, if any, in the Contract Sum or Contract Time, or both. The Owner may by Construction Change Directive, without invalidating the Contract, order changes in the Work within the general scope of the Contract consisting of additions, deletions or other revisions, the Contract Sum and Contract Time being adjusted accordingly. The signature of the Architect signifies that he has reviewed and recommends the change. However, if the Owner Representative has signed the Change Directive the Architect's signature is not necessary in order for the Change Directive to be valid.

§ 7.3.2 A Construction Change Directive shall be used in the absence of total agreement on the terms of a Change Order.

§ 7.3.3 If the Construction Change Directive provides for a proposed adjustment to the Contract Sum and/or Contract Time, the adjustment shall be based on one of the following methods:

- .1 Mutual acceptance of a lump sum properly itemized and supported by sufficient substantiating data to permit evaluation;
- .2 Unit prices stated in the Contract Documents or subsequently agreed upon;
- .3 Cost to be determined in a manner agreed upon by the parties and a mutually acceptable fixed or percentage fee; or
- .4 As provided in Section 7.3.7.

§ 7.3.4 If unit prices are stated in the Contract Documents or subsequently agreed upon, and if quantities originally contemplated are materially changed in a proposed Change Order or Construction Change Directive so that application of such unit prices to quantities of Work proposed will cause substantial inequity to the Owner or Contractor, the applicable unit prices shall be equitably adjusted.

§ 7.3.5 Upon receipt of a Construction Change Directive, the Contractor shall promptly proceed with the change in the Work involved and advise the Architect of the Contractor's agreement or disagreement with the method, if any, provided in the Construction Change Directive for determining the proposed adjustment in the Contract Sum or Contract Time.

§ 7.3.6 A Construction Change Directive signed by the Contractor indicates the Contractor's agreement therewith, including adjustment in Contract Sum and Contract Time or the method for determining them. The Contractor must proceed promptly regardless if the directive is signed by the Contractor.

§ 7.3.7 If the contractor does not respond promptly or disagrees with the method for adjustment in the Contract Sum, the method for adjustment in the Contract Sum and/or Contract Time shall be determined at the sole discretion of the Owner Representative, on the basis of reasonable expenditures and savings of those performing the Work attributable to the change, including, in case of an increase in the Contract Sum, a reasonable allowance for overhead and profit in accordance with Section 7.2. In such case, and also under Section 7.3.3.3, the Contractor shall keep and present, in such form as the Owner Representative may prescribe, an itemized accounting together with appropriate supporting data. Any increase to Contract time will be limited to only changes that have been demonstrated through a critical path analysis in conformance with Section 8.3 and Division 1 of the Contract Documents to extend the Project end date. Unless otherwise provided in the Contract Documents, costs of performing the Work attributable to the changes for the purposes of this Section 7.3.7 shall be limited to the following as defined in Section 7.2:

- .1 Costs of labor, including social security, old age and unemployment insurance, fringe benefits required by agreement or custom, and workers' compensation insurance;
- .2 Costs of materials, supplies and equipment, including cost of transportation, whether incorporated or consumed;
- .3 Rental costs of machinery and equipment, exclusive of hand tools and any hand-held equipment, whether rented from the Contractor or others;
- .4 Costs of premiums for all bonds, permit fees, and sales, use or similar taxes related to the Work; and
- .5 Additional costs of field overhead personnel directly attributable to the change based on supporting data.

§ 7.3.8 If the Contractor does not expeditiously proceed with the work in dispute, the Owner may, in its sole discretion, cause the work to be performed by other forces, and may issue a Change Order deducting the actual cost of the work to the Owner from the Contract Sum.

§ 7.3.9 The amount of credit to be allowed by the Contractor to the Owner for a deletion or change that results in a net decrease in the Contract Sum shall be actual net cost as confirmed by the Owner Representative. When both additions and credits covering related Work or substitutions are involved in a change, the allowance for overhead and profit shall be figured on the basis of net increase, if any, with respect to that change.

§ 7.3.9 NOT USED.

§ 7.3.10 When the Owner and Contractor agree concerning the adjustments in the Contract Sum and/or Contract Time, or otherwise reach agreement upon the adjustments, such agreement shall be effective immediately and shall be recorded by preparation and execution of an appropriate Change Order, Change Orders may be issued for all or any part of a Construction Change Directive.

§ 7.4 MINOR CHANGES IN THE WORK

The Architect, subject to approval of the Owner Representative, has authority to order minor changes in the Work not involving adjustment in the Contract Sum or extension of the Contract Time and not inconsistent with the intent of the Contract Documents. Such changes will be effected by written order and shall be binding on the Owner and Contractor. The Contractor shall carry out such written orders promptly.

ARTICLE 8 TIME

§ 8.1 DEFINITIONS

§ 8.1.1 Unless otherwise provided, Contract Time is the period of time, including authorized adjustments, allotted in the Contract Documents for Substantial Completion of the Work.

§ 8.1.2 The date of commencement of the Work is the date established in the Notice to Proceed.

§ 8.1.3 The date of Substantial Completion is the date certified by the Architect in accordance with Section 9.8.

§ 8.1.4 The term “day” as used in the Contract Documents shall mean calendar day unless otherwise specifically defined.

§ 8.2 PROGRESS AND COMPLETION

§ 8.2.1 Time limits stated in the Contract Documents are of the essence of the Contract. By executing the Contract the Contractor confirms that the Contract Time is a reasonable period for performing the Work and that the Contractor is capable of properly completing the Work within the Contract Time.

§ 8.2.2 The Contractor shall not knowingly, except by agreement or instruction of the Owner in writing, prematurely commence operations on the site or elsewhere prior to the effective date of insurance required by Article 11 to be furnished by the Contractor and Owner. The date of commencement of the Work shall not be changed by the effective date of such insurance.

§ 8.2.3 The Contractor shall proceed expeditiously with adequate forces and shall achieve Substantial Completion within the Contract Time.

§ 8.2.3.1 The Contractor shall monitor the progress of the Work for conformance with the requirements of the construction schedule and shall promptly advise the Owner of any delays or potential delays. The accepted construction schedule shall be updated to reflect actual conditions (sometimes referred to as progress reports) as set forth in Section 3.10.1 of AIA Document A201 or if requested by the Owner. In the event any progress report indicates any delays or potential delays, the Contractor shall advise the Owner of its plan to recover the schedule, providing the Owner with a recovery schedule, and shall further take all steps necessary to correct the delay, including overtime and/or additional labor, if necessary. In no event shall any progress report or recovery schedule constitute an adjustment in the Contract Time or the Contract Sum unless any such adjustment is agreed to by the Owner and authorized pursuant to Change Order.

§ 8.2.3.2 In the event the Owner determines that the performance of the Work has not progressed or reached the level of completion required by the approved construction schedule for reasons within the responsibility of the Contractor, the Owner shall have the right to order the Contractor to take any and all corrective measures necessary to expedite the progress of construction, including, without limitation, (1) working additional shifts or overtime, (2) supplying additional manpower, equipment, and facilities and (3) other similar measure (hereinafter referred to collectively as “Extraordinary Measures”). Such Extraordinary Measure shall continue until the progress of the Work complies with the stage of completion required by the approved construction schedule. The Owner’s right to require Extraordinary Measures is solely for the purpose of ensuring the Contractor’s compliance with the construction schedule.

§ 8.2.3.3 The Contractor shall not be entitled to any adjustment in the Contract Price in connection with Extraordinary Measures required by the Owner, if the Owner determines that the conditions creating the need for such Extraordinary Measures were within the responsibility of the Contractor.

§ 8.2.3.4 The Owner may exercise the rights furnished the Owner under or pursuant to this Section as frequently as the Owner deems necessary to ensure that the Contractor’s performance of the Work will comply with any approved construction schedule or completion date established in accordance with the Contract.

§ 8.2.4 The Contractor and the Owner agree that the times specified for the performance of the Contract shall include not only the work of the original Contract but any additional work ordered by the Owner which, in the opinion of the Owner Representative, can be performed concurrently with the original work specified and therefore do not warrant the granting of an extension of time.

§ 8.2.5 Except in the event of emergency, no substantial field operations shall be performed outside of regular working hours without the prior approval of the Architect and the Owner. The Contractor shall not be entitled to additional compensation for work performed outside of regular working hours.

§ 8.3 DELAYS AND EXTENSIONS OF TIME

§ 8.3.1 If the Contractor is delayed at any time in the commencement or progress of the Work by an act or neglect of the Owner or Architect, or of an employee of either, or of a separate contractor employed by the Owner; or by changes ordered in the Work; or by labor disputes, fire, or unavoidable casualties beyond the Contractor's control, then the Contract Time may be extended by Change Order for such reasonable time periods as demonstrated through a Critical Path Analysis in conformance with Division 1 of the Contract Documents and accepted by the Owner Representative.

§ 8.3.2 Claims relating to time shall be made in accordance with applicable provisions of Article 15.

§ 8.3.2.1 Claims of delay and requests for extension of time shall set forth in detail the circumstances of such claim, the dates upon which claimed delay began and ended, and the number of days' extension of time requested. The Contractor shall provide supporting documentation as the Architect and Owner may require, including a revised Construction Schedule indicating the affect of the circumstances which form the basis for the claim.

§ 8.3.2.2 The contractor shall not be entitled to an extension of time for each and every one of a number of causes which have a concurrent and interrelated effect on the progress of the Work.

§ 8.3.2.3 Claims for extension of time arising out of authorized changes in the Work shall be made in writing prior to or concurrent with the submission of the Contractor's proposal for such change. No extension of time arising out of changes in the Work will be granted after the date upon which the Contractor is authorized to proceed with such change unless specific provision for an extension of time has been incorporated in the authorization.

§ 8.3.2.4 Any additional cost to the contractor arising from such change shall be included in the amended Contract Sum set forth in such Change Order. No claim for damages for delay, arising from such change in the Work, shall be recognized or be deemed valid.

§ 8.3.3 This Section 8.3 does not preclude recovery of damages for delay by either party under other provisions of the Contract Documents.

ARTICLE 9 PAYMENTS AND COMPLETION

§ 9.1 CONTRACT SUM

The Contract Sum is stated in the Contract and, including authorized adjustments, is the total amount payable by the Owner to the Contractor for performance of the Work under the Contract Documents.

§ 9.2 SCHEDULE OF VALUES

§ 9.2.1 Where the Contract is based on a stipulated sum or Guaranteed Maximum Price, the Contractor shall submit to the Architect, before the first Application for Payment, a schedule of values allocating the entire Contract Sum to the various portions of the Work and prepared in such form and supported by such data to substantiate its accuracy as the Owner Representative may require. This schedule, unless objected to by the Architect, shall be used as a basis for reviewing the Contractor's Applications for Payment.

§ 9.2.1.1 Submission of the Schedule of Values shall be made within five (5) days for projects under One Million Dollars (\$1,000,000.00) and for all others within thirty (30) days of the Contract execution.

§ 9.2.1.2 The Schedule of Values shall be submitted (typewritten) on an AIA Document G702 form and should be broken down into a minimum of sixteen (16) divisions based on the Construction Specifications Institute (CSI) Guidelines and subdivided further by Materials and Labor.

§ 9.3 APPLICATIONS FOR PAYMENT

§ 9.3.1 By the twenty-fifth of each month, the Contractor shall submit to the Owner Representative and the Architect a Draft Application for Payment for Work in the form of an AIA Document G702, Application and Certification for

Payment, supported by AIA Document G703, Continuation Sheet. The latest edition of each document must be used.

The Owner Representative and the Architect will within ten (10) days after receipt of the Contractor's Draft Application for Payment notify the Contractor in writing of all necessary revisions.

The Contractor shall make all revisions to the Application for Payment as required by the Owner Representative.

The Contractor shall then submit to the Owner Representative and the Architect an Application for Payment for Work in the form of a notarized AIA Document G702, Application for Payment, supported by AIA Document G703, Continuation Sheet, free of any handwritten marks, notes, annotations, etc. and an Affidavit of Payment and Release of Claims form (either partial release or final release as appropriate) in a form as provided by the Owner.

By submission of the Affidavit and the Application for Payment the Contractor certifies that to the best of the Contractor's knowledge, information and belief the Work covered by this Application for Payment has been completed in accordance with the Contract Documents, that all amounts have been paid by the Contractor for Work for which previous Certificates for Payment were issued and payments received from the Owner, and that current payment shown therein is now due.

§ 9.3.1.1 Each payment requisition submitted by the Contractor shall include a statement showing the status of all pending construction change orders, other pending change directives and approved changes to the original contract or subcontract. Such statement shall identify the pending construction change orders and other pending change directives, and shall include the date such change orders and directives were initiated, the costs associated with their performance and a description of any work completed. As used in this subsection, "pending for construction change order" or "other pending change directive", means an authorized directive for extra work that has been issued to a contractor or a subcontractor.

§ 9.3.1.2 Applications for Payment shall not include requests for payment for portions of the Work for which the Contractor does not intend to pay a Subcontractor or material supplier, unless such Work has been performed by others whom the Contractor intends to pay.

§ 9.3.1.3 Such Application for Payment shall include a deduction of seven and one half (7.5%) percent of the estimated amount of the application to be retained by the Owner until the completion of the entire Contract in an acceptable manner. The Contractor shall be prohibited from withholding more than seven and one half (7.5%) percent retainage from any payment which is otherwise due to any Subcontractor.

§ 9.3.1.3.1 In addition, if the State Commission on Human Rights and Opportunities ("CHRO") authorizes the award or execution of this contract in advance of CHRO's approval of the Affirmative Action Plan required to be submitted by the Contractor pursuant to Connecticut General Statutes Section 46a-68d, the Owner will withhold an additional two percent (2%) of the total contract price per month from any payment made to such Contractor, until such time as the Contractor has received approval from CHRO of the Affirmative Action Plan. Moreover, if CHRO determines through its complaint procedure and the hearing process provided in Connecticut General Statutes Section 46a-56(c) that a contractor or subcontractor is not complying with anti-discrimination statutes or contract provisions required under Connecticut General Statutes Section 4a-60 or 4a-60(a) or the provisions of Connecticut General Statutes Section 46a-68c to 46a-68f, inclusive, and if so ordered by the presiding officer after such hearing and upon a finding of noncompliance, the University shall retain two percent (2%) of the total contract price per month on the contract with the Contractor.

§ 9.3.1.4 Whenever the Owner has designated a separate section for a class of work the Contractor shall, when applicable, state as part of its application for partial payment that it considers the work required to be done under any such separate section to be fully completed in accordance with the terms of the Contract. The Owner shall thereupon conduct an inspection of the work in such class, and if it finds that such work has been fully completed in accordance with the terms of the Contract, it shall issue a statement certifying that such work is accepted as fully completed, and shall pay the Contractor in full for such work.

§ 9.3.2 Unless otherwise specifically approved, the Owner will pay only for material and equipment delivered and incorporated in the Work. If approved in advance by the Owner, payment may be similarly made for material and equipment suitably stored on site or off site at a location agreed upon in writing. Payment for materials and

equipment stored on or off the site shall be conditioned upon compliance by the Contractor with procedures satisfactory to the Owner to establish the Owner's title to such materials and equipment or otherwise protect the Owner's interest, and shall include the costs of applicable insurance, storage and transportation to the site for such materials and equipment stored off the site.

§ 9.3.2.1 Payment for stored material either on site or off site will require Owner's prior approval. Approval will be dependent upon demonstration of hardship due to extended time duration between required purchase and actual field installation or the critical nature of the commodity in relationship to the critical path of the construction schedule. Additionally, the Contractor must provide secured storage, insurance coverage for the material during storage, transfer of ownership of the material to the Owner and indemnify the Owner from any delay, cost associated with or resulting from, the loss or damage of such material during such storage. Payment for such material will be paid for at 80% of invoice verified cost. No stored payment will be considered for raw materials. Those items requiring fabrication must be complete so that identification and appropriate documentation can be obtained to insure such items are part of the work identified in this Contract.

§ 9.3.3 The Contractor warrants that title to all Work covered by an Application for Payment will pass to the Owner no later than the time of payment. The Contractor further warrants that upon submittal of an Application for Payment all Work for which Certificates for Payment have been previously issued and payments received from the Owner shall, to the best of the Contractor's knowledge, information and belief, be free and clear of liens, claims, security interests or encumbrances in favor of the Contractor, Subcontractors, material suppliers, or other persons or entities making a claim by reason of having provided labor, materials and equipment relating to the Work.

§ 9.3.4 If payment for stored products is approved, Contractor shall furnish with Application for Payment a vendor invoice establishing value of material and equipment stored along with a statement of amount to be paid to vendor.

§ 9.3.4.1 Such stored items are subject to prior approval for storage and to inspection by Architect and Owner before payment is recommended.

§ 9.3.4.2 Contractor shall give Owner Certificates of Insurance in accordance with Contract Documents for the full value of the items stored. Insurance to be maintained until items are incorporated in the Work.

§ 9.4 CERTIFICATES FOR PAYMENT

§ 9.4.1 The Architect will, within seven days after receipt of the Contractor's Application for Payment, either issue to the Owner a Certificate for Payment, with a copy to the Contractor, for such amount as the Architect determines is properly due, or notify the Contractor and Owner in writing of the Architect's reasons for withholding certification in whole or in part as provided in Section 9.5.1.

§ 9.4.2 The issuance of a Certificate for Payment will constitute a representation by the Architect to the Owner, based on the Architect's evaluation of the Work and the data comprising the Application for Payment, that, to the best of the Architect's knowledge, information and belief, the Work has progressed to the point indicated and that the quality of the Work is in accordance with the Contract Documents. The foregoing representations are subject to an evaluation of the Work for conformance with the Contract Documents upon Substantial Completion, to results of subsequent tests and inspections, to correction of minor deviations from the Contract Documents prior to completion and to specific qualifications expressed by the Architect. The issuance of a Certificate for Payment will further constitute a representation that the Contractor is entitled to payment in the amount certified. However, the issuance of a Certificate for Payment will not be a representation that the Architect has (1) made exhaustive or continuous on-site inspections to check the quality or quantity of the Work, (2) reviewed construction means, methods, techniques, sequences or procedures, (3) reviewed copies of requisitions received from Subcontractors and material suppliers and other data requested by the Owner to substantiate the Contractor's right to payment, or (4) made examination to ascertain how or for what purpose the Contractor has used money previously paid on account of the Contract Sum.

§ 9.5 DECISIONS TO WITHHOLD CERTIFICATION

§ 9.5.1 The Architect following consultation with the Owner Representative may withhold a Certificate for Payment in whole or in part, to the extent reasonably necessary to protect the Owner, if in the Architect's opinion the representations to the Owner required by Section 9.4.2 cannot be made. If the Architect is unable to certify payment in the amount of the Application, the Architect will notify the Contractor and Owner as provided in Section 9.4.1. If the Architect is unable to certify payment in the amount of the Application, the Architect will notify the Contractor

and Owner as provided in Section 9.4.1. The Architect following consultation with the Owner Representative may also withhold a Certificate for Payment or, because of subsequently discovered evidence, may nullify the whole or a part of a Certificate for Payment previously issued, to such extent as may be necessary in the Architect's opinion to protect the Owner from loss for which the Contractor is responsible, including loss resulting from acts and omissions described in Section 3.3.2, because of

- .1 after prior notice, defective Work not remedied;
- .2 third party claims filed or reasonable evidence indicating probable filing of such claims unless full bond coverage, insurance or security acceptable to the Owner is provided by or demonstrated by the Contractor, or unless the Contractor demonstrates to the Owner that the claims do not have a reasonable basis in fact;
- .3 failure of the Contractor to make payments properly to Subcontractors or for labor, materials or equipment in accordance with the provisions of this Contract;
- .4 reasonable evidence that the Work cannot be completed for the unpaid balance of the Contract Sum;
- .5 injury to persons or damage to the Work or property of the Owner, other Contractors, or others caused by the act of neglect of the Contractor or any of his Subcontractors;
- .6 reasonable evidence that the Work will not be completed within the Contract Time, and that the unpaid balance of the Contract Sum would not be adequate to cover actual or liquidated damages for the anticipated delay unless the Contractor demonstrates to the satisfaction of the Owner that it or others for whom it is responsible are not responsible for such delay;
- .7 repeated failure to carry out the Work in accordance with the Contract Documents;
- .8 failure to submit Construction Schedules as outlined in Division 1 of the Specifications in the time prescribed;
- .9 failure to submit all documents necessary for compliance with CHRO requirements;
- .10 failure to submit all copies of all certified payrolls;
- .11 failure to provide copies of subcontractors contracts per statute; or
- .12 failure to submit any other documentation requested by the Owner necessary for compliance with the requirements of any regulatory agency.

§ 9.5.2 When the above reasons for withholding certification are removed, certification will be made for amounts previously withheld. The Owner shall not be deemed in default by reason of withholding payment while any of the above grounds remain uncured, nor shall any interest accrue or be payable with respect to any payments so withheld.

§ 9.5.3 If the Architect withholds certification for payment under Section 9.5.1.3, the Owner may, at its sole option, issue joint checks to the Contractor and to any Subcontractor or material or equipment suppliers to whom the Contractor failed to make payment for Work properly performed or material or equipment suitably delivered. If the Owner makes payments by joint check, the Owner shall notify the Architect and the Architect will reflect such payment on the next Certificate for Payment.

§ 9.5.4 The Owner shall have the right to apply any such amounts so withheld in such manner, as the Owner may deem proper to satisfy such claims or to secure such protection. Such application of such amounts shall be payments to the Contractor.

§ 9.6 PROGRESS PAYMENTS

§ 9.6.1 After the Architect has certified the Application for Payment, the Owner shall make payment in the manner and within the time provided in the Contract Documents, or shall so notify the Contractor of the Owner's intent to withhold payment to the extent reasonably necessary to protect the Owner from loss for which the Contractor is responsible, including loss resulting from acts and omissions of its Subcontractors due to the causes set forth in Section 9.5.1.

§ 9.6.2 For every Contract with the Owner for the construction, alteration or repair of any building or work;

- .1 The Contractor within thirty (30) days after payment to the Contractor by the Owner, shall be required to pay any amounts due any Subcontractor, whether for labor performed or materials furnished, when the labor or materials have been included in a requisition submitted by the Contractor and paid by the Owner;
- .2 The Contractor shall include in each of its subcontracts a provision requiring each Subcontractor to pay any amounts due any of its Subcontractors, whether for labor performed or materials furnished,

within thirty (30) days after each Subcontractor receives a payment from the Contractor which encompasses labor or materials furnished by such Subcontractor.

§ 9.6.3 The Architect will, on request, furnish to a Subcontractor, if practicable, information regarding percentages of completion or amounts applied for by the Contractor and action taken thereon by the Architect and Owner on account of portions of the Work done by such Subcontractor.

§ 9.6.4 The Owner has the right to request written evidence from the Contractor that the Contractor has properly paid Subcontractors and material and equipment suppliers amounts paid by the Owner to the Contractor for subcontracted Work. If the Contractor fails to furnish such evidence within seven (7) days, the Owner shall have the right to contact Subcontractors to ascertain whether they have been properly paid. Neither the Owner nor Architect shall have an obligation to pay or to see to the payment of money to a Subcontractor, except as may otherwise be required by law.

§ 9.6.5 Contractor payments to material and equipment suppliers shall be treated in a manner similar to that provided in Sections 9.6.2, 9.6.3 and 9.6.4.

§ 9.6.6 A Certificate for Payment, a progress payment, or partial or entire use or occupancy of the Project by the Owner shall not constitute acceptance of Work not in accordance with the Contract Documents.

§ 9.6.7 Pursuant to Connecticut General Statutes Sections 10a-109a through 10a-109y:

- .1 No payments shall be made by the Owner on account of this Contract for this project until the bills or estimates presented for such payments shall have been duly certified to be correct by the Owner;
- .2 The obligations of the Owner or the State of Connecticut to make payments to the Contractor for services, labor, or materials provided on this project are limited to those amounts set forth in the Contract Documents and any agreed upon changes or amendments thereto. Neither the Owner nor the State of Connecticut shall or may be liable to make payments in excess of such amount.

§ 9.7 FAILURE OF PAYMENT

If the Architect does not issue a Certificate for Payment, through no fault of the Contractor, within seven (7) days after receipt of the Contractor's Application for Payment, or if the Owner does not pay the Contractor within seven (7) days after the date established in the Contract Documents the amount certified by the Architect or awarded by binding dispute resolution, then the Contractor may, upon seven (7) additional days' written notice to the Owner and Architect be entitled to the applicable statutory interest.. Said provision does not apply where the Owner has submitted to the Contractor its intention to withhold payment in accordance with Section 9.6.1 or where the Architect has submitted to the Contractor its intention to withhold certification in accordance with Section 9.5.1.

§ 9.8 SUBSTANTIAL COMPLETION

§ 9.8.1 Substantial Completion is the stage in the progress of the Work when the Work or designated portion thereof is sufficiently complete in accordance with the Contract Documents so that the Owner can occupy or utilize without impact or interruptions the Work for its intended use.

§ 9.8.2 When the Contractor considers that the Work, or a portion thereof which the Owner agrees to accept separately, is substantially complete, the Contractor shall prepare and submit to the Architect a comprehensive list of items to be completed or corrected prior to final payment. Failure to include an item on such list does not alter the responsibility of the Contractor to complete all Work in accordance with the Contract Documents.

§ 9.8.3 Upon receipt of the Contractor's list, the Architect will make an inspection to determine whether the Work or designated portion thereof is substantially complete. If the Architect's inspection discloses any item, whether or not included on the Contractor's list, which is not sufficiently complete in accordance with the Contract Documents so that the Owner can occupy or utilize the Work or designated portion thereof for its intended use, the Contractor shall, before issuance of the Certificate of Substantial Completion, complete or correct such item upon notification by the Architect. In such case, the Contractor shall then submit a request for another inspection by the Architect to determine Substantial Completion.

§ 9.8.4 When the Work or designated portion thereof is substantially complete, the Architect will prepare a Certificate of Substantial Completion that shall establish the date of Substantial Completion, shall establish responsibilities of the Owner and Contractor for security, maintenance, heat, utilities, damage to the Work and insurance, and shall fix the time within which the Contractor shall finish all items on the list accompanying the Certificate. Warranties required by the Contract Documents shall commence on the date of Substantial Completion of the Work or designated portion thereof unless otherwise provided in the Certificate of Substantial Completion.

§ 9.8.5 The Certificate of Substantial Completion shall be submitted to the Owner and Contractor for their written acceptance of responsibilities assigned to them in such Certificate. The Certificate of Substantial Completion shall become valid upon the written approval thereof by the Owner Representative. Upon such acceptance and consent of surety, if any, and release of the Project from CHRO, applying to such Work or designated portion thereof, at the sole discretion of the University, reductions in retainage may be allowed before the Contractor reaches substantial completion. Such reductions shall not be allowed without a release from the bond company. Such payment shall be adjusted for Work that is incomplete or not in accordance with the requirements of the Contract Documents.

§ 9.8.6 **Certifications.** The Contractor at completion of construction shall provide to the Owner a “Certificate of Substantial Compliance” bearing original signatures of an officer of the company stating: “This is to CERTIFY that in my professional opinion the complete structure/renovations described above is in substantial compliance with the approved construction documents on file with the University of Connecticut. Minor deviations and special stipulations are noted below (if any)”.

§ 9.9 PARTIAL OCCUPANCY OR USE

§ 9.9.1 The Owner may occupy or use any completed or partially completed portion of the Work at any stage when such portion is designated by separate agreement with the Contractor, provided such occupancy or use is consented to by the insurer as required under Section 11.3.1.5 and authorized by public authorities having jurisdiction over the Project. Such partial occupancy or use may commence whether or not the portion is substantially complete, provided the Owner and Contractor have accepted in writing the responsibilities assigned to each of them for payments, retainage, if any, security, maintenance, heat, utilities, damage to the Work and insurance, and have agreed in writing concerning the period for correction of the Work and commencement of warranties required by the Contract Documents. When the Contractor considers a portion substantially complete, the Contractor shall prepare and submit a list to the Architect as provided under Section 9.8.2. Consent of the Contractor to partial occupancy or use shall not be unreasonably withheld. The stage of the progress of the Work shall be determined by written agreement between the Owner and Contractor or, if no agreement is reached, by decision of the Architect.

§ 9.9.2 Immediately prior to such partial occupancy or use, the Owner, Contractor and Architect shall jointly inspect the area to be occupied or portion of the Work to be used in order to determine and record the condition of the Work.

§ 9.9.3 Unless otherwise agreed upon, partial occupancy or use of a portion or portions of the Work shall not constitute acceptance of Work not complying with the requirements of the Contract Documents.

§ 9.10 FINAL COMPLETION AND FINAL PAYMENT

§ 9.10.1 Upon receipt of the Contractor’s written notice that the Work is ready for final inspection and acceptance and upon receipt of a final Application for Payment, the Architect will promptly make such inspection and, when the Architect finds the Work acceptable under the Contract Documents and the Contract fully performed, the Architect will promptly issue a final Certificate for Payment stating that to the best of the Architect’s knowledge, information and belief, and on the basis of the Architect’s on-site visits and inspections, the Work has been completed in accordance with terms and conditions of the Contract Documents and that the entire balance found to be due the Contractor and noted in the final Certificate is due and payable. The Architect’s final Certificate for Payment will constitute a further representation that conditions listed in Section 9.10.2 as precedent to the Contractor’s being entitled to final payment have been fulfilled.

§ 9.10.2 Neither final payment nor any remaining retained percentage shall become due until the Contractor submits to the Architect (1) an affidavit that payrolls, bills for materials and equipment, and other indebtedness connected with the Work for which the Owner or the Owner’s property might be responsible or encumbered (less amounts withheld by Owner) have been paid or otherwise satisfied, (2) a certificate evidencing that insurance required by the Contract Documents to remain in force after final payment is currently in effect and will not be canceled or allowed

to expire until at least thirty 30 days' prior written notice has been given to the Owner, (3) a written statement that the Contractor knows of no substantial reason that the insurance will not be renewable to cover the period required by the Contract Documents, (4) consent of surety, if any, to final payment, (5) if required by the Owner, other data establishing payment or satisfaction of obligations, such as receipts, releases and waivers of liens, claims, security interests or encumbrances arising out of the Contract, to the extent and in such form as may be designated by the Owner, (6) all documents necessary for compliance with CHRO requirements and as required to obtain the written statement of release from CHRO referenced in Section 9.8.5, (7) copies of all certified payrolls, (8) certifies that all material installed does not contain asbestos, (9) the Certificate of Substantial Compliance referenced in Section 9.8.6, and (10) any other documentation requested by the Owner necessary for compliance with the requirements of any regulatory agency. If a Subcontractor refuses to furnish a release or waiver required by the Owner, the Contractor may furnish a bond satisfactory to the Owner to indemnify the Owner against such claim. If such claim remains unsatisfied after payments are made to the Contractor, the Contractor shall promptly pay to the Owner all money that the Owner may be compelled to pay in discharging such claim, including all costs and reasonable attorneys' fees.

§ 9.10.3 If, after Substantial Completion of the Work, final completion thereof is materially delayed through no fault of the Contractor or by issuance of Change Orders affecting final completion, and the Architect so confirms, the Owner shall, upon application by the Contractor, the written approval of the Owner Representative and certification by the Architect, and without terminating the Contract, make payment of the balance due for that portion of the Work fully completed and accepted. If the remaining balance for Work not fully completed or corrected is less than retainage stipulated in the Contract Documents, and if bonds have been furnished, the written consent of surety to payment of the balance due for that portion of the Work fully completed and accepted shall be submitted by the Contractor to the Architect prior to certification of such payment. Such payment shall be made under terms and conditions governing final payment, except that it shall not constitute a waiver of claims.

§ 9.10.4 NOT USED.

§ 9.10.5 Acceptance of final payment by the Contractor, a Subcontractor or material supplier shall constitute a waiver of claims by that payee except those previously made in writing and identified by that payee as unsettled at the time of final Application for Payment.

§ 9.11 LIQUIDATED DAMAGES

§ 9.11.1 Time is of the essence to the Contract Documents and all obligations there under. The Contractor acknowledges and agrees that if the Contractor fails to achieve Substantial Completion, or causes any delay to the Substantial Completion of any portion of the Work within the Contract Time, as may be extended by the Owner, the Owner will sustain extensive damages and serious loss as a result of such failure. The exact amount of such damages will be difficult to ascertain. Therefore, the Owner and the Contractor agree as follows:

- .1 If the Contractor fails to achieve Substantial Completion of the Work within the Contract Time and as otherwise required by the Contract Documents, the Owner shall be entitled to retain or recover from the Contractor, as liquidated damages and not as a penalty, the amount per calendar day specified in §3.3 of the AIA A101-2007 for every calendar day that the Contractor is in default, commencing upon the first day following the expiration of the Contract Time and continuing until the actual date of Substantial Completion. Such liquidated damages are hereby agreed to be a reasonable pre-estimate of damages the Owner will incur as a result of delayed completion of the Work.
- .2 The Owner shall be entitled to recover as actual damages the Owner's costs, expenses and damages it incurs in connection with the completion of the Work in the event that the Contractor fails to complete the Work, and/or the Contractor's surety fails to perform the Work pursuant to any Performance Bond. The Owner shall be entitled to recover as actual damages any payments it makes to any subcontractor or materials supplier that the Contractor's surety fails to pay pursuant to any Payment Bond.
- .3 The Owner may deduct liquidated damages described in Clause 9.11.1.1 from any unpaid amounts then or thereafter due the Contractor under this Contract. Any liquidated damages not so deducted from any unpaid amounts due the Contractor shall be payable to the Owner, together with interest from the date of the demand at the legal rate.

ARTICLE 10 PROTECTION OF PERSONS AND PROPERTY

§ 10.1 SAFETY PRECAUTIONS AND PROGRAMS

§ 10.1.1 The Contractor shall be responsible for initiating, maintaining and supervising all safety precautions and programs in connection with the performance of the Contract. Prior to and as a condition of mobilization on site, the Contractor shall submit a Safety Plan to Owner. To the extent the Owner provides safety manuals or other information, any such manuals and information shall be deemed minimum requirements for the Contractor's fulfillment of its safety obligations. Safety fines may be assessed based on Owner's safety plan and or Occupational Safety and Health Administration ("OSHA").

§ 10.1.1.1 In accordance with C.G.S. Section 31-53b, the Contractor is required to submit proof that each employee has completed a course of at least ten hours in duration in construction safety and health approved by the federal OSHA.

§ 10.1.1.2 The Contractor shall remove all snow and ice as may be required for the proper protection and/or prosecution of the Contractor's work. The Contractor shall coordinate and cooperate with the Owner for such activities.

§ 10.1.2 **Contractors Safety Program:** The Contractor hereby acknowledges that the job site safety will be of utmost importance. Contractor shall be responsible for initiating, maintaining and supervising safety and anti-substance abuse precautions and programs in connection with the Work. Contractor shall provide all protection to prevent injury to all persons involved in any way in the Work and all other persons, including, without limitation, the employees, agents, guests, visitors, invitees and licensees of the Owner who may visit or be affected thereby. These precautions shall include, but in no event be limited to: (1) those set forth in the most current provisions of the Owner's Contractor Environmental Health and Safety Manual, which is incorporated by reference as a Contract Document; (2) the posting of danger signs and personal notification to all affected persons of the existence of a hazard of whatever nature; (3) the furnishing and maintaining of necessary traffic control barricades and flagman services; (4) the use, or storage, removal and disposal of required explosives or other hazardous materials only under the supervision of qualified personnel and after first obtaining permission of all applicable governmental authorities; (5) and the maintenance of adequate quantities of both hose and operable fire extinguishers at the job site. The Contractor shall set forth in writing its own safety and anti-substance abuse precautions and programs in connection with the Work and if requested by the Owner submit the same to the Owner or its designee for review. The Owner may but shall not be obligated to make suggestions and recommendations to the Contractor with respect thereto.

- .1 **Compliance of Work, Equipment and Procedures with all Laws:** All Work, whether performed by the Contractor and its Subcontractors of any tier, or anyone directly or indirectly employed by any of them, and all equipment, appliances, machinery, materials, tools and like items incorporated or used in the Work, shall be in compliance with and conform to: (a) all applicable laws, ordinances, rules, regulations and orders of any public, quasi-public or other governmental bodies relating to the safety of persons and their protection against injury, specifically including, but in no event limited to the Federal Occupations Safety and Health Act of 1970, as amended and all rules and regulations now or hereafter in effect pursuant to said Act and the OSHA Act of the State of Connecticut, as amended and all rules and regulations now or hereafter in effect pursuant to said Act; and (b) all rules, regulations and requirements of the Owner and its insurance carriers relating thereto, including without limitation the O. In the event of conflicting provisions the more stringent shall govern. The Owner reserves the right to assess fines and penalties to the Contractor for violations of the Owner's Contractor Environmental Health and Safety Manual as may be more specifically referred to in the Manual and may deduct such fines and penalties from any payments due the Contractor under the Contract.
- .2 **Contractors Designation of Safety Program Administrator:** The Contractor shall designate a qualified member of its organization at the job site in accordance with the requirements of the Owner's Contractor Environmental Health and Safety Manual whose duties shall include enforcement of the Contractor's Safety Program to assure compliance with Article 10 and to prevent accidents. This position may be required to be a full time position dedicated to this Project. This person's name, qualifications and the estimated number of man-hours of effort per week performing this function shall be submitted to the Owner in writing. His or her identity, qualifications and level of effort must be satisfactory to the Owner who shall have the sole discretion to approve or reject same. Any reduction to this schedule must be submitted to the Owner for approval. The Contractor

shall further cause each of its Subcontractors of any tier to designate a qualified safety representative to assist the Contractor's Representative in the performance of its duties as described above and the names of such representative shall be given to the Owner.

3. **Suspension of Contractor's Work:** If in the opinion of the Owner or its designee the Contractor shall fail to provide a safe area for the performance of the Work or any portion thereof the Owner or its designee shall have the right but not the obligation to suspend Work in the unsafe area. Contractor shall be liable for all costs incurred of any nature (including without limitation overtime pay, liquidated damages or other costs resulting from delays) resulting from the suspension.
4. **Right of Owner to have Contractor Send Worker Home:** The Contractor shall provide to each worker on the job site the proper safety equipment for the duties being performed by that worker and will not permit any worker on the job site who fails or refuses to use the same. The Owner shall have the right but not the obligation to order the Contractor to cause any worker to be sent home for the day or to otherwise temporarily or permanently remove him or her from the job site for his or her failure to comply with safe practices or anti-substance abuse policies. Contractor shall promptly comply with such orders from the Owner and shall be liable for any and all costs of whatsoever nature, including attorney's fees paid or incurred by the Owner.

§ 10.1.3 **Protection of Work and Property; Responsibility for Loss:** The Contractor shall, throughout its performance of the Work, maintain adequate and continuous protection of all property of the Owner and third parties and of the Work and temporary facilities against loss or damage from whatever cause arising out of the performance of the Work and shall comply with the requirements of the Owner and its insurance carriers and with all applicable laws, codes, rules and regulations with respect to the prevention of loss or damage to property as a result of fire or other hazards.

§ 10.1.4 **Emergencies:** In any emergency affecting the safety of persons or property, or in the event of a claimed violation of any federal or state safety or health law or regulation arising out of or in any way connected with the Work or its performance, the Contractor shall act immediately to prevent threatened damage injury or loss or to remedy said violation whichever is applicable, failing which the Owner or its Designee may immediately take whatever action it deems necessary including, but not limited to, suspending the Work.

The Owner may offset any and all cost or expenses of whatever nature including attorneys' fees paid or incurred by the Owner in taking such action against any sums then or thereafter due to the Contractor. The Contractor shall defend indemnify and hold the Owner, and its officers, agents, employees, harmless against any and all costs, expenses or liability in accordance with Section 3.1.8. If the Contractor shall be entitled to any additional compensation or extension of time claimed on account of emergency work not due to the fault or neglect of the Contractor or its Subcontractors or Sub-subcontractors, it shall be handled as a request for a Change Order as provided in Section 7.2 of this Contract.

§ 10.2 SAFETY OF PERSONS AND PROPERTY

§ 10.2.1 The Contractor shall take reasonable precautions for safety of, and shall provide reasonable protection to prevent damage, injury or loss to

- .1 employees on the Work and other persons who may be affected thereby;
- .2 the Work and materials and equipment to be incorporated therein, whether in storage on or off the site, under care, custody or control of the Contractor or the Contractor's Subcontractors or Sub-subcontractors; and
- .3 other property at the site or adjacent thereto, such as trees, shrubs, lawns, walks, pavements, roadways, structures and utilities not designated for removal, relocation or replacement in the course of construction.

The Contractor shall provide and pay for whatever security measures the Contractor deems necessary to protect the Contractor's work until acceptance by the Owner through issuance of a Certificate of Substantial Completion.

§ 10.2.2 The Contractor shall comply with and give notices required by applicable laws, statutes, ordinances, codes, rules and regulations, and lawful orders of public authorities bearing on safety of persons or property or their protection from damage, injury or loss.

§ 10.2.3 At a minimum, the Contractor shall erect and maintain, as required by existing conditions and performance of the Contract, reasonable safeguards for safety and protection, including posting danger signs and other warnings against hazards, promulgating safety regulations and notifying owners and users of adjacent sites and utilities. Additionally, the Contractor shall maintain all passageways, guard fences, lights and other facilities for protection.

§ 10.2.4 When use or storage of explosives or other hazardous materials or equipment or unusual methods are necessary for execution of the Work, the Contractor, at a minimum, shall exercise utmost care and carry on such activities under supervision of properly qualified personnel.

- .1 When use or storage of explosives or other hazardous materials or equipment or unusual methods are necessary, the Contractor shall give the Owner advance written notice of at least five (5) days prior to bringing to the site or utilizing such explosives, materials, equipment or methods..

§ 10.2.5 The Contractor shall promptly remedy damage and loss (other than damage or loss insured under property insurance required by the Contract Documents) to property referred to in Sections 10.2.1.2 and 10.2.1.3 and indemnify and save the Owner harmless for all damage or injury to referenced persons and property caused in whole or in part by the Contractor, a Subcontractor, a Sub-subcontractor, or anyone directly or indirectly employed by any of them, or by anyone for whose acts they may be liable and for which the Contractor is responsible under Sections 10.2.1.2 and 10.2.1.3, except damage or loss attributable to acts or omissions of the Owner or Architect or anyone directly or indirectly employed by either of them, or by anyone for whose acts either of them may be liable, and not attributable in whole or in part to the fault or negligence of the Contractor. The foregoing obligations of the Contractor are in addition to the Contractor's obligations under Section 3.18.

- .1 The Contractor shall repair or replace any such damage at no additional cost to the Owner. Such repair or replacement shall be completed within one week of the damage or as directed by the Owner Representative. If the Contractor fails or refuses to repair the damage promptly, the Owner may have the necessary Work performed and charge the cost to the Contractor.

§ 10.2.6 The Contractor shall designate a responsible member of the Contractor's organization at the site whose duty shall be the prevention of accidents. This person shall be the Contractor's superintendent unless otherwise designated by the Contractor in writing to the Owner and Architect.

§ 10.2.7 The Contractor shall not load or permit any part of the construction or site to be loaded so as to endanger the safety of persons or property or cause damage or create an unsafe condition.

§ 10.2.8 All materials furnished and all work installed shall comply with the rules and recommendations of the National Board of Fire Underwriters; with all applicable State and local codes, laws, ordinances, rules and regulations; with all requirements of local utility companies and with the recommendations of the Insurance Rating Organization having jurisdiction.

§ 10.2.9 All apparatus, equipment and construction such as ladders, scaffolds, chutes, etc. shall comply with the recommendations of the manual of Accident Prevention in Construction published by the Associated General Contractors of America.

§ 10.3 HAZARDOUS MATERIALS

§ 10.3.1 The Contractor is responsible for compliance with any requirements included in the Contract Documents regarding hazardous materials. If the Contractor encounters a hazardous material or substance not addressed in the Contract Documents and if reasonable precautions will be inadequate to prevent foreseeable bodily injury or death to persons resulting from a material or substance, including but not limited to asbestos or polychlorinated biphenyl (PCB), encountered on the site by the Contractor, the Contractor shall, upon recognizing the condition, immediately stop Work in the affected area and report the condition to the Owner and Architect in writing.

§ 10.3.1.1 Upon request, the Owner, through the Office of Environmental Health and Safety, will provide the Contractor with a written copy of the Hazard Communication Program and chemical inventory for work areas in which they will be working. The Owner, upon request, will make available to the Contractor an opportunity to review the Material Safety Data Sheets ("MSDS") on file for areas where hazardous chemicals are used and stored for work areas they will be working in.

§ 10.3.1.2 Per OSHA's Hazard Communication Standard, Contractors are expected to inform and provide the Owner any MSDSs of materials to be used in their work at the University of Connecticut. Contractors shall provide a chemical inventory and information on the location of chemical use and storage. The Contractor shall be responsible for the removal of all unused portions of chemicals and their waste products from the Project Site. A copy of the Hazard Communication Policy is available for review by the Contractor or prospective Proposers of the Contract at the Office of Capital Project & Contract Administration or at:

<http://www.ehs.uconn.edu/Occupational/occuhazard.php>

or <http://ors.uhc.edu>

§ 10.3.2 Upon receipt of the Contractor's written notice, the Owner shall obtain the services of a licensed laboratory to verify the presence or absence of the material or substance reported by the Contractor and, in the event such material or substance is found to be present, to cause it to be rendered harmless. Upon written request, the Owner shall furnish in writing to the Contractor and Architect the names and qualifications of persons or entities who are to perform tests verifying the presence or absence of such material or substance or who are to perform the task of removal or safe containment of such material or substance. The Contractor and the Architect will promptly reply to the Owner in writing stating whether or not either has reasonable objection to the persons or entities proposed by the Owner. If either the Contractor or Architect has an objection to a person or entity proposed by the Owner, the Owner shall propose another to whom the Contractor and the Architect have no reasonable objection. When the material or substance has been rendered harmless, Work in the affected area shall resume upon written agreement of the Owner and Contractor. By Change Order, the Contract Time shall be extended appropriately and the Contract Sum shall be increased in the amount of the Contractor's reasonable additional costs of shut-down, delay and start-up which may have occurred, but must be demonstrated as impacting the critical path of the schedule.

§ 10.3.3 NOT USED.

§ 10.3.4 In no event, however, shall the Owner have any responsibility for any substance or material that is brought to the Project site by the Contractor, any Subcontractor, any materialman or supplier or any entity for whom any of them is responsible. The Contractor agrees not to use any fills or other materials to be incorporated into the Work, which are hazardous, toxic or comprised of any items that are hazardous or toxic. In the event it is determined materials that are hazardous, toxic or comprised of items that are hazardous or toxic have been used as fills or incorporated into the Work, the Contractor, at its sole expense, shall be responsible for immediate removal, proper disposal, and replacement of materials of the Work and surrounding areas so affected.

§ 10.3.5 The Contractor shall indemnify the Owner for the cost and expense the Owner incurs (1) for remediation of a material or substance the Contractor brings to the site and negligently handles, or (2) where the Contractor fails to perform its obligations under Section 10.3.1, except to the extent that the cost and expense are due to the Owner's fault or negligence.

§ 10.3.6 Contractor shall verify that all material/equipment installed in any portion of the Work shall be asbestos free. The Owner may perform sampling to verify all suspect material/equipment is asbestos free. If any material/equipment is found to contain asbestos, the Contractor shall pay for the lawful and proper removal and disposal of product(s), and re-install acceptable material/equipment all at its sole expense. Contractor shall visually and in writing provide to Owner or its representative proof that products or equipment to be used are non-asbestos containing, asbestos free, do not contain asbestos, or similar via manufacture statement on product itself or accompanying information.

10.3.6.1 For purposes of this requirement, materials include, but are not limited to, the following:

- .1 **Surfacing Treatments**
Fireproofing Acoustical Plaster
Finish Plasters, Skim Coats of Joint Compound, Fibrous Type Paint Applications
- .2 **Thermal System Insulation**
Equipment Insulation

Boiler, Breeching, Boiler Rope, Duct or Tank Insulation, Cement or Mortar used for boilers and refractory brick
Piping and fitting insulations including but not limited to Wrapped Paper, Aircell, Millboard, Rope, Cork, Preformed Plaster, Job Molded Plaster and coverings over fibrous glass insulation

3 Roofing and Siding Miscellaneous Materials

Insulation Board Vapor Barriers
Coatings Felts
Flashing Shingles
Cementitious Board (Transite) Galbestos
Non-Metallic or Non-Wood roof Decking

4 Other Miscellaneous Materials

Cove Base Floor Leveling Compound
Ceiling Tile Vermiculite Insulation
Vibration Isolators Laboratory Tables and Hoods

§ 10.3.7 Most buildings at the University of Connecticut have some Asbestos Containing Materials (ACM) used as building products. Any known ACM has been identified on the Plans and Specifications of this Contract.

§ 10.3.8 Every effort has been made to identify ACM; however, there may be additional ACM present in the area of work. This suspected ACM may become apparent especially during the demolition phases of contracts.

§ 10.3.9 The Contractor shall make every attempt to accomplish work in such a manner as to not disturb ACM or suspected ACM. If the Work cannot be accomplished without disturbing ACM or suspected ACM, or if ACM abatement is specifically incorporated as part of this contract, the Contractor must have the applicable training, licenses, or any other qualifications necessary to perform such work safely and in accordance with Federal, State and Local regulations.

§ 10.3.10 The Contractor shall bring to the immediate attention of the Owner Representative the location of suspected ACM that will be disturbed by work required under this Contract. No work shall be attempted that could result in a release of ACM to the environment.

§ 10.3.11 Asbestos surveys for most buildings of the Owner which are part of this Contract are available for Contractor's review in the Architectural and Engineering Services building or for UCHC projects at the Facilities Development & Operations office..

§10.3.12 Exposure levels for lead in the construction industry are regulated by 29 CFR 1926.62. Construction activities disturbing surfaces containing lead-based paint (LBP) which are likely to be employed, such as sanding, grinding, welding, cutting and burning, have been known to expose workers to levels of lead in excess of the Permissible Exposure Limit (PEL). Contractor shall conduct demolition and removal work specified in the Contract Documents in conformance with these regulations. In addition, construction debris/waste may be classified as hazardous waste. Disposal of hazardous waste material shall be in accordance with 40 CFR Parts 260 through 271 and Connecticut Hazardous Waste Management Regulations Section 22a-209-1; 22a-209-8(c)-11; and 22a-449(c)-100 through 110.

§ 10.3.13 Where a child under the age of six resides, the work shall also be in accordance with Connecticut Regulations Section 19a-111-1 through 11.

§ 10.3.14 **If this is a renovation project**, testing for lead-based paint has been conducted at selected facilities of the Owner. Results of LBP testing are for information purposes only. Under no circumstance shall this information be the sole means used by the Contractor for determining the extent of LBP. The Contractor shall be responsible for verification of all field conditions affecting performance of the Work.

§ 10.3.15 Except for UCHC projects, lead based paint testing results are available at the Architectural and Engineering Services building. Contractors proposing on this project are requested to visit this office and review lead testing documents.

§ 10.4 EMERGENCIES

In an emergency affecting safety of persons or property, the Contractor shall act, at the Contractor's discretion, to prevent threatened damage, injury or loss. Additional compensation or extension of time claimed by the Contractor on account of an emergency shall be determined as provided in Article 15 and Article 7.

10.5 LOCKOUT/TAGOUT PROCEDURES REQUIRED BY OSHA

§ 10.5.1 OSHA regulations 29 CFR 1910.147 (The Control of Hazardous Energy) requires employers to develop procedures for the lockout or tag out of machines or equipment. The purpose is to prevent injuries by ensuring that hazardous forms of energy are isolated (locked or tagged out) before employees perform any servicing or maintenance activities, which could result in the unexpected energization, start-up or release of stored energy. This includes electrical, mechanical, hydraulic, pneumatic, chemical, thermal or other energy sources.

§ 10.5.2 The Owner has a written Lockout/Tag out Policy, as required under 29 CFR 1910.147. The policy is available for review by the Contractor or prospective Proposers of this Contract upon request.

§ 10.5.3 Prior to commencing any work under this Contract that will or may involve exposure to potentially hazardous energy; the Contractor shall notify the Owner Representative of the lockout/tag out procedures to be used. Lockout/tag out procedures shall be exchanged between the Contractor and the Owner Representative at the Pre-Construction Conference.

§ 10.5.4 All work carried out under this Contract that will or may involve exposure to potentially hazardous energy shall be carried out in accordance with all applicable Federal, State and local rules and regulations, including OSHA regulation 29 CFR 1910.147 (The Control of Hazardous Energy) and 1926.417 (Locking and Tagging of Circuits).

10.6 SOLVENT BASED PRODUCTS

§ 10.6.1 The use of solvent-based products, including paints and adhesives within occupied areas of buildings shall not be allowed as part of this project, unless specifically directed in other provisions of the Contract Documents. The use of solvent-based products in non-occupied areas shall be carried out using adequate ventilation that prevents migration of vapors into occupied areas. If solvent-based products are to be used in occupied areas, then work shall only be accomplished on nights or weekends and with prior approval with the Owner Representative; continuous ventilation should be provided as required to mitigate odors on building occupants using adequate ventilation. The Contractor's representative shall notify the Owner Representative, the Department of Environmental Health and Safety and the Building Safety Committee Representative two (2) days prior to the intended date of such work.

10.7 CONFINED SPACE ENTRY

§ 10.7.1 Certain areas at the University of Connecticut such as manholes, tanks, vessels, trenches, ducts, etc. meet the OSHA definition of a confined space (pursuant to 29 CFR 1910.146) in that they: 1) are large enough and so configured that an employee can bodily enter and perform assigned work; 2) have limited or restricted means for entry or exit; and 3) are not designated for continuous employee occupancy.

§ 10.7.2 According to this OSHA regulation, employers are required to implement a confined space entry permit program if its employees will enter confined spaces which have one or more of the following characteristics: 1) contain or have the potential to contain a hazardous atmosphere, 2) contain a material that has the potential for engulfing and entrant, 3) have an internal configuration such that an entrant could be trapped or asphyxiated by inwardly converging walls, or by a floor which slopes downward and tapers to a smaller cross-section, or 4) contain any other recognized safety or health hazard. Such a space is considered to be a permit-required confined space.

§ 10.7.3 The Owner has a written confined space entry policy, which implements a permit program. The policy is available for review by the Contractor or prospective Proposers of this Contract at the Architectural and Engineering Services building.

§ 10.7.4 Prior to commencing work that may require entry into a confined space; the Contractor shall consult with the Owner Representative and the Environmental Health and Safety Department to become apprised of the locations, the nature of the hazards, and safe entry procedures of known permit-required confined spaces.

§ 10.7.5 The contractor shall coordinate entry operations with the Owner through the Owner Representative when both Owner and Contractor personnel will be working in or near permit spaces.

§ 10.7.6 Any work carried out under this Contract that will require entry into a confined space shall be carried out in accordance with all applicable Federal, State, and Local rules and regulations, including OSHA regulations 29 CFR 1910.146 (Permit required confined spaces), 1926.21(b) (6) (Safety Training and Education – Employer responsibility (confined spaces)), 1926.352(g) (Fire prevention in enclosed spaces) and 1926.353(b) (Welding, cutting and heating in confined spaces).

10.8 EXCAVATION AND TRENCHING

§ 10.8.1 The Owner has a written Excavation and Trenching Policy, which can be found in the Owner's Contractor Environmental Health and Safety Manual.

§ 10.8.2 Any work carried out under this Contract that will require excavation or trenching shall be carried out in accordance with all applicable Federal, State and Local rules and regulations, including OSHA regulation 29 CFR 1926 Subpart P (Excavations).

§ 10.8.3 At a minimum, the Contractor shall comply with established Owner's Contractor Environmental Health and Safety Manual, which have been previously provided to bidders and/or are available for review upon request. These policies are hereby incorporated by reference herein, including but not limited to: Policies on Lockout/Tagout; Confine Space Entry; Code of Conduct; Sexual Harassment; Racism and Acts of Intolerance; Smoking.

ARTICLE 11 INSURANCE AND BONDS

§ 11.1 CONTRACTOR'S LIABILITY INSURANCE

§ 11.1.1 The Contractor shall demonstrate and provide evidence of insurance in an industry accepted certificate of insurance and maintain with a company or companies lawfully authorized to do business in the jurisdiction in which the Project is located such insurance as will protect the Contractor from claims set forth below which may arise out of or result from the Contractor's operations and completed operations under the Contract and for which the Contractor may be legally liable, whether such operations be by the Contractor or by a Subcontractor or by anyone directly or indirectly employed by any of them, or by anyone for whose acts any of them may be liable:

- .1 Claims under workers' compensation, disability benefit and other similar employee benefit acts that are applicable to the Work to be performed;
- .2 Claims for damages because of bodily injury, occupational sickness or disease, or death of the Contractor's employees;
- .3 Claims for damages because of bodily injury, sickness or disease, or death of any person other than the Contractor's employees;
- .4 Claims for damages insured by usual personal injury liability coverage;
- .5 Claims for damages, other than to the Work itself, because of injury to or destruction of tangible property, including loss of use resulting therefrom;
- .6 Claims for damages because of bodily injury, death of a person or property damage arising out of ownership, maintenance or use of a motor vehicle;
- .7 Claims for bodily injury or property damage arising out of completed operations; and
- .8 Claims involving contractual liability applicable to the Contractor's obligations under Section 3.18.

§ 11.1.2 The insurance required by Section 11.1.1 shall be written for not less than limits of liability specified in the Contract Documents or required by law, whichever coverage is greater. Coverages, whether written on an occurrence or claims-made basis, shall be maintained without interruption from the date of commencement of the Work until the date of final payment and termination of any coverage required to be maintained after final payment, and, with respect to the Contractor's completed operations coverage, until the expiration of the period for correction of Work or for such other period for maintenance of completed operations coverage as specified in the Contract Documents.

- .1 **Worker's Compensation Insurance:** Worker's Compensation Insurance in Statutory Limits of the Worker's Compensation Laws of the State of Connecticut, and other extensions, with Coverage B – Employer's Liability of not less than limits of \$1,000,000 – Each Accident, \$1,000,000 – Policy Limit and \$1,000,000 – Each Employee. Coverage under the Broad Form All-State extension shall also be included.

- .2 **Commercial General Liability Insurance:** \$1,000,000 combined single limit per occurrence for bodily injury, personal injury and property damage. Coverage shall include Premises and Operations, Independent Contractors, Products and Completed Operations, Contractual Liability and Broad Form Property Damage coverage. If a general aggregate is used, the general aggregate limit shall apply separately to the project or the general aggregate limit shall be twice the occurrence limit. The coverage shall contain no special limitations on the scope of protection afforded to the State. Said policy shall also state that it is primary insurance, and that the Owner, the State of Connecticut, the Contractor, and such other persons or interests as the Owner may designate as additional insured in connection with the performance of the Work, including hazards of operations (including explosion, collapse and underground coverage), elevators, independent contractors, employees as additional insured, completed operations for a period of three (3) years after final completion of the Work.
- .3 **Automobile Liability Insurance:** Automobile Liability Insurance covering all owned, non-owned and hired automobiles, trucks and trailers of the respective parties required to provide and maintain this insurance. Such insurance shall provide coverage not less than that of the Standard Comprehensive Automobile Liability policy in limits not less than, as respects Contractor and all tiers of Subcontractors, \$1,000,000 Combined Single Limit each occurrence for Bodily Injury and Property Damage.
- .4 **Umbrella Liability Insurance:** Umbrella liability (following form) in the amount of \$5,000,000 per Occurrence.
- .5 **Aircraft Liability:** If aircraft of any kind is used by the Contractor, any tier of Subcontractor or by anyone else on their behalf, the Contractor or Subcontractor shall maintain or cause the operator of the aircraft to maintain aircraft public liability insurance insuring passengers and the general public against personal injury, bodily injury or property damage arising from aircraft owned, used, operated or hired in connection with the Work by the Contractor, Subcontractor or anyone else in limits of \$50,000,000 Combined Single Limit for any one occurrence, each aircraft.
- .6 **Contractor's Pollution Liability:** If the work of this project includes the abatement, removal, cleanup or handling of any asbestos, PCB's, lead based paint, or other pollutants or hazardous materials, then the Contractor shall also provide evidence that Pollution Liability Insurance, including completed operations and Contractual Liability coverage of not less than limits of \$5,000,000 has been procured and is in force on the project. However, if the Contractor demonstrates that coverage for claims arising out of the abatement, removal, cleanup or other handling of asbestos, PCB's, lead based paint, or other pollutants or hazardous materials is covered by the Contractor's general liability insurance, a separate Contractor's Pollution Liability Policy will not be required.
- .7 **Builder's Risk:** If the Project is for new construction, rather than for renovations to an existing structure or facilities, the Contractor shall purchase and maintain Builder's Risk Insurance, ISO CP 30 10 00 special form, in the amount of the initial contract amount plus values of subsequent modifications or change orders on a replacement cost basis. The Builder's Risk coverage shall be written on a Special Covered Cause of Loss form and shall include theft, vandalism, malicious mischief, collapse, temporary buildings, transit, debris removal, increased cost of construction, architect fees and expenses, soft costs, flood and earthquake. Builder's Risk shall include portions of work located away from site but intended for use at the site. Contractor shall obtain consent of the insurance company and delete any provisions with regard to restrictions within any occupancy clause. Equipment break down coverage shall be included and shall cover insured equipment during installation and testing.
- .8 It is agreed that the Owner, the State of Connecticut, their officers, officials, agents, employees, boards and commissions shall be additional named insureds under the coverages described in Clauses 11.1.2.2; 11.1.2.3; 11.1.2.4; 11.1.2.5; 11.1.2.6; 11.1.2.7 and that said coverage(s) is provided for all operations, uses, occupations, acts and activities of the insureds under the Contract Documents and under any amendments, modifications, extensions or renewals of said Contracts regardless of whether liability is attributable to the named insureds or a combination of the named insureds and the additional named insureds.
- .9 If the Contractor is a joint venture, the joint venture and each individual partner of the joint venture must be designated in each policy as named insureds.
- .10 A Certificate of Insurance shall clearly indicate the Project name, Project number or some easily identifiable reference to the relationship to the Owner.
- .11 Each liability policy shall contain a Cross Liability Endorsement.

- .12 Coverage, written on an occurrence basis, shall be maintained without interruption from date of commencement of the Work until date of final payment and termination of any coverage required to be maintained after final payment.
- .13 All insurance secured by Contractor or Subcontractors pursuant to the Owner's requirements under the provisions of this Section 11.1.2 shall be in policies subject to the Owner's approval, as to form, content, limits of liability, cost and issuing companies. Such companies shall have and maintain an A.M. Best rating of not less than A-(VII), or otherwise acceptable to Owner.
- .14 If the Contractor maintains insurance against physical loss or damage to Contractor's construction equipment and tools, such insurance shall include an insurer's waiver of rights of subrogation in favor of Owner.

§ 11.1.3 Certificates of insurance acceptable to the Owner shall be filed with the Owner prior to commencement of the Work and thereafter upon renewal or replacement of each required policy of insurance. These certificates and the insurance policies required by this Section 11.1 shall contain a provision that coverages afforded under the policies will not be canceled, terminated or materially changed, altered or allowed to expire until at least thirty (30) days' prior written notice has been given to the Owner. If any of the foregoing insurance coverages are required to remain in force after final payment and are reasonably available, an additional certificate evidencing continuation of liability coverage, including coverage for completed operations, shall be submitted with the final Application for Payment as required by Section 9.10.2 and thereafter upon renewal or replacement of such coverage until the expiration of the time required by Section 11.1.2. Information concerning reduction of coverage on account of revised limits or claims paid under the General Aggregate, or both, shall be furnished by the Contractor with reasonable promptness in accordance with the Contractor's information and belief and shall identify on their faces the project name and contract number to which they apply. The Certificate(s) of Insurance must also provide clear evidence that the Contractor's Insurance Policies contain at least the minimum limits of coverage and special provisions prescribed in Article 11.

§ 11.1.4 Form Certificates acceptable by the Owner shall be Accord 25(2001/08) together with Endorsement CG 20 37 07 04.

§ 11.1.5 The Contractor shall cause the commercial liability coverage required by the Contract Documents to include (1) the Owner, the Architect and the Architect's Consultants as additional insureds for claims caused in whole or in part by the Contractor's negligent acts or omissions during the Contractor's operations; and (2) the Owner as an additional insured for claims caused in whole or in part by the Contractor's negligent acts or omissions during the Contractor's completed operations.

§ 11.2 OWNER'S LIABILITY INSURANCE NOT USED.

§ 11.3 PROPERTY INSURANCE

§ 11.3.1 Property insurance on an all-risk basis, including coverage for the perils of earthquakes and floods, has been purchased by the Owner. Insurance required by Section 11.3 is not intended to cover machinery, tools and equipment of the Contractor which is used in the performance of the Work, but is not incorporated into the permanent improvements, nor any materials and equipment paid for by the Owner and stored off-site, for which the Contractor shall procure property insurance satisfactory to the Owner. The Contractor shall, at its own expense, provide coverage for its machinery, tools and equipment subject to these provisions.

§ 11.3.1.1 NOT USED.

§ 11.3.1.2 If the Owner does not intend to purchase such property insurance required by the Contract and with all of the coverages in the amount described above, the Owner shall so inform the Contractor in writing prior to commencement of the Work. The Contractor may then procure and maintain insurance that will protect the interests of the Contractor, Subcontractors and Sub-subcontractors in the Work, and by appropriate Change Order the cost thereof shall be charged to the Owner. If the Contractor is damaged by the failure or neglect of the Owner to purchase or maintain insurance as described above, without so notifying the Contractor in writing, then the Owner shall bear all reasonable costs properly attributable thereto.

§ 11.3.1.3 If the Owner's property insurance requires deductibles, the Contractor shall pay costs not covered because of such deductibles.

§ 11.3.1.4 NOT USED.

§ 11.3.1.5 Partial occupancy or use in accordance with Section 9.9 shall not commence until the insurance company or companies providing property insurance have consented to such partial occupancy or use by endorsement or otherwise. The Owner and the Contractor shall take reasonable steps to obtain consent of the insurance company or companies and shall, without mutual written consent, take no action with respect to partial occupancy or use that would cause cancellation, lapse or reduction of insurance.

§ 11.3.2 BOILER AND MACHINERY INSURANCE

The Owner shall purchase and maintain boiler and machinery insurance required by the Contract Documents or by law, which shall specifically cover such insured objects during installation and until final acceptance by the Owner; this insurance shall include interests of the Owner, Contractor, Subcontractors and Sub-subcontractors in the Work, and the Owner and Contractor shall be named insureds.

§ 11.3.3 LOSS OF USE INSURANCE
NOT USED.

§ 11.3.4 NOT USED.

§ 11.3.5 NOT USED.

§ 11.3.6 NOT USED.

§ 11.3.7 WAIVERS OF SUBROGATION

The Owner and Contractor waive all rights of subrogation against (1) each other and any of their subcontractors of all tiers, agents and employees, each of the other, and (2) the Architect, Architect's consultants, separate contractors described in Article 6, if any, and any of their subcontractors of all tiers, agents and employees, for damages caused by fire or other causes of loss to the extent covered by property insurance obtained pursuant to this Section 11.3, the boiler and machinery insurance maintained by the Owner or other property insurance applicable to the Work, except such rights as they have to proceeds of such insurance held by the Owner as fiduciary. The Owner or Contractor, as appropriate, shall require of the Architect, Architect's consultants, separate contractors described in Article 6, if any, and the subcontractors, sub-subcontractors, agents and employees of any of them, by appropriate agreements, written where legally required for validity, similar waivers each in favor of other parties enumerated herein. The policies shall provide such waivers of subrogation by endorsement or otherwise. A waiver of subrogation shall be effective as to a person or entity even though that person or entity would otherwise have a duty of indemnification, contractual or otherwise, did not pay the insurance premium directly or indirectly, and whether or not the person or entity had an insurable interest in the property damaged.

§ 11.3.8 A loss insured under the Owner's property insurance shall be adjusted by the Owner as fiduciary and made payable to the Owner as fiduciary for the insureds, as their interests may appear, subject to requirements of any applicable mortgagee clause and of Section 11.3.10. The Contractor shall pay Subcontractors their just shares of insurance proceeds received by the Contractor, and by appropriate agreements, written where legally required for validity, shall require Subcontractors to make payments to their Sub-subcontractors in similar manner.

§ 11.3.9 If required in writing by a party in interest, the Owner as fiduciary shall, upon occurrence of an insured loss, give bond for proper performance of the Owner's duties. The cost of required bonds shall be charged against proceeds received as fiduciary. The Owner shall deposit in a separate account proceeds so received, which the Owner shall distribute in accordance with such agreement as the parties in interest may reach, or as determined in accordance with the method of binding dispute resolution selected in the Contract between the Owner and Contractor. If after such loss no other special agreement is made and unless the Owner terminates the Contract for convenience, replacement of damaged property shall be performed by the Contractor after notification of a Change in the Work in accordance with Article 7.

§ 11.3.10 The Owner as fiduciary shall have power to adjust and settle a loss with insurers unless one of the parties in interest shall object in writing within five (5) days after occurrence of loss to the Owner's exercise of this power; if such objection is made, the dispute shall be resolved in the manner selected by the Owner and Contractor as the

method of binding dispute resolution in the Contract. If the Owner and Contractor have selected arbitration as the method of binding dispute resolution, the Owner as fiduciary shall make settlement with insurers or, in the case of a dispute over distribution of insurance proceeds, in accordance with the directions of the arbitrators.

§ 11.4 PERFORMANCE BOND; PAYMENT BOND AND GUARANTY/CASHBOND

§ 11.4.1 The Contractor shall furnish to the Owner and deliver at the time of contract signing Performance and Payment Bonds pursuant to the requirements of Connecticut General Statutes Section 49-41 et seq. and the requirements of this Section 11.4. In all cases where the Contract Sum exceeds \$100,000, the Contractor shall furnish bonds covering faithful performance of the Contract and payment of obligations arising thereunder. Each such Bond shall be in compliance with the form which has been adopted by the Owner as its required form of payment or performance bond and shall be provided by a Surety company licensed to do business in the State of Connecticut and that is acceptable to the Owner, and is named in the current list of "Surety Companies Acceptable on Federal Bonds" as published in the "Treasury Department Circular 570". The Surety company's underwriting limitation, as further set forth in "Treasury Department Circular 570", must not be less than the full amount required by the bond itself. The amount of each bond shall be equal to One Hundred Percent (100%) of the Contract Sum. The Payment and Performance Bonds shall name as "Obligee" the University of Connecticut.

§ 11.4.1.1 Upon the request of any person or entity appearing to be a potential beneficiary of bonds covering payment of obligations arising under the Contract, the Contractor shall promptly furnish a copy of the bonds or shall authorize a copy to be furnished.

§ 11.4.1.2 Each surety bond and surety contract between the Contractor named as a principal on the bond and the surety that issued the bond shall contain the following language: "In the event that the surety assumes the contract or obtains a bid or bids for completion of the contract, the surety shall ensure that the contractor chosen to complete the contract is prequalified pursuant to section 4a-100 of the Connecticut General Statutes in the requisite classification and has the aggregate work capacity rating and single project limit necessary to complete the contract.

§ 11.4.2 If the Contractor or any of its subcontractors is a non-resident contractor, the Contractor and/or subcontractor shall comply with the requirements of Connecticut General Statutes Section 12-430(7) ("the statute"), to the extent applicable. If the Contractor is a verified contractor as defined in the statute, the Contractor shall provide to the Owner written verification of that status from the State Commissioner of Revenue Services. If the Contractor is a unverified contractor as defined in the statute, the Contractor shall provide to the Owner proof that the Contractor has posted with the Commissioner of Revenue Services a surety bond in an amount equal to five percent (5%) of the contract price and which is otherwise in compliance with the requirements of the statute.

§ 11.4.3 If the Contractor proposes a Subcontractor default coverage program, the Contractor must demonstrate a cost savings of no less than 18% as compared to the actual Subcontractor traditional bond cost, including a reasonable percentage for changes as agreed upon by the Owner.

ARTICLE 12 UNCOVERING AND CORRECTION OF WORK

§ 12.1 UNCOVERING OF WORK

§ 12.1.1 If a portion of the Work is covered contrary to the Architect's request or to requirements specifically expressed in the Contract Documents, it must, if requested in writing by the Architect, be uncovered for the Architect's examination and be replaced at the Contractor's expense without change in the Contract Time.

§ 12.1.2 If a portion of the Work has been covered that the Owner Representative with the advice of the Architect has not specifically requested to examine prior to its being covered, the Owner Representative with the advice of the Architect may request to see such Work and it shall be uncovered by the Contractor. If such Work is in accordance with the Contract Documents, costs of uncovering and replacement shall, by appropriate Change Order, be at the Owner's expense. If such Work is not in accordance with the Contract Documents, such costs and the cost of correction shall be at the Contractor's expense unless the condition was caused by the Owner or a separate contractor in which event the Owner shall be responsible for payment of such costs.

§ 12.2 CORRECTION OF WORK

§ 12.2.1 BEFORE OR AFTER SUBSTANTIAL COMPLETION

The Contractor shall promptly correct Work rejected by the Owner Representative with the advice of the Architect or failing to conform to the requirements of the Contract Documents, whether discovered before or after Substantial Completion and whether or not fabricated, installed or completed. Costs of correcting such rejected Work, including additional testing, inspections, uncovering and replacement, and compensation for the Architect's and Owner Representative services made necessary thereby, shall be at the Contractor's expense.

If prior to the date of Substantial Completion, the Contractor, a Subcontractor or anyone from whom either is responsible uses or damages any portion of the Work, including, without limitation, mechanical, electrical, plumbing, and other building systems, machinery, equipment, or other mechanical device, the Contractor shall cause such item to be restored to "like new" condition at no expense to the Owner.

§ 12.2.2 AFTER SUBSTANTIAL COMPLETION

§ 12.2.2.1 In addition to the Contractor's obligations under Section 3.5, if, within one year after the date of Substantial Completion of the Work or designated portion thereof or after the date for commencement of warranties established under Section 9.9.1, or by terms of an applicable special warranty required by the Contract Documents, any of the Work is found to be not in accordance with the requirements of the Contract Documents, the Contractor shall correct it promptly at Contractor's sole expense after receipt of written notice from the Owner to do so unless the Owner has previously given the Contractor a written acceptance of such condition. The Owner shall give such notice promptly after discovery of the condition. During the one-year period for correction of Work, if the Owner fails to notify the Contractor and give the Contractor an opportunity to make the correction, the Owner waives the rights to require correction by the Contractor. If the Contractor fails to correct nonconforming Work within a reasonable time during that period after receipt of notice from the Owner or Architect, the Owner may correct it in accordance with Section 2.4 or may exercise any other commercially reasonable remedies to compensate Owner for any expenses losses or damage caused by such nonconforming work.

§ 12.2.2.2 The one-year period for correction of Work shall be extended with respect to portions of Work first performed after Substantial Completion by the period of time between Substantial Completion and the actual completion of that portion of the Work.

§ 12.2.2.3 The one-year period for correction of Work shall not be extended by corrective Work performed by the Contractor pursuant to this Section 12.2.

§ 12.2.3 The Contractor shall remove from the site portions of the Work that are not in accordance with the requirements of the Contract Documents and are neither corrected by the Contractor nor accepted by the Owner.

§ 12.2.4 The Contractor shall bear the cost of correcting destroyed or damaged construction, whether completed or partially completed, of the Owner or separate contractors caused by the Contractor's correction or removal of Work that is not in accordance with the requirements of the Contract Documents.

§ 12.2.5 Nothing contained in this Section 12.2 shall be construed to establish a period of limitation with respect to other obligations the Contractor has under the Contract Documents. Establishment of the one-year period for correction of Work as described in Section 12.2.2 relates only to the specific obligation of the Contractor to correct the Work, and has no relationship to the time within which the obligation to comply with the Contract Documents may be sought to be enforced, nor to the time within which proceedings may be commenced to establish the Contractor's liability with respect to the Contractor's obligations other than specifically to correct the Work.

§ 12.3 ACCEPTANCE OF NONCONFORMING WORK

If the Owner prefers to accept Work that is not in accordance with the requirements of the Contract Documents, the Owner may do so instead of requiring its removal and correction, in which case the Contract Sum will be reduced as appropriate and equitable. Such adjustment shall be effected whether or not final payment has been made.

ARTICLE 13 MISCELLANEOUS PROVISIONS

§ 13.1 GOVERNING LAW

The Contract shall be governed by the law of the place where the Project is located.

§ 13.2 SUCCESSORS AND ASSIGNS

§ 13.2.1 The Owner and Contractor respectively bind themselves, their partners, successors, assigns and legal representatives to the other party hereto and to partners, successors, assigns and legal representatives of such other party in respect to covenants, agreements and obligations contained in the Contract Documents. Except as provided in Section 13.2.2, neither party to the Contract shall assign the Contract as a whole without written consent of the other. If either party attempts to make such an assignment without such consent, that party shall nevertheless remain legally responsible for all obligations under the Contract.

§ 13.2.2 The Owner may, without consent of the Contractor, assign the Contract to a lender providing construction financing for the Project, if the lender assumes the Owner's rights and obligations under the Contract Documents. The Contractor shall execute all consents reasonably required to facilitate such assignment.

§ 13.3 WRITTEN NOTICE

Written notice shall be deemed to have been duly served if delivered in person to the individual, to a member of the firm or entity, or to an officer of the corporation for which it was intended; or if delivered at, or sent by registered or certified mail or by courier service providing proof of delivery to, the last business address known to the party giving notice.

§ 13.4 RIGHTS AND REMEDIES

§ 13.4.1 Duties and obligations imposed by the Contract Documents and rights and remedies available thereunder shall be in addition to and not a limitation of duties, obligations, rights and remedies otherwise imposed or available by law.

§ 13.4.2 No action or failure to act by the Owner, Architect or Contractor shall constitute a waiver of a right or duty afforded them under the Contract, nor shall such action or failure to act constitute approval of or acquiescence in a breach there under, except as may be specifically agreed in writing.

§ 13.5 TESTS AND INSPECTIONS

§ 13.5.1 Tests, inspections and approvals of portions of the Work shall be made at an appropriate time as required by the Contract Documents and by applicable laws, statutes, ordinances, codes, rules and regulations or lawful orders of public authorities having jurisdiction. Unless otherwise provided, the Contractor shall make arrangements for such tests, inspections and approvals with an independent testing laboratory or entity acceptable to the Owner, or with the appropriate public authority, and shall bear all related costs of tests, inspections and approvals. The Contractor shall give the Architect timely notice of when and where tests and inspections are to be made so that the Architect may be present for such procedures. The Owner shall bear costs of (1) tests, inspections or approvals that do not become requirements until after bids are received or negotiations concluded, and (2) tests, inspections or approvals where building codes or applicable laws or regulations prohibit the Owner from delegating their cost to the Contractor.

§ 13.5.2 If the Architect, Owner or public authorities having jurisdiction determine that portions of the Work require additional testing, inspection or approval not included under Section 13.5.1, the Architect will, upon written authorization from the Owner, instruct the Contractor to make arrangements for such additional testing, inspection or approval by an entity acceptable to the Owner, and the Contractor shall give timely notice to the Architect of when and where tests and inspections are to be made so that the Architect may be present for such procedures. Such costs, except as provided in Section 13.5.3, shall be at the Owner's expense.

§ 13.5.3 If such procedures for testing, inspection or approval under Sections 13.5.1 and 13.5.2 reveal failure of the portions of the Work to comply with requirements established by the Contract Documents, all costs made necessary by such failure including those of repeated procedures and compensation for the Architect's and Owner Representative services and expenses shall be at the Contractor's expense.

§ 13.5.4 Required certificates of testing, inspection or approval shall, unless otherwise required by the Contract Documents, be secured by the Contractor and promptly delivered to the Architect.

§ 13.5.5 If the Architect is to observe tests, inspections or approvals required by the Contract Documents, the Architect will do so promptly and, where practicable, at the normal place of testing.

§ 13.5.6 Tests or inspections conducted pursuant to the Contract Documents shall be made promptly to avoid unreasonable delay in the Work.

§ 13.6 INTEREST
NOT USED.

§ 13.7 TIME LIMITS ON CLAIMS
NOT USED.

§ 13.8 NON-DISCRIMINATION, AFFIRMATIVE ACTION, GOVERNOR'S EXECUTIVE ORDERS, AND OTHER MISCELLANEOUS PROVISIONS

§ 13.8.1 NONDISCRIMINATION. References in this section to "Contract" shall mean this Contract and references to "Contractor" shall mean the Contractor.

(a) For purposes of this Section, the following terms are defined as follows: (i) "Commission" means the Commission on Human Rights and Opportunities; (ii) "Contract" and "contract" include any extension or modification of the Contract or contract; (iii) "Contractor" and "contractor" include any successors or assigns of the Contractor or contractor; (iv) "Gender identity or expression" means a person's gender-related identity, appearance or behavior, whether or not that gender-related identity, appearance or behavior is different from that traditionally associated with the person's physiology or assigned sex at birth, which gender-related identity can be shown by providing evidence including, but not limited to, medical history, care or treatment of the gender-related identity, consistent and uniform assertion of the gender-related identity or any other evidence that the gender-related identity is sincerely held, part of a person's core identity or not being asserted for an improper purpose; (v) "good faith" means that degree of diligence which a reasonable person would exercise in the performance of legal duties and obligations; (vi) "good faith efforts" shall include, but not be limited to, those reasonable initial efforts necessary to comply with statutory or regulatory requirements and additional or substituted efforts when it is determined that such initial efforts will not be sufficient to comply with such requirements; (vii) "marital status" means being single, married as recognized by the State of Connecticut, widowed, separated or divorced; (viii) "mental disability" means one or more mental disorders, as defined in the most recent edition of the American Psychiatric Association's "Diagnostic and Statistical Manual of Mental Disorders", or a record of or regarding a person as having one or more such disorders; (ix) "minority business enterprise" means any small contractor or supplier of materials fifty-one percent or more of the capital stock, if any, or assets of which is owned by a person or persons: (1) who are active in the daily affairs of the enterprise, (2) who have the power to direct the management and policies of the enterprise, and (3) who are members of a minority, as such term is defined in subsection (a) of Connecticut General Statutes § 32-9n; and (x) "public works contract" means any agreement between any individual, firm or corporation and the State or any political subdivision of the State other than a municipality for construction, rehabilitation, conversion, extension, demolition or repair of a public building, highway or other changes or improvements in real property, or which is financed in whole or in part by the State, including, but not limited to, matching expenditures, grants, loans, insurance or guarantees.

For purposes of this Section, the terms "Contract" and "contract" do not include a contract where each contractor is (1) a political subdivision of the state, including, but not limited to, a municipality, (2) a quasi-public agency, as defined in Conn. Gen. Stat. Section 1-120, (3) any other state, including but not limited to any federally recognized Indian tribal governments, as defined in Conn. Gen. Stat. Section 1-267, (4) the federal government, (5) a foreign government, or (6) an agency of a subdivision, agency, state or government described in the immediately preceding enumerated items (1), (2), (3), (4) or (5).

(b) (1) The Contractor agrees and warrants that in the performance of the Contract such Contractor will not discriminate or permit discrimination against any person or group of persons on the grounds of race, color, religious creed, age, marital status, national origin, ancestry, sex, gender identity or expression, mental retardation, mental disability or physical disability, including, but not limited to, blindness, unless it is shown by such Contractor that such disability prevents performance of the work involved, in any manner prohibited by the laws of the United States or of the State of Connecticut; and the Contractor further agrees to take affirmative action to insure that applicants with job-related qualifications are employed and that employees are treated when employed without regard to their race, color, religious creed, age, marital status, national origin, ancestry, sex, gender identity or expression, mental retardation, mental disability or physical disability, including, but not limited to, blindness, unless it is shown by the Contractor that such disability prevents performance of the work involved; (2) the

Contractor agrees, in all solicitations or advertisements for employees placed by or on behalf of the Contractor, to state that it is an "affirmative action-equal opportunity employer" in accordance with regulations adopted by the Commission; (3) the Contractor agrees to provide each labor union or representative of workers with which the Contractor has a collective bargaining Agreement or other contract or understanding and each vendor with which the Contractor has a contract or understanding, a notice to be provided by the Commission, advising the labor union or workers' representative of the Contractor's commitments under this section and to post copies of the notice in conspicuous places available to employees and applicants for employment; (4) the Contractor agrees to comply with each provision of this Section and Connecticut General Statutes §§ 46a-68e and 46a-68f and with each regulation or relevant order issued by said Commission pursuant to Connecticut General Statutes §§ 46a-56, 46a-68e and 46a-68f; and (5) the Contractor agrees to provide the Commission on Human Rights and Opportunities with such information requested by the Commission, and permit access to pertinent books, records and accounts, concerning the employment practices and procedures of the Contractor as relate to the provisions of this Section and Connecticut General Statutes § 46a-56. If the contract is a public works contract, the Contractor agrees and warrants that he will make good faith efforts to employ minority business enterprises as subcontractors and suppliers of materials on such public works projects.

(c) Determination of the Contractor's good faith efforts shall include, but shall not be limited to, the following factors: The Contractor's employment and subcontracting policies, patterns and practices; affirmative advertising, recruitment and training; technical assistance activities and such other reasonable activities or efforts as the Commission may prescribe that are designed to ensure the participation of minority business enterprises in public works projects.

(d) The Contractor shall develop and maintain adequate documentation, in a manner prescribed by the Commission, of its good faith efforts.

(e) The Contractor shall include the provisions of subsection (b) of this Section in every subcontract or purchase order entered into in order to fulfill any obligation of a contract with the State and such provisions shall be binding on a subcontractor, vendor or manufacturer unless exempted by regulations or orders of the Commission. The Contractor shall take such action with respect to any such subcontract or purchase order as the Commission may direct as a means of enforcing such provisions including sanctions for noncompliance in accordance with Connecticut General Statutes §46a-56; provided if such Contractor becomes involved in, or is threatened with, litigation with a subcontractor or vendor as a result of such direction by the Commission, the Contractor may request the State of Connecticut to enter into any such litigation or negotiation prior thereto to protect the interests of the State and the State may so enter.

(f) The Contractor agrees to comply with the regulations referred to in this Section as they exist on the date of this Contract and as they may be adopted or amended from time to time during the term of this Contract and any amendments thereto.

(g) (1) The Contractor agrees and warrants that in the performance of the Contract such Contractor will not discriminate or permit discrimination against any person or group of persons on the grounds of sexual orientation, in any manner prohibited by the laws of the United States or the State of Connecticut, and that employees are treated when employed without regard to their sexual orientation; (2) the Contractor agrees to provide each labor union or representative of workers with which such Contractor has a collective bargaining Agreement or other contract or understanding and each vendor with which such Contractor has a contract or understanding, a notice to be provided by the Commission on Human Rights and Opportunities advising the labor union or workers' representative of the Contractor's commitments under this section, and to post copies of the notice in conspicuous places available to employees and applicants for employment; (3) the Contractor agrees to comply with each provision of this section and with each regulation or relevant order issued by said Commission pursuant to Connecticut General Statutes § 46a-56; and (4) the Contractor agrees to provide the Commission on Human Rights and Opportunities with such information requested by the Commission, and permit access to pertinent books, records and accounts, concerning the employment practices and procedures of the Contractor which relate to the provisions of this Section and Connecticut General Statutes § 46a-56.

(h) The Contractor shall include the provisions of the foregoing paragraph in every subcontract or purchase order entered into in order to fulfill any obligation of a contract with the State and such provisions shall be binding on a subcontractor, vendor or manufacturer unless exempted by regulations or orders of the Commission. The Contractor

shall take such action with respect to any such subcontract or purchase order as the Commission may direct as a means of enforcing such provisions including sanctions for noncompliance in accordance with Connecticut General Statutes § 46a-56; provided, if such Contractor becomes involved in, or is threatened with, litigation with a subcontractor or vendor as a result of such direction by the Commission, the Contractor may request the State of Connecticut to enter into any such litigation or negotiation prior thereto to protect the interests of the State and the State may so enter.

§ 13.8.2 This Contract is subject to the provisions of **Executive Order No. 3 of Governor Thomas J. Meskill promulgated June 16, 1971**, concerning labor employment practices, **Executive Order No. Seventeen of Governor Thomas J. Meskill**, promulgated February 15, 1973, concerning the listing of openings and **Executive Order No. Sixteen of Governor John G. Rowland**, promulgated August 4, 1999, concerning violence in the workplace, all of which are incorporated into and are made a party of this Contract as if they had been fully set forth herein. At the Contractor's request, the Owner shall provide a copy of these orders to the Contractor. The Contract may also be subject to **Executive Order No. 7C of Governor M. Jodi Rell**, promulgated July 13, 2006, concerning contracting reforms and **Executive Order No. 14 of Governor M. Jodi Rell**, promulgated April 17, 2006, concerning procurement of cleaning products and services, in accordance with their respective terms and conditions.

§13.8.3 ETHICS AND COMPLIANCE

In accordance with the Owner's compliance program, the Owner has in place an anonymous ethics and compliance reporting hotline service – 1-888-685-2637. Any person who is aware of unethical practices, fraud, violation of state laws or regulations or other concerns relating to Owner policies and procedures can report such matters anonymously. Such persons may also directly contact the Owner's compliance office at: Office of Audit, Compliance, and Ethics, 9 Walters Avenue, Unit 5084, Storrs, CT 06269-5084; Phone 860-486-4526; Fax 860-486-4527. As a provider of goods and/or services to the Owner, you are hereby required to notify your employees, as well as any subcontractors, who are involved in the implementation of this contract, of this reporting mechanism.

§13.8.4 CAMPAIGN CONTRIBUTION RESTRICTIONS

For all State contracts as defined in P.A. 10-1 having a value in a calendar year of \$50,000 or more or a combination or series of such agreements or contracts having a value of \$100,000 or more, the authorized signatory to this Contract expressly acknowledges receipt of the State Elections Enforcement Commission's notice advising state contractors of state campaign contribution and solicitation prohibitions, and will inform its principals of the contents of the notice (SEEC Form 11) below:

SEEC FORM 11
CONNECTICUT STATE ELECTIONS ENFORCEMENT COMMISSION
Rev. 1/11

**NOTICE TO EXECUTIVE BRANCH STATE CONTRACTORS AND
PROSPECTIVE STATE CONTRACTORS OF CAMPAIGN CONTRIBUTION
AND SOLICITATION LIMITATIONS**

This notice is provided under the authority of Connecticut General Statutes §9-612(g)(2), as amended by P.A. 10-1, and is for the purpose of informing state contractors and prospective state contractors of the following law (italicized words are defined on the reverse side of this page).

**CAMPAIGN CONTRIBUTION AND SOLICITATION
LIMITATIONS**

No state contractor, prospective state contractor, principal of a state contractor or principal of a prospective state contractor, with regard to a *state contract* or *state contract solicitation* with or from a state agency in the executive branch or a quasi-public agency or a holder, or principal of a holder of a valid prequalification certificate, shall make a contribution to (i) an exploratory committee or candidate committee established by a candidate for nomination or election to the office of Governor, Lieutenant Governor, Attorney General, State Comptroller, Secretary of the State or State Treasurer, (ii) a political committee authorized to make contributions or expenditures to or for the benefit of such candidates, or (iii) a party committee (which includes town committees).

In addition, no holder or principal of a holder of a valid prequalification certificate, shall make a contribution to (i) an exploratory committee or candidate committee established by a candidate for

nomination or election to the office of State senator or State representative, (ii) a political committee authorized to make contributions or expenditures to or for the benefit of such candidates, or (iii) a party committee.

On and after January 1, 2011, no state contractor, prospective state contractor, principal of a state contractor or principal of a prospective state contractor, with regard to a state contract or state contract solicitation with or from a state agency in the executive branch or a quasi-public agency or a holder, or principal of a holder of a valid prequalification certificate, shall **knowingly solicit** contributions from the state contractor's or prospective state contractor's employees or from a *subcontractor or principals of the subcontractor* on behalf of (i) an exploratory committee or candidate committee established by a candidate for nomination or election to the office of Governor,

Lieutenant Governor, Attorney General, State Comptroller, Secretary of the State or State Treasurer, (ii) a political committee authorized to make contributions or expenditures to or for the benefit of such candidates, or (iii) a party committee.

DUTY TO INFORM

State contractors and prospective state contractors are required to inform their principals of the above prohibitions, as applicable, and the possible penalties and other consequences of any violation thereof.

PENALTIES FOR VIOLATIONS

Contributions or solicitations of contributions made in violation of the above prohibitions may result in the following civil and criminal penalties:

Civil penalties—Up to \$2,000 or twice the amount of the prohibited contribution, whichever is greater, against a principal or a contractor. Any state contractor or prospective state contractor which fails to make reasonable efforts to comply with the provisions requiring notice to its principals of these prohibitions and the possible consequences of their violations may also be subject to civil penalties of up to \$2,000 or twice the amount of the prohibited contributions made by their principals.

Criminal penalties—Any knowing and willful violation of the prohibition is a Class D felony, which may subject the violator to imprisonment of not more than 5 years, or not more than \$5,000 in fines, or both.

CONTRACT CONSEQUENCES

In the case of a state contractor, contributions made or solicited in violation of the above prohibitions may result in the contract being voided.

In the case of a prospective state contractor, contributions made or solicited in violation of the above prohibitions shall result in the contract described in the state contract solicitation not being awarded to the prospective state contractor, unless the State Elections Enforcement Commission determines that mitigating circumstances exist concerning such violation.

The State shall not award any other state contract to anyone found in violation of the above prohibitions for a period of one year after the election for which such contribution is made or solicited, unless the State Elections Enforcement Commission determines that mitigating circumstances exist concerning such violation.

Additional information may be found on the website of the State Elections Enforcement Commission, www.ct.gov/seec. Click on the link to "Lobbyist/Contractor Limitations."

DEFINITIONS

"State contractor" means a person, business entity or nonprofit organization that enters into a state contract. Such person, business entity or nonprofit organization shall be deemed to be a state contractor until December thirty-first of the year in which such contract terminates. "State contractor" does not include a municipality or any other political subdivision of the state, including any entities or associations duly created by the municipality or political subdivision exclusively amongst themselves to further any purpose authorized by statute or charter, or an employee in the executive or legislative branch of state government or a quasi-public agency, whether in the classified or unclassified service and full or part-time, and only in such person's capacity as a state or quasi-public agency employee.

“Prospective state contractor” means a person, business entity or nonprofit organization that (i) submits a response to a state contract solicitation by the state, a state agency or a quasi-public agency, or a proposal in response to a request for proposals by the state, a state agency or a quasi-public agency, until the contract has been entered into, or (ii) holds a valid prequalification certificate issued by the Commissioner of Administrative Services under section 4a-100. “Prospective state contractor” does not include a municipality or any other political subdivision of the state, including any entities or associations duly created by the municipality or political subdivision exclusively amongst themselves to further any purpose authorized by statute or charter, or an employee in the executive or legislative branch of state government or a quasi-public agency, whether in the classified or unclassified service and full or part-time, and only in such person’s capacity as a state or quasi-public agency employee.

“Principal of a state contractor or prospective state contractor” means (i) any individual who is a member of the board of directors of, or has an ownership interest of five per cent or more in, a state contractor or prospective state contractor, which is a business entity, except for an individual who is a member of the board of directors of a nonprofit organization, (ii) an individual who is employed by a state contractor or prospective state contractor, which is a business entity, as president, treasurer or executive vice president, (iii) an individual who is the chief executive officer of a state contractor or prospective state contractor, which is not a business entity, or if a state contractor or prospective state contractor has no such officer, then the officer who duly possesses comparable powers and duties, (iv) an officer or an employee of any state contractor or prospective state contractor who has *managerial or discretionary responsibilities with respect to a state contract*, (v) the spouse or a *dependent child* who is eighteen years of age or older of an individual described in this subparagraph, or (vi) a political committee established or controlled by an individual described in this subparagraph or the business entity or nonprofit organization that is the state contractor or prospective state contractor.

“State contract” means an agreement or contract with the state or any state agency or any quasi-public agency, let through a procurement process or otherwise, having a value of fifty thousand dollars or more, or a combination or series of such agreements or contracts having a value of one hundred thousand dollars or more in a calendar year, for (i) the rendition of services, (ii) the furnishing of any goods, material, supplies, equipment or any items of any kind, (iii) the construction, alteration or repair of any public building or public work, (iv) the acquisition, sale or lease of any land or building, (v) a licensing arrangement, or (vi) a grant, loan or loan guarantee. “State contract” does not include any agreement or contract with the state, any state agency or any quasi-public agency that is exclusively federally funded, an education loan, a loan to an individual for other than commercial purposes or any agreement or contract between the state or any state agency and the United States Department of the Navy or the United States Department of Defense.

“State contract solicitation” means a request by a state agency or quasi-public agency, in whatever form issued, including, but not limited to, an invitation to bid, request for proposals, request for information or request for quotes, inviting bids, quotes or other types of submittals, through a competitive procurement process or another process authorized by law waiving competitive procurement.

“Managerial or discretionary responsibilities with respect to a state contract” means having direct, extensive and substantive responsibilities with respect to the negotiation of the state contract and not peripheral, clerical or ministerial responsibilities.

“Dependent child” means a child residing in an individual’s household who may legally be claimed as a dependent on the federal income tax of such individual.

“Solicit” means (A) requesting that a contribution be made, (B) participating in any fund-raising activities for a candidate committee, exploratory committee, political committee or party committee, including, but not limited to, forwarding tickets to potential contributors, receiving contributions for transmission to any such committee or bundling contributions, (C) serving as chairperson, treasurer or deputy treasurer of any such committee, or (D) establishing a political committee for the sole purpose of soliciting or receiving contributions for any committee. Solicit does not include: (i) making a contribution that is otherwise permitted by Chapter 155 of the Connecticut General Statutes; (ii) informing any person of a position taken by a candidate for public office or a public official, (iii) notifying the person of any activities of, or contact information for, any candidate for public office; or (iv) serving as a member in any party committee or as an officer of such committee that is not otherwise prohibited in this section.

“Subcontractor” means any person, business entity or nonprofit organization that contracts to perform part or all of the obligations of a state contractor’s state contract. Such person, business entity or nonprofit organization shall be deemed to be a subcontractor until December thirty first of the year in which the subcontract terminates. “Subcontractor” does not include (i) a municipality or any other political subdivision of the state, including any entities or associations duly created by the municipality or political subdivision exclusively amongst themselves to further any purpose authorized by statute or charter, or (ii) an employee in the executive or legislative branch of state government or a quasi-public agency, whether in the classified or unclassified service and full or part-time, and only in such person’s capacity as a state or quasi-public agency employee.

“Principal of a subcontractor” means (i) any individual who is a member of the board of directors of, or has an ownership interest of five per cent or more in, a subcontractor, which is a business entity, except for an individual who is a member of the board of directors of a nonprofit organization, (ii) an individual who is employed by a subcontractor, which is a business

entity, as president, treasurer or executive vice president, (iii) an individual who is the chief executive officer of a subcontractor, which is not a business entity, or if a subcontractor has no such officer, then the officer who duly possesses comparable powers and duties, (iv) an officer or an employee of any subcontractor who has managerial or discretionary responsibilities with respect to a subcontract with a state contractor, (v) the spouse or a dependent child who is eighteen years of age or older of an individual described in this subparagraph, or (vi) a political committee established or controlled by an individual described in this subparagraph or the business entity or nonprofit organization that is the subcontractor.

§ 13.8.5 WHISTLEBLOWING:

This Contract is subject to the provisions of § 4-61dd of the Connecticut General Statutes. In accordance with this statute, if an officer, employee or appointing authority of the Contractor takes or threatens to take any personnel action against any employee of the Contractor in retaliation for such employee's disclosure of information to any employee of the Contracting state or quasi-public agency or the Auditors of Public Accounts or the Attorney General under the provisions of subsection (a) of such statute, the Contractor shall be liable for a civil penalty of not more than five thousand dollars for each offense, up to a maximum of twenty per cent of the value of this Contract. Each violation shall be a separate and distinct offense and in the case of a continuing violation, each calendar day's continuance of the violation shall be deemed to be a separate and distinct offense. The Owner may request that the Attorney General bring a civil action in the Superior Court for the Judicial District of Hartford to seek imposition and recovery of such civil penalty. In accordance with subsection (f) of such statute, each large state Contractor, as defined in the statute, shall post a notice of the provisions of the statute relating to large state Contractors in a conspicuous place which is readily available for viewing by the employees of the Contractor.

§ 13.8.6 COMPLIANCE WITH OWNER POLICIES AND GUIDELINES

At a minimum, the Contractor shall comply with established Owner policies and guidelines, which have been previously provided to bidders and/or are available for review upon request. These policies are hereby incorporated by reference herein, including but not limited to: Policies on Lockout/Tagout; Confined Space Entry as referenced in the Contractor's Environmental Health and Safety Manual; Code of Conduct; Sexual Harassment; Racism and Acts of Intolerance; Smoking.

§ 13.9 PREFERENCE IN EMPLOYMENT

§ 13.9.1 In the employment of labor to perform the work specified herein, preference shall be given to citizens of the United States, who are, and continuously for three months prior to the date hereof have been residents of the labor market areas, as established by the Labor Commissioner in which said work is to be done; and if no such qualified persons are available, then to citizens who have continuously resided in the county in which the work is to be performed for at least three months prior to the date hereof and then to citizens of the State who have continuously resided in the State at least three months prior to the date hereof. In no event shall said provisions be deemed to abrogate or supersede in any manner any provision regarding residence requirements contained in a Collective Bargaining Agreement to which the Contractor is a party.

§ 13.10 MINIMUM WAGE RATES

§ 13.10.1 If this project involves new construction of a building or other structure or improvement and the total cost of all Work to be performed by Contractors and Subcontractors is \$400,000 or more or if the project involves remodeling, refurbishing, rehabilitation, alteration or repair of a building or other structure or improvement and such total cost is \$100,000 or more then:

- .1 The wages paid on an hourly basis to any mechanic, laborer or workman employed upon the work herein contracted to be done and the amount of payment or contribution paid or payable on behalf of each such employee to any employee welfare fund as defined in Subsection (i) of Section 31-53 of the Connecticut General Statutes shall be at a rate equal to the rate customary or prevailing for the same work in the same trade or occupation in the town in which such project is being constructed. Any Contractor who is not obligated by agreement to make payment or contribution on behalf of such employees to any such employee welfare fund shall pay to each employee as part of his wages the amount of payment or contribution for his classification on each payday.

§ 13.10.2 The State of Connecticut Labor Department Wage Schedule where required shall be provided with these documents typically with the Bidding Documents, or will be incorporated in the Contract Documents as an Addendum. The Contractor agrees to accept the current prevailing wage scale as well as any annual adjustment to the prevailing wage scale as provided by the Connecticut Department of Labor. Wage Rates will be posted each July 1st on the Department of Labor's website: www.ctdol.state.ct.us. Such prevailing wage adjustment will not be

considered a basis for an annual contract amendment. The schedule is deemed to reflect customary or prevailing wages for this project and is hereby incorporated and made a part of the Contract Documents. Wage Rates shall be paid pursuant to Sections 31-53 and 31-54 of the Connecticut General Statutes and any regulations issued there under.

§ 13.11 HOURS OF LABOR PERMITTED

§ 13.11.1 Pursuant to Section 31-57 of the Connecticut General Statutes, no person shall be employed to work or be permitted to work more than eight hours in any day or more than forty hours in any week on any work provided for in the Contract. The operation of such limitation of hours of work may be suspended during an emergency upon the approval of the Owner Representative.

§ 13.12 EXAMINING AND COPYING CONTRACTOR'S RECORDS

§ 13.12.1 The Contractor shall permit the Owner or its duly authorized representative to examine and copy books and records of the Contractor relative to charges for extra work, alleged breaches of contract, settlement of claims, or any other matter involving the Contractor's demand for added compensation from the Owner. The Contractor shall also permit such examination and copying of his records as the Owner may deem necessary, excepting papers and records preceding the execution of the Contract that are not a matter of record with the Owner, in order to determine that the Contractor has complied with all laws and regulations pertaining to the Contract, such as but not limited to Labor Compliance, Affirmative Action Program and Equal Employment Opportunity.

§ 13.12.2 The Contractor further agrees that he shall keep all records relating to this Contract until the expiration of six (6) years after final payment under this Contract is made, or six (6) months after settlement of any disputes whichever may be later.

§ 13.12.3 The Contractor further agrees that he and his Subcontractors shall permit the Owner, at its own expense, by its duly authorized representatives, to inspect and audit all their data, records and files pertaining to this Contract.

§ 13.13 SYSTEM LAYOUT DRAWING

§ 13.13.1 System layouts indicated on the on the drawings are generally diagrammatic and locations and arrangements of items are approximate. Exact routing of conduit, wiring, location of fixtures, outlets, panels, piping, valves and all other equipment shall be governed by the structural conditions and obstructions. The entire layout shall be followed as closely as possible and the right is reserved by the Owner to reasonably change the locations to accommodate any conditions which may arise during the progress of the work without additional compensation to the Contractors.

§ 13.14 GUARANTY OF PERFORMANCE

§ 13.14.1 If the Contractor has submitted the financial statement of a parent or other affiliated entity in its Proposers Qualification Statement, or if pre-qualified, its application for pre-qualification and has also indicated in that submission that such parent or affiliate will guarantee the performance of the Contract, then the parent or affiliate shall execute, simultaneously, with the Contractor's execution of the Contract, a Guaranty in a form provided by and acceptable to the Owner.

§ 13.15 JOINT VENTURE

§ 13.15.1 If the Contractor is a joint venture, each joint venture partner shall be jointly, severally and individually responsible to the Owner for the performance of any and all obligations of the Contractor encompassed by this contract or as required by applicable law, and each joint venture partner shall be jointly, severally and individually liable to the Owner for any failures to perform such obligations in accordance with the contract or applicable law. In its dealings with the Owner, each joint venture partner shall have full authority to act in behalf of and bind the joint venture and any other joint venture partner. Each joint venture partner shall be considered to be the agent of the joint venture and of any other joint venture partner.

§ 13.16 WORKER GEOGRAPHIC DISTRIBUTION

§ 13.16.1 If the Project is a Covered Project (as defined hereinafter), the Contractor shall comply with the provisions of this Section 13.16.

§ 13.16.2 The Contractor shall submit to the Owner a plan for encouraging the hiring of Workers (as defined hereinafter) with Residence (as defined hereinafter) in the State of Connecticut.

§13.16.3 Following the close of each Quarter (as defined hereinafter), the Contractor shall submit a Worker Geographic Distribution Report (as defined hereinafter) to the Owner in a form satisfactory to the Owner. The “Worker Geographic Distribution Report” is a report that shall provide the following information for each Worker paid, during the most recently closed Quarter, for work on the Project:

- .1 The numbers of hours of Project work for which such Worker was paid during such Quarter.
- .2 The Wages (as defined hereinafter) paid to such Worker during such Quarter.
- .3 The Residence of such Worker as of the close of such Quarter.

§13.16.4 The Worker Geographic Distribution Report shall not contain any personally identifiable information about a Worker.

§13.16.5 The following terms shall have the meaning assigned below for the purposes of this Section 13.16.

- .1 “Covered Project” is a project that is both subject to Section 31-53(a) of the Connecticut General Statutes and for which the total cost of all work to be performed by all contractors and subcontractors is \$1,000,000 or greater.
- .2 “Quarter” means a calendar quarter of each calendar year.
- .3 “Residence” is the state and town in which a Worker resides, as reflected in the payroll records of such Worker’s employer.
- .4 “Subcontractor” is any subcontractor or sub-subcontractor of the Contractor, which subcontractor or sub-subcontractor employs Workers on the Project.
- .5 “Wages” are the wages that are subject to Section 31-53(a) of the Connecticut General Statutes (including any amounts paid to an employee welfare fund).
- .6 “Worker” is an employee of the Contractor or a Subcontractor (as defined hereinabove), which employee is working on the Project and whose wages for such work is subject to Section 31-53(a) of the Connecticut General Statutes.

ARTICLE 14 TERMINATION OR SUSPENSION OF THE CONTRACT

§ 14.1 TERMINATION BY THE CONTRACTOR

§ 14.1.1 The Contractor may terminate the Contract if the Work is stopped for a period of sixty (60) consecutive days through no act or fault of the Contractor or a Subcontractor, Sub-subcontractor or their agents or employees or any other persons or entities performing portions of the Work under direct or indirect contract with the Contractor, for any of the following reasons:

- .1 Issuance of an order of a court or other public authority having jurisdiction that requires all Work to be stopped; or
- .2 An act of government, such as a declaration of national emergency that requires all Work to be stopped.
- .3 Not Used.
- .4 Not Used.

§ 14.1.2 Not Used.

§ 14.1.3 If one of the reasons described in Section 14.1.1 exists, the Contractor may, upon seven (7) days’ written notice to the Owner and Architect, terminate the Contract and recover from the Owner payment for Work executed and for proven loss with respect to materials, equipment, tools, and construction equipment and machinery.

§ 14.1.4 If the Work is stopped for a period of sixty (60) consecutive days through no act or fault of the Contractor or a Subcontractor or their agents or employees or any other persons performing portions of the Work under contract with the Contractor because the Owner has repeatedly failed to fulfill the Owner’s obligations under the Contract Documents with respect to matters important to the progress of the Work, the Contractor may, upon seven (7) additional days’ written notice to the Owner and the Architect, terminate the Contract and recover from the Owner as provided in Section 14.1.3.

§ 14.2 TERMINATION BY THE OWNER FOR CAUSE

§ 14.2.1 The Owner may, without prejudice to or waiving any other right or remedy of the Owner, terminate the Contract if the Contractor

- .1 refuses or fails to supply enough properly skilled workers or proper materials;
- .2 fails to make payment to Subcontractors for materials or labor in accordance with the respective agreements between the Contractor and the Subcontractors;
- .3 disregards applicable laws, statutes, ordinances, codes, rules and regulations, or lawful orders of a public authority;
- .4 otherwise is guilty of substantial breach of a provision of the Contract Documents;
- .5 Fails to furnish the Owner with assurances satisfactory to the Owner evidencing the Contractor's ability to complete the Work in compliance with all requirements of the Contract Documents;
- .6 Refuses or fails to prosecute the Work or any separable part, with the diligence that will insure its completion within the time specified in this Contract including any duly authorized extension, or fails to complete the Work within said period; or
- .7 Fails to comply with laws, rules, regulations, or directives regarding job site safety; or to comply with the provisions of the Owner's Contractor Environmental Health and Safety Manual, or orders or directives regarding safety issued by the Owner pursuant to the Contract.

§ 14.2.2 When any of the above reasons exist, the Owner, with advice of the Architect and upon certification by the Initial Decision Maker, determines that sufficient cause exists to justify such action, may without prejudice to any other rights or remedies of the Owner and after giving the Contractor and the Contractor's surety, if any, seven (7) days' written notice, terminate employment of the Contractor and may, subject to any prior rights of the surety:

- .1 Exclude the Contractor from the site and take possession of all materials, equipment, tools, and construction equipment and machinery thereon owned by the Contractor;
- .2 Accept assignment of subcontracts pursuant to Section 5.4;
- .3 Finish the Work by whatever reasonable method the Owner may deem expedient. Upon written request of the Contractor, the Owner shall furnish to the Contractor a detailed accounting of the costs incurred by the Owner in finishing the Work; and
- .4 Terminate the Contractor's right to proceed with a separate part of the Work if the Owner so elects.

§ 14.2.3 When the Owner terminates the Contract for one of the reasons stated in Section 14.2.1, the Contractor shall not be entitled to receive further payment until the Work is finished.

§ 14.2.4 If the unpaid balance of the Contract Sum exceeds costs of finishing the Work, including compensation for the Architect's services and expenses made necessary thereby, and other damages incurred by the Owner and not expressly waived, such excess shall be retained by the Owner. If such costs and damages exceed the unpaid balance, the Contractor shall pay the difference to the Owner. The amount to be paid to the Contractor or Owner, as the case may be, shall be certified by the Architect and Initial Decision Maker, upon application, and this obligation for payment shall survive termination of the Contract.

§ 14.3 SUSPENSION BY THE OWNER FOR CONVENIENCE

§ 14.3.1 The Owner may, without cause and without prejudice to or waiving any other right or remedy of the Owner, order the Contractor in writing to suspend, delay or interrupt the Work in whole or in part for such period of time as the Owner may determine.

§ 14.3.2 The Contract Sum and Contract Time shall be adjusted for increases in the cost and time caused by suspension, delay or interruption as described in Section 14.3.1. Adjustment of the Contract Sum shall include profit. No adjustment shall be made to the extent

- .1 that performance is, was or would have been so suspended, delayed or interrupted by another cause for which the Contractor is responsible; or
- .2 that an equitable adjustment is made or denied under another provision of the Contract.

§ 14.4 TERMINATION BY THE OWNER FOR CONVENIENCE

§ 14.4.1 The Owner may, at any time, without prejudice or waiving any other right or remedy of the Owner, terminate the Contract in whole or in part for the Owner's convenience and without cause. Termination by the Owner under this Section shall be by a Notice of Termination delivered to the Contractor specifying the extent of termination and the effective date.

§ 14.4.2 Upon receipt of a Notice of Termination for convenience, the Contractor shall immediately, in accordance with instructions from the Owner, proceed with performance of the following duties regardless of delay in determining or adjusting amounts due under this Section:

- .1 Cease operations as specified in the notice;
- .2 Place no further orders and enter into no further Subcontracts for materials, labor, services or facilities except as necessary to complete continued portions of the Contract;
- .3 except for Work directed to be performed prior to the effective date of termination stated in the notice, terminate all existing subcontracts and purchase orders and enter into no further subcontracts and purchase orders.
- .4 Proceed to complete the performance of Work not terminated;
- .5 Take actions that may be necessary or that the Owner may direct for the protection and preservation of the terminated Work.

§ 14.4.3 Upon such termination, the Contractor shall recover as its sole remedy, payment for Work properly performed in connection with the terminated portion of the Work prior to the effective date of termination and for items properly and timely purchased or fabricated off the Project site, delivered and stored in accordance with the Owner's instructions plus demobilization costs. The Contractor hereby waives and forfeits all other claims for payment and damages, including without limitation, anticipated profits.

§14.4.4 The Owner shall be credited for (1) payments previously made to the Contractor for the terminated portion of the Work; (2) claims which the Owner has against the Contractor under the Contract and (3) the value of the materials, supplies, equipment or other items that are to be disposed of by the Contractor that are part of the Contract Sum.

§14.4.5 The payment to the Contractor pursuant to this Section may not exceed the total Contract Price as reduced by:

- .1 The amount of payments previously made
- .2 The Contract price of work not terminated.

ARTICLE 15 CLAIMS AND DISPUTES

§ 15.1 CLAIMS

§ 15.1.1 DEFINITION

A Claim is a demand or assertion by one of the parties seeking, as a matter of right, adjustment or interpretation of Contract terms, payment of money, extension or time, and/or other relief with respect to the terms of the Contract. The term "Claim" also includes other disputes and matters in question between the Owner and Contractor arising out of or relating to the Contract. The responsibility to substantiate Claims shall rest with the party making the Claim.

§ 15.1.2 NOTICE OF CLAIMS

Claims by the Contractor must be initiated by written notice to the Owner Representative as described in Section 1.1.1.1 and to the Initial Decision Maker with a copy sent to the Architect, if the Architect is not serving as the Initial Decision Maker. Claims by the Contractor must be initiated within twenty-one (21) days after occurrence of the event giving rise to such Claim or within fourteen (14) days after the claimant first recognizes the condition giving rise to the Claim, whichever is later. Claims may also be reserved by the Contractor in writing within the time limits set forth in this Section 15.1.2. If a Claim is reserved, the Resolution of Claims and Disputes procedures described in Article 15 shall not commence until a written notice from the Contractor is received by the Owner Representative. No such claim shall be valid unless so made. Any notice of Claim or reservation of Claim must clearly identify the alleged cause and the nature of the Claim and include data and information then available to the claimant that will facilitate prompt verification and evaluation of the Claim.

§ 15.1.3 CONTINUING CONTRACT PERFORMANCE

Pending final resolution of a Claim, except as otherwise agreed in writing or as provided in Article 14, the Contractor shall proceed diligently with performance of the Contract and the Owner shall continue to make payments in accordance with the Contract Documents. The Architect will prepare Change Orders and issue Certificates for Payment in accordance with the decisions of the Initial Decision Maker.

§ 15.1.4 CLAIMS FOR ADDITIONAL COST

§ 15.1.4.1 If the Contractor wishes to make a Claim for an increase in the Contract Sum, written notice as provided herein shall be given before proceeding to execute the Work. Prior notice is not required for Claims relating to an emergency endangering life or property arising under Section 10.4.

§ 15.1.4.2 If the Contractor believes additional cost is involved for reasons including but not limited to (1) a written interpretation from the Architect, (2) an order by the Owner to stop the Work where the Contractor was not at fault, (3) a written order for a minor change in the Work issued by the Architect, (4) failure of payment by the Owner, (5) termination of the Contract by the Owner, (6) Owner's suspension or (7) other reasonable grounds, Claim shall be made in accordance with the provisions of this Article 15.

§ 15.1.5 CLAIMS FOR ADDITIONAL TIME

§ 15.1.5.1 If the Contractor wishes to make a Claim for an increase in the Contract Time, written notice as provided herein shall be given. The Contractor's Claim shall include an estimate of cost and of probable effect of delay on progress of the Work. No such claim shall be valid unless made in accordance with the provisions of this Article 15. In the case of a continuing delay, only one Claim is necessary.

§ 15.1.5.2 If adverse weather conditions are the basis for a Claim for additional time, such Claim shall be documented by data substantiating that weather conditions were abnormal for the period of time, could not have been reasonably anticipated and had an adverse effect on the scheduled construction.

§ 15.1.6 CLAIMS FOR CONSEQUENTIAL DAMAGES NOT USED.

§ 15.1.7 Injury or Damage to Person or Property. If the Contractor suffers injury or damage to person or property because of an act or omission of the Owner Representative, or of others for whose acts such party is legally responsible, written notice of such injury or damage, whether or not insured, shall be given to the other party within a reasonable time not exceeding twenty-one (21) days after discovery. The notice shall provide sufficient detail to enable the other party to investigate the matter.

§ 15.1.8 Claims for Concealed or Unknown Conditions: If, upon or subsequent to the Contractor's and its Subcontractors' site visits and performance of the tests, examinations and inspections required by Section 3.2.2, the Contractor encounters conditions at the site that are (1) subsurface or otherwise concealed physical conditions that differ materially from those indicated in the Contract Documents or (2) unknown physical conditions of an unusual nature that differ materially from those ordinarily found to exist and generally recognized as inherent in construction activities of the character provided for in the Contract Documents, the Contractor will promptly provide notice to the Owner and the Architect before conditions are disturbed and in no event later than 5 days after first observance of the conditions. The Architect will promptly investigate such conditions and, if the Architect determines that they differ materially and cause an increase or decrease in the Contractor's cost of, or time required for, performance of any part of the Work, will recommend an equitable adjustment in the Contract Sum or Contract Time, or both. If the Architect determines that the conditions at the site are not materially different in the respects noted above and that no change in the terms of the Contract is justified, the Architect shall promptly notify the Owner and Contractor in writing, stating the reasons. Any claim by the Contractor in opposition to such determination must be made within 21 days after the Architect has given notice of the recommendation. The Owner Representative will have the final authority to accept or reject the Architect's recommendations, which decision by the Owner Representative shall be subject to further proceedings pursuant to Article 15.

§ 15.2 INITIAL DECISION

§ 15.2.1 Claims by the Contractor, excluding those arising under Sections 10.3, 10.4, 11.3.9, and 11.3.10, shall be referred to the Initial Decision Maker for initial decision. The Architect will serve as the Initial Decision Maker, unless otherwise indicated in the AIA 101-2007 Section 6.1 of the Contract. Except for those Claims excluded by this Section 15.2.1, an initial decision shall be required as a condition precedent to mediation of any Claim arising prior to the date final payment is due, regardless of (1) whether such matters relate to execution and progress of the Work, or (2) the extent to which the Work has been completed. The decision by the Initial Decision Maker in response to a Claim shall not be a condition precedent to arbitration or litigation in the event (1) the position of Initial Decision Maker is vacant, (2) the Contractor has not provided evidence or (3) the Initial Decision Maker has failed to take action required under Section 15.2.2 within thirty (30) days after the Claim is made.

§ 15.2.2 The Initial Decision Maker will review Claims by the Contractor and within thirty (30) days of the receipt of a Claim take one or more of the following actions: (1) request additional supporting data from the claimant or a response with supporting data from the other party, (2) reject the Claim in whole or in part, (3) approve the Claim, (4) suggest a compromise, or (5) advise the parties that the Initial Decision Maker is unable to resolve the Claim if the Initial Decision Maker lacks sufficient information to evaluate the merits of the Claim or if the Initial Decision Maker concludes that, in the Initial Decision Maker's sole discretion, it would be inappropriate for the Initial Decision Maker to resolve the Claim.

§ 15.2.3 In evaluating Claims of the Contractor, the Initial Decision Maker may, but shall not be obligated to, consult with or seek information from either party or from persons with special knowledge or expertise who may assist the Initial Decision Maker in rendering a decision.

§ 15.2.4 If the Initial Decision Maker requests a party to provide a response to a Claim of the Contractor or to furnish additional supporting data, such party shall respond, within ten (10) days after receipt of such request, and shall either (1) provide a response on the requested supporting data, (2) advise the Initial Decision Maker when the response or supporting data will be furnished or (3) advise the Initial Decision Maker that no supporting data will be furnished. Upon receipt of the response or supporting data, if any, the Initial Decision Maker will either reject or approve the Claim in whole or in part.

§ 15.2.4.1 If a Claim of the Contractor has not been resolved after consideration of the foregoing, the Initial Decision Maker will render a written decision on the claim, including any change in the Contract Sum or Contract Time or both, which decision shall be final and binding but subject to meeting and mediation pursuant to Section 15.3 of this document and arbitration or litigation pursuant to Connecticut General Statutes Section 4-61 and Section 15.4 of this Contract to the extent applicable.

§ 15.2.5 NOT USED.

§ 15.2.6 NOT USED.

§ 15.2.6.1 NOT USED.

§ 15.2.7 In the event of a Claim against the Contractor, the Owner may, but is not obligated to, notify the surety, if any, of the nature and amount of the Claim. If the Claim relates to a possibility of a Contractor's default, the Owner may, but is not obligated to, notify the surety and request the surety's assistance in resolving the controversy.

§ 15.2.8 NOT USED.

§ 15.3 MEDIATION

§ 15.3.1 Claims of the Contractor except those waived as provided for in Section 9.10.5 shall be submitted to the meeting and mediation process described in the Sections which follow, prior to and as a precondition to the Contractor pursuing any other available remedy. Claims by the Owner, at the option of the Owner, may be submitted to such meeting process and/or mediation process, and, in such event, Contractor shall be required to submit to and participate in such a meeting and/or mediation. The meeting shall be between the parties and attended by individuals with decision-making authority regarding the dispute, to attempt in good faith to negotiate a resolution of the dispute.

§ 15.3.2 The meeting referenced in Section 15.3.1 shall be held promptly, but not less than fourteen (14) calendar days after a party's request for the meeting. The Contractor shall not submit any claim to mediation in accordance with the provisions of Sections 15.3.1 through 15.3.6 until fourteen (14) calendar days after the date of the meeting.

§ 15.3.3 In connection with any such mediation, a request for mediation shall be made in writing, delivered to the other party to the Contract. The request may be made concurrently with the filing of applicable binding dispute resolution proceedings but, in such event, mediation shall proceed in advance of binding dispute resolution proceedings, which shall be stayed pending mediation for a period of sixty (60) calendar days from the date of filing, unless stayed for a different period of time by agreement of the parties or as modified by court order.

§ 15.3.4 The parties will jointly appoint a mutually acceptable mediator, seeking assistance in such regard from a mutually agreed upon dispute resolution entity if they have been unable to agree upon such appointment within twenty (20) calendar days from the submittal of the request for mediation. If the parties are unable to agree on the dispute resolution entity, the mediation shall be administered by the American Arbitration Association in accordance with its Construction Industry Mediation Procedures in effect on the date of this Contract.

§ 15.3.5 The parties agree to participate in good faith in the mediation and negotiations related thereto for a period of sixty (60) calendar days from the date of submittal, or until the parties reach impasse as evidenced by a letter from a party to the mediator, whichever first occurs. If the parties are not successful in resolving the dispute through mediation, then the parties may pursue other legal remedies available to them.

§ 15.3.6 Should the Owner request, the Contractor agrees to participate as a party in any mediation proceeding between the Owner and the Architect or other Consultant for the Project in which construction deficiencies, contract breaches, or other alleged wrongful acts by the Contractor are alleged.

§ 15.4 ARBITRATION OR LITIGATION OF CLAIMS

§ 15.4.1 NOT USED.

§ 15.4.1.1 NOT USED.

§ 15.4.2 NOT USED.

§ 15.4.3 NOT USED.

§ 15.4.4 Should the Owner have a claim against the Contractor, the parties agree that the Owner, whether or not it elects to proceed with the meeting process or mediation described in Section 15.3, shall have the option of either prosecuting the claim against the Contractor in an appropriate court of general jurisdiction, or by arbitrating the claim by filing a demand for arbitration pursuant to the rules of a dispute resolution entity agreed upon by the parties, except that if the parties cannot agree upon a dispute resolution entity, the rules of the American Arbitration Association shall apply.

§ 15.4.5 Should the Contractor have a claim against the Owner which has not been resolved by mediation or any other procedure set forth in this Contract, the Contractor's rights to assert its claim against the Owner shall be subject to the provisions of Connecticut General Statutes Section 4-61.

§ 15.4.6 CONSOLIDATION OR JOINDER

§ 15.4.6.1 Should either the Contractor institute an arbitration to the extent authorized by Section 4-61 of the Connecticut General Statutes or the Owner institute an arbitration as set forth herein, the Contractor agrees that any such arbitration may be consolidated, at the Owner's discretion, with any arbitration proceeding involving the Owner and the Architect or other Consultant for the Project in which construction or design deficiencies, breaches of contract, or any other alleged wrongful acts by the Contractor or Architect are alleged.

§ 15.4.6.2 NOT USED.

§ 15.4.6.3 NOT USED.

ARTICLE 16 CODE OF CONDUCT

§ 16.1 CODE OF CONDUCT

§ 16.1.1 In furtherance of its longstanding commitment to fundamental human rights, to the dignity of all people, and to the environment, the Owner has developed the Code of Conduct for University of Connecticut Vendors (the "Vendor Code of Conduct"). The Contractor hereby acknowledges receipt of the Vendor Code of Conduct. A copy of the Vendor Code of Conduct is available at <http://csr.uconn.edu/>. The Vendor Code of Conduct is hereby incorporated herein by reference to the extent the Contractor is required to comply with the same pursuant to this section.

The Contractor agrees to comply with the "Principal Expectations" described in the Vendor Code of Conduct. The Contractor further agrees to comply with the "Preferential Standards" described in the Vendor Code of Conduct, to the extent a commitment to so comply, or a representation of compliance, was provided by the Contractor to the

Owner in writing. Any such commitment or representation is hereby incorporated herein by reference. The Contractor agrees to provide the Owner with such evidence of Contractor's compliance with this section as the Owner reasonably requests and to, at the request of the Owner, provide a comprehensive, annual summary report of the Contractor's corporate social and environmental practices.

ARTICLE 17 BACKGROUND CHECKS

§ 17.1 The Contractor warrants that it will not assign any employee, independent contractor or agent to perform services under this Contract unless that employee, independent contractor or agent has satisfactorily completed a background check and is deemed suitable by the Contractor for performing such services on a college campus attended and inhabited by students. The background check must minimally include criminal arrest information for the past seven years, a check of the national and state sex offender registries and a social security number verification. All fees associated with the background checks shall be the responsibility of the Contractor. The Contractor shall immediately remove any employee, independent contractor or agents performing services under this Contract on campus if it becomes known to the Contractor that such person may be a danger to the health or safety of the campus community, or at the request of the University based on a concern of community or individual safety.

§ 17.2 Without limiting the obligations of the Contractor under § 3.18 of this Contract, the Contractor shall defend, indemnify and hold harmless the state of Connecticut, the University of Connecticut and all of their employees, agents and/or assigns for any claims, suits or proceedings resulting from a breach of the foregoing warranty and/or that are caused in whole or in part by the actions or omissions of the Contractor, its employees, or other persons that the Contractor causes to be on the campus.

ARTICLE 18 UNIVERSITY POLICIES

The Contractor shall, at no additional cost to the University, comply with all policies and procedures of the University. In the event the University establishes new policies or procedures following execution of the contract, or makes modifications to policies or procedures in existence at the time of contract execution, the Contractor shall comply with such new or modified policies or procedures upon written notice.

ARTICLE 19 SOVEREIGN IMMUNITY

§ 19.1 The parties acknowledge and agree that nothing in this Contract shall be construed as a waiver by the State of Connecticut or the Owner of any rights or defenses of sovereign immunity, which it may have had, now has, or will have with respect to all matters arising out of this Contract. To the extent that this provision conflicts with any other provision hereunder, this provision shall govern.

This document acknowledging agreement to the General Conditions contained herein is entered into as of _____, 2014 and is executed in at least three originals, of which one is to be delivered to the Contractor, one to the Architect for use in the administration of the Contract, and the remainder to the Owner.

OWNER (Signature)

_____, Executive VP for
Administration & CFO

Duly Authorized: CGS §§ 10a-104 and 10a-108
(Printed name and title)

Date: _____

CONTRACTOR (Signature)

« Duly Authorized »« »
(Printed name and title)

Date: _____

APPROVED AS TO FORM:

Assistant/Associate Attorney General

Date Signed: _____

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UNIVERSITY OF CONNECTICUT



NORTH EAGLEVILLE ROAD AREA INFRASTRUCTURE REPAIR/REPLACEMENT PHASE II – YOUNG QUAD

DIVISION 1 AND TECHNICAL SPECIFICATIONS

STORRS CAMPUS
UCONN PROJECT NO. 901954
APRIL 21, 2015

AECOM

500 Enterprise Drive, Suite 3B
Rocky Hill, Connecticut 06067
AECOM PROJECT NO. 36940200

DIVISION 01 GENERAL REQUIREMENTS

01-1000 – SUMMARY
01-2100 - ALLOWANCES
01-2200 - UNIT PRICES
01-2300 - ALTERNATES
01-2500 - SUBSTITUTION PROCEDURES
01-2600 - CONTRACT MODIFICATION PROCEDURES
01-3100 - PROJECT MANAGEMENT AND COORDINATION
01-3200 - CONSTRUCTION PROGRESS DOCUMENTATION
01-3233 - PHOTOGRAPHIC DOCUMENTATION
01-3300 - SUBMITTAL PROCEDURES
01-4000 - QUALITY REQUIREMENTS
01-5000 - TEMPORARY FACILITIES AND CONTROLS
01-5639 - TEMPORARY TREE AND PLANT PROTECTION
01-5719 – TEMPORARY ENVIRONMENTAL CONTROLS
01-6000 - PRODUCT REQUIREMENTS
01-6100 - UNIVERSITY PRODUCT STANDARD
01-7300 - EXECUTION
01-7700 - CLOSEOUT PROCEDURES
01-7823 - OPERATION AND MAINTENANCE DATA
01-7839 - PROJECT RECORD DOCUMENTS
01-7900 - DEMONSTRATION AND TRAINING

END OF SECTION 01-0000

SECTION 01-1000 - SUMMARY

PART 1 - GENERAL

1.1 RELATED DOCUMENTS

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

1.2 SUMMARY

A. Section Includes:

1. Project information.
2. Work covered by Contract Documents.
3. Work under separate contracts.
4. Time of Completion.
5. Access to site and Contractor Parking.
6. Coordination with occupants.
7. Work restrictions.
8. Work Sequence.
9. Miscellaneous provisions.

B. Related Requirements:

1. Division 01 Section "Temporary Facilities and Controls" for limitations and procedures governing temporary use of Owner's facilities.
2. Division 01 Section "Temporary Tree and Plant Protection" for general protection and pruning of existing trees and plants that are affected by the execution of the Work.
3. Division 01 Section "Submittal Procedures" for submittal requirements prior to start of work.

1.3 PROJECT INFORMATION

A. Project Identification: UCONN Project No. 901954

North Eagleville Road Infrastructure Repair/Replacement

Phase II – Young Quad Utilities.

1. Project Location: UCONN, Storrs Campus, Storrs, CT 06067.

B. Owner: University of Connecticut

1. Owner's Representative:

Brian McKeon, P.E., UCONN PAES, 31 LeDoyt Road, Storrs, CT 06269.

- C. Engineer: Peter Sammis, P.E., AECOM, 500 Enterprise Drive, Rocky Hill, CT 06067.
- D. Engineer's Consultants: The Engineer has retained the following design professionals who have prepared designated portions of the Contract Documents:
 - 1. F.A. Bartlett Company, Arborist, 1250 Hopmeadow Street, Simsbury, CT 06070.

1.4 WORK COVERED BY CONTRACT DOCUMENTS

- A. The Work of Project is defined by the Contract Documents and consists of the following:
 - 1. Construction of underground utilities including steam and condensate return, sanitary and storm sewers, sanitary sewer force main, water main, electrical and telecommunication duct banks and surface restoration.
 - 2. Removal of all debris caused by this Contract.
 - 3. Protection for the public, building, grounds from damage during this contract is the responsibility of the Contractor for this project at all times.
 - 4. Repair or replace landscaping including trees, shrubs or other planting disturbed during the Work of the contract with new to match existing, unless otherwise noted. Regrade and reseed any grass area damaged as a result of the Work. Repair any walkways or paved areas damaged as a result of the Work.

1.5 WORK UNDER SEPARATE CONTRACTS

- A. General: Cooperate fully with contractors that may have been issued separate contract(s) to perform certain construction operations at the site prior to construction activity under this contract so work on those contracts may be carried out smoothly, without interfering with or delaying work under this Contract or other contracts. Coordinate the Work of this Contract with work performed under separate contracts.

1.6 TIME OF COMPLETION

- A. Work required by the project shall commence immediately upon receipt of a Notice to Proceed. However, physical work on site may not commence sooner than **May 16, 2015**.
 - 1. The successful bidder shall obtain the Certificate of Substantial Completion as defined in the Contract Documents within **210** calendar days of the Notice to Proceed.
 - 2. Substantial Completion as defined in the Contract Documents must be achieved and evidenced by a Certificate of Substantial Completion no later than **November 30, 2015**.

3. Due to the nature of this institution, it is required that the academic schedule must be maintained. Contractor shall cooperate and coordinate with the University to assure that the academic schedule will be maintained.
4. No Work may be conducted during University exam periods without the written permission from the University Representative. Exam periods which may affect this project are scheduled per attached link: <http://www.registrar.uconn.edu/calendar.htm>
5. Existing steam, sanitary sewer and potable water services to the Young Building and Ratcliffe Hicks Arena shall be maintained throughout the duration of the project, with the exception of short duration cut-over connections between the proposed improvements and the existing systems. Limited cut-over periods must be coordinated with the Owner, and may require work during off hours of weekends, holidays, academic recess and/or nights. Grange Hall and Hicks Hall will not be occupied during the summer academic recess, and steam, sanitary sewer and potable water services will allowed to be disrupted from the start of work until August 15, 2015, at which time all services must be fully operational. Existing services within the work zone that also service other portions of campus (water, sanitary sewer, storm sewer), must be maintained at all times, or alternative means of providing the services must be provided.
6. The existing steam service to Ratcliffe Hicks Arena from Steam Vault B-6 developed a leak in April, 2015, and has been isolated and shut down. The existing steam service to Ratcliffe Hicks Arena is currently from Steam Vault C-6. In order to complete the proposed work in the vicinity of Steam Vault C-6, which must be completed by July 31, 2015, this steam service must be interrupted. Once the proposed work in the vicinity of Steam Vault C-6 is completed, there will be no steam service directly from Steam Vault C-6 to Ratcliffe Hicks Arena. The Contractor has several options for completing this work:
 - a. Excavate and repair the existing steam line from Steam Vault B-6 to Ratcliffe Hicks Arena. This allows the steam service between Steam Vault B-6 and Ratcliffe Hicks Arena to be restored, the steam service from Steam Vault C-6 to Ratcliffe Hicks Arena to be shut down, and the work in the vicinity of Steam Vault C-6 to be completed.
 - b. Complete and make operational the proposed steam service to Ratcliffe Hicks Arena from the vicinity of Steam Vault B-6. This allows the steam service between the vicinity of Steam Vault B-6 and Ratcliffe Hicks Arena to be restored, the steam service from Steam Vault C-6 to Ratcliffe Hicks Arena to be shut down, and the work in the vicinity of Steam Vault C-6 to be completed.
 - c. Provide other means of temporary heat and hot water service to Ratcliffe Hicks Arena. Temporary heat and hot water would be required until the new steam service to Ratcliffe Hicks Arena from the vicinity of Steam Vault B-6 is operational. This allows the steam service from Steam Vault C-6 to Ratcliffe Hicks Arena to be shut down, and the work in the vicinity of Steam Vault C-6 to be completed.

1.7 ACCESS TO SITE

- A. General: Contractor shall have limited use of Project site for construction operations as indicated on Drawings by the Contract limits and as indicated by requirements of this Section.
- B. Use of Site: Limit use of Project site to areas indicated; allow for Owner occupancy and use by the public. Do not disturb portions of Project site beyond areas in which the Work is indicated.

1. Limits: Confine construction operations to areas within Contract Limits indicated. Portions of the site beyond areas in which construction operations are indicated are not to be disturbed.
 2. Driveways, Walkways and Entrances: Keep driveways and entrances serving premises clear and available to Owner, Owner's employees, and emergency vehicles at all times. Do not use these areas for parking or storage of materials.
 - a. Schedule deliveries to minimize space and time requirements for storage of materials and equipment on-site.
 3. Burial of Waste Materials: No not dispose of organic and hazardous material on site, either by burial or by burning.
 4. All grounds including construction site within contract limit shall be kept neat and orderly at all times.
 5. Construction Entrances: Contractor shall prevent sediment from being transported onto paved areas and roads by construction vehicles exiting the project site. Provide temporary portable wheel washing system by Neptune Automated Wheel Wash Systems or university approved equal. The contractor shall be responsible for sizing the length of spray deck appropriately to the number of vehicles exiting the site, soil type and the amount of soil adhering to vehicles as they depart the site. Contractor shall provide all water and reservoir tanks required for proper operation of washing system. Furnish and Install crushed stone drive off area at each side of drive thru bay. Contractor shall be responsible immediate clean-up of soils or sediments tracked onto paved off site areas including but not limited to sweeping with motorized sweepers and power washing paved areas.
 - a. Schedule deliveries to minimize use of driveways and entrances by construction operations.
 - b. Schedule deliveries to minimize space and time requirements for storage of materials and equipment on-site.
- C. Condition of Existing Building: Maintain portions of existing building affected by construction operations in a weather tight condition throughout construction period. Repair damage caused by construction operations. Take all precautions necessary to protect the building and its occupants during the construction period.
- D. Contractor's Parking: Contractors working for the University of Connecticut at the regional campus will work with the University Representative to determine where contractors are allowed to park during the course of the Project.
1. Construction vehicles may park within the fenced construction area. Personal vehicles are not considered construction vehicles.
 2. Restore all lawn, sidewalk, paved areas damaged by vehicles and or construction activities to their original condition.
 3. Contractors working for the University of Connecticut at Storrs Campus are required to obtain a parking permit through the Parking Services Office. For additional information please contact the Parking Services Office at 860-486-4930. The Contractor is responsible for payment of all fees for parking permits. Parking fees may be prorated monthly.
 - a. The University will provide a maximum of three (3) contract parking places in the vicinity of the work. Additional parking required by the Contractor will be designated at a location specified by the Owner's Representative.
 - b. Construction vehicles are exempt from this requirement.
- E. Contractor shall restrict use of construction related trucks on local roads, such as Hillyndale, Eastwood and Westwood Road.
- F. Refer to Section 01-3300 Par 2.1.L Safety Plan for submittal requirements prior to site access

1.8 COORDINATION WITH OCCUPANTS

- A. Full Owner Occupancy: Owner will occupy site and building(s) during entire construction period. Cooperate with Owner during construction operations to minimize conflicts and facilitate Owner usage. Perform the Work so as not to interfere with Owner's day-to-day operations. Maintain existing exits unless otherwise indicated.
1. Maintain access to existing walkways, corridors, and other adjacent occupied or used facilities. Do not close or obstruct walkways, corridors, or other occupied or used facilities without written permission from Owner and approval of authorities having jurisdiction.
 2. Notify Owner not less than 72 hours in advance of activities that will affect Owner's operations.
- B. Partial Owner Occupancy: The Owner reserves the right to occupy and to place and install equipment in completed areas of the building, prior to Substantial Completion provided that such occupancy does not interfere with completion of the Work. Such placing of equipment and partial occupancy shall not constitute acceptance of the total Work.
1. A Certificate of Substantial Completion will be executed for each specific portion of the Work to be occupied prior to Owner occupancy.
 2. This project has been identified as a Threshold Building subject to the requirements of Connecticut General Statutes Section 29-276b. Obtain a Certificate of Occupancy from Building Officials prior to Owner occupancy.
 3. Certifications. The Contractor at completion of construction shall provide to the University a "Certificate of Substantial Compliance with the State Building and Fire Safety Codes" bearing original signatures of an officer of the company stating: "This is the CERTIFY that in my professional opinion the complete structure/renovations described above is in substantial compliance with the approved construction documents on file with the University of Connecticut. Minor deviations and special stipulations are noted below (if any)".
 4. Prior to partial Owner occupancy, mechanical and electrical systems shall be fully operational. Required inspections and tests shall have been successfully completed. Upon occupancy the Owner will provide operation and maintenance of mechanical and electrical systems in occupied portions of the building.

1.9 WORK RESTRICTIONS

- A. Work Restrictions, General: Comply with restrictions on construction operations.
1. Comply with limitations on use of public streets and with other requirements of authorities having jurisdiction.
- B. On-Site Work Hours: Limit work in the existing building to normal business working hours of 7:00 a.m. to 4:30 p.m., Monday through Friday, unless otherwise indicated. Permission must be requested and approved in writing to perform work outside the normal working hours or on a State Holiday.
1. Early Morning Hours for Dormitory Work: No noisy activities can take place prior to 8:00 am when working on or in the vicinity of a student dormitory.

- C. Existing Utility Interruptions: Do not interrupt utilities serving facilities occupied by Owner or others unless permitted under the following conditions and then only after providing temporary utility services according to requirements indicated:
 - 1. Obtain Owner Representative written permission before proceeding with utility interruptions.
 - D. Noise, Vibration, and Odors: Coordinate operations that may result in high levels of noise and vibration, odors, or other disruption to Owner occupancy with Owner.
 - 1. Notify Owner Representative not less than two days in advance of proposed disruptive operations.
 - 2. Obtain Owner's written permission before proceeding with disruptive operations
 - 3. Noise which exceeds 80 db at the site perimeter will not be permitted between the hours of 8:00 PM and 8:00 AM.
 - E. Controlled Substances: Use of tobacco products and other controlled substances is not permitted.
 - F. In addition to reasons determined by the University, approval of deviations in work hours is dependent upon availability of University supervisory personnel.
 - 1. No person shall be employed to work or permitted to work more than eight hours in any day or more than forty hours in any week on any work provided for under this Contract. The observance of such limitations of hours of work may be suspended during an emergency, upon approval of the Executive Director of Architectural and Engineering Services.
 - G. If the Contractor determines that work on this project must be performed during a time other than normal working hours of the University, costs for any premium time must be included in the Base Bid.
 - H. No Work may be conducted during University exam periods without the written permission from the University Representative. Exam periods which may affect this project are scheduled per attached link: <http://www.registrar.uconn.edu/calendar.htm>
- 1.10 WORK SEQUENCE
- A. The responsibility of phasing the Work falls entirely on the Contractor.
- 1.11 MISCELLANEOUS PROVISIONS
- A. Certifications
 - 1. The Contractor, at completion of construction, shall provide to the University a "Certificate of Substantial Compliance" bearing original signatures of an officer of the company stating: "this is to CERTIFY that, in my professional opinion, the complete structure/renovations described above is in substantial compliance with the approved construction documents on file with the University of Connecticut. Minor deviations and special stipulations are noted below (if any)"
 - 2. Prior to Owner's approval and acceptance, mechanical and electrical systems shall be fully operational and tested.

3. Exposure levels for lead in the construction industry are regulated by 29CFR 1926.62. Construction activities disturbing surfaces containing lead-based paint (LBP) which are likely to be employed, such as sanding, grinding, welding, cutting and burning, have been known to expose workers to levels of lead in excess of the Permissible Exposure Limit (PEL). Conduct all work specified in the technical sections of this specification in conformance with these regulations. In addition, construction debris/waste may be classified as hazardous waste. Disposal of Hazardous Waste Management Regulations Section 22a-209-1; 22a-209-8(c); 22a-449(c)-11; and 22a-449(c)-100 through 110. These facilities were constructed prior to 1978 and are likely to have painted surfaces containing lead-based paint.
4. These bid documents include lead-based paint inspection information prepared by (Cardno ATC Associates). This information was obtained only for the University's use and is offered, in good faith for information only, solely for the purpose of placing the Contractor in receipt of all information known to the University at this time. Unless otherwise provided, this data is not to be considered a part of the contract documents. The University does not warrant or represent that the information contained in these reports is complete or accurate but only that it constitutes a disclosure of the information known to the Owner at this time regarding these conditions.
5. Original construction drawings are provided for information and reference only and do not represent exact conditions existing in the buildings. The Contractor is responsible for all work described in the scope of work regardless of information provided in the reference drawings. This information is offered in good faith for information only, solely for the purpose of placing the Contractor in receipt of all information known to the University at this time. Unless otherwise provided, this data is not to be considered a part of the contract documents. The University does not warrant or represent that the information contained in these reports is complete or accurate but only that it constitutes a disclosure of the information known to the Owner at this time regarding these conditions.

PART 2 - PRODUCTS (Not Used)

PART 3 - EXECUTION (Not Used)

END OF SECTION 01-1000

SECTION 01-2100 - ALLOWANCES

PART 1 - GENERAL

1.1 RELATED DOCUMENTS

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

1.2 SUMMARY

- A. Section includes administrative and procedural requirements governing allowances.
 - 1. Certain items are specified in the Contract Documents by allowances. Allowances have been established in lieu of additional requirements and to defer selection of actual materials and equipment to a later date when direction will be provided to Contractor. If necessary, additional requirements will be issued by Change Order.
- B. Types of allowances include the following:
 - 1. Lump-sum allowances.
 - 2. Unit-cost allowances.
 - 3. Quantity allowances.
- C. Related Requirements:
 - 1. Division 01 Section "Unit Prices" for procedures for using unit prices.
 - 2. Divisions 02 through 33 Sections for items of Work covered by allowances.

1.3 SELECTION AND PURCHASE

- A. Within 30 days after Contract award, advise the Architect of the date when final selection and purchase of each product or system described by an allowance must be completed to avoid delaying the Work.
- B. At Architect's request, obtain proposals for each allowance for use in making final selections. Include recommendations that are relevant to performing the Work.
- C. Purchase products and systems selected by Architect from the designated supplier.

1.4 SUBMITTALS

- A. Submit proposals for purchase of products or systems included in allowances, in the form specified for Change Orders.

- B. Submit invoices or delivery slips to show actual quantities of materials delivered to the site for use in fulfillment of each allowance.
- C. Submit time sheets and other documentation to show labor time and cost for installation of allowance items that include installation as part of the allowance.
- D. Coordinate and process submittals for allowance items in same manner as for other portions of the Work.

1.5 UNUSED MATERIALS

- A. Return unused materials to the manufacturer or supplier for credit to the Owner, after installation has been completed and accepted.
- B. Where it is not economically feasible to return unused material for credit and when requested by the Architect, prepare unused material for the Owner's storage, and deliver to the Owner's storage space as directed. Otherwise, disposal of excess material is the Contractor's responsibility.

1.6 COORDINATION

- A. Coordinate allowance items with other portions of the Work. Furnish templates as may be required to coordinate installation.

1.7 ALLOWANCES

- A. Allowance shall include cost to Contractor of specific products and materials ordered by Owner or selected by Architect under allowance and shall include freight, and delivery to Project site.
- B. Unless otherwise indicated, Contractor's costs for receiving and handling at Project site, labor, installation, overhead and profit, and similar costs related to products and materials under allowance shall be included as part of the Contract Sum and not part of the allowance.

1.8 ADJUSTMENT OF ALLOWANCES

- A. Allowance Adjustment: To adjust allowance amounts, prepare a Change Order proposal based on the difference between purchase amount and the allowance, multiplied by final measurement of work-in-place where applicable. If applicable, include reasonable allowances for cutting losses, tolerances, mixing wastes, normal product imperfections, and similar margins.
 - 1. Include installation costs in purchase amount only where indicated as part of the allowance.
 - 2. If requested, prepare explanation and documentation to substantiate distribution of overhead costs and other margins claimed.
 - 3. Submit substantiation of a change in scope of work, if any, claimed in Change Orders related to unit-cost allowances.
 - 4. Owner reserves the right to establish the quantity of work-in-place by independent quantity survey, measure, or count.

- B. Submit claims for increased costs because of a change in scope or nature of the allowance described in the Contract Documents, whether for the purchase order amount or Contractor's handling, labor, installation, overhead, and profit.
 - 1. Do not include Contractor's or subcontractor's indirect expense in the Change Order cost amount unless it is clearly shown that the nature or extent of work has changed from what could have been foreseen from information in the Contract Documents.
 - 2. No change to Contractor's indirect expense is permitted for selection of higher- or lower-priced materials or systems of the same scope and nature as originally indicated.

1.9 ALLOWANCE CLOSE OUT

- A. Any unused portion of the allowance, whether it is lump sum, unit cost, or quantity allowance, shall be credited to the Owner. Any unused portion of the allowance shall be reviewed by the owner to determine the amount of credit, based on actual invoices, delivery slips, etc.

PART 2 - PRODUCTS (Not Used)

PART 3 - EXECUTION

3.1 EXAMINATION

- A. Examine products covered by an allowance promptly on delivery for damage or defects. Return damaged or defective products to manufacturer for replacement.

3.2 PREPARATION

- A. Coordinate materials and their installation for each allowance with related materials and installations to ensure that each allowance item is completely integrated and interfaced with related work.

3.3 SCHEDULE OF ALLOWANCES

- A. Allowance No. 1: Quantity Allowance: Include **500 cu. yd.** of unsatisfactory soil excavation and disposal off-site as specified in Section 02221 - "Trench Excavation, Backfilling And Compaction" and replacement with satisfactory soil material from off-site, as specified in Section 02234 - "Compacted Granular Fill".
 - 1. Coordinate quantity allowance adjustment with unit-price requirements in Division 01 Section "Unit Prices."
- B. Allowance No. 2: Quantity Allowance: Include **500 cu. yd.** of rock removal and replacement with satisfactory soil material, as specified in as specified in Section 02221 - "Trench Excavation, Backfilling And Compaction" and Section 02234 - "Compacted Granular Fill".
 - 1. Coordinate quantity allowance adjustment with unit-price requirements in Division 01 Section "Unit Prices."

- C. Allowance No. 3: Quantity Allowance: Include **7,500 square yards** of “Turf Establishment By Means Of Sodding”, if requested by the Owner, as specified in Section 02936 – “Turfs And Grasses”.
 - 1. Coordinate quantity allowance adjustment with unit-price requirements in Division 01 Section "Unit Prices."
- D. Allowance No. 4: Time And Material Allowance: Include the sum of \$10,000 for testing that is not included in the Contract Documents but may be required during the course of the work, at the request of the Owner.
- E. Allowance No. 5: Time And Material Allowance: Include the sum of \$10,000 for modifications to the construction fencing, pedestrian detouring or construction / detouring signage that is beyond the scope of work included in the Contract Documents, and requested by the Owner during the course of the work.
- F. Allowance No. 6: Quantity Allowance: Include **150 square yards** of “Concrete Walkway”, if requested by the Owner, as specified in Section 02511 – “Concrete Walkway”.
 - 1. Coordinate quantity allowance adjustment with unit-price requirements in Division 01 Section "Unit Prices."
- G. Allowance No. 7: Quantity Allowance: Include **100 cubic yards** of “Process Aggregate Base”, if requested by the Owner, as specified in Section 02235 – “Process Aggregate Base”.
 - 1. Coordinate quantity allowance adjustment with unit-price requirements in Division 01 Section "Unit Prices."
- H. Allowance No. 8: Quantity Allowance: Include **500 square yards** of “Bituminous Pavement”, if requested by the Owner, as specified in Section 02500 – “Bituminous Pavement”.
 - 1. Coordinate quantity allowance adjustment with unit-price requirements in Division 01 Section "Unit Prices."
- I. Allowance No. 9: Quantity Allowance: Include **50 square yards** of “Mulch”, if requested by the Owner, as specified in Section 02938 – “Planting”.
 - 1. Coordinate quantity allowance adjustment with unit-price requirements in Division 01 Section "Unit Prices."

END OF SECTION 01-2100

SECTION 01-2200 - UNIT PRICES

PART 1 - GENERAL

1.1 RELATED DOCUMENTS

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

1.2 SUMMARY

- A. Section includes administrative and procedural requirements for unit prices.
 - 1. A unit price is an amount stated on the Proposal Form or in the Specifications as a price per unit of measurement for materials or services that will be added to or deducted from the Contract Sum by Change Order in the event the quantities of Work required by the Contract Documents are increased or decreased.
 - 2. Unit Prices include all necessary material, overhead, profit, and applicable taxes.
 - 3. Refer to individual Specification Sections for construction activities requiring the establishment of unit prices. Methods of measurement and payment for unit prices are specified in those Sections.
- B. Related Requirements:
 - 1. Division 01 Section "Contract Modification Procedures" for procedures for submitting and handling Change Orders.
 - 2. Division 01 Section "Quality Requirements" for general testing and inspecting requirements.

1.3 DEFINITIONS

- A. Unit price is an amount incorporated in the Agreement, applicable during the duration of the Work as a price per unit of measurement for materials, equipment, or services, or a portion of the Work, added to or deducted from the Contract Sum by appropriate modification, if the Scope of Work or estimated quantities of Work required by the Contract Documents are increased or decreased.

1.4 PROCEDURES

- A. Unit prices include all necessary material, plus cost for delivery, installation, insurance, applicable taxes, overhead, and profit.
- B. Measurement and Payment: See individual Specification Sections for work that requires establishment of unit prices. Methods of measurement and payment for unit prices are specified in those Sections.

- C. Owner reserves the right to reject Contractor's measurement of work-in-place that involves use of established unit prices and to have this work measured, at Owner's expense, by an independent surveyor acceptable to Contractor.
- D. List of Unit Prices: A schedule of unit prices is included in Part 3. Specification Sections referenced in the schedule contain requirements for materials described under each unit price.

PRODUCTS (Not Used)

PART 2 - EXECUTION

2.1 SCHEDULE OF UNIT PRICES

- A. Unit Price 1: "Removal Of Unsatisfactory Soil And Replacement With Satisfactory Soil Material".
 - 1. Description: Unsatisfactory soil excavation and disposal off site and replacement with satisfactory fill material or engineered fill from off site, as required, according to Section 02221 "Trench Excavation, Backfilling and Compaction". Replacement materials shall be "Compacted Granular Fill" in accordance with Section 02234.
 - 2. Unit of Measurement: **Cubic yard** of soil excavated, based on survey of volume removed.
 - 3. Quantity Allowance: Coordinate unit price with allowance adjustment requirements in Division 01 Section "Allowances."
- B. Unit Price No. 2: "Rock Excavation And Replacement With Satisfactory Soil Material".
 - 1. Description: Classified rock excavation and disposal off site and replacement with satisfactory fill material or engineered fill from off site, as required, according to Section 02221 "Trench Excavation, Backfilling and Compaction". Replacement materials shall be "Compacted Granular Fill" in accordance with Section 02234.
 - 2. Unit of Measurement: **Cubic yard** of rock excavated and replaced, based on survey of volume removed.
 - 3. Quantity Allowance: Coordinate unit price with allowance adjustment requirements in Division 01 Section "Allowances."
- C. Unit Price No. 3: "Turf Establishment By Means Of Sodding".
 - 1. Description: Turf establishment by means of sodding, if requested by the Owner, according to Section 02936 "Turfs And Grasses".
 - 2. Unit of Measurement: Square Yard.
 - 3. Quantity Allowance: Coordinate unit price with allowance adjustment requirements in Division 01 Section "Allowances."
- D. Unit Price No. 4: "Concrete Walkway".
 - 1. Description: Replacement of concrete walkways beyond the limits of work identified on the Contract Drawings, if requested by the Owner, according to Section 02511 "Concrete Walkway". Price includes removal and disposal of existing concrete walkways to be replaced. Concrete walkway details shall be in accordance with the concrete sidewalk details on Sheet C-27.

2. Unit of Measurement: Square Yard.
3. Quantity Allowance: Coordinate unit price with allowance adjustment requirements in Division 01 Section "Allowances."

E. Unit Price No. 5: "Process Aggregate Base".

1. Description: Replacement of process aggregate base beyond the limits of the Contract Drawings, if requested by the Owner, according to Section 02235 "Process Aggregate Base".
2. Unit of Measurement: Cubic Yard.
3. Quantity Allowance: Coordinate unit price with allowance adjustment requirements in Division 01 Section "Allowances."

F. Unit Price No. 6: "Bituminous Pavement".

1. Description: Replacement of bituminous pavement beyond the limits of the Contract Drawings, if requested by the Owner, according to Section 02500 "Bituminous Concrete". Price includes removal and disposal of existing bituminous pavement to be replaced. Pavement section shall be in accordance with permanent trench pavement detail for Town Roads on Sheet C-27.
2. Unit of Measurement: Square Yard.
3. Quantity Allowance: Coordinate unit price with allowance adjustment requirements in Division 01 Section "Allowances."

G. Unit Price No. 7: "Mulch".

1. Description: Placement of mulch beyond the limits of the Contract Drawings, if requested by the Owner, according to Section 02938 "Planting". Price includes edging, removal and disposal of turf in the area of mulch placement.
2. Unit of Measurement: Cubic Yard.
3. Quantity Allowance: Coordinate unit price with allowance adjustment requirements in Division 01 Section "Allowances."

END OF SECTION 01-2200

SECTION 01-2300 - ALTERNATES

PART 1 - GENERAL

1.1 RELATED DOCUMENTS

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

1.2 SUMMARY

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

1.3 DEFINITIONS

- A. Alternate: An amount proposed by bidders and stated on the Bid Form for certain work defined in the bidding requirements that may be added to or deducted from the base bid amount if Owner decides to accept a corresponding change either in the amount of construction to be completed or in the products, materials, equipment, systems, or installation methods described in the Contract Documents.
 - 1. Alternates described in this Section are part of the Work only if enumerated in the Agreement.
 - 2. The cost or credit for each alternate is the net addition to or deduction from the Contract Sum to incorporate alternate into the Work. No other adjustments are made to the Contract Sum.

1.4 PROCEDURES

- A. Coordination: Revise or adjust affected adjacent work as necessary to completely integrate work of the alternate into Project.
 - 1. Include as part of each alternate, miscellaneous devices, accessory objects, and similar items incidental to or required for a complete installation whether or not indicated as part of alternate.
- B. Notification: Immediately following award of the Contract, notify each party involved, in writing, of the status of each alternate. Indicate if alternates have been accepted, rejected, or deferred for later consideration. Include a complete description of negotiated revisions to alternates.
- C. Execute accepted alternates under the same conditions as other work of the Contract.
- D. Schedule: A schedule of alternates is included at the end of this Section. Specification Sections referenced in schedule contain requirements for materials necessary to achieve the work described under each alternate.
- E. Alternates shall be valid for the life of the contract and may be selected within 30 days from notice to proceed at no additional cost to the owner. Alternates may be negotiated as applicable, in the event the owner selects the alternate beyond the 30 day period from notice to proceed.

PART 2 - PRODUCTS (Not Used)

PART 3 - EXECUTION

3.1 SCHEDULE OF ALTERNATES

A. Alternate No. 1 – Steam Vault Manhole Covers

1. Base Bid: The base bid includes Steam Vault manhole frames and covers manufactured of cast iron as specified in Section 03420 2.02.
2. Alternate: The alternate bid includes Steam Vault watertight manhole frames and covers manufactured of fiberglass as specified in Section 03420 2.03.

B. Alternate No. 2 – Steam Vault Waterproofing System

1. Base Bid: The base bid includes Steam Vault bituminous waterproofing system as specified in Section 03420 2.04.
2. Alternate 2A: The alternate bid includes Steam Vault HDPE Membrane waterproofing system as specified in Section 03420 2.05.
3. Alternate 2B: The alternate bid includes Steam Vault Bentonite membrane waterproofing system as specified in Section 03420 2.06.

END OF SECTION 01-2300

SECTION 01-2500 - SUBSTITUTION PROCEDURES

PART 1 - GENERAL

1.1 RELATED DOCUMENTS

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

1.2 SUMMARY

- A. Section includes administrative and procedural requirements for substitutions.
- B. Related Requirements:
 - 1. Division 01 Section "Allowances" for products selected under an allowance.
 - 2. Division 01 Section "Alternates" for products selected under an alternate.
 - 3. Division 01 Section "Product Requirements" for requirements for submitting comparable product submittals for products by listed manufacturers.
 - 4. Divisions 02 through 33 Sections for specific requirements and limitations for substitutions.

1.3 DEFINITIONS

- A. Substitutions: Changes in products, materials, equipment, and methods of construction from those required by the Contract Documents and proposed by Contractor.
 - 1. Substitutions for Cause: Changes proposed by Contractor that are required due to changed Project conditions, such as unavailability of product, regulatory changes, or unavailability of required warranty terms.
 - 2. Substitutions for Convenience: Changes proposed by Contractor or Owner that are not required in order to meet other Project requirements but may offer advantage to Contractor or Owner.

1.4 ACTION SUBMITTALS

- A. Substitution Requests: Submit three copies of each request for consideration. Identify product or fabrication or installation method to be replaced. Include Specification Section number and title and Drawing numbers and titles.
 - 1. Substitution Request Form: Use CSI Form 13.1A.
 - 2. Documentation: Show compliance with requirements for substitutions and the following, as applicable:
 - a. Statement indicating why specified product or fabrication or installation cannot be provided, if applicable.

- b. Coordination information, including a list of changes or revisions needed to other parts of the Work and to construction performed by Owner and separate contractors that will be necessary to accommodate proposed substitution.
 - c. Detailed comparison of significant qualities of proposed substitution with those of the Work specified. Include annotated copy of applicable Specification Section. Significant qualities may include attributes such as performance, weight, size, durability, visual effect, sustainable design characteristics, warranties, and specific features and requirements indicated. Indicate deviations, if any, from the Work specified.
 - d. Product Data, including drawings and descriptions of products and fabrication and installation procedures.
 - e. Samples, where applicable or requested.
 - f. Certificates and qualification data, where applicable or requested.
 - g. List of similar installations for completed projects with project names and addresses and names and addresses of architects and owners.
 - h. Material test reports from a qualified testing agency indicating and interpreting test results for compliance with requirements indicated.
 - i. Detailed comparison of Contractor's construction schedule using proposed substitution with products specified for the Work, including effect on the overall Contract Time. If specified product or method of construction cannot be provided within the Contract Time, include letter from manufacturer, on manufacturer's letterhead, stating date of receipt of purchase order, lack of availability, or delays in delivery.
 - j. Cost information, including a proposal of change, if any, in the Contract Sum.
 - k. Contractor's certification that proposed substitution complies with requirements in the Contract Documents except as indicated in substitution request, is compatible with related materials, and is appropriate for applications indicated.
 - l. Contractor's waiver of rights to additional payment or time that may subsequently become necessary because of failure of proposed substitution to produce indicated results.
3. Architect's Action: If necessary, Architect will request additional information or documentation for evaluation within seven (7) days of receipt of a request for substitution. Architect will notify Contractor of acceptance or rejection of proposed substitution within fifteen (15) days of receipt of request, or seven (7) days of receipt of additional information or documentation, whichever is later.
- a. Forms of Acceptance: Change Order, Construction Change Directive, or Architect's Supplemental Instructions for minor changes in the Work.
 - b. Use product specified if Architect does not issue a decision on use of a proposed substitution within time allocated.

1.5 QUALITY ASSURANCE

- A. Compatibility of Substitutions: Investigate and document compatibility of proposed substitution with related products and materials. Engage a qualified testing agency to perform compatibility tests recommended by manufacturers.

1.6 PROCEDURES

- A. Coordination: Revise or adjust affected work as necessary to integrate work of the approved substitutions.

PART 2 - PRODUCTS

2.1 SUBSTITUTIONS

- A. Substitutions for Cause: Submit requests for substitution immediately on discovery of need for change, but not later than Thirty (30) days prior to time required for preparation and review of related submittals.
1. Conditions: Architect will consider Contractor's request for substitution when the following conditions are satisfied. If the following conditions are not satisfied, Architect will return requests without action, except to record noncompliance with these requirements:
- a. Requested substitution is consistent with the Contract Documents and will produce indicated results.
 - b. Requested substitution provides sustainable design characteristics that specified product provided.
 - c. Substitution request is fully documented and properly submitted.
 - d. Requested substitution will not adversely affect Contractor's construction schedule.
 - e. Requested substitution has received necessary approvals of authorities having jurisdiction.
 - f. Requested substitution is compatible with other portions of the Work.
 - g. Requested substitution has been coordinated with other portions of the Work.
 - h. Requested substitution provides specified warranty.
 - i. If requested substitution involves more than one contractor, requested substitution has been coordinated with other portions of the Work, is uniform and consistent, is compatible with other products, and is acceptable to all contractors involved.
 - j. Requested substitution does not require additional design changes to be performed by the architect/engineer in order to incorporate the substitution into the work.
- B. Substitutions for Convenience: Not allowed.

PART 3 - EXECUTION (Not Used)

END OF SECTION 01-2500

SECTION 012600 - CONTRACT MODIFICATION PROCEDURES

PART 1 - GENERAL

1.1 RELATED DOCUMENTS

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

1.2 SUMMARY

- A. Section includes administrative and procedural requirements for handling and processing Contract modifications.
- B. Related Requirements:
 - 1. Division 01 Section "Substitution Procedures" for administrative procedures for handling requests for substitutions made after the Contract award.

1.3 MINOR CHANGES IN THE WORK

- A. Architect will issue through the University Representative supplemental instructions authorizing minor changes in the Work, not involving adjustment to the Contract Sum or the Contract Time, on **AIA Document G710, "Architect's Supplemental Instructions."**

1.4 PROPOSAL REQUESTS

- A. Owner-Initiated Proposal Requests: Architect or University Representative will issue a detailed description of proposed changes in the Work that may require adjustment to the Contract Sum or the Contract Time. If necessary, the description will include supplemental or revised Drawings and Specifications.
 - 1. Work Change Proposal Requests issued by Architect or University Representative are not instructions either to stop work in progress or to execute the proposed change.
 - 2. Within time specified in Proposal Request after receipt of Proposal Request, submit a quotation estimating cost adjustments to the Contract Sum and the Contract Time necessary to execute the change.
 - a. Include a list of quantities of products required or eliminated and unit costs, with total amount of purchases and credits to be made. If requested, furnish survey data to substantiate quantities.
 - b. Indicate applicable taxes, delivery charges, equipment rental, and amounts of trade discounts.
 - c. Include costs of labor and supervision directly attributable to the change.

- d. Include an updated Contractor's construction schedule that indicates the effect of the change, including, but not limited to, changes in activity duration, start and finish times, and activity relationship. Use available total float before requesting an extension of the Contract Time.
 - e. Quotation Form: Use forms acceptable to Architect.
- B. Contractor-Initiated Proposals: If latent or changed conditions require modifications to the Contract, Contractor may initiate a claim by submitting a request for a change to Architect or University Representative.
1. Include a statement outlining reasons for the change and the effect of the change on the Work. Provide a complete description of the proposed change. Indicate the effect of the proposed change on the Contract Sum and the Contract Time.
 2. Include a list of quantities of products required or eliminated and unit costs, with total amount of purchases and credits to be made. If requested, furnish survey data to substantiate quantities.
 3. Indicate applicable taxes, delivery charges, equipment rental, and amounts of trade discounts.
 4. Include costs of labor and supervision directly attributable to the change.
 5. Include an updated Contractor's construction schedule that indicates the effect of the change, including, but not limited to, changes in activity duration, start and finish times, and activity relationship. Use available total float before requesting an extension of the Contract Time.
 6. Comply with requirements in Division 01 Section "Substitution Procedures" if the proposed change requires substitution of one product or system for product or system specified.
 7. Proposal Request Form: Use form acceptable to Architect or University Representative

1.5 ADMINISTRATIVE CHANGE ORDERS

- A. Allowance Adjustment: See Division 01 Section "Allowances" for administrative procedures for preparation of Change Order Proposal for adjusting the Contract Sum to reflect actual costs of allowances.
- B. Unit-Price Adjustment: See Division 01 Section "Unit Prices" for administrative procedures for preparation of Change Order Proposal for adjusting the Contract Sum to reflect measured scope of unit-price work.

1.6 CHANGE ORDER PROCEDURES

- A. On Owner's approval of a Work Changes Proposal Request, Architect or University Representative will issue a Change Order for signatures of Owner and Contractor on AIA Document G701.

1.7 CONSTRUCTION CHANGE DIRECTIVE

- A. Construction Change Directive: Architect or University Representative may issue a Construction Change Directive on AIA Document G714. Construction Change Directive instructs Contractor to proceed with a change in the Work, for subsequent inclusion in a Change Order.
 1. Construction Change Directive contains a complete description of change in the Work. It also designates method to be followed to determine change in the Contract Sum or the Contract Time.

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CONTRACT MODIFICATION PROCEDURES

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- B. Documentation: Maintain detailed records on a time and material basis of work required by the Construction Change Directive.
 - 1. After completion of change, submit an itemized account and supporting data necessary to substantiate cost and time adjustments to the Contract.

PART 2 - PRODUCTS (Not Used)

PART 3 - EXECUTION (Not Used)

END OF SECTION 012600

SECTION 01-3100 - PROJECT MANAGEMENT AND COORDINATION

PART 1 - GENERAL

1.1 RELATED DOCUMENTS

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

1.2 SUMMARY

- A. Section includes administrative provisions for coordinating construction operations on Project including, but not limited to, the following:
 - 1. General coordination procedures.
 - 2. Coordination drawings.
 - 3. Requests for Information (RFIs).
 - 4. Project Meetings.
 - a. Pre-construction conference
 - b. Pre-installation conference
 - c. Progress meetings
 - d. Coordination meetings
- B. Each contractor shall participate in coordination requirements. Certain areas of responsibility are assigned to a specific contractor.
- C. Related Requirements:
 - 1. Division 01 Section "Construction Progress Documentation" for preparing and submitting Contractor's construction schedule.
 - 2. Division 01 Section "Execution" for procedures for coordinating general installation and field-engineering services, including establishment of benchmarks and control points.
 - 3. Division 01 Section "Closeout Procedures" for coordinating closeout of the Contract.

1.3 DEFINITIONS

- A. RFI: Request from Owner, Architect, or Contractor seeking information required by or clarifications of the Contract Documents.

1.4 INFORMATIONAL SUBMITTALS

- A. Subcontract List: Prepare a written summary identifying individuals or firms proposed for each portion of the Work, including those who are to furnish products or equipment fabricated to a special design. Use of CSI Form 1.5A is recommended. Include the following information in tabular form:

1. Name, address, and telephone number of entity performing subcontract or supplying products.
 2. Number and title of related Specification Section(s) covered by subcontract.
 3. Drawing number and detail references, as appropriate, covered by subcontract.
- B. Key Personnel: Within fifteen (15) days of starting construction operations, submit a list of key personnel assignments, including project manager, superintendent, safety engineer and other personnel in attendance at Project site. Identify individuals and their duties and responsibilities; list addresses and telephone numbers, including home, office, and cellular telephone numbers and e-mail addresses. Provide names, addresses, and telephone numbers of individuals assigned as alternates in the absence of individuals assigned to Project.
1. Post copies of list in project meeting room, in temporary field office, and by each temporary telephone. Keep list current at all times.
 2. The University requires as a minimum, the following Key Personnel be assigned to this project. Each position shall be a full-time individual, dedicated to the position listed.
 - a. Project Manager (on site a minimum of once a week)
 - b. Project Superintendent (on-site full time for duration of project)
 - c. Safety Engineer (part time with a minimum of 2 site visits per week and mandatory during welding of any kind: **AS REQUIRED BY CONTRACT: EDIT AS NEEDED**)
 - d. Project Engineer (Project specific)
 3. Each individual listed above shall have not less than five (5) years experience performing work of a similar nature to this project and in a comparable position to the position assigned on this project. Resumes will be required on all key personnel prior to acceptance. Removal of any personnel denoted as Key Personnel from the project will require Owner's prior approval.

1.5 GENERAL COORDINATION PROCEDURES

- A. Coordination: Coordinate construction operations included in different Sections of the Specifications to ensure efficient and orderly installation of each part of the Work. Coordinate construction operations, included in different Sections that depend on each other for proper installation, connection, and operation.
1. Schedule construction operations in sequence required to obtain the best results where installation of one part of the Work depends on installation of other components, before or after its own installation.
 2. Weekly inspections of project by the safety officer are required. Safety inspector report to be submitted weekly to the University Representative.
 3. Coordinate installation of different components to ensure maximum performance and accessibility for required maintenance, service, and repair.
 4. Make adequate provisions to accommodate items scheduled for later installation.
- B. Where necessary, prepare memoranda for distribution to each party involved, outlining special procedures required for coordination. Include such items as required notices, reports, and list of attendees at meetings.
1. Prepare similar memoranda for Owner and separate contractors if coordination of their Work is required.

- C. Administrative Procedures: Coordinate scheduling and timing of required administrative procedures with other construction activities to avoid conflicts and to ensure orderly progress of the Work. Such administrative activities include, but are not limited to, the following:
1. Preparation of Contractor's construction schedule.
 2. Preparation of the schedule of values.
 3. Installation and removal of temporary facilities and controls.
 4. Delivery and processing of submittals.
 5. Progress meetings.
 6. Project closeout activities.
 7. Startup and adjustment of systems.
- D. Conservation: Coordinate construction activities to ensure that operations are carried out with consideration given to conservation of energy, water, and materials. Coordinate use of temporary utilities to minimize waste.
1. Salvage materials and equipment involved in performance of, but not actually incorporated into, the Work. See other Sections for disposition of salvaged materials that are designated as Owner's property.

1.6 COORDINATION DRAWINGS

- A. Coordination Drawings, General: **PRIOR TO START OF WORK:** Prepare coordination drawings according to requirements in individual Sections, and additionally where installation is not completely shown on Shop Drawings, where limited space availability necessitates coordination, or if coordination is required to facilitate integration of products and materials fabricated or installed by more than one entity.
1. Content: Project-specific information, drawn accurately to a scale large enough to indicate and resolve conflicts. Do not base coordination drawings on standard printed data. Include the following information, as applicable:
 - a. Use applicable Drawings as a basis for preparation of coordination drawings. Prepare sections, elevations, and details as needed to describe relationship of various systems and components.
 - b. Coordinate the addition of trade-specific information to the coordination drawings by multiple contractors in a sequence that best provides for coordination of the information and resolution of conflicts between installed components before submitting for review.
 - c. Indicate functional and spatial relationships of components of architectural, structural, civil, mechanical, and electrical systems.
 - d. Indicate space requirements for routine maintenance and for anticipated replacement of components during the life of the installation.
 - e. Show location and size of access doors required for access to concealed dampers, valves, and other controls.
 - f. Indicate required installation sequences.
 - g. Indicate dimensions shown on the Drawings. Specifically note dimensions that appear to be in conflict with submitted equipment and minimum clearance requirements. Provide alternate sketches to Architect indicating proposed resolution of such conflicts. Minor dimension changes and difficult installations will not be considered changes to the Contract.

B. Coordination Drawing Organization: Organize coordination drawings as follows:

1. Floor Plans and Reflected Ceiling Plans: Show architectural and structural elements, and mechanical, plumbing, fire-protection, fire-alarm, and electrical Work. Show locations of visible ceiling-mounted devices relative to acoustical ceiling grid. Supplement plan drawings with section drawings where required to adequately represent the Work.
2. Plenum Space: Indicate subframing for support of ceiling and wall systems, mechanical and electrical equipment, and related Work. Locate components within ceiling plenum to accommodate layout of light fixtures indicated on Drawings. Indicate areas of conflict between light fixtures and other components.
3. Mechanical Rooms: Provide coordination drawings for mechanical rooms showing plans and elevations of mechanical, plumbing, fire-protection, fire-alarm, and electrical equipment.
4. Structural Penetrations: Indicate penetrations and openings required for all disciplines.
5. Slab Edge and Embedded Items: Indicate slab edge locations and sizes and locations of embedded items for metal fabrications, sleeves, anchor bolts, bearing plates, angles, door floor closers, slab depressions for floor finishes, curbs and housekeeping pads, and similar items.
6. Mechanical and Plumbing Work: Show the following:
 - a. Sizes and bottom elevations of ductwork, piping, and conduit runs, including insulation, bracing, flanges, and support systems.
 - b. Dimensions of major components, such as dampers, valves, diffusers, access doors, cleanouts and electrical distribution equipment.
 - c. Fire-rated enclosures around ductwork.
7. Electrical Work: Show the following:
 - a. Runs of vertical and horizontal conduit 1-1/4 inches in diameter and larger.
 - b. Light fixture, exit light, emergency battery pack, smoke detector, and other fire-alarm locations.
 - c. Panel board, switch board, switchgear, transformer, busway, generator, and motor control center locations.
 - d. Location of pull boxes and junction boxes, dimensioned from column center lines.
8. Fire-Protection System: Show the following:
 - a. Locations of standpipes, mains piping, branch lines, pipe drops, and sprinkler heads.
9. Review: Architect will review coordination drawings to confirm that the Work is being coordinated, but not for the details of the coordination, which are Contractor's responsibility. If Architect determines that coordination drawings are not being prepared in sufficient scope or detail, or are otherwise deficient, Architect will so inform Contractor, who shall make changes as directed and resubmit.
10. Coordination Drawing Prints: Prepare coordination drawing prints according to requirements in Division 01 Section "Submittal Procedures."

1.7 REQUESTS FOR INFORMATION (RFIs)

- A. General: Immediately on discovery of the need for additional information or interpretation of the Contract Documents, Contractor shall prepare and submit an RFI in the form specified.

1. Architect will return RFIs submitted to Architect by other entities controlled by Contractor with no response.
 2. Coordinate and submit RFIs in a prompt manner so as to avoid delays in Contractor's work or work of subcontractors.
- B. Content of the RFI: Include a detailed, legible description of item needing information or interpretation and the following:
1. Project name.
 2. Project number.
 3. Date.
 4. Name of Contractor.
 5. Name of Architect.
 6. RFI number, numbered sequentially.
 7. RFI subject.
 8. Specification Section number and title and related paragraphs, as appropriate.
 9. Drawing number and detail references, as appropriate.
 10. Field dimensions and conditions, as appropriate.
 11. Contractor's suggested resolution. If Contractor's suggested resolution impacts the Contract Time or the Contract Sum, Contractor shall state impact in the RFI.
 12. Contractor's signature.
 13. Attachments: Include sketches, descriptions, measurements, photos, Product Data, Shop Drawings, coordination drawings, and other information necessary to fully describe items needing interpretation.
 - a. Include dimensions, thicknesses, structural grid references, and details of affected materials, assemblies, and attachments on attached sketches.
- C. RFI Forms: AIA Document G716.
1. Attachments shall be electronic files in Adobe Acrobat PDF format.
- D. Architect's Action: Architect will review each RFI, determine action required, and respond. Allow five (5) working days for Architect's response for each RFI. RFIs received by Architect after 2:00 p.m. will be considered as received the following working day.
1. The following Contractor-generated RFIs will be returned without action:
 - a. Requests for approval of submittals.
 - b. Requests for approval of substitutions.
 - c. Requests for approval of Contractor's means and methods.
 - d. Requests for coordination information already indicated in the Contract Documents.
 - e. Requests for adjustments in the Contract Time or the Contract Sum.
 - f. Requests for interpretation of Architect's actions on submittals.
 - g. Incomplete RFIs or inaccurately prepared RFIs.
 2. Architect's action may include a request for additional information, in which case Architect's time for response will date from time of receipt of additional information.

3. Architect's action on RFIs that may result in a change to the Contract Time or the Contract Sum may be eligible for Contractor to submit Change Proposal according to Division 01 Section "Contract Modification Procedures."
 - a. If Contractor believes the RFI response warrants change in the Contract Time or the Contract Sum, notify Architect in writing within five (5) days of receipt of the RFI response.

E. RFI Log: Prepare, maintain, and submit a tabular log of RFIs organized by the RFI number. Submit log monthly or as directed by Owner's representative. Use CSI Log Form 13.2B is recommended. Include the following:

1. Project name.
2. Name and address of Contractor.
3. Name and address of Architect.
4. RFI number including RFIs that were returned without action or withdrawn.
5. RFI description.
6. Date the RFI was submitted.
7. Date Architect's response was received.

F. On receipt of Architect's action, update the RFI log and immediately distribute the RFI response to affected parties. Review response and notify Architect within seven (7) days if Contractor disagrees with response.

1. Identification of related Minor Change in the Work, Construction Change Directive, and Proposal Request, as appropriate.
2. Identification of related Field Order, Work Change Directive, and Proposal Request, as appropriate.

1.8 PROJECT MEETINGS

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

1. Attendees: Inform participants and others involved, and individuals whose presence is required, of date and time of each meeting. Notify Owner and Architect of scheduled meeting dates and times.
2. Agenda: Prepare the meeting agenda. Distribute the agenda to all invited attendees.
3. Minutes: Entity responsible for conducting meeting will record significant discussions and agreements achieved. Distribute the meeting minutes to everyone concerned, including Owner and Architect, within three (3) days of the meeting.

B. Preconstruction Conference: The successful bidder shall attend a preconstruction conference and organizational meeting at the University of Connecticut Office of Architectural and Engineering Services, with the University Representative prior to any field work to review responsibilities and personnel assignments and to insure that Specifications, drawings and all conditions are understood to properly complete this Contract.

1. The meeting will be scheduled by the University Representative.

2. Attendees: The Owner, University Tree Warden, Architect, and their consultants; Contractor and its superintendent; major subcontractors; suppliers; and other concerned parties shall attend the conference. Participants at the conference shall be familiar with Project and authorized to conclude matters relating to the Work.
 3. Agenda: Discuss items of significance that could affect progress, including the following:
 - a. Tentative construction schedule.
 - b. Phasing.
 - c. Critical work sequencing and long-lead items.
 - d. Labor Market Regulations.
 - e. Designation of key personnel and their duties.
 - f. Lines of communications and emergency phone numbers.
 - g. Procedures for processing field decisions and Change Orders.
 - h. Procedures for RFIs.
 - i. Procedures for testing and inspecting.
 - j. Procedures for processing Applications for Payment.
 - k. Distribution of the Contract Documents and correspondence.
 - l. Submittal procedures.
 - m. Sustainable design requirements.
 - n. Preparation of record documents.
 - o. Use of the premises, including dust and noise control.
 - p. Parking and parking permits
 - q. Work restrictions including working hours.
 - r. Owner's occupancy requirements.
 - s. Responsibility for temporary facilities and controls.
 - t. Procedures for moisture and mold control.
 - u. Procedures for disruptions and shutdowns.
 - v. Construction waste management and recycling.
 - w. Office, work, and storage areas.
 - x. Equipment deliveries and priorities.
 - y. First aid.
 - z. Unacceptable behavior
 - aa. Security.
 - bb. Progress cleaning.
 - cc. UConn Construction Safety Manual, Safety procedures, including the University's Hazard Communication Program and policies on pest control, asbestos, lead-based paints, lockout/tagout procedures, excavation and trenching, disposal of PCB containing light ballasts, use of solvents, solvent or epoxy based paints, confined space entries and use of open flames.
 4. Minutes: Entity responsible for conducting meeting will record and distribute meeting minutes.
- C. Preinstallation Conferences: Conduct a preinstallation conference at Project site before each construction activity that requires coordination with other construction.
1. Attendees: Installer and representatives of manufacturers and fabricators involved in or affected by the installation and its coordination or integration with other materials and installations that have preceded or will follow, shall attend the meeting. Advise Architect, and Owner's Representative of scheduled meeting dates.
 2. Agenda: Review progress of other construction activities and preparations for the particular activity under consideration, including requirements for the following:

- a. Contract Documents.
 - b. Options.
 - c. Related RFIs.
 - d. Related Change Orders.
 - e. Purchases.
 - f. Deliveries.
 - g. Submittals, shop drawings, product data, and quality control samples.
 - h. Sustainable design requirements.
 - i. Review of mockups.
 - j. Possible conflicts.
 - k. Compatibility requirements.
 - l. Time schedules.
 - m. Weather limitations.
 - n. Manufacturer's written instructions.
 - o. Warranty requirements.
 - p. Compatibility of materials.
 - q. Acceptability of substrates.
 - r. Temporary facilities and controls.
 - s. Space and access limitations.
 - t. Safety.
 - u. Regulations of authorities having jurisdiction.
 - v. Testing and inspecting requirements.
 - w. Installation procedures.
 - x. Coordination with other work.
 - y. Required performance results.
 - z. Protection of adjacent work.
 - aa. Protection of construction and personnel.
3. Record significant conference discussions, agreements, and disagreements, including required corrective measures and actions.
 4. Reporting: Distribute minutes of the meeting to each party present and to other parties requiring information.
 5. Do not proceed with installation if the conference cannot be successfully concluded. Initiate whatever actions are necessary to resolve impediments to performance of the Work and reconvene the conference at earliest feasible date.
- D. Progress Meetings: Conduct progress meetings at the Project Site at regularly (minimum bi-weekly) scheduled intervals.
1. Coordinate dates of meetings with preparation of payment requests.
 2. Attendees: In addition to representatives of Owner and Architect, each contractor, subcontractor, supplier, and other entity concerned with current progress or involved in planning, coordination, or performance of future activities shall be represented at these meetings. All participants at the meeting shall be familiar with Project and authorized to conclude matters relating to the Work.
 3. Agenda: Review and correct or approve minutes of previous progress meeting. Review other items of significance that could affect progress. Include topics for discussion as appropriate to status of Project.
 - a. Contractor's Construction Schedule: Review progress since the last meeting. Determine whether each activity is on time, ahead of schedule, or behind schedule, in relation to Contractor's construction schedule. Determine how construction behind schedule will be

expedited; secure commitments from parties involved to do so. Discuss whether schedule revisions are required to ensure that current and subsequent activities will be completed within the Contract Time.

- 1) Review schedule for next period.
- b. Review present and future needs of each entity present, including the following:
- 1) Interface requirements.
 - 2) Sequence of operations.
 - 3) Status of submittals.
 - 4) Status of stainable design documentation, if required.
 - 5) Deliveries.
 - 6) Off-site fabrication problems.
 - 7) Access.
 - 8) Site utilization.
 - 9) Temporary facilities and controls.
 - 10) Progress cleaning.
 - 11) Quality and work standards.
 - 12) Status of correction of deficient items.
 - 13) Field observations.
 - 14) Status of RFIs.
 - 15) Status of proposal requests.
 - 16) Pending changes.
 - 17) Status of Change Orders.
 - 18) Pending claims and disputes.
 - 19) Documentation of information for payment requests.
4. Minutes: Entity responsible for conducting the meeting will record and distribute the meeting minutes to each party present and to parties requiring information. Contractor shall distribute copies of minutes of the meeting to each party present and to other parties who should have been present. Include a brief summary, in narrative form, of progress since the previous meeting and report. Submit report no later than 3 days after each progress meeting date.
- a. Schedule Updating: Revise Contractor's construction schedule after each progress meeting where revisions to the schedule have been made or recognized. Issue revised schedule concurrently with the report of each meeting.
- E. Coordination Meetings: Conduct Project coordination meetings at regular intervals convenient for all parties involved. Project coordination meetings are in addition to specific meetings held for other purposes, such as progress meetings and preinstallation conferences.
1. Attendees: Every party currently involved in coordination or planning for the construction activities involved. All participants at the meetings shall be familiar with Project and authorized to conclude matters relating to the Work.
 2. Reporting: Record meeting results and distribute copies to everyone in attendance and to others affected by decisions or actions resulting from each meeting.

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PART 2 - PRODUCTS (Not Used)

PART 3 - EXECUTION (Not Used)

END OF SECTION 01-3100

SECTION 01-3200 - CONSTRUCTION PROGRESS DOCUMENTATION

PART 1 - GENERAL

1.1 RELATED DOCUMENTS

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

1.2 SUMMARY

- A. Section includes administrative and procedural requirements for documenting the progress of construction during performance of the Work, including the following:
 - 1. Contractor's construction schedule.
 - 2. Construction schedule updating reports.
 - 3. Daily construction reports.
 - 4. Material location reports.
 - 5. Site condition reports.
 - 6. Special reports.
- B. Related Requirements:
 - 1. Division 01 Section "Submittal Procedures" for submitting schedules and reports.
 - 2. Division 01 Section "Quality Requirements" for submitting a schedule of tests and inspections.

1.3 DEFINITIONS

- A. Activity: A discrete part of a project that can be identified for planning, scheduling, monitoring, and controlling the construction project. Activities included in a construction schedule consume time and resources.
 - 1. Critical Activity: An activity on the critical path that must start and finish on the planned early start and finish times.
 - 2. Predecessor Activity: An activity that precedes another activity in the network.
 - 3. Successor Activity: An activity that follows another activity in the network.
- B. Cost Loading: The allocation of the schedule of values for the completion of an activity as scheduled. The sum of costs for all activities must equal the total Contract Sum unless otherwise approved by Architect.
- C. CPM: Critical path method, which is a method of planning and scheduling a construction project where activities are arranged based on activity relationships. Network calculations determine when activities can be performed and the critical path of Project.

- D. Critical Path: The longest connected chain of interdependent activities through the network schedule that establishes the minimum overall Project duration and contains no float.
- E. Event: The starting or ending point of an activity.
- F. Float: The measure of leeway in starting and completing an activity.
 - 1. Float time belongs to Owner.
 - 2. Free float is the amount of time an activity can be delayed without adversely affecting the early start of the successor activity.
 - 3. Total float is the measure of leeway in starting or completing an activity without adversely affecting the planned Project completion date.
- G. Resource Loading: The allocation of manpower and equipment necessary for the completion of an activity as scheduled.

1.4 INFORMATIONAL SUBMITTALS

- A. Format for Submittals: Submit required submittals in the following format:
 - 1. Working electronic copy of schedule file, where indicated.
 - 2. PDF electronic file.
 - 3. Three (3) paper copies.
- B. Contractor's Construction Schedule: Initial schedule, of size required to display entire schedule for entire construction period.
 - 1. Submit a working electronic copy of schedule, using software indicated, and labeled to comply with requirements for submittals. Include type of schedule (initial or updated) and date on label. Submit schedule to the University Representative within 20 calendar days after the Contract Award
- C. CPM Reports: Concurrent with CPM schedule, submit each of the following reports. Format for each activity in reports shall contain activity number, activity description, cost and resource loading, original duration, remaining duration, early start date, early finish date, late start date, late finish date, and total float in calendar days.
 - 1. Activity Report: List of all activities sorted by activity number and then early start date, or actual start date if known.
 - 2. Logic Report: List of preceding and succeeding activities for all activities, sorted in ascending order by activity number and then early start date, or actual start date if known.
 - 3. Total Float Report: List of all activities sorted in ascending order of total float.
 - 4. Earnings Report: Compilation of Contractor's total earnings from the Notice to Proceed until most recent Application for Payment.
- D. Construction Schedule Updating Reports: Submit with Applications for Payment.
- E. Daily Construction Reports: Submit at monthly intervals.
- F. Material Location Reports: Submit at monthly intervals.

- G. Site Condition Reports: Submit at time of discovery of differing conditions.
- H. Special Reports: Submit at time of unusual event.

1.5 COORDINATION

- A. Coordinate preparation and processing of schedules and reports with performance of construction activities and with scheduling and reporting of separate contractors.
- B. Coordinate Contractor's construction schedule with the schedule of values, submittal schedule, progress reports, payment requests, and other required schedules and reports.
 - 1. Secure time commitments for performing critical elements of the Work from entities involved.
 - 2. Coordinate each construction activity in the network with other activities and schedule them in proper sequence.

PART 2 - PRODUCTS

2.1 CONTRACTOR'S CONSTRUCTION SCHEDULE, GENERAL

- A. Time Frame: Extend schedule from date established for the Notice to Proceed to date of Substantial Completion.
 - 1. Contract completion date shall not be changed by submission of a schedule that shows an early completion date, unless specifically authorized by Change Order.
- B. Activities: Treat each story or separate area as a separate numbered activity for each main element of the Work. Comply with the following:
 - 1. Activity Duration: Define activities so no activity is longer than 20 days, unless specifically allowed by Architect.
 - 2. Procurement Activities: Include procurement process activities for long lead items and major items, requiring a cycle of more than 60 days, as separate activities in schedule. Procurement cycle activities include, but are not limited to, submittals, approvals, purchasing, fabrication, and delivery.
 - 3. Submittal Review Time: Include review and resubmittal times indicated in Division 01 Section "Submittal Procedures" in schedule. Coordinate submittal review times in Contractor's construction schedule with submittal schedule.
 - 4. Startup and Testing Time: Include no fewer than 15 days for startup and testing.
 - 5. Substantial Completion: Indicate completion in advance of date established for Substantial Completion, and allow time for Architect's administrative procedures necessary for certification of Substantial Completion.
 - 6. Punch List and Final Completion: Include not more than 30 days for completion of punch list items and final completion.
- C. Milestones: Include milestones indicated in the Contract Documents in schedule, including, but not limited to, the Notice to Proceed, Substantial Completion, and final completion.

- D. Upcoming Work Summary: Prepare summary report indicating activities scheduled to occur or commence prior to submittal of next schedule update. Summarize the following issues:
1. Unresolved issues.
 2. Unanswered Requests for Information.
 3. Rejected or unreturned submittals.
 4. Notations on returned submittals.
 5. Pending modifications affecting the Work and Contract Time.
- E. Recovery Schedule: When periodic update indicates the Work is 14 or more calendar days behind the current approved schedule, submit a separate recovery schedule indicating means by which Contractor intends to regain compliance with the schedule. Indicate changes to working hours, working days, crew sizes, and equipment required to achieve compliance, and date by which recovery will be accomplished.
- F. Computer Scheduling Software: Prepare schedules using current version of a program that has been developed specifically to manage construction schedules.

2.2 CONTRACTOR'S CONSTRUCTION SCHEDULE (CPM SCHEDULE)

- A. CPM Schedule: Prepare Contractor's construction schedule of sufficient detail to indicate all significant construction activities. The level of detail should be such that no activity should exceed 20 working days. Where similar activities continue beyond the 20 day limit, these activities should be broken into subgroups, specific areas, or phases so that the 20 day maximum duration is maintained.
1. Develop network diagram in sufficient time to submit CPM schedule so it can be accepted for use no later than 20 calendar days after date established for the Notice to Proceed.
 - a. Failure to include any work item required for performance of this Contract shall not excuse Contractor from completing all work within applicable completion dates, regardless of Architect's approval of the schedule.
 2. Establish procedures for monitoring and updating CPM schedule and for reporting progress. Coordinate procedures with progress meeting and payment request dates.
 3. Use "one workday" as the unit of time for individual activities. Indicate nonworking days and holidays incorporated into the schedule in order to coordinate with the Contract Time.
- B. CPM Schedule Preparation: Prepare a list of all activities required to complete the Work. Using the startup network diagram, prepare a skeleton network to identify probable critical paths.
1. Activities: Indicate the estimated time duration, sequence requirements, and relationship of each activity in relation to other activities. Include estimated time frames for the following activities:
 - a. Preparation and processing of submittals.
 - b. Mobilization and demobilization.
 - c. Purchase of materials.
 - d. Delivery.
 - e. Fabrication.
 - f. Utility interruptions.
 - g. Installation.
 - h. Testing.

- i. Punch list and final completion.
 - j. Activities occurring following final completion.
2. Critical Path Activities: Identify critical path activities, including those for interim completion dates. Scheduled start and completion dates shall be consistent with Contract milestone dates.
 3. Processing: Process data to produce output data on a computer-drawn, time-scaled network. Revise data, reorganize activity sequences, and reproduce as often as necessary to produce the CPM schedule within the limitations of the Contract Time.
 4. Format: Mark the critical path. Locate the critical path near center of network; locate paths with most float near the edges.
 - a. Subnetworks on separate sheets are permissible for activities clearly off the critical path.

2.3 REPORTS

- A. Daily Construction Reports: Prepare a daily construction report recording the following information concerning events at Project site:
 1. List of subcontractors at Project site.
 2. List of separate contractors at Project site.
 3. Approximate count of personnel at Project site.
 4. Equipment at Project site.
 5. Material deliveries.
 6. High and low temperatures and general weather conditions, including presence of rain or snow.
 7. Accidents.
 8. Meetings and significant decisions.
 9. Unusual events (see special reports).
 10. Stoppages, delays, shortages, and losses.
 11. Meter readings and similar recordings.
 12. Emergency procedures.
 13. Orders and requests of authorities having jurisdiction.
 14. Change Orders received and implemented.
 15. Construction Change Directives received and implemented.
 16. Services connected and disconnected.
 17. Equipment or system tests and startups.
 18. Partial completions and occupancies.
 19. Substantial Completions authorized.
- B. Material Location Reports: At monthly intervals, prepare and submit a comprehensive list of materials delivered to and stored at Project site. List shall be cumulative, showing materials previously reported plus items recently delivered. Include with list a statement of progress on and delivery dates for materials or items of equipment fabricated or stored away from Project site. Indicate the following categories for stored materials:
 1. Material stored prior to previous report and remaining in storage.
 2. Material stored prior to previous report and since removed from storage and installed.
 3. Material stored following previous report and remaining in storage.
- C. Site Condition Reports: Immediately on discovery of a difference between site conditions and the Contract Documents, prepare and submit a detailed report. Submit with a Request for Information.

Include a detailed description of the differing conditions, together with recommendations for changing the Contract Documents.

2.4 SPECIAL REPORTS

- A. General: Submit special reports directly to Owner within one (1) day of an occurrence. Distribute copies of report to parties affected by the occurrence.
- B. Reporting Unusual Events: When an event of an unusual and significant nature occurs at Project site, whether or not related directly to the Work, prepare and submit a special report. List chain of events, persons participating, response by Contractor's personnel, evaluation of results or effects, and similar pertinent information. Advise Owner in advance when these events are known or predictable.

PART 3 - EXECUTION

3.1 CONTRACTOR'S CONSTRUCTION SCHEDULE

- A. Contractor's Construction Schedule Updating: At monthly intervals, update schedule to reflect actual construction progress and activities. Issue schedule one week before each regularly scheduled progress meeting.
 - 1. Revise schedule immediately after each meeting or other activity where revisions have been recognized or made. Issue updated schedule concurrently with the report of each such meeting.
 - 2. Include a report with updated schedule that indicates every change, including, but not limited to, changes in logic, durations, actual starts and finishes, and activity durations.
 - 3. As the Work progresses, indicate final completion percentage for each activity.
- B. Distribution: Distribute copies of approved schedule to Architect, Owner, separate contractors, testing and inspecting agencies, and other parties identified by Contractor with a need-to-know schedule responsibility.
 - 1. Post copies in Project meeting rooms and temporary field offices.
 - 2. When revisions are made, distribute updated schedules to the same parties and post in the same locations. Delete parties from distribution when they have completed their assigned portion of the Work and are no longer involved in performance of construction activities.

END OF SECTION 01-3200

SECTION 01-3233 - PHOTOGRAPHIC DOCUMENTATION

PART 1 - GENERAL

1.1 RELATED DOCUMENTS

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

1.2 SUMMARY

- A. Section includes administrative and procedural requirements for the following:
 - 1. Preconstruction photographs.
 - 2. Periodic construction photographs.
 - 3. Final completion construction photographs.
- B. Related Requirements:
 - 1. Division 01 Section "Submittal Procedures" for submitting photographic documentation.
 - 2. Division 01 Section "Closeout Procedures" for submitting photographic documentation as project record documents at Project closeout.
 - 3. Division 02 Section "Selective Demolition" for photographic documentation before selective demolition operations commence.

1.3 INFORMATIONAL SUBMITTALS

- A. Key Plan: Submit key plan of Project site and building with notation of vantage points marked for location and direction of each photograph. Indicate elevation or story of construction. Include same information as corresponding photographic documentation.
- B. Digital Photographs: Submit image files within three days of taking photographs.
 - 1. Digital Camera: Minimum sensor resolution of 8 megapixels.
 - 2. Format: Minimum 3200 by 2400 pixels, in unaltered original files, with same aspect ratio as the sensor, uncropped, date and time stamped, in folder named by date of photograph, accompanied by key plan file.
 - 3. Identification: Provide the following information with each image description in file metadata tag:
 - a. Name of Project.
 - b. Name and contact information for photographer.
 - c. Name of Architect.
 - d. Name of Contractor.
 - e. Date photograph was taken.
 - f. Description of vantage point, indicating location, direction (by compass point), and elevation or story of construction.

- g. Unique sequential identifier keyed to accompanying key plan.
- C. Construction Photographs: Submit digital images in jpg format and 3-by-5 or 4-by-6 smooth-surface matte prints on single-weight, commercial-grade photographic paper in seven days of taking photographs.
- 1. Identification: On back of each print, provide an applied label or rubber-stamped impression with the following information:
 - a. Name of Project.
 - b. Name and contact information for photographer.
 - c. Name of Architect.
 - d. Name of Contractor.
 - e. Date photograph was taken if not date stamped by camera.
 - f. Description of vantage point, indicating location, direction (by compass point), and elevation or story of construction.
 - g. Unique sequential identifier keyed to accompanying key plan.

1.4 USAGE RIGHTS

- A. Obtain and transfer copyright usage rights from photographer to Owner for unlimited reproduction of photographic documentation.

PART 2 - PRODUCTS

2.1 PHOTOGRAPHIC MEDIA

- A. Digital Images: Provide images in JPG format, produced by a digital camera with minimum sensor size of 8 megapixels, and at an image resolution of not less than 3200 by 2400 pixels.

PART 3 - EXECUTION

3.1 CONSTRUCTION PHOTOGRAPHS

- A. Photographer: Engage a qualified photographer to take construction photographs.
- B. General: Take photographs using the maximum range of depth of field, and that are in focus, to clearly show the Work. Photographs with blurry or out-of-focus areas will not be accepted.
 - 1. Maintain key plan with each set of construction photographs that identifies each photographic location.
- C. Digital Images: Submit digital images exactly as originally recorded in the digital camera, without alteration, manipulation, editing, or modifications using image-editing software.
 - 1. Date and Time: Include date and time in file name for each image.

2. Field Office Images: Maintain one set of images accessible in the field office at Project site, available at all times for reference. Identify images in the same manner as those submitted to Architect.
- D. Preconstruction Photographs: Before commencement of demolition for renovation projects or starting new construction, take photographs of Project site and surrounding properties, including existing items to remain during construction, from different vantage points, as directed by Architect.
1. Flag construction limits before taking construction photographs.
 2. Take 20 photographs to show existing conditions adjacent to property before starting the Work.
 3. Take 20 photographs of existing buildings either on or adjoining property to accurately record physical conditions at start of construction.
 4. Take additional photographs as required to record settlement or cracking of adjacent structures, pavements, and improvements.
- E. Periodic Construction Photographs: Take 20 photographs monthly or at significant start and finish points of construction phases with the cutoff date associated with each Application for Payment. Select vantage points to show status of construction and progress since last photographs were taken.
- F. Architect-Directed Construction Photographs: From time to time, Architect may instruct photographer about number and frequency of photographs and general directions on vantage points. Select actual vantage points and take photographs to show the status of construction and progress since last photographs were taken.
- G. Time-Lapse Sequence Construction Photographs: Take 20 photographs as indicated, to show status of construction and progress since last photographs were taken.
1. Frequency: Take photographs monthly, coinciding with the cutoff date associated with each Application for Payment.
 2. Vantage Points: Following suggestions by Architect and Contractor, photographer to select vantage points. During each of the following construction phases, take not less than two of the required shots from same vantage point each time to create a time-lapse sequence as follows:
 - a. Commencement of the Work, through completion of subgrade construction.
 - b. Above-grade structural framing.
 - c. Exterior building enclosure.
 - d. Interior Work, through date of Substantial Completion.
- H. Final Completion Construction Photographs: Take 20 color photographs after date of Substantial Completion for submission as project record documents. Architect will inform photographer of desired vantage points.
1. Do not include date stamp.
- I. Additional Photographs: Architect or Owner may request photographs in addition to periodic photographs specified. Additional photographs will be paid for by Change Order and are not included in the Contract Sum.
1. Three days' notice will be given, where feasible.
 2. In emergency situations, take additional photographs within 24 hours of request.

3. Circumstances that could require additional photographs include, but are not limited to, the following:
 - a. Special events planned at Project site.
 - b. Immediate follow-up when on-site events result in construction damage or losses.
 - c. Photographs to be taken at fabrication locations away from Project site. These photographs are not subject to unit prices or unit-cost allowances.
 - d. Substantial Completion of a major phase or component of the Work.
 - e. Extra record photographs at time of final acceptance.
 - f. Owner's request for special publicity photographs.

END OF SECTION 01-3233

SECTION 01-3300 - SUBMITTAL PROCEDURES

PART 1 - GENERAL

1.1 RELATED DOCUMENTS

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

1.2 SUMMARY

- A. Section includes requirements for the submittal schedule and administrative and procedural requirements for submitting Shop Drawings, Product Data, Samples, and other submittals, including;
 - 1. Contractor's construction schedule
 - 2. Submittal schedule
 - 3. Shop Drawings
 - 4. Coordination Drawings and Layout
 - 5. Daily Construction Reports
 - 6. Product Data
 - 7. Samples
 - 8. Site Mobilization Plan
 - 9. Safety Plan
- B. Related Requirements:
 - 1. AIA Document A101 Contract Article 5 "Payments" for submitting Applications for Payment and the schedule of values.
 - 2. Division 01 Section "Construction Progress Documentation" for submitting schedules and reports, including Contractor's construction schedule.
 - 3. Division 01 Section "Operation and Maintenance Data" for submitting operation and maintenance manuals.
 - 4. Division 01 Section "Project Record Documents" for submitting record Drawings, record Specifications, and record Product Data.

1.3 DEFINITIONS

- A. Action Submittals: Written and graphic information and physical samples that require Architect's responsive action. Action submittals are those submittals indicated in individual Specification Sections as "action submittals."
- B. Informational Submittals: Written and graphic information and physical samples that do not require Architect's responsive action. Submittals may be rejected for not complying with requirements. Informational submittals are those submittals indicated in individual Specification Sections as "informational submittals."

- C. Portable Document Format (PDF): An open standard file format licensed by Adobe Systems used for representing documents in a device-independent and display resolution-independent fixed-layout document format.

1.4 ACTION SUBMITTALS

- A. Submittal Schedule: Submit a schedule of submittals, arranged in chronological order by dates required by construction schedule. Include time required for review, ordering, manufacturing, fabrication, and delivery when establishing dates. Include additional time required for making corrections or revisions to submittals noted by Architect and additional time for handling and reviewing submittals required by those corrections.
 - 1. Coordinate submittal schedule with list of subcontracts, the schedule of values, and Contractor's construction schedule.
 - 2. Initial Submittal: Submit concurrently with startup construction schedule. Include submittals required during the first 60 days of construction. List those submittals required to maintain orderly progress of the Work and those required early because of long lead time for manufacture or fabrication.
 - 3. Final Submittal: Submit concurrently with the first complete submittal of Contractor's construction schedule.
 - a. Submit revised submittal schedule to reflect changes in current status and timing for submittals.
 - 4. Format: Arrange the following information in a tabular format:
 - a. Scheduled date for first submittal.
 - b. Specification Section number and title.
 - c. Submittal category: Action; informational.
 - d. Name of subcontractor.
 - e. Scheduled date for Architect's final release or approval.

1.5 SUBMITTAL ADMINISTRATIVE REQUIREMENTS

- A. Coordination: Coordinate preparation and processing of submittals with performance of construction activities.
 - 1. Coordinate each submittal with fabrication, purchasing, testing, delivery, other submittals, and related activities that require sequential activity.
 - 2. Submit all submittal items required for each Specification Section concurrently unless partial submittals for portions of the Work are indicated on approved submittal schedule.
 - 3. Submit action submittals and informational submittals required by the same Specification Section as separate packages under separate transmittals.
 - 4. Coordinate transmittal of different types of submittals for related parts of the Work so processing will not be delayed because of need to review submittals concurrently for coordination.
 - a. Architect reserves the right to withhold action on a submittal requiring coordination with other submittals until related submittals are received.

- B. Processing Time: Allow time for submittal review, including time for resubmittals, as follows. Time for review shall commence on Architect's receipt of submittal. No extension of the Contract Time will be authorized because of failure to transmit submittals enough in advance of the Work to permit processing, including resubmittals.
1. Initial Review: Allow 10 days for initial review of each submittal. Allow additional time if coordination with subsequent submittals is required. Architect will advise Contractor when a submittal being processed must be delayed for coordination.
 2. Intermediate Review: If intermediate submittal is necessary, process it in same manner as initial submittal.
 3. Resubmittal Review: Allow 10 days for review of each resubmittal.
 4. Sequential Review: Where sequential review of submittals by Architect's consultants, Owner, or other parties is indicated, allow 21 days for initial review of each submittal.
 5. Concurrent Consultant Review: Where the Contract Documents indicate that submittals may be transmitted simultaneously to Architect and to Architect's consultants, allow 15 days for review of each submittal. Submittal will be returned to Architect before being returned to Contractor.
- C. Paper Submittals: Place a permanent label or title block on each submittal item for identification.
1. Indicate name of firm or entity that prepared each submittal on label or title block.
 2. Provide a space approximately 6 by 8 inches on label or beside title block to record Contractor's review and approval markings and action taken by Architect.
 3. Include the following information for processing and recording action taken:
 - a. Project name.
 - b. Date.
 - c. Name of Architect.
 - d. Name of Contractor.
 - e. Name of subcontractor.
 - f. Name of supplier.
 - g. Name of manufacturer.
 - h. Submittal number or other unique identifier, including revision identifier.
 - 1) Submittal number shall use Specification Section number followed by a decimal point and then a sequential number (e.g., 061000.01). Resubmittals shall include an alphabetic suffix after another decimal point (e.g., 061000.01.A).
 4. Additional Paper Copies: Unless additional copies are required for final submittal, and unless Architect observes noncompliance with provisions in the Contract Documents, initial submittal may serve as final submittal.
 - a. Submit one copy of submittal to concurrent reviewer in addition to specified number of copies to University Representative.

5. Transmittal for Paper Submittals: Assemble each submittal individually and appropriately for transmittal and handling. Transmit each submittal using a transmittal form. Architect will return without review submittals received from sources other than Contractor.
 - a. Transmittal Form for Paper Submittals: Use AIA Document G810
- D. Electronic Submittals: Identify and incorporate information in each electronic submittal file as follows:
 1. Assemble complete submittal package into a single indexed file incorporating submittal requirements of a single Specification Section and transmittal form with links enabling navigation to each item.
 2. Name file with submittal number or other unique identifier, including revision identifier.
 - a. File name shall use project identifier and Specification Section number followed by a decimal point and then a sequential number (e.g., LNHS-061000.01). Resubmittals shall include an alphabetic suffix after another decimal point (e.g., LNHS-061000.01.A).
 3. Provide means for insertion to permanently record Contractor's review and approval markings and action taken by Architect.
 4. Transmittal Form for Electronic Submittals: Use electronic form acceptable to Owner, containing the following information:
 - a. Project name.
 - b. Date.
 - c. Name and address of Architect.
 - d. Name of Contractor.
 - e. Names of subcontractor, manufacturer, and supplier.
 - f. Category and type of submittal.
 - g. Specification Section number and title.
 - h. Related physical samples submitted directly.
 - i. Indication of full or partial submittal.
 - j. Transmittal number.
 - k. Submittal and transmittal distribution record.
 - l. Remarks.
- E. Options: Identify options requiring selection by Architect.
- F. Deviations and Additional Information: On an attached separate sheet, prepared on Contractor's letterhead, record relevant information, requests for data, revisions other than those requested by Architect on previous submittals, and deviations from requirements in the Contract Documents, including minor variations and limitations. Include same identification information as related submittal.
- G. Resubmittals: Make resubmittals in same form and number of copies as initial submittal.
 1. Note date and content of previous submittal.
 2. Note date and content of revision in label or title block and clearly indicate extent of revision.
 3. Resubmit submittals until they are marked with approval notation from Architect's action stamp.
- H. Distribution: Furnish copies of final submittals to manufacturers, subcontractors, suppliers, fabricators, installers, authorities having jurisdiction, and others as necessary for performance of construction activities. Show distribution on transmittal forms.

- I. Use for Construction: Retain complete copies of submittals on Project site. Use only final action submittals that are marked with approval notation from Architect's action stamp.

PART 2 - PRODUCTS

2.1 SUBMITTAL PROCEDURES

- A. General Submittal Procedure Requirements: Prepare and submit submittals required by individual Specification Sections. Types of submittals are indicated in individual Specification Sections. Transmit each submittal from Contractor to University Representative using a transmittal form.
 1. Submit electronic submittals via email as PDF electronic files.
 - a. Architect will return annotated file. Annotate and retain one copy of file as an electronic Project record document file.
 2. Action Submittals: Submit seven (7) paper copies of each submittal unless otherwise indicated. Architect will return three (3) copies.
 3. Informational Submittals: Submit four (4) paper copies of each submittal unless otherwise indicated. Architect will not return copies.
 4. Certificates and Certifications Submittals: Provide a statement that includes signature of entity responsible for preparing certification. Certificates and certifications shall be signed by an officer or other individual authorized to sign documents on behalf of that entity.
 - a. Provide a digital signature with digital certificate on electronically submitted certificates and certifications where indicated.
 - b. Provide a notarized statement on original paper copy certificates and certifications where indicated.
- B. Product Data: Collect information into a single submittal for each element of construction and type of product or equipment.
 1. If information must be specially prepared for submittal because standard published data are not suitable for use, submit as Shop Drawings, not as Product Data.
 2. Mark each copy of each submittal to show which products and options are applicable.
 3. Include the following information, as applicable:
 - a. Manufacturer's catalog cuts.
 - b. Manufacturer's product specifications.
 - c. Standard color charts.
 - d. Statement of compliance with specified referenced standards.
 - e. Notation of coordination requirements.
 4. For equipment, include the following in addition to the above, as applicable:
 - a. Clearances required to other construction, if not indicated on accompanying Shop Drawings.
 5. Submit Product Data before or concurrent with Samples.

6. Submit Product Data in the following format:
 - a. Four (4) paper copies of Product Data unless otherwise indicated. Owner will retain one (1) copy and Architect will retain one copy; remainder will be returned.

- C. Shop Drawings: Prepare Project-specific information, drawn accurately to scale. Do not base Shop Drawings on reproductions of the Contract Documents or standard printed data.
 1. Preparation: Fully illustrate requirements in the Contract Documents. Include the following information, as applicable:
 - a. Identification of products.
 - b. Schedules.
 - c. Compliance with specified standards.
 - d. Notation of coordination requirements.
 - e. Notation of dimensions established by field measurement.
 - f. Relationship and attachment to adjoining construction clearly indicated.
 - g. Seal and signature of professional engineer if specified.
 2. Sheet Size: Except for templates, patterns, and similar full-size drawings, submit Shop Drawings on sheets at least 8-1/2 by 11 inches, but no larger than 30 by 42 inches.
 3. Submit Shop Drawings in the following format:
 - a. Five (5) opaque copies of each submittal. Owner will retain one (1) copy and Architect will retain two (2) copies; remainder will be returned.

- D. Samples: Submit Samples for review of kind, color, pattern, and texture for a check of these characteristics with other elements and for a comparison of these characteristics between submittal and actual component as delivered and installed.
 1. Transmit Samples that contain multiple, related components such as accessories together in one submittal package.
 2. Identification: Attach label on unexposed side of Samples that includes the following:
 - a. Generic description of Sample.
 - b. Product name and name of manufacturer.
 - c. Sample source.
 - d. Number and title of applicable Specification Section.
 3. For projects where electronic submittals are required, provide corresponding electronic submittal of Sample transmittal, digital image file illustrating Sample characteristics, and identification information for record.
 4. Disposition: Maintain sets of approved Samples at Project site, available for quality-control comparisons throughout the course of construction activity. Sample sets may be used to determine final acceptance of construction associated with each set.
 - a. Samples that may be incorporated into the Work are indicated in individual Specification Sections. Such Samples must be in an undamaged condition at time of use.
 - b. Samples not incorporated into the Work, or otherwise designated as Owner's property, are the property of Contractor.

5. Samples for Initial Selection: Submit manufacturer's color charts consisting of units or sections of units showing the full range of colors, textures, and patterns available.
 - a. Number of Samples: Submit two full set(s) of available choices where color, pattern, texture, or similar characteristics are required to be selected from manufacturer's product line. Architect will return submittal with options selected.
6. Samples for Verification: Submit full-size units or Samples of size indicated, prepared from same material to be used for the Work, cured and finished in manner specified, and physically identical with material or product proposed for use, and that show full range of color and texture variations expected. Samples include, but are not limited to, the following: partial sections of manufactured or fabricated components; small cuts or containers of materials; complete units of repetitively used materials; swatches showing color, texture, and pattern; color range sets; and components used for independent testing and inspection.
 - a. Number of Samples: Submit three (3) sets of Samples. Architect will retain two Sample sets; remainder will be returned. Mark up and retain one returned Sample set as a project record sample.
 - 1) Submit a single Sample where assembly details, workmanship, fabrication techniques, connections, operation, and other similar characteristics are to be demonstrated.
 - 2) If variation in color, pattern, texture, or other characteristic is inherent in material or product represented by a Sample, submit at least three (3) sets of paired units that show approximate limits of variations.
- E. Coordination Drawing Submittals: Comply with requirements specified in Division 01 Section "Project Management and Coordination."
- F. Contractor's Construction Schedule: Comply with requirements specified in Division 01 Section "Construction Progress Documentation."
- G. Application for Payment and Schedule of Values: Comply with requirements specified in Division 00 Section "Payment Procedures."
- H. Test and Inspection Reports and Schedule of Tests and Inspections Submittals: Comply with requirements specified in Division 01 Section "Quality Requirements."
- I. Closeout Submittals and Maintenance Material Submittals: Comply with requirements specified in Division 01 Section "Closeout Procedures."
- J. Maintenance Data: Comply with requirements specified in Division 01 Section "Operation and Maintenance Data."
- K. Site Mobilization Plan
 1. Prior to the start of operations on the site, the Contractor shall submit to the University Representative, a Site Mobilization Plan which shall indicate pertinent dates and times, logistics, construction fence, laydown area, traffic flow and compliance with the General Requirements to a level of detail commensurate with the complexity of the construction and the sensitivity of the Owner's ongoing activities on site.

L. Safety Plan

1. Prior to, and as a condition of mobilization on site, the Contractor shall submit a Safety Plan consisting of no less that the following information:
 - a. Material Safety Data Sheets for all potentially harmful substances.
 - b. A list of Contractor, Subcontractor, and University personnel to be notified in the event of an emergency.
 - c. A list of Contractor's personnel to be notified by the University in the event of an emergency during "off" hours.
 - d. Evacuation Plans.
 - e. Emergency medical procedures.
 - f. Locations of emergency medical equipment.
 - g. Completed Contractor Receipt Acknowledgement Form from the last page of the University of Connecticut, Contractor EHS Manual (http://www.ehs.uconn.edu/ppp/Contractor_EHS_Manual.pdf)

2.2 DELEGATED-DESIGN SERVICES

- A. Performance and Design Criteria: Where professional design services or certifications by a design professional are specifically required of Contractor by the Contract Documents, provide products and systems complying with specific performance and design criteria indicated.
 1. If criteria indicated are not sufficient to perform services or certification required, submit a written request for additional information to Architect.
- B. Delegated-Design Services Certification: In addition to Shop Drawings, Product Data, and other required submittals, submit digitally signed PDF electronic file and three (3) paper copies of certificate, signed and sealed by the responsible design professional, for each product and system specifically assigned to Contractor to be designed or certified by a design professional.
 1. Indicate that products and systems comply with performance and design criteria in the Contract Documents. Include list of codes, design loads, and other factors used in performing these services.

PART 3 - EXECUTION

3.1 CONTRACTOR'S REVIEW

- A. Action and Informational Submittals: Review each submittal and check for coordination with other Work of the Contract and for compliance with the Contract Documents. Note corrections and field dimensions. Mark with approval stamp before submitting to University Representative. The University Representative will transmit submittals to Architect for action unless otherwise agreed upon arrangements are made.
- B. Project Closeout and Maintenance Material Submittals: See requirements in Division 01 Section "Closeout Procedures."

- C. Approval Stamp: Stamp each submittal with a uniform, approval stamp. Include Project name and location, submittal number, Specification Section title and number, name of reviewer, date of Contractor's approval, and statement certifying that submittal has been reviewed, checked, and approved for compliance with the Contract Documents.

3.2 ARCHITECT'S ACTION

- A. Action Submittals: Architect will review each submittal, make marks to indicate corrections or revisions required, and return the submittal to contractor with a copy to the University Representative. Architect will stamp each submittal with an action stamp and will mark stamp appropriately to indicate action.
- B. Informational Submittals: Architect will review each submittal and will not return it, or will return it if it does not comply with requirements. Architect will forward each submittal to appropriate party.
- C. Partial submittals prepared for a portion of the Work will be reviewed when use of partial submittals has received prior approval from Architect.
- D. Incomplete submittals are unacceptable, will be considered nonresponsive, and will be returned for resubmittal without review.
- E. Submittals not required by the Contract Documents may be returned by the Architect without action.

END OF SECTION 01-3300

SECTION 01-4000 - QUALITY REQUIREMENTS

PART 1 - GENERAL

1.1 RELATED DOCUMENTS

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

1.2 SUMMARY

- A. Section includes administrative and procedural requirements for quality assurance and quality control.
- B. Testing and inspecting services are required to verify compliance with requirements specified or indicated. These services do not relieve Contractor of responsibility for compliance with the Contract Document requirements.
 - 1. Specific quality-assurance and -control requirements for individual construction activities are specified in the Sections that specify those activities. Requirements in those Sections may also cover production of standard products.
 - 2. Specified tests, inspections, and related actions do not limit Contractor's other quality-assurance and control procedures that facilitate compliance with the Contract Document requirements.
 - 3. Requirements for Contractor to provide quality-assurance and control services required by Architect, Owner, or authorities having jurisdiction are not limited by provisions of this Section.
- C. Related Requirements:
 - 1. Division 01 Section "Allowances" for testing and inspecting allowances.
 - 2. Divisions 02 through 33 Sections for specific test and inspection requirements.

1.3 DEFINITIONS

- A. Quality-Assurance Services: Activities, actions, and procedures performed before and during execution of the Work to guard against defects and deficiencies and substantiate that proposed construction will comply with requirements.
- B. Quality-Control Services: Tests, inspections, procedures, and related actions during and after execution of the Work to evaluate that actual products incorporated into the Work and completed construction comply with requirements. Services do not include contract enforcement activities performed by Architect.
- C. Mockups: Full-size physical assemblies that are constructed on-site. Mockups are constructed to verify selections made under Sample submittals; to demonstrate aesthetic effects and, where indicated, qualities of materials and execution; to review coordination, testing, or operation; to show interface between dissimilar materials; and to demonstrate compliance with specified installation tolerances. Mockups are

not Samples. Unless otherwise indicated, approved mockups establish the standard by which the Work will be judged.

- D. Preconstruction Testing: Tests and inspections performed specifically for Project before products and materials are incorporated into the Work, to verify performance or compliance with specified criteria.
- E. Product Testing: Tests and inspections that are performed by an NRTL, an NVLAP, or a testing agency qualified to conduct product testing and acceptable to authorities having jurisdiction, to establish product performance and compliance with specified requirements.
- F. Source Quality-Control Testing: Tests and inspections that are performed at the source, e.g., plant, mill, factory, or shop.
- G. Field Quality-Control Testing: Tests and inspections that are performed on-site for installation of the Work and for completed Work.
- H. Testing Agency: An entity engaged to perform specific tests, inspections, or both. Testing laboratory shall mean the same as testing agency.
- I. Installer/Applicator/Erector: Contractor or another entity engaged by Contractor as an employee, Subcontractor, or Sub-subcontractor, to perform a particular construction operation, including installation, erection, application, and similar operations.
 - 1. Use of trade-specific terminology in referring to a trade or entity does not require that certain construction activities be performed by accredited or unionized individuals, or that requirements specified apply exclusively to specific trade(s).
- J. Experienced: When used with an entity or individual, "experienced" means having successfully completed a minimum of five previous projects similar in nature, size, and extent to this Project; being familiar with special requirements indicated; and having complied with requirements of authorities having jurisdiction.

1.4 CONFLICTING REQUIREMENTS

- A. Referenced Standards: If compliance with two or more standards is specified and the standards establish different or conflicting requirements for minimum quantities or quality levels, comply with the most stringent requirement. Refer conflicting requirements that are different, but apparently equal, to Architect for a decision before proceeding.
- B. Minimum Quantity or Quality Levels: The quantity or quality level shown or specified shall be the minimum provided or performed. The actual installation may comply exactly with the minimum quantity or quality specified, or it may exceed the minimum within reasonable limits. To comply with these requirements, indicated numeric values are minimum or maximum, as appropriate, for the context of requirements. Refer uncertainties to Architect for a decision before proceeding.

1.5 INFORMATIONAL SUBMITTALS

- A. Contractor's Quality-Control Plan: For quality-assurance and quality-control activities and responsibilities.

- B. Qualification Data: For Contractor's quality-control personnel.
- C. Contractor's Statement of Responsibility: When required by authorities having jurisdiction, submit copy of written statement of responsibility sent to authorities having jurisdiction before starting work on the following systems:
 - 1. Seismic-force-resisting system, designated seismic system, or component listed in the designated seismic system quality-assurance plan prepared by Architect.
 - 2. Main wind-force-resisting system or a wind-resisting component listed in the wind-force-resisting system quality-assurance plan prepared by Architect.
- D. Schedule of Tests and Inspections: Prepare in tabular form and include the following:
 - 1. Specification Section number and title.
 - 2. Entity responsible for performing tests and inspections.
 - 3. Description of test and inspection.
 - 4. Identification of applicable standards.
 - 5. Identification of test and inspection methods.
 - 6. Number of tests and inspections required.
 - 7. Time schedule or time span for tests and inspections.
 - 8. Requirements for obtaining samples.
 - 9. Unique characteristics of each quality-control service.

1.6 CONTRACTOR'S QUALITY-CONTROL PLAN

- A. Quality-Control Plan, General: Submit quality-control plan within 10 days of Notice to Proceed, and not less than five days prior to preconstruction conference. Submit in format acceptable to Owner. Identify personnel, procedures, controls, instructions, tests, records, and forms to be used to carry out Contractor's quality-assurance and quality-control responsibilities. Coordinate with Contractor's construction schedule.
- B. Quality-Control Personnel Qualifications: Engage qualified full-time personnel trained and experienced in managing and executing quality-assurance and quality-control procedures similar in nature and extent to those required for Project.
 - 1. Project quality-control manager may also serve as Project superintendent.
- C. Submittal Procedure: Describe procedures for ensuring compliance with requirements through review and management of submittal process. Indicate qualifications of personnel responsible for submittal review.
- D. Testing and Inspection: In quality-control plan, include a comprehensive schedule of Work requiring testing or inspection, including the following:
 - 1. Contractor-performed tests and inspections including subcontractor-performed tests and inspections. Include required tests and inspections and Contractor-elected tests and inspections.
 - 2. Special inspections required by authorities having jurisdiction and indicated on the "Statement of Special Inspections."
 - 3. Owner-performed tests and inspections indicated in the Contract Documents.

- E. Continuous Inspection of Workmanship: Describe process for continuous inspection during construction to identify and correct deficiencies in workmanship in addition to testing and inspection specified. Indicate types of corrective actions to be required to bring work into compliance with standards of workmanship established by Contract requirements and approved mockups.
- F. Monitoring and Documentation: Maintain testing and inspection reports including log of approved and rejected results. Include work Architect has indicated as nonconforming or defective. Indicate corrective actions taken to bring nonconforming work into compliance with requirements. Comply with requirements of authorities having jurisdiction.

1.7 REPORTS AND DOCUMENTS

- A. Test and Inspection Reports: Prepare and submit certified written reports specified in other Sections. Include the following:
 - 1. Date of issue.
 - 2. Project title and number.
 - 3. Name, address, and telephone number of testing agency.
 - 4. Dates and locations of samples and tests or inspections.
 - 5. Names of individuals making tests and inspections.
 - 6. Description of the Work and test and inspection method.
 - 7. Identification of product and Specification Section.
 - 8. Complete test or inspection data.
 - 9. Test and inspection results and an interpretation of test results.
 - 10. Record of temperature and weather conditions at time of sample taking and testing and inspecting.
 - 11. Comments or professional opinion on whether tested or inspected Work complies with the Contract Document requirements.
 - 12. Name and signature of laboratory inspector.
 - 13. Recommendations on retesting and reinspecting.
- B. Manufacturer's Technical Representative's Field Reports: Prepare written information documenting manufacturer's technical representative's tests and inspections specified in other Sections. Include the following:
 - 1. Name, address, and telephone number of technical representative making report.
 - 2. Statement on condition of substrates and their acceptability for installation of product.
 - 3. Statement that products at Project site comply with requirements.
 - 4. Summary of installation procedures being followed, whether they comply with requirements and, if not, what corrective action was taken.
 - 5. Results of operational and other tests and a statement of whether observed performance complies with requirements.
 - 6. Statement whether conditions, products, and installation will affect warranty.
 - 7. Other required items indicated in individual Specification Sections.
- C. Factory-Authorized Service Representative's Reports: Prepare written information documenting manufacturer's factory-authorized service representative's tests and inspections specified in other Sections. Include the following:
 - 1. Name, address, and telephone number of factory-authorized service representative making report.
 - 2. Statement that equipment complies with requirements.

3. Results of operational and other tests and a statement of whether observed performance complies with requirements.
4. Statement whether conditions, products, and installation will affect warranty.
5. Other required items indicated in individual Specification Sections.

1.8 QUALITY ASSURANCE

- A. General: Qualifications paragraphs in this article establish the minimum qualification levels required; individual Specification Sections specify additional requirements.
- B. Manufacturer Qualifications: A firm experienced in manufacturing products or systems similar to those indicated for this Project and with a record of successful in-service performance, as well as sufficient production capacity to produce required units.
- C. Fabricator Qualifications: A firm experienced in producing products similar to those indicated for this Project and with a record of successful in-service performance, as well as sufficient production capacity to produce required units.
- D. Installer Qualifications: A firm or individual experienced in installing, erecting, or assembling work similar in material, design, and extent to that indicated for this Project, whose work has resulted in construction with a record of successful in-service performance.
- E. Professional Engineer Qualifications: A professional engineer who is legally qualified to practice in jurisdiction where Project is located and who is experienced in providing engineering services of the kind indicated. Engineering services are defined as those performed for installations of the system, assembly, or product that are similar in material, design, and extent to those indicated for this Project.
- F. Specialists: Certain Specification Sections require that specific construction activities shall be performed by entities who are recognized experts in those operations. Specialists shall satisfy qualification requirements indicated and shall be engaged for the activities indicated.
 1. Requirements of authorities having jurisdiction shall supersede requirements for specialists.
- G. Testing Agency Qualifications: An NRTL, an NVLAP, or an independent agency with the experience and capability to conduct testing and inspecting indicated, as documented according to ASTM E 329; and with additional qualifications specified in individual Sections; and, where required by authorities having jurisdiction, that is acceptable to authorities.
 1. NRTL: A nationally recognized testing laboratory according to 29 CFR 1910.7.
 2. NVLAP: A testing agency accredited according to NIST's National Voluntary Laboratory Accreditation Program.
- H. Manufacturer's Technical Representative Qualifications: An authorized representative of manufacturer who is trained and approved by manufacturer to observe and inspect installation of manufacturer's products that are similar in material, design, and extent to those indicated for this Project.
- I. Factory-Authorized Service Representative Qualifications: An authorized representative of manufacturer who is trained and approved by manufacturer to inspect installation of manufacturer's products that are similar in material, design, and extent to those indicated for this Project.

- J. Mockups: Before installing portions of the Work requiring mockups, build mockups for each form of construction and finish required to comply with the following requirements, using materials indicated for the completed Work:
1. Build mockups in location and of size indicated or, if not indicated, as directed by Architect.
 2. Notify Architect 7 days in advance of dates and times when mockups will be constructed.
 3. Employ supervisory personnel who will oversee mockup construction. Employ workers that will be employed during the construction at Project.
 4. Demonstrate the proposed range of aesthetic effects and workmanship.
 5. Obtain Architect's approval of mockups before starting work, fabrication, or construction.
 - a. Allow 7 days for initial review and each re-review of each mockup.
 6. Maintain mockups during construction in an undisturbed condition as a standard for judging the completed Work.
 7. Demolish and remove mockups when directed unless otherwise indicated.
- K. Integrated Exterior Mockups: Construct integrated exterior mockup as indicated on Drawings. Coordinate installation of exterior envelope materials and products for which mockups are required in individual Specification Sections, along with supporting materials.

1.9 QUALITY CONTROL

- A. Owner Responsibilities: The Owner will provide independent inspections, tests, and similar quality control services specified to be performed by independent agencies and not by the contractor, except where they are specifically indicated as the contractor's responsibility or are provided by another identified entity. Costs for these services are not included in the Contract Sum.
1. The Owner will employ and pay for services of an independent agency and furnish Contractor with names, addresses, and telephone numbers of testing agencies engaged and a description of types of testing and inspecting they are engaged to perform.
 2. Costs for retesting and reinspecting construction that replaces or is necessitated by work that failed to comply with the Contract Documents will be charged to Contractor, and the Contract Sum will be adjusted by Change Order.
- B. Contractor Responsibilities: Perform additional quality-control activities required to verify that the Work complies with requirements, whether specified or not.
1. Unless otherwise indicated, provide quality-control services specified and those required by authorities having jurisdiction. Perform quality-control services required of Contractor by authorities having jurisdiction, whether specified or not.
 2. Where services are indicated as Contractor's responsibility, engage a qualified testing agency to perform these quality-control services.
 - a. Contractor shall not employ same entity engaged by Owner, unless agreed to in writing by Owner.
 3. Notify the University Representative and testing agencies at least 24 hours in advance of time when Work that requires testing or inspecting will be performed.

4. Where quality-control services are indicated as Contractor's responsibility, submit a certified written report, in duplicate, of each quality-control service.
 5. Testing and inspecting requested by Contractor and not required by the Contract Documents are Contractor's responsibility.
 6. Submit additional copies of each written report directly to authorities having jurisdiction, when they so direct.
- C. **Manufacturer's Field Services:** Where indicated, engage a factory-authorized service representative to inspect field-assembled components and equipment installation, including service connections. Report results in writing as specified in Division 01 Section "Submittal Procedures."
- D. **Manufacturer's Technical Services:** Where indicated, engage a manufacturer's technical representative to observe and inspect the Work. Manufacturer's technical representative's services include participation in preinstallation conferences, examination of substrates and conditions, verification of materials, observation of Installer activities, inspection of completed portions of the Work, and submittal of written reports.
- E. **Retesting/Reinspecting:** Regardless of whether original tests or inspections were Contractor's responsibility, provide quality-control services, including retesting and reinspecting, for construction that replaced Work that failed to comply with the Contract Documents.
- F. **Testing Agency Responsibilities:** Cooperate with Architect, and Contractor in performance of duties. Provide qualified personnel to perform required tests and inspections.
1. Notify University Representative, Architect, and Contractor promptly of irregularities or deficiencies observed in the Work during performance of its services.
 2. Determine the location from which test samples will be taken and in which in-situ tests are conducted.
 3. Conduct and interpret tests and inspections and state in each report whether tested and inspected work complies with or deviates from requirements.
 4. Submit a certified written report, in duplicate, of each test, inspection, and similar quality-control service through Contractor.
 5. Do not release, revoke, alter, or increase the Contract Document requirements or approve or accept any portion of the Work.
 6. Do not perform any duties of Contractor.
- G. **Associated Services:** Cooperate with agencies performing required tests, inspections, and similar quality-control services, and provide reasonable auxiliary services as requested. Notify agency sufficiently in advance of operations to permit assignment of personnel. Provide the following:
1. Access to the Work.
 2. Incidental labor and facilities necessary to facilitate tests and inspections.
 3. Adequate quantities of representative samples of materials that require testing and inspecting. Assist agency in obtaining samples.
 4. Facilities for storage and field curing of test samples.
 5. Delivery of samples to testing agencies.
 6. Preliminary design mix proposed for use for material mixes that require control by testing agency.
 7. Security and protection for samples and for testing and inspecting equipment at Project site.

- H. Coordination: Coordinate sequence of activities to accommodate required quality-assurance and control services with a minimum of delay and to avoid necessity of removing and replacing construction to accommodate testing and inspecting.
 - 1. Schedule times for tests, inspections, obtaining samples, and similar activities.
- I. Schedule of Tests and Inspections: Prepare a schedule of tests, inspections, and similar quality-control services required by the Contract Documents. Coordinate and submit concurrently with Contractor's construction schedule. Update as the Work progresses.
 - 1. Distribution: Distribute schedule to Owners Representative, Architect, testing agencies, and each party involved in performance of portions of the Work where tests and inspections are required.

1.10 SPECIAL TESTS AND INSPECTIONS

- A. Special Tests and Inspections: Owner will engage a qualified special inspector to conduct special tests and inspections required by authorities having jurisdiction as the responsibility of Owner, as indicated in Statement of Special Inspections attached to this Section.

PART 2 - PRODUCTS (Not Used)

PART 3 - EXECUTION

3.1 TEST AND INSPECTION LOG

- A. Test and Inspection Log: Prepare a record of tests and inspections. Include the following:
 - 1. Date test or inspection was conducted.
 - 2. Description of the Work tested or inspected.
 - 3. Date test or inspection results were transmitted to Architect.
 - 4. Identification of testing agency or special inspector conducting test or inspection.
- B. Maintain log at Project site. Post changes and revisions as they occur. Provide access to test and inspection log for Owner Representative and Architect's reference during normal working hours.

3.2 REPAIR AND PROTECTION

- A. General: On completion of testing, inspecting, sample taking, and similar services, repair damaged construction and restore substrates and finishes.
 - 1. Provide materials and comply with installation requirements specified in other Specification Sections or matching existing substrates and finishes. Restore patched areas and extend restoration into adjoining areas with durable seams that are as invisible as possible. Comply with the Contract Document requirements for cutting and patching in Division 01 Section "Execution."
- B. Protect construction exposed by or for quality-control service activities.

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URS JOB #36940200

QUALITY REQUIREMENTS

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- C. Repair and protection are Contractor's responsibility, regardless of the assignment of responsibility for quality-control services.

END OF SECTION 01-4000

SECTION 01-5000 - TEMPORARY FACILITIES AND CONTROLS

PART 1 - GENERAL

1.1 RELATED DOCUMENTS

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

1.2 SUMMARY

- A. Section includes requirements for temporary services and facilities, including:
 - 1. Utilities
 - 2. Temporary construction
 - 3. Construction aids
 - 4. Barriers and enclosures
 - 5. Security
 - 6. Access roads
 - 7. Temporary controls
 - 8. Traffic control
 - 9. Project identification and signs
 - 10. Field offices and sheds
 - 11. Installation of Owner provided decorative banners on site enclosure fencing.
- B. Related Requirements:
 - 1. Division 01 Section "Summary" for work restrictions and limitations on utility interruptions.
 - 2. Divisions 01 Section "Temporary Tree and Plant Protection" for protection and pruning of existing trees and plants that are affected by execution of the Work.
 - 3. Division 02 Section "Dewatering" for disposal of ground water at Project site.
 - 4. Division 02 Section "Bituminous Concrete" for construction and maintenance of asphalt pavement for temporary roads and paved areas.
- C. Temporary utilities may include but are not limited to:
 - 1. Temporary electric power and light.
 - 2. Temporary heating, cooling and ventilating.
 - 3. Telephone service.
 - 4. Water services and distribution.
 - 5. Temporary sanitary facilities, including drinking water.
 - 6. Temporary sewers and drainage
 - 7. Temporary fire protection.
- D. Security may include but is not limited to:
 - 1. Permanent fire protection.

2. Covered walkways at entrances
3. Security enclosures, fences and lockups

E. Access roads and parking include but are not limited to:

1. Temporary roads and paving

F. Temporary controls may include but are not limited to:

1. Dewatering facilities and drains
2. Waste disposal
3. Rodent and pest control
4. Environmental protection
5. Nuisance dust control
6. Noise control.
7. Irrigation

1.3 USE CHARGES

A. General: Installation and removal of and use charges for temporary facilities shall be included in the Contract Sum unless otherwise indicated. Allow other entities to use temporary services and facilities without cost, including, but not limited to, Architect, testing agencies, and authorities having jurisdiction.

1. Contractor shall furnish and install all necessary temporary switches, wiring, fixtures, bulbs, piping and other devices as may be required to connect to existing systems.

B. Water and Sewer Service from Existing System: A moderate quantity of water from Owner's existing water system is available for use without metering and without payment of use charges. Provide connections and extensions of services as required for construction operations. The University reserves the right to require the Contractor to install meters and, if obvious and excessive use is observed, to pay for these utilities.

C. Electric Power Service from Existing System: A moderate quantity of electric power from Owner's existing system is available for use without metering and without payment of use charges. Provide connections and extensions of services as required for construction operations. The University reserves the right to require the Contractor to install meters and, if obvious and excessive use is observed, to pay for these utilities.

1.4 INFORMATIONAL SUBMITTALS

A. Site Plan: Show temporary facilities, utility hookups, staging areas, and parking areas for construction personnel.

B. Erosion and Sedimentation Control Plan: Show compliance with requirements of EPA Construction General Permit or authorities having jurisdiction, whichever is more stringent.

C. Fire-Safety Program: Show compliance with requirements of NFPA 241 and authorities having jurisdiction. Indicate Contractor personnel responsible for management of fire-prevention program.

- D. Moisture-Protection Plan: Describe procedures and controls for protecting materials and construction from water absorption and damage.
 - 1. Describe delivery, handling, and storage provisions for materials subject to water absorption or water damage.
 - 2. Indicate procedures for discarding water-damaged materials, protocols for mitigating water intrusion into completed Work, and replacing water-damaged Work.

- E. Dust- and HVAC-Control Plan: Submit coordination drawing and narrative that indicates the dust and HVAC control measures proposed for use, proposed locations, and proposed time frame for their operation. Identify further options if proposed measures are later determined to be inadequate. Include the following:
 - 1. Locations of dust-control partitions at each phase of work.
 - 2. HVAC system isolation schematic drawing.
 - 3. Location of proposed air-filtration system discharge.
 - 4. Waste handling procedures.
 - 5. Other dust-control measures.

1.5 QUALITY ASSURANCE

- A. Regulations: Comply with industry standards and applicable laws and regulations and authorities having jurisdiction, including but not limited to:
 - 1. Building Code requirements
 - 2. Health and safety regulations
 - 3. Utility company regulations
 - 4. Police, Fire Department and Rescue Squad rules.
 - 5. Environmental protection regulations.

- B. Standards: Comply with NFPA Code 241, “Standard for Safeguarding Construction, Alteration, and Demolition Operations”, ANSI-A10 Series standards for “Safety Requirements for Construction and Demolition”, and NECA Electrical Design Library “Temporary Electrical Facilities.”

- C. Electric Service: Comply with NECA, NEMA, and UL standards and regulations for temporary electric service. Install service to comply with National Electric Code (NFPA 70).

- D. Tests and Inspections: Arrange for authorities having jurisdiction to test and inspect each temporary utility before use. Obtain required certifications and permits.

1.6 PROJECT CONDITIONS

- A. Temporary Utilities: Prepare a schedule indicating dates of implementation and termination of each temporary utility. At the earliest feasible time, when acceptable to the Owner, change over from use of temporary services to use of the permanent service.

- B. Conditions of Use: Keep temporary services and facilities clean and neat in appearance. Operate in a safe and efficient manner. Take necessary fire preventative measures. Do not overload facilities, or permit

them to interfere with progress of work. Do not allow hazardous dangerous or unsanitary conditions, or public nuisances to develop or persist on the site.

PART 2 - PRODUCTS

2.1 MATERIALS

- A. General: Provide new materials; if acceptable to the Architect, undamaged previously used materials in serviceable condition may be used. Provide materials suitable for the use intended.
- B. Portable Chain-Link Fencing: Minimum 2-inch, 0.148-inch thick, galvanized-steel, chain-link fabric fencing; minimum 6 feet high with galvanized-steel pipe posts; minimum 2-3/8-inch OD line posts and 2-7/8-inch OD corner and pull posts, with 1-5/8-inch- (42-mm-) OD top and bottom rails. Supporting post shall be driven. Provide dark green reinforced scrim sheeting on all fencing.
- C. Wood Enclosure Fence: 3/8" thick Plywood, minimum 6 feet high, framed with four 2-by-4-inch rails, with preservative-treated wood posts spaced not more than 8 feet apart.
- D. Polyethylene Sheet: Reinforced, fire-resistive sheet, 10-mil minimum thickness, with flame-spread rating of 15 or less per ASTM E 84 and passing NFPA 701 Test Method 2.
- E. Dust-Control Adhesive-Surface Walk-off Mats: Provide mats minimum 36 by 60 inches.
- F. Gypsum Wallboard: Provide gypsum wallboard complying with requirements of ASTM C 36 on interior walls of temporary partitions.
- G. Insulation: Unfaced mineral-fiber blanket, manufactured from glass, slag wool, or rock wool; with maximum flame-spread and smoke-developed indexes of 25 and 50, respectively.
- H. Water: Provide potable water approved by local health authorities.

2.2 TEMPORARY FACILITIES

- A. Field Offices, General: Prefabricated or mobile units with serviceable finishes, temperature controls, and foundations adequate for normal loading.
- B. Common-Use Field Office: Of sufficient size to accommodate needs of Owner, Architect and construction personnel office activities and to accommodate Project meetings specified in other Division 01 Sections. Keep office clean and orderly. Furnish and equip offices as follows:
 - 1. Furniture required for Project-site documents including file cabinets, plan tables, plan racks, and bookcases.
 - 2. Conference room of sufficient size to accommodate meetings of 10 individuals. Provide electrical power service and 120-V ac duplex receptacles, with no fewer than one receptacle on each wall. Furnish room with conference table, chairs, and 4-foot square tack and marker boards.
 - 3. Drinking water and private toilet.
 - 4. Coffee machine and supplies.

5. Heating and cooling equipment necessary to maintain a uniform indoor temperature of 68 to 75 deg F.
6. Lighting fixtures capable of maintaining average illumination of 20 fc at desk height.

C. Storage and Fabrication Sheds: Provide sheds sized, furnished, and equipped to accommodate materials and equipment for construction operations.

1. Store combustible materials apart from building.

2.3 EQUIPMENT

A. Fire Extinguishers: Portable, UL rated; comply with NFPA 10 and 241 for classification, extinguishing agent and size required by location and class of fire exposure.

B. HVAC Equipment: Unless Owner authorizes use of permanent HVAC system, provide vented, self-contained, liquid-propane-gas or fuel-oil heaters with individual space thermostatic control.

1. Use of gasoline-burning space heaters, open-flame heaters, or salamander-type heating units is prohibited.
2. Heating Units: Listed and labeled for type of fuel being consumed, by a qualified testing agency acceptable to authorities having jurisdiction, and marked for intended location and application.
3. Permanent HVAC System: If Owner authorizes use of permanent HVAC system for temporary use during construction, provide filter with MERV of 8 at each return-air grille in system and remove at end of construction.

C. Air-Filtration Units: Primary and secondary HEPA-filter-equipped portable units with four-stage filtration. Provide single switch for emergency shutoff. Configure to run continuously.

D. Electrical Outlets: Provide properly configured NEMA polarized outlets to prevent insertion of 110-120 volt plugs into higher voltage outlets. Provide receptacle outlets equipped with ground-fault circuit interrupters, reset button and pilot light, for connection of power tools and equipment.

E. Electrical Power Cords: Provide grounded extension cords; use “hard-service” cords where exposed to abrasion and traffic. Provide waterproof connectors to connect separate lengths of electric cords, if single lengths will not reach areas where construction activities are in progress.

F. Lamps and Light Fixtures: Provide general service incandescent lamps of wattage required for adequate illumination. Provide guard cages or tempered glass enclosures, where exposed to breakage. Provide exterior fixture where exposed to moisture.

G. First Aid Supplies: Comply with governing regulations.

PART 3 - EXECUTION

3.1 INSTALLATION, GENERAL

- A. Use qualified personnel for installation of temporary facilities. Locate facilities where they will serve Project adequately and result in minimum interference with performance of the Work. Relocate and modify facilities as required by progress of the Work.
 - 1. Locate facilities to limit site disturbance as specified in Division 01 Section "Summary."
- B. Provide each facility ready for use when needed to avoid delay. Maintain and modify as required. Do not remove until facilities are no longer needed or are replaced by authorized use of completed permanent facilities.
- C. Temporary buildings (e.g., storage sheds, shops, offices) and utilities may be erected by the Contractor only with the approval of the University Representative and shall be built with labor and materials furnished by the Contractor without expense to the University. The temporary buildings and utilities shall remain the property of the Contractor at its expense upon completion of the Work. With the written consent of the University Representative, the buildings and utilities may be abandoned and need not be removed.
- D. Noise Control: The Contractor shall make every effort to minimize noise disruption to occupants of buildings and adjacent buildings. Restrict use of noise making tools and equipment to hours that will minimize complaints from persons or firms near the site. No noise generating work that interferes with classroom operation shall be tolerated. No noise generating work shall be allowed during exam periods where the noise will impact classroom functions. Examples of noise generating work include, but are not limited to sawing, drilling and hammering and/or jackhammering.
 - 1. Avoid use of tools and equipment, which produce harmful noise. No gasoline-powered equipment shall be used during times that the buildings are occupied. No gasoline-powered equipment may be used in the interior of buildings at any time.
- E. Collection and Disposal of Waste: Collect waste from construction areas and elsewhere daily. Comply with requirements of NFPA 241 for removal of combustible waste material and debris. Enforce requirements strictly. Do not hold materials more than 7 days during normal weather or 3 days when the temperature is expected to rise above 80 deg F (27 deg C). Handle hazardous, dangerous, or unsanitary waste materials separately from other waste by containerizing properly. Dispose of material in a lawful manner.
 - 1. All removed materials that are salvageable are the property of the Contractor unless otherwise noted in the specifications.
 - 2. All debris resulting from the performance of this contract will be the property of the Contractor and will be completely removed from the campus and disposed of in a legal manner.
 - 3. Chutes and dumpster type containers designed to keep dust and spillage to a minimum will be used by the Contractor. Dumpsters will be completely covered with a waterproof covering at all times when not in use.
- F. Nuisance Dust Control: The following provisions shall apply during demolition or construction phases of work:

1. It is the intent of this specification to insure that nuisance dusts resulting from demolition or construction activities do not impact occupied areas of the building. The Contractor shall take all measures necessary to accomplish this goal. These measures will include as minimum polyethylene sheeting or wet methods of fugitive dust control.
2. The Contractor shall submit a plan prior to commencement of work that will detail all methods of dust control. This plan shall be approved by the University Representative prior to commencement of work. Upon approval, this plan shall be distributed to the University Representative and the building representative on the Safety Committee.
3. Failure to comply shall result in immediate stoppage of work until effective dust control measures are employed.

3.2 TEMPORARY UTILITY INSTALLATION

A. General: Install temporary service or connect to existing service.

1. Arrange with appropriate local utility company to install temporary service or connect to existing service. Where the company provides only part of the service, provide the remainder with matching, compatible materials and equipment; comply with the company's recommendations.
2. Arrange with utility company, Owner, and existing users for time when service can be interrupted, if necessary, to make connections for temporary services.
3. The University must be notified at least 72 hours in advance of any proposed interruption in order that all affected departments may be advised and have time to adjust their schedules accordingly.
4. Any service (steam, water, electricity, etc.) shutdown which will interrupt the continuity of an experiment or be detrimental to a research project or which, in the opinion of the University, is required for other valid reasons, shall be maintained by safe and adequate temporary means and such temporary piping, wiring and associated devices shall be removed when no longer required.
5. The University reserves the right to limit the down time to a specified number of net hours and to set the date for each occasion of complete shutdown.
6. Provide adequate capacity at each stage of construction. Prior to temporary utility availability, provide trucked-in services.
7. Obtain easements to bring temporary utilities to the site, where the Owner's easements cannot be used for that purpose.

B. Sewers and Drainage: If sewers are available, provide temporary connection to remove effluent that can be discharged lawfully. If sewers are not available or cannot be used, provide drainage ditches, dry wells, stabilization ponds and similar facilities. If neither sewers nor drainage facilities can be lawfully used for discharge of effluent, provide containers to remove and dispose of effluent off the site in a lawful manner.

1. Filter out excessive amounts of soil, construction debris, chemicals, oils and similar contaminants that might clog sewers or pollute waterways before discharge.
2. Connect temporary sewers to the municipal system as directed by the sewer department officials.
3. Maintain temporary sewers and drainage facilities in a clean, sanitary condition. Following heavy use, restore normal conditions promptly.

C. Water Service: Install water service and distribution piping in sizes and pressures adequate for construction. Connect to Owner's existing water service facilities. Clean and maintain water service facilities in a condition acceptable to Owner. At Substantial Completion, restore these facilities to condition existing before initial use.

1. Sterilization: Sterilize temporary water piping in accordance with AWWA requirements prior to use.
- D. Sanitary Facilities: Provide temporary toilets, wash facilities, and drinking water for use of construction personnel. Comply with requirements of authorities having jurisdiction for type, number, location, operation, and maintenance of fixtures and facilities.
1. Use of Owner's existing sanitary facilities will not be permitted.
 2. Toilets: Install self-contained toilet units. Shield toilets to ensure privacy. Use of pit-type privies will not be permitted.
 3. Provide toilet tissue, paper towels, paper cups and similar disposable materials for each facility. Provide covered waste containers for used materials.
 4. Wash Facilities: Install wash facilities supplied with potable water at convenient locations for personnel involved in handling materials that require wash-up for a healthy and sanitary condition. Dispose of drainage properly. Supply cleaning compounds appropriate for each condition.
 - a. Provide safety showers, eyewash fountains and similar facilities for convenience, safety and sanitation of personnel
 5. Drinking Water Fixtures: Provide drinking water fountains where indicated including paper supply.
 6. Drinking Water Facilities: Provide containerized tap-dispenser bottled-water type drinking water units, including paper supply.
 - a. Where power is accessible, provide electric water coolers to maintain dispensed water temperature at 45 to 55 deg F.
- E. Heating: Provide temporary heating required by construction activities for curing or drying of completed installations or for protecting installed construction from adverse effects of low temperatures or high humidity. Select equipment that will not have a harmful effect on completed installations or elements being installed.
1. Steam from the University's steam lines shall be metered and paid for by the Contractor at a rate of \$0/Therm. Contractor shall install and maintain temporary piping, radiators or unit heaters, reducing valves, steam traps and other necessary fittings and accessories. Traps shall be provided to prevent steam from entering main returns. The temporary layout shall meet the approval of the Architect/Engineer and University Representative. Condensate meter (or meters) shall be installed to record usage of steam. Provide temporary heat required by construction activities, for curing or drying of completed installations or protection of installed construction from adverse effects of low temperature or high humidity. Select safe equipment that will not have a harmful effect on completed installations or elements being installed. Coordinate ventilation requirements to produce the ambient condition required and minimize consumption of energy.
 2. The Contractor shall provide temporary heat during construction for interior areas included in the Contract, and any adjacent or nearby occupied areas, to counteract low temperatures or excessive dampness and in any event, between October 15th and May 15th, maintain during said period or periods until final completion of the Contract, unless otherwise approved by the University representative in writing. Provide heat and ventilation to maintain specified conditions for construction operations and to protect materials and finishes from damage by temperature or humidity. Costs shall be paid by the Contractor. Unless otherwise specified in the Contract Documents, the temporary heating shall be sized to maintain the following conditions on a 24-hour-per-day basis:
 - a. Occupied Dormitory or Living Areas: 68 degrees F
 - b. Office Spaces/Laboratories/Classrooms: 68 degrees F

- c. Warehouses/Storage: 55 degrees F
3. The areas listed above are for example only. The University Representative shall have sole discretion to assign minimum heating criteria.
- F. Electrical Power Service: Provide weatherproof, grounded electric power service and distribution system of sufficient size, capacity, and power characteristics during construction period. Include meters, transformers, overload protected disconnects, automatic ground-fault interrupters and main distribution switch gear.
 1. Except where overhead service must be used, install electric power service underground.
 2. Power Distribution System: Install wiring overhead, and rise vertically where least exposed to damage. Where permitted, wiring circuits not exceeding 125 volts, AC 20 ampere rating, and lighting circuits may be nonmetallic sheathed cable where overhead and exposed for surveillance
- G. Lighting: Whenever overhead floor or roof deck has been installed, provide temporary lighting with local switching.
 1. Install and operate temporary lighting that will fulfill security and protection requirements, without operating the entire system, and will provide adequate illumination for construction and traffic and safety conditions.
 2. Install exterior yard and sign lights so that signs are visible when Work is being performed.
- H. Telephones: Provide temporary or cellular telephone service for all personnel engaged in construction activities, throughout the construction period. Contractor shall arrange and pay for his own telephone service.
 1. Post or maintain within a project notebook a list of important telephone numbers.
 - a. Police and fire departments.
 - b. Ambulance service.
 - c. Contractor's home office.
 - d. Contractor's emergency after-hours telephone number.
 - e. Architect's office.
 - f. Engineers' offices.
 - g. University Representative office.
 - h. Principal subcontractors' field and home offices.
- I. Isolation of Work Areas in Occupied Facilities: Prevent dust, fumes, and odors from entering occupied areas.
 1. Prior to commencing work, isolate the HVAC system in area where work is to be performed according to coordination drawings.
 - a. Disconnect supply and return ductwork in work area from HVAC systems servicing occupied areas.
 - b. Maintain negative air pressure within work area using HEPA-equipped air-filtration units, starting with commencement of temporary partition construction, and continuing until removal of temporary partitions is complete.

2. Maintain dust partitions during the Work. Use vacuum collection attachments on dust-producing equipment. Isolate limited work within occupied areas using portable dust-containment devices.
 3. Perform daily construction cleanup and final cleanup using approved, HEPA-filter-equipped vacuum equipment.
- J. Ventilation and Humidity Control: Provide temporary ventilation required by construction activities for curing or drying of completed installations or for protecting installed construction from adverse effects of high humidity. Select equipment that will not have a harmful effect on completed installations or elements being installed. Coordinate ventilation requirements to produce ambient condition required and minimize energy consumption.
1. Provide dehumidification systems when required to reduce substrate moisture levels to level required to allow installation or application of finishes.
- K. Fire Protection: Until fire protection needs are supplied by permanent facilities, install and maintain temporary fire protection facilities of the types needed to protect against reasonably predictable and controllable fire losses. Comply with NFPA 10 “Standard for Portable Fire Extinguishers,” and NFPA 241 “Standard for Safeguarding Construction, Alterations and Demolition Operations.”
1. Locate fire extinguishers where convenient and effective for their intended purpose, but not less than one extinguisher on each floor at or near each usable stairwell.
 2. Store combustible materials in containers in fire-safe locations.
 3. Maintain unobstructed access to fire extinguishers, fire hydrants, temporary fire protection facilities, stairways and other access routes for fighting fires. Prohibit smoking in hazardous fire exposure areas.
 4. Provide supervision of all welding operations, combustion type temporary heating units, and similar sources of fire ignition.
 5. No gasoline shall be stored in or close to a building at any time.

3.3 SUPPORT FACILITIES INSTALLATION

- A. General: Comply with the following:
1. Provide construction for temporary offices, shops, and sheds located within construction area or within 30 feet of building lines that is noncombustible according to ASTM E 136. Comply with NFPA 241.
 2. Maintain support facilities until Architect schedules Substantial Completion inspection. Remove before Substantial Completion. Personnel remaining after Substantial Completion will be permitted to use permanent facilities, under conditions acceptable to Owner.
 3. Locate field offices, storage sheds, sanitary facilities and other temporary construction and support facilities for easy access.
- B. Field Offices and Sheds: A field office is not required for this project, however should the Contractor choose to provide a field office, see requirements below:
1. Provide non-combustible construction for offices, shops and sheds located within the construction area, or within 30 feet of building lines. Comply with requirements of NFPA 241.
 2. Field Offices: Provide insulate, weathertight temporary offices with electric lighting, air conditioning and heat and of sufficient size to accommodate required office personnel at the Project Site. The Field Office shall have two rooms, each approximately 150 square feet in size.

The offices shall have ample natural light, a heater of sufficient capacity to maintain 70 degrees F in winter and an air conditioner of sufficient capacity to maintain 75 degrees F in summer. No trailer will be allowed on University property unless permanent markings indicating the name of the company are clearly visible. Keep the office clean and orderly of use for small progress meetings. Furnish and equip offices with a minimum of the following:

- a. Furnish with desks and chairs, file cabinets, plan tables, plan racks, waste receptacles, conference room table and at least eight chairs.
- b. Equip with a water cooler and private toilet complete with water closet, lavatory and mirror-medicine cabinet unit.
- c. Equip with a 5 lb ABC fire extinguisher and an OSHA-approved first aid kit.
Equip with a facsimile machine and copier for use by the Contractor, University Representative and Architect/Enginner.

C. Temporary Roads and Paved Areas: Comply with the following:

1. The Contractor shall, under regulation prescribed by the University Representative, use only established roadways, or use temporary roadways constructed by the Contractor when and as authorized by the University Representative. When materials are transported in prosecuting the Work, vehicles shall not be loaded beyond the loading capacity recommended by the manufacturer of the vehicle or prescribed by any Federal, State, or local law or regulation. When it is necessary to cross curbs or sidewalks, the Contractor shall protect them from damage. The Contractor shall repair or pay for the repair of any damaged curbs, sidewalks, or roads.
2. Provide dust-control treatment that is nonpolluting and nontracking. Reapply treatment as required to minimize dust.
3. Construct and maintain temporary roads and paving to adequately support the indicated loading and to withstand exposure to traffic during the construction period. Locate temporary paving for roads, storage areas and parking where the same permanent facilities will be located. Review proposed modifications to permanent paving with the Architect.
 - a. Paving: Comply with Division-2 Section “Asphalt Concrete Paving” for construction and maintenance of temporary paving.
 - b. Coordinate temporary paving development with subgrade grading, compaction, installation and stabilization of subbase, and installation of base and finish courses of permanent paving.
 - c. Install temporary paving to minimize the need to rework the installations and to result in permanent roads and paved areas that are without damage or deterioration when occupied by the Owner
 - d. Delay installation of the final course of permanent asphalt concrete paving until immediately before Substantial Completion. Coordinate with weather conditions to avoid unsatisfactory results.
 - e. Extend temporary paving in and around the construction area as necessary to accommodate delivery and storage of materials, equipment usage, administration and supervision.

D. Temporary Use of Permanent Roads and Paved Areas: Locate temporary roads and paved areas in same location as permanent roads and paved areas. Construct and maintain temporary roads and paved areas adequate for construction operations. Extend temporary roads and paved areas, within construction limits indicated, as necessary for construction operations.

1. Coordinate elevations of temporary roads and paved areas with permanent roads and paved areas.
 2. Prepare subgrade and install subbase and base for temporary roads and paved areas according to Division 31 Section "Earth Moving."
 3. Recondition base after temporary use, including removing contaminated material, regrading, proofrolling, compacting, and testing.
 4. Delay installation of final course of permanent hot-mix asphalt pavement until immediately before Substantial Completion. Repair hot-mix asphalt base-course pavement before installation of final course according to Division 32 Section "Asphalt Paving."
 5. Maintain access for fire-fighting equipment and access to fire hydrants.
- E. Dewatering Facilities and Drains: Comply with requirements of authorities having jurisdiction. Maintain Project site, excavations, and construction free of water.
1. Dispose of rainwater in a lawful manner that will not result in flooding Project or adjoining properties or endanger permanent Work or temporary facilities.
 2. Remove snow and ice as required to minimize accumulations.
- F. Lifts and Hoists: Provide facilities necessary for hoisting materials and personnel.
1. Truck cranes and similar devices used for hoisting materials are considered "tools and equipment" and not temporary facilities.
- G. Temporary Elevator Use: The Contractor will be permitted to use the freight elevator for freight service and transportation of construction personnel during the construction period. This elevator must also be available to the Owner at all times; coordinate usage with the University Representative. At the end of construction, restore the elevator to its original condition; replace worn cables, guide shoes and similar items of limited life. Use of other elevators by the Contractor will not be permitted.
1. Do not load elevators beyond their rated weight capacity.
 2. Provide protective coverings, barriers, devices, signs, or other procedures to protect elevator car and entrance doors and frame. If, despite such protection, elevators become damaged, engage elevator Installer to restore damaged work so no evidence remains of correction work. Return items that cannot be refinished in field to the shop, make required repairs and refinish entire unit, or provide new units as required.
- H. Temporary Stairs: Until permanent stairs are available, provide temporary stairs where ladders are not adequate.
- I. Existing Stair Usage: Use of Owner's existing emergency stairs will be permitted, provided stairs are cleaned and maintained in a condition acceptable to Owner. At Substantial Completion, restore stairs to condition existing before initial use.
1. Provide protective coverings, barriers, devices, signs, or other procedures to protect stairs and to maintain means of egress. If stairs become damaged, restore damaged areas so no evidence remains of correction work.
- J. Temporary Use of Permanent Stairs: Use of new stairs for construction traffic will be permitted, provided stairs are protected and finishes restored to new condition at time of Substantial Completion.

3.4 SECURITY AND PROTECTION FACILITIES INSTALLATION

- A. Protection of Existing Facilities: Protect existing vegetation, equipment, structures, utilities, and other improvements at Project site and on adjacent properties, except those indicated to be removed or altered. Repair damage to existing facilities.
- B. Environmental Protection: Provide protection, operate temporary facilities, and conduct construction as required to comply with environmental regulations and that minimize possible air, waterway, and subsoil contamination or pollution or other undesirable effects.
 - 1. Comply with work restrictions specified in Division 01 Section "Summary."
- C. Temporary Erosion and Sedimentation Control: Comply with the latest requirements of EPA Construction General Permit or authorities having jurisdiction, whichever is more stringent and requirements specified in Division 31 Section "Site Clearing."
- D. Temporary Erosion and Sedimentation Control: Provide measures to prevent soil erosion and discharge of soil-bearing water runoff and airborne dust to undisturbed areas and to adjacent properties and walkways, according to requirements of the latest EPA Construction General Permit or authorities having jurisdiction, whichever is more stringent.
 - 1. Verify that flows of water redirected from construction areas or generated by construction activity do not enter or cross tree- or plant- protection zones.
 - 2. Inspect, repair, and maintain erosion and sedimentation-control measures during construction until permanent vegetation has been established.
 - 3. Clean, repair, and restore adjoining properties and roads affected by erosion and sedimentation from Project site during the course of Project.
 - 4. Remove erosion and sedimentation controls and restore and stabilize areas disturbed during removal.
- E. Stormwater Control: Comply with requirements of authorities having jurisdiction. Provide barriers in and around excavations and subgrade construction to prevent flooding by runoff of stormwater from heavy rains.
- F. Tree and Plant Protection: Comply with requirements specified in Division 01 Section "Temporary Tree and Plant Protection."
 - 1. Install temporary fencing located as indicated or outside the drip line of trees to protect vegetation from damage from construction operations. Protect tree root systems from damage, flooding, and erosion.
- G. Pest Control: Engage pest-control service to recommend practices to minimize attraction and harboring of rodents, roaches, and other pests and to perform extermination and control procedures at regular intervals so Project will be free of pests and their residues at Substantial Completion. Perform control operations lawfully, using environmentally safe materials.
- H. Site Enclosure Fence: Prior to commencing earthwork, furnish and install site enclosure fence in a manner that will prevent people and animals from easily entering site except by entrance gates. All fencing to have dark green reinforced scrim sheeting.

1. Extent of Fence: As required to enclose entire Project site or portion determined sufficient to accommodate construction operations or as indicated on Drawings.
 2. Maintain security by limiting number of keys and restricting distribution to authorized personnel.
 3. Contractor to install owner provided decorative banners on the exterior side of the site enclosure fencing as directed by owner's representative
- I. Security Enclosure and Lockup: Install temporary enclosure around partially completed areas of construction. Provide lockable entrances to prevent unauthorized entrance, vandalism, theft, and similar violations of security. Lock entrances at end of each work day.
- J. Barricades, Warning Signs, and Lights: Comply with requirements of authorities having jurisdiction for erecting structurally adequate barricades, including warning signs and lighting.
- K. Temporary Egress: Maintain temporary egress from existing occupied facilities at all times and as required by authorities having jurisdiction.
- L. Covered Walkway: Erect protective, covered walkway for passage of individuals through or adjacent to Project site. Coordinate with entrance gates, other facilities, and obstructions. Comply with regulations of authorities having jurisdiction and requirements indicated on Drawings.
1. Construct covered walkways using scaffold or shoring framing.
 2. Provide overhead decking, protective enclosure walls, handrails, barricades, warning signs, exit signs, lights, safe and well-drained walkways, and similar provisions for protection and safe passage.
 3. Where required by OSHA regulations provide temporary lighting under covered walkways to satisfy requirements.
 4. Covered walkways shall maintain a minimum clear height of 8ft above walking surface, and shall be designed to support all imposed loads and a minimum live load of 150 psf.
- M. Temporary Enclosures: Provide temporary enclosures for protection of construction, in progress and completed, from exposure, foul weather, other construction operations, and similar activities. Provide temporary weathertight enclosure for building exterior.
1. Where heating or cooling is needed and permanent enclosure is incomplete, insulate temporary enclosures.
- N. Temporary Partitions: Provide floor-to-ceiling dustproof partitions to limit dust and dirt migration and to separate areas occupied by Owner from fumes and noise.
1. Construct dustproof partitions with gypsum wallboard with joints taped on occupied side, and fire-retardant-treated plywood on construction operations side.
 2. Construct dustproof partitions with two layers of 6-mil polyethylene sheet on each side. Cover floor with two layers of 6-mil polyethylene sheet, extending sheets 18 inches up the sidewalls. Overlap and tape full length of joints. Cover floor with fire-retardant-treated plywood.
 - a. Construct vestibule and airlock at each entrance through temporary partition with not less than 48 inches between doors. Maintain water-dampened foot mats in vestibule.
 3. Where fire-resistance-rated temporary partitions are indicated or are required by authorities having jurisdiction, construct partitions according to the rated assemblies.
 4. Insulate partitions to control noise transmission to occupied areas.

5. Seal joints and perimeter. Equip partitions with gasketed dustproof doors and security locks where openings are required.
 6. Protect air-handling equipment.
 7. Provide walk-off mats at each entrance through temporary partition.
- O. Temporary Fire Protection: Install and maintain temporary fire-protection facilities of types needed to protect against reasonably predictable and controllable fire losses. Comply with NFPA 241; manage fire-prevention program.
1. Prohibit smoking in construction areas.
 2. Supervise welding operations, combustion-type temporary heating units, and similar sources of fire ignition according to requirements of authorities having jurisdiction.
 3. Develop and supervise an overall fire-prevention and -protection program for personnel at Project site. Review needs with University fire department and establish procedures to be followed. Instruct personnel in methods and procedures. Post warnings and information.
 4. Provide temporary standpipes and hoses for fire protection. Hang hoses with a warning sign stating that hoses are for fire-protection purposes only and are not to be removed. Match hose size with outlet size and equip with suitable nozzles.

3.5 MOISTURE AND MOLD CONTROL

- A. Contractor's Moisture-Protection Plan: Avoid trapping water in finished work. Document visible signs of mold that may appear during construction.
- B. Exposed Construction Phase: Before installation of weather barriers, when materials are subject to wetting and exposure and to airborne mold spores, protect as follows:
1. Protect porous materials from water damage.
 2. Protect stored and installed material from flowing or standing water.
 3. Keep porous and organic materials from coming into prolonged contact with concrete.
 4. Remove standing water from decks.
 5. Keep deck openings covered or dammed.
- C. Partially Enclosed Construction Phase: After installation of weather barriers but before full enclosure and conditioning of building, when installed materials are still subject to infiltration of moisture and ambient mold spores, protect as follows:
1. Do not load or install drywall or other porous materials or components, or items with high organic content, into partially enclosed building.
 2. Keep interior spaces reasonably clean and protected from water damage.
 3. Periodically collect and remove waste containing cellulose or other organic matter.
 4. Discard or replace water-damaged material.
 5. Do not install material that is wet.
 6. Discard, replace, or clean stored or installed material that begins to grow mold.
 7. Perform work in a sequence that allows any wet materials adequate time to dry before enclosing the material in drywall or other interior finishes.
- D. Controlled Construction Phase of Construction: After completing and sealing of the building enclosure but prior to the full operation of permanent HVAC systems, maintain as follows:

1. Control moisture and humidity inside building by maintaining effective dry-in conditions.
2. Use permanent HVAC system to control humidity.
3. Comply with manufacturer's written instructions for temperature, relative humidity, and exposure to water limits.
 - a. Hygroscopic materials that may support mold growth, including wood and gypsum-based products, that become wet during the course of construction and remain wet for 48 hours are considered defective.
 - b. Measure moisture content of materials that have been exposed to moisture during construction operations or after installation. Record readings beginning at time of exposure and continuing daily for 48 hours. Identify materials containing moisture levels higher than allowed. Report findings in writing to Architect.
 - c. Remove materials that cannot be completely restored to their manufactured moisture level within 48 hours.

3.6 TRAFFIC CONTROL

- A. Due to the large volume of pedestrian and vehicular traffic within the campus, it shall be the responsibility of the Contractor to provide continuous traffic accessibility to all areas of the campus.
- B. The Contractor shall comply with Connecticut Regulation 13b-17-28, Safety to Traffic, which requires that "When portions of the traveled way are made dangerous for the movement of vehicles or pedestrians, a sufficient number of uniformed police officers, flagmen, or traffic men, shall be employed by the permittee to direct traffic safely through the area."
- C. The requirement to maintain pedestrian and vehicular traffic is further defined in the Connecticut Department of Transportation Specifications Section 9.71, Form 814, which requirements are incorporated herein by reference.
- D. The Contractor may contact the University Police Department, Town of Mansfield Police Department, or other private sources to obtain the necessary manpower to comply with these regulations. The University Representative assigned to the given construction project shall be informed by the General Contractor of his traffic control procedures prior to the commencement of construction.

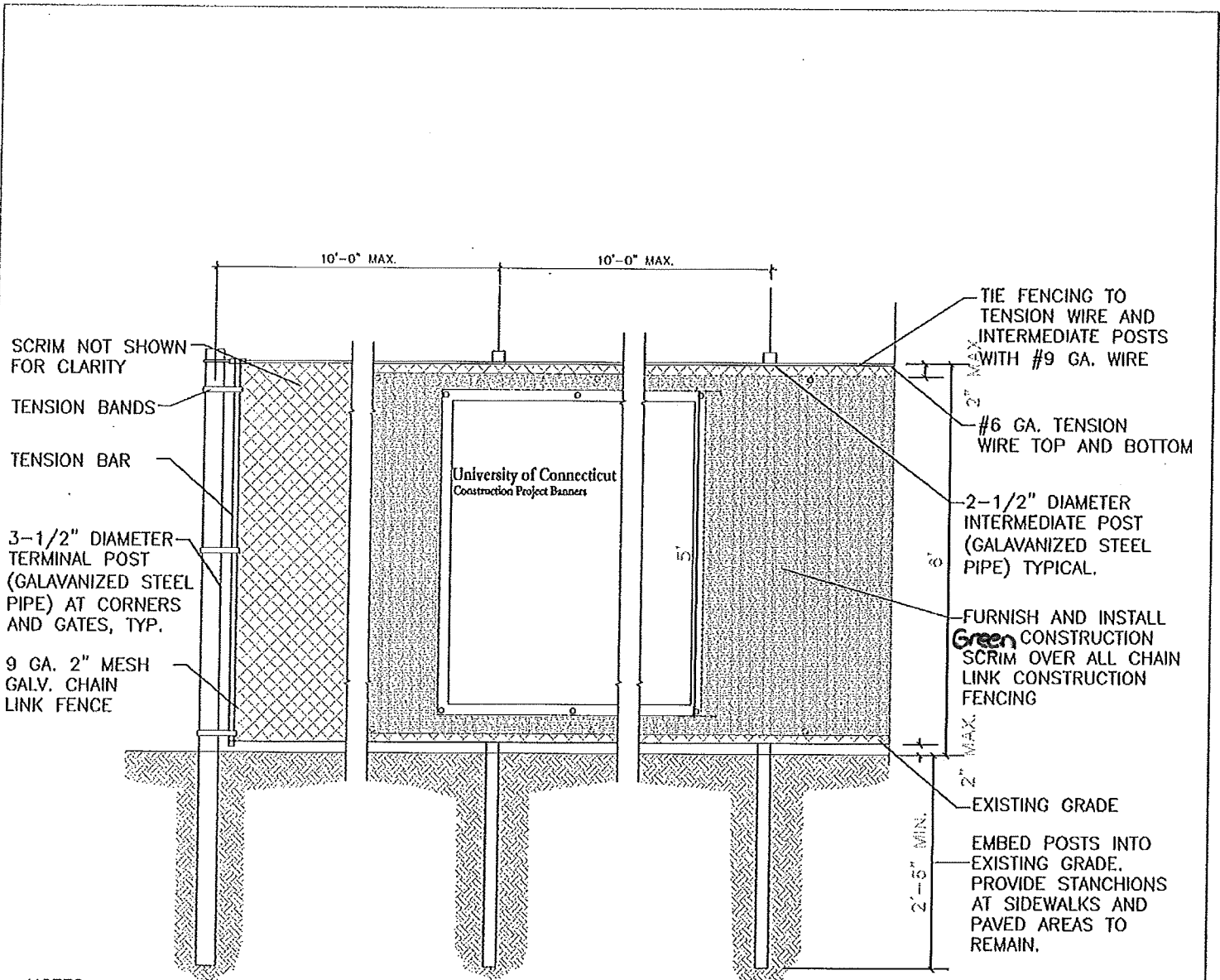
3.7 PROJECT IDENTIFICATION AND SIGNS

- A. Project Identification Signs: Provided and installed by the University.
 1. Decorative banners for the site enclosure fencing shall be provided by the Owner and installed by the Contractor.
- B. Temporary Signs: Prepare signs to provide directional information to construction personnel and visitors. Install signs where indicated to inform the public and persons seeking entrance to the Project. Support on posts or framing of preservative treated wood or steel. Do not permit installation of unauthorized signs.
- C. Other Signs: Any other signage shall be submitted to the University Representative for approval.

3.8 OPERATION, TERMINATION, AND REMOVAL

- A. Supervision: Enforce strict discipline in use of temporary facilities. To minimize waste and abuse, limit availability of temporary facilities to essential and intended uses.
- B. Maintenance: Maintain facilities in good operating condition until removal.
 - 1. Maintain operation of temporary enclosures, heating, cooling, humidity control, ventilation, and similar facilities on a 24-hour basis where required to achieve indicated results and to avoid possibility of damage.
 - 2. Prevent water filled piping from freezing. Maintain markers for underground lines. Protect from damage during excavation operations.
- C. Temporary Facility Changeover: Do not change over from using temporary security and protection facilities to permanent facilities until Substantial Completion.
- D. Termination and Removal: Unless the University Representative requests that it be maintained longer, remove each temporary facility when need for its service has ended, when it has been replaced by authorized use of a permanent facility, or no later than Substantial Completion. Complete or, if necessary, restore permanent construction that may have been delayed because of interference with temporary facility. Repair damaged Work, clean exposed surfaces, and replace construction that cannot be satisfactorily repaired.
 - 1. Materials and facilities that constitute temporary facilities are property of Contractor. Owner reserves right to take possession of Project identification signs.
 - 2. Remove temporary roads and paved areas not intended for or acceptable for integration into permanent construction. Where area is intended for landscape development, remove soil and aggregate fill that do not comply with requirements for fill or subsoil. Remove materials contaminated with road oil, asphalt and other petrochemical compounds, and other substances that might impair growth of plant materials or lawns. Repair or replace street paving, curbs, and sidewalks at temporary entrances, as required by authorities having jurisdiction.
 - 3. At Substantial Completion, repair, renovate, and clean permanent facilities used during construction period. Comply with final cleaning requirements specified in Division 01 Section "Closeout Procedures."
 - a. Replace air filters and clean inside of ductwork and housings.
 - b. Replace significantly worn parts and parts that have been subject to unusual operating conditions.
 - c. Replace lamps that are burned out or noticeably dimmed by substantial hours of use.
 - d. Restore all existing facilities and grounds used during construction to specified or to original condition.

END OF SECTION 01-5000



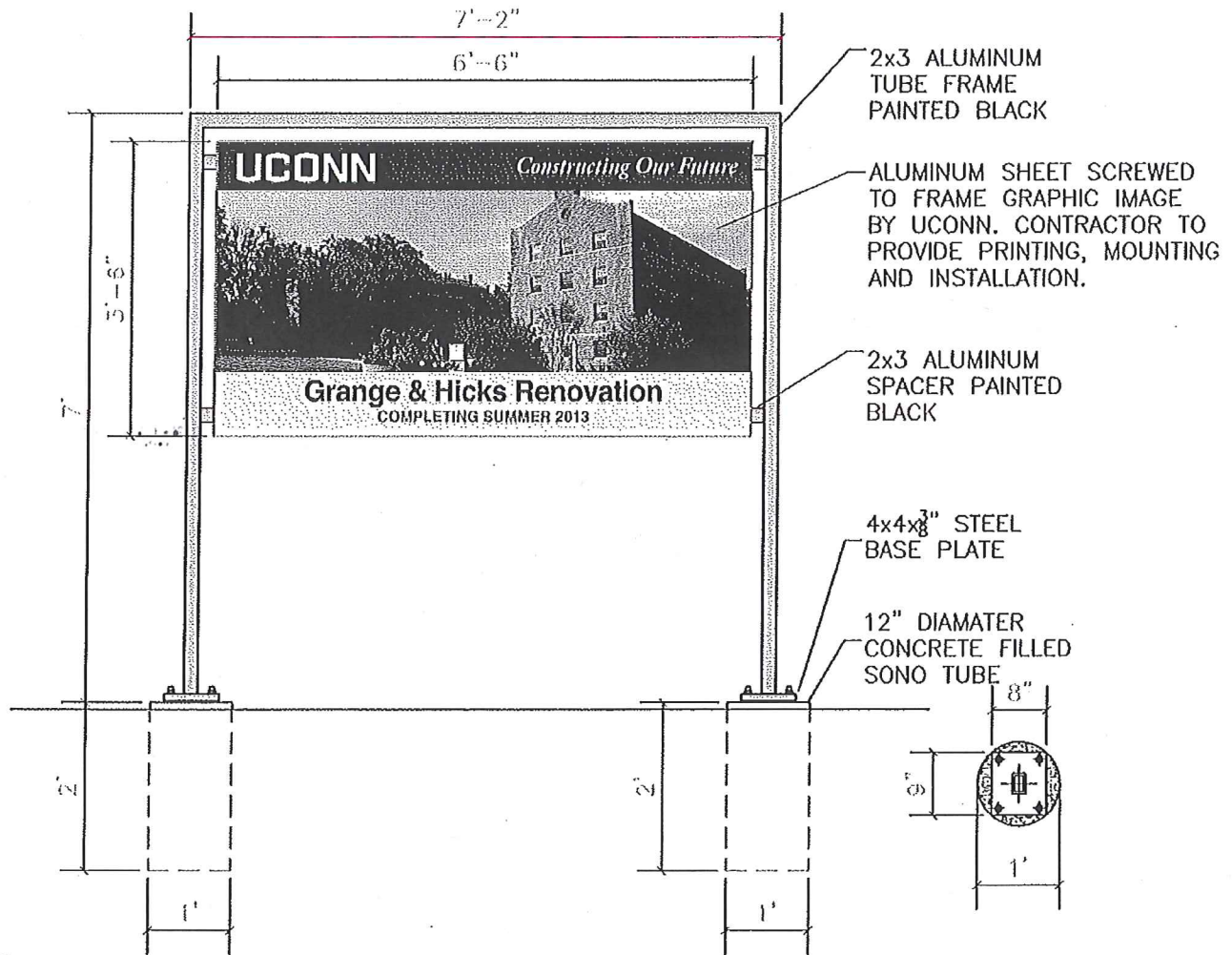
NOTES:

1. TEMPORARY CONSTRUCTION FENCING SHALL REMAIN THE PROPERTY OF THE CONTRACTOR AND SHALL BE REMOVED BY THE CONTRACTOR AT COMPLETION OF THE PROJECT.
2. REFER TO PRELIMINARY LOGISTICS PLAN FOR EXTENT OF CONSTRUCTION FENCING. CONTRACTOR SHALL SUBMIT A FINAL LOGISTICS PLAN FOR APPROVAL BY THE UNIVERSITY.
3. BANNERS SHALL BE FURNISHED BY UCONN AND INSTALLED BY THE CONTRACTOR.
4. REFER TO PRELIMINARY LOGISTICS PLAN FOR QUANTITY AND LOCATIONS OF BANNERS.
5. BANNERS SHALL BE 5'-0"X30'-0" UNLESS UNLESS NOTED OTHERWISE.
6. CONSTRUCTION SHALL NOT BEGIN ON SITE UNTIL SCRIM AND BANNERS HAVE BEEN INSTALLED.
7. INSTALLATION OF CHAIN LINK FENCING SHALL NOT BEGIN UNTIL SCRIM AND BANNERS ARE ON SITE READY TO INSTALL.
8. RETURN BANNERS TO UNIVERSITY'S DESIGNATED STORAGE LOCATION UPON COMPLETION OF PROJECT

UPDATED:
March 25, 2013

TITLE:
TEMPORARY CONSTRUCTION FENCING
NOT TO SCALE
FOR ALL CAMPUS PROJECTS WITH CONSTRUCTION FENCING

DRAWING:
FENCE



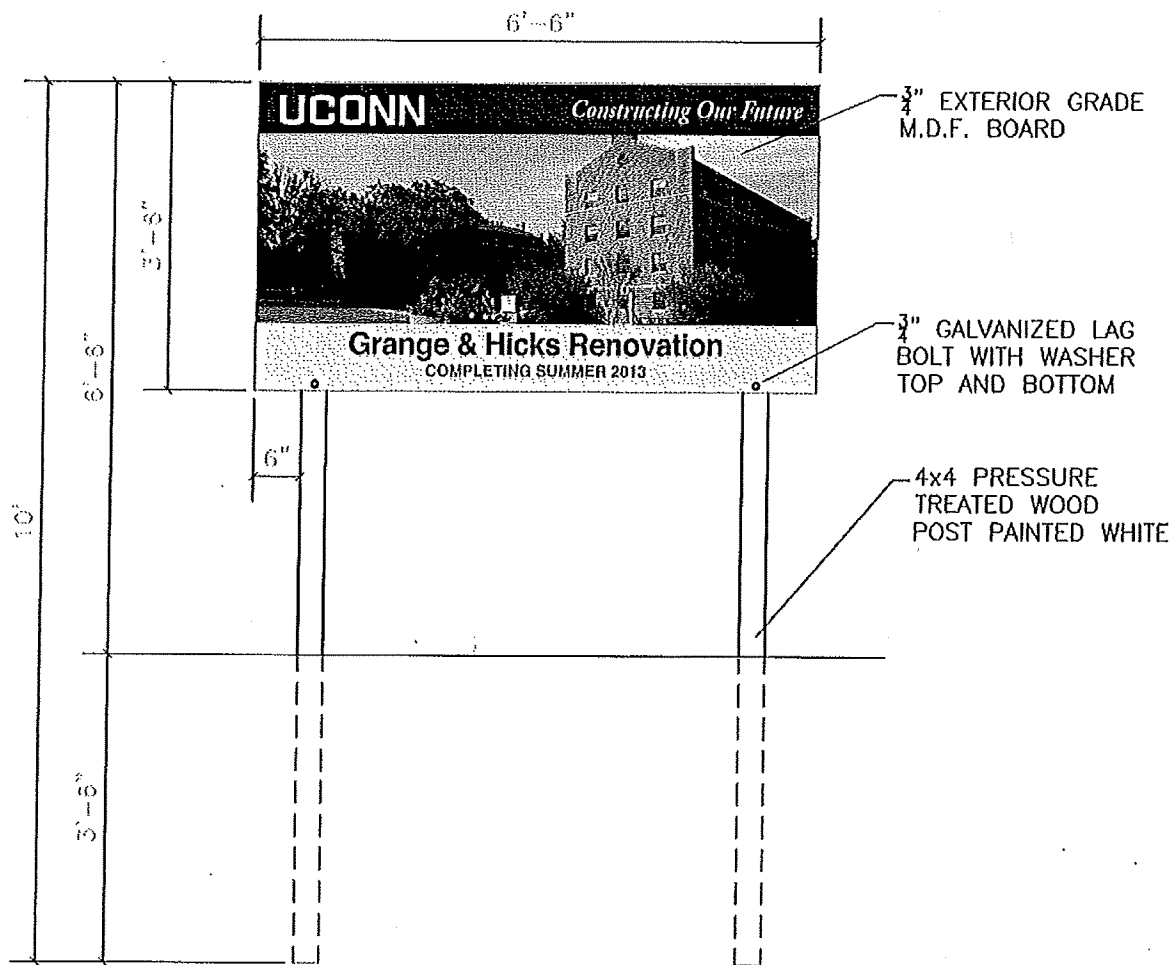
NOTES:

1. TEMPORARY CONSTRUCTION SIGNS SHALL REMAIN THE PROPERTY OF THE CONTRACTOR AND SHALL BE REMOVED BY THE CONTRACTOR AT COMPLETION OF THE PROJECT UNLESS NOTED OTHERWISE.
2. REFER TO PRELIMINARY LOGISTICS PLAN FOR LOCATION OF CONSTRUCTION SIGNS. CONTRACTOR SHALL SUBMIT A FINAL LOGISTICS PLAN FOR APPROVAL BY THE UNIVERSITY.
3. CONSTRUCTION SHALL NOT BEGIN ON SITE UNTIL PROJECT SIGNS HAVE BEEN INSTALLED.

UPDATED:
March 25, 2013

TITLE:
TEMPORARY CONSTRUCTION SIGN
NOT TO SCALE
FOR ALL CAMPUS PROJECTS WITH CONSTRUCTION DURATION MORE THAN 6 MONTHS

DRAWING:
SIGN 1



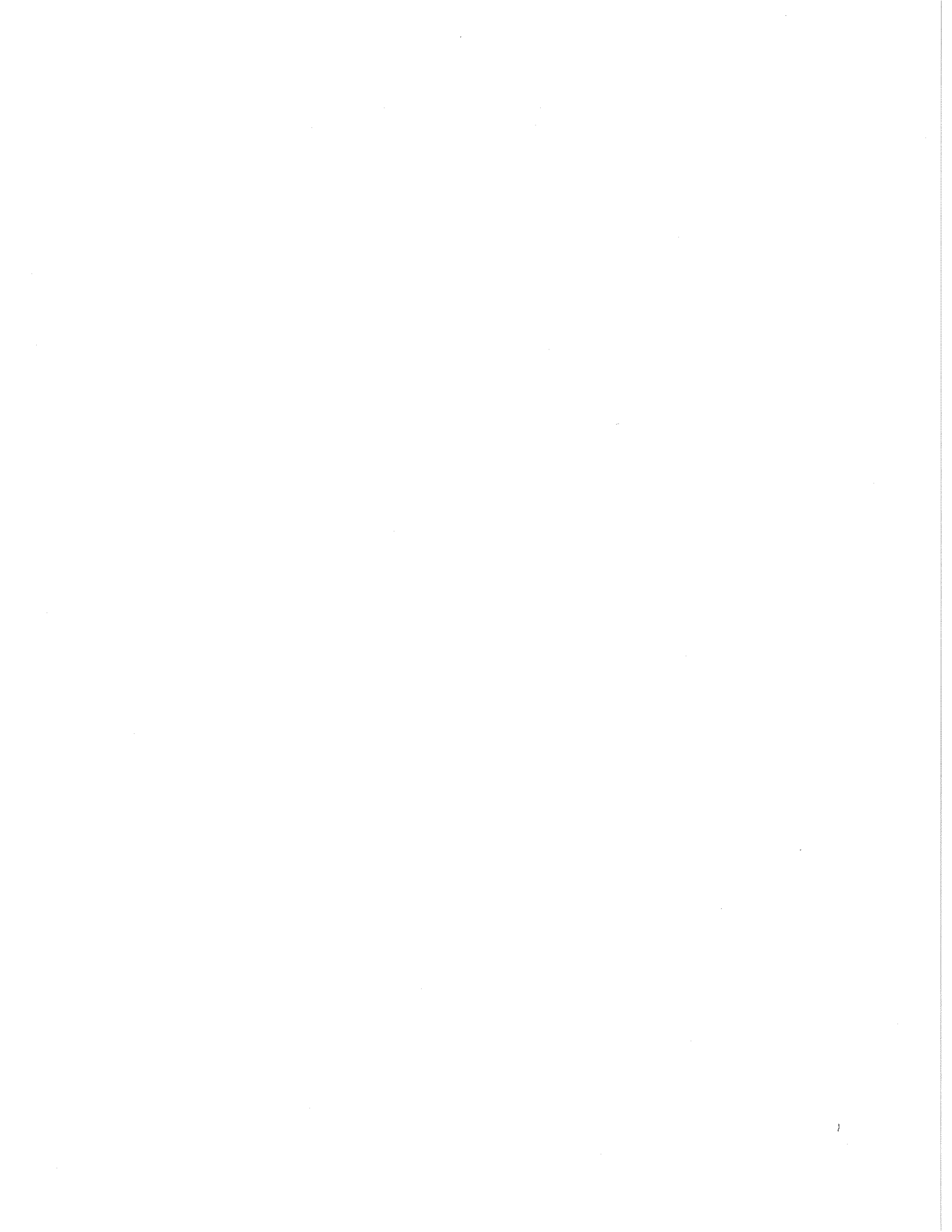
NOTES:

1. TEMPORARY CONSTRUCTION SIGNS SHALL REMAIN THE PROPERTY OF THE CONTRACTOR AND SHALL BE REMOVED BY THE CONTRACTOR AT COMPLETION OF THE PROJECT UNLESS NOTED OTHERWISE.
2. REFER TO PRELIMINARY LOGISTICS PLAN FOR LOCATION OF CONSTRUCTION SIGNS. CONTRACTOR SHALL SUBMIT A FINAL LOGISTICS PLAN FOR APPROVAL BY THE UNIVERSITY.
3. CONSTRUCTION SHALL NOT BEGIN ON SITE UNTIL PROJECT SIGNS HAVE BEEN INSTALLED.

UPDATED:
March 25, 2013

TITLE:
TEMPORARY CONSTRUCTION SIGN
NOT TO SCALE
FOR ALL CAMPUS PROJECTS WITH CONSTRUCTION DURATION LESS THAN 6 MONTHS

DRAWING:
SIGN 2



SECTION 01-5639 - TEMPORARY TREE AND PLANT PROTECTION

PART 1 - GENERAL

1.1 RELATED DOCUMENTS

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

1.2 SUMMARY

- A. Section includes general protection and pruning of existing trees and plants that are affected by execution of the Work, whether temporary or permanent construction. Tree and plant protection shall include, but not be limited to:
 - 1. Tree protection fencing
 - 2. Root pruning
 - 3. Wood chip mulching of selected trees
 - 4. All other tree and plant protection indicated
- B. Related Sections:
 - 1. Division 01 Section "Temporary Facilities and Controls" for temporary site fencing.
 - 2. Division 2 Section "Clearing and Grubbing" for removing existing trees and shrubs.

1.3 DEFINITIONS

- A. Caliper: Diameter of a trunk measured by a diameter tape at 6 inches (150 mm) above the ground for trees up to, and including, 4-inch (100-mm) size; and 12 inches (300 mm) above the ground for trees larger than 4-inch (100-mm) size.
- B. Plant-Protection Zone: Area surrounding individual trees, groups of trees, shrubs, or other vegetation to be protected during construction, and indicated on Drawings.
- C. Vegetation: Trees, shrubs, groundcovers, grass, and other plants.

1.4 SUBMITTALS

- A. Product Data: For each type of product indicated.
- B. Samples for Verification: For each type of the following:
 - 1. Organic Mulch: 1-quart (1-L) volume of organic mulch; in sealed plastic bags labeled with composition of materials by percentage of weight and source of mulch.
 - 2. Protection-Zone Signage: Full-size Samples of each size and text, ready for installation.

- C. Proposed methods, materials, and schedule for effecting tree and plant protection shall be submitted for approval.
- D. Proposed methods, materials, and schedule for root pruning and tree fertilization shall be submitted for approval.
- E. Certifications: Submit appropriate evidence of certification of all arborists to be employed on the Project.
- F. Licenses: Submit appropriate evidence of licensing of all chemical applicators to be employed on the Project.
- G. MSDS: Submit Material Safety Data Sheets (MSDS) of all chemicals to be applied on the Project.
- H. Existing Conditions: Documentation of existing trees and plantings indicated to remain, which establishes preconstruction conditions that might be misconstrued as damage caused by construction activities.
 - 1. Use sufficiently detailed photographs or videotape.
 - 2. Include plans and notations to indicate specific wounds and damage conditions of each tree or other plants designated to remain.

1.5 QUALITY ASSURANCE

- A. Work of root pruning, fertilizing, spraying, and similar activities shall be undertaken only by certified Arborists and chemical applicators, as pertinent to the work being performed.
- B. Arborist Qualifications: Certified Arborist as certified by ISA
- C. Application of chemicals shall be performed by licensed chemical applicators.
- D. Tree Service Firm Qualifications: An experienced tree service firm that has successfully completed temporary tree and plant protection work similar to that required for this Project and that will assign an experienced, qualified arborist to Project site during execution of the Work.
- E. Preconstruction Conference: Before the start of any work on the site, preceding the arrival of equipment, materials or vehicles to the site, and prior to the commencement of any clearing on the site, the Contractor shall arrange a preconstruction conference on the site with the University Representative to identify trees and shrubs that are to be protected or removed. Do no clearing without a clear understanding of existing conditions to be preserved. In addition to the responsibilities and penalties described in this Part of the Specification, the Contractor shall be held responsible for any and all clearing, damage or destruction to plant material that results from the Contractor's failure to schedule and attend the preconstruction conference on site. In the event of said clearing, damage or destruction the Contractor will be assessed the full penalties described in this section.
 - 1. Review methods and procedures related to temporary tree and plant protection including, but not limited to, the following:
 - a. Construction schedule. Verify availability of materials, personnel, and equipment needed to make progress and avoid delays.
 - b. Enforcing requirements for protection zones.
 - c. Arborist's responsibilities.
 - d. Field quality control.

1.6 PROJECT CONDITIONS

- A. The following practices are prohibited within protection zones:
 - 1. Storage of construction materials, debris, or excavated material.
 - 2. Parking vehicles or equipment.
 - 3. Foot traffic.
 - 4. Erection of sheds or structures.
 - 5. Impoundment of water.
 - 6. Excavation or other digging unless otherwise indicated.
 - 7. Attachment of signs to or wrapping materials around trees or plants unless otherwise indicated.
- B. Do not direct vehicle or equipment exhaust toward protection zones.
- C. Prohibit heat sources, flames, ignition sources, and smoking within or near protection zones and organic mulch.

1.7 LIABILITY FOR DAMAGES

- A. The Contractor shall be liable for all damage and/or disturbance to existing trees and shrubs not otherwise designated for removal. For bidding and general work guidelines prior to on-site tree protection conference, the Contractor shall assume all trees within the Limit of Work shall be saved unless specifically designated to be removed on the Plans. Actual charges for damage to plants shall be in accordance with the schedules defined herein, with assessed charges to be deducted from sums payable under the Construction Contract.
 - 1. Damage which, in the Owner's Opinion can be remedied by corrective maintenance shall be repaired immediately.
 - 2. Trees or shrubs which are damaged irreparably shall, at the Owner's discretion, be replaced by the Contractor with new trees or shrubs of the same size and type.
 - 3. In the event that replacement of damaged trees is not feasible or impractical as determined by the Owner, the full replacement costs will be assessed to the Contractor's account at values based upon the square inches of cross sectional area of trunk (measured at 4 ft. above grade), in accordance with the Trunk Formula Method described in the ISA Guide described herein, and the following table:
 - \$95.00/square inch for trees < or = 6 inch diameter
 - \$70.00/square inch for trees > 6 inch & < 18 inch diameter
 - \$60.00/square inch for trees > or = to 18 inch diameter
- B. Damaged trees or shrubs which require removal and/or replacement shall be removed according to the Specification requirements for removals, including refilling and repair of ground surface, with such costs to be borne by the Contractor in addition to assessed charges described herein.
- C. The Contractor shall be liable for all damage and disturbance to existing adjacent lands beyond the Limit of Work. Actual damage to these areas, caused by the Contractor, shall be repaired to the satisfaction of the Owner, at no additional cost to the University. Repairs may include pruning or removing damaged vegetation as specified, replacement of damaged vegetation, restoration of the ground plane to its original condition, and any other work required to restore the area to its original condition as depicted in the site

photographs taken at the beginning of construction. The project will not be accepted until all repair work is complete.

PART 2 - PRODUCTS

2.1 TREE PROTECTION FENCING

- A. Tree protection fencing shall be equal to the following:
 - 1. Galvanized chain link fencing with 2 in. mesh, II gauge minimum, and nominal 2-1/2 in. diameter posts.
 - 2. Posts for fencing shall be galvanized steel posts, driven a minimum of 3 ft. into the ground. Posts shall be spaced 10ft. o.c. maximum.
 - 3. Unless otherwise indicated, height of fencing shall be 6 ft.
- B. Tree protection fence is not to be substituted for construction security fencing.
- C. Protection-Zone Signage: Plastic laminated 8 1/2" x 11" paper signage secured to the protection fence:
 - 1. Use Owner provide PDF file.

2.2 WOOD CHIP MULCH

- A. Wood chips for mulching trees for the duration of the Construction Contract may be either hardwood or softwood chips as produced by a chipping machine, which meet the specified requirements. Leaves, young green growth, branches, twigs 2 inches or less in diameter, wood shavings, sawdust and other extraneous materials produced in the course of chipping operations are acceptable components. Chips shall not exceed 2 inches in greatest dimension. Submit samples for the Owner's Representative's approval.

2.3 FERTILIZERS

- A. Fertilizer shall be a commercial product complying with the State and United States fertilizer laws. Deliver to the site in the original unopened containers that shall bear the manufacturer's certificate of compliance covering analysis. Liquid fertilizer for subsurface hydraulic injection to correct soil nutrient deficiencies shall be a product meeting the requirements of ANSI 300 and as modified by this paragraph. Liquid fertilizer shall include a slow release form of nitrogen (50% of N to be water insoluble), phosphorus and potassium; shall be chloride free; shall have a low salt content; and shall have a wetting agent to aid with dispersion. Fertilizer shall contain required micronutrients established by soil test analysis.

PART 3 - EXECUTION

3.1 EXAMINATION

- A. Erosion and Sedimentation Control: Examine the site to verify that temporary erosion and sedimentation control measures are in place. Verify that flows of water redirected from construction areas or generated by construction activity do not enter or cross protection zones.
- B. For the record, prepare written report, endorsed by arborist, listing conditions detrimental to tree and plant protection.

3.2 IDENTIFICATION OF TREES TO REMAIN

- A. Prior to starting site clearing operations, stake out all areas of trees to be saved as noted on the Contract Documents for approval by the Owner.
- B. Before any clearing is done, the Contractor shall arrange a conference on the site with the Owner to identify trees that are to be protected or removed. Do no clearing without clear an understanding of existing conditions to be preserved.
- C. The Contractor shall be responsible for the protection of all existing trees and plants designated to remain for the length of the construction period, including liability for all damages as specified herein. The placement of protection devices additional to those specified shall, however, be at the Contractor's discretion and with no additional cost to the University.

3.3 PROTECTION OF EXISTING TREES

- A. The Contractor shall make every effort not to damage existing trees. The Contractor is required to install protection as necessary to assure undamaged plant material and adjacent conditions.
- B. Plants as designated to remain shall be protected by the placement of a tree protection fence enclosure at the drip line of each tree and as directed by the Owner. Place tree protection additionally at all other locations where trees may be jeopardized by construction activities. Tree protection fencing shall be supported with specified stakes at maximum 5 ft. on center intervals.
- C. Tree protection shall remain in place and be maintained in working condition by the Contractor until directed for removal by the Owner. All tree protection devices shall be removed from the site by the Contractor at the completion of the work.
- D. Damage no plants to remain by burning, by pumping of water, by cutting of live roots or branches, or by any other means. No plants to be saved shall be used for crane stays, guys or other fastenings. Vehicles shall not be parked within the dripline or where damage may result to trees to be saved. Construction materials shall not be stored beneath trees to be saved.
- E. Establish and carry out maintenance program as approved by the Owner for all trees and plants to be saved within the work limits throughout the time of construction. As a minimum, the maintenance program shall include the following:
 - 1. Watering during drought periods.

2. Regular fertilizing.
3. Spraying for insect and fungus control as required.
4. Pruning of all broken, dead, diseased or weak branches as specified.
5. Removal and disposal of debris generated by maintenance activities.

F. Within the tree protection fencing spread a 3 inch layer of wood chip mulch. Maintain depth of mulch throughout the duration of the construction contract and remove immediately prior to placement of planting soils and follow-on lawn seeding operations. Do not mulch within 6 inches of tree trunks.

3.4 INSTALLATION OF TREE AND PLANT PROTECTION FENCING

A. Protection-Zone Fencing: Install protection-zone fencing along edges of protection zones before materials or equipment are brought on the site and construction operations begin in a manner that will prevent people from easily entering protected area except by entrance gates. Construct fencing so as not to obstruct safe passage or visibility at vehicle intersections where fencing is located adjacent to pedestrian walkways or in close proximity to street intersections, drives, or other vehicular circulation.

1. Chain-Link Fencing: Install to comply with ASTM F 567 and with manufacturer's written instructions.
2. Posts: Set or drive posts into ground one-third the total height of the fence without concrete footings. Where a post is located on existing paving or concrete to remain, provide appropriate means of post support acceptable to Owner.
3. Access Gates: Install where indicated, adjust to operate smoothly, easily, and quietly, free of binding, warp, excessive deflection, distortion, nonalignment, misplacement, disruption, or malfunction, throughout entire operational range. Confirm that latches and locks engage accurately and securely without forcing or binding.

B. Protection-Zone Signage: Install protection-zone signage in visibly prominent locations in a manner approved by Owner. Install one sign spaced approximately every 20 feet on protection-zone fencing, but no fewer than four signs with each facing a different direction.

C. Maintain protection zones free of weeds and trash.

D. Repair or replace trees, shrubs, and other vegetation indicated to remain or be relocated that are damaged by construction operations, in a manner approved by Owner.

E. Maintain protection-zone fencing and signage in good condition as acceptable to Owner and remove when construction operations are complete and equipment has been removed from the site.

1. Do not remove protection-zone fencing, even temporarily, to allow deliveries or equipment access through the protection zone.
2. Temporary access is permitted subject to preapproval in writing by arborist if a root buffer effective against soil compaction is constructed as directed by arborist. Maintain root buffer so long as access is permitted.

3.5 EXCAVATION

A. General: Excavate at edge of protection zones and for trenches indicated within protection zones according to requirements in Division 31 Section "Earth Moving."

- B. Trenching near Trees: Where utility trenches are required within protection zones, hand excavate under or around tree roots or tunnel under the roots by drilling, auger boring, or pipe jacking. Do not cut main lateral tree roots or taproots; cut only smaller roots that interfere with installation of utilities. Cut roots as required for root pruning.
- C. Redirect roots in backfill areas where possible. If encountering large, main lateral roots, expose roots beyond excavation limits as required to bend and redirect them without breaking. If encountered immediately adjacent to location of new construction and redirection is not practical, cut roots approximately 3 inches (75 mm) back from new construction and as required for root pruning.
- D. Do not allow exposed roots to dry out before placing permanent backfill. Provide temporary earth cover or pack with peat moss and wrap with burlap. Water and maintain in a moist condition. Temporarily support and protect roots from damage until they are permanently relocated and covered with soil.

3.6 ROOT PRUNING

- A. Prune roots that are affected by temporary and permanent construction. Root pruning to be performed under the supervision of a certified arborist. Prune roots as shown on Drawings and as follows:
 - 1. Cut roots manually by digging a trench and cutting exposed roots with sharp pruning instruments; do not break, tear, chop, or slant the cuts. Do not use a backhoe or other equipment that rips, tears, or pulls roots.
 - 2. Temporarily support and protect roots from damage until they are permanently redirected and covered with soil.
 - 3. Cover exposed roots with burlap and water regularly.
 - 4. Backfill as soon as possible according to requirements in Division 31 Section "Earth Moving."
- B. Root Pruning at Edge of Protection Zone: Prune roots 12 inches (300 mm) outside of the protection zone, by cleanly cutting all roots to the depth of the required excavation.
- C. Root Pruning within Protection Zone: Clear and excavate by hand to the depth of the required excavation to minimize damage to root systems. Use narrow-tine spading forks, comb soil to expose roots, and cleanly cut roots as close to excavation as possible.

3.7 CROWN PRUNING

- A. Prune branches that are affected by temporary and permanent construction. Prune branches as shown on Drawings and as follows:
 - 1. Prune trees to remain to compensate for root loss caused by damaging or cutting root system. Provide subsequent maintenance during Contract period as recommended by arborist.
 - 2. Pruning Standards: Prune trees according to ANSI A300 (Part 1)
 - 3. Cut branches with sharp pruning instruments; do not break or chop.
 - 4. Do not apply pruning paint to wounds.
 - 5. Pruning to be performed by certified arborist.
- B. Chip removed branches and dispose of off-site.

3.8 REGRADING

- A. Lowering Grade: Where new finish grade is indicated below existing grade around trees, slope grade beyond the protection zone. Maintain existing grades within the protection zone.
- B. Lowering Grade within Protection Zone: Where new finish grade is indicated below existing grade around trees, slope grade away from trees as recommended by arborist unless otherwise indicated.
 - 1. Root Pruning: Prune tree roots exposed by lowering the grade. Do not cut main lateral roots or taproots; cut only smaller roots. Cut roots as required for root pruning.
- C. Raising Grade: Where new finish grade is indicated above existing grade around trees, slope grade beyond the protection zone. Maintain existing grades within the protection zone.
- D. Minor Fill within Protection Zone: Where existing grade is 2 inches (50 mm) or less below elevation of finish grade, fill with topsoil. Place topsoil in a single uncompacted layer and hand grade to required finish elevations.

3.9 FIELD QUALITY CONTROL

- A. Inspections: Engage a qualified arborist to direct plant-protection measures in the vicinity of trees, shrubs, and other vegetation indicated to remain and to prepare inspection reports.

3.10 REPAIR AND REPLACEMENT

- A. General: Repair or replace trees, shrubs, and other vegetation indicated to remain or be relocated that are damaged by construction operations, in a manner approved by Owner.
 - 1. Submit details of proposed root cutting and tree and shrub repairs.
 - 2. Have arborist perform the root cutting, branch pruning, and damage repair of trees and shrubs.
 - 3. Treat damaged trunks, limbs, and roots according to arborist's written instructions.
 - 4. Perform repairs within 24 hours.
 - 5. Replace vegetation that cannot be repaired and restored to full-growth status, as determined by Owner.
- B. Trees: Remove and replace trees indicated to remain that are more than 50 percent dead or in an unhealthy condition or are damaged during construction operations that Owner determines are incapable of restoring to normal growth pattern.
 - 1. Provide new trees of same size and species as those being replaced for each tree that measures 6 inches (150 mm) > or smaller in caliper size.
 - 2. Provide one new tree of 6-inch (150-mm) caliper size for each tree being replaced that measures more than 6 inches (150 mm) in caliper size.
 - 3. Plant and maintain new trees as specified in Division 32 Section "Plants."
- C. Soil Aeration: Where directed by Owner, aerate surface soil compacted during construction. Aerate 10 feet (3 m) beyond drip line and no closer than 36 inches (900 mm) to tree trunk. Drill 2-inch- (50-mm-)

diameter holes a minimum of 12 inches (300 mm) deep at 24 inches (600 mm) o.c. Backfill holes with an equal mix of augered soil and sand.

3.11 DISPOSAL OF SURPLUS AND WASTE MATERIALS

- A. Disposal: Remove excess excavated material, displaced trees, trash and debris, and legally dispose of them off Owner's property.

END OF SECTION 015639

SECTION 01-5719 - TEMPORARY ENVIRONMENTAL CONTROLS

PART 1 - GENERAL

1.1 DESCRIPTION

- A. This section specifies the control of environmental pollution and damage that the Contractor must consider for air, water, and land resources. It includes management of visual aesthetics, noise, solid waste, radiant energy, and radioactive materials, as well as other pollutants and resources encountered or generated by the Contractor. The Contractor is obligated to consider specified control measures with the costs included within the various contract items of work.
- B. Environmental pollution and damage is defined as the presence of chemical, physical, or biological elements or agents which:
1. Adversely effect human health or welfare,
 2. Unfavorably alter ecological balances of importance to human life,
 3. Effect other species of importance to humankind, or;
 4. Degrade the utility of the environment for aesthetic, cultural, and historical purposes.
- C. Definitions of Pollutants:
1. Chemical Waste: Petroleum products, bituminous materials, salts, acids, alkalis, herbicides, pesticides, organic chemicals, and inorganic wastes.
 2. Debris: Combustible and noncombustible wastes, such as leaves, tree trimmings, ashes, and waste materials resulting from construction or maintenance and repair work.
 3. Sediment: Soil and other debris that has been eroded and transported by runoff water.
 4. Solid Waste: Rubbish, debris, garbage, and other discarded solid materials resulting from industrial, commercial, and agricultural operations and from community activities.
 5. Surface Discharge: The term "Surface Discharge" implies that the water is discharged with possible sheeting action and subsequent soil erosion may occur. Waters that are surface discharged may terminate in drainage ditches, storm sewers, creeks, and/or "water of the United States" and would require a permit to discharge water from the governing agency.
 6. Rubbish: Combustible and noncombustible wastes such as paper, boxes, glass and crockery, metal and lumber scrap, tin cans, and bones.
 7. Sanitary Wastes:
 - a. Sewage: Domestic sanitary sewage and human and animal waste.
 - b. Garbage: Refuse and scraps resulting from preparation, cooking, dispensing, and consumption of food.

1.2 QUALITY CONTROL

- A. Establish and maintain quality control for the environmental protection of all items set forth herein.
- B. Record on daily reports any problems in complying with laws, regulations, and ordinances. Note any corrective action taken.

1.3 REFERENCES

- A. The publications listed below form a part of this specification to the extent referenced. The publications are referred to in the text by basic designation only.
- B. U.S. National Archives and Records Administration (NARA): 33 CFR 328 Definitions

1.4 SUBMITTALS

- A. In accordance with Section, 01 33 23, SHOP DRAWINGS, PRODUCT DATA, AND SAMPLES, furnish the following:
 - 1. Environmental Protection Plan: After the contract is awarded and prior to the commencement of the work, the Contractor shall meet with the Resident Engineer to discuss the proposed Environmental Protection Plan and to develop mutual understanding relative to details of environmental protection. Not more than 20 days after the meeting, the Contractor shall prepare and submit to the Resident Engineer // and the Contracting Officer // for approval, a written and/or graphic Environmental Protection Plan including, but not limited to, the following:
 - a. Name(s) of person(s) within the Contractor's organization who is (are) responsible for ensuring adherence to the Environmental Protection Plan.
 - b. Name(s) and qualifications of person(s) responsible for manifesting hazardous waste to be removed from the site.
 - c. Name(s) and qualifications of person(s) responsible for training the Contractor's environmental protection personnel.
 - d. Description of the Contractor's environmental protection personnel training program.
 - e. A list of Federal, State, and local laws, regulations, and permits concerning environmental protection, pollution control, noise control and abatement that are applicable to the Contractor's proposed operations and the requirements imposed by those laws, regulations, and permits.
 - f. Methods for protection of features to be preserved within authorized work areas including trees, shrubs, vines, grasses, ground cover, landscape features, air and water quality, fish and wildlife, soil, historical, and archeological and cultural resources.
 - g. Procedures to provide the environmental protection that comply with the applicable laws and regulations. Describe the procedures to correct pollution of the environment due to accident, natural causes, or failure to follow the procedures as described in the Environmental Protection Plan.
 - h. Permits, licenses, and the location of the solid waste disposal area.
 - i. Drawings showing locations of any proposed temporary excavations or embankments for haul roads, // stream crossings, // material storage areas, structures, sanitary facilities, and stockpiles of excess or spoil materials. Include as part of an Erosion Control Plan approved by the District Office of the U.S. Soil Conservation Service and the Department of Veterans Affairs.
 - j. Environmental Monitoring Plans for the job site including land, water, air, and noise.
 - k. Work Area Plan showing the proposed activity in each portion of the area and identifying the areas of limited use or nonuse. Plan should include measures for marking the limits of use areas. This plan may be incorporated within the Erosion Control Plan.
- B. Approval of the Contractor's Environmental Protection Plan will not relieve the Contractor of responsibility for adequate and continued control of pollutants and other environmental protection measures.

1.5 PROTECTION OF ENVIRONMENTAL RESOURCES

- A. Protect environmental resources within the project boundaries and those affected outside the limits of permanent work during the entire period of this contract. Confine activities to areas defined by the specifications and drawings.
- B. Protection of Land Resources: Prior to construction, identify all land resources to be preserved within the work area. Do not remove, cut, deface, injure, or destroy land resources including trees, shrubs, vines, grasses, top soil, and land forms without permission from the Resident Engineer. Do not fasten or attach ropes, cables, or guys to trees for anchorage unless specifically authorized, or where special emergency use is permitted.
1. Work Area Limits: Prior to any construction, mark the areas that require work to be performed under this contract. Mark or fence isolated areas within the general work area that are to be saved and protected. Protect monuments, works of art, and markers before construction operations begin. Convey to all personnel the purpose of marking and protecting all necessary objects.
 2. Protection of Landscape: Protect trees, shrubs, vines, grasses, land forms, and other landscape features shown on the drawings to be preserved by marking, fencing, or using any other approved techniques.
 - a. Box and protect from damage existing trees and shrubs to remain on the construction site.
 - b. Immediately repair all damage to existing trees and shrubs by trimming, cleaning, and painting with antiseptic tree paint.
 - c. Do not store building materials or perform construction activities closer to existing trees or shrubs than the farthest extension of their limbs.
 3. Reduction of Exposure of Unprotected Erodible Soils: Plan and conduct earthwork to minimize the duration of exposure of unprotected soils. Clear areas in reasonably sized increments only as needed to use. Form earthwork to final grade as shown. Immediately protect side slopes and back slopes upon completion of rough grading.
 4. Temporary Protection of Disturbed Areas: Construct diversion ditches, benches, and berms to retard and divert runoff from the construction site to protected drainage areas approved under paragraph 208 of the Clean Water Act.
 - a. Sediment Basins: Trap sediment from construction areas in temporary or permanent sediment basins that accommodate the runoff of a local //____// (design year) storm. After each storm, pump the basins dry and remove the accumulated sediment. Control overflow/drainage with paved weirs or by vertical overflow pipes, draining from the surface.
 - b. Reuse or conserve the collected topsoil sediment as directed by the Resident Engineer. Topsoil use and requirements are specified in Section 31 20 00, EARTH MOVING.
 - c. Institute effluent quality monitoring programs as required by Federal, State, and local environmental agencies.
 5. Erosion and Sedimentation Control Devices: The erosion and sediment controls selected and maintained by the Contractor shall be such that water quality standards are not violated as a result of the Contractor's activities. Construct or install all temporary and permanent erosion and sedimentation control features // shown. // on the Environmental Protection Plan. // Maintain temporary erosion and sediment control measures such as berms, dikes, drains, sedimentation basins, grassing, and mulching, until permanent drainage and erosion control facilities are completed and operative.
 6. Manage borrow areas on // and off // Government property to minimize erosion and to prevent sediment from entering nearby water courses or lakes.
 7. Manage and control spoil areas on // and off // Government property to limit spoil to areas // shown // on the Environmental Protection Plan // and prevent erosion of soil or sediment from entering nearby water courses or lakes.
 8. Protect adjacent areas from despoilment by temporary excavations and embankments.

9. Handle and dispose of solid wastes in such a manner that will prevent contamination of the environment. Place solid wastes (excluding clearing debris) in containers that are emptied on a regular schedule. Transport all solid waste off Government property and dispose of waste in compliance with Federal, State, and local requirements.
 10. Store chemical waste away from the work areas in corrosion resistant containers and dispose of waste in accordance with Federal, State, and local regulations.
 11. Handle discarded materials other than those included in the solid waste category as directed by the Resident Engineer.
- C. Protection of Water Resources: Keep construction activities under surveillance, management, and control to avoid pollution of surface and ground waters and sewer systems. Implement management techniques to control water pollution by the listed construction activities that are included in this contract.
1. Washing and Curing Water: Do not allow wastewater directly derived from construction activities to enter water areas. Collect and place wastewater in retention ponds allowing the suspended material to settle, the pollutants to separate, or the water to evaporate.
 2. Control movement of materials and equipment at stream crossings during construction to prevent violation of water pollution control standards of the Federal, State, or local government.
 3. Monitor water areas affected by construction.
- D. Protection of Fish and Wildlife Resources: Keep construction activities under surveillance, management, and control to minimize interference with, disturbance of, or damage to fish and wildlife. Prior to beginning construction operations, list species that require specific attention along with measures for their protection.
- E. Protection of Air Resources: Keep construction activities under surveillance, management, and control to minimize pollution of air resources. Burning is not permitted on the job site. Keep activities, equipment, processes, and work operated or performed, in strict accordance with the State of // insert Name of State and title of State Air Pollution Statue, Rule, or Regulation // and Federal emission and performance laws and standards. Maintain ambient air quality standards set by the Environmental Protection Agency, for those construction operations and activities specified.
1. Particulates: Control dust particles, aerosols, and gaseous by-products from all construction activities, processing, and preparation of materials (such as from asphaltic batch plants) at all times, including weekends, holidays, and hours when work is not in progress.
 2. Particulates Control: Maintain all excavations, stockpiles, haul roads, permanent and temporary access roads, plant sites, spoil areas, borrow areas, and all other work areas within or outside the project boundaries free from particulates which would cause a hazard or a nuisance. Sprinklering, chemical treatment of an approved type, light bituminous treatment, baghouse, scrubbers, electrostatic precipitators, or other methods are permitted to control particulates in the work area.
 3. Hydrocarbons and Carbon Monoxide: Control monoxide emissions from equipment to Federal and State allowable limits.
 4. Odors: Control odors of construction activities and prevent obnoxious odors from occurring.
- F. Reduction of Noise: Minimize noise using every action possible. Perform noise-producing work in less sensitive hours of the day or week as directed by the Resident Engineer. Maintain noise-produced work at or below the decibel levels and within the time periods specified.
1. Perform construction activities involving repetitive, high-level impact noise only between 8:00 //____//a.m. and 6:00//____//p.m unless otherwise permitted by local ordinance or the Resident Engineer. Repetitive impact noise on the property shall not exceed the following dB limitations:

Time Duration of Impact Noise	Sound Level in dB
More than 12 minutes in any hour	70
Less than 30 seconds of any hour	85
Less than three minutes of any hour	80
Less than 12 minutes of any hour	75

2. Provide sound-deadening devices on equipment and take noise abatement measures that are necessary to comply with the requirements of this contract, consisting of, but not limited to, the following:
 - a. Maintain maximum permissible construction equipment noise levels at 15 m (50 feet) (dBA):

<u>EARTHMOVING</u>		<u>MATERIALS HANDLING</u>	
FRONT LOADERS	75	CONCRETE MIXERS	75
BACKHOES	75	CONCRETE PUMPS	75
DOZERS	75	CRANES	75
TRACTORS	75	DERRICKS IMPACT	75
SCAPERS	80	PILE DRIVERS	95
GRADERS	75	JACK HAMMERS	75
TRUCKS	75	ROCK DRILLS	80
PAVERS, STATIONARY	80	PNEUMATIC TOOLS	80
PUMPS	75	BLASTING	//--//
GENERATORS	75	SAWS	75
COMPRESSORS	75	VIBRATORS	75

- b. Use shields or other physical barriers to restrict noise transmission.
 - c. Provide soundproof housings or enclosures for noise-producing machinery.
 - d. Use efficient silencers on equipment air intakes.
 - e. Use efficient intake and exhaust mufflers on internal combustion engines that are maintained so equipment performs below noise levels specified.
 - f. Line hoppers and storage bins with sound deadening material.
 - g. Conduct truck loading, unloading, and hauling operations so that noise is kept to a minimum.
3. Measure sound level for noise exposure due to the construction at least once every five successive working days while work is being performed above 55 // ____ // dB(A) noise level. Measure noise exposure at the property line or 15 m (50 feet) from the noise source, whichever is greater. Measure the sound levels on the A weighing network of a General Purpose sound level meter at slow response. To minimize the effect of reflective sound waves at buildings, take measurements at 900 to 1800 mm (three to six feet) in front of any building face. Submit the

recorded information to the Resident Engineer noting any problems and the alternatives for mitigating actions.

- G. Restoration of Damaged Property: If any direct or indirect damage is done to public or private property resulting from any act, omission, neglect, or misconduct, the Contractor shall restore the damaged property to a condition equal to that existing before the damage at no additional cost to the Government. Repair, rebuild, or restore property as directed or make good such damage in an acceptable manner.
- H. Final Clean-up: On completion of project and after removal of all debris, rubbish, and temporary construction, Contractor shall leave the construction area in a clean condition satisfactory to the Resident Engineer. Cleaning shall include off the station disposal of all items and materials not required to be salvaged, as well as all debris and rubbish resulting from demolition and new work operations.

END OF SECTION 01-5719

SECTION 01-6000 - PRODUCT REQUIREMENTS

PART 1 - GENERAL

1.1 RELATED DOCUMENTS

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

1.2 SUMMARY

- A. Section includes administrative and procedural requirements for selection of products for use in Project; product delivery, storage, and handling; manufacturers' standard warranties on products; special warranties; and comparable products.
- B. Related Requirements:
 - 1. Division 01 Section "Allowances" for products selected under an allowance.
 - 2. Division 01 Section "Alternates" for products selected under an alternate.
 - 3. Division 01 Section "Substitution Procedures" for requests for substitutions.

1.3 DEFINITIONS

- A. Products: Items obtained for incorporating into the Work, whether purchased for Project or taken from previously purchased stock. The term "product" includes the terms "material," "equipment," "system," and terms of similar intent.
 - 1. Named Products: Items identified by manufacturer's product name, including make or model number or other designation shown or listed in manufacturer's published product literature that is current as of date of the Contract Documents.
 - 2. New Products: Items that have not previously been incorporated into another project or facility. Products salvaged or recycled from other projects are not considered new products.
 - 3. Comparable Product: Product that is demonstrated and approved through submittal process to have the indicated qualities related to type, function, dimension, in-service performance, physical properties, appearance, and other characteristics that equal or exceed those of specified product.
- B. Basis-of-Design Product Specification: A specification in which a specific manufacturer's product is named and accompanied by the words "basis-of-design product," including make or model number or other designation, to establish the significant qualities related to type, function, dimension, in-service performance, physical properties, appearance, and other characteristics for purposes of evaluating comparable products of additional manufacturers named in the specification.

1.4 ACTION SUBMITTALS

- A. Comparable Product Requests: Submit request for consideration of each comparable product. Identify product or fabrication or installation method to be replaced. Include Specification Section number and title and Drawing numbers and titles.
1. Include data to indicate compliance with the requirements specified in "Comparable Products" Article.
 2. Architect's Action: If necessary, Architect will request additional information or documentation for evaluation within one week of receipt of a comparable product request. Architect will notify Contractor of approval or rejection of proposed comparable product request within 15 days of receipt of request, or 7 days of receipt of additional information or documentation, whichever is later.
 - a. Form of Approval: As specified in Division 01 Section "Submittal Procedures."
 - b. Use product specified if Architect does not issue a decision on use of a comparable product request within time allocated.
- B. Basis-of-Design Product Specification Submittal: Comply with requirements in Division 01 Section "Submittal Procedures." Show compliance with requirements.

1.5 QUALITY ASSURANCE

- A. Compatibility of Options: If Contractor is given option of selecting between two or more products for use on Project, select product compatible with products previously selected, even if previously selected products were also options.
1. Each contractor is responsible for providing products and construction methods compatible with products and construction methods of other contractors.
 2. If a dispute arises between contractors over concurrently selectable but incompatible products, Architect will determine which products shall be used.

1.6 PRODUCT DELIVERY, STORAGE, AND HANDLING

- A. Deliver, store, and handle products using means and methods that will prevent damage, deterioration, and loss, including theft and vandalism. Comply with manufacturer's written instructions.
- B. Delivery and Handling:
1. Schedule delivery to minimize long-term storage at Project site and to prevent overcrowding of construction spaces.
 2. Coordinate delivery with installation time to ensure minimum holding time for items that are flammable, hazardous, easily damaged, or sensitive to deterioration, theft, and other losses.
 3. Deliver products to Project site in an undamaged condition in manufacturer's original sealed container or other packaging system, complete with labels and instructions for handling, storing, unpacking, protecting, and installing.
 4. Inspect products on delivery to determine compliance with the Contract Documents and to determine that products are undamaged and properly protected.

C. Storage:

1. Store products to allow for inspection and measurement of quantity or counting of units.
2. Store materials in a manner that will not endanger Project structure.
3. Store products that are subject to damage by the elements, under cover in a weathertight enclosure above ground, with ventilation adequate to prevent condensation.
4. Protect foam plastic from exposure to sunlight, except to extent necessary for period of installation and concealment.
5. Comply with product manufacturer's written instructions for temperature, humidity, ventilation, and weather-protection requirements for storage.
6. Protect stored products from damage and liquids from freezing.
7. Provide a secure location and enclosure at Project site for storage of materials and equipment by Owner's construction forces. Coordinate location with Owner.

1.7 PRODUCT WARRANTIES

A. Warranties specified in other Sections shall be in addition to, and run concurrent with, other warranties required by the Contract Documents. Manufacturer's disclaimers and limitations on product warranties do not relieve Contractor of obligations under requirements of the Contract Documents.

1. Manufacturer's Warranty: Written warranty furnished by individual manufacturer for a particular product and specifically endorsed by manufacturer to Owner.
2. Special Warranty: Written warranty required by the Contract Documents to provide specific rights for Owner.

B. Special Warranties: Prepare a written document that contains appropriate terms and identification, ready for execution.

1. Manufacturer's Standard Form: Modified to include Project-specific information and properly executed.
2. Specified Form: When specified forms are included with the Specifications, prepare a written document using indicated form properly executed.
3. See Divisions 02 through 33 Sections for specific content requirements and particular requirements for submitting special warranties.

C. Submittal Time: Comply with requirements in Division 01 Section "Closeout Procedures."

PART 2 - PRODUCTS

2.1 PRODUCT SELECTION PROCEDURES

A. General Product Requirements: Provide products that comply with the Contract Documents, are undamaged and, unless otherwise indicated, are new at time of installation.

1. Provide products complete with accessories, trim, finish, fasteners, and other items needed for a complete installation and indicated use and effect.

2. Standard Products: If available, and unless custom products or nonstandard options are specified, provide standard products of types that have been produced and used successfully in similar situations on other projects.
 3. Owner reserves the right to limit selection to products with warranties not in conflict with requirements of the Contract Documents.
 4. Where products are accompanied by the term "as selected," Architect will make selection.
 5. Descriptive, performance, and reference standard requirements in the Specifications establish salient characteristics of products.
 6. Or Equal: For products specified by name and accompanied by the term "or equal," or "or approved equal," or "or approved," comply with requirements in "Comparable Products" Article to obtain approval for use of an unnamed product.
- B. Product Selection Procedures: Product selection is governed by the Contract Documents and governing regulations and not by previous Project experience. Procedures governing product selection include the following:
1. Proprietary Specification Requirements: Where Specifications name only a single manufacturer and product, provide the named product that complies with requirements. Comparable products or substitutions for Contractor's convenience will not be considered.
 2. Semiproprietary Specification Requirements: Where Specifications name three or more products or manufacturers, provide one of the products indicated. Comparable products or substitutions for Contractor's convenience will not be considered.
 - a. Where products or manufacturers are specified by name, accompanied by the term "or equal," or "or approved equal" comply with the provisions concerning "substitutions" to obtain approval for use of an unnamed product.
 3. Non-Proprietary Specifications: When the Specifications list products or manufacturers that are available and may be incorporated in the Work, but do not restrict the Contractor to use of these products only, the Contractor may propose any available product that complies with Contract requirements. Comply with provisions concerning "substitutions" to obtain approval for use of an unnamed product.
 4. Descriptive Specification Requirements: Where Specifications describe a product or assembly, listing exact characteristics required, with or without use of a brand or trade name, provide a product or assembly that provides the characteristics and otherwise complies with Contract requirements.
 5. Performance Specification Requirements: Where Specifications require compliance with performance requirements, provide products that comply with these requirements, and are recommended by the manufacturer for the application indicated. General overall performance of a product is implied where the product is specified for a specific application.
 - a. Manufacturer's recommendations may be contained in published product literature, or by the manufacturer's certification of performance.
 6. Basis-of-Design Product: Where Specifications name a product, or refer to a product indicated on Drawings, and include a list of manufacturers, provide the specified or indicated product or a comparable product by one of the other named manufacturers. Drawings and Specifications indicate sizes, profiles, dimensions, and other characteristics that are based on the product named.

Comply with requirements in "Comparable Products" Article for consideration of an unnamed product by one of the other named manufacturers.

7. Visual Matching Specification: Where Specifications require "match Architect's sample", provide a product that complies with requirements and matches Architect's sample. Architect's decision will be final on whether a proposed product matches.
 - a. If no product available within specified category matches and complies with other specified requirements, comply with requirements in Division 01 Section "Substitution Procedures" for proposal of product.
8. Visual Selection Specification: Where Specifications include the phrase "as selected by Architect from manufacturer's full range" or similar phrase, select a product that complies with requirements. Architect will select color, gloss, pattern, density, or texture from manufacturer's product line that includes both standard and premium items.
9. Allowances: Refer to individual Specification Sections and provisions in Section 01-2100, Allowances, for allowances that control product selection, and for procedures required for processing such selections.

2.2 COMPARABLE PRODUCTS

- A. Conditions for Consideration: Architect will consider Contractor's request for comparable product when the following conditions are satisfied. If the following conditions are not satisfied, Architect may return requests without action, except to record noncompliance with these requirements:
 1. Evidence that the proposed product does not require revisions to the Contract Documents that it is consistent with the Contract Documents and will produce the indicated results, and that it is compatible with other portions of the Work.
 2. Proposed changes are in keeping with the intent of Contract Documents.
 3. The request is timely, fully documented and properly submitted.
 4. The request is directly related to an "or equal" clause or similar language in the Contract Documents.
 5. The specified product or method of construction cannot be provided within the Contract Time.
 - a. The request will not be considered if the product or method cannot be provided as a result of failure to pursue the Work promptly or coordinate activities properly.
 6. The specified product or method of construction cannot receive necessary approval by a governing authority, and the requested substitution can be approved.
 7. A substantial advantage is offered the Owner, in terms of cost, time, energy conservation or other considerations of merit, after deduction offsetting responsibilities the Owner may be required to bear.
 - a. Additional responsibilities for the Owner may include additional compensation to the Architect for redesign and evaluation services, increased cost of other construction by the Owner or separate Contractors, and similar considerations.
 8. The specified product or method of construction cannot be provided in a manner that is compatible with other material, and where the Contractor certifies that the substitution will overcome the incompatibility.
 9. The specified product or method of construction cannot be coordinated with other materials, and where the Contractor certifies that the proposed substitution can be coordinated.

10. The specified product or method of construction cannot provide a warranty required by the Contract Documents and where the Contractor certifies that the proposed substitution provide the required warranty.
 11. Detailed comparison of significant qualities of proposed product with those named in the Specifications. Significant qualities include attributes such as performance, weight, size, durability, visual effect, and specific features and requirements indicated.
 12. List of similar installations for completed projects with project names and addresses and names and addresses of architects and owners, if requested.
 13. Samples, if requested.
- B. The Contractor's submittal and Architect's acceptance of Shop Drawings, Product Data or Samples that relate to construction activities not complying with the Contract Documents does not constitute an acceptable or valid request for substitution, nor does it constitute approval.

PART 3 - EXECUTION

3.1 INSTALLATION OF PRODUCTS:

- A. Comply with manufacturer's instructions and recommendations for installation of products in the applications indicated. Anchor each product securely in place, accurately located and aligned with other work.
 1. Clean exposed surfaces and protect as necessary to ensure freedom from damage and deterioration at time of Substantial Completion.

END OF SECTION 01-6000

SECTION 01-6100 – UNIVERSITY PRODUCT STANDARD

A. Asbestos Certification

Contractor shall certify that all material/equipment installed in any portion of the Work shall be asbestos free. The owner may perform sampling to verify all suspect material/equipment is asbestos free. If any material/equipment is found to contain asbestos, the Contractor shall pay for the lawful and proper removal and disposal of product(s), and re-install acceptable material/equipment all at its sole expense.

B. For purposes of this requirement, materials include, **but are not limited to** the following:

2.1 Surfacing Treatments

Fireproofing Acoustical Plaster
Finish Plasters, Skim Coats of Joint Compound, Fibrous Type Paint Applications, Sprayed-on applications

2.2 Thermal System Insulation

Equipment Insulation, Gaskets, Valve Packings,
Boiler, Breeching, Boiler Rope, Duct or Tank Insulation,
Cement or Mortar used for boilers and refractory brick.
Piping and Fitting Insulations including but not limited to Wrapped Paper, Millboard, Rope, Cork, Preformed Plaster, Job Molded Plaster and Coverings over Fibrous Glass Insulation.

2.3 Roofing and Siding Materials

Insulation Board, Vapor Barriers, Felts, Coatings & Adhesives,
Flashing, Shingles, Cementitious Board (Transite),
Galbestos, Non-Metallic or Non-Wood Roof Decking

2.4 Other Miscellaneous Materials

Cove Base, Floor Leveling Compound,
Ceiling & Floor Tiles, Vibration Isolators, Laboratory Tables and Hoods,
Mastics, Adhesives, Coatings & Caulks,
Wallboard & Joint Compounds,
Friction Products, Gaskets,
Fire Door Materials, Cementitious Products (Transite)

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PHASE II – YOUNG QUAD UTILITIES
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STORRS, CT
UCONN PROJ. #901954
URS JOB #36940200

UNIVERSITY PRODUCT STANDARD

01-6100-2

The Contractor certifies that all material/equipment installed in any portion of the Work shall be asbestos free:

Contractor Signature: Date:

Print Name:

Company:

Please keep a completed copy of this document in the department's project files and mail or fax a copy to:
University of Connecticut, Department of Environmental Health and Safety, Unit 4097, 486-1106 (FAX)

END OF SECTION 01-6100

SECTION 01-7300 - EXECUTION

PART 1 - GENERAL

1.1 RELATED DOCUMENTS

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

1.2 SUMMARY

- A. Section includes general administrative and procedural requirements governing execution of the Work including, but not limited to, the following:

1. Construction layout.
2. Field engineering and surveying.
3. Installation of the Work.
4. Cutting and patching.
5. Coordination of Owner-installed products.
6. Progress cleaning.
7. Starting and adjusting.
8. Protection of installed construction.

- B. Related Requirements:

1. Division 01 Section "Summary" for limits on use of Project site.
2. Division 01 Section "Submittal Procedures" for submitting surveys.
3. Division 01 Section "Closeout Procedures" for submitting final property survey with Project Record Documents, recording of Owner-accepted deviations from indicated lines and levels, and final cleaning.

1.3 DEFINITIONS

- A. Cutting: Removal of in-place construction necessary to permit installation or performance of other work.
- B. Patching: Fitting and repair work required to restore construction to original conditions after installation of other work.

1.4 INFORMATIONAL SUBMITTALS

- A. Certificates: Submit certificate signed by land surveyor certifying that location and elevation of improvements comply with requirements.

- B. Cutting and Patching Plan: Submit plan describing procedures at least 10 days prior to the time cutting and patching will be performed. Include the following information:
1. Extent: Describe reason for and extent of each occurrence of cutting and patching.
 2. Changes to In-Place Construction: Describe anticipated results. Include changes to structural elements and operating components as well as changes in building appearance and other significant visual elements.
 3. Products: List products to be used for patching and firms or entities that will perform patching work.
 4. Dates: Indicate when cutting and patching will be performed.
 5. Utilities and Mechanical and Electrical Systems: List services and systems that cutting and patching procedures will disturb or affect. List services and systems that will be relocated and those that will be temporarily out of service. Indicate length of time permanent services and systems will be disrupted.
 - a. Include description of provisions for temporary services and systems during interruption of permanent services and systems.

1.5 QUALITY ASSURANCE

- A. Land Surveyor Qualifications: A professional land surveyor who is legally qualified to practice in jurisdiction where Project is located and who is experienced in providing land-surveying services of the kind indicated.
- B. Cutting and Patching: Comply with requirements for and limitations on cutting and patching of construction elements.
1. Structural Elements: When cutting and patching structural elements, notify Architect of locations and details of cutting and await directions from Architect before proceeding. Shore, brace, and support structural elements during cutting and patching. Do not cut and patch structural elements in a manner that could change their load-carrying capacity or increase deflection
 2. Operational Elements: Do not cut and patch operating elements and related components in a manner that results in reducing their capacity to perform as intended or that results in increased maintenance or decreased operational life or safety.
 3. Other Construction Elements: Do not cut and patch other construction elements or components in a manner that could change their load-carrying capacity, that results in reducing their capacity to perform as intended, or that results in increased maintenance or decreased operational life or safety
 4. Visual Elements: Do not cut and patch construction in a manner that results in visual evidence of cutting and patching. Do not cut and patch exposed construction in a manner that would, in Architect's opinion, reduce the building's aesthetic qualities. Remove and replace construction that has been cut and patched in a visually unsatisfactory manner.
- C. Cutting and Patching Conference: Before proceeding, meet at Project site with parties involved in cutting and patching, including mechanical and electrical trades. Review areas of potential interference and conflict. Coordinate procedures and resolve potential conflicts before proceeding.

- D. Manufacturer's Installation Instructions: Obtain and maintain on-site manufacturer's written recommendations and instructions for installation of products and equipment.

PART 2 - PRODUCTS

2.1 MATERIALS

- A. General: Comply with requirements specified in other Sections.
1. For projects requiring compliance with sustainable design and construction practices and procedures, use products for patching that comply with requirements in Division 01 sustainable design requirements Section.
- B. In-Place Materials: Use materials for patching identical to in-place materials. For exposed surfaces, use materials that visually match in-place adjacent surfaces to the fullest extent possible.
1. If identical materials are unavailable or cannot be used, use materials that, when installed, will provide a match acceptable to Architect for the visual and functional performance of in-place materials.

PART 3 - EXECUTION

3.1 EXAMINATION

- A. Existing Conditions: The existence and location of underground and other utilities and construction indicated as existing are not guaranteed. Before beginning sitework, investigate and verify the existence and location of underground utilities, mechanical and electrical systems, and other construction affecting the Work.
1. Before construction, verify the location and invert elevation at points of connection of sanitary sewer, storm sewer, and water-service piping; underground electrical services, and other utilities.
 2. Furnish location data for work related to Project that must be performed by public utilities serving Project site.
- B. Examination and Acceptance of Conditions: Before proceeding with each component of the Work, examine substrates, areas, and conditions, with Installer or Applicator present where indicated, for compliance with requirements for installation tolerances and other conditions affecting performance. Record observations.
1. Examine roughing-in for mechanical and electrical systems to verify actual locations of connections before equipment and fixture installation.
 2. Examine walls, floors, and roofs for suitable conditions where products and systems are to be installed.
 3. Verify compatibility with and suitability of substrates, including compatibility with existing finishes or primers.

- C. Written Report: Where a written report listing conditions detrimental to performance of the Work is required by other Sections, include the following:
1. Description of the Work.
 2. List of detrimental conditions, including substrates.
 3. List of unacceptable installation tolerances.
 4. Recommended corrections.
- D. Proceed with installation only after unsatisfactory conditions have been corrected. Proceeding with the Work indicates acceptance of surfaces and conditions.

3.2 PREPARATION

- A. Existing Utility Information: Furnish information to University Representative that is necessary to adjust, move, or relocate existing utility structures, utility poles, lines, services, or other utility appurtenances located in or affected by construction. And coordinate with authorities having jurisdiction.
- B. Field Measurements: Take field measurements as required to fit the Work properly. Recheck measurements before installing each product. Where portions of the Work are indicated to fit to other construction, verify dimensions of other construction by field measurements before fabrication. Coordinate fabrication schedule with construction progress to avoid delaying the Work.
- C. Space Requirements: Verify space requirements and dimensions of items shown diagrammatically on Drawings.
- D. Review of Contract Documents and Field Conditions: Immediately on discovery of the need for clarification of the Contract Documents caused by differing field conditions outside the control of Contractor, submit a request for information to Architect according to requirements in Division 01 Section "Project Management and Coordination."

3.3 CONSTRUCTION LAYOUT

- A. Verification: Before proceeding to lay out the Work, verify layout information shown on Drawings, in relation to the property survey and existing benchmarks. If discrepancies are discovered, notify Architect promptly.
- B. General: Engage a land surveyor to lay out the Work using accepted surveying practices.
1. Establish benchmarks and control points to set lines and levels at each story of construction and elsewhere as needed to locate each element of Project.
 2. Establish limits on use of Project site.
 3. Establish dimensions within tolerances indicated. Do not scale Drawings to obtain required dimensions.
 4. Inform installers of lines and levels to which they must comply.
 5. Check the location, level and plumb, of every major element as the Work progresses.
 6. Notify Architect when deviations from required lines and levels exceed allowable tolerances.
 7. Close site surveys with an error of closure equal to or less than the standard established by authorities having jurisdiction.

- C. Site Improvements: Locate and lay out site improvements, including pavements, grading, fill and topsoil placement, utility slopes, and rim and invert elevations.
- D. Building Lines and Levels: Locate and lay out control lines and levels for structures, building foundations, column grids, and floor levels, including those required for mechanical and electrical work. Transfer survey markings and elevations for use with control lines and levels. Level foundations and piers from two or more locations.
- E. Record Log: Maintain a log of layout control work. Record deviations from required lines and levels. Include beginning and ending dates and times of surveys, weather conditions, name and duty of each survey party member, and types of instruments and tapes used. Make the log available for reference by Architect.

3.4 FIELD ENGINEERING

- A. Reference Points: Locate existing permanent benchmarks, control points, and similar reference points before beginning the Work. Preserve and protect permanent benchmarks and control points during construction operations.
 - 1. Do not change or relocate existing benchmarks or control points without prior written approval of Architect. Report lost or destroyed permanent benchmarks or control points promptly. Report the need to relocate permanent benchmarks or control points to Architect before proceeding.
 - 2. Replace lost or destroyed permanent benchmarks and control points promptly. Base replacements on the original survey control points.
- B. Benchmarks: Establish and maintain a minimum of two permanent benchmarks on Project site, referenced to data established by survey control points. Comply with authorities having jurisdiction for type and size of benchmark.
 - 1. Record benchmark locations, with horizontal and vertical data, on Project Record Documents.
 - 2. Where the actual location or elevation of layout points cannot be marked, provide temporary reference points sufficient to locate the Work.
 - 3. Remove temporary reference points when no longer needed. Restore marked construction to its original condition.
- C. Certified Survey: On completion of foundation walls, major site improvements, and other work requiring field-engineering services, prepare a certified survey showing dimensions, locations, angles, and elevations of construction and sitework.

3.5 INSTALLATION

- A. General: Locate the Work and components of the Work accurately, in correct alignment and elevation, as indicated.
 - 1. Make vertical work plumb and make horizontal work level.
 - 2. Where space is limited, install components to maximize space available for maintenance and ease of removal for replacement.
 - 3. Conceal pipes, ducts, and wiring in finished areas unless otherwise indicated.

- B. Comply with manufacturer's written instructions and recommendations for installing products in applications indicated.
- C. Install products at the time and under conditions that will ensure the best possible results. Maintain conditions required for product performance until Substantial Completion.
- D. Conduct construction operations so no part of the Work is subjected to damaging operations or loading in excess of that expected during normal conditions of occupancy.
- E. Sequence the Work and allow adequate clearances to accommodate movement of construction items on site and placement in permanent locations.
- F. Tools and Equipment: Do not use tools or equipment that produce harmful noise levels.
- G. Templates: Obtain and distribute to the parties involved templates for work specified to be factory prepared and field installed. Check Shop Drawings of other work to confirm that adequate provisions are made for locating and installing products to comply with indicated requirements.
- H. Attachment: Provide blocking and attachment plates and anchors and fasteners of adequate size and number to securely anchor each component in place, accurately located and aligned with other portions of the Work. Where size and type of attachments are not indicated, verify size and type required for load conditions.
 - 1. Mounting Heights: Where mounting heights are not indicated, mount components at heights directed by Architect.
 - 2. Allow for building movement, including thermal expansion and contraction.
 - 3. Coordinate installation of anchorages. Furnish setting drawings, templates, and directions for installing anchorages, including sleeves, concrete inserts, anchor bolts, and items with integral anchors, that are to be embedded in concrete or masonry. Deliver such items to Project site in time for installation.
- I. Joints: Make joints of uniform width. Where joint locations in exposed work are not indicated, arrange joints for the best visual effect. Fit exposed connections together to form hairline joints.
- J. Hazardous Materials: Use products, cleaners, and installation materials that are not considered hazardous.

3.6 CUTTING AND PATCHING

- A. Cutting and Patching, General: Employ skilled workers to perform cutting and patching. Proceed with cutting and patching at the earliest feasible time, and complete without delay.
 - 1. Cut in-place construction to provide for installation of other components or performance of other construction, and subsequently patch as required to restore surfaces to their original condition.
- B. Existing Warranties: Remove, replace, patch, and repair materials and surfaces cut or damaged during installation or cutting and patching operations, by methods and with materials so as not to void existing warranties.

- C. Temporary Support: Provide temporary support of work to be cut.
- D. Protection: Protect in-place construction during cutting and patching to prevent damage. Provide protection from adverse weather conditions for portions of Project that might be exposed during cutting and patching operations.
- E. Adjacent Occupied Areas: Where interference with use of adjoining areas or interruption of free passage to adjoining areas is unavoidable, coordinate cutting and patching according to requirements in Division 01 Section "Summary."
- F. Existing Utility Services and Mechanical/Electrical Systems: Where existing services/systems are required to be removed, relocated, or abandoned, bypass such services/systems before cutting to minimize interruption to occupied areas.
- G. Cutting: Cut in-place construction by sawing, drilling, breaking, chipping, grinding, and similar operations, including excavation, using methods least likely to damage elements retained or adjoining construction. If possible, review proposed procedures with original Installer; comply with original Installer's written recommendations.
 - 1. In general, use hand or small power tools designed for sawing and grinding, not hammering and chopping. Cut holes and slots neatly to minimum size required, and with minimum disturbance of adjacent surfaces. Temporarily cover openings when not in use.
 - 2. Finished Surfaces: Cut or drill from the exposed or finished side into concealed surfaces.
 - 3. Concrete and Masonry: Cut using a cutting machine, such as an abrasive saw or a diamond-core drill.
 - 4. Excavating and Backfilling: Comply with requirements in applicable Division 31 Sections where required by cutting and patching operations.
 - 5. Mechanical and Electrical Services: Cut off pipe or conduit in walls or partitions to be removed. Cap, valve, or plug and seal remaining portion of pipe or conduit to prevent entrance of moisture or other foreign matter after cutting.
 - 6. Proceed with patching after construction operations requiring cutting are complete.
- H. Patching: Patch construction by filling, repairing, refinishing, closing up, and similar operations following performance of other work. Patch with durable seams that are as invisible as practicable. Provide materials and comply with installation requirements specified in other Sections, where applicable.
 - 1. Inspection: Where feasible, test and inspect patched areas after completion to demonstrate physical integrity of installation.
 - 2. Exposed Finishes: Restore exposed finishes of patched areas and extend finish restoration into retained adjoining construction in a manner that will minimize evidence of patching and refinishing.
 - a. Clean piping, conduit, and similar features before applying paint or other finishing materials.
 - b. Restore damaged pipe covering to its original condition.
 - 3. Floors and Walls: Where walls or partitions that are removed extend one finished area into another, patch and repair floor and wall surfaces in the new space. Provide an even surface of

uniform finish, color, texture, and appearance. Remove in-place floor and wall coverings and replace with new materials, if necessary, to achieve uniform color and appearance.

- a. Where patching occurs in a painted surface, prepare substrate and apply primer and intermediate paint coats appropriate for substrate over the patch, and apply final paint coat over entire unbroken surface containing the patch. Provide additional coats until patch blends with adjacent surfaces.
4. Ceilings: Patch, repair, or rehang in-place ceilings as necessary to provide an even-plane surface of uniform appearance.
5. Exterior Building Enclosure: Patch components in a manner that restores enclosure to a weathertight condition and ensures thermal and moisture integrity of building enclosure.
- I. Cleaning: Clean areas and spaces where cutting and patching are performed. Remove paint, mortar, oils, putty, and similar materials from adjacent finished surfaces.

3.7 OWNER-INSTALLED PRODUCTS

- A. Site Access: Provide access to Project site for Owner's construction personnel.
- B. Coordination: Coordinate construction and operations of the Work with work performed by Owner's construction personnel.
 1. Construction Schedule: Inform Owner of Contractor's preferred construction schedule for Owner's portion of the Work. Adjust construction schedule based on a mutually agreeable timetable. Notify Owner if changes to schedule are required due to differences in actual construction progress.
 2. Preinstallation Conferences: Include Owner's construction personnel at preinstallation conferences covering portions of the Work that are to receive Owner's work. Attend preinstallation conferences conducted by Owner's construction personnel if portions of the Work depend on Owner's construction.

3.8 PROGRESS CLEANING

- A. General: Clean Project site and work areas daily, including common areas. Enforce requirements strictly. Dispose of materials lawfully.
 1. Comply with requirements in NFPA 241 for removal of combustible waste materials and debris.
 2. Do not hold waste materials more than seven days during normal weather or three days if the temperature is expected to rise above 80 deg F.
 3. Containerize hazardous and unsanitary waste materials separately from other waste. Mark containers appropriately and dispose of legally, according to regulations.
 - a. Use containers intended for holding waste materials of type to be stored.
 4. Coordinate progress cleaning for joint-use areas where Contractor and other contractors are working concurrently.

- B. Site: Maintain Project site free of waste materials and debris.
- C. Work Areas: Clean areas where work is in progress to the level of cleanliness necessary for proper execution of the Work.
 - 1. Remove liquid spills promptly.
 - 2. Where dust would impair proper execution of the Work, broom-clean or vacuum the entire work area, as appropriate.
- D. Installed Work: Keep installed work clean. Clean installed surfaces according to written instructions of manufacturer or fabricator of product installed, using only cleaning materials specifically recommended. If specific cleaning materials are not recommended, use cleaning materials that are not hazardous to health or property and that will not damage exposed surfaces.
- E. Concealed Spaces: Remove debris from concealed spaces before enclosing the space.
- F. Exposed Surfaces in Finished Areas: Clean exposed surfaces and protect as necessary to ensure freedom from damage and deterioration at time of Substantial Completion.
- G. Waste Disposal: Do not bury or burn waste materials on-site. Do not wash waste materials down sewers or into waterways. Comply with waste disposal requirements in Division 01 Section "Construction Waste Management and Disposal."
- H. During handling and installation, clean and protect construction in progress and adjoining materials already in place. Apply protective covering where required to ensure protection from damage or deterioration at Substantial Completion.
- I. Clean and provide maintenance on completed construction as frequently as necessary through the remainder of the construction period. Adjust and lubricate operable components to ensure operability without damaging effects.
- J. Limiting Exposures: Supervise construction operations to assure that no part of the construction completed or in progress, is subject to harmful, dangerous, damaging, or otherwise deleterious exposure during the construction period.

3.9 STARTING AND ADJUSTING

- A. Coordinate startup and adjusting of equipment and operating components.
- B. Start equipment and operating components to confirm proper operation. Remove malfunctioning units, replace with new units, and retest.
- C. Adjust equipment for proper operation. Adjust operating components for proper operation without binding.
- D. Test each piece of equipment to verify proper operation. Test and adjust controls and safeties. Replace damaged and malfunctioning controls and equipment.

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EXECUTION

01-7300-10

- E. Manufacturer's Field Service: Comply with qualification requirements in Division 01 Section "Quality Requirements."

3.10 PROTECTION OF INSTALLED CONSTRUCTION

- A. Provide final protection and maintain conditions that ensure installed Work is without damage or deterioration at time of Substantial Completion.
- B. Comply with manufacturer's written instructions for temperature and relative humidity.

END OF SECTION 01-7300

SECTION 01-7700 - CLOSEOUT PROCEDURES

PART 1 - GENERAL

1.1 RELATED DOCUMENTS

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

1.2 SUMMARY

- A. Section includes administrative and procedural requirements for contract closeout, including, but not limited to, the following:
 - 1. Substantial Completion procedures.
 - 2. Final completion procedures.
 - 3. Warrantee Requirements
 - 4. Submittal of Warranties.
 - 5. Revenue Services Requirements
 - 6. Final cleaning.
 - 7. Repair of the Work.
- B. Related Requirements:
 - 1. Division 01 Section "Photographic Documentation" for submitting final completion construction photographic documentation.
 - 2. Division 01 Section "Execution" for progress cleaning of Project site.
 - 3. Division 01 Section "Operation and Maintenance Data" for operation and maintenance manual requirements.
 - 4. Division 01 Section "Project Record Documents" for submitting record Drawings, record Specifications, and record Product Data.
 - 5. Division 01 Section "Demonstration and Training" for requirements for instructing Owner's personnel
 - 6. Divisions 02 through 33 Sections for specific closeout and special cleaning requirements for the Work in those Sections.

1.3 ACTION SUBMITTALS

- A. Product Data: For cleaning agents.
- B. Contractor's List of Incomplete Items: Initial submittal at Substantial Completion.
- C. Certified List of Incomplete Items: Final submittal at Final Completion.

1.4 CLOSEOUT SUBMITTALS

- A. Certificates of Release: From authorities having jurisdiction.
- B. Certificate of Insurance: For continuing coverage.
- C. Field Report: For pest control inspection.

1.5 MAINTENANCE MATERIAL SUBMITTALS

- A. Schedule of Maintenance Material Items: For maintenance material submittal items specified in other Sections.

1.6 SUBSTANTIAL COMPLETION PROCEDURES

- A. Contractor's List of Incomplete Items: Prepare and submit a list of items to be completed and corrected (Contractor's punch list), indicating the value of each item on the list and reasons why the Work is incomplete.
- B. Submittals Prior to Substantial Completion: Complete the following a minimum of 10 days prior to requesting inspection for determining date of Substantial Completion. List items below that are incomplete at time of request.
 - 1. Certificates of Release: Obtain and submit releases from authorities having jurisdiction permitting Owner unrestricted use of the Work and access to services and utilities. Include occupancy permits, operating certificates, and similar releases.
 - 2. Submit closeout submittals specified in other Division 01 Sections, including project record documents, operation and maintenance manuals, final completion construction photographic documentation, damage or settlement surveys, property surveys, and similar final record information.
 - 3. Submit closeout submittals specified in individual Divisions 02 through 33 Sections, including specific warranties, workmanship bonds, maintenance service agreements, final certifications, and similar documents.
 - 4. Submit maintenance material submittals specified in individual Divisions 02 through 33 Sections, including tools, spare parts, extra materials, and similar items, and deliver to location designated by University Representative. Label with manufacturer's name and model number where applicable.
 - a. Schedule of Maintenance Material Items: Prepare and submit schedule of maintenance material submittal items, including name and quantity of each item and name and number of related Specification Section. Obtain University Representative signature for receipt of submittals.
 - 5. Submit test/adjust/balance records.
 - 6. Submit sustainable design submittals required in Division 01 sustainable design requirements Section and in individual Division 02 through 33 Sections.
 - 7. Submit changeover information related to Owner's occupancy, use, operation, and maintenance.

- C. Procedures Prior to Substantial Completion: Complete the following a minimum of 10 days prior to requesting inspection for determining date of Substantial Completion. List items below that are incomplete at time of request.
1. Advise Owner of pending insurance changeover requirements.
 2. Make final changeover of permanent locks and deliver keys to Owner. Advise Owner's personnel of changeover in security provisions.
 3. Complete startup and testing of systems and equipment.
 4. Perform preventive maintenance on equipment used prior to Substantial Completion.
 5. Instruct Owner's personnel in operation, adjustment, and maintenance of products, equipment, and systems. Submit demonstration and training video recordings when specified in Division 01 Section "Demonstration and Training."
 6. Advise Owner of changeover in heat and other utilities.
 7. Participate with Owner in conducting inspection and walkthrough with local emergency responders.
 8. Terminate and remove temporary facilities from Project site, along with mockups, construction tools, and similar elements.
 9. Complete final cleaning requirements, including touchup painting.
 10. Touch up and otherwise repair and restore marred exposed finishes to eliminate visual defects.
- D. Inspection: Submit a written request for inspection to determine Substantial Completion a minimum of 10 days prior to date the work will be completed and ready for final inspection and tests. On receipt of request, Architect will either proceed with inspection or notify Contractor of unfulfilled requirements. Architect will prepare the Certificate of Substantial Completion after inspection or will notify Contractor of items, either on Contractor's list or additional items identified by Architect, that must be completed or corrected before certificate will be issued.
1. Reinspection: Request reinspection when the Work identified in previous inspections as incomplete is completed or corrected.
 2. Results of completed inspection will form the basis of requirements for final completion.

1.7 FINAL COMPLETION PROCEDURES

- A. Submittals Prior to Final Completion: Before requesting final inspection for determining final completion, complete the following:
1. Submit a final Application for Payment request with releases and supporting documentation not previously submitted and accepted. Include certificates of insurance for products and completed operations where required.
 2. Submit an updated final Application for Payment statement, accounting for final additional charges to the Contract Sum.
 3. Certified List of Incomplete Items: Submit certified copy of Architect's Substantial Completion inspection list of items to be completed or corrected (punch list), endorsed and dated by Architect. Certified copy of the list shall state that each item has been completed or otherwise resolved for acceptance.
 4. Certificate of Insurance: Submit evidence of final, continuing insurance coverage complying with insurance requirements.
 5. Submit final meter readings for utilities, a measured record of stored fuel, and similar data as of the date of Substantial Completion, or when the Owner took possession of and responsibility for corresponding elements of the Work.

6. Submit consent of surety to final payment.
7. Submit a final liquidated damages settlement statement.

B. Inspection: Submit a written request for final inspection to determine acceptance a minimum of 10 days prior to date the work will be completed and ready for final inspection and tests. On receipt of request, Architect will either proceed with inspection or notify Contractor of unfulfilled requirements. Architect will prepare a final Certificate for Payment after inspection or will notify Contractor of construction that must be completed or corrected before certificate will be issued.

1. Reinspection: Request reinspection when the Work identified in previous inspections as incomplete is completed or corrected.
2. Upon completion of reinspection, the University Representative with advice of the Architect will prepare a Certificate of Final Acceptance, or advise the Contractor of Work that is incomplete or of obligations that have not been fulfilled but are required for final acceptance.
3. If necessary, reinspection will be repeated.

1.8 LIST OF INCOMPLETE ITEMS (PUNCH LIST)

A. Organization of List: Include name and identification of each space and area affected by construction operations for incomplete items and items needing correction including, if necessary, areas disturbed by Contractor that are outside the limits of construction.

1. Organize list of spaces in sequential order.
2. Organize items applying to each space by major element, including categories for ceiling, individual walls, floors, equipment, and building systems.
3. Include the following information at the top of each page:
 - a. Project name.
 - b. Date.
 - c. Name of Architect.
 - d. Name of Contractor.
 - e. Page number.
4. Submit list of incomplete items in the following format or format approved by Owner:
 - a. PDF electronic file. Architect will return annotated file.

1.9 WARRANTY REQUIREMENTS

A. Related Damages and Losses: When correcting warranted Work that has failed, remove and replace other Work that has been damaged as a result of such failure or that must be removed and replaced to provide access for correction of warranted Work.

B. Reinstatement of Warranty: When Work covered by a warranty has failed and been corrected by replacement or rebuilding, reinstate the warranty by written endorsement. The reinstated warranty shall be equal to the original warranty with an equitable adjustment for depreciation.

C. Replacement Cost: Upon determination that Work covered by a warranty has failed, replace or rebuild the Work to an acceptable condition complying with requirements of Contract Documents. The

Contractor is responsible for the cost of replacing or rebuilding defective Work regardless of whether the Owner has benefited from use of the Work through a portion of its anticipated useful service life.

- D. Owner's Recourse: Written warranties made to the Owner are in addition to implied warranties, and shall not limit the duties, obligations, rights and remedies otherwise available under the law, nor shall warranty periods be interpreted as limitations on time in which the Owner can enforce such other duties, obligations, rights, or remedies. Rejection of Warranties: The Owner reserves the right to reject warranties and to limit selections to products with warranties not in conflict with requirements of the Contract Documents.
- E. The Owner reserves the right to refuse to accept Work for the Project where a special warranty, certification, or similar commitment is required on such Work or part of the Work, until evidence is presented that entities required to countersign such commitments are willing to do so.

1.10 SUBMITTAL OF PROJECT WARRANTIES

- A. Time of Submittal: Submit written warranties on request of Architect for designated portions of the Work where commencement of warranties other than date of Substantial Completion is indicated, or when delay in submittal of warranties might limit Owner's rights under warranty.
- B. All work shall be covered by the standard one (1) year guarantee as set forth in the General Conditions. The Contractor shall visit the project site at 11 months into the guarantee period to determine the scope of any required guarantee work. The Contractor shall contact the University Representative prior to this visit so that the University Representative may attend.
- C. Partial Occupancy: Submit properly executed warranties within 15 days of completion of designated portions of the Work that are completed and occupied or used by Owner during construction period by separate agreement with Contractor.
- D. Specific requirements for warranties for the Work and products and installations that are specified to be warrantee are included in the individual Sections of Divisions 2 through 33.
- E. Disclaimers and limitations: Manufacturer's disclaimers and limitations on product warranties do not relieve the Contractor of the warranty on the Work that incorporates the products, nor does it relieve suppliers, manufacturers, and subcontractors required to countersign special warranties with the Contractor.
- F. Organize warranty documents into an orderly sequence based on the table of contents of Project Manual.
 - 1. Bind warranties and bonds in heavy-duty, three-ring, vinyl-covered, loose-leaf binders, thickness as necessary to accommodate contents, and sized to receive 8-1/2-by-11-inch paper.
 - 2. Address to: Executive Director of Architectural and Engineering Services, Office of Architectural and Engineering Services, University of Connecticut Box Unit-3038, Storrs, Connecticut 06269-3038
 - 3. Provide heavy paper dividers with plastic-covered tabs for each separate warranty. Mark tab to identify the product or installation. Provide a typed description of the product or installation, including the name of the product and the name, address, and telephone number of Installer.
 - 4. Identify each binder on the front and spine with the typed or printed title "WARRANTIES," Project name and number, and name of Contractor.

5. Warranty Electronic File: Scan warranties and bonds and assemble complete warranty and bond submittal package into a single indexed electronic PDF file with links enabling navigation to each item. Provide bookmarked table of contents at beginning of document.
6. All required guarantees/warranties will be by the respective company made out to the University of Connecticut.
7. All guarantees/warranties supplied by subcontractors or manufacturers shall be countersigned by the General Contractor.

G. Provide additional copies of each warranty to include in operation and maintenance manuals.

1.11 REVENUE SERVICES REQUIREMENTS

- A. Upon receipt of the Certificate of Substantial Completion, the Contractor shall submit the following information required by the Connecticut Department of Revenue Services.
 1. The identity and addresses of all subcontractors performing work on the project.
 2. The Connecticut tax registration numbers of the General Contractors and all subcontractors.
 3. The Federal Social Security account numbers, or Federal Employer Identification numbers, or both, if applicable, for the General Contractor and all subcontractors.

PART 2 - PRODUCTS

2.1 MATERIALS

- A. Cleaning Agents: Use cleaning materials and agents recommended by manufacturer or fabricator of the surface to be cleaned. Do not use cleaning agents that are potentially hazardous to health or property or that might damage finished surfaces.
 1. Use cleaning products that comply with Green Seal's GS-37, or if GS-37 is not applicable, use products that comply with the California Code of Regulations maximum allowable VOC levels.

PART 3 - EXECUTION

3.1 FINAL CLEANING

- A. General: Perform final cleaning. Conduct cleaning and waste-removal operations to comply with local laws and ordinances and Federal and local environmental and antipollution regulations.
- B. Cleaning: Employ experienced workers or professional cleaners for final cleaning. Clean each surface or unit to condition expected in an average commercial building cleaning and maintenance program. Comply with manufacturer's written instructions.
 1. Complete the following cleaning operations before requesting inspection for certification of Substantial Completion for entire Project or for a designated portion of Project:

- a. Clean Project site, yard, and grounds, in areas disturbed by construction activities, including landscape development areas, of rubbish, waste material, litter, and other foreign substances.
 - b. Clean catch basins affected by construction activities.
 - c. Sweep paved areas broom clean. Remove petrochemical spills, stains, and other foreign deposits.
 - d. Rake grounds that are neither planted nor paved to a smooth, even-textured surface.
 - e. Remove tools, construction equipment, machinery, and surplus material from Project site.
 - f. Remove snow and ice to provide safe access to building.
 - g. Clean exposed exterior and interior hard-surfaced finishes to a dirt-free condition, free of stains, films, and similar foreign substances. Avoid disturbing natural weathering of exterior surfaces. Restore reflective surfaces to their original condition.
 - h. Vacuum carpet and similar soft surfaces, removing debris and excess nap; clean according to manufacturer's recommendations if visible soil or stains remain.
 - i. Clean transparent materials, including mirrors and glass in doors and windows. Remove glazing compounds and other noticeable, vision-obscuring materials. Polish mirrors and glass, taking care not to scratch surfaces.
 - j. Remove labels that are not permanent.
 - k. Clean and polish tile and other glazed surfaces affected by construction activity.
 - l. Clean and polish finish hardware affected by construction activity.
 - m. Clean exposed surfaces of diffusers, registers, and grills affected by construction activity.
 - n. Clean light fixtures, lamps, globes, and reflectors to function with full efficiency that were affected by construction activity.
 - o. Leave Project clean and ready for occupancy.
- C. Pest Control: Comply with pest control requirements in Division 01 Section "Temporary Facilities and Controls." Prepare written report.
- D. Removal of Protection: Remove temporary protection and facilities installed for protection of the Work during construction.
- E. Compliance: Comply with regulations of authorities having jurisdiction and safety standards for cleaning. Do not burn waste materials. Do not bury debris or excess materials on the Owner's property. Do not discharge volatile, harmful or dangerous materials into drainage systems. Remove waste materials from the site and dispose of in a lawful manner.
1. Where extra materials of value remaining after completion of associated Work have become the Owner's property, arrange for disposition of these materials as directed.

3.2 REPAIR OF THE WORK

- A. Complete repair and restoration operations before requesting inspection for determination of Substantial Completion.
- B. Repair or remove and replace defective construction. Repairing includes replacing defective parts, refinishing damaged surfaces, touching up with matching materials, and properly adjusting operating equipment. Where damaged or worn items cannot be repaired or restored, provide replacements. Remove and replace operating components that cannot be repaired. Restore damaged construction and permanent facilities used during construction to specified condition.

1. Remove and replace chipped, scratched, and broken glass, reflective surfaces, and other damaged transparent materials.
2. Touch up and otherwise repair and restore marred or exposed finishes and surfaces. Replace finishes and surfaces that already show evidence of repair or restoration.
 - a. Do not paint over "UL" and other required labels and identification, including mechanical and electrical nameplates. Remove paint applied to required labels and identification.
3. Replace parts subject to operating conditions during construction that may impede operation or reduce longevity.
4. Replace burned-out bulbs, bulbs noticeably dimmed by hours of use, and defective and noisy starters in fluorescent and mercury vapor fixtures to comply with requirements for new fixtures.

3.3 CERTIFICATIONS

- A. The Contractor, at complete of construction, shall provide to the University a "Certificate of Substantial Compliance" bearing original signatures of an officer of the company stating: "this is to CERTIFY that, in my professional opinion, the complete structure/renovations described above is in substantial compliance with the approved construction documents on file with the University of Connecticut. Minor deviations and special stipulations are noted below (if any)"
- B. Prior to Owners' approval and acceptance, mechanical and electrical systems shall be fully operational.

PART 4 - SCHEDULES

4.1 SCHEDULE OF WARRANTIES

- A. Schedule: Provide warranties and bonds on products and installations as specified in the following Sections:
 1. Section 02660 - Underground Steam and Condensate Piping
 2. Section 02938 - Planting

END OF SECTION 01-7700



PUNCH LIST

Project: _____

From (A/E): _____

Site Visit Date: _____

To (Contractor): _____

A/E Project Number: _____

Contract For: _____

The following items require the attention of the Contractor for completion or correction. This list may not be all-inclusive, and the failure to include any items on this list does not alter the responsibility of the Contractor to complete all Work in accordance with the Contract Documents.

Item Number	Room Number	Location (Area)	Description	Correction/Completion Date	Verification A/E Check
-------------	-------------	-----------------	-------------	----------------------------	------------------------

Attachments

Signed by: _____ Date: _____

Copies: Owner Consultants _____ _____ _____ _____ _____ _____ _____ File

SECTION 01-7823 - OPERATION AND MAINTENANCE DATA

PART 1 - GENERAL

1.1 RELATED DOCUMENTS

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

1.2 SUMMARY

- A. Section includes administrative and procedural requirements for preparing operation and maintenance manuals, including the following:
 - 1. Operation and maintenance documentation directory.
 - 2. Emergency manuals.
 - 3. Operation manuals for systems, subsystems, and equipment.
 - 4. Product maintenance manuals.
 - 5. Systems and equipment maintenance manuals.
- B. Related Requirements:
 - 1. Division 01 Section "Submittal Procedures" for submitting copies of submittals for operation and maintenance manuals.
 - 2. Divisions 02 through 33 Sections for specific operation and maintenance manual requirements for the Work in those Sections.

1.3 DEFINITIONS

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

1.4 CLOSEOUT SUBMITTALS

- A. Manual Content: Operations and maintenance manual content is specified in individual Specification Sections to be reviewed at the time of Section submittals. Submit reviewed manual content formatted and organized as required by this Section.
 - 1. Architect will comment on whether content of operations and maintenance submittals are acceptable.
 - 2. Where applicable, clarify and update reviewed manual content to correspond to revisions and field conditions.

- B. Format: Submit operations and maintenance manuals in the following format:
1. PDF electronic file. Assemble each manual into a composite electronically indexed file. Submit on digital media acceptable to Architect.
 - a. Name each indexed document file in composite electronic index with applicable item name. Include a complete electronically linked operation and maintenance directory.
 - b. Enable inserted reviewer comments on draft submittals.
 2. Three paper copies, separately bound. Include a complete operation and maintenance directory. Enclose title pages and directories in clear plastic sleeves.
- C. Initial Manual Submittal: Submit draft copy of each manual at least 30 days before commencing demonstration and training. Architect will comment on whether general scope and content of manual are acceptable.
- D. Final Manual Submittal: Submit each manual in final form prior to requesting inspection for Substantial Completion and at least 15 days before commencing demonstration and training. Architect will return copy with comments.
1. Correct or revise each manual to comply with Architect's comments. Submit copies of each corrected manual within 15 days of receipt of Architect's comments and prior to commencing demonstration and training.

PART 2 - PRODUCTS

2.1 OPERATION AND MAINTENANCE DOCUMENTATION DIRECTORY

- A. Directory: Prepare a single, comprehensive directory of emergency, operation, and maintenance data and materials, listing items and their location to facilitate ready access to desired information. Include a section in the directory for each of the following:
1. List of documents.
 2. List of systems.
 3. List of equipment.
 4. Table of contents.
- B. List of Systems and Subsystems: List systems alphabetically. Include references to operation and maintenance manuals that contain information about each system.
- C. List of Equipment: List equipment for each system, organized alphabetically by system. For pieces of equipment not part of system, list alphabetically in separate list.
- D. Tables of Contents: Include a table of contents for each emergency, operation, and maintenance manual.
- E. Identification: In the documentation directory and in each operation and maintenance manual, identify each system, subsystem, and piece of equipment with same designation used in the Contract Documents. If no designation exists, assign a designation according to ASHRAE Guideline 4, "Preparation of Operating and Maintenance Documentation for Building Systems."

2.2 REQUIREMENTS FOR EMERGENCY, OPERATION, AND MAINTENANCE MANUALS

- A. Organization: Unless otherwise indicated, organize each manual into a separate section for each system and subsystem, and a separate section for each piece of equipment not part of a system. Each manual shall contain the following materials, in the order listed:
1. Title page.
 2. Table of contents.
 3. Manual contents.
- B. Title Page: Include the following information:
1. Subject matter included in manual.
 2. Name and address of Project.
 3. Name and address of Owner.
 4. Date of submittal.
 5. Name and contact information for Contractor.
 6. Name and contact information for Architect.
 7. Name and contact information for Commissioning Authority, (if applicable).
 8. Names and contact information for major consultants to the Architect that designed the systems contained in the manuals.
 9. Cross-reference to related systems in other operation and maintenance manuals.
- C. Table of Contents: List each product included in manual, identified by product name, indexed to the content of the volume, and cross-referenced to Specification Section number in Project Manual.
1. If operation or maintenance documentation requires more than one volume to accommodate data, include comprehensive table of contents for all volumes in each volume of the set.
- D. Manual Contents: Organize into sets of manageable size. Arrange contents alphabetically by system, subsystem, and equipment. If possible, assemble instructions for subsystems, equipment, and components of one system into a single binder.
- E. Manuals, Electronic Files: Submit manuals in the form of a multiple file composite electronic PDF file for each manual type required.
1. Electronic Files: Use electronic files prepared by manufacturer where available. Where scanning of paper documents is required, configure scanned file for minimum readable file size.
 2. File Names and Bookmarks: Enable bookmarking of individual documents based on file names. Name document files to correspond to system, subsystem, and equipment names used in manual directory and table of contents. Group documents for each system and subsystem into individual composite bookmarked files, then create composite manual, so that resulting bookmarks reflect the system, subsystem, and equipment names in a readily navigated file tree. Configure electronic manual to display bookmark panel on opening file.
- F. Manuals, Paper Copy: Submit manuals in the form of hard copy, bound and labeled volumes.
1. Binders: Heavy-duty, three-ring, vinyl-covered, loose-leaf binders, in thickness necessary to accommodate contents, sized to hold 8-1/2-by-11-inch paper; with clear plastic sleeve on spine to hold label describing contents and with pockets inside covers to hold folded oversize sheets.

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

2.3 EMERGENCY MANUALS

- A. Content: Organize manual into a separate section for each of the following:
 1. Type of emergency.
 2. Emergency instructions.
 3. Emergency procedures.
- B. Type of Emergency: Where applicable for each type of emergency indicated below, include instructions and procedures for each system, subsystem, piece of equipment, and component:
 1. Fire.
 2. Flood.
 3. Gas leak.
 4. Water leak.
 5. Power failure.
 6. Water outage.
 7. System, subsystem, or equipment failure.
 8. Chemical release or spill.
- C. Emergency Instructions: Describe and explain warnings, trouble indications, error messages, and similar codes and signals. Include responsibilities of Owner's operating personnel for notification of Installer, supplier, and manufacturer to maintain warranties.
- D. Emergency Procedures: Include the following, as applicable:

1. Instructions on stopping.
2. Shutdown instructions for each type of emergency.
3. Operating instructions for conditions outside normal operating limits.
4. Required sequences for electric or electronic systems.
5. Special operating instructions and procedures.

2.4 OPERATION MANUALS

A. Content: In addition to requirements in this Section, include operation data required in individual Specification Sections and the following information:

1. System, subsystem, and equipment descriptions. Use designations for systems and equipment indicated on Contract Documents.
2. Performance and design criteria if Contractor has delegated design responsibility.
3. Operating standards.
4. Operating procedures.
5. Operating logs.
6. Wiring diagrams.
7. Control diagrams.
8. Piped system diagrams.
9. Precautions against improper use.
10. License requirements including inspection and renewal dates.

B. Descriptions: Include the following:

1. Product name and model number. Use designations for products indicated on Contract Documents.
2. Manufacturer's name.
3. Equipment identification with serial number of each component.
4. Equipment function.
5. Operating characteristics.
6. Limiting conditions.
7. Performance curves.
8. Engineering data and tests.
9. Complete nomenclature and number of replacement parts.

C. Operating Procedures: Include the following, as applicable:

1. Startup procedures.
2. Equipment or system break-in procedures.
3. Routine and normal operating instructions.
4. Regulation and control procedures.
5. Instructions on stopping.
6. Normal shutdown instructions.
7. Seasonal and weekend operating instructions.
8. Required sequences for electric or electronic systems.
9. Special operating instructions and procedures.

D. Systems and Equipment Controls: Describe the sequence of operation, and diagram controls as installed.

- E. Piped Systems: Diagram piping as installed, and identify color-coding where required for identification.

2.5 PRODUCT MAINTENANCE MANUALS

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

2.6 SYSTEMS AND EQUIPMENT MAINTENANCE MANUALS

- A. Content: For each system, subsystem, and piece of equipment not part of a system, include source information, manufacturers' maintenance documentation, maintenance procedures, maintenance and service schedules, spare parts list and source information, maintenance service contracts, and warranty and bond information, as described below.
- B. Source Information: List each system, subsystem, and piece of equipment included in manual, identified by product name and arranged to match manual's table of contents. For each product, list name, address, and telephone number of Installer or supplier and maintenance service agent, and cross-reference Specification Section number and title in Project Manual and drawing or schedule designation or identifier where applicable.

- C. Manufacturers' Maintenance Documentation: Manufacturers' maintenance documentation including the following information for each component part or piece of equipment:
1. Standard maintenance instructions and bulletins.
 2. Drawings, diagrams, and instructions required for maintenance, including disassembly and component removal, replacement, and assembly.
 3. Identification and nomenclature of parts and components.
 4. List of items recommended to be stocked as spare parts.
- D. Maintenance Procedures: Include the following information and items that detail essential maintenance procedures:
1. Test and inspection instructions.
 2. Troubleshooting guide.
 3. Precautions against improper maintenance.
 4. Disassembly; component removal, repair, and replacement; and reassembly instructions.
 5. Aligning, adjusting, and checking instructions.
 6. Demonstration and training video recording, if available.
- E. Maintenance and Service Schedules: Include service and lubrication requirements, list of required lubricants for equipment, and separate schedules for preventive and routine maintenance and service with standard time allotment.
1. Scheduled Maintenance and Service: Tabulate actions for daily, weekly, monthly, quarterly, semiannual, and annual frequencies.
 2. Maintenance and Service Record: Include manufacturers' forms for recording maintenance.
- F. Spare Parts List and Source Information: Include lists of replacement and repair parts, with parts identified and cross-referenced to manufacturers' maintenance documentation and local sources of maintenance materials and related services.
- G. Maintenance Service Contracts: Include copies of maintenance agreements with name and telephone number of service agent.
- H. Warranties and Bonds: Include copies of warranties and bonds and lists of circumstances and conditions that would affect validity of warranties or bonds.
1. Include procedures to follow and required notifications for warranty claims.

PART 3 - EXECUTION

3.1 MANUAL PREPARATION

- A. Operation and Maintenance Documentation Directory: Prepare a separate manual that provides an organized reference to emergency, operation, and maintenance manuals.
- B. Emergency Manual: Assemble a complete set of emergency information indicating procedures for use by emergency personnel and by Owner's operating personnel for types of emergencies indicated.

- C. Product Maintenance Manual: Assemble a complete set of maintenance data indicating care and maintenance of each product, material, and finish incorporated into the Work.
- D. Operation and Maintenance Manuals: Assemble a complete set of operation and maintenance data indicating operation and maintenance of each system, subsystem, and piece of equipment not part of a system.
 - 1. Engage a factory-authorized service representative to assemble and prepare information for each system, subsystem, and piece of equipment not part of a system.
 - 2. Prepare a separate manual for each system and subsystem, in the form of an instructional manual for use by Owner's operating personnel.
- E. Manufacturers' Data: Where manuals contain manufacturers' standard printed data, include only sheets pertinent to product or component installed. Mark each sheet to identify each product or component incorporated into the Work. If data include more than one item in a tabular format, identify each item using appropriate references from the Contract Documents. Identify data applicable to the Work and delete references to information not applicable.
 - 1. Prepare supplementary text if manufacturers' standard printed data are not available and where the information is necessary for proper operation and maintenance of equipment or systems.
- F. Drawings: Prepare drawings supplementing manufacturers' printed data to illustrate the relationship of component parts of equipment and systems and to illustrate control sequence and flow diagrams. Coordinate these drawings with information contained in record Drawings to ensure correct illustration of completed installation.
 - 1. Do not use original project record documents as part of operation and maintenance manuals.
 - 2. Comply with requirements of newly prepared record Drawings in Division 01 Section "Project Record Documents."
- G. Comply with Division 01 Section "Closeout Procedures" for schedule for submitting operation and maintenance documentation.

END OF SECTION 01-7823

SECTION 01-7839 - PROJECT RECORD DOCUMENTS

PART 1 - GENERAL

1.1 RELATED DOCUMENTS

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

1.2 SUMMARY

- A. Section includes administrative and procedural requirements for project record documents, including the following:
 - 1. Record Drawings.
 - 2. Record Specifications.
 - 3. Record Product Data.
 - 4. Miscellaneous record submittals.
- B. Related Requirements:
 - 1. Division 01 Section "Closeout Procedures" for general closeout procedures.
 - 2. Division 01 Section "Operation and Maintenance Data" for operation and maintenance manual requirements.
 - 3. Divisions 02 through 33 Sections for specific requirements for project record documents of the Work in those Sections.

1.3 CLOSEOUT SUBMITTALS

- A. Record Drawings: Comply with the following:
 - 1. Number of Copies: Submit copies of record Drawings as follows:
 - a. Initial Submittal:
 - 1) Submit one (1) paper-copy set of marked-up record prints.
 - 2) Architect will indicate whether general scope of changes, additional information recorded, and quality of drafting are acceptable.
 - b. Final Submittal:
 - 1) Submit one (1) paper-copy set of marked-up record prints.
 - 2) Print each drawing, whether or not changes and additional information were recorded.

- B. Record Specifications: Submit one paper copy of Project's Specifications, including addenda and contract modifications.
- C. Record Product Data: Submit one paper copy of each submittal.
 - 1. Where record Product Data are required as part of operation and maintenance manuals, submit duplicate marked-up Product Data as a component of manual.
- D. Miscellaneous Record Submittals: See other Specification Sections for miscellaneous record-keeping requirements and submittals in connection with various construction activities. Submit one paper copy of each submittal.
- E. Reports: Submit written report monthly indicating items incorporated into project record documents concurrent with progress of the Work, including revisions, concealed conditions, field changes, product selections, and other notations incorporated.

PART 2 - PRODUCTS

2.1 RECORD DRAWINGS

- A. Record Prints: Maintain one set of marked-up paper copies of the Contract Drawings and Shop Drawings, incorporating new and revised drawings as modifications are issued.
 - 1. Preparation: Mark record prints to show the actual installation where installation varies from that shown originally. Require individual or entity who obtained record data, whether individual or entity is Installer, subcontractor, or similar entity, to provide information for preparation of corresponding marked-up record prints.
 - a. Give particular attention to information on concealed elements that would be difficult to identify or measure and record later.
 - b. Accurately record information in an acceptable drawing technique.
 - c. Record data as soon as possible after obtaining it.
 - d. Record and check the markup before enclosing concealed installations.
 - e. Cross-reference record prints to corresponding archive photographic documentation.
 - 2. Content: Types of items requiring marking include, but are not limited to, the following:
 - a. Dimensional changes to Drawings.
 - b. Revisions to details shown on Drawings.
 - c. Depths of foundations below first floor.
 - d. Locations and depths of underground utilities.
 - e. Revisions to routing of piping and conduits.
 - f. Revisions to electrical circuitry.
 - g. Actual equipment locations.
 - h. Duct size and routing.
 - i. Locations of concealed internal utilities.
 - j. Changes made by Change Order or Construction Change Directive.
 - k. Changes made following Architect's written orders.
 - l. Details not on the original Contract Drawings.

- m. Field records for variable and concealed conditions.
 - n. Record information on the Work that is shown only schematically.
3. Mark the Contract Drawings and Shop Drawings completely and accurately. Use personnel proficient at recording graphic information in production of marked-up record prints.
 4. Mark record sets with erasable, red-colored pencil. Use other colors to distinguish between changes for different categories of the Work at same location.
 5. Mark important additional information that was either shown schematically or omitted from original Drawings.
 6. Note Construction Change Directive numbers, alternate numbers, Change Order numbers, and similar identification, where applicable.
- B. Format: Identify and date each record Drawing; include the designation "PROJECT RECORD DRAWING" in a prominent location.
1. Record Prints: Organize record prints and newly prepared record Drawings into manageable sets. Bind each set with durable paper cover sheets. Include identification on cover sheets.
 2. Identification: As follows:
 - a. Project name.
 - b. Date.
 - c. Designation "PROJECT RECORD DRAWINGS."
 - d. Name of Architect and or Construction Manager.
 - e. Name of Contractor.

2.2 RECORD SPECIFICATIONS

- A. Preparation: Mark Specifications to indicate the actual product installation where installation varies from that indicated in Specifications, addenda, and contract modifications.
1. Give particular attention to information on concealed products and installations that cannot be readily identified and recorded later.
 2. Mark copy with the proprietary name and model number of products, materials, and equipment furnished, including substitutions and product options selected.
 3. Record the name of manufacturer, supplier, Installer, and other information necessary to provide a record of selections made.
 4. For each principal product, indicate whether record Product Data has been submitted in operation and maintenance manuals instead of submitted as record Product Data.
 5. Note related Change Orders and record Drawings where applicable.
- B. Format: Submit Record Specifications as paper copy.

2.3 RECORD PRODUCT DATA

- A. Preparation: Mark Product Data to indicate the actual product installation where installation varies substantially from that indicated in Product Data submittal.
1. Give particular attention to information on concealed products and installations that cannot be readily identified and recorded later.

2. Include significant changes in the product delivered to Project site and changes in manufacturer's written instructions for installation.
3. Note related Change Orders] and record Drawings where applicable.

B. Format: Submit record Product Data as paper copy.

2.4 MISCELLANEOUS RECORD SUBMITTALS

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

B. Format: Submit miscellaneous record submittals as paper copy.

PART 3 - EXECUTION

3.1 RECORDING AND MAINTENANCE

A. Recording: Maintain one copy of each submittal during the construction period for project record document purposes. Post changes and revisions to project record documents as they occur; do not wait until end of Project.

B. Maintenance of Record Documents and Samples: Store record documents and Samples in the field office apart from the Contract Documents used for construction. Do not use project record documents for construction purposes. Maintain record documents in good order and in a clean, dry, legible condition, protected from deterioration and loss. Provide access to project record documents for Architect's and Owner Representative's reference during normal working hours.

END OF SECTION 01-7839

SECTION 01-7900 - DEMONSTRATION AND TRAINING

PART 1 - GENERAL

1.1 RELATED DOCUMENTS

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

1.2 SUMMARY

- A. Section includes administrative and procedural requirements for instructing Owner's personnel, including the following:
 - 1. Demonstration of operation of systems, subsystems, and equipment.
 - 2. Training in operation and maintenance of systems, subsystems, and equipment.
- B. Related Requirements:
 - 1. Divisions 02 through 33 Sections for specific requirements for demonstration and training for products in those Sections.

1.3 INFORMATIONAL SUBMITTALS

- A. Instruction Program: Submit outline of instructional program for demonstration and training, including a list of training modules and a schedule of proposed dates, times, length of instruction time, and instructors' names for each training module. Include learning objective and outline for each training module.
 - 1. Indicate proposed training modules using manufacturer-produced demonstration and training video recordings for systems, equipment, and products in lieu of video recording of live instructional module.
- B. Attendance Record: For each training module, submit list of participants and length of instruction time.

1.4 QUALITY ASSURANCE

- A. Facilitator Qualifications: A firm or individual experienced in training or educating maintenance personnel in a training program similar in content and extent to that indicated for this Project, and whose work has resulted in training or education with a record of successful learning performance.
- B. Instructor Qualifications: A factory-authorized service representative, complying with requirements in Division 01 Section "Quality Requirements," experienced in operation and maintenance procedures and training.

- C. Pre-instruction Conference: Conduct conference at Project site to comply with requirements in Division 01 Section "Project Management and Coordination." Review methods and procedures related to demonstration and training including, but not limited to, the following:
1. Inspect and discuss locations and other facilities required for instruction.
 2. Review and finalize instruction schedule and verify availability of educational materials, instructors' personnel, audiovisual equipment, and facilities needed to avoid delays.
 3. Review required content of instruction.
 4. For instruction that must occur outside, review weather and forecasted weather conditions and procedures to follow if conditions are unfavorable.

1.5 COORDINATION

- A. Coordinate instruction schedule with Owner's operations. Adjust schedule as required to minimize disrupting Owner's operations and to ensure availability of Owner's personnel.
- B. Coordinate instructors, including providing notification of dates, times, length of instruction time, and course content.
- C. Coordinate content of training modules with content of approved emergency, operation, and maintenance manuals. Do not submit instruction program until operation and maintenance data has been reviewed and approved by Architect.

1.6 PRODUCTS

1.7 INSTRUCTION PROGRAM

- A. Program Structure: Develop an instruction program that includes individual training modules for each system and for equipment not part of a system, as required by individual Specification Sections.
- B. Training Modules: Develop a learning objective and teaching outline for each module. Include a description of specific skills and knowledge that participant is expected to master. For each module, include instruction for the following as applicable to the system, equipment, or component:
1. Basis of System Design, Operational Requirements, and Criteria: Include the following:
 - a. System, subsystem, and equipment descriptions.
 - b. Performance and design criteria if Contractor is delegated design responsibility.
 - c. Operating standards.
 - d. Regulatory requirements.
 - e. Equipment function.
 - f. Operating characteristics.
 - g. Limiting conditions.
 - h. Performance curves.
 2. Documentation: Review the following items in detail:
 - a. Emergency manuals.

- b. Operations manuals.
 - c. Maintenance manuals.
 - d. Project record documents.
 - e. Identification systems.
 - f. Warranties and bonds.
 - g. Maintenance service agreements and similar continuing commitments.
3. Emergencies: Include the following, as applicable:
 - a. Instructions on meaning of warnings, trouble indications, and error messages.
 - b. Instructions on stopping.
 - c. Shutdown instructions for each type of emergency.
 - d. Operating instructions for conditions outside of normal operating limits.
 - e. Sequences for electric or electronic systems.
 - f. Special operating instructions and procedures.
4. Operations: Include the following, as applicable:
 - a. Startup procedures.
 - b. Equipment or system break-in procedures.
 - c. Routine and normal operating instructions.
 - d. Regulation and control procedures.
 - e. Control sequences.
 - f. Safety procedures.
 - g. Instructions on stopping.
 - h. Normal shutdown instructions.
 - i. Operating procedures for emergencies.
 - j. Operating procedures for system, subsystem, or equipment failure.
 - k. Seasonal and weekend operating instructions.
 - l. Required sequences for electric or electronic systems.
 - m. Special operating instructions and procedures.
5. Adjustments: Include the following:
 - a. Alignments.
 - b. Checking adjustments.
 - c. Noise and vibration adjustments.
 - d. Economy and efficiency adjustments.
6. Troubleshooting: Include the following:
 - a. Diagnostic instructions.
 - b. Test and inspection procedures.
7. Maintenance: Include the following:
 - a. Inspection procedures.
 - b. Types of cleaning agents to be used and methods of cleaning.
 - c. List of cleaning agents and methods of cleaning detrimental to product.
 - d. Procedures for routine cleaning
 - e. Procedures for preventive maintenance.

- f. Procedures for routine maintenance.
 - g. Instruction on use of special tools.
8. Repairs: Include the following:
- a. Diagnosis instructions.
 - b. Repair instructions.
 - c. Disassembly; component removal, repair, and replacement; and reassembly instructions.
 - d. Instructions for identifying parts and components.
 - e. Review of spare parts needed for operation and maintenance.

PART 2 - EXECUTION

2.1 PREPARATION

- A. Assemble educational materials necessary for instruction, including documentation and training module. Assemble training modules into a training manual organized in coordination with requirements in Division 01 Section "Operations and Maintenance Data."
- B. Set up instructional equipment at instruction location.

2.2 INSTRUCTION

- A. Facilitator: Engage a qualified facilitator to prepare instruction program and training modules, to coordinate instructors, and to coordinate between Contractor and Owner for number of participants, instruction times, and location.
- B. Engage qualified instructors to instruct Owner's personnel to adjust, operate, and maintain systems, subsystems, and equipment not part of a system.
 - 1. Owner will furnish Contractor with names and positions of participants.
- C. Scheduling: Provide instruction at mutually agreed on times. For equipment that requires seasonal operation, provide similar instruction at start of each season.
 - 1. Schedule training with Owner through Owners Representative with at least seven days' advance notice.
- D. Training Location and Reference Material: Conduct training on-site in the completed and fully operational facility using the actual equipment in-place. Conduct training using final operation and maintenance data submittals.
- E. Cleanup: Collect used and leftover educational materials and give to Owner. Remove instructional equipment. Restore systems and equipment to condition existing before initial training use.

END OF SECTION 017900

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SECTION 02001 – MAINTENANCE AND PROTECTION OF TRAFFIC

PART 1 - GENERAL

1.1 RELATED DOCUMENTS

- A. The Contract Drawings, General Conditions and Supplementary General Conditions apply to this Section of the Specifications.

1.2 SUMMARY

- A. The Contractor shall keep all adjacent roadways and pedestrian walkways open to traffic during the course of this project.
- B. The travel lanes and pedestrian passways shall be drained and kept reasonably smooth and in suitable condition at all times in order to provide minimum interference to traffic consistent with the proper prosecution of the work.
- C. Suitable ingress and egress shall be provided at all times where required, for all intersecting roads, for all abutting properties and all construction sites having legal access.
- D. The Contractor shall supply, install, maintain, adjust, move, relocate, and store all signs, suitable lighted barricades, traffic cones, and traffic delineators, as necessary to carry out the traffic routing plan and maintain vehicular and pedestrian traffic. All of this work shall meet with the requirements of the Local Regulatory Agencies, the Owner and the UConn Facilities Department.
- E. The Contractor shall employ trafficmen as required to maintain traffic, prevent damage or injury to persons, vehicles or other property and to minimize the inconvenience and danger to the public by his construction operations. Trafficmen shall be as identified under Section 02002 Trafficmen.
- F. Clean all adjacent pavement areas on a regular basis as directed by the UConn Facilities Department.
- G. Provide snow removal in the construction area, access roads, storage yards, etc.

1.3 QUALITY ASSURANCE

- A. Codes and Standards: Comply with provisions of following, except otherwise indicated:
 - 1. Reference to "Form 816" means the State of Connecticut Department of Transportation "Standard Specification for Roads, Bridges and Incidental Construction, 2004", including any interim and supplemental specifications.
 - 2. "Manual of Uniform Traffic Control Devices", U. S. Department of Transportation, 2003 Edition.

PART 2 - PRODUCTS

2.1 MATERIALS

- A. Construction Signing shall conform to Article 12.20.02 of the "Form 816".
- B. Traffic Cones shall conform to Article 9.77.02 of the "Form 816".
- C. Traffic Drums shall conform to Article 9.78.02 of "Form 816".
- D. Barricade Warning Lights shall conform to Article 9.76.02 of the "Form 816".

PART 3 - EXECUTION

3.1 CONSTRUCTION METHODS

- A. Maintenance and Protection of Traffic shall be performed in accordance with Article 9.71.03 of the "Form 816" and as modified.
- B. Traffic Drums shall be placed in accordance with Article 9.78.03 of the "Form 816".
- C. Construction Signing shall conform to Article 12.20.03 of "Form 816".
- D. Barricade Warning Lights shall conform to Article 9.76.03 of "Form 816".
- E. Trafficmen shall conform to Article 9.70 of "Form 816".
- F. Comply with the following requirements:
 - 1. The Contractor shall furnish lighted signs and maintain such signs as may be directed, or may be necessary for the safe regulation, or convenience of traffic. Said signs will be as specified on the Contract Drawings or elsewhere herein, or if not specified, they shall be adequate for the regulation, safety and convenience of traffic. The Contractor shall provide, erect, and maintain suitably lighted barricades, warning lights, etc., as needed, or as directed in order to keep people, animals and vehicles from excavations, obstacles, etc. The Contractor may be required to employ trafficmen and take other such reasonable means or precautions as the Technical Representative may direct, or as may be needed to prevent damage or injury to persons, vehicles, or other property, and to minimize the inconvenience and danger to the public by his construction operations. He shall arrange his operations to provide access to properties along the street including temporary bridges to driveways, and provide access to fire hydrants, manholes, gate boxes, or other utilities. Whenever any trench obstructs traffic in or to any public street, private driveway, or property entrance, the Contractor shall take such steps as required to maintain necessary traffic and access including temporary bridging if required. The Contractor shall confine his occupancy of public or traveled ways to the smallest space compatible with the efficient and safe performance of the work contemplated by the Contract.

2. The Contractor shall observe and obey all local and state laws, ordinances, regulations and permits in relation to the obstruction of streets and highways, keeping passageways open and protecting traffic where there may be danger from construction activities.
3. Suitable lighted barriers or barricades shall be furnished by the Contractor and put up and maintained at all times during the night or daytime, around all open ditches, trenches, excavations or other work potentially dangerous to traffic. Such barricades shall be as shown on the Contract Plans, or if not shown, will be constructed of 2 inch by 8 inch rough lumber, securely supported and braced at least 3 feet high above the ground. Barricades shall be placed on all sides and throughout the entire length and breadth of all open ditches, trenches, excavations, or other work which must be barred to the general public. Barricades shall be properly painted to the satisfaction of the UConn Facilities Department in order to retain a high degree of visibility to vehicular and pedestrian traffic.
4. The use of unauthorized or unapproved signs, barricades, drums, traffic cones or delineators will not be permitted.
5. All signs in any one signing pattern shall be mounted the same height above the roadway. The Contractor shall keep all signs in proper position, clean and legible at all times. Care shall be taken so that weeds, shrubbery, construction materials or equipment and soil are not allowed to obscure any sign, light, barricade or sightline. Signs that do not apply to existing conditions shall be removed or adjusted so that the legend is not visible to approaching traffic.
6. At least one lane shall be open to through traffic at all times during construction. A minimum lane width of 11 feet shall be free and clear for traffic movement. If it becomes necessary to detour or cut an area off, the Town of Mansfield, University Police and Fire Departments must first approve the traffic plan.
7. Should the Contractor or his employees neglect to set out and maintain barricades or lights, as required in these Specifications, the Owner immediately, and without notice, may furnish, install and maintain barricades or lights. The cost thereof shall be borne by the Contractor and may be deducted from any amount due or to become due to the Contractor under this Contract.
8. The Contractor will be held responsible for any damages that the Local Public Agency, State, Governmental Units, or their heirs or assigns may have to pay as a consequence of the Contractor's failure to protect the public from injury, and the same way be deducted from any payments that are due or may become due to the Contractor under this Contract. The Contractor shall include in the scope of work for "Maintenance and Protection of Traffic" bridging for trenches at all street and driveway crossings in such manner as the Technical Representative may direct in order that the traffic on intersecting streets may not be blocked, and in order that entrance may be made to properties along the line of work.
9. If the Contractor's operations or occupancy of any public street or highway, or the uneven surfaces over any trenches being maintained by the Contractor shall interfere with the removal or sanding of snow or ice by the public authorities or adjoining landowners, in an ordinary manner with regular highway equipment, the Contractor shall be required to perform such services for the public authorities or adjoining owners without charge. If the Contractor

fails to do so, he shall reimburse the said authorities or adjoining owners or the Local Public Agency for any additional cost to them for doing such work occasioned by conditions arising from the Contractor's operations, occupancy, or trench surfaces, together with any damage to the equipment of said parties by those conditions, or claims of any parties for damage or injury or loss by reason of failure to remove snow or ice or to sand icy spots under these conditions.

10. The Contractor shall submit a detailed plan for review and approval by the Engineer and UConn Facilities Department for maintenance and protection of traffic within 2 weeks of Contract signing and shall update this plan on a monthly basis.

3.2 TRAFFIC CONTROL PATTERNS

- A. The following guidelines shall assist field personnel in determining when and what type of traffic control patterns to use for various situations. These guidelines shall provide for the safe and efficient movement of traffic through work zones and enhance the safety of work forces in the work area.
- B. Traffic control patterns shall be used when a work operation requires that all or part of any vehicle or work area protrudes onto any part of a travel lane or shoulder. For each situation, the installation of traffic control devices shall be based on the following:
 - Speed and volume of traffic
 - Duration of operation
 - Exposure to hazards
- C. Traffic control patterns shall be uniform, neat and orderly so as to command respect from the motorist.
- D. In the case of a horizontal or vertical sight restriction in advance of the work area, the traffic control pattern shall be extended to provide adequate sight distance for approaching traffic.
- E. If a lane reduction taper is required to shift traffic, the entire length of the taper should be installed on a tangent section of roadway so that the entire taper area can be seen by the motorist.
- F. Any existing signs that are in conflict with the traffic control patterns shall be removed, covered, or turned so that they are not readable by oncoming traffic.
- G. When installing a traffic control pattern, a Buffer Area should be provided and this area shall be free of equipment, workers, materials and parked vehicles.
- H. Traffic control patterns will not be required when vehicles are on an emergency patrol type activity or when a short duration stop is made and the equipment can be contained within the shoulder. Flashing lights and appropriate trafficperson shall be used when required.
- I. Although each situation must be dealt with individually, conformity with the typical traffic control plans contained herein is required. In a situation not adequately covered by the typical traffic control plans, the Contractor must contact the Engineer for assistance prior to setting up a traffic control pattern.

3.3 ALLOWABLE ADJUSTMENT OF SIGNS AND DEVICES SHOWN ON THE TRAFFIC CONTROL PLANS

- A. The traffic control plans contained herein show the location and spacing of signs and devices under ideal conditions. Signs and devices should be installed as shown on these plans whenever possible.
- B. The proper application of the traffic control plans and installation of traffic control devices depends on actual field conditions.
- C. Adjustments to the traffic control plans shall be made only at the direction of the Engineer to improve the visibility of the signs and devices and to better control traffic operations. Adjustments to the traffic control plans shall be based on safety of work forces and motorists, abutting property requirements, driveways, side roads, and the vertical and horizontal curvature of the roadway.
- D. The Engineer may require that the traffic control pattern be located significantly in advance of the work area to provide better sight line to the signing and safer traffic operations through the work zone.
- E. Table I indicates the minimum taper length required for a lane closure based on the posted speed limit of the roadway. These taper lengths shall only be used when the recommended taper lengths shown on the traffic control plans cannot be achieved.

TABLE I – MINIMUM TAPER LENGTHS

POSTED SPEED LIMIT MILES PER HOUR	MINIMUM TAPER LENGTH IN FEET FOR A SINGLE LANE CLOSURE
30 OR LESS	180
35	250
40	320
45	540
50	600
55	660
65	780

3.4 INSTALLING AND REMOVING TRAFFIC CONTROL PATTERNS

- A. Lane Closures shall be installed beginning with the advanced warning signs and proceeding forward toward the work area.
- B. Lane Closures shall be removed in the reverse order, beginning at the work area, or end of the traffic control pattern, and proceeding back toward the advanced warning signs.
- C. Stopping traffic may be allowed:
 - During trenching, paving, milling operations, etc. where, in the middle of the operation, it is necessary to flip the pattern to complete the operation on the other half of the roadway and traffic should not travel across the longitudinal joint or difference in roadway elevation.

- To move slow moving equipment across live traffic lanes into the work area.
- D. Under certain situations when the safety of the traveling public and/or that of the workers may be compromised due to conditions such as traffic volume, speed, roadside obstructions, or sight line deficiencies, as determined by the Engineer, traffic may be briefly impeded while installing and/or removing the advanced warning signs and the first ten traffic cones/drums only. Appropriate measures shall be taken to safely slow traffic.
- E. The Contractor must adhere to using the proper signs, placing the signs correctly, and ensuring the proper spacing of signs.
- F. Additional devices are required on driveways and intersecting roads to warn and/or move traffic into the proper travel path prior to merging/exiting with/from the main line traffic. This shall be completed before installing the mainline pattern past the driveway or intersecting roadway.
- G. Prior to installing a pattern, any conflicting existing signs shall be covered with an opaque material. Once the pattern is removed, the existing signs shall be uncovered.

PART 4 - METHOD OF MEASUREMENT AND BASIS OF PAYMENT

4.1 MEASUREMENT AND PAYMENT

- A. There shall be no separate measurement for payment for work under this Section. The cost of this work shall be included in the lump sum bid for this project.

SECTION 02002 – TRAFFICMEN

PART 1 - GENERAL

1.1 RELATED DOCUMENTS

- A. The Contract Drawings, General Conditions and Supplementary General Conditions apply to this Section of the Specifications.

1.2 SUMMARY

- A. The work under this Section shall include:
1. The Contractor shall provide the services of uniformed Town of Mansfield Police or State Police as trafficmen at the following town roads or as ordered by the Engineer's Representative:
 - a. Route 195
 - b. North Eagleville Road
 2. Article 9.70.01 of the Form 816 shall apply.
 3. The Contractor shall anticipate utilizing uniformed trafficmen (not Police Officers) for construction on all other town roads.

PART 2 - PRODUCTS

Not applicable to this Section.

PART 3 - EXECUTION

Not applicable to this Section.

PART 4 - METHOD OF MEASUREMENT AND BASIS OF PAYMENT

4.1 MEASUREMENT AND PAYMENT

- A. There shall be no separate measurement for payment for work under this Section. The cost of this work shall be included in the lump sum bid for this project.

END OF SECTION 02002

SECTION 02015 - TEST PITS

PART 1 - GENERAL

1.1 RELATED DOCUMENTS

- A. The Contract Drawings, General Conditions and Supplementary General Conditions apply to this Section of the Specifications.

1.2 SUMMARY

- A. The work of this Section includes the excavation of test pits where necessary to locate or examine utilities, subsurface structures, pipes, soils, groundwater, or any other obstacles or conditions.
- B. This work shall consist of the satisfactory removal of all materials including, but not limited to, sawcutting pavements, pavement removal, excavation, shoring and bracing, water removal from within pit, stockpiling, satisfactory disposal of surplus or unsuitable material, backfilling, compacting, pavement repair, etc.
- C. Test pits shall be dug as necessary for the Contractor to determine subsurface conditions as indicated on the Contract Drawings or as directed by the UConn Facilities Department.

PART 2 - PRODUCTS

2.1 MATERIALS

- A. Materials used for reconstruction of test pits shall be approved by the UConn Facilities Department.
- B. Unless otherwise shown or directed, replace excavated materials with equal or better materials.
- C. Unsuitable materials, as determined by the UConn Facilities Department shall be replaced with compacted granular fill.

PART 3 - EXECUTION

3.1 COORDINATION

- A. Coordinate excavation of test pits with respective utility company, University of Connecticut, Facilities Department, or other owners having facilities in the vicinity. Check with "Call Before You Dig", 1/800/922-4455 before digging.
- B. Give sufficient notice and allow ample delay time for others to perform necessary work.
- C. Notify the UConn Facilities Department one week in advance of digging each test pit.

3.2 CONSTRUCTION METHODS

- A. Perform all work in conformance with applicable safety codes.

- B. Sawcut pavement, curbs or other hard surface materials in neat and straight line. Excavate pits providing clean cut vertical sides. Provide sheeting, bracing and dewatering wherever necessary.
- C. Dig test pits so as to ensure that underground utilities or structures are not damaged. It shall be the Contractor's sole responsibility for any damages incurred during excavation operations. Any damages shall be repaired or replaced by the Contractor to the satisfaction of the Owner/UConn Facilities Department at the Contractor's own expense.
- D. The Contractor shall measure and record the size, configuration, exact horizontal (northing and easting coordinates – no ties) and vertical (elevation) location of all utilities, pipes or other obstacles uncovered in the pits. Indicate size of utilities being test pitted. Submit information in written (spreadsheet) or sketch form to the Engineer, UConn Facilities Department and respective utility companies for review. Notify the Engineer and UConn Facilities Department of any revealed conflicts which may require design revisions, relocations and/or adjustments as early as possible to avoid unnecessary delays. No work shall be started within areas of conflict until so authorized.
- E. Protect each pit with steel plates, other coverings, fences, barriers or other appropriate materials as deemed necessary.
- F. Do not backfill pits until authorized. Compact backfill materials to at least 95% of maximum density to the subgrade elevation or as otherwise directed.
- G. The surface of test pit areas shall be restored to a condition equal or better than original as approved by the UConn Facilities Department.

PART 4 - METHOD OF MEASUREMENT AND BASIS OF PAYMENT

4.1 MEASUREMENT AND PAYMENT

- A. There shall be no separate measurement for payment for work under this Section. The cost of this work shall be included in the lump sum bid for this project.

END OF SECTION 02015

SECTION 02072 - ABANDONING PIPES, CONDUITS AND UTILITY STRUCTURES

PART 1 - GENERAL

1.1 RELATED DOCUMENTS

- A. The Contract Drawings, General Conditions and Supplementary General Conditions shall apply to this Section of the Specifications.

1.2 SUMMARY

- A. The work under this Section shall consist of the abandoning of existing pipes, conduits and structures which are not removed during the construction of the work under this Contract and which shall be filled with sand and/or plugged as indicated on the Contract Drawings or as ordered by the Engineer.
- B. The Contractor shall coordinate the utility abandonment/demolition with all work shown on the Contract Drawings.

PART 2 - PRODUCTS

2.1 MATERIALS

- A. Plugs shall be of brick and mortar or as approved by the Engineer.
- B. Sand for filling the pipes or conduits shall be fine mason sand as approved by the Engineer.

PART 3 - EXECUTION

3.1 CONSTRUCTION METHODS

- A. Prior to abandoning any pipes or conduits under this Contract, it shall be the responsibility of the Contractor to ensure that no active connections to the pipes or conduits remain. Where the existing connections cannot be located during the excavation for the installation of the new work, the Contractor shall, by closed circuit television or visual inspection, carefully record the exact location of all existing connections thereto and reconnect the same to the new work as required. Should, after said abandoning, live connections be discovered, the Contractor shall be responsible for all damages caused thereby and it shall be his responsibility to perform all remedial work to correct same at no additional cost to the Owner.
- B. The Contractor shall fill the pipes or conduits by pumping or blowing sand through long hoses into the pipe or conduit and slowly backing the hose off or by some other method that is recommended by the Contractor and approved by the Engineer. Said filling will be done so that the pipe or conduit is completely filled. No more than 150 feet of pipe or conduits shall be filled at one time (75 feet from each end). The Contractor shall submit a plan of this procedure to the Engineer for approval. Wherever possible in larger pipes which are safer to enter, the laterals to the mainline pipe or conduit to be abandoned will also be plugged.

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- C. After the pipe or conduit is filled with mason sand if required, the end of the pipe or conduit shall be plugged with brick and mortar for a minimum thickness of 8 inches.
 - D. The Engineer may direct that the Contractor not abandon pipes or conduits but direct that the same be removed. Removal thereof will be in accordance with the Section “Trench Excavation, Backfilling and Compaction”.
 - E. All structures shall have their roof slabs removed and floor slabs broken to permit the free passage of water. Only that portion of the walls from finished grade to a point five feet below grade need be removed.
 - F. The Contractor shall excavate as required to perform the work.
 - G. All pieces of broken masonry and rubble shall be removed and disposed of as directed by the Engineer.
 - H. Pipe or ducts entering or leaving the abandoned structure shall be sealed with concrete and masonry plugs.

PART 4 - METHOD OF MEASUREMENT AND BASIS OF PAYMENT

4.1 MEASUREMENT AND PAYMENT

- A. There shall be no separate measurement for payment for work under this Section. The cost of this work shall be included in the lump sum bid for this project.

END OF SECTION 02072

SECTION 02100 –CLEARING AND GRUBBING

PART 1 - GENERAL

1.1 RELATED DOCUMENTS

- A. Work Included: This Section generally includes site clearing as indicated on drawings, including excavation and backfilling for the following:
1. Protection of existing trees.
 2. Removal of trees and other vegetation.
 3. Topsoil stripping.
 4. Clearing and grubbing.
 5. Removing above-grade improvements.
 6. Removing below-grade improvements.

1.2 PROJECT CONDITIONS

- A. Traffic: Conduct site clearing to ensure minimum interference with roads, streets, walks, and other adjacent properties. Do not close or obstruct streets, or other occupied areas without permission from authorities having jurisdiction.
- B. Protection of Existing Improvements: Provide protection necessary to prevent damage to existing improvements indicated to remain.
1. Protect improvements on adjoining properties and on Town property.
 2. Restore damaged improvements to their original condition, as acceptable to property owners.
- C. Protection of Existing Trees and Vegetation: Protect existing trees and other vegetation indicated to remain, against unnecessary cutting, damage or smothering of trees by stockpiling within drip line, excess foot or vehicular traffic, or parking of vehicles within drip line. Provide temporary guards to protect trees and vegetation.
1. Water trees and other vegetation to remain within limits of contract work to maintain their health during construction.
 2. Protect roots over 1-1/2 inch diameter that are cut during construction. Coat cut faces with emulsified asphalt, or other acceptable coating. Temporarily cover exposed roots with wet burlap to prevent roots from drying out; cover with earth as soon as possible.

Repair or replace trees and vegetation indicated to remain which are damaged by construction operations, in a manner acceptable to the Owner. Employ a licensed arborist to repair damages to trees and shrubs.
 3. Replace trees which cannot be repaired and restored to full growth status, as determined by arborist.

PART 2 - PRODUCTS

- A. Not applicable to this Section.

PART 3 - EXECUTION

3.1 CLEARING AND GRUBBING

- A. General: Remove trees, shrubs, grass and other vegetation, improvements or obstructions as required to permit installation of new construction. "Removal" includes digging out and off-site disposing of stumps and roots.
1. Cut minor roots and branches of trees indicated to remain in a clean and careful manner, where such roots and branches obstruct new construction.
- B. Topsoil: Topsoil is defined as friable organic clay loam surface soil found in a depth of not less than 4 inches. Satisfactory topsoil is reasonably free of subsoil, clay lumps, stones, and other objects over 2 inches in diameter, and without weeds, roots, and other objectionable material.
1. Strip topsoil to whatever depths encountered in a manner to prevent intermingling with underlying subsoil or other objectionable material.
 - a. Remove heady growths of grass from areas before stripping.
 - b. Where existing trees are indicated to remain, leave existing topsoil in place within drip lines to protect root system.
 2. Stockpile topsoil in storage piles in areas indicated or directed. Construct storage piles to provide free drainage of surface water. Cover storage piles, if required, to prevent wind erosion.
 3. Dispose of unsuitable or excess topsoil same as specified for disposal of waste material.
- C. Clearing and Grubbing: Clear site of trees, shrubs and other vegetation, except for those indicated to be left standing.
1. Completely remove stumps, roots, and other debris protruding through ground surface.
 2. Use only hand methods for grubbing inside drip line of trees indicated to remain.
 3. Fill depressions caused by clearing and grubbing with satisfactory soil, unless further earthwork is indicated.
 - a. Place fill material in horizontal layers not exceeding 6 inches loose depth, and thoroughly compact to a density equal to adjacent original ground.
- D. Removal of Improvements: Remove existing above-grade and below-grade improvements as necessary for new construction.

N. EAGLEVILLE RD INFRA. R/R
PHASE II – YOUNG QUAD UTILITIES
AT THE UNIVERSITY OF CONNECTICUT
STORRS, CT
UCONN PROJ. #901954
URS JOB #36940200

CLEARING AND GRUBBING

02100-3

3.2 DISPOSAL OF WASTE MATERIALS

- A. Removal: Transport non-combustible waste materials and unsuitable topsoil materials to designated State approved landfill site and dispose of legally.

PART 4 - METHOD OF MEASUREMENT AND BASIS OF PAYMENT

4.1 MEASUREMENT AND PAYMENT

- A. There shall be no separate measurement for payment for work under this Section. The cost of this work shall be included in the lump sum bid for this project.

END OF SECTION 02100

SECTION 02118 - SAW CUT EXISTING PAVEMENT

PART 1 - GENERAL

1.1 RELATED DOCUMENTS

- A. The Contract Drawings, General Conditions and Supplementary General Conditions apply to this Section of the Specifications.

1.2 SUMMARY

- A. The work of this Section shall consist of saw cutting existing bituminous and concrete pavement or other encountered pavements, as well as curbs, sidewalks, etc., as necessary for installation of the proposed work.

PART 2 – PRODUCTS (Not Used)

PART 3 - EXECUTION

3.1 CONSTRUCTION METHODS

- A. All pavements to be removed shall be cut uniformly along lines as shown on the Contract Drawings or as directed.
- B. Concrete sidewalks and pavements and/or bases shall be cut with an approved concrete saw through a minimum of one third of the depth of the pavement or base. The remaining depth may be removed carefully by approved methods.
- C. Bituminous pavements/base shall be saw cut or other methods if straight edge can be attained.
- D. Bituminous curbs shall be cut at the designated lines. Stones or concrete curbs shall be removed to the nearest joint or saw cut as directed.

PART 4 - METHOD OF MEASUREMENT AND BASIS OF PAYMENT

4.1 MEASUREMENT AND PAYMENT

- A. There shall be no separate measurement for payment for work under this Section. The cost of this work shall be included in the lump sum bid for this project.

END OF SECTION 02118

SECTION 02150 - SHEETING AND STAYBRACING

PART 1 - GENERAL

1.1 RELATED DOCUMENTS

- A. The Contract Drawings, General Conditions and Supplementary General Conditions apply to this Section of the Specifications.

1.2 SUMMARY

- A. The Contractor shall install sheeting or staybracing as necessary in order to comply with the applicable Safety Code; to accommodate traffic; to permit access to adjacent occupied properties; to protect adjacent buildings, pavements, structures, and all existing utilities; to provide an opening of proper depth and width in which to install the proposed pipes and other underground structures, and to protect his workmen, employees of the Town, University and Engineer, and the public, from death or injury from bank failure, earth collapse or earth movement of any nature whatsoever.
- B. The Contractor shall install sheeting or staybracing as necessary in order to comply with the applicable Safety Code; to accommodate traffic; to permit access to adjacent occupied properties; to protect adjacent buildings, pavements, structures, and all existing utilities; to provide an opening of proper depth and width in which to install the proposed pipes and other underground structures, and to protect his workmen, employees of the Town, University and Engineer, and the public, from death or injury from bank failure, earth collapse or earth movement of any nature whatsoever.
- C. The Contractor shall be entirely and solely responsible for the adequacy and sufficiency of all supports and of all sheeting, bracing, shoring, underpinning, cofferdamming, etc. The Contractor shall assume the entire and sole responsibility for damages from injury to persons or damage to adjacent pavements and public and private property (including but not limited to, the work under construction, existing buildings, facilities, etc.) which injury or damage results directly from the Contractor's failure to install or to leave in place adequate and sufficient supports, sheeting, bracing, underpinning, cofferdamming, etc.
- D. The Contractor shall submit his proposed sheeting and/or shoring plans to the Engineer and to any others as required by law or as elsewhere specified prior to the installation of any sheeting and/or shoring. These plans should include, but not be limited to, the type of sheeting or shoring, sizes and dimensions, bracing, spacing, methods of installation and removal, etc.
- E. All sheeting shall be designed and sealed by a Professional Engineer licensed to practice in the State of Connecticut. He shall be known as the Contractor's Engineer.
- F. Sheeting, shoring, or other timbering may be left-in-place at the option of the Contractor when needed to protect other existing facilities or the work constructed or to be constructed under this Contract, unless shown/indicated on the Contract Plans to be removed.
- G. It is expressly understood and agreed that removing or leaving-in-place any sheeting or shoring, etc. as described above, shall not relieve the Contractor from any responsibility for any loss or damage due to omission of or failure of the sheeting, etc., failure to leave it in place, or the settling of the backfill, or any movement of the ground or any structure or object adjacent to any trench or excavation made by

the Contractor. The Engineer will not order any sheeting, etc. left-in-place at the expense of the Owner in order to accommodate the convenience of the Contractor or to save him the cost of its removal.

- H. The Contractor may, with the approval of the Engineer, lay back slopes in accordance with the provisions of the applicable Safety Code in order to avoid the necessity for sheeting or limiting the quantity thereof. However, in the case of trenches, the toe of this slope will not be lower than one foot above the top of the pipe to be installed. A level bench of at least two (2) feet in width shall be maintained between the toe of the sloped section and vertical trench excavation for pipes with an outside diameter of six (6) feet or less. Where sloping is used as a substitute for sheeting or staybracing, or used in combination therewith, it shall be sloped a minimum of one horizontal to one vertical except where instability of the material requires a slope flatter than one to one. In no circumstances will the Contractor be allowed to lay back slopes within the tree protection fencing as indicated on the Contract Drawings.
- I. There shall be no obligation on the part of the Engineer to issue orders for sheeting, staybracing, or sheeting left-in-place and/or to pass upon sufficiency and adequacy of sheeting; nor shall the failure on the part of the Engineer to give such orders relieve the Contractor from liability for damages from injury to persons or damage to property occurring from or upon the work and occasioned by negligence, or otherwise growing out of the Contractor's failure to either install sufficient and adequate sheeting and/or staybracing or to leave in place in the excavation sufficient and adequate support to prevent the caving in or moving of the ground adjacent to the sides of the excavation during and after the backfilling operation.

1.3 USE OF SHEETING IN VICINITY OF YOUNG BUILDING

- A. The use of vibratory hammers or drop hammers for sheeting within 150' of the Young Building will only be allowed with the written permission of the Owner, due to research activities that may be ongoing at that location. The Contractor shall assume that the use of other sheeting methodologies will be required in this location.

1.4 SUBMITTALS

- A. Layout drawings for sheeting and staybracing and other related data prepared by the Contractor's Engineer. System design, locations and calculations shall be prepared in a manner and form acceptable to the UConn Facilities Department, the Engineer and local authorities having jurisdiction.

1.5 QUALITY ASSURANCE

- A. Engineer Qualifications: The Contractor's Engineer shall be authorized to practice in the State of Connecticut and shall be experienced in providing successful engineering services for sheeting and staybracing systems similar in extent required for this project.
- B. Supervision: Engage and assign supervision of sheeting and staybracing system to a qualified professional engineer foundation consultant.
- C. Regulations: Comply with codes and ordinances of governing authorities having jurisdiction.

1.6 JOB CONDITIONS

- A. Before starting work, verify governing dimensions and elevations. Verify condition of adjoining properties. Take photographs to record any existing settlement or cracking of structures, pavements, and other improvements. Prepare a list of such damages, verified by dated photographs, and signed by Contractor and other conducting investigation.
- B. Survey adjacent structures and improvements, employing a professional land surveyor, registered in the State of Connecticut, establishing exact elevations at fixed points to act as benchmarks. Clearly identify benchmarks and record existing elevations.
- C. During excavation, re-survey benchmarks weekly, maintaining accurate log of surveyed elevations for comparison with original elevations. Promptly notify the UConn Facilities Department if changes in elevations occur or if cracks, sags, or other damage is evident.

1.7 EXISTING UTILITIES

- A. Protect existing active steam, condensate, storm, sanitary sewer, water, gas, electric, telecommunications and other utility services and structures.
- B. Notify municipal agencies and service utility companies having jurisdiction. Comply with requirements of governing authorities and agencies for protection, relocation, removal, and disconnecting of services.

PART 2 - PRODUCTS

2.1 MATERIALS

- A. General: Provide adequate shoring and bracing materials which will support loads imposed. Materials need not to be new, but should be in serviceable condition.
- B. Structural Steel: ASTM A 36.
- C. Steel Sheet Piles: ASTM A 328.
- D. Timber Lagging: Any species, rough-cut, mixed hardwood, nominal 3 inches thick, unless otherwise indicated.
- E. Steel Pipe: ASTM A501.

PART 3 - EXECUTION

3.1 CONSTRUCTION METHODS

- A. Trench shields shall not be used unless requested by the Contractor and authorized by the Engineer. If authorized, they shall be used only when the protection of only workmen is involved, not for support for existing adjacent utilities, structures, embankments, etc. A trench protected by the use of a trench shield shall not be considered a sheeted trench.

- B. Unless expressly authorized by the Engineer, sheeting shall be driven ahead of the excavation to avoid loss of material from behind the sheeting. If it is necessary to excavate below the sheeting to facilitate driving, care shall be taken to avoid trimming behind the face along which the sheeting will be driven. Care shall be taken to prevent voids outside of the sheeting.
- C. All sheeting and staybracing shall be securely installed and properly braced in accordance with the applicable Safety Code.
- D. The depth of pilot cuts for trenches or structures shall not exceed five (5) feet in depth at any time. The Engineer may reduce the depth of the pilot cut should the soil and subsurface conditions warrant such action. Sheeting must be driven by drop hammer or other methods approved in writing by the Engineer below the area of the pilot cut. Driving of sheeting above the pilot cut is subject to the directions of the Engineer. The Engineer may direct the Contractor to use other types of equipment, and to revise the procedure during the excavation of the pilot cut and the driving of the sheeting should it be found necessary to do so.
- E. Vibratory driving hammers shall not be used unless specifically authorized by the Engineer.
- F. Where wooden sheeting cannot be driven due to the nature of the material, then steel sheeting may be driven and removed in lieu of wooden sheeting providing the following procedures are followed:
1. Backfilling of sheeted trenches or areas shall proceed by one of the following two (2) methods:
 - a. Simultaneously with the withdrawal of sheeting and as each layer is compacted in accordance with Section "Trench Excavation, Backfilling and Compaction"; or
 - b. The trench/area will be backfilled to the surface. If the sheeting is to be withdrawn, backfilling will proceed up to each set of rangers and braces; the rangers and braces will be removed; the backfilling will proceed up to the next set of rangers and braces, etc. - up to the top of the excavation. The backfill material shall be compacted to 98% of the maximum dry density as determined by AASHTO T 99, Method C. Alternate sections of sheeting from the left side and right side of the trench/area shall be removed and the cavity remaining therefrom shall be jetted thoroughly by high pressure water, starting at the toe of the sheeting and being drawn to the surface. Sand shall be inserted with the jetting process.
- G. Where the bottom of the excavation is not free draining material (some areas of organic material or miscellaneous fill) or where granular backfill is not available or ordered by the Engineer, the jetting shall be very carefully done with a minimum amount of water being expended. In such locations, the Contractor may request the approval of the Engineer for other compaction methods in the sheeting cavity.
- H. The Contractor shall remove the sheeting and/or staybracing from the excavation except where it is specifically indicated on the Contract Drawings "To Be Left-In-Place" or the Contractor may elect to leave the sheeting and/or staybracing in place for his own convenience or to serve his own interest to protect existing facilities, the work constructed or to be constructed under this Contract, or for the safety of the public, etc., at no cost to the Owner. No sheeting or bracing which is within three (3) feet of the existing or proposed finished grade may be left-in-place without the prior permission of the

Engineer. This may require that the Contractor cut off sheeting at this elevation at no additional cost to the Owner.

- I. Where sheeting, regardless of the type of sheeting used, is left in place, as specified or ordered or at the Contractor's convenience option, unless otherwise specifically permitted in writing by the Engineer, all elements such as rangers, braces, wales, etc. shall be left in place except as specified hereinbefore; and, except such temporary braces required to be removed to make way for the structure or utility. Where it is necessary to remove such temporary braces, the sheeting shall be rebraced but in no case shall sheeting be braced against the sides of the structure or utility to be constructed unless approved in writing by the Owner of the structure or utility. Where lagging and "soldier" beams are used, the "soldier" beams and all the braces shall also be left in place.
- J. Where wood sheeting has been driven below the excavation bottom to provide for a "toe-in", no wood sheeting below the top of pipe or structure shall be removed but cut off at this elevation and the remaining sheeting above this line removed as described herein.
- K. Sheeting shall be cut away and removed from in front of capped outlets or other branches or inlets set in the pipe for future connections.
- L. All sheeting, shoring, and bracing removed shall be carefully removed from the excavation in such a manner as not to endanger the completed work or any adjacent pavements, buildings, structures, utilities, property, etc. The sheeting shall be withdrawn to such an extent that it is just above the backfill material being compacted and all voids left or caused by the withdrawal of such sheeting, shall be immediately refilled with approved material and compacted at no additional cost to the Owner.
- M. Where the excavation is to be left open during non-working hours, the sheeting shall extend 42 inches above the open excavation.
- N. The Contractor shall provide all means necessary to protect existing trees and overhead branches from sheeting installation or removal activities. The Contract Arborist shall provide recommendations to the Owner with regard to these activities which shall be incorporated into the work by the Contractor.

PART 4 - METHOD OF MEASUREMENT AND BASIS OF PAYMENT

4.1 MEASUREMENT AND PAYMENT

- A. There shall be no separate measurement for payment for work under this Section. The cost of this work shall be included in the lump sum bid for this project.

END OF SECTION 02150

SECTION 02205 - SWEEPING FOR DUST CONTROL

PART 1 - GENERAL

1.1 RELATED DOCUMENTS

- A. The Contract Drawings, General Conditions and Supplementary General Conditions apply to this Section of the Specifications.

1.2 SUMMARY

- A. This Item shall consist of furnishing a pick-up sweeper and accessory equipment and utilizing it for the removal of earth and/or other dust producing materials from paved surfaces for the purpose of allaying dust conditions.

1.3 QUALITY ASSURANCE

- A. Codes and Standards: Comply with provisions of following, except otherwise indicated:
 - 1. References to "Form 816" means the State of Connecticut Department of Transportation "Standard Specification for Roads, Bridges and Incidental Construction, 2004", including any interim and supplemental specifications.

PART 2 - PRODUCTS

2.1 MATERIALS AND EQUIPMENT

- A. Sweeping for Dust Control: Article 9.39.03 of "Form 816".

PART 3 - EXECUTION

3.1 CONSTRUCTION METHODS

- A. Should the Contractor, after notice from the Engineer, fail to provide Sweeping for Dust Control on the site, the Owner immediately and without further notice, may furnish sweepers as necessary to rectify the situation. The cost of such shall be borne by the Contractor and may be deducted from any amounts due the Contractor.

PART 4 - METHOD OF MEASUREMENT AND BASIS OF PAYMENT

4.1 MEASUREMENT AND PAYMENT

- A. There shall be no separate measurement for payment for work under this Section. The cost of this work shall be included in the lump sum bid for this project.

END OF SECTION 02205

SECTION 02207 - WATER FOR DUST CONTROL

PART 1 - GENERAL

1.1 RELATED DOCUMENTS

- A. The Contract Drawings, General Conditions and Supplementary General Conditions apply to this Section of the Specifications.

1.2 SUMMARY

- A. This Item shall consist of furnishing water and applying it for the purpose of allaying dust conditions.

1.3 QUALITY ASSURANCE

- A. Codes and Standards: Comply with provisions of following, except otherwise indicated:
 - 1. References to "Form 816" means the State of Connecticut Department of Transportation "Standard Specification for Roads, Bridges and Incidental Construction, 2004", including any interim and supplemental specifications.

PART 2 - PRODUCTS

2.1 MATERIALS AND EQUIPMENT

- A. Water: Article 9.43.03 of "Form 816".

PART 3 - EXECUTION

3.1 CONSTRUCTION METHODS

- A. The application of water shall be under the control of the Technical Representative at all times. It shall be applied only at locations at such times, and in the amount as may be directed by the Technical Representative. Watering equipment shall consist of pipelines, tanks, tank trucks, or other devices, approved by the Technical Representative, which are capable of applying a uniform spread of water over the surface. A suitable device for a positive shut-off and for regulating the flow of water shall be located so as to permit positive operator control.

PART 4 - METHOD OF MEASUREMENT AND BASIS OF PAYMENT

4.1 MEASUREMENT AND PAYMENT

- A. There shall be no separate measurement for payment for work under this Section. The cost of this work shall be included in the lump sum bid for this project.

END OF SECTION 02207

SECTION 02208 - CALCIUM CHLORIDE FOR DUST CONTROL

PART 1 - GENERAL

1.1 RELATED DOCUMENTS

- A. The Contract Drawings, General Conditions and Supplementary General Conditions apply to this Section of the Specifications.

1.2 SUMMARY

- A. This Item shall consist of furnishing calcium chloride and spreading it on the subgrade or in other areas of a project under construction, for the purpose of allaying dust conditions.

1.3 QUALITY ASSURANCE

- A. Codes and Standards: Comply with provisions of following, except otherwise indicated:
 - 1. References to "Form 816" means the State of Connecticut Department of Transportation "Standard Specification for Roads, Bridges and Incidental Construction, 2004", including any interim and supplemental specifications.

PART 2 - PRODUCTS

2.1 MATERIALS AND EQUIPMENT

- A. Calcium Chloride: Articles 9.42.02 and 9.42.03 of "Form 816".

PART 3 - EXECUTION

3.1 USE

- A. Due to environmental concerns on the University of Connecticut campus, the use of calcium chloride for dust control must have prior written authorization from the Owner.

3.2 CONSTRUCTION METHODS

- A. Calcium chloride shall be applied only at the locations, at such times and in the amount as may be directed by the Technical Representative. It shall be spread in such manner and by such devices that uniform distribution is attained over the entire area on which it is ordered period.

PART 4 - METHOD OF MEASUREMENT AND BASIS OF PAYMENT

4.1 MEASUREMENT AND PAYMENT

- A. There shall be no separate measurement for payment for work under this Section. The cost of this work shall be included in the lump sum bid for this project.

END OF SECTION 02208

April 21, 2015

SECTION 02221 – TRENCH EXCAVATION, BACKFILLING AND COMPACTION

PART 1 - GENERAL

1.1 RELATED DOCUMENTS

- A. The Contract Drawings, General Conditions and Supplementary General Conditions apply to this Section of the Specifications.

1.2 SUMMARY

- A. Without limitations, the work of this Section includes:
1. Trench excavation, bedding, backfill and compaction for all underground piping such as steam and condensate pipes, valves, fittings, storm drainage pipes, underdrain, service laterals, utility ducts, conduit or cable, utility structures, etc.
 2. Disposal of all items to be removed, unsuitable soils or excess materials.
 3. Sheeting and dewatering.
- B. Classification: All excavation for trenches shall be "Unclassified", defined as removal of all materials, including rock and unsuitable materials excavation. Excavation of rock in trench or unsuitable material beyond the required contract limits, as authorized by the Engineer, shall be "Classified".
1. Rock excavation in trench shall include rock in definite ledge formation and boulders, or portions of the boulders, one half (1/2) cubic yard or more in volume.
 2. Unsuitable Material Excavation: Defined as any material containing vegetation or organic matter, such as muck, peat, organic silt, sod or any other encountered material considered by the Technical Representative as having unsuitable in-situ bearing properties (clay). All encountered unsuitable materials shall be removed and disposed legally off the project site, unless otherwise directed.

1.3 QUALITY ASSURANCE

- A. Codes and Standards: Comply with provisions of following, except otherwise indicated:
1. References to "Form 816" means the State of Connecticut Department of Transportation "Standard Specification for Roads, Bridges and Incidental Construction, 2004", including any interim and supplemental specifications.

PART 2 - PRODUCTS

2.1 MATERIALS

A. Backfill

1. Unless otherwise directed, all suitable materials removed in making the trench excavation

shall be used for backfill.

2. Where unsuitable material is excavated and removed, backfill and/or refill shall be Compacted Granular Fill meeting requirements of Section 02234.
3. New material from off-site sources used for backfill under all pavements or structures, as shown on the details, shall be in accordance with the Contract Drawings or shall be Compacted Granular Fill meeting requirements of Section 02234.

B. Pipe Bedding

1. Bedding materials for steam and condensate pre-insulated piping, sanitary force main and water main shall be Gravel/Sand Cushion, conforming to Section 02229.
2. Bedding materials for sanitary sewer shall be Foundation Stone, conforming to Section 02250.

PART 3 - EXECUTION

3.1 CONSTRUCTION METHODS

- A. Rock excavation shall be by means other than blasting due to the close proximity of existing utilities. In order to protect the existing utilities from damage, the Contractor shall employ rock excavation methods other than blasting such as barring and wedging, impact hammers, drilling, hydraulic splitters, expansive chemical compounds or other such hand or machinery methods which will not damage the adjacent utility.
- B. Comply with the following Articles of "Form 816":
- | | |
|-----------------------------------------|------------------|
| Trench Excavation | Article 2.05.03 |
| Culverts | Article 6.51.03 |
| Trenching and Backfilling
(Conduits) | Article 10.01.03 |
- C. Trench backfill under pavements and structures shall be compacted granular fill.
- D. Compact bedding and backfill a minimum of 95% of the dry density under all pavements or structures.
- E. Refer to Section 02150 for sheeting and staybracing.
- F. Refer to Section 02240 for dewatering.
- G. Suitable excess trench excavation material shall be used as site fill under the required topsoil or as directed.

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TRENCH EXCAVATION,
BACKFILLING AND COMPACTION

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PART 4 - METHOD OF MEASUREMENT AND BASIS OF PAYMENT

4.1 MEASUREMENT AND PAYMENT

- A. There shall be no separate measurement for payment for work under this Section. The cost of this work shall be included in the lump sum bid for this project.

END OF SECTION 02221

SECTION 02229 – GRAVEL/SAND CUSHION

PART 1 - GENERAL

1.1 RELATED DOCUMENTS

- A. The Contract Drawings, General Conditions and Supplemental General Conditions apply to this Section of the Specifications.

1.2 SUMMARY

- A. The work under this Section shall consist of the furnishing, placing and compacting of gravel/sand/fine granular material for a gravel/sand cushion around pipes, utilities, existing structures, etc. at the locations and in accordance with the details shown on the Contract Drawings or as directed by the Engineer. It may also be used as backfill where ordered by the Engineer.

1.3 QUALITY ASSURANCE

- A. Codes and Standards: Comply with provisions of following, except otherwise indicated:
 - 1. References to "Form 816" means the State of Connecticut Department of Transportation "Standard Specification for Roads, Bridges and Incidental Construction, 2004", including any interim and supplemental specifications.
 - 2. AASHTO: Refers to number, letter, or both, to the latest specification or test method of the American Association of State Highway and Transportation Officials.

PART 2 - PRODUCTS

2.1 MATERIALS

- A. The materials for this work shall be well graded sand, fine gravel or other fine granular material as approved by the Engineer and with 100% passing #4 and with not more than 10 percent passing the #200 sieve, conforming to Subarticle M.08.01 Bedding Material of "Form 816".

PART 3 - EXECUTION

3.1 CONSTRUCTION METHODS

- A. This Item will generally be used to protect new or existing pipes, utilities and other facilities in those areas where the native material is unsuitable for backfill over, around and directly adjacent to the pipes, utilities or other facilities.
- B. Gravel/Sand Cushion shall be placed in accordance with the details and at the locations indicated on the Contract Drawings or as directed by the Engineer. It shall be placed carefully and evenly on both sides of the pipe, utility or other facility being cushioned.
- C. It shall be deposited in layers not over 8 inches thick and each layer shall be thoroughly compacted to 98% of the maximum dry density as determined by AASHTO T-99, Method "C", before the addition

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GRAVEL/SAND CUSHION

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of other layers.

PART 4 - METHOD OF MEASUREMENT AND BASIS OF PAYMENT

4.1 MEASUREMENT AND PAYMENT

- A. There shall be no separate measurement for payment for work under this Section. The cost of this work shall be included in the lump sum bid for this project..

END OF SECTION 02229

SECTION 02234 – COMPACTED GRANULAR FILL

PART 1 - GENERAL

1.1 RELATED DOCUMENTS

- A. The Contract Drawings, General Conditions and Supplementary General Conditions apply to this Section of the Specifications.

1.2 SUMMARY

- A. The work under this Section consists of furnishing and placing compacted granular fill for replacement material for unsuitable materials where not specified elsewhere, as foundation for structures, as bedding material for riprap or other proposed improvements as indicated or detailed on the Drawings.

1.3 QUALITY ASSURANCE

- A. Codes and Standards: Comply with provisions of following, except otherwise indicated:
 - 1. References to "Form 816" means the State of Connecticut Department of Transportation "Standard Specification for Roads, Bridges and Incidental Construction, 2004", including any interim and supplemental specifications.

PART 2 - PRODUCTS

2.1 MATERIALS

- A. Gravel or reclaimed miscellaneous aggregate shall conform to the requirements of Article M.02.02 of "Form 816".

PART 3 - EXECUTION

3.1 CONSTRUCTION METHODS

- A. Comply with Article 2.14.03 of "Form 816".

PART 4 - METHOD OF MEASUREMENT AND BASIS OF PAYMENT

4.1 MEASUREMENT AND PAYMENT

- A. There shall be no separate measurement for payment for work under this Section. The cost of this work shall be included in the lump sum bid for this project.

END OF SECTION 02234

SECTION 02235 – PROCESSED AGGREGATE BASE

PART 1 - GENERAL

1.1 RELATED DOCUMENTS

- A. The Contract Drawings, General Conditions and Supplementary General Conditions apply to this Section of the Specifications.

1.2 SUMMARY

- A. The base shall consist of a two-course foundation for bituminous concrete pavement constructed on a prepared subbase in accordance with the standard specifications and in conformity with the lines, grades, compacted thickness and typical details or cross sections indicated on the Contract Drawings.

1.3 QUALITY ASSURANCE

- A. Codes and Standards: Comply with provisions of following, except otherwise indicated:
 - 1. References to "Form 816" means the State of Connecticut Department of Transportation "Standard Specification for Roads, Bridges and Incidental Construction, 2004", including any interim and supplemental specifications.

1.4 SUBMITTALS

- A. Submit certified test results from a testing laboratory to the Technical Representative for approval. Test results must indicate characteristics of materials, including gradations.

PART 2 - PRODUCTS

2.1 MATERIALS

- A. All materials for this work shall conform to the requirements of Article M.05.01 of "Form 816". The required depth shall be as indicated on the Contract Drawings.

PART 3 - EXECUTION

3.1 CONSTRUCTION METHODS

- A. Comply with Article 3.04.03 of "Form 816".

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PART 4 - METHOD OF MEASUREMENT AND BASIS OF PAYMENT

4.1 MEASUREMENT AND PAYMENT

- A. There shall be no separate measurement for payment for work under this Section. The cost of this work shall be included in the lump sum bid for this project.

END OF SECTION 02235

SECTION 02240 - DEWATERING

PART 1 - GENERAL

1.1 RELATED DOCUMENTS

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

1.2 SUMMARY

- A. This Section includes construction dewatering.
- B. Related Sections include the following:
 - 1. Division 2 Section "Sheeting and Staybracing".

1.3 PERFORMANCE REQUIREMENTS

- A. Dewatering Performance: Design, provide, test, operate, monitor, and maintain a dewatering system of sufficient scope, size, and capacity to control ground-water flow into excavations and permit construction to proceed on dry, stable subgrades.
 - 1. Work includes removing dewatering system when no longer needed.
 - 2. Maintain dewatering operations to ensure erosion is controlled, stability of excavations and constructed slopes is maintained, and flooding of excavation and damage to structures are prevented.
 - 3. Prevent surface water from entering excavations by grading, dikes, or other means.
 - 4. Accomplish dewatering without damaging existing buildings adjacent to excavation.

1.4 SUBMITTALS

- A. Shop Drawings: For all dewatering systems, show arrangement, locations, and details of wells and well points; locations of headers and discharge lines; and means of discharge and disposal of water.
 - 1. Include layouts of piezometers and flow-measuring devices for monitoring performance of dewatering system.
 - 2. Include a written report outlining control procedures to be adopted if dewatering problems arise.
 - 3. Include Shop Drawings signed and sealed by the qualified professional engineer responsible for their preparation.
- B. Qualification Data: For firms and persons specified in "Quality Assurance" Article to demonstrate their capabilities and experience. Include lists of completed projects with project names and

addresses, names and addresses of architects and owners, and other information specified.

- C. Photographs or videotape, sufficiently detailed, of existing conditions of adjoining construction and site improvements that might be misconstrued as damage caused by dewatering operations.
- D. Record drawings at Project closeout identifying and locating capped utilities and other subsurface structural, electrical, or mechanical conditions.
- E. Field Test Reports: Before starting excavation, submit test results and computations demonstrating that dewatering system is capable of meeting performance requirements.

1.5 QUALITY ASSURANCE

- A. Installer Qualifications: Engage an experienced installer to assume engineering responsibility and perform dewatering who has specialized in installing dewatering systems similar to those required for this Project and with a record of successful in-service performance.
- B. Professional Engineer Qualifications: A professional engineer who is legally registered to practice in the State of Connecticut and who is experienced in providing engineering services for designing dewatering systems that are similar to those indicated for this Project in material, design, and extent.
 - 1. Engineering Responsibility: Engage a qualified professional engineer to prepare or supervise the preparation of data for the dewatering system including drawings, testing program, test result interpretation, and comprehensive engineering analysis that shows the system's compliance with specified requirements.
- C. Regulatory Requirements: Comply with water disposal requirements of authorities having jurisdiction.

1.6 PROJECT CONDITIONS

- A. Existing Utilities: Do not interrupt utilities serving facilities occupied by the Owner or others unless permitted in writing by the Engineer and then only after arranging to provide temporary utility services according to requirements indicated.
- B. Project Site Information: A geotechnical report has been prepared for this Project and is available for information only. The report is not part of the Contract Documents. The opinions expressed in this report are those of the geotechnical engineer and represent interpretations of the subsoil conditions, tests, and results of analyses conducted by the geotechnical engineer. Owner will not be responsible for interpretations or conclusions drawn from this data by Contractor.
 - 1. Make additional test borings and conduct other exploratory operations as necessary.
 - 2. The geotechnical report is included elsewhere in the Project Manual.
- C. Survey adjacent structures and improvements, employing a qualified professional engineer or surveyor, establishing exact elevations at fixed points to act as benchmarks. Clearly identify benchmarks and record existing elevations.
 - 1. During dewatering, resurvey benchmarks weekly, maintaining an accurate log of surveyed elevations for comparison with original elevations. Promptly notify Engineer if changes in

elevations occur or if cracks, sags, or other damage is evident in adjacent construction.

PART 2 - PRODUCTS (Not Applicable)

PART 3 - EXECUTION

3.1 PREPARATION

- A. Protect structures, utilities, sidewalks, pavements, and other facilities from damage caused by settlement, lateral movement, undermining, washout, and other hazards created by earthwork operations.
 - 1. Prevent surface water and subsurface or ground water from entering excavations, from ponding on prepared subgrades, and from flooding site and surrounding area.
 - 2. Protect subgrades and foundation soils from softening and damage by rain or water accumulation.
- B. Install dewatering system to ensure minimum interference with roads, streets, walks, and other adjacent occupied and used facilities.
 - 1. Do not close or obstruct streets, walks, or other adjacent occupied or used facilities without permission from Owner and authorities having jurisdiction. Provide alternate routes around closed or obstructed traffic ways if required by governing regulations.

3.2 DEWATERING

- A. Install dewatering system utilizing wells, well points, or similar methods complete with pump equipment, standby power and pumps, filter material gradation, valves, appurtenances, water disposal, and surface-water controls.
- B. Before excavation below ground-water level, place system into operation to lower water to specified levels and then operate it continuously until water main and structures have been constructed and fill materials have been placed, or until dewatering is no longer required.
- C. Provide an adequate system to lower and control ground water to permit excavation, construction of structures, and placement of fill materials on dry subgrades. Install sufficient dewatering equipment to drain water-bearing strata above and below bottom of foundations, water main, and other excavations.
 - 1. Do not permit open-sump pumping that leads to loss of fines, soil piping, subgrade softening, and slope instability.
- D. Reduce hydrostatic head in water-bearing strata below subgrade elevations of foundations, water main, and other excavations.
 - 1. Maintain piezometric water level a minimum of 24 inches (600 mm) below surface of excavation.

- E. Dispose of water removed from excavations in a manner to avoid endangering public health, property, and portions of work under construction or completed. Dispose of water in a manner to avoid inconvenience to others. Provide sumps, sedimentation tanks, and other flow-control devices as required by authorities having jurisdiction.
- F. Provide standby equipment on-site, installed and available for immediate operation, to maintain dewatering on a continuous basis if any part of system becomes inadequate or fails. If dewatering requirements are not satisfied due to inadequacy or failure of dewatering system, restore damaged structures and foundation soils at no additional expense.
 - 1. Remove dewatering system from Project site on completion of dewatering. Plug or fill well holes with sand or cut off and cap wells a minimum of 36 inches (900 mm) below overlying construction.
- G. Damages: Promptly repair damages to adjacent facilities caused by dewatering operations.

3.3 OBSERVATION WELLS

- A. Provide, take measurements, and maintain at least the minimum number of observation wells or piezometers indicated and additional observation wells as may be required by authorities having jurisdiction.
- B. Observe and record daily elevation of ground water and piezometric water levels in observation wells.
- C. Repair or replace, within 24 hours, observation wells that become inactive, damaged, or destroyed. Suspend construction activities in areas where observation wells are not functioning properly until reliable observations can be made. Add or remove water from observation-well risers to demonstrate that observation wells are functioning properly.
 - 1. Fill observation wells, remove piezometers, and fill holes when dewatering is completed.

PART 4 - METHOD OF MEASUREMENT AND BASIS OF PAYMENT

4.1 MEASUREMENT AND PAYMENT

- A. There shall be no separate measurement for payment for work under this Section. The cost of this work shall be included in the lump sum bid for this project.

END OF SECTION 02240

SECTION 02250 - FOUNDATION STONE

PART 1 - GENERAL

1.1 RELATED DOCUMENTS

- A. The Contract Drawings, General Conditions and Supplementary General Conditions apply to this Section of the Specifications.

1.2 SUMMARY

- A. The work under this Section shall consist of the furnishing, placing and compacting of Foundation Stone used to replace unsuitable foundation material, provide pipe bedding, and elsewhere as indicated on the drawings, required by the Specifications or as ordered by the Engineer. Foundation stone shall consist of (a) graded crushed gravel, crushed or broken stone; or (b) processed aggregate.

1.3 QUALITY ASSURANCE

- A. Codes and Standards: Comply with provisions of following, except otherwise indicated:
 - 1. References to "Form 816" means the State of Connecticut Department of Transportation "Standard Specification for Roads, Bridges and Incidental Construction, 2004", including any interim and supplemental specifications.

PART 2 - PRODUCTS

2.1 MATERIALS

- A. Graded crushed gravel, crushed or broken stone shall conform to the grading requirements of Article M.01.01 of "Form 816" for the 3/8 inch or 3/4 inch gradations. Quality, Soundness and Loss on Abrasion shall conform to the requirements of Article M.02.02 of "Form 816".
- B. Processed aggregate shall conform to the requirements of Article M.05.01 of "Form 816" except that the maximum aggregate size shall not exceed 1-3/4 inches.

PART 3 - EXECUTION

3.1 CONSTRUCTION METHODS

- A. Where foundation stone is used for a foundation or to replace unsuitable material, it shall be deposited in layers not over 8 inches thick and each layer shall be thoroughly compacted before the addition of other layers.
- B. The Engineer will specify the foundation stone type and gradation to be utilized based on field conditions. The surface shall be carefully brought to grade and compacted as shown on the drawings and as directed by the Technical Representative.
- C. Where foundation stone is used for pipe bedding, it shall be placed and compacted in conformance with the respective item for the pipe being bedded or as directed by the Technical Representative.

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FOUNDATION STONE

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PART 4 - METHOD OF MEASUREMENT AND BASIS OF PAYMENT

4.1 MEASUREMENT AND PAYMENT

- A. There shall be no separate measurement for payment for work under this Section. The cost of this work shall be included in the lump sum bid for this project.

END OF SECTION 02250

SECTION 02275 – EROSION AND SEDIMENTATION CONTROL

PART 1 - GENERAL

1.1 RELATED DOCUMENTS

- A. The Contract Drawings, General Conditions and Supplementary General Conditions apply to this Section of the Specifications.

1.2 SUMMARY

- A. The work of this Section consists of furnishing, placing, maintaining and removal of erosion and sedimentation control systems at the location and detail shown on the Contract Drawings or as directed by the Engineer, and in conformity with the specifications.

1.3 QUALITY ASSURANCE

- A. Codes and Standards: Comply with provisions of following, except otherwise indicated:
1. References to "Form 816" means the State of Connecticut Department of Transportation "Standard Specification for Roads, Bridges and Incidental Construction, 2004", including any interim and supplemental specifications.
 2. References to "Connecticut Guidelines for Soil Erosion and Sedimentation Control" (2002).
 3. State of Connecticut, Department of Transportation, Best Management Practices for the Protection of the Environment.

1.4 SUBMITTALS

- A. Submit erosion and sedimentation control plans in conformance with Article 2.10.01 of "Form 816".

PART 2 - PRODUCTS

2.1 MATERIALS

- A. Materials for this work shall conform to the requirements of Article 2.10.02, 2.18.02 and 2.19.02 of "Form 816".
- B. All erosion control blankets shall be manufactured with 100% natural materials. Erosion control blankets with plastic netting will not be accepted.

PART 3 - EXECUTION

3.1 CONSTRUCTION METHODS

- A. Construction methods shall conform to the requirements of Article 2.10.03, 2.18.03 and 2.19.03 of "Form 816".

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EROSION AND SEDIMENTATION CONTROL

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PART 4 - METHOD OF MEASUREMENT AND BASIS OF PAYMENT

4.1 MEASUREMENT AND PAYMENT

- A. There shall be no separate measurement for payment for work under this Section. The cost of this work shall be included in the lump sum bid for this project.

END OF SECTION 02275

SECTION 02500 – BITUMINOUS CONCRETE
PART 1 - GENERAL

1.1 RELATED DOCUMENTS

- A. The Contract Drawings, General Conditions and Supplementary General Conditions apply to this Section of the Specifications.

1.2 SUMMARY

- A. The work under this Section shall consist of milling of existing roadways and bituminous concrete placed upon a completed processed aggregate base course or upon the surface of an existing pavement. The work shall be installed in accordance with the line, grade, compacted thickness and details shown on the Contract Drawings. Pre-existing pavement markings shall be reinstalled on the new pavement.
- B. The work shall include, but not limited to the following:
1. Milling of existing bituminous concrete surfaces.
 2. New pavement.
 3. Permanent Pavement Repair
 4. Temporary pavement repair and temporary bituminous curbing.

1.3 QUALITY ASSURANCE

- A. Codes and Standards: Comply with provisions of following, except otherwise indicated:
1. References to "Form 816" means the State of Connecticut Department of Transportation "Standard Specification for Roads, Bridges and Incidental Construction, 2004", including any interim and supplemental specifications.

1.4 SUBMITTALS

- A. General: Submit the following in accordance with Conditions of Contract and Division 1 Specification Sections:
- B. Submit Material Certificates of Bituminous Mixture (Class) and Tack Coat signed by material producer and Contractor, certifying that each material item complies with or exceeds specified requirements.

PART 2 - PRODUCTS

2.1 MATERIALS

- A. Bituminous Concrete Pavement:
1. Material for Bituminous Concrete Pavement and Bituminous Bases shall comply with Section M.04 of "Form 816".
 2. The class of bituminous and compacted thickness shall be as indicated on the Drawings.

PART 3 - EXECUTION

3.1 CONSTRUCTION METHODS

- A. The equipment for milling of pavement surfaces shall be a commercially designed and manufactured power operated, track propelled, planing machine or a grinder capable of removing, in one pass, a layer of bituminous material six (6') feet in width, and a minimum depth of cut equal to four (4") inches. The equipment shall be self-propelled with sufficient power, traction and stability to maintain accurate depth of cut and slope. The equipment should also have the ability to provide variable depth of cut across the width of the planing equipment.

The machine shall be capable of accurately and automatically establishing profile grades (within $\pm 1/8$ ") along each edge of the machine by referencing from the existing pavement by means of a ski or matching shoe, or from an independent grade line. The machine shall have an automatic system for controlling grade elevation and cross slope.

The equipment shall have the means for self-loading the cuttings directly into a truck. All planing machinery shall be equipped with dust control devices to prevent any dust produced in the cutting operation from escaping into the air. The Contractor should have available an extra set of cutting teeth and the necessary tools and equipment to perform field adjustments and repairs. Contractor to supply water as required.

The equipment used to remove pavement materials from around manholes, catch basins, and other areas not accessible to the large machine shall be a smaller, specially designed commercial machine capable of performing work in a similar manner and character as the larger machine. Sweeping equipment shall be a motorized self-loading power broom capable of adequately cleaning the recently milled pavement surface of all-foreign matter and debris.

Prior to beginning work the contractor shall meet with the inspector and carefully review the project noting all utility structures, limits of construction, phasing, and points of interest or concern. Adequate support vehicles and equipment such as trucks, sweepers, and refueling equipment shall be on site and available for use as required.

All traffic control devices such as signs, drums, barricades, etc. shall be in place as per the construction phasing plans, or in the absence of such plans as per the direction of the Engineer. Traffic police officers, if required by the engineer, shall be ordered in advance by the contractor and shall be located as required by the Engineer.

Milling operations shall then commence with the existing bituminous surface being planed and profiled to the required depth, width, grade, and cross-section as required on the plans, or as ordered by the Engineer. After each pass of the machine, all loose matter and debris shall be cleaned and swept from the site.

After the work has progressed sufficiently, the contractor shall mill the remaining portions of pavement around manholes, and catch basins, etc. so that these areas match the surrounding areas.

All longitudinal drop-offs between milled and existing surfaces shall be delineated at all times until paving as directed by the Engineer. All manholes, catch basins, drives and intersecting streets and other utility structures shall be ramped with bituminous concrete in conformance with the traffic phasing details. Payment for bituminous concrete used in this manner will be made under the appropriate contract Item.

Sweeping operations shall be performed concurrently as milling operations may permit. If construction operations dictate that paving operations be undertaken as a future construction activity, the contractor shall be required to re-sweep the milled pavement surface just prior to paving operations.

Unless otherwise noted on the plans, or ordered by the Technical Representative, all milled bituminous concrete material(s) shall be removed and legally disposed of by the Contractor.

In all cases, the resulting final surface from milling operations shall be characterized by uniform, discontinuous longitudinal striations, or other uniform patterns and shall not be gouged or torn.

- B. Bituminous Concrete shall comply with Article 4.06.03 of "Form 816".
- C. Temporary bituminous curbing shall be installed as directed to replace curb sections removed during construction required to maintain street drainage and/or control erosion. Temporary curbing may be "hand-formed" and compacted in place.
- D. Unless otherwise specified, temporary sidewalk and temporary pavement construction shall consist of a single two-inch lift. Trenches or excavations shall be backfilled and properly compacted with specified or acceptable materials to within two (2) inches of the existing surrounding finish surface where the temporary pavement is to be placed on the backfilled material.
- E. Before making any permanent repairs, all temporary repairs of existing bituminous or concrete pavement/base and other materials as required shall be removed to the required depth and widths as shown on the Contract Drawings or as directed by the Technical Representative. Edges of existing bituminous pavement shall be trimmed or cut to a straight square edged surface and shall be coated with a hot liquid asphalt immediately before placing the permanent pavement repair. Edges of existing concrete pavement shall be cut to a reasonably true edge.

PART 4 - METHOD OF MEASUREMENT AND BASIS OF PAYMENT

4.1 MEASUREMENT AND PAYMENT

- A. There shall be no separate measurement for payment for work under this Section. The cost of this work shall be included in the lump sum bid for this project.

END OF SECTION 02500

SECTION 02510 - CAST-IN-PLACE CONCRETE

PART 1 - GENERAL

1.1 DESCRIPTION OF WORK

- A. Provide labor, materials, equipment, services and transportation to complete work.
1. Installation of concrete footings and foundations.
 2. Installation of Cast-in-place concrete.

1.2 REFERENCES

- A. Comply with applicable requirements of:
1. State of Connecticut, Department of Transportation, Standard Specifications for Roads, Bridges and Incidental Construction, latest edition.
 2. ASTM: American Society of Testing Materials.
 1. A 36 Structural Steel.
 2. A 185 Welded Steel Wire Fabric for Concrete Reinforcement.
 3. A 307 Carbon Steel Externally and Internally Threaded Standard Fasteners.
 4. A 615 Deformed and Plain Billet-Steel Bars for Concrete Reinforcement.
 5. A 31 Making and Curing Concrete Compressive.
 6. A 33 Concrete Aggregates.
 7. C 39 Compressive strength of Cylindrical Concrete Specimens.
 8. C 94 Ready-Mixed Concrete.
 9. C 109 Compressive Strength of Hydraulic Cement Mortars (Using 2-Inch Cube Specimens).
 10. C 127 Specific Gravity and Absorption of Aggregate.
 11. C 143 Slump of Portland Cement Concrete.
 12. C 150 Portland Cement.
 13. C 171 Sheet Materials for Curing Concrete.
 14. C 172 Sampling Fresh Concrete.
 15. C 173 Air Content of Freshly Mixed Concrete by the Volumetric Method.
 16. C 192 Making and Curing Concrete Test Specimens in the Laboratory.
 17. C 231 Air Content of Freshly Mixed Concrete by the Pressure Method.
 18. C 260 Air-Entraining Admixtures for Concrete.
 19. C 309 Liquid Membrane-Forming Compounds for Curing Concrete.
 20. C 404 Aggregates for Masonry Grout.
 21. C 454 Chemical Admixtures for Concrete.
 22. C881 Epoxy-Resin-Base Bonding Systems for Concrete.
 23. D 226 Asphalt-Saturated Roofing Felt for Use in Waterproofing and in Constructing Built-up Roofs.
 3. AASHTO: American Association of State Highway and Transportation Officials.
 4. ACI Standards. The following standards of the American Concrete Institute form a part of these Specifications, and indicate the minimum standards required.

1. ACI 211.1 Recommended practices for Selecting Proportions for Normal Weight Concrete.
 2. ACI 214 Recommended Practice for Evaluation of Compression Test Results of Field Concrete.
 3. ACI 301 Specifications for Structural Concrete for Buildings.
 4. ACI 302 Recommended Practice for Concrete Floor and Slab Construction.
 5. ACI 304 Recommended Practice for Measuring, Mixing, Transporting, and Placing Concrete.
 6. ACI 305 Recommended Practice for Hot Weather Concreting.
 7. ACI 306 Recommended Practice for Cold Weather Concreting.
 8. ACI 308 Recommended Practice for Curing Concrete.
 9. ACI 309 Recommended Practice for Consolidation of Concrete.
 10. ACI 311 Recommended Practice for Concrete Inspection.
 11. ACI 315 Manual of Standard Practices for Detailing Reinforced Concrete Structures.
 12. ACI 318 Building Code Requirements for Reinforced Concrete.
 13. ACI 347 Recommended Practice for Concrete Formwork.
 18. C 260 Air-Entraining Admixtures for Concrete.
 19. C 309 Liquid Membrane-Forming Compounds for Curing Concrete.
 20. C 404 Aggregates for Masonry Grout.
 21. C 454 Chemical Admixtures for Concrete.
 22. C881 Epoxy-Resin-Base Bonding Systems for Concrete.
 23. D 226 Asphalt-Saturated Roofing Felt for Use in Waterproofing and in Constructing Built-up Roofs.
5. CRSI Standards: The following standards of the Concrete Reinforcing Steel Institute form a part of these specifications, unless otherwise Specified.
1. "Reinforced Concrete - A Manual of Standard Practice."
 2. "Recommended Practice for Placing Reinforcing Bars."
 3. "Recommended Practice for Placing Bar Supports."
6. AWS Publications: The following standards of the Welding of Reinforcing Steel and Inserts shall be in accordance with the following American Welding Society Publications:
1. D 12.1 Metal Inserts and Connections in Reinforcing Concrete Construction.

1.3 SUBMITTALS

A. Design Data: submit design mix for:

1. Cement concrete

B. Shop Drawings: Submit:

1. Shop drawings for fabrication, bending details and placement of reinforcing steel shall be submitted to Owner's Representative for review. Detailing shall conform with ACI 315 and 318 and shall include actual dimensions provided for concrete cover over bars.
2. Drawings and design calculations made by the Contractor for bracing, special formwork, or temporary structures.
3. Shop drawings for fabrication of formwork.

C. Certificates: Submit materials certificates signed by material producer and Contractor. Provide certifications stating materials comply with requirements.

1.4 QUALITY CONTROL

A. Preliminary Tests:

1. To establish the suitability of any material used in concrete work, make preliminary tests and prepare design mixes, in accordance with ACI 301, Chapter 3, in a design laboratory acceptable to the Owner's Representative. Bear all costs in connection with these tests and for the design of concrete mixes.

B. Plant and Field Tests and Inspection:

1. Concrete work will be subject to detailed inspection and tests at the plant and in the field, as required, at the Owner's discretion. Inspection and field and laboratory tests of concrete taken from the job will be made by a testing laboratory engaged by the Owner, without expense to the Contractor.
2. Facilitate the work of, and cooperate with the laboratory inspectors at all times. Notify the inspectors when reinforcing steel is in place in order to facilitate any inspections they deem necessary. Do not place concrete until these inspections have been completed and all deficiencies reported by an inspector have been corrected to the inspector's satisfaction.
3. The testing laboratory will supply all molds required for tests as described below, using molds of the same type and manufacture for making all test specimens. If field tests performed by a testing laboratory show excessive slumps or other violations of the Contract Documents, the entire batch of concrete from which the sample in question was taken will be rejected for use and shall be removed from the site at the Contractor's expense. The testing laboratory will inspect all concrete operations in the plant and in the field, as required. A record of such inspection will be submitted to the Owner's Representative, covering the quality and quantity of concrete materials, mixing and placing of concrete, placing of reinforcing steel and the general progress of the work.
4. If ready-mix concrete is used, each load of concrete arriving at the job shall be accompanied by a delivery ticket which shall be subject to checking by the testing laboratory at the plant and which shall contain the following information.
 - a. The strength of the mix of concrete being delivered.
 - b. The exact time the cement and aggregate were discharged into the delivery truck. If upon reaching the job, the concrete cannot be placed within the time limits stated, or if the type of concrete delivered is incorrect, the inspector will reject the load for use, and it shall be removed from the site at the Contractor's expense.
 - c. List of admixtures.
5. The testing laboratory will take specimens of each class of concrete from different locations on the job as follows:
 - a. At least four (4) specimens for each 50 cu. yds. or fraction thereof, of each class of concrete and in any case not less than four (4) specimens for any one day's operations.
 - b. Test specimens will be taken at pouring locations to give a fair average of the concrete in part of the construction indicated.
 - c. Samples will be obtained in accordance with ASTM C172.
 - d. The testing laboratory will conform to ASTM C31 in making, curing and subsequently handling test specimens, except as modified herein. Specimens will be tested in accordance with ASTM C39.
 - e. The cylinders will be placed in laboratory storage under moist curing conditions at approximately 70°F within 24 hours after molding and maintained therein until tested. One

- specimen will be tested at seven days, two specimens at 28 days and retain one specimen for future testing if needed.
- f. Make one slump test in compliance with ASTM C143 for each load at discharge from truck.
 - g. Make one air content test in compliance with ASTM D173 for each set of compressive strength specimens.
- C. Load Tests: In the event that laboratory tests taken from any part of the Work indicate an apparent failure to develop the ultimate strengths required at 45 days, the Owner's Representative may, at his discretion, order load tests or other tests to be made on the portion of the structure affected to determine the adequacy of such portion to sustain the loads for which its members are designed. These tests, if required, will be made at the Contractor's expense, and shall conform to the requirements of ACI 318. If the structure, or any part of the structure, cannot pass the load tests, it shall be removed and replaced at the Contractor's expense.
- D. Coefficient of Variation:
- 1. The testing laboratory engaged and paid for by the Owner will establish a coefficient of variation for the substantial evaluation of concrete for the Project. The Contractor shall be fully acquainted with all provisions relative to coefficient of variation as specified herein and fully comply with the applicable requirements.
 - 2. The coefficient of variation will be established for the project on the basis of not less than 30 test results from any one class of concrete. Once established, the testing laboratory will maintain the coefficient of variation as a moving average based on the 10 latest test results to check compliance with specification requirements. The figure for the moving coefficient of variation and moving average for strength will be kept up-to-date by the testing laboratory on the job site, and reported without delay to the Owner's Representative. The testing laboratory will maintain a continuous up-to-date log in both graphical and tabulated form for each class of concrete.
 - 3. Strength Requirements and Compliance Therewith: Concrete will be considered to meet strength requirements of the Specifications when in compliance with ACI 301, Chapter 17, Paragraph 17.2.
 - 4. Enforcement:
 - a. When actual non-compliance and/or ominous trends are observed by the testing laboratory, such information will be relayed expeditiously by telephone to the Contractor and the concrete supplier who shall take immediate appropriate action to correct the deficiency.
 - b. If non-compliance occurs, the producer will be warned to take immediate corrective action. Test results of concrete furnished subsequent to such a warning shall be sufficient cause for the Owner's Representative to refuse to permit any additional concrete to be furnished by the non-complying producer.
 - c. Reinstatement of the disqualified concrete producer may be permitted on the condition that he produces a certificate by an independent qualified engineer acceptable to the Owner's Representative attesting that adequate correct measures have been incorporated and that the producer is, in his opinion, entitled to another trial. Failure after this point will necessitate permanent expulsion from the job.
 - d. If the test strength of concrete which does not comply with the strength requirements of these specifications is sufficiently low so that, in the opinion of the Owner's Representative, the performance of the structure is jeopardized, the Owner's Representative may require that test specimens be cut from the structure at the locations designated by the Owner's Representative at which the questionable concrete was placed. Specimens will be secured and tested in accordance with ASTM C42. If the results of these tests show that the actual strength of the concrete is sufficiently low as to jeopardize the performance of the structure, the Owner's Representative may require that the concrete be removed from the structure, and replaced at no additional cost to the Owner. These tests, if required, will be made at the Contractor's expense.

5. The coefficient of variation shall be assumed as 20% unless another value has been determined from current similar tests, or until it may be calculated from current similar tests, or until it may be calculated from the results of 30 or more job tests. This compliance is described in ACI 214.

1.5 JOB CONDITIONS

- A. Weather: Protect concrete from damage and reduced strength or performance due to weather extremes during mixing, placing and curing.
- B. Cold Weather: Unless special precautions are taken to protect concrete, do not work when temperatures are below 40°F or when temperatures are expected to fall below 40°F within 72 hours after placing concrete.
 1. Comply with ACI 306 in cold.
 2. Maintain concrete temperature of at least 60°F. Reinforcement forms and ground in contact with concrete shall be free of frost.
 3. Keep concrete and formwork at least 50°F for at least 96 hours after placing concrete.
 4. The use of calcium chloride in any form is not permitted.
- C. Hot Weather: Concrete, when deposited, shall be less than 80°F. Cool the mix in a manner acceptable to the Owner's Representative if the concrete temperature is higher.
 1. Comply with ACI 305 in hot weather.

1.6 STORAGE

- A. Storage of materials shall conform with ACI 301, Chapter 2, Section 2.5.

PART 2 - PRODUCTS

2.1 MATERIALS

- A. Admixtures
 1. Air-entraining admixtures shall conform to ASTM Standard C260. They shall be "Darex AEA", "Vinsol NVX", "Airecon", "Sika AER", or approved equal.
 2. Chemical admixtures to act as water-reducing agents, retardants, or accelerators, when required or approved, shall conform to ASTM Standard C 494. Calcium chloride shall be not used as an admixture.
- B. Aggregates
 1. Aggregates for concrete of normal weight shall conform to ASTM Standard C33. Fine aggregate shall be inert natural sand. Coarse aggregate shall be well graded crushed stone or crushed gravel, size No. 67 for reinforced concrete 9 inches or less in thickness, size no. 467 for all other concrete. To be classified as crushed gravel, at least 50 percent of the fragments shall have a minimum of one face resulting from fracture, nicked gravel will not be considered as crushed fragments. The use of more than one source without prior approval is not permitted.

- C. Anchor Slots and Inserts. Slots and inserts for anchoring masonry and mechanical items to concrete shall be of standard manufacture and of types required to engage with the anchors to be provided and installed therein under other Sections of these specifications.
- D. Cement. Cement shall conform to ASTM Standard C 150, Type II, except that high-early strength cement, if required or permitted, shall be Type III. Only one brand of cement shall be used on the project.
- E. Epoxy Bonding Compound and Epoxy Grout. Epoxy bonding compound shall be a two-component epoxy-resin system conforming to ASTM Standard C 881, Type II, Grade 2 for application to horizontal surfaces and Grade 3 for vertical surfaces, Class as required. Epoxy grout shall be epoxy manufacturer. Execution shall be as specified by the epoxy manufacturer.
- F. Formwork. Materials for formwork shall conform with ACTI 301, Chapter 4, and with special requirements shown on the Drawings, or listed below:
1. Forms for exposed concrete surfaces shall be plywood or other form-finishing material approved by the Owner's Representative. Rough lumber may be used for covered surfaces.
 2. Form ties shall be factory-fabricated, removable or snap-off metal ties of design that will not allow form deflections and will not spall concrete upon removal, and shall meet the following requirements unless shown otherwise on the Drawings.
 - a. Ties shall be fitted with devices that will leave holes in the concrete surface not less than 1/2 inch nor more than 1 inch diameter and of depth not less than 1 inch.
 - b. Ties shall have waterseal features.
 - c. Portions of ties remaining in the concrete after removal of the exterior parts shall not project beyond the surface of the concrete and shall be at least 1 1/2 inches back from any surface of the concrete that will be exposed, painted, dampproofed or waterproofed.
 - d. Solid backing shall be provided for each tie.
 - e. Bolts and rods that are to be completely withdrawn shall be coated with a nonstaining bond breaker.
 3. Forms shall be coated with oil before reinforcing is placed, or wetted immediately before placing concrete (except in freezing weather) in lieu of oil coating. Form oil shall be compatible with sealer and caulking compound to be used in joints. Where concrete is to be painted, a sealer compatible with the paint shall be used in place for form oil.
- G. Reinforcing Bars. Reinforcing bars shall be new, deformed billet steel bars, conforming to ASTM A615, Grade 60 and conforming to ACI 301, Chapter 5.
- H. Accessories. Reinforcement accessories, consisting of spacers, chairs, ties, and similar items shall be provided as required for spacing, assembling, and supporting reinforcement in place. Accessories shall be galvanized steel or approved plastic accessories, conforming to the applicable requirements of the CRSI standards hereinbefore specified.
- I. Tie Wire. Tie wire for reinforcement shall be 16 gauge or heavier black or galvanized steel wire conforming to ASTM A 82.
- J. Joint Fillers. Preformed expansion joint filler strips shall conform to ASTM Standard D1751 or D 1751, thickness as indicated.
1. Neoprene joint seals shall conform to ASTM Standard D 2628 with sizes and shapes as shown.
- K. Joint Sealer. Sealers shall be as specified in the Standard Specifications.

- L. Moisture Barrier. Moisture barrier for use under slabs shall be fungi-resistant and shall have a vapor permeance rating not exceeding 0.5 per. Moisture barrier shall be:
1. Asphalt-saturated, waterproof reinforced kraft paper.
 2. Clear polyethylene sheeting 0.006-inch thick.
 3. Polyethylene coated asphalt-saturated reinforced kraft paper.
 4. Two layers of 30-pound asphalt-saturated felt solidly mopped with hot bitumen, or other similar material meeting the requirements for fungi-resistance and vapor permeance.
- M. Nonshrinking Grout. Nonshrinking grout shall be “Embeco 636” or “Embeco 153” manufactured by Plaster Builders, “Ferrolith G” manufactured by Sonneborn Contech or “Firmix” manufactured by the Euclid Chemical Co.
1. Portland Cement: ASTM C150, and complying with ASTM C91-staining requirements for not more than 0.03% water soluble alkali. Use Type I generally; Type III shall be used for setting brickwork during cold weather.
 2. Hydrated Lime: ASTM C207, Type S.
 3. Sand: Clean, washed uniformly well-graded masonry sand conforming to the requirements of ASTM Spec C144.
- O. Water. Mixing water for concrete shall be clean, fresh, and potable. Non-potable water may be used only if tested (at Contractor’s expense:) in accordance with ASTM Standard C109 and shown to produce mortar cubes having 7 and 28-day strengths equal to the strengths of similar specimens made with distilled water.

2.2 PROPORTIONING CONCRETE

- A. Proportioning of all concrete mixtures shall be subject to the approval of the Owner’s Representative and no concrete shall be placed without such approval. (See “Acceptance Tests of Aggregates and Concrete” hereinbefore). Proportioning shall conform to the recommendations of ACI 211.1, ACI 211.2 and ACI 301. Proportions shall be selected to meet all required standards and to produce a mixture which will work readily into the forms and around reinforcement by the methods of placing employed, but without permitting segregation of materials or collection of excessive free water at the surface.
1. Strength. The strength of the concrete for each portion of the work shall be as stated on the Drawings or as specified herein. Where no strength is indicated, a minimum strength of 3000 psi shall be required. Strength requirements are based on 28-day compressive strengths except for high-early strengths, which are based on 7-day compressive strengths.
 2. Air content. All exterior concrete shall be air-entrained. Air-entrained concrete may be used elsewhere, at the option of the Contractor. Air-entrained concrete shall be produced by adding the air-entraining admixture to each batch at the mixer. The air entrained concrete shall be not less than 6 or more than 8 percent of the volume of the concrete.
 3. Slump. The slump of concrete (ASTM C 143) shall be as low as is consistent with proper handling, to obtain improved durability and strength. Normal limits are from 1 to 4 inches and moistures should be proportioned to provide for that range without exceeding the maximum water-cement ratio. In exceptional cases, when higher slump is needed, and approved, the amount of cement in the mixture shall be increased sufficiently to maintain strength by keeping the water-cement ratio within the maximum. During the course of concrete placement, reduce slump as depth of fresh concrete increases, subject to the approval of the Owner’s Representative. Concrete delivered with excessive slump will be rejected.

4. Admixtures.
 - a. Approved admixture for water reduction shall be used in all concrete, in the proportions recommended by the manufacturer, subject to the Owner's Representative's approval.
 - b. Approved admixtures for retarding or accelerating the set may be used, at the option of the Contractor, in the proportions recommended by the manufacturer, subject to the Owner's Representative's approval.
5. Water-cement ratio. A maximum water-cement ratio for each mixture will be established by one (or more) of the following methods:
 - a. Approved of previous test data. If test data submitted (See "Acceptance Tests of Aggregates and Concrete" hereinbefore) show previous satisfactory results from the proposed mixture, it will be approved.
 - b. Laboratory trial mixtures. When trial mixtures are required and satisfactory results obtained, the maximum water-cement ratios will be determined thereby. The maximum ratio for each mixture will be the ratio which produces a laboratory strength 15 percent higher than the required strength, except that for ultimate strength type concrete, the average laboratory strength shall be 25 percent higher than required strength.
 - c. Table. The Owner's Representative may waive requirements for both of the above methods when considered unnecessary. In such cases, the following table of maximum water-cement ratios shall govern mix proportions:

Maximum Water Cement Ratio

Required 28-Day Strength	Air-Entrained Concrete Gals. Per Sack	Non-Air-Entrained Concrete Gals. Per Sack
4,000	5.5	6.0
3,500	6.0	6.5
3,000	6.5	7.0

- d. Special Requirements. When required for increased durability under severe exposure to physical or chemical attack, the water-cement ratio shall be decreased.
6. Cement factor. Regardless of whatever method is used to establish the water-cement ratio, minimum cement factor shall be as follows:

Required 28-day Strength	Sacks (94 lb.) of Cement Per Cubic Yard of Concrete
4,000	6.5
3,500	6.0
3,000	5.5

7. Adjustments during construction. Based on strength tests results obtained as the work progresses, the Owner's Representative may adjust to the maximum water-cement ratio and corresponding mix proportions to maintain required strengths or to decrease consistently excessive strengths, but still maintain the cement factor as required in paragraph 6, above.

2.3 MIXING CONCRETE

- A. Ready-mixed concrete shall conform to ASTM Standard C94. The mixing and transporting equipment and the method of placement shall be subject to the approval of the Owner's Representative. Concrete discharge time shall be no more than 1 1/2 hours after adding cement to aggregates, or water to cement and aggregates, or 300 revolutions, whichever comes first. In hot weather or conditions contributing to quick stiffening, the discharge time shall be reduced from that specified above, to maintain the specified slump without addition of water of batch.
- B. Mixing of all other concrete shall conform with ACI 301, Chapter 7, except that the reference to Calcium Chloride as an admixture is deleted. Hand mixing of small volumes may be permitted by the Owner's Representative.
- C. Concrete delivery slips shall note the total amount of water used in the batch at point of discharge (the total of plant water plus water added at site.)

PART 3 - EXECUTION

3.1 FORMWORK

- A. Formwork shall conform with ACI 301 Chapter 4, and all special requirements shown on the Drawings. The strength and adequacy of formwork shall be solely the responsibility of the Contractor.
 - 1. Before placing concrete, forms shall be thoroughly inspected. All chips, dirt, etc., shall be removed, all temporary bracing and cleats taken out, all forms properly secured in their correct position and made tight, all reinforcement, anchors, and embedded items secured in their proper places. Concrete which may be on the forms or reinforcement, and which is set and dry, shall be cleaned off, and the forms and steel washed off before proceeding. Remove all foreign matter from forms and excavations.
 - 2. Joints in forms for exposed surfaces shall be sealed so that no joint marks will be left on the concrete surfaces. Caulking compound, white lead, or other approved materials or methods may be used for sealing joints, but the use of tapes will not be permitted.
 - 3. When rough-sawn lumber form liner is shown on the Drawings, the arrangement of joints shall be as indicated. End joints shall be butted and staggered with at least two boards between joints. All joints shall be tight.
 - 4. External corners of exposed concrete shall be beveled, rounded or chamfered by moldings placed in the forms.
 - 5. Forms shall be removed in a manner to insure complete safety of the structure. Shoring, posts or uprights shall not be removed until the supported member has acquired sufficient strength to support safely its own weight and all loads upon it. Members subjected to additional loads during construction shall be adequately shored and braced. The Contractor shall assume full responsibility for any damage to the structure due to premature removal of forms.

3.2 PLACING CONCRETE

- A. Placing of concrete shall conform with ACI 301, Chapter 8, and any special requirements shown on the Drawings. In all cases, the Contractor shall give the Owner's Representative at least 72 hours notice of intended concrete placement and no placement shall begin until the Owner's Representative has approved the condition of foundations, forms, reinforcement, and embedded items.

1. Before any concrete is placed, the Contractor shall notify all whose work is in any way connected with or influenced by the concrete work, and give them reasonable time to complete all portions of their work that must be completed before concrete is placed.
2. Immediately before concrete is placed, the Contractor shall inspect all forms to be sure that they are in proper position, sufficiently rigid, thoroughly clean, properly oiled and free from foreign materials, and that all reinforcement is in proper position.
3. Concreting, once started, shall be carried on as a continuous operation until the section of approved size and shape is completed.
4. Concrete shall be conveyed as rapidly as practicable from the mixer to the place of final deposit by methods which prevent the separation or loss of ingredients. It shall be deposited, as nearly as practicable, in its final position to avoid rewinding or flowing.
5. Concrete shall not be dropped freely where reinforcement will cause segregation, nor shall it be dropped freely more than three feet at less than 4" slump and no more than 2 feet at more than 4" slump. Concrete shall be deposited to maintain a plastic surface approximately horizontal.
6. Concrete that has partially hardened shall not be deposited in the work. The discharge of concrete shall be started not more than 45 minutes after the introduction of mixing water. Placing of concrete shall be completed within 90 minutes of the first introduction of water into the mix.
7. When no moisture barrier is required, the subgrade shall be dry at the time of placing concrete to allow for absorbing mixing water from the concrete, and preventing plastic shrinkage.
8. Earth foundation upon which concrete is to be placed shall be clean, free from, frost, ice, and standing or running water. Prior to placing concrete, the earth foundation shall have been satisfactorily leveled and compacted.
9. Before depositing new concrete on concrete that has set, the surfaces of the set concrete shall be thoroughly roughened and cleaned of laitance, foreign matter and loose particles. The set concrete shall be saturated with water and, after free or glistening water disappears, the surface of the set concrete shall be slushed with a coat of grout. The grout shall be well scrubbed in by means of stiff brushes wherever possible. No concrete shall be placed before the grout coat has attained initial set. Grout shall consist of one part cement and one part sand with only a sufficient amount of water to provide suitable workability. Alternatively, a thin, neat cement grout may be substituted as approved by the Owner's Representative.
 - a. When the surface of old concrete is inaccessible, the grout shall be placed in such a way that it will be spread over the entire surface as the concrete is deposited.
 - b. Where "Epoxy Grout" or "Epoxy Bonding Agent" is shown, epoxy resin grout shall be used in strict accordance with the directions of the manufacturer.

3.3 VIBRATING AND COMPACTING

- A. All concrete shall be thoroughly consolidated and compacted by suitable means during the operation of placing, and shall be thoroughly worked around reinforcement, embedded items, and into the corners of the forms. All concrete against forms shall be thoroughly spaded. Internal vibrators shall be used under experienced supervision, and shall be kept out of contact with reinforcement and wood forms. Vibrators shall not be used in a manner that forces mortar between individual form members.
- B. Vibrators shall be flexible electric type or approved compressed air type, adequately powered and capable of transmitting to the concrete not less than seven thousand (7,000) impulses per minute. Vibration shall be sufficiently intense to cause the concrete to flow or settle readily into place without segregation. A sufficient number of vibrators shall be employed so that complete compaction is secured throughout the entire volume of each layer of concrete. At least one (1) vibrator shall be kept in readiness as a spare for emergency use. Vibrators shall be such that the concrete becomes uniformly plastic with their use.

- C. Vibration shall be close to the forms but shall not be continued at one spot to the extent that large areas of grout are formed or the heavier aggregates are caused to settle. Care shall be taken not to disturb concrete which had its initial set.
- D. Where conditions make compacting difficult, or where the reinforcement is congested, batches of mortar containing the same proportions of cement to sand as used in the concrete shall first be deposited in the forms, to a depth of at least one inch.
- E. The responsibility for providing fully filled out, smooth, clean, and properly aligned surfaces free from objectionable pockets shall rest entirely with the Contractors.

3.4 JOINTS

- A. Joints shall conform with ACI 301, Chapter 6, and all special requirements shown on the Drawings.
- B. Construction joints shall be provided where shown on the Drawings and additionally as needed to limit the length of all Sections between construction joints to control shrinkage. Except for joints shown on the Drawings, all construction joints shall be located by the Contractor and a location plan submitted to the Owner's Representative for approval. Joints shall be keyed as indicated on the Drawings or as approved. The width of the keys shall be about one-third of the thickness of the wall (or slab) and the depth of the keys shall be about one-half of the width.
- C. Asphalt paper joints, where shown, shall consist of a double layer of 15-pound asphalt-saturated roofing felt.

3.5 REINFORCEMENT

- A. The placement and positioning of reinforcing steel shall conform with ACI 301, ACI 318 and special requirements shown on the Drawings. Welding of reinforcing steel will not be permitted except when specifically approved by the Owner's Representative. No tack welding will be permitted. Supports for reinforcement shall be galvanized and plastic tipped.
- B. Reinforcing Steel Supports. Bars shall be supported on metal chairs or spacers, accurately placed and securely fastened to forms or steel reinforcement in place. Additional bars shall be supplied, whether specifically shown on the drawings or not, where necessary to securely fasten reinforcement in place. Support legs of accessories in forms without embedding in form surface. Spacing of chairs and accessories shall conform with CRSI's "Recommended Practice for Placing Bar Supports." Hopping and stirrups shall be accurately spaced and wired to the reinforcement. No wood will be permitted inside forms.
- C. Placing and tying. All reinforcement shall be set in place, spaced, and rigidly and securely tied or wired with 16 gauge steel tie wire at all splines and at all crossing points and intersections in the position shown, or as directed. Rebending of bars on the job to accommodate existing conditions will not be permitted without the written approval of the Owner. Point ends of wire ties away from forms.
- D. Splices. Splices shall be in accordance with Paragraph 7.5 and 12.5 of ACI 318.71.

3.6 EMBEDDED ITEMS

- A. Embedded items shall conform with ACI 301, Chapter 6, and all special requirements shown on the Drawings. It shall be the responsibility of the contractor to coordinate and verify the installation of all

embedded items, including those furnished and installed by subcontractors. He shall be responsible for avoiding, or reconciling, interferences between locations of inserts for all purposes, subject to the approval of the Owner's Representative. In addition, the Contractor shall furnish and install all items shown on the Drawings but not required to be furnished and installed by any subcontractor.

3.7 NON-SHRINKING GROUT

- A. Grout for setting equipment bases, and wherever non-shrinking grout is shown on the Drawings, shall be used in strict accordance with the manufacturer's direction.

3.8 FINISHING

- A. Repair of Surface Defects. The repair of defects in formed surfaces and filling of tie holes shall proceed immediately after the removal of forms (See Formwork). The work shall conform with ACI 301, Chapter 9, except that, when approved by the Owner's Representative, honeycombed surfaces may be repaired by filling the voids without prior removal of concrete. All fins and projections shall be removed and irregular areas smoothed with carborundum stones, as approved.
 - 1. Voids left by entrapped air or water bubbles at formed surfaces (sometimes covered by a thin film of mortar) shall be exposed by a wire brush and filled. For surfaces below finish grade, only repair of honeycomb and filling of tie holes are required.
- B. Finishing of Formed Surfaces. The finishing of formed surfaces shall proceed concurrently with, or immediately after the repair of surface defects and shall conform with ACI 301, Chapter 10, except that the selection of finishes provided in Section 10.4 shall apply only when required finishes are not stated on the Drawings. Related unformed by surfaces (Section 10.5), such as tops of walls, shall be finished by initially placing an excess of fresh concrete at the top of the form, striking off the excess with wooden tools and forcing coarse aggregate below the surface before final floating. Such surfaces (if horizontal) shall be crowned slightly to provide drainage. No addition of mortar topping or retempering of concrete to facilitate finishing will be permitted. Grout cleaned finish conforming to ACI 301, Chapter 10, is required on all interior exposed concrete surfaces (except slabs, wet well fills and surfaces to be coated), and on all exterior surfaces to 6 inches below grade.
- C. Flatwork. Flatwork includes slab on grade, framed slabs, beams and girders, and other flat concrete surfaces. Flatwork shall conform with ACI 301, Chapter 11, and all special requirements shown on the Drawings. The selections of finishes provided in Section 11.8 shall apply, unless other finishes are specified hereinafter or shown on the Drawings.

3.9 CURING AND PROTECTION

- A. Curing and protection of concrete shall conform with ACI 301, Chapter 12, and as specified hereinafter. Curing shall be accomplished by means of direct application of water, either by spraying, ponding, or wet covers, except that a curing compound may be used to cure the underside of ceiling slabs. All walls shall be continuously covered during wet curing with a minimum of 2 layers of nonstaining wet covers, as approved by the Owner's Representative, and secured from the wind. The walls shall be covered immediately after stripping. The job shall be equipped with a dependable water supply. Water curing shall be continuous for a minimum of 7 days. Covering shall be left on for an additional minimum 4 days without wetting to allow the concrete surface to dry slowly. Intermittent wetting and drying will not be allowed. Curing shall be maintained during nonworking hours, including weekends and holidays.

1. During hot weather, the formwork and reinforcing shall be sprayed with water and cooled to a temperature of not more than 90°F and subgrades shall be dampened prior to concreting. Whenever the evaporation rate is expected to approach 0.2 pounds per square foot per hour, as per ACI 305, paragraph 2.1.3, figure 2.1.4, windbreaks and sunshades shall be erected; fog nozzles shall be used to cool and moisten surrounding air, formwork and reinforcing; and concrete shall be placed at the lowest practical temperature. The temperature of concrete when placed shall not exceed 90°F and if greater than 75°F preparations shall be made to transport, place and consolidate the concrete at the fastest possible rate. Curing shall start as soon as possible as finishing has been completed and/or the water sheen has disappeared. Forms shall be removed as soon as possible or loosened and water curing started immediately.
2. During cold weather, the temperature of the concrete as placed shall not be less than 55°F. The curing temperature shall be maintained at not less than 50°F for a minimum of 5 days. Drying of the concrete surfaces in a heated enclosure shall be avoided by proper curing or by maintaining the relative humidity above 40 percent within the enclosure. Water curing should be terminated 12 hours before the end of the temperature protection period and the concrete shall be permitted to dry prior to and during the 24-hour period of adjusted to ambient cold weather conditions as outlined in ACI 306. No further curing practice is required as long as the air temperature remains below 50°F, except normal curing practices shall apply when air temperature remains above 50°F for more than half of any 24-hour period.
3. In addition to the Specification requirements for curing and protection outlined above, the curing and protection requirements not mentioned shall conform to ACI 305, ACI 306, and ACI 308.

3.10 MASS CONCRETE

- A. Mass concrete shall conform with ACI 301, Chapter 14 and shall be defined as stated herein.-

3.11 EVALUATION OF CONCRETE STRENGTH

- A. Evaluation of concrete strength shall conform with ACI 301, Chapter 17. When the strengths of laboratory-cured test specimens (see QUALITY CONTROL above) are acceptable, no other tests of hardened concrete will be required. If the strengths of test specimens are unsatisfactory, the areas of concrete represented shall be subjected to additional tests at the expense of the Contractor, as provided in ACI 301, Section 18.4.6.

3.13 ACCEPTANCE OF CONCRETE

- A. The acceptance of completed concrete work will be governed by the provisions of ACI 301, Chapter 18.

PART 4 - METHOD OF MEASUREMENT AND BASIS OF PAYMENT

4.1 MEASUREMENT AND PAYMENT

- A. There shall be no separate measurement for payment for work under this Section. The cost of this work shall be included in the lump sum bid for this project.

END OF SECTION 02510

SECTION 02511 - CONCRETE WALKWAY

PART 1 - GENERAL

1.1. RELATED DOCUMENTS

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

1.2. SUMMARY

- A. Provide labor, materials, equipment, services and transportation to complete work:

1. Portland Cement Concrete Sidewalk

1.3. REFERENCES

- A. Comply with applicable requirements of:

1. State of Connecticut, Department of Transportation, Standard Specifications for Roads, Bridges and Incidental Construction, latest edition.
2. ASTM: American Society of Testing Materials.
3. AASHTO: American Association of State Highway and Transportation Officials.

1.4. SUBMITTALS

- A. Product Data: submit manufacturer's specifications and installation instructions for:

1. Sealant
2. Backer Rod
3. Salt Guard

- B. Design Mix for concrete

- C. Sample panel: After receipt of Owner's Representative's approval of material samples, construct one four foot square sample panel showing the full range of color, edge finishes, surface finishes and joint types proposed for the project. Mock up panels shall be constructed on site at location directed by Owner's Representative. Panels shall have specified joint size and other features of typical construction. Owner's Representative/Engineer shall have the right to require additional panels of similar size and composition constructed at no additional cost to the Owner if workmanship on the first panel is not acceptable. After Owner's Representative's approval, leave accepted panels on site as standard of acceptable work for permanent construction and remove same only when directed by Owner's Representative.

- D. Certificates: submit materials certificates signed by material producer and Contractor. Provide certifications stating materials comply with requirements. Certification shall be based on independent testing laboratory tests made within last year.

1.5. QUALITY ASSURANCE

- A. Work under this Section shall be performed by workmen experienced and familiar with required construction procedures and under full time supervision of a qualified foreman.

1.6. DELIVERY AND STORAGE

- A. Store materials on raised platforms. Locate storage piles or stacks to avoid and be protected from traffic. Store materials under an approved roof or covered with waterproof tarpaulins, except when men are working and using materials.
- B. Handle, store, mix and apply setting materials in strict compliance with manufacturer's recommendations and instructions.

1.7. PROTECTION

- A. Protect paving surfaces from damage or defacement.
- B. Protect adjacent surfaces from staining, soiling and other damage.

PART 2 - PRODUCTS

2.1. PORTLAND CEMENT CONCRETE MATERIALS AND PRODUCTS

- A. Cast-in-place concrete for concrete sidewalk shall be air-entrained concrete conforming to the requirements and applicable provisions of Section 3.03, M.03.01 and M.06.01 of the Standard Specifications, Product Type 'F': 4,500 psi Compressive strength at 28 days, 3/4 aggregate, 658 pounds per cubic yard cement content and 5% to 7% air-entrained with 2" to 4" maximum slump.
- B. Wire mesh for reinforcement shall conform to AASHTO M55, latest requirements. Gauge of wire and dimensions of mesh as shown on the Drawings. Reinforcing steel shall conform to AASHTO M31.
- C. Expansion Joints with dowels as shown on the drawings or every 400 sq ft.
- D. Dowels: Shall be Type 304 Stainless Steel ASTM A276, A479, latest requirements. Dimensions and sizes as shown on the drawings.

2.2. JOINT FILLER

- A. Sponge rubber in conformance to AASHTO M-153-65, Type I, Fed. Spec. HH-F- 341F, Type II, Class A and ASTM D-1752.67, Type I and be one of the following:
 - 1. Sealtight Sponge Rubber Expansion Joint Filler manufactured by W.R. Meadows, Inc., Elgin, IL.
 - 2. Vuikem 116 manufactured by Mameko International.
 - 3. Sikaflex-IA manufactured by Sika Chemical Corp.
 - 4. Sonalastic NP-1 manufactured by Sonnenborn Building Products.

5. Or Equal

2.3. BACKER ROD

- A. Continuous round rod of 100% closed cell polyethylene foam, complying with requirements of ASTM C-272.

2.4. JOINT SEALANT

- A. Two or more part, self-leveling, polyurethane based elastomeric sealant, complying with ASTM C920, Federal Specification 1-F-S-00227E Type 1 Class A, having Shore A hardness of not less than 40 + 5 when tested according to ASTM D2240, cured modulus of elasticity at 100% elongation of not more than 150 psi when tested according to ASTM D412, and tear resistance of not less than 50 lbs inch when tested according to ASTM D624.
1. Provide one of the following:
 - a. Pecora Urexpam NR-200
 - b. Tremco THC 900
 - c. Sika 1A, SL
 - d. Or Equal
 2. Where joint surfaces contain bituminous materials, provide modified sealant compatible with bituminous materials encountered.

2.5. EXPANSION DOWELS AND SLEEVES

- A. Stainless steel bars, complying with ASTM A276, Type 304, with smooth end cuts. Provide bar in dimensions and size indicated on Drawings. Provide expansion caps with compatible waxed tube sleeve which permit at least 1 inch movement.

2.6. COMPACTED GRAVEL BASE

- A. Gravel shall consist of inert material that is hard, durable stone and coarse sand, free from loam, clay, surface coatings and deleterious materials, and shall conform to the following gradation:

Sieve (ASTM D422)	Percent Passing
*	100
1/2-inch	50-85
No. 4	40-75
No. 10	30-60
No. 40	10-35
No. 100	5-20
No. 200	2-10

*Four inches (4") where placed as base below slab and pavement; One and one half inches (1 1/2") where placed as pipe bedding and backfill up to 24 inches above pipe; and elsewhere two thirds (2/3) the loose lift thickness.

2.7. DE-ICING SALT PROTECTION

- A. De-icing protection of concrete walkway surfaces shall be with Saltguard WB as manufactured by Prosooco, Inc.

PART 3 - EXECUTION

3.1 PREPARATION

- A. Coordinate layout and installation of paving with layout and installation of adjacent paving, curbing, walls and other site improvements to ensure proper alignments.
- B. Make corrections as required to base courses, to bring base courses to the proper sections and elevations.

3.2 PREPARATION OF GRAVEL BASE

- A. Compact subgrade to achieve a 95% minimum compaction rate consistent throughout subgrade.
- B. Place gravel base in 2" to 3" lifts
- C. Provide gravel subbase.
- D. Final surface of base course to be left 1/8" higher than adjacent surfaces to allow for settlement.

3.3 INSTALLATION OF PORTLAND CEMENT CONCRETE PAVING

- A. Formwork: Set forms accurately to maintain specified tolerances. Remove loose material and clean forms immediately before concrete placement.
- B. Reinforcing: Place reinforcing as detailed. Provide reinforcing in longest practical lengths. Unroll wire mesh for reinforcement flat before placing in concrete. Minimum concrete covering of 2" over wire mesh and reinforcing bars. Secure reinforcing against displacement during concrete placement.
- C. Concrete: as specified in CAST IN PLACE CONCRETE for mixing, placing and curing concrete. Use vibrators to consolidate concrete and to prevent honeycombs.
- D. After consolidating and screeding concrete, float and trowel to smooth hard surface and even plane. Check tolerances and make necessary adjustments. Tool edges and form joints to create 1/4 inch radius. Tool marks to match existing concrete sidewalk to remain.
- E. Broom Finish: Slightly roughen concrete surface by brooming with fine bristle broom perpendicular to main traffic directions to achieve uniform medium broom finish. Obtain Owner's Representative's approval.

- F. Expansion Joints: Provide expansion joints using galvanized metal keyway sections where concrete placement is interrupted for more than 1/2 hour and at end of placement and in grid pattern not more than 400 square feet on center or at locations approved by Owner's Representative. Provide shear dowels and expansion caps at not more than 16 inches on center to transfer vertical loads but permit horizontal movement. Extend joint filler full depth of joint and allow 1/2 inch minimum space at top for insertion of backer rod and sealant. Protect top edge of joint filler with metal cap or other temporary protection. Remove protection after concrete has been placed on both sides of forms
- G. Caulked Construction Joints: Provide caulked construction joints wherever concrete abuts dissimilar material at locations approved by Owner's Representative. Extend joint filler full depth of joint and allow 1/2 inch minimum space at top for insertion of backer rod and sealant. Protect top edge of joint filler with metal cap or other temporary protection. Remove protection after concrete has been placed on both sides of joint.

3.4 PORTLAND CEMENT CONCRETE PAVING TOLERANCES

- A. The following installed tolerances are allowable variations from locations and dimensions on Drawings and shall not be added to allowable tolerances for other work
 - 1. Allowable Variation from True Level: +/- 1/8 inch in 20 feet
 - 2. Allowable Variation from True Line: +/- 1/8 inch in 20 feet

3.5 ADJUSTING UTILITY STRUCTURES

- A. Existing-to-remain water, sewer, drainage, and communications structures that are located in proposed sidewalk areas shall be made to conform to the newly proposed final grade. Work shall be performed in accordance with the requirements of the Standard Specifications.

3.6 PATCHING

- A. Areas to be patched with Portland cement concrete pavement shall be sawcut to rectilinear shapes conforming to the scoring pattern of the larger pavement panel. Concrete shall match surrounding existing grade on every side. Concrete shall be placed and finished to match surrounding existing pavement. Contractor shall take care to protect adjacent surfaces from soiling or damage.

3.7 SIDEWALK MOCKUP

- A. A mockup of the proposed concrete walkways shall be completed by the Contractor, and accepted by the University, prior to the installation of concrete walkways in this Section.

3.8 DE-ICING SALT PROTECTION APPLICATION

- A. Concrete shall be thoroughly cured prior to application.
- B. Use low pressure spray equipment with fan-type spray tips. Adjust pressure to avoid atomization of the material.
- C. Apply in a single saturating coat. Use enough material to keep the surface wet for 2-3 minutes before penetration.

- D. Saturate surfaces uniformly. After several minutes for penetration, brush out pools and puddles quickly.
- E. Protect treated surfaces from rainfall for a minimum of 6 hours following treatment.
- F. Protect treated surfaces from vehicular and pedestrian traffic for a minimum of 24 hours following treatment.

PART 4 - METHOD OF MEASUREMENT AND BASIS OF PAYMENT

4.1 MEASUREMENT AND PAYMENT

- A. There shall be no separate measurement for payment for work under this Section. The cost of this work shall be included in the lump sum bid for this project.

END OF SECTION 02511

SECTION 02521 – METAL HAND RAILS

PART 1 – GENERAL

1.1 RELATED DOCUMENTS

- A. The Contract Drawings, General Conditions and Supplementary General Conditions apply to this Section of the Specifications.

1.2 SUMMARY

- A. This Section includes the following:
 - 1. Metal handrails, metal guardrails and railing systems.

1.3 DEFINITIONS

- A. Definitions in ASTM E 985 for railing related terms apply to this Section.

1.4 PERFORMANCE REQUIREMENTS

- A. General: In engineering handrail and railing systems to withstand structural loads indicated, determine allowable design working stresses of materials based on the following:
 - 1. Cold Formed Structural Steel: AISI “Specification for the Design of Cold Formed Steel Structural Members”.
- B. Structural Performance of Handrails and Railing Systems: Engineer, fabricate, and install handrails and railing systems to comply with requirements of ASTM E 985 for structural performance based on the following:
 - 1. Testing performed according to ASTM E 894 and E 935.
 - 2. Structural computations.
- C. Structural Performance of Handrails and Railing Systems: Engineer, fabricate, and install handrails and railing systems to withstand the following structural loads without exceeding the allowable design working stress of the materials for handrails, railing systems, anchors, and connections. Apply each load to produce the maximum stress in each of the respective components comprising handrails and railing systems.
 - 1. Top Rail of Guardrail Systems: Capable of withstanding the following loads applied as indicated.
 - a. Concentrated load of 200 lbf applied at any point and in any direction.
 - b. Uniform load of 50 lbf per linear foot applied horizontally and concurrently with uniform load of 100 lbf per linear foot applied vertically downward.
 - c. Concentrated and uniform loads above need not be assumed to act concurrently.

2. Handrails Not Serving as Top Rails: Capable of withstanding the following loads applied as indicated:
 - a. Concentrated load of 200 lbf applied at any point and in any direction.
 - b. Uniform load of 50 lbs per linear foot applied in any direction.
 - c. Concentrated and uniform loads above need not be assumed to act concurrently.
3. Infill Area of Guardrail Systems: Capable of withstanding a horizontal concentrated load of 200 lbf applied to 1 sq. ft. at any point in the system including panels, intermediate rails, balusters, or other elements composing the infill area.
 - a. Above load need not be assumed to act concurrently with loads on top rails of railing systems in determining stress on guard.
- D. Thermal Movements: Allow for thermal movement resulting from the following maximum change (range) in ambient temperature in engineering, fabricating, and installing handrails and railing systems to prevent buckling, opening of joints, overstressing of components and connections, and other detrimental effects. Base engineering calculation on actual surface temperatures of materials due to both solar heat gain and nighttime sky heat loss.
 1. Temperature Change (Range): 120 deg F ambient 180 deg F material surfaces.
- E. Control of Corrosion: Prevent galvanic action and other forms of corrosion by insulating metals and other materials from direct contact with incompatible materials.

1.5 SUBMITTALS

- A. General: Submit each item in this Article according to the Conditions of the Contract.
- B. Product data for mechanically connected handrails and railing systems, each kind of fitting, grout, and anchoring cement.
- C. Shop drawings showing fabrication and installation of handrails and railing systems including plans, elevations, sections, details of components, and attachments to other units of work.
 1. For installed handrails and railing systems indicated to comply with certain design loadings, include structural analysis data sealed and signed by the qualified Professional Engineer who was responsible for their preparation.
- D. Samples for verification of each type of exposed finish required, prepared on components indicated below that are of the same thickness and metal indicated for final unit of work. Where finishes involve normal color and texture variations, include sample sets showing the full range of variations expected.
 1. 6 inch long sections of each distinctly different linear railing member including handrails, top rails, posts, and balusters.
- E. Qualification data for firms and persons specified in the “Quality Assurance” Article to demonstrate their capabilities and experience. Include a list of completed projects with project names, addresses, names of Architects and Owners, and other information specified.

- F. Product test reports from a qualified independent testing agency evidencing compliance of handrails and railing systems with requirements based on comprehensive testing of current products.
- G. Test reports from an independent testing agency evidencing compliance of handrails and railing systems with ASTM E 985.

1.6 QUALITY ASSURANCE

- A. Single Source Responsibility: Obtain handrails and railing systems of each type and material from a single manufacturer.
- B. Engineer Qualifications: Professional Engineer legally authorized to practice in the jurisdiction where project is located and experienced in providing engineering services of the kind indicated for handrails and railing systems similar to this project in material, design, and extent, and that have a record of successful in-service performance.

1.7 STORAGE

- A. Store handrails and railing systems inside a well ventilated area, away from uncured concrete and masonry and protected from weather, moisture, soiling, abrasion, extreme temperatures, and humidity.

1.8 PROJECT CONDITIONS

- A. Field Measurements: Where handrails and railing systems are indicated to fit to other construction, check actual dimensions of other construction by accurate field measurements before fabrication; show recorded measurements on final shop drawings. Coordinate fabrication schedule with construction progress to avoid delaying the work.

PART 2 – PRODUCTS

2.1 METALS

- A. General: Provide metals free from surface blemishes where exposed to view in the finished unit. Exposed to view surfaces exhibiting pitting, seam marks, roller marks, stains, discolorations, or other imperfections on finished units are not acceptable.
- B. Steel: Provide steel in the form indicated, complying with the following requirements:
 - 1. Steel Pipe: ASTM A 53; finish, type, and weight class as follows:
 - a. Black finish, unless otherwise indicated.
 - b. Type F, or Type S, Grade A, standard weight (Schedule 40), unless otherwise indicated, or another weight, type, and grade required by structural loads.
 - 2. Steel Tubing: Product type (manufacturing method), grade as indicated below:
 - a. Cold Formed Steel Tubing: ASTM A 500, grade as indicated below:
 - 1) Grade A, unless otherwise indicated or required by structural loads.

- b. Hot Formed Steel Tubing: ASTM A 501.

2.2 WELDING MATERIALS

- A. Welding Electrodes and Filler Metal: Provide type and alloy of filler metal and electrodes as recommended by producer or metal to be welded and as required for color match, strength, and compatibility in fabricated items.

2.3 GROUT AND ANCHORING CEMENT

- A. Non-shrink, Non-metallic Grout: Premixed, factory packaged, non-staining, non-corrosive, non-gaseous grout complying with ASTM C 1107. Provide grout specifically recommended by manufacturer for interior and exterior applications.
- B. Interior Anchoring Cement: Factory packaged, non-shrink, non-staining, hydraulic controlled expansion cement formulation for mixing with water at project site to create pourable anchoring, patching, and grouting compound. Use for interior applications only.
- C. Erosion Resistant Anchoring Cement: Factory packaged, non-shrink, non-staining hydraulic controlled expansion cement formulation for mixing with water at project site to create pourable anchoring, patching, and grouting compound. Provide formulation that is resistant from water exposure without need for protection by a sealer or waterproof coating and is recommended for exterior use by manufacturer.
- D. Products: Subject to compliance with requirements, provide one of the following:
 - 1. Non-Shrink, Non-Metallic Grouts:
 - a. B-6 Construction Grout; W.R. Bonsal Co.
 - b. Diamond-Crete Grout; Concrete Service Materials Co.
 - c. Supreme; Cormix Construction Chemicals.
 - d. Sure-grip High Performance Grout; Dayton Superior Corp.
 - e. Euco N-S Grout; Euclid Chemical Co.
 - f. Five Star Grout; Five Star Products.
 - g. Vibropruf #11; Lambert Corp.
 - h. Crystex; L&M Construction Chemicals, Inc.
 - i. Masterflow 928 and 713; Master Builders Technologies, Inc.
 - j. Sealtight 588 Grout; W.R. Meadows, Inc.
 - k. SonogROUT 14; Sonneborn Building Products –ChemRex, Inc.
 - l. Kemset; The Spray-Cure Company.
 - 2. Interior Anchoring Cement:
 - a. Ankerite Cement; Dayton Superior Corp.
 - b. Por-Rok; Minwax Construction Products Division.

2.4 FABRICATION

- A. General: Fabricate handrails and railing systems to comply with requirements indicated for design, dimensions, details, finish, and member sizes, including wall thickness of hollow members, post spacings, and anchorage, but not less than those required to support structural loads.
- B. Assemble handrails and railing systems in the shop to the greatest extent possible to minimize field splicing and assembly. Disassemble units only as necessary for shipping and handling limitations. Clearly mark units for reassembly and coordinated installation. Use connections that maintain structural value of joined pieces. Clearly mark units for reassembly and coordinated installation.
- C. Form changes in direction of members as follows:
 - 1. As detailed.
 - 2. By radius bends of radius indicated.
 - 3. By flush radius bends.
 - 4. By bending.
 - 5. By mitering at elbow bends.
 - 6. By insertion of prefabricated flush elbow fittings.
 - 7. By any method indicated above, applicable to change of direction involved.
- D. Form simple and compound curves by bending pipe in jigs to produce uniform curvature for each repetitive configuration required; maintain cylindrical cross section of pipe throughout entire bend without buckling, twisting, cracking, or otherwise deforming exposed surfaces of pipe.
- E. Welded Connections: Fabricate handrails and railing systems for connection of members by welding. For connections made during fabrication, weld corners and seams continuously to comply with the following:
 - 1. Use materials and methods that minimize distortion and develop strength and corrosion resistance of base metals.
 - 2. Obtain fusion without undercut or overlap.
 - 3. Remove welding flux immediately.
 - 4. At tee and cross intersections, cope ends of intersecting members to fit contour of pipe or tube to which end is joined, and weld all around.
 - 5. At exposed connections, finish exposed welds and surfaces smooth and blended so that no roughness shows after finishing and welding surface matches contours of adjoining surfaces.
- F. Provide inserts and other anchorage devices to connect handrails and railing systems to concrete or masonry work. Fabricate anchorage devices capable to withstanding loads imposed by handrails and railing systems. Coordinate anchorage devices with supporting structure.
- G. Shear and punch metals cleanly and accurately. Remove burrs from exposed cut edges.

- H. Ease exposed edges to a radius of approximately 1/32 inch, unless otherwise indicated. Form bent metal corners to the smallest radius possible without causing grain separation or otherwise impairing work.
- I. Cut, reinforce, drill, and tap components, as indicated, to receive finish hardware, screws, and similar items.
- J. Provide wall returns at ends of wall mounted handrails, unless otherwise indicated.

2.5 FINISHES, GENERAL

- A. Comply with NAAMM “Metal Finishes Manual” for recommendations relative to applying and designating finishes.
- B. Protect mechanical finishes on exposed surfaces from damage by applying a strippable, temporary protective covering prior to shipment.
- C. Appearance of Finished Work: Variations in appearance of abutting or adjacent pieces are acceptable if they are within one-half of the range of approved samples. Noticeable variations in the same piece are not acceptable. Variations in appearance of other components are acceptable if they are within the range of approved samples and they are assembled or installed to minimize contrast.
- D. Provide exposed fasteners with finish matching appearance, including colors and texture, of handrails and railing systems.

2.6 STEEL FINISHES

- A. Fill vent and drain holes that will be exposed in the finished work, unless indicated to remain as weep holes, by plugging with zinc solder and filing off smooth.
- B. For non-galvanized steel handrails and railing systems, provide non-galvanized ferrous metal fittings, brackets, fasteners, and sleeves, except provide galvanized anchors where embedded in exterior masonry and concrete construction.

PART 3 – EXECUTION

3.1 PREPARATION

- A. Coordinate setting drawings, diagrams, templates, instructions, and directions for installing anchorages, such as sleeves, concrete inserts, anchor bolts, and miscellaneous items having integral anchors, that are to be embedded in concrete as masonry construction. Coordinate delivery of such items to project site.

3.2 INSTALLATION, GENERAL

- A. Fit exposed connections accurately together to form tight, hairline joints.

- B. Cutting, Fitting, and Placement: Perform cutting, drilling, and fitting required for installing handrails and railing systems. Set handrails and railing systems accurately in location, alignment, and elevation, measured from established lines and levels and free from rack.
1. Do not weld, cut, or abrade surfaces of handrails and railing components that have been coated or finished after fabrication and are intended for field connection by mechanical or other means without further cutting or fitting.
 2. Set posts plumb within a tolerance of 1/4 inch in 12 feet .
 3. Align rails so that variations from level for horizontal members and from parallel with rake of steps and ramps for sloping members do not exceed 1/4 inch in 12 feet.
- C. Field Welding: Comply with the following requirements:
1. Use materials and methods that minimize distortion and develop strength and corrosion resistance of base metals.
 2. Obtain fusion without undercut or overlap.
 3. Remove welding flux immediately.
 4. At exposed connections, finish exposed welds and surfaces smooth and blended so that no roughness shows after finishing, and welded surface matches contours of adjoining surfaces.
- D. Corrosion Protection: Coat concealed surfaces of aluminum that will come into contact with grout, concrete, masonry, wood, or dissimilar metals with a heavy coat of bituminous paint.
- E. Adjust handrails and railing systems prior to anchoring to ensure matching alignment at abutting joints. Space posts at interval indicated but not less than that required by design loadings.
- F. Fastening to In-Place Construction: Provide anchorage devices and fasteners where necessary for securing handrails and railing systems and for properly transferring loads to in-place construction.

3.3 RAILING CONNECTIONS

- A. Welded Connections: Use fully welded joints for permanently connecting railing components by welding. Cope or butt components to provide 100 percent contact, or use fittings designed for this purpose.

3.4 ANCHORING RAIL ENDS

- A. Anchor rail ends into concrete and masonry with round flanges connected to rail ends and anchored into wall connections with post-installed anchor and bolts.

3.5 PROTECTION

- A. Protect finishes of handrails and railing systems from damage during construction period with temporary protective covering approved by railing manufacturer. Remove protective coverings at time of Substantial Completion.
- B. Restore finishes damage during installation and construction period so that no evidence remains of correction work. Return items that cannot be refinished in the field to the shop; make required alterations and refinish entire unit, or provide new units.

PART 4 - METHOD OF MEASUREMENT AND BASIS OF PAYMENT

4.1 MEASUREMENT AND PAYMENT

- A. There shall be no separate measurement for payment for work under this Section. The cost of this work shall be included in the lump sum bid.

END OF SECTION 02521

SECTION 02528 - GRANITE CURBING

PART 1 - GENERAL

1.1 RELATED DOCUMENTS

- A. The Contract Drawings, General Conditions and Supplementary General Conditions apply to this Section of the Specifications.

1.2 SUMMARY

- A. Furnish and install granite curbing placed in a concrete setting bed in accordance with the locations, dimensions and details shown on the Contract Drawings, or as directed.

1.3 QUALITY ASSURANCE

- A. Codes and Standards: Comply with provisions of following, except otherwise indicated:
 - 1. References to "Form 816" means the State of Connecticut Department of Transportation "Standard Specification for Roads, Bridges and Incidental Construction, 2004", including any interim and supplemental specifications.

PART 2 - PRODUCTS

2.1 MATERIALS

- A. Granite and mortar shall conform to the requirements of Article M.12.06 and M.11.04 of "Form 816." Concrete shall conform to Section 02510, Class "C".

PART 3 - EXECUTION

3.1 CONSTRUCTION METHODS

- A. Comply with Article 8.13.03 of "Form 816". Firmly set and brace granite curbing, using non-organic stakes, shims, wedges or blocking to place concrete setting bed. Protect and fully clean all exposed faces of granite curbing from all laitance of concrete and mortar.

PART 4 - METHOD OF MEASUREMENT AND BASIS OF PAYMENT

4.1 MEASUREMENT AND PAYMENT

- A. There shall be no separate measurement for payment for work under this Section. The cost of this work shall be included in the lump sum bid for this project.

-END OF SECTION-

SECTION 02661 – UNDERGROUND STEAM AND CONDENSATE PIPING

PART 1 - GENERAL

1.01 DESCRIPTION:

A. Scope:

1. Provide new direct buried factory insulated and jacketed steam and condensate piping and appurtenances as indicated on the Contract Drawings and specified herein. The work includes all labor, materials, tools, equipment and appurtenances, and performing all operations necessary for the factory design and fabrication; furnishing; installing; and testing of each steam and condensate buried piping system hereinafter in this Section referred to as the “system”. Provide complete and operable systems in accordance with this section of the Specifications, the Contract Drawings, and the codes and standards listed herein. The system shall consist of piping as indicated together with fittings and appurtenances necessary for a complete and operable system. The systems shall be terminated 6 inches inside of the buildings and steam vaults. The Contract Drawings show the specific arrangement of piping, sizes and grades of pipe, and other details. The system shall not use any part of a building as an anchor point. Portions of the system not in compliance with this Section shall be rejected and removed from the job site.

B. Design:

1. The system manufacturer shall be responsible for the complete design of the system, the product to be supplied, fabrication, witnessing installation and testing of the system within the design parameters established by the Contract Drawings and Specifications, and in compliance with the detailed design. The complete design of the system shall be sealed by a professional engineer licensed in the State of Connecticut and in the employ of the system manufacturer.

C. Rated Characteristics and Media:

1. The system shall have a rated temperature of 353 degrees F and a rated pressure of 125 psig at 353 degrees F. Media shall be steam and steam condensate.

D. Operating Characteristics and Thermal Expansion Calculations:

1. Furnish thermal expansion calculations for the steam and condensate piping using the following design operating characteristics and installation temperature:
 - a. Steam pipe: 353 degrees F and 125 psig.
 - b. Condensate pipe: 353 degrees F and 125 psig.
 - c. Minimum installation temperature: 32 degrees F. For calculation purposes, the installation temperature shall not be higher than the ambient temperature at the site.

E. Furnish all local, state and federal permits.

1.02 REFERENCES:

- A. Except as specified herein, the latest edition of the standards listed below form a part of this Specification to the extent referenced in this Section. Where earlier editions of standards are adopted as referenced in applicable codes, those shall govern. The publications are referred to within the text by the basic designation only.
- B. In each of the standards referred to herein, consider the advisory provisions to be mandatory, as though the word, "shall" had been substituted for "should" wherever it appears.

1. American Society of Mechanical Engineers (ASME)

- a. [B1.20.1](#): Pipe Threads, General Purpose (Inch)
- b. [B16.11](#): Forged Fittings, Socket-Welding and Threaded
- c. [B16.9](#): Standard for Factory-Made Wrought Steel Butt-welding Fittings
- d. [B31.1](#): Power Piping
- e. [B 40.1](#): Pressure Gauges
- f. [BPVC SEC IX](#): Boiler and Pressure Vessel Code; Section IX, Welding and Brazing Qualifications

2. American Society for Testing And Materials (ASTM):

- a. [A105](#): Standard Specification for Carbon Steel Forgings for Piping Applications
- b. [A106](#): Standard Specification for Seamless Carbon Steel Pipe for High-Temperature Service
- c. [A234](#): Standard Specification for Piping Fittings of Wrought Carbon Steel and Alloy Steel for Moderate and High Temperature Service
- d. [A53](#): Standard Specification for Pipe, Steel, Black and Hot-Dipped, Zinc-Coated, Welded and Seamless
- e. [C518](#): Steady-State Thermal Transmission Properties by Means of the Heat Flow Meter Apparatus
- f. [C591](#): Standard Specification for Unfaced Preformed Rigid Cellular Polyisocyanurate Thermal Insulation
- g. [D1248](#): Polyethylene Plastics Extrusion Materials for Wire and Cable
- h. [D2487](#): Standard Practice for Classification of Soils for Engineering Purposes

1.03 SUBMITTALS:

A. Submit the following in accordance with Section 01-3300:

1. Procedures:

- a. Welding Procedure Specifications (WPS)
- b. Procedure Qualification Records (PQR)
- c. Welding Operation Qualification Tests (WPQ)

2. Shop Drawings:

- a. Steam and Condensate Pre-Insulated Buried Piping System – Manufacturer’s complete description of the design, fabrication and assembly of the system, materials of construction and field installation instructions, not later than 28 calendar days prior to start of factory fabrication. Include sufficient system details to show compliance with the Contract Documents. Show in the detail drawings complete piping, wiring and schematic diagrams and any other details to demonstrate that the system has been coordinated and will properly function as a unit. Clearly identify on the drawings any proposed deviations from the requirements of the Contract Documents. The shop drawings shall include a detailed design layout of the system (plan and elevation views) showing size, type, elevations and location of each component to be used in the system, the design and location of anchors, pipe guides, pipe supports, expansion loops, Z-bends, L-bends, end seals, leak plates, pipe joint locations, pipe and insulation thickness and sizes, types, and movements, and connection to wall penetrations. Detailed design layout drawings shall be based on field measurements and shall be stamped by a professional engineer licensed in the State of Connecticut and in the employ of the system manufacturer.

3. Product Data:

- a. Prefabricated pipe assembly including carrier pipe, insulation, jacket, field joint closure system, end seal system, leak detection system and accessories not later than 28 calendar days prior to start of factory fabrication – Manufacturer’s data composed of printed catalog cuts, brochures, specifications, and printed instructions in sufficient detail and scope to verify compliance with the requirements of the Contract Documents. Include data sheets for all coatings and indicate thicknesses of insulation for carrier pipes.

4. Calculations:

- a. Thermal Expansion Calculation – System manufacturer’s pipe-stress and system-expansion calculations using a finite element computer generated 3-dimensional analysis, not later than 28 calendar days prior to start of factory fabrication. Demonstrate with calculations that pipe stresses from temperature changes are within the allowable requirements in ASME B31.1 and that the anchors, guides and elbows will withstand the resultant forces. Detailed design layout drawings shall include all analysis node points. As a minimum, computer analysis results shall include node stresses, forces, moments and displacements. Calculations shall be stamped by a professional engineer licensed in the state of Connecticut and in the employ of

- the system manufacturer. Stresses shall be less than the maximum allowable stress from the ASME B31.1.
- b. Heat Transfer Calculation - System manufacturer's heat transfer calculations not later than 28 calendar days prior to start of factory fabrication for each pipe size indicated based on the specified insulation and thickness, and the specified operating temperature at. The calculations shall assume a ground temperature of 32 degrees F and permanent submergence below the groundwater table. The calculation shall demonstrate a maximum temperature drop of 0.25 degrees F per 1,000 feet of piping.
5. Work Plans and Quality Assurance:
- a. Work Plan - A proposed schedule of activities prepared by the Contractor, not later than 14 calendar days after notice to proceed.
 - b. Interruption of Existing Service - Schedule of proposed outages and interruptions of existing services prepared by the Contractor, not later than 21 calendar days in advance.
 - c. Connecting to Existing Work - Changes required to the system design due to interferences or conflicts, upon realization of interferences or conflicts, prepared by the Contractor.
 - d. Quality Assurance Plan - Manufacturer's quality assurance plan not later than 28 calendar days prior to start of factory fabrication. The quality assurance plan shall include requirements for fabrication, delivery, storage, installation and testing of the system as well as a schedule of when its representative will be present at the job site. The quality assurance plan shall include a list of characteristics indicating what defects or damage will necessitate replacement.
- B. Installer Qualifications: System supplier shall have fabricated systems of the composition specified herein for a continuous period of at least ten years. Installer shall have been in the business of installing the systems of the type specified herein for a continuous period of at least five years.
- C. Welder Qualifications: Certification according to ASME Boiler and Pressure Vessel Code, Section IX, Welding and Brazing
- D. System Manufacturer's Representative Reports - A daily written report from the representative of the system manufacturer, whenever the representative is required to be on the jobsite.
- E. Field Tests - Schedule of testing prepared by the Contractor, not later than 14 calendar days in advance for each specified test.
1. Test Reports:
- a. Test Procedures - A proposed test procedure and proposed samples of test data sheets for each specified test, not later than 28 calendar days prior to the proposed test date. The procedure shall contain a complete description of the proposed test with calibration curves or test results furnished by an independent testing laboratory of each instrument, to be used in the tests. Tests shall not commence until the procedures have been accepted.

- b. Test Reports - Test reports in booklet form showing all factory and field tests performed to prove compliance with the specified performance criteria, upon completion and testing of the installed system.

2. Certificates:

- a. Manufacturer - Certification stating that the system manufacturer regularly for the previous 10 years and currently manufactures systems of the type specified, and that the designs of the system to be provided for this project conform to specification requirements. This certification shall be an original signed by a principal officer of the system manufacturer and shall be submitted not later than 28 calendar days prior to the start of factory fabrication.
- b. Manufacturer's Representative - A letter from the system manufacturer, not later than 28 calendar days prior to the start of factory fabrication, listing the experience and training of the manufacturer's representative who will be overseeing the project. This certification shall be an original signed by a principal officer of the system manufacturer.
- c. System Quality - A Certificate of Satisfactory Operation certifying that at least 3 systems by the system manufacturer installed within the previous 5 years are operating satisfactorily, not later than 28 calendar days prior to start of factory fabrication. The certificate shall indicate the location, type of system, size of system, point of contact (POC) including phone number, for information verification. This certification shall be an original signed by a principal officer of the system manufacturer.
- d. Pipe Insulation, Jacket and End Seals - Manufacturer shall certify that the prefabricated pipe assembly is free of insulation voids. Manufacturer shall certify jacket and end seal integrity via the specified factory testing.
- e. Certificate of Compliance - Upon completion of the work, and before final acceptance, an original notarized statement signed by a principal officer of both the system manufacturer and the Contractor, certifying that the system has been installed satisfactorily and in accordance with the Contract Drawings, specifications, system manufacturer's detailed design layout drawings and with the system manufacturer's recommendations and field instructions.
- f. Testing Firms - A Certificate of Qualification from the independent testing firm or firms, not later than 14 days after notice to proceed.
- g. Welding:
 - (1) Prior to welding operations, a copy of qualified procedures and a list of names and identification symbols of qualified welders and welding operators.
 - (2) Certification of Acceptability of all welds made in the factory, upon completion of the project. This certification shall consist of a letter, signed by an official of the system manufacturer examining welds, stating that all provisions of this specification have been complied with, and that all welds inspected radiographically have met the specified acceptability standards.
 - (3) Certification of Acceptability of all welds made in the field, upon completion of the project. This certification shall consist of a letter, signed by an official of the

independent testing firm or firms examining welds, stating that all provisions of this specification have been complied with, and that all welds inspected radiographically have met the specified acceptability standards.

3. Operation and Maintenance Manuals:
 - a. Detailed procedures for the replacement of damaged pipe sections, and repair of damage insulation and/or jacket.
4. Warranties:
 - a. The system manufacturer shall provide a warranty for all factory-fabricated and/or factory-supplied components for a period of five years from the date of delivery to the project site.
 - b. The Contractor shall provide a warranty for all field-fabricated and/or field supplied components as well as the complete installation for a period of five years from the date of project acceptance.
5. Closeout Submittals
 - a. Record Drawings - Prepare and maintain record drawings as specified in this Section.

1.04 QUALITY ASSURANCE:

- A. Comply with the requirements specified in Section 01-4000.
- B. General:
 1. Drawings and specification direct attention to certain features of the system, but do not purport to cover all details entering into design and construction of the system.
 2. Consideration shall be given only to products of manufacturers who demonstrate successful experience in manufacture, operation, and servicing systems of type, size, performance, and reliability equal to that specified.
 3. Install system in compliance with state, local and federal codes and regulations.
- C. Alternate Material and Arrangement:
 1. If any material submitted for acceptance requires arrangement differing from that indicated or specified, Contractor shall prepare and submit for review, detailed drawings and specifications showing all necessary changes and all special features of the system proposed. Changes shall be at no additional cost.
- D. Manufacturer:
 1. The system manufacturer is the company responsible for the design and manufacture of the system. The system manufacturer shall direct the installation of the system and have a representative on the jobsite. The system manufacturer shall make all submittals specified to be by the manufacturer and shall assist the Contractor as in executing the Work.

E. Manufacturer's Representative:

1. The system manufacturer's representative shall be a person who regularly performs the duties specified, is certified in writing by the system manufacturer to be technically qualified and experienced in the installation of the system, and shall be authorized by the manufacturer to make and sign the daily reports specified. The system manufacturer's representative shall be under the direct employ and supervision of the system manufacturer. The system manufacturer's representative shall be required to be on the job site to observe, report on, and approve the Work when the specified types of work are being performed.

F. Pipe Stresses:

1. Stresses shall be less than the maximum allowable stress from the ASME B31.1.

G. Welding:

1. Weld piping in accordance with qualified procedures using performance qualified welders and welding operators. Qualify procedures and welders in accordance with ASME BPVC SEC IX. Welding procedures qualified by others, and welders and welding operators qualified by another employer may be accepted as permitted by ASME B31.1. The welder or welding operator shall apply the personally assigned symbol near each weld made as a permanent record.
2. The System Manufacturer (factory welds) and the Testing Firm (field welds) shall certify that:
 - a. Weld examination methods and procedures, and the interpretation of radiographic films will be performed in accordance with ASME B31.1;
 - b. The firm intends to utilize the proper film exposure, techniques, and penetrometer to produce density and geometric sharpness in sufficient clarity to determine presence of defects;
 - c. All radiographic films will be reviewed and interpreted, and reading reports signed, by not less than a Certified American Society for Nondestructive Testing Level III Radiographer.

H. Contract Drawings: The Contract Drawings accompanying this specification provide information on:

1. The size of carrier pipes, approximate length, and site location of the system.
2. The routing and elevation of the piping along the route.
3. Location and design of steam vaults where indicated.
4. Location of piping anchors at steam vaults. The system manufacturer shall incorporate anchors as needed for the system.
5. Operating pressure and temperature of system.

1.05 DELIVERY, STORAGE AND HANDLING:

- A. Provide as specified.

B. Shipping:

1. Material shall be shipped completely assembled.

C. Receiving:

1. Inspect and inventory items upon delivery to site.
2. Store and safeguard material in accordance with manufacturer's recommendations.

- D. Equipment and material placed on the job shall remain in the custody of the Contractor until final acceptance whether or not the Contractor has been reimbursed for the equipment and material by the Owner. The Contractor shall be solely responsible for the protection of the equipment and material against damage from any source while stored or during installation. Protect materials against damage from ultraviolet light, and entry of water, mud, dirt, dust and/or other foreign material by installing watertight protection on open ends at all times. Immediately replace sections of the casing or carrier piping found to have been subjected to full or partial submergence in water (which would allow the insulation to become wet).

1.06 SPECIAL REQUIREMENTS:

A. Refer to applicable sections of Division 1 with regard to providing the following:

1. Submittal of manufacturer's specifications, catalog data, descriptive matter, illustrations, diagrams, etc., including complete motor data for all equipment.
2. Foundations and installations
3. Operating and maintenance instructions
4. Special tools
5. Bolts, anchor bolts, and nuts
6. Sleeves

1.07 COOPERATION AND COORDINATION WITH OTHER TRADES:

- A. Field Measurements: Verify actual dimensions at tie in points to existing systems prior to fabrication.
- B. Work shall be performed in cooperation with other trades on the project and so scheduled as to allow efficient completion of the project. Materials and equipment shall be installed as fast as conditions will permit, and installed promptly.
- C. Furnish to all other trades advance information on location and size of all frames, and openings needed for the Work, and also furnish layout information and shop drawings necessary to permit other trades affected by the Work to install their work properly coordinated and without delay.

- D. Where there is evidence that Work installed interferes with the work of other Sections, assist in working out space conditions to make satisfactory adjustments.
 - E. With the acceptance of the Engineer and without additional cost, make reasonable modifications in Work specified under this Section of the Specifications required to coordinate with normal structural or utility interferences, or for proper execution of specified work.
 - F. If work is installed before coordinating with other trades so as to cause interference with the work of such trades, make all necessary changes in Work under this Section of the Specifications at no additional cost.
 - G. Protect all materials and work of other trades from damage that may be caused by the Work required under this Section of the Specifications and be responsible for repairing any damages caused by such work without any additional cost.
 - H. Follow Drawings in layout work. Check drawings of, and coordinate with, other trades to verify special provisions, installation requirements and spaces in which Work provided under this Section of the Specifications will be installed. Maintain space conditions at all points unless otherwise indicated. Where space conditions appear inadequate, notify the Engineer before proceeding.
 - I. Attend regular coordination and job progress meetings required.
- 1.08 REMOVAL WORK:
- A. Work shall be performed in accordance with requirements for phasing. Pipe, fittings, and insulation, including the connection to the structure and any fastenings, shall be removed. Openings in building and/or steam vaults to remain shall be sealed after removal of piping. Material and equipment removed shall become the property of the Contractor and shall be removed from the property within 1 week and shall not be stored in operating areas. Flame cutting shall be performed with adequate fire protection facilities available as required by safety codes and the Owner.
 - B. Particular care shall be taken to avoid creating hazards on the site or causing disruption of service.
 - C. All existing piping indicated to be removed shall be done in a neat and workmanlike manner.
 - D. Should any asbestos and/or asbestos related products or materials be encountered during the performance of the Work, stop work immediately and inform the Engineer and the Owner of the presence of asbestos.
- 1.09 CODES, PERMITS AND FEES:
- A. Except for additional requirements as specified or indicated under the Work of this Section, materials, workmanship and equipment shall conform to the governing edition of the following regulations, and agency requirements.
 - 1. State and Local Building Codes including, but not limited to, the Connecticut Mechanical Code, Connecticut Energy Conservation Code, Connecticut Building Code, and Connecticut Department of Energy and Environmental Protection.
 - 2. Local Fire Department
 - 3. Occupational Safety and Health Administration (OSHA)

4. Any other local codes or requirements of Authorities Having Jurisdiction.

- B. Pay for all fees and give all notices, file all plans, obtain all permits and licenses, and obtain all necessary acceptances from Authorities Having Jurisdiction. Deliver all certificates of inspection to the Authorities Having Jurisdiction. No Work shall be covered before examination and acceptance by Authorities having jurisdiction. Replace imperfect or condemned work to conform to inspectional requirements, satisfactory to the Owner, Engineer and Authorities Having Jurisdiction without extra cost to the Owner. If Work is covered before inspection and acceptance, pay costs of uncovering and reinstalling the covering, whether it meets contract requirements or not.

1.10 RECORD DRAWINGS:

- A. Record drawings shall be provided under this Section as specified herein.
- B. As work progresses and for the duration of the Contract, maintain a complete and separate set of prints of Record Drawings at the job site at all times. On a daily basis, record work completed and all changes from original Contract Drawings clearly and accurately, including work installed as a modification or addition to the original design such as change orders, instructions issued by the Engineer, or conditions encountered in the field.
- C. Drawings shall show record condition of layout, details, and control changes. Schedules shall show actual manufacturer and make and model numbers of final equipment installation. Remove all superceded data to show the completed work.
- D. The Record Drawings will be used as a guide for determining the progress of the Work installed. They shall be inspected on a regular basis and shall be corrected immediately if found inaccurate or incomplete. Requisitions for payment will not be accepted until the Record Drawings are accurate and up-to-date.
- E. At completion of Work prepare a complete set of Record Drawings showing all systems as actually installed. The Contract Drawing electronic CAD files will be made available for this Contractor's copying, at his expense, into reproducibles to serve as backgrounds for the Record Drawings. These reproducibles shall be made on 4 mil polyester-based "Estar" or acceptable equivalent product. Provide all drawings necessary to show the required record information. Submit mylars and three sets of prints to the Engineer for comments as to compliance with this Section. Submit an electronic spreadsheet of all record data showing points, northing, eating, and elevation. Make all modifications so noted by the Engineer.
- F. Certify the accuracy of the Record Drawings. Record Drawings shall become the property of the Owner.
- G. When required by jurisdiction, submit the record set for approval by the Authority Having Jurisdiction in a form acceptable to the jurisdiction.

PART 2 - PRODUCTS

2.01 GENERAL:

- A. Where applicable, all products requiring approval shall be so approved.

2.01 MANUFACTURERS:

A. Acceptable manufacturers include:

1. Perma-Pipe, Inc.
2. Rovanco Piping Systems, Inc.
3. Thermacor Process, Inc.

2.02 STANDARD PRODUCTS:

- A. Provide for this project a designed system that duplicates systems that have been in satisfactory use for at least 5 years at 3 locations prior to bid opening. Provide systems that have been operated under pressure, temperature and site characteristics which are equal to or more severe than the operating conditions in this specification and that have distributed the same medium. The system shall be supported by a service organization that can reach the site after a service call within 48 hours.

2.03 SYSTEM TYPE:

- A. The system shall be composed of carrier piping with insulation, annular space, inner conduit, inner conduit insulation and outer HDPE jacket. The system shall be drainable-dryable-testable (DDT) type composed of carrier piping with direct applied insulation enclosed within a secondary containment casing (conduit) providing annular air space.
- B. All straight sections, anchors, fittings, and other accessories of the system shall be factory fabricated and assembled including carrier pipe, coatings, insulation and jacket. Field fabrication shall be limited to welding joints between fittings and straight pipe sections; welding joints between straight pipe sections; coating, insulating and jacketing the aforementioned field joints; and providing concrete around anchors.
- C. Water spread limiting devices shall be required at all ends of pipe fittings, anchors, and field joints. Such end seals shall be designed and factory fabricated to prevent the ingress of moisture into the system. All steel pipe shall be welded. Joints shall be butt-weld except socket-weld joints shall be provided for pipe sizes 2 inch and smaller.

2.04 CARRIER PIPING:

- A. General: Metallic pressure pipe, fittings, and piping accessories shall conform to the requirements of ASME B31.1 and shall be types suitable for the media, and the temperature and pressure of the media.
- B. Pipe:
1. Steam: Schedule 40 seamless
 2. Pumped Condensate Return: Schedule 80 seamless
 3. High Pressure Condensate: Schedule 80 seamless

C. Pipe Fittings:

1. Fittings for Steel Pipe:

- a. Welding fittings shall conform to the requirements of ASTM A105 or ASTM A234, Grade B and be same schedule as adjoining pipe. Welding fittings shall also conform to ASME B16.9 for butt-weld fittings, and ASME B16.11 2000 pound class for socket-weld fittings. For butt-welded piping, long radius elbows shall be used unless otherwise indicated. The system manufacturer may utilize a pipe bender at the factory to fabricate elbows up to and including 8 inch size. Split-ring welding rings shall be used on butt-welded piping. Pipe threads shall conform to ASME B1.20.1. Pipe to be threaded shall be schedule 80. Tees shall be full size or reducing type, having interior surfaces smoothly contoured. Factory fabricated weldolets and threadolets may be used in accordance with the manufacturer's instructions.

D. Coating:

1. The exterior of steel pipe and fitting surfaces shall be coated.
2. Abrasive blast-cleaned substrate to a minimum of a near white surface in accordance with SSPC SP10-63T. Profile shall be a minimum of 1.5 mil peak to valley range. Any areas of rust bloom or oil shall be wiped and re-blasted. After blasting, the steel service pipe shall be coated.
3. Coating shall be a two part epoxy coating consisting of a base material and curing agent spray applied and bonded to a minimum thickness of 8 – 12 mils.
4. Coated pipe and fittings shall be holiday tested at 1,000 volts to ensure a void free coating. Areas of the piping not passing the holiday test shall be patch coated and re-tested.
5. Factory Tests - Reports for holiday testing shall be required for each carrier pipe piece coated and shipped to the job site. Test reports shall include the results of the holiday test, any repairs made and verification that the repaired area passed a second holiday test. Factory test reports shall be part of the paperwork accompanying the pipe shipment to the job site and shall be submitted by the Contractor to the Engineer for acceptance. Non-testing of the service pipe epoxy coating shall not be acceptable and may result in removal of product from the site at contractors expense.

2.05 INSULATION:

A. Recycled Materials:

1. Provide thermal insulation containing recycled materials to the extent practicable, provided that the materials meet all other requirements of this Section. The minimum recycled material content shall be in compliance with specified Department of Environmental Protection rules and regulations.

B. Factory Applied Foam Insulation:

1. Prefabricated pipe and fittings shall be insulated in the factory. Insulation for prefabricated insulated pipe and fittings shall be closed cell high-temp polyisocyanurate insulation having a density not less than 2 pounds per cubic foot (pcf). The insulation thermal conductivity factor shall

not exceed the numerical value of 0.13 Btu-inch/square foot-degree F-hour at 75 degrees F, when tested in accordance with ASTM C518.

2. The high-temp polyisocyanurate insulation shall be spray-applied. The insulation shall be bonded to the carrier pipe and jacket. Systems using open cell insulation or a non-bonded design shall not be permitted. Foam injected polyurethane foam manufacturing processes shall not be permitted. The insulated pipe shall be guaranteed 100 percent free of insulation voids.
3. Factory Tests - Quality assurance procedures at the manufacturing plant shall include:
 - a. Foam density testing
 - b. Thermal conductivity testing
 - c. Closed cell content testing
 - d. Compressive strength testing
 - e. Dimensional stability testing
 - f. Visual (no void) test.

C. Field Applied Insulation:

1. Field joints shall only be placed in straight sections. Field insulation of fittings shall not be permitted. Thickness shall match adjacent piping insulation thickness. Field-applied insulation shall be protected with a field jackets closure matching the pipe insulation jacket. Heat-shrinkable sleeves with a minimum thickness of 50 mils shall be provided over field jacket closure connection joints as indicated. All insulation and coating materials for making field joints shall be furnished by the system manufacturer.
2. The field-applied insulation mold shall be of removable design to facilitate visual inspection of the joint. Air pressure testable field joints shall not be permitted.

D. Insulation Thickness:

1. Insulation thickness shall be as indicated on the Contract Drawings.

2.06 DIRECT APPLIED JACKET:

- A. Provide factory-fabricated, factory-applied jacket over the insulation. Jacket shall be seamless high density polyethylene (HDPE) conforming to ASTM D 3350, minimum cell classification PE 345444 C.
- B. The minimum thickness of the HDPE jacket shall be 0.175 inch thick.
- C. Deformation onset temperature of jacket shall be equal to or greater than 140 degrees F for HDPE. Melting temperature of jacket shall be equal to or greater than 250 degrees F.
- D. Jacket shall be directly applied by a filament winder/chop spray up manufacturing process for RTRP, or an extruder manufacturing process for HDPE. Directly extruded HDPE jackets shall be treated to ensure bonding between the insulation and jacket

2.07 DRAINABLE-DRYABLE-TESTABLE (DDT) SYSTEMS:

A. Inner Casing:

1. Casing shall be smooth-wall 10 gauge black steel.

B. Casing End Plates, Vents, and Drains:

1. End plates shall be made of ASTM A36 steel, minimum thickness 1/2-inch for conduit pipe sizes above 12 inches and 0.375 inches for conduit pipe sizes 12 inches and less. A 1 inch ASTM A53, Schedule 40, galvanized vent riser pipe shall be provided on end plate vent opening. Vent pipe shall be extended into the steam vault vent as indicated on the Contract Drawings. A 1 inch drain shall be provided at the bottom and vent at the top. Brass plugs and half coupling, constructed with welded steel and welded to the end plate, shall be furnished; drains shall be plugged; vents shall not be plugged.

C. Air Space:

1. Continuous 1 inch minimum air space shall be provided between carrier pipe insulation and inner casing.

D. Carrier Pipe Guides:

1. Carrier pipe guides shall be spaced 10 feet on centers maximum, no more than 5 feet from pipe ends, with a minimum of 3 guides per elbow section. Guides shall be designed to allow thermal expansion without damage, to provide proper pipe guiding, and to allow horizontal movement in 2 directions at expansion loops and bends. Design of supports shall permit flow of water through the support. Pipe insulation shall extend through the pipe guides and be protected by steel sleeves. Design of guides shall negate metal-to-metal contact between the casing and the carrier pipe. Insulation or non-metallic material used to ensure no metal-to-metal contact shall not be compressed by the weight of the carrier pipe when full of water.

E. Field Connection of Casing Sections:

1. Field connection of casing shall be made using a compatible steel section, welded to casing sections, coated on all surfaces with system manufacturer's coating field repair compound, and covered with a 0.05 inch minimum thickness polyethylene shrink sleeve designed for a service temperature exceeding 350 degrees F.

2.08 END SEALS:

A. General:

1. Each prefabricated piping component of the system shall have a complete sealing of the insulation to provide a permanent water and vapor seal at each end of the component. Prefabricated pipe components modified in the field shall be provided with an end seal which is equivalent to the end seals furnished with the prefabricated component of piping. End seals shall be tested and certified in accordance with paragraph Jacket and End Seal Testing and Certification.

B. Types:

1. End seals provided shall be one of the following types. Gland type end seals shall not be permitted. Mastic seals shall not be considered an equal to tapered jacket or molded caps and shall not be permitted.
 - a. Using specially designed molded caps made of polyethylene or rubber of standard manufactured thickness. A minimum 1-1/2 inch (38 mm) surface bonding area shall be provided between the cap and both the jacket and carrier pipe.
 - b. Using elastomer-ring end seals designed and dimensioned to fit in the annular space between the jacket and the carrier pipe.
 - c. Using a waterproof mastic seal vapor barrier over the exposed insulation ends.
 - d. Heat-shrinkable sleeves.

2.09 ANCHOR PLATES:

- A. Anchor plate shall be ASTM A36 steel, welded to carrier pipe, 1/2-inch minimum thickness, with passages for air flow and water drainage thru the annular air space in the system. Exterior surface of the anchor plate shall be coated with the same coating materials as the casing.

2.10 MANUFACTURER'S IDENTIFICATION:

- A. Embossed brass or stainless steel tag, hung by brass or stainless steel chain at each end of each conduit or insulated piping in the manholes and buildings, shall be provided. The tag shall identify System Manufacturer's name, date of installation, contract number, and manufacturer's project number.

2.11 PIPE SLEEVES:

- A. Sleeves in Concrete Walls. Ductile iron pipe or cast iron pipe, service weight.

2.12 DETECTION SYSTEMS

A. LEAK DETECTION SYSTEM

1. Leak Detection System: Factory Fabricated UL listed complete with cable type leak detection system complete with sensor cable, probes, system layout map, microprocessor based monitoring unit and auxiliary equipment required for a complete and operable system. The leak detection system shall be capable of detecting leaks in both the pre-insulated piping and flooding in Steam Vaults C-6, B-6 and South Steam Vault.
2. Sensor Cable in the Interior Air Space: The sensor cable is to be installed at the low point of the space between the carrier pipe insulation and the inner surface of the steel conduit. It shall be of Fluoropolymer and polymer coated wire construction with no exposed parts. Cable shall detect water-based liquids. The sensor cable can be flushed and dried in-place and will not require replacement after a leak event of any volatile liquid. The cable shall have a breaking strength of at least 100 lb and shall be resistant to corrosion, abrasion and most chemicals tested in accordance

with exposure procedures in ASTM D-543. The cable shall be available in lengths up to 1,500 feet in bulk spools. All cables must be field repairable by trained technicians.

3. The Leak Detection System shall locate the point or origin of the first liquid leak or fault (break/short/probe) within + 0.1% (.2% for hydrocarbons) of the sensor string, length, or + 5 feet, whichever is greater. The system shall identify the type of alarm leak/break/short/probe as well as the location. The system shall be able to monitor (detect and locate) with up to 100' of cable wetted without significant inaccuracy in location.
4. The system shall be capable of monitoring up to 5,000 feet of cable per sensor string from a single monitoring unit.
5. The system shall be capable of monitoring (detecting and locating) for multiple leaks or additional liquid on the sensor cable. The system shall be able to monitor with up to 100 feet of cable wetted with reduced location accuracy. The system shall be capable of detecting and locating additional leaks both further away from the initial leak location and closer to the panel than the initial detection location.
6. The system shall be capable of identifying the location of breaks and shorts on the cable. When either of these faults occurs, an alarm shall sound and a display visible on the front of the monitoring unit shall clearly indicate the type of fault, i.e. BREAK or SHORT and display the location of the fault.
7. The system shall be capable of detecting all aqueous liquids.
8. The system shall provide relays for remote indication of an alarm conditions exist, an alarm condition exists but has not yet been acknowledged, and an alarm condition exists and has been acknowledged. Communications shall be available via RS-232 and ASCH communication protocol to allow central monitoring and control via a remote computer.
9. The system shall record significant events in nonvolatile memory. A minimum of 900 events shall be stored. When the memory becomes full, the recorded events shall be deleted from memory on a FIFO basis. Each recorded event shall include the time and date that the event occurred. Archives shall be retrievable through the RS232 and ASCII communication protocols.
10. The system shall continuously provide positive indication that it is monitoring the sensing string and the status of the sensing string. The system clock shall provide the time and date on the LCD of the monitoring panel. The system clock shall be programmable by the user. A time and date indication shall be included for all events recorded in memory.
11. The system shall have assignable password security to provide for varying levels of system access. A minimum of 20 passwords shall be available within the system. The system shall not permit unauthorized modifications to the sensing string to be made (i.e. shortening the cable length) without causing an alarm condition.
12. The system shall be capable of monitoring sensor cables, probe sensors and switch sensors (such as float switches, pressure switches, etc.) from the same monitoring panel. English language displays shall indicate the status of the sensors.

13. The system shall not detect incidental liquid contact that is not at least equivalent to a small puddle, 3 inches in diameter. The sensitivity of the system shall be field adjustable to increase or decrease the amount of wetted cable needed to cause an alarm from several inches to several feet.
 14. The monitoring unit shall be microprocessor based and capable of monitoring up to 5,000 feet of sensing string per cable, including sensor cable, probes and jumper cable, depending on cable type. The monitoring unit shall indicate when any liquid comes in contact with the sensor cable by sounding an alarm, actuating the two output relays, displaying a message stating that a leak has been detected and the location of that leak on the sensing string.
 15. The monitoring unit shall have a green LED on the front panel to indicate the unit is powered. A 2-line by 40-character backlit LCD shall be visible from the front of the unit to provide system data. A red LED on the front panel shall indicate an alarm condition has occurred.
 16. The monitoring unit power requirements shall be 120/240 VAC, 100 VA, 50/60 Hz, single-phase. Monitoring units shall be equipped with an RS-232 communication port and a minimum of one common and one per cable SPDT output relay, rated for 250 VAC, IOA.
 17. The monitoring unit shall be enclosed in a modified NEMA 12 enclosure. The unit shall be UL Listed and FM approved to provide connections for intrinsically safe sensor circuits for use in Class 1. Division I, Groups C and D Hazardous Locations. The ability to locate a leak shall not depend on battery backed up functions. In the event of power failure, system conditions and parameters shall be stored in nonvolatile memory allowing the unit to automatically resume monitoring, without resetting, upon restoration power. An on-off switch shall be provided in the panel for servicing.
- B. BREAK DETECTION – The outer jacket of the conduits shall be provided with a break detection system capable of detecting a break in the HDPE outer jacket, and determining the location of the break. The break detection system shall work in concert with the leak detection system.

PART 3 - EXECUTION

3.01 GENERAL:

- A. Installation, workmanship, inspection, and testing shall be in accordance with the specified Codes with the additions specified herein.

3.02 PREPARATION:

A. Job Conditions:

1. Phasing of demolition and new work shall be as indicated on the Contract Drawings.

B. Interruption of Existing Service:

1. Arrange, phase and perform work and, where required, provide temporary facilities, materials, equipment, and connections to utilities, to ensure adequate steam distribution service for existing installations at all times. Only necessary interruptions required for making connections will be permitted, and only at times as approved by the Owner.

C. Grading:

1. Unless otherwise indicated, steam and condensate piping shall be graded uniformly downward not less than 5 inches in 100 feet to the lower point of entry between building entries and/or steam vaults.

D. Connecting to Existing Work:

1. Connect new work to existing work in a neat and workmanlike manner. Make connections only within buildings and/or in manholes. Where an existing structure must be cut or existing utilities interfere, such obstructions shall be bypassed, removed, replaced or relocated, restored and repaired. Any changes required to the system design as a result of interferences or conflicts shall be approved by the system manufacturer and the Engineer. Work disturbed or damaged shall be replaced to its pre-existing condition.

E. Coordination:

1. The location of all items of equipment and work of all trades shall be coordinated. Operability and maintainability of the equipment and systems shall be maintained.

F. Variations:

1. Any variations from the accepted, detailed design layout drawings shall be submitted to the Engineer for acceptance. Variations shall be signed and sealed by the system manufacturer's professional engineer licensed in the State of Connecticut, responsible for the complete design of the system.

G. Pipe Joints:

1. Pipe and fittings shall be cleaned inside and outside before and after assembly. Dirt, scale, and other foreign matter shall be removed from inside the piping by use of a pipe swab or pipe pig before connecting pipe sections, valves, equipment or fittings. Eccentric connectors shall be used as needed between pipe sections to provide drainage of sections between manholes and between manholes and buildings.

H. Direction Changes:

1. Changes in direction shall be made with factory-built insulated fittings. Field-fabricated fittings shall not be permitted except carrier pipe miters of up to 11 degree angle from straight-through orientation are allowable in accordance with the system manufacturer recommendations.

3.03 PIPE WELDING:

A. General

1. Weld pipe joints only when ambient temperature is above 0 degree F where possible.
2. Bevel pipe ends at a 37.5 degree angle where possible, smooth rough cuts, and clean to remove slag, metal particles, and dirt.

3. Use pipe clamps or tack-weld joints with 1 inch long welds; 4 welds for pipe sizes to 10 inches, 8 welds for pipe sizes 12 inches to 20 inches.
4. Build up welds with stringer-bead pass, followed by hot pass, followed by cover or filler pass. Eliminate valleys at center and edges of each weld. Weld by procedures which will ensure elimination of unsound or unfused metal, cracks, oxidation, blow-holes, and non-metallic inclusions.
5. Do not weld-out piping system imperfections by tack-welding procedures; refabricate to comply with requirements.
6. If piping component ends are bored, such boring shall not result in the finished wall thickness after welding less than the minimum design thickness.
7. The inside diameters of piping components to be butt-welded shall be aligned as accurately as is practicable within existing commercial tolerances on diameters, wall thickness and out of roundness. Alignment shall be preserved during welding. The internal misalignment of the ends to be joined shall not exceed 0.05 inch.

B. Welding Processes

1. All welding on metal piping systems shall be performed using qualified welding procedures and qualified welders and welding operators in accordance with Section IX of the ASME Boiler and Pressure Vessel Code.
2. All welding shall be performed by a process that is compatible with the work being welded and the working conditions. Shielded metal-arc welding (SMAW) shall not be used on work less than 3/16 inch thick.
3. Work thicker than 3/16 inch shall have a root pass by the GTAW process with the back purged with argon and the balance of the weld may be completed by the SMAW process or other process as stated below.
4. Welding shall be performed by using only one of the following processes:
 - a. Shielded Metal Arc Welding (SMAW), also known as "Stick" Welding
 - b. Gas Tungsten Arc Welding (GTAW), also known as TIG and Heliarc Welding
 - c. Submerged Arc Welding (SAW)
 - d. Metal Inert Gas Welding (MIG)
5. Spray Rustoleum on welds after welding to prevent rust.

C. Welding Grooves

1. The ends of steel pipe and fittings to be erected with butt welded joints shall be beveled to form welding grooves in accordance with ASME B16.25.
2. Welding grooves for butt welded joints in pipe of unequal wall thickness shall be beveled in accordance with ASME Code for Pressure Piping B31.1.

D. Backing Rings

1. Backing rings shall not be used.

E. Cleaning of Welding

1. All slag or flux remaining on the bead of welding shall be completely removed before laying down the next successive bead and at the completion of the weld.

F. Weld Quality

1. All welds shall have full penetration and complete fusion with a minimum of weld metal protruding on the inside of the pipe.
2. The finished weld contour shall be uniform, with the toe or edge of the weld merging smoothly into the base material. Butt welds shall have a slight reinforcement build-up gradually from the toe or edge toward the center of the weld. The limitation on butt weld reinforcement shall be in accordance with ASME B31.1, Table 127.4.2 and shall apply separately to both inside and outside surfaces of the joint. Fillet welds may be slightly concave on the furnished surface.

G. Socket Welding Joints

1. Where socket welding valves or fittings are used, the pipe shall be spaced with a minimum of 1/16 inch clearance between the end of the pipe and the socket so that no stresses will be imparted to the weld due to "bottoming" of the pipe in the socket. The fit between the socket and the pipe shall conform to applicable standards for socket weld fittings and in no case shall the inside diameter of the socket exceed the outside diameter of the pipe by more than 0.075 inches.

3.4. WELDER QUALIFICATIONS

A. Welding Procedures

1. In the form of a submittal, the Contractor shall record in detail and shall qualify the Welding Procedure Specifications for every welding procedure that he proposes. Procedures shall be developed for all metals included in the work. The procedures for making transition welds between different materials or between plates or pipes of different wall thickness shall be qualified. Qualification for each welding procedure shall conform to the requirements of ASME B31.1, and to this specification. The method for each system shall be fully described including the number of beads, the volts, the amperes, and the welding rod for various pipe thicknesses and materials. The welding procedures shall specify end preparation for butt welds including cleaning, alignment, and root openings. Preheat, interpass temperature control, and postheat treatment of welds shall be as required by approved welding procedures, unless otherwise indicated or specified. Approval of any procedure does not relieve the Contractor of the sole responsibility for producing acceptable welds. Welding procedures shall be identified individually and shall be clearly referenced to the type of welding required for this project. These procedures shall be the same as those used for all pipe welder qualification tests, all shop welds, and all field welds. The Contractor shall provide Procedure Qualification Records for all proposed Welding Procedure Specifications (WPS).

B. Welding Procedure Submittals. Submit the following:

1. Welding Procedure Specifications: Provide for each weld type. It is highly recommended that the Contractor use ASME Form E00006, QW-482 "Suggested Format for Welding Procedure Specification (WPS)".

2. Procedure Qualification Records: Provide for each weld type. It is highly recommended that the Contractor use ASME Form E00007, QW-483 "Suggested Format for Procedure Qualification Record (PQR)".

C. Welder Qualification

1. WPQs: Provide welder qualifications for each welder for each weld type. It is highly recommended that the Contractor use ASME Form E00008, QW-484 "Suggested Format for Manufacturer's Record of Welder or Welding Operation Qualification Tests (WPQ)." The WPQs shall be performed under the witness of an independent agency. The witness shall be a representative of an independent testing agency, Authorized Inspector, or consultant, any of which must be approved by the National Certified Pipe Welding Bureau. The qualifying test segment must be a 2 inch nominal pipe size with wall thickness within range of the WPS. Tests position shall be "6G" per ASME Section IX.
2. Evidence of Continuity: Welder qualifications must be current. If the qualification test is more than 6 months old, provide record of welding continuity for each welder. Record of welding continuity shall show that the welder in question has performed welding to the procedure in question without a 6 month continuous span of inactivity since the date that the welder qualification test was passed for the submitted welding procedure. Record of welding continuity shall include, at a minimum, the welder's employer name and address, the date the welder qualification test was passed, and the dates indicating welding continuity including welding procedure for each date.
3. In lieu of providing WPQs and Evidence of Continuity, the Contractor may elect to have all welders qualified on-site by an Independent Testing Agency prior to beginning work. This may be required by Owner, especially on larger projects.

3.5. WELD RECORDS

A. General

1. For all welding within the scope of ASME B31.1, the Contractor shall submit for approval an administrative procedure for recording, locating, monitoring, and maintaining the quality of all welds to be performed on the project. This quality control document record shall include but not be limited to drawings and schedules identifying location of each weld by individual number, identification of welder who performed each weld by individual welder's name, stamp number, date and WPS used.
2. After achieving qualification, but before being assigned work, each qualified person shall be assigned an identifying number by the Contractor that shall be used to identify all of his welds. A list of qualified persons with their respective numbers shall be submitted by the Contractor and shall be maintained accurately with deletions and additions reported promptly.
3. Upon completing a joint, the welder shall mark the pipe not more than 6 inches from the weld with the identifying number and the last two digits of the year in which the work was performed. Identification marks shall be made by using a rubber stamp or felt-tipped marker with permanent, weatherproof ink or other methods approved by the Engineer that do not deform the metal. For seam welds, identification marks shall be placed adjacent to the welds at 3-foot intervals. Identification by die stamps or electric etchers will not be allowed. The markers are to be provided by the Contractor. Substituting a map of welds with welders' names shall not be acceptable.
4. Weld Locations - The Contractor shall locate the as-built position of each weld on the constructed pipe systems by GPS. The Contractor shall provide the Owner with a digital file containing the

centerline coordinates at each of the weld locations along the constructed steam and condensate pipeline route.

B. Testing

1. The system manufacturer shall perform radiographic examination of 100 percent of the factory welds in the carrier piping fittings in accordance with ASME B31.1. The following shall be furnished: a set of films showing each weld inspected by radiographic testing, and a reading report evaluating the quality of each weld. Submit for acceptance prior to shipment of HVAC Buried Piping Systems.
2. An accepted independent testing firm engaged by the Contractor and regularly engaged in weld testing shall perform radiographic examination of 10 percent of the field welds in the piping systems in accordance with ASME B31.1. The following shall be furnished: a set of films showing each weld inspected by radiographic testing, a reading report evaluating the quality of each weld, and a location plan showing the physical location where each weld is to be found in the completed project. Submit for acceptance prior to installing field joint jackets, backfilling and hydrostatic testing.

3.04 PIPE THROUGH PENETRATIONS:

- A. Furnish pipe sleeves where piping passes through building foundation walls and/or manholes. Sleeves shall be installed and secured in proper position and location during construction. Core drilling of concrete may be provided by this Section in lieu of pipe sleeves when core-drilled holes are completely smooth. Furnish sleeves of sufficient length to pass through entire thickness of walls.
- B. Pipe Penetrations Through Building Exterior Construction: Provide a mechanically adjustable segmented elastomeric seal as indicated with sleeve sized as recommended by seal manufacturer.
- C. Sleeves through walls shall terminate flush with the finished surface on either side of the wall.

3.05 SYSTEM INSTALLATION:

- A. The system manufacturer's representative shall oversee the delivery, storage, installation and testing of the system. Work shall be in accordance with the requirements specified and with the printed instructions of the system manufacturer. These specifications shall take precedence over the printed instructions if conflicts arise. Printed instructions shall be submitted to the Engineer prior to system installation.
- B. Field Joint Closures:
 1. After welds, visual and pressure tests specified are completed, carrier pipe cut backs and field weld areas shall be wire brushed, cleaned and coated with epoxy in accordance with the manufacturer's installation instructions. Once the coating has cured the insulation shall be applied.
 2. Insulation and jacketing of field joints shall be in accordance with the manufacturer's written instructions. Thickness dimensions of the insulation and jacketing materials shall not be less than those of the adjoining prefabricated section. Care shall be taken to ensure that field closures are made under conditions of temperature and cleanliness required to produce a sound, continuous vapor barrier. A standard polyethylene heat shrink sleeve shall be installed over the jacketing and shall have a 6 inch minimum overlap at each end.

3. All coating, insulation and jacketing materials for the field joint shall be furnished by the system manufacturer.
- B. Verification of Final Elevations:
4. Prior to covering the top of the pipe, measure and record the elevation and location of the top of each field joint, 1/3 points along each pipe section, and the top of each elbow. These measurements shall be checked against the contract drawings and shall confirm that the system has been installed to the elevations shown on the Contract Drawings. Slope shall be uniform to within 0.1 percent. These measurements shall be recorded by the Contractor, included in the system manufacturer's representative daily report, and given to the Engineer prior to covering the piping with backfill material.
- C. Excavation, Trenching, and Backfilling:
1. Backfilling shall not begin until heat shrink sleeves have cooled. Pipe shall lay on a 6 inch minimum sand bed and shall be backfilled with sand on all sides, including top of pipe, to a minimum of 6 inches as measured from outside of jacket. Bedding for system shall be compacted, firm and stable. The entire trench width shall be evenly backfilled in 6 inch compacted layers. Bedding and backfill shall be free from rocks or substances which could damage the system. Concrete anchor and thrust blocks shall be installed in undisturbed earth. Backfilling shall not commence until system has been satisfactorily pressure tested (both hydrostatic test of carrier pipe and air test of conduit where applicable). Minimum depth of burial to the top of the casing shall be 36 inches.
- D. System Manufacturer's Representative Responsibilities
1. The system manufacturer's representative shall be present at the job site and witness when the following types of work are being performed:
 - a. Unloading and Inspection.
 - b. Inspection of trenches, then inspection of the pipe bedding, prior to commencing installation of system.
 - c. Inspection of concrete anchors and thrust blocks.
 - d. Pressure testing.
 - e. Field joint closure work for first six joints.
 - f. Air test of casings.
 - g. Verification of final elevations. Elevation readings shall be witnessed and recorded.
 - h. Operational tests.
 2. The system manufacturer's representative shall notify the Contractor immediately of any problems. The system manufacturer's representative shall notify the Engineer of problems requiring immediate action; otherwise, the daily reports shall note any problems encountered and indicate the corrective actions taken.

C. System Manufacturer's Representative Reports:

3. The system manufacturer's representative shall: prepare and sign a written daily report; present the original daily report to the Engineer no later than one working day after it is prepared; and forward one copy to the manufacturer's main office. The report shall state whether or not the condition and quality of the materials used and the delivery, storage, installation and testing of the system are in accordance with the drawings, specifications, and manufacturer's printed instructions and are satisfactory in all respects. When any work connected with the installation is unsatisfactory, the report shall state what corrective action has been taken or shall contain the system manufacturer's recommendations for corrective action. The report shall identify any condition that could result in an unsatisfactory installation, including such items as open pipe [and casing] ends left in the trench overnight and improper manhole entries. The daily reports shall be reviewed, signed and sealed, on a weekly basis, by the system manufacturer's technical service manager responsible for the system warranty. Signed and sealed copies of the daily reports shall be submitted with the payment request. Requests for payment will be denied if the weekly review is not accomplished. Upon completion of the work and before final acceptance, a notarized Certificate of Compliance, signed by a principal officer of both the manufacturing and the contracting firms, stating that the installation is satisfactory and in accordance with drawings, specifications, and manufacturer's instructions shall be delivered to the Engineer. The system manufacturer shall retain a copy of all daily reports and the Certificate of Compliance for 5 years after final acceptance of the system.

D. Defective Material

4. The system manufacturer's representative shall take prompt action to remove from the site all damaged or defective material, subject to rejection in accordance with the quality assurance provisions included in the manufacturer's submittals and printed instructions, and shall order prompt replacement of such material at no additional cost.

3.06 FIELD TESTS:

- A. Deficiencies discovered during field tests shall be corrected at no additional cost. Major deficiencies, or failure to correct deficiencies, may be considered cause for rejecting the entire installation. Mercury shall not be used in thermometers required for the tests.

B. Non-Destructive Testing:

1. Visual Examination (VT)

- a. General: ASME B31.1 requires that all welds be visually examined. Therefore, visually examine all pipe welds per ASME B31.1. As described below, visual examination of welds shall be performed by the Contractor and the records not are required to be reported to Owner.

b. Acceptance Standards

- 1) The acceptance standards for visual examination shall be as defined in ASME B31.1, Paragraph 136.4.2.A, and are repeated here for convenience. The following indications are unacceptable:

- Cracks-external surface.
- Undercut on surface which is greater than 1/32 inch deep.
- Weld reinforcement greater than that specified in Table 127.4.2. of ASME B31.1.
- Lack of fusion on surface.

- Incomplete penetration (applies only when inside surface is readily accessible).
 - Any other linear indications greater than 3/16 inch long.
- 2) Surface porosity with rounded indications having dimensions greater than 3/16 inch or four or more rounded indications separated by 1/16 inch or less edge to edge in any direction. Rounded indications are indications which are circular or elliptical with their length less than three times their width.
- 3) In addition, acceptance will also be based on the proper lay-out, materials, and methods, as specified.
- c. Failed Welds
- 1) All welds not passing visual examination shall be repaired or replaced at no expense to the Owner.
- 2) Do not begin to repair or replace the weld until the weld report has been submitted to the Engineer and the Engineer gives approval for repairing the weld with the method that the Contractor proposes. Repair shall be performed using the qualified welding procedures applicable to the original weld.
- 3) If a welder has three failed welds, he must be removed from the project.
- d. Reporting
- 1) Reports performed for visual examinations are not required to be submitted, but shall be kept available for review at any time by the Owner or Engineer.
- 2) Each weld report shall include the following:
- Date of weld examination.
 - Type of examination.
 - Examiner's name.
 - Welders' names including all persons who worked on the weld and their work involved.
 - Piping system.
 - Weld location.
 - Weld procedure and materials.
 - Materials and dimensions of items that were welded.
 - Visual examination results.
- e. Examiners' Qualifications
- 1) All persons performing visual examinations and evaluating examinations shall be certified according to the company's welding policy.
- 2) Credentials and certification of all examiners must be submitted and approved prior to an examiner performing the initial examination.
- a. Visual Examination Requirements

1) Welds designated for visual examination shall be examined as follows:

Before welding - for compliance with requirements for joint preparation, alignment and fit-up, cleanliness, condition of welding equipment, quality and condition of base and filler materials to be used, and preheat, when required.

During welding - for cracks, conformance to the qualified welding procedure, quality of individual weld passes, interpass temperature, placement and sequencing of individual weld passes, and backgouged surfaces.

After welding - for cracks, contour and finish, bead reinforcement, undercutting, overlap, size of fillet welds, finished weld appearance, weld size, weld length, dimensional accuracy of weldment, and monitor post weld heat treatment.

2) Records of visual examinations must be kept as described in this Section.

3) Shop fabricated welds may be examined in the shop prior to arrival at the project site provided all other conditions of this Section are satisfied.

b. Examiner's Scope

1) Visual examinations to be performed by the Contractor may be performed and interpreted by an employee or employees of the Contractor, provided that each individual is certified as specified. As an option, the Contractor may obtain the services of an independent testing agency to perform these examinations.

2) If the Contractor elects to utilize the services of an independent testing agency to perform any visual examinations, the following applies:

- The qualifications for the personnel of the independent testing agency performing the examinations shall be submitted.
- The Contractor shall provide all required access and lighting for the independent testing agency.
- The Contractor shall be responsible for all of the independent testing agencies activities, including handling submittals, performing evaluations at the required times, etc.

3) A welder who has performed any work with regard to a specific weld shall not perform the visual examination of the same weld.

1. Radiographic Examination (RT)

a. General

1) Although not required per the written code of ASME B31.1, Owner will require that some piping be radiographically examined in order to maintain quality of welding, as indicated in Paragraph 3.5 B.

- 2) When RT is designated, butt welds and welded branch connections for sizes over NPS 2 shall be examined per the requirements specified herein.
 - 3) Contractor shall count and document count of welds prior to testing to establish the percent of welds for each system and size category. Submit this documentation with weld testing written procedures prior to weld testing work.
 - 4) Radiographic (gamma ray) testing shall be performed by an independent testing agency.
- b. Acceptance Standards: Shall be in accordance with Paragraph 136.4.5 of ASME B31.1. The Engineer may, at his sole discretion, elect to waive some of the acceptance standards on a case by case basis.
- c. Procedure
- 1) Radiographic examination shall be performed in accordance with Article 2 of Section V of the ASME Boiler and Pressure Vessel Code.
 - 2) Submit written procedure as described in Paragraph T-221 of Article 2 of Section V of the ASME Boiler and Pressure Vessel Code.
- d. Reporting
- 1) The report of each radiographic examination shall be submitted to the Engineer within 5 working days of the examination.
 - 2) In addition to the requirements of Paragraph T-291 of Article 2 of Section V of the ASME Boiler and Pressure Vessel Code, each weld report shall include the following:
 - Date of weld examination.
 - Type of examination.
 - Examiner's name.
 - Welders' names including all persons who worked on the weld and their work involved.
 - Pipe system.
 - Weld location.
 - Weld procedure and materials.
 - Materials and dimensions of items that were welded.
 - Radiography examination results.
- e. Examiner's Qualifications
- 1) All persons performing and evaluating radiographic examinations shall be certified for NDT Level II RT as recognized by the ASNT. A Nationally Certified level III RT

technician per ASNT shall be on staff at the testing laboratory. A Corporate Level III RT without National Certification is not acceptable.

- 2) Credentials and certification of all examiners must be submitted and approved prior to a person performing the initial examination.

f. Radiographic Examination Requirements

- 1) The Contractor shall be responsible for obtaining and paying for the services of the independent testing agency. For the purposes of bidding and when a limited number of welds are specified to be tested (not 100%), the Contractor shall assume that the welds to be radiographically examined by the Independent Testing Agency shall be the largest pipe diameter for new piping indicated on the Contract Drawings and shall be located in the most difficult place to reach. The Contractor is responsible for providing access to the welds for the Independent Testing Agency.
- 2) When a limited number of welds are specified (not 100%), the welds to be examined shall be random. The Engineer shall designate the specific welds that are to be randomly tested as the job is in progress. The Contractor shall coordinate with the Engineer to ensure that these requirements are met.
- 3) It is suggested to the Contractor that the Contractor should notify the Engineer when welds that require scaffolding are complete so that the Contractor will not have to re-build scaffolding to gain access to the welds.
- 4) Shop fabricated welds will be examined in the field.

g. Failed Welds

- 1) All welds not passing radiography examination shall be repaired or replaced at no expense to the Owner.
- 2) Do not begin to repair or replace the failed weld until the weld report has been submitted to the Engineer and the Engineer gives approval for repairing the weld with the method that the Contractor proposes. Repair shall be performed using the qualified welding procedures applicable to the original weld.
- 3) All failed welds discovered by radiographic examination shall be re-examined by radiographic examination after the weld is repaired or replaced at no additional cost to the Owner.
- 4) When a weld is found defective, the Contractor shall test the weld repair via RT and shall also test an additional weld via RT as directed by the Engineer at no additional cost to Owner. If a welder has three failed welds, he must be removed from the project.

C. Pressure Tests:

1. Before conducting pressure tests. Lines shall be flushed with high pressure water until discharge shows no foreign matter. The carrier pipe shall be hydrostatically tested. Casings (conduits) shall be pneumatically tested.

a. Pneumatic Test:

- (1) Casing (conduit) shall be pneumatically tested after welding and before field coating using air as the test medium. The test pressure shall be 5 psig. Persons not working on the test operations shall be kept out of the testing area while testing is proceeding. The test shall be made on the system as a whole or on sections that can be isolated. Joints in sections shall be tested prior to backfilling when trenches must be backfilled before the completion of other pipeline sections. The test shall continue for 24 hours from the time of the initial readings to the final readings of pressure and temperature. The initial test readings of the instrument shall not be made for at least 1 hour after the casing has been subjected to the full test pressure, and neither the initial nor final reading shall be made at times of rapid changes in atmospheric conditions. There shall be no indication of reduction of pressure during the test after corrections have been made for changes in atmospheric conditions in conformity with the relationship $T(1)P(2) = T(2)P(1)$, in which T and P denote absolute temperature and pressure, respectively, and the numbers denote initial (1) and final (2) readings. Pressure shall be measured with a pressure gauge conforming to ASME B40.1. A throttling type needle valve or a pulsation dampener and shutoff valve may be included. The diameter of the face shall be at least 4-1/2 inches (144 mm) with a measurable range of 0 to 15 psig and graduations of at least 0.6 psig. During the test, the entire system shall be completely isolated from all compressors and other sources of air pressure. Each joint shall be tested while under test pressure by means of soap and water or an equivalent nonflammable solution prior to backfilling or concealing any work. All labor, materials and equipment for conducting the tests shall be furnished by the Contractor and shall be subject to inspection at all times during the test. Maintain proper safety precautions for air pressure testing at all times during the tests.
- b. Hydrostatic Test:
 - (1) Carrier piping shall be tested hydrostatically before insulation is applied at field joints and shall be proved tight at 190 psig or 1.5 times the specified supply operating pressure, whichever is greater, for 2 hours. There shall be no indication of reduction of pressure during the test. Pressure shall be measured with a device calibrated to be read in increments not greater than 0.1 psi.
 - (2) Examinations for leakage shall be made of all joints and connections. The piping system shall show no visual evidence of weeping or leaking.
 - (3) Provide temporary equipment for testing, including pump and gages. The gage shall be accurate to within 3 psig and shall be calibrated within six months of the test as recorded on a sticker on the gage. Test piping system before insulation is installed or piping is painted. Pressure testing shall be performed following the completion of nondestructive examinations, and all other fabrication, assembly, and erection activities required to provide the system or portions thereof subjected to the pressure test with pressure retaining capability. Remove control devices before testing. Ensure that all expansion joints, anchors, and guides are installed and completed. Fill each section with water and pressurize for indicated pressure and time. The Contractor shall provide air vent valves at all high points in the system to purge air pockets while the system is filling and drain valves at all low points to drain system.

- (4) The Contractor shall consider that testing may be performed against existing valves and equipment having unknown sealing capability. It is the Contractor's responsibility to provide adequate pumping and test medium to accommodate any leakage through the existing equipment and valves.
- (5) Testing shall be performed with calibrated test gages (Contractor furnished) in the presence of the Owner or Engineer.
- (6) The Contractor shall furnish all temporary pipe, fittings, and pumps required to perform the tests.
- (7) Pipe hangers, snubbers, or restraints shall be blocked, disconnected, or pinned, as required, prior to pressure testing or cleaning and shall be restored to operating condition following such test.
- (8) Equipment and instruments shall be isolated and openings shall be plugged, as required, to accomplish the required testing and cleaning and to prevent over pressurizing connecting piping or equipment. Relief and safety valves shall be "gagged" or the valves removed and the respective nozzle blanked for testing of the associated equipment.
- (9) The equipment to which any piping system is attached shall not be subjected to any line tests. The test pressures apply to the piping materials as specified but shall not be assumed to apply to piping specialties, accessories, or equipment, including safety heads, rupture disks, relief valves, expansion joints, instruments, or filters. Items that may be damaged by the test pressure shall either be removed or blanked off.
- (10) Lines containing check valves shall have the source of test pressure located on the upstream side.
- (11) The system shall be filled with water; care being taken that air is completely vented from the top of system so that there are no air pockets remaining.
- (12) The test water for hydrostatic tests shall be clean and of such quality as to minimize corrosion of the materials in the piping system. The temperature of the test medium shall be a minimum of 60 degrees F, unless the Engineer specifies otherwise. The test pressure shall not be applied until the system and the pressurizing medium are approximately at the same temperature.
- (13) The leak test shall be considered satisfactory if no leakage is discovered on the piping or at any joints and if no sweating due to porosity is discovered on piping or at joints. Lines requiring repairing shall be retested to the pressure originally specified. The piping system, exclusive of possible localized instances at pumps or packing, shall show no evidence of leaking.
- (14) Repair piping systems sections which fail required piping test, by disassembly and re-installation, using new materials to extent required to overcome leakage. Do not use chemicals, stop-leak compounds, mastics, or other temporary repair methods.

- (15) Drain test water from piping systems after testing and repair work has been completed. After hydrostatic testing, thoroughly clean piping using caustic soda, trisodium phosphate or cleaner recommended by the pipe manufacturer. Flush piping with clean potable water. Discharge hydrostatic test water, cleaning fluid and flushing water to the sanitary sewer system. Discharge to the storm sewer system is not allowed.
- (16) It is the responsibility of the Contractor to keep accurate, updated records of all hydrostatic testing. The Contractor shall submit a final log of all hydrostatic testing for the Owner's records.
- (17) Contractor shall maintain a constantly updated list of the following for all hydrostatic tests:
 - a) Date and time of test.
 - b) Hydrostatic test pressure.
 - c) Piping system tested.
 - d) Extent of piping system tested so that it can be clearly identified up to what point a piping system has been tested.
 - e) Test results. All failures shall be indicated with the cause explicitly stated and the corrective action taken.
 - f) Signed witnesses of each test which shall be one employee of the Contractor and by the Owner or Engineer

3.07 BURIED UTILITY WARNING AND IDENTIFICATION:

A. Plastic Marking Tape:

1. Polyethylene plastic tape manufactured specifically for warning and identifying buried utility lines shall be supplied and installed. Tape shall be buried above the pipe during the trench backfilling operation and shall be buried as indicated on the Contract documents. Tape shall be 0.004 inch thick polyethylene or polyethylene with a metallic core. Tape shall be acid- and alkali-resistant and shall have a minimum strength of 1750 psi lengthwise and 1,500 psi crosswise with an elongation factor of 350 percent. The tape shall be manufactured with integral wires, foil backing or other means to enable detection by a metal detector when the tape is buried up to 3 feet deep. The metallic core of the tape shall be encased in a protective jacket or provided with other means to protect it from corrosion. The tape shall be of a type specifically manufactured for marking and locating metallic underground utilities. Tape shall be 6 inches wide and printed with a caution and identification of the piping system over the entire tape length. Tape shall be yellow with bold black letters. Tape color and lettering shall be unaffected by moisture and other substances contained in the backfill material.

3.08 CONTRACT CLOSEOUT:

- A. Provide in accordance with Section 01-7700.

N. EAGLEVILLE RD INFRA. R/R
PHASE II – YOUNG QUAD UTILITIES
AT THE UNIVERSITY OF CONNECTICUT
STORRS, CT
UCONN PROJ. #901954
AECOM JOB #36940200

UNDERGROUND STEAM AND CONDENSATE
PIPING

02661-32

PART 4 - METHOD OF MEASUREMENT AND BASIS OF PAYMENT

4.1 MEASUREMENT AND PAYMENT

- A. There shall be no separate measurement for payment for work under this Section. The cost of this work shall be included in the lump sum bid for this project.

END OF SECTION

- B. The Contractor shall furnish to the Owner manufacturer's notarized test reports and methods of test to show compliance with all specification requirements, and notarized certificates of conformance stating that all materials to be furnished under this Section of the Specifications conform with all specification requirements, and each shipment of pipe, fittings, joints and gaskets and accessories meet all requirements of the Specifications.
- C. The Contractor shall furnish to the Owner manufacturer's written transcripts in accordance with Section 51-5 of AWWA Specification C151, latest revision.

1.6 PRODUCT INSPECTION, RECEIVING, HANDLING AND STORAGE

- A. The inspection, receiving, handling and storage of all materials shall conform in all respects to the requirements of AWWA Specification C600, latest revision, Section 2.

PART 2 - PRODUCTS

2.1 MATERIALS

- A. Ductile iron pipe shall conform to the following material standards.
 - 1. All pipe shall be Class 54.
 - 2. All pipe shall be lined with a double-thickness, cement mortar in accordance with ANSI/AWWA C 104/A21.4, Section 4.8.2.
 - 3. All pipe shall be coated inside and outside with an approved bituminous material in accordance with Section 4.12 of ANSI/AWWA C 104/A21.4 and Section 51-8.1 of ANSI/AWWA C 151/A21.51.
 - 4. The grade of ductile iron shall be 60-42-10.
 - 5. All pipe shall be marked in accordance with Section 51-10 of ANSI/AWWA C 151/A21.51-81.
 - 6. All ductile iron pipe for buried service shall be push-on type rubber gasketed unless otherwise specified as manufactured by United States Pipe and Foundry Company, Atlantic States Cast Iron Pipe Company, American Cast Iron Pipe Company, or approved equal.
- B. Rubber gasket joints for ductile iron pipe shall conform to ANSI/AWWA C111/A21.11.
- C. Water main fittings shall conform to ANSI/AWWA C110/A21.10.
- D. All fittings shall have mechanical joints with retainer glands. At all changes of direction, locking gaskets shall be placed on push-on type joints within 25 feet of said change in direction. Retainer Glands shall be equivalent to "Megalugs" by EBAA Iron Sales, Inc. and shall be acceptable to the University.

- E. Gate valves shall be resilient seated, iron body, bronze mounted resilient wedge, double “O” ring seal, mechanical joint with retainer glands, non-rising bronze stem for underground valves, with a minimum working pressure of 250 psi, conforming to the requirements of ANSI/AWWA C509-01 and shall be acceptable to the University. All gate valves 16” and larger shall be equipped with standard by-pass valves and equipped with gears of the totally enclosed type suitable for installation of the underground valve, and in conformance with AWWA C-500. Acceptable manufacturers include: Mueller, Kennedy, Clow, M&H. The valves shall open left.
- F. Cast iron valve boxes shall be 5-1/4” buffalo type, two-piece sliding type, with a flange located approximately 2” from the top of the valve box and shall be acceptable to the University. The valve box cover shall have two notched openings and the word “WATER” shall be clearly cast into the cover.
- G. Fire hydrant assemblies shall contain one 4-1/2” National Standard Fire Hose Thread (NST) pumper outlet and two 2 ½” NST hose outlets. The pumper outlet shall be adjusted in the direction prescribed by the University’s Code Compliance Officer, and such adjustment shall be made by the installing contractor prior to acceptance of the installation by the University’s Code Compliance Officer. Fire Hydrants shall conform to ANSI/AWWA C502 and ULFM C550 and shall be acceptable to the University. Fire hydrants shall be model Super Centurion 250 as manufactured by Mueller Co. or approved equal.
- H. Blow off assemblies shall have a full main size gate valve and comply with the University standards.
- I. Concrete for thrust blocks and encasements shall conform to Article M.03 of "Form 816", Class "A" Concrete and Section 02510 Miscellaneous Site Concrete Work.
- J. Flexible expansion joints shall be manufactured of ductile-iron conforming to the material properties of ANSI/AWWA C153/A21.53. All flexible expansion joints shall be capable of deflecting and expanding simultaneously no less than 15° deflection and 8" expansion. All flexible expansion joints shall have the expansion capability designed as an integral part of the ductile-iron ball castings. All pressure containing parts shall be lined with a minimum of 15 mils of Fusion Bonded Epoxy conforming to the requirements of ANSI/AWWA C213 and shall be holiday tested with a 1,500 volt spark test conforming to said specification. All flexible expansion joints shall be Flex-Tend as manufactured by EBAA Iron, Inc., Eastland, Texas or approved equivalent. A polyethylene wrap shall be included with each flexible expansion joint assembly.
- K. Ductile iron pipe and fittings used for buried service shall be polyethylene encased in accordance with ANSI/AWWA A21.5/C105.
- L. Tapping Sleeves shall be Smith-Blair Model 665 stainless steel tapping sleeve or approved equal by the engineer.
- M. Tapping valves shall be non-rising stem, meeting AWWA C509 standards. Valves shall open left. Acceptable manufacturers include: Mueller, US Pipe.
- N. Check valves shall be silent type with full body flanges, cast iron body class 250, bronze seat, plug and bushings and stainless steel spring and screw. Acceptable manufacturers include: Val-matic, DeZurik, Mueller.

2.2 INSTALLATION

- A. Leaks and/or breaks of the existing 16” water main and appurtenances within the project limits shall be reported to the University as soon as discovered. The contractor shall repair all leaks and/or breaks of the existing 16” water main and appurtenances within the limits of this replacement project that occur as a result of the construction activities for the proposed work. Repairs shall require immediate response and the repairs shall be prosecuted until completed. Additional work in the vicinity of the leak and/or break shall be suspended until the leak and/or break is repaired to the satisfaction of the University. The Contractor shall have a minimum of two (2) sets of repair clamps, couplings and repair materials stored at the Contractor’s work and storage area at all times, prior to the start of work, and during construction activities.
- B. The installation of the entire site water distribution shall be in accordance with ANSI/AWWA C600-99 (latest edition) and acceptable to the University.
- C. Concrete encasements shall be constructed in accordance with Article 6.01.03 of "Form 816" and shall be acceptable to the University.
- D. Thrust restraint shall be accomplished through the use of boltless restrained joint pipe and/or a restrained joint system utilizing either retaining glands and/or lacing rods in accordance with the University. Thrust blocks shall additionally be provided at all bends and tees.

2.3 TESTING

- A. Hydrostatic Testing
 - 1. The pipeline or sections thereof, as soon as completed, shall be filled with water and subjected to a leakage test with water under the appropriate hydrostatic head. Air valves may be used for test connections. The total leakage per day from the pipeline or sections thereof shall not exceed the amounts stated in ANSI/AWWA Standard C600-82, “Installation of Ductile Iron Water Mains and Their Appurtenances”. Should the pipeline or sections thereof not come within the permissible leakage limits, the Contractor will be required to excavate and locate the source of leakage and make repairs. The test will be repeated until the pipeline or sections thereof are made satisfactory.
 - 2. The Contractor shall furnish all labor necessary for leakage testing, and shall be responsible for any damage to the pipeline or adjoining property due to the test.
 - 3. The Contractor shall be responsible for the satisfactory disposal of all hydrostatic testing water. The Contractor shall be responsible for contacting State and local regulatory authorities to determine special provisions for the disposal of hydrostatic testing water.
- B. Sterilization
 - 1. The Contractor shall sterilize the main by using the Tablet Method as described in Section 5.1 of ANSI/AWWA C651-05 Standard “Disinfecting Water Mains”. The appropriate number of five (5) gram calcium hypochlorite tables in Table 2 of the ANSI/AWWA Standard, shall be cemented in each length of pipe by the Contractor. Once the line has been

completed, the main shall be filled with water as part of the tablet method of sterilization. The water shall remain in the pipe a minimum of 24 hours. After final flushing and before placing the main in service, the Contractor will make the appropriate bacteriological tests. If the main fails these tests, the Contractor will be required to provide additional sterilization, flushing and testing. All expense for this additional work will be the responsibility of the Contractor.

2. The Contractor shall be responsible for the satisfactory disposal of all chlorinated water. The Contractor shall be responsible for contacting State and local regulatory authorities to determine special provisions for the disposal of heavily chlorinated water.
3. The Contractor shall be advised that water main disinfection shall be accomplished by specially trained personnel with a minimum of three (3) years documented experience.
4. The contractor shall submit an affidavit of compliance to the University, stating that the water main has been disinfected in accordance with the procedures specified herein.
5. The Contractor's workers who are responsible for the water main work shall be aware of the potential health hazards with chlorine and should be trained to observe carefully the prescribed construction practices and disinfection procedures.
6. An adequate amount of reducing agent should be applied by the Contractor to water being disposed of in order to neutralize thoroughly the chlorine residual remaining in the water before final disposal. Arrangements for, and all associated costs of, final disposal, including procurement of any necessary discharge permits by State or local regulatory agencies, shall be made by the Contractor.
7. To prevent possible backflow or siphoning of contaminants into the existing water distribution system which is in service, the Contractor will be required to provide a reduced pressure backflow prevention device in the temporary piping which is supplying water from the existing transmission system to the water main being treated and to provide such other safety and control measures as directed by the University. The Contractor shall not disrupt the existing water system which is in service.
8. In order to take samples after the disinfection of the new main, the Contractor shall install one 1" blow-off in both line caps, composed of a corporation stop, bushing, flared fitting, shut-off valve and pipe, of the length and at the locations ordered by the University. After disinfection, sufficient time must be allowed, as determined by the University, to allow chlorine residual to reach normal.
9. Disinfection procedure to follow at connections to existing water mains: The interior of the pipe and fittings, used in making the connection, shall be swabbed or sprayed with a 1% hypochlorite solution before they are installed.

C. Permit Registration

1. The Contractor is responsible for submitting a registration for the General Permit for the Discharge of Hydrostatic Pressure Testing Water to the CT DEEP prior to the testing procedures, on behalf of the University. The Contractor will be responsible for completing all required entries on the registration form, acquiring the appropriate signatures from the

University, professional engineering certifications required on the form, timely submission to CT DEEP, and all costs and fees associated with the registration. A copy of the registration form is included at the end of this specification. Instructions for completing the registration form are available on-line.

PART 3 - EXECUTION

3.1 CONSTRUCTION METHODS

- A. The installation of the entire site water distribution shall be in accordance with University Standards and Practices.
- B. Hydrostatic testing, leak testing and sterilization of water mains shall be in accordance with the University Standards and Practices and the Health Code and AWWA Standards.
- C. Concrete encasements shall be constructed in accordance with Article 6.01.03 of "Form 816" and the University Standards.
- D. Thrust restraint shall be accomplished through the use of mechanical joints with retainer glands or push-on, restrained joint type pipe and fittings. Installation shall be in accordance with the University standards and practices. All bends and tees shall be additionally provided with thrust blocks.

PART 4 - METHOD OF MEASUREMENT AND BASIS OF PAYMENT

4.1 METHOD OF MEASUREMENT

- A. There shall be no separate measurement for payment for work under this Section. The cost of this work shall be included in the lump sum bid for this project.

END OF SECTION 02670

SECTION 02730 – SANITARY SEWER

PART 1 - GENERAL

1.1 RELATED DOCUMENTS

- A. The Contract Drawings, General Conditions and Supplementary General Conditions apply to this Section of the Specifications.

1.2 SUMMARY

- A. The work under this Section shall consist of furnishing and installing of polyvinyl chloride gravity sanitary sewer pipe, fittings, and all other materials necessary to construct the sanitary sewers in accordance with the details and in the locations shown on the Contract Drawings, ordered by the Engineer, described herein or necessary to complete the sanitary sewers.
- B. The sanitary sewer pipe shall be as indicated in the Contract Documents with no substitutions, and in conformity with the respective requirements herein.

1.3 QUALITY ASSURANCE

- A. Codes and Standards: Comply with provisions of the following, except otherwise indicated:
1. ASTM: Wherever reference is made to ASTM, it refers by numbers, letters, or both, to the latest specification or test method of the American Society for Testing and Materials.

PART 2 - PRODUCTS

2.1 MATERIALS

- A. General
1. All polyvinyl chloride sewer pipe shall be the product manufactured by an organization of good reputation, experienced in the manufacturer of polyvinyl chloride sewer pipe. The Contractor shall submit to the Engineer for approval the manufacturer's name with details of the pipe, fittings, joints, etc. offered before ordering. The Engineer reserves the right to have the manufacturer submit a printed certified set of material specifications certifying to the manufacturer's conformity with these Specifications.
 2. Tests provided by ASTM Specifications will be made. The manufacturer or the Contractor shall furnish equipment and labor, both skilled and unskilled, for making tests and certificates of each test, without cost to the Owner and so far as applicable, the Owner shall be considered as the "Purchaser" as that word is used in ASTM Specifications. The Engineer may require said test to be made in the Engineer's presence.
 3. Preliminary passing of tests or acceptance of pipe at the manufacturer's plant or storage yard shall not constitute final acceptance of pipe. Pipe damaged at any time or found defective in any way, prior to being set in place and final acceptance, may be rejected. The Engineer may reject an entire lot of pipe should the sample pipe from such lot fail to meet requirements.

4. Spot tests, at the expense of the Contractor and witnessed by the Engineer or his authorized agent, on random lengths of pipe as selected by the Engineer may be made at any time to verify compliance with these Specifications.
5. Sample pipe for testing, when requested by the Engineer, shall be furnished by the Contractor in sufficient numbers. The facilities and services for making load tests shall be made available by the Contractor and/or the pipe manufacturer. All pipe to be tested shall be as selected by the Engineer. No pipe which is damaged or which does not conform in every respect to these Specifications shall be used, even though the lot from which it was taken may have been accepted. Pipe shall be handled and transported with care by experienced personnel. Methods and equipment for storing, loading and transporting the pipe from the manufacturing yard to the job site and for the unloading and handling of the pipe shall be such as to insure the pipe against injury.
6. All pipe which has been damaged after delivery will be rejected, and if such pipe has already been laid, it shall be removed and replaced solely at the Contractor's expense.

B. Polyvinyl Chloride Pipe (PVC)

1. Description and Materials
 - a. Polyvinyl chloride (PVC) sewer pipe shall be acceptable to the Sewer Division and conform to the requirements of ASTM D 3034 for Type PSM and shall be SDR 35, with the following additions and/or exceptions:
 - b. The pipe and fittings shall be made from PVC plastic having a cell classification of 12454-B as described in ASTM D 1784.
2. Physical and Chemical Properties
 - a. The physical and chemical properties shall conform to those minimums specified for cell classification 39454-B designated in ASTM D 1784 noted above.
3. Dimensions
 - a. The standard length of pipe provided under this Specification shall be a minimum of 10 feet.
 - b. Fittings shall be made in sizes and to the dimensions of the pipe. Variation of dimensions, structural design or materials of the fittings from other provisions of this Specifications, shall not be allowed except with the approval of the Engineer.

C. Ductile Iron Pipe (DIP)

1. Description: All ductile iron pipe shall conform to ANSI A21.51. The thickness class shall be Class 54 unless indicated otherwise on the Contract Drawings or specified elsewhere. The standard interior and exterior bituminous coatings will be applied.

2. Joints: Joints shall be rubber gasket joints of either the push-on or mechanical type unless otherwise specified on the Contract Drawings. These joints shall conform to ANSI A21.11 and as approved by the Engineer.
3. Fittings: All fittings shall be as called for on the Contract Drawings or required to complete the work and shall conform to the requirements of ANSI A21.10 and as approved by the Engineer. Joints on all fittings shall be of the same type as used on the main pipeline unless otherwise noted on the Contract Drawings or directed by the Engineer.

Tees for capped outlets shall be installed and capped where called for on the Contract Drawings or as ordered by the Engineer.

Pipe joints and end caps shall be made in the manner set forth by the manufacturer.

D. Joints

1. Joints shall be push-on bell and spigot type subject to the approval of the Engineer. All joints shall use flexible watertight elastomeric gaskets and shall conform to the requirements of ASTM D-3212.
2. The gasket shall be as recommended by the pipe manufacturer and approved by the Engineer and shall be of a composition which is resistant to common ingredients of sewage, industrial wastes including oil and groundwater. The elastomeric gaskets shall conform to the physical requirements of oil resistant rubber rings as specified in ASTM D 1869. The gasket must be integrally formed into the pipe and be non-removable.
3. The joint, when assembled, must be able to withstand an internal hydrostatic pressure of at least 10 psi.

E. Fittings

1. Wyes, trees, bends, adapters and all other fittings required to complete the work shall be provided by the Contractor. The materials used in their manufacturer shall conform with the requirements for the pipe with which they shall be used and any variation of such requirements shall be subject to the approval of the Engineer.

F. Waterstops

1. All pipe penetrations through masonry structures, other than sanitary manholes, shall be inserted through cast-in-place wall sleeves and sealed with link seals.

G. Pipe Straightness

1. No pipe shall be laid unless it is found to be generally straight. Such pipe shall have a maximum ordinate as measured from the concave side of the pipe not to exceed 1/16 inch per foot of length. If the deviation from straightness exceeds this requirement, then the particular piece of pipe shall be rejected for use until it can comply with this provision.

PART 3 - EXECUTION

3.1 CONSTRUCTION METHODS

A. General Construction Methods

1. Sanitary sewer pipe shall be of the sizes indicated by the Contract Documents with no substitutions. All pipe shall be laid, supported, jointed, tested, and backfilled as indicated or required for the particular job, location or condition, by the Contract Drawings, Technical Specifications, or other Contract Documents. All pipe, when in place, shall be to the line and grade indicated therefor in the Contract Documents or directed by the Engineer, sound, well laid, jointed and bedded and free from defects.
2. Pipe laying in general shall start at the downstream end and progress upstream with bell or groove ends placed upstream. If, however, due to restrictions imposed by land acquisition and/or other construction activities, construction may be done in sections as approved by the Engineer.
3. Straight runs of sewer line pipes and laterals over 50 feet in length shall be laid to line and grade by the use of lasers only. Such laser equipment shall be furnished by the Contractor and operated by competent personnel. Equipment and operating procedures shall be subject to the approval of the Engineer. Prior to laying the first section of pipe after each set up of the laser equipment, the bedding/pipe grade shall be checked by means of a surveyor's level or transit to verify the laser grade setting and in addition the grade shall be rechecked along the line of the pipe at intervals of not less than 100 feet.
4. Where bends occur and on laterals less than 50 feet, the pipes shall be laid using a grade string stretched taut above the line of pipe between batter boards averaging 25 feet and not exceeding 30 feet apart and by measuring down to the bed for each pipe prior to setting it in place and to the end of each pipe, when it has been placed, by means of a suitable grade pole, and brought to line with a plumb bob, all of which tools and equipment shall be furnished and operated by competent Contractor's personnel satisfactory to the Engineer.
5. At the start of each job, when the Contractor is in a position to start laying pipe, he shall notify the proper representative of the supplying pipe company who will come to the job and thoroughly instruct the Contractor, his men and the Resident Project Representative in the proper methods of laying said pipe. The Contractor shall notify his men who are actually doing the laying that this method shall be strictly enforced unless otherwise specified or directed by the Engineer, or if required by local regulations.
6. Details of gasket attachment and joint formation will, in general, follow the directions of the manufacturer of the joint material and of the pipe, based upon the design therefor and their experience with such joints elsewhere, all subject to approval of the Engineer.
7. Pipe shall be laid and the joints made in the manner set forth by the manufacturer. Where applicable, immediately after pipes are put together, the position of rubber ring and the joint shall be inspected to be sure it has been properly put together. Gauges shall be furnished to the Contractor and the Resident Project Representative by the manufacturer for this purpose, and all joints shall be checked with such gauge. All defective joints shall be corrected immediately.

8. At any time during pipe laying operations, if the occasion arises, when instruction or advice is required from a pipe representative, he shall be notified and shall come to the site of pipe laying operations for consultation before any further pipe is laid involving any such problems.
9. Where the pipe connects with the outside faces of manhole walls or the outside faces of the walls of other structures, there shall be a short section of pipe (usually 2 feet) placed at the connections to the structure. In order to accomplish this, without cutting pipe and destroying water-tight integrity by having other than the normal type joints, minor modifications in manhole locations may be made with the approval of the Engineer.

B. Inspection

1. One Resident Project Representative Per Pipe Laying Crew
 - a. To enable the representative of the Engineer to oversee pipe laying and other work, in general, only one pipe laying crew will be permitted to operate at any time under one Resident Project Representative. Thus, the number of pipe laying crews and the number of locations at which pipe may be laid simultaneously under this Contract may be limited by the number of Resident Project Representatives assigned by the Engineer to oversee that type of work on the Contract. If the Contractor wishes to lay pipe at more than one location on a given day, or additional pipe laying crews, he must notify the Engineer at least two days in advance so that an adequate number of Resident Project Representatives may be assigned to the job.
2. Contractor to Assist Resident Project Representative
 - a. The Contractor shall furnish materials, tools and men to assist the Resident Project Representative and to handle survey equipment, levels, grade poles, plumb bobs, straight edges, laser equipment, and other equipment used for transferring grades, setting strings on profiles or grade slats or aligning pipe. While the Resident Project Representatives may at times assist or check alignment, the Contractor's crew shall not be dependent upon the Resident Project Representative for the performance of such work. All labor, tools and facilities needed to set or transfer line and grade, to measure pipe beds, pipe grade and lines, etc. shall be furnished by the Contractor.

C. Dewatering

1. General
 - a. The Contractor shall provide all necessary pumps, dams, drains, ditches, flumes, well points and other means for excluding and removing water from trenches and other parts of the work, and for preventing the slopes from sliding or caving all in accordance with the Section "Dewatering".
2. Foundation Stone Drain
 - a. Where, in the opinion of the Engineer, some form of underdrainage is desirable but conditions do not warrant the installation of a pipe underdrain, the standard foundation

stone bedding may be utilized or, if foundation stone bedding has not been specified, he may order a layer of foundation stone of suitable size placed in the bottom of the trench below the sewer to serve as a drain or as a foundation or both.

3. Engineer Need Not Order Underdrain

- a. The Engineer will not be under any obligation to order underdrain of any type laid to lower ground water levels in general or for other purposes when, in his opinion, the underdrain is not needed for the construction of the sewer or structure at the point in question. The matter of when to order underdrain of any type at the expense of the Owner is solely at the discretion of the Engineer. The fact that the Engineer did not order underdrain at any point shall not relieve the Contractor of his duty to properly drain trenches.

D. Foundations for Sewers

1. This Section refers to foundation under the sewer and its appurtenances. It does not apply to street pavement foundations or other structures, which are covered by other sections of the Specifications.
2. When the Contract Drawings or other Contract Documents indicate certain foundations, they will be constructed as indicated or as directed by the Engineer.
3. Generally, pipe will be laid on a bedding material base and backfilled as shown on the details. Where the soil in subgrade is found to be soft, loose, freshly filled earth, unstable or unsuitable as a base for the proposed sewer or appurtenances, the Engineer may, at his discretion, order it excavated to such additional depth and width as he may deem proper and replaced with gravel fill, bedding material, concrete, or similar material as he may direct.
 - a. Bedding Material
 - (i) Foundations of bedding material required by the Contract Drawings, other Contract Documents or ordered by the Engineer, shall be constructed as required or ordered. The top of the bedding shall be brought carefully to the proper grade wall tamped or compacted as may be directed and shaped for the barrel of the pipe and the pipe laid thereon.
 - b. Concrete Foundations
 - (i) Where call for on the Contract Drawings or directed by the Engineer, sanitary sewer pipe shall be constructed on a concrete slab, on a concrete cradle, on bedding material with concrete cap, or encased entirely in concrete. Slabs may be pre-poured ahead of sewer placement or poured integrally with the cradle after the sewer is placed, at the option of the Contractor and subject to the approval of the Engineer.
 - (ii) Where pipe is to be laid on a foundation as described in preceding sections and encased or bedded in concrete above that base, it will be laid as described in those sections and then concrete will be placed on each side up to the height or extent required, using methods that will insure that all spaces under and on the sides of the pipe are completely filled. Concrete will be carried out to the trench walls or to

sheeting resting against those walls or to the lines shown on the Contract Drawings or as ordered.

- (iii) Where pipe is to be encased in concrete or laid in a concrete cradle, as detailed on the Contract Drawings or directed by the Engineer, the pipe will be laid on wooden cross sills of adequate size and area to support the pipe to grade and line after excavating to required subgrade. Wooden wedges or shims and tie downs will be used to secure pipe in place to proper lines and grades.

A pre-poured foundation will consist of a slab of concrete of the sizes and dimensions shown on the Contract Drawings and of such thickness and width as the Engineer may order, poured into place a sufficient time in advance of laying pipe thereon so that the concrete will have set prior to laying pipe.

The time required for and the degree of setting of concrete will be approved by the Engineer (minimum of three (3) days). The upper surface of the concrete base will be carefully leveled off to a grade about 2 inches below the bottom of the barrel of the pipe. The top of the pre-poured slab should contain adequate bell holes if bell and spigot pipe is to be laid. Pipe will then be laid to line and grade, using wooden shims or wedges as necessary, jointed as specified elsewhere, and then the space between slab and lower surface of pipe filled with concrete carried up to such height as may be required. Concrete will be poured in from one side until it appears flowing through into the other side. Backfill on sides of pipe above the concrete base will be as specified or as directed by the Engineer. Backfill shall not be placed thereon for two (2) days unless public safety requires otherwise.

c. Pile Foundations

- (i) Pile foundations, if indicated by the Contract Drawings or other Contract Documents, will be built as required and detailed on the Contract Drawings and in accordance with the Section "Piles" or as specified elsewhere. Pile foundations may be ordered by the Engineer where and as, in his opinion, they may be needed.
- (ii) Piles will be spaced and of such lengths as may be indicated ordered, driven by a suitable hammer and cut off at the elevations indicated or ordered and capped with a slab of concrete of the dimensions indicated or ordered. The degree of setting of the concrete cap shall be approved by the Engineer (minimum three (3) days) before the pipe is laid thereon.

d. Embankment Foundations

- (i) Where called for on the Contract Drawings or ordered by the Engineer, sewers to be constructed above existing grade shall be installed in an embankment section as subsequently described (unless bridging or piling is called for on the Contract Drawings or ordered by the Engineer.)
- (ii) The Contractor shall clear and grub the embankment area in accordance with the Section "Site Clearing". Topsoil and unsuitable material shall be excavated along the length and width of the embankment area.

- (iii) The topsoil if suitable for uses as topsoil as specified elsewhere will be stockpiled in the locations shown on the Contract Drawings or as directed by the Engineer. Unsuitable material shall be disposed of as directed by the Engineer.
- (iv) The methods and materials for the construction of the embankment shall follow the pertinent articles specified for the formation of embankments in the Section "Formation of Subgrade" except that rock may not be used to form embankment for sewers. Material shall either be acceptable excavated material from other portions of the job or borrow supplied by the Contractor as specified.
- (v) Upon completion of the embankment, it shall be compacted to the minimum allowable density. With the approval of the Engineer, the Contractor shall excavate, within the embankment, a trench of the dimensions indicated on the Contract Drawings, exercising care to maintain and protect the sides of the trench during excavation. The sanitary sewer pipe shall then be installed within this trench, in accordance with bedding details and installation procedures shown on the Contract Drawings and described in the appropriate sections of these Specifications. Note that the full embankment up to the finished surface grade shall be constructed and re-trenched to lay the pipe unless otherwise shown on the Contract Drawings or specified elsewhere.

E. Pipe Laying - General

1. Pipe Laid on Bedding Material

- a. Where no underdrain, cradle, special bedding, or haunching is required, the pipe shall be laid as follows:
- b. The trench will be excavated to lines and grades shown on the Contract Drawings, the typical trench section or as ordered. Loose native material will be removed from the excavation.
- c. The bedding material base will be placed to the depth required by the Contract Drawings and compacted, then shaped by hand just before the pipe is set in place to conform as nearly as possible to the shape and grade of the outside of the lower part of the pipe barrel and bells. The grade of this bedding material base shall be measured and checked at least once for each length of pipe, and in any case at intervals of not more than 4 feet apart, immediately before pipe is laid upon the base. The base must be such that the barrel of the pipe will be evenly supported for its entire length. Pipe must not be supported by bells or by lumps of soil, sills, shims, etc. Pushing fine material under any pipe laying on its bed in order to bring it up to grade or line will not be permitted. The bed must be formed to the correct grade before the pipe is placed on it.
- d. After pre-shaping the bedding material, the pipe will then be laid accurately to line and grade, pushed home against the end of the last pipe previously laid, and held in position. Sufficient bedding material as required shall then be placed on each side to hold the pipe in position while the joint is being made. Joints will then be made, as described elsewhere, and inspected. After the pipe has been installed, additional bedding material as required shall be added along the full width of the trench and compacted on the sides of the pipe to

the height required by the Contract Drawings.

- e. Holes under bells must be completely filled and suitable tools must be provided and used to ram the fill tightly under and against the rounded sides of the pipe so that all space on each side of each pipe is entirely filled with well compacted material.
- f. The remaining trench area shall then be backfilled and compacted with suitable approved material in accordance with the Section "Trench Excavation, Backfilling and Compaction".

2. Pipe Laid in Rock Trench

- a. In trenches excavated through rock, the rock shall be removed so that no projecting points or spurs of rock project within 12 inches of the bottom of the pipe. The bottom of the trench shall then be filled with bedding material as required or ordered, this fill being well tamped and compacted in place. Then the bedding material shall be smoothed off to grade for the pipe, bell holes provided, etc. and the backfilling and compacting under, around and directly over the pipe laid in rock cuts shall be as previously described. No fill of rock fragments larger than 3 inches in longest dimension will be allowed along the sides of the pipe or until the pipe has been covered to a depth of at least 2 feet with compacted material.
- b. Where the Contract Drawings or any Contract Document requires or the Engineer orders pipe in rock trenches to be laid in a concrete bed, and for poured-in-place concrete structures, the space between the face of the rock cut and the bottom and sides of the sewer or structure will be filled with concrete.

3. Sanitary Sewer Construction in Proximity to Water Mains

- a. The Engineer may vary the location of sanitary sewers in close proximity to water mains. No variations in location will be permitted without approval of the Engineer.
 - (i) Parallel Installation - Sanitary sewers shall be laid at least 10 feet horizontally from any water main whenever possible; the distance shall be measured edge-to-edge. When local conditions prevent a horizontal separate of 10 feet, a sanitary sewer may be laid closer to a water main provided that:
 - (a) The bottom of the water main is at least 18 inches above the top of the sewer; or
 - (b) Where this vertical separation cannot be obtained, the sewer shall be constructed of materials and with joints that are equivalent to water main standards of construction and shall be pressure tested to assure watertightness prior to backfilling.
 - (ii) Crossings - Sanitary sewers crossing water mains shall be laid to provide a separation of at least 18 inches between the bottom of the water main and the top of the sewer, whenever possible.
 - (a) When local conditions prevent this vertical separation of at least 18 inches, the sewers passing under the water mains shall be constructed with joints on the

water and sewer mains equidistantly spaced from the crossing and of the materials described above or shall be concrete encased for a distance of 10 feet on either side of the water main in accordance with the details shown on the Contract Drawings or as ordered by the Engineer.

F. Special Construction Methods

1. The following paragraphs shall apply as modifications to and detailed instructions for "Construction Methods", "Pipe Laying - General" for the polyvinyl chloride pipe. Only those portions of the "Construction Methods", "Pipe Laying - General" as are not modified hereafter, elsewhere in the Contract Documents or by the Engineer shall apply.

- a. Polyvinyl Chloride Pipe (PVC)

- (i) Handling and Storage

- (a) Pipe and fittings should be protected from direct sunlight. Store pipe in a horizontal position and supported along its entire length. As with any kind of pipe, PVC pipe should be handled with reasonable care to prevent damage.

- (ii) Installation

- (a) Cutting Pipe - Use a hand saw, pipe cutter with a thin cutting wheel or power saw with a fine tooth blade. Cut the pipe square and remove burrs inside and outside with a knife or coarse file.

- (iii) Allowable Transverse Pipe Deflection

- (a) Plastic pipe provided under this Specification shall be so installed in the ground that the maximum transverse deflection ("out-of-round") shall not exceed 7 percent. Such transverse deflection shall be computed by dividing the amount of transverse deflection (nominal diameter less minimum diameter when measured) by the nominal diameter of the pipe.
 - (b) After an initial inspection by the Engineer, if in his opinion the transverse deflection may be excessive, he may order the Contractor to arrange for and take accurate measurements of the pipe at whatever intervals and at whatever locations between such adjacent manholes as the Engineer deems advisable.
 - (c) The Engineer may take or order such measurements to be taken at any time during the maintenance period. These measurements shall be taken in a manner and by such methods as approved by the Engineer.

- (iv) Backfilling and Compacting

- (a) Backfilling and compacting of trenches above the foundation stone shown on the details shall be performed in accordance with the Section "Trench Excavation, Backfilling and Compaction".

(v) Inspection and Testing

(a) General

- (1) Upon completion of the installation of the pipe and backfilling and compacting of the trench, the pipe shall be inspected by one or several of the methods subsequently described. This inspection and testing shall be undertaken as the work progresses. The Engineer shall be notified in advance of such inspection and testing and the Contractor shall provide all facilities, materials, equipment and labor required for such testing. Such inspection and testing shall be a prerequisite for acceptance of all work.

(b) Visual Inspection

- (1) An inspection of the interior of the completed sanitary sewer pipe by direct visual inspection shall be made for all pipe installed from manhole to manhole. All lights, equipment or labor necessary for such inspection shall be provided by the Contractor.
- (2) All foreign material found in the interior of the sewer, all dirt, debris, or other objects shall be removed by the Contractor. Visible defects such as broken pipe sections, improperly installed gaskets, projecting connections, cracks, visible leaks or other defects shall be noted, corrected and the pipe reinspected.

(c) Air Pressure Testing

- (1) Gravity sewers shall be subjected to an air pressure test in conformance with ASTM F1417 and the following schedule:

Sewer-Inside Diameter (Inches)	Minimum Time Required to Drop from 3.5 psig to 2.5 psig for Approximate Length of Sewer Tested (Minute: Seconds)		
	100 Feet	200 Feet	300 Feet
6	5:40	5:40	5:40
8	7:34	7:34	7:36
10	9:26	9:26	11:52
12	11:20	11:24	17:05

(d) Laterals, Connections and Provisions for Connections

- (i) Stubs, etc. required to provide for future connections shall be furnished and set where and as indicated on the Contract Drawings or as ordered by the Engineer. Since the number required or their locations cannot be fully determined in advance, the actual number and exact locations shall be

determined as the work progresses. The number and location for future connections shall be determined by the Engineer.

(a) Stubs

Stubs constructed from manholes or structures for future use shall be as indicated on the Contract Drawings or as ordered by the Engineer and shall be capped/plugged as specified elsewhere herein.

(b) Caps/Plugs

Unless otherwise specified or approved by the Engineer, all caps/ plugs for sealing outlets, laterals, stubs, connection chimneys, etc. shall be manufactured units set in the bell in accordance with the manufacturer's recommended installation procedures as approved by the Engineer.

All caps/plugs shall be installed such that their removal in the future can be made without damage to the bell and they shall be capable of withstanding the maximum anticipated head during exfiltration testing.

(ii) Sheeting shall be cut away and removed in front of all capped outlets, laterals, stubs, connection chimneys, etc.

(iii) Markers at Capped Outlets, Capped Laterals, Stubs, etc.

(a) The Contractor shall provide that a piece of lumber, not less than 2" x 4" will be set vertically and left in place, extending from a point directly in front of, but not in contact with the outer end of a capped outlet, etc., to a point about 4 feet below the ground surface or finished grade.

PART 4 - METHOD OF MEASUREMENT AND BASIS OF PAYMENT

4.1 METHOD OF MEASUREMENT

A. There shall be no separate measurement for payment for work under this Section. The cost of this work shall be included in the lump sum bid for this project.

END OF SECTION 02730

SECTION 02735 – SANITARY SEWER MANHOLES

PART 1 - GENERAL

1.1 RELATED DOCUMENTS

- A. The Contract Drawings, General Conditions and Supplementary General Conditions apply to this Section of the Specifications.

1.2 SUMMARY

- A. The work under this Section shall consist of the construction, alteration, reconstruction, conversion or resetting of sanitary manholes and drop manholes. Said structures shall be constructed in conformity with the lines, grades, dimensions and details shown on the Contract Drawings or as ordered and in accordance with the provisions of these Specifications. In this Contract, unless otherwise directed by the Engineer or shown on the details, all manholes shall be precast concrete.
- B. For the work under this Section, the following definitions shall apply:
1. "Construct" shall mean the work required to construct a new manhole.
 2. "Alter" shall mean that work required on existing manholes in order to make required connections of pipes being installed under other Sections of work.
 3. "Reconstruct" shall mean major changes made to an existing manhole in order to adjust the frame and cover or other reconstruction work all as indicated on the Contract Drawings.
 4. "Convert" shall mean the work required in changing an existing unit to a unit of another type.
 5. "Reset" shall mean the minor adjustment of frames and covers of existing units to the proposed grade not involving major reconstruction of the unit. (Examples of resetting are: adding several courses of brick/block or use of an approved manufactured manhole extension adapter ring to bring a frame to required grade; removing some masonry courses for lowering a frame without reconstruction below the required elevation of the bottom of the frame; providing that the frame will be properly seated.)

PART 2 - PRODUCTS

2.1 MATERIALS

- A. The materials to be used in this construction shall be those indicated on the Contract Drawings or ordered by the Engineer and they shall conform to the requirements of these Specifications. Precast reinforced concrete manhole sections and precast manhole bases shall conform to the type and size specified on the Contract Drawings and the requirements of ASTM Specification C-478. Precast manhole sections shall be joined with rubber gaskets in conformance with the provisions of ASTM Specification C-443.
- B. Concrete for cast-in-place bases (or when required) shall conform to the applicable requirements of Section 02510 "Cast-in-Place Concrete" of these Specifications.

- C. Concrete building brick will conform to the provisions of ASTM C-55, Grade P-II; brick shall conform to the provisions of ASTM C-32, Grade MM.
- D. Metal for manhole frames, covers and steps shall be cast iron, cast or wrought aluminum, structural steel or malleable iron conforming to the requirements of the Contract Drawings. The lower surface of the cover and the corresponding upper surface of the frame shall be machine finished to provide a smooth flat contact or fit, so that covers shall bear uniformly on their supports without tendency for the cover to rock or rattle. Cast iron shall conform to the requirements of AASHTO M 105, Class 25
- E. Mortar shall conform to the requirements of the Standard Specifications except that the annular rings around the pipe shall be bricked up using brick and an approved non-shrink mortar.
- F. Manhole steps shall be steel reinforced copolymer polypropylene plastic, as manufactured by M.A. Industries, Inc., Kelley & Dividend Drive, Peachtree City, GA or approved equivalent. They shall be of the dimensions shown on the plans and shall meet the requirements of ASTM C0-478, paragraph 11.

PART 3 - EXECUTION

3.1 CONSTRUCTION METHODS

- A. Excavation for installation of manholes and drop manholes will be performed in accordance with the Section "Trench Excavation, Backfilling and Compaction".
- B. Sanitary sewer manholes and drop manholes shall be constructed as shown on the Contract Drawings.
- C. Precast concrete riser sections shall be carried to below finished grade as shown on the details. The Contractor shall set the casting to grade using not less than two or more than four courses of brick. Precast concrete sections of manholes will be joined using "O" ring gaskets installed as specified under the Section "Sanitary Sewers" and the joints shall be mortared with non-shrink mortar.
- D. If specified or directed, prior to backfilling around the manholes or drop manholes, the Contractor shall place a capped observation well at each manhole for measuring the ground water level. These observations wells shall be cast iron or steel pipes with a minimum inside diameter of 2-1/2 inches. The lower open end of the pipe shall be embedded in and surrounded by foundation stone and shall be at the elevation of the bottom of the manhole floor slab.
- E. Upon completion of the ground water measurements, as approved by the Engineer, the observation well pipes shall be satisfactorily removed and the holes filled.
- F. Prior to backfilling, the manhole shall be subjected to a vacuum test. The test shall be conducted according to ASTM C 1244. The manhole shall be considered as passing this test if the time for the vacuum in the manhole to drop from 10 inches of mercury to 9 inches of mercury meets or exceeds the values shown in the following table (a partial reproduction of Table 1 of ASTM C 1244).

Depth (ft).	Diameter (in.)		
	36	48	60
	Time (Seconds)		
8	14	20	26
10	18	25	33
12	21	30	39
14	25	35	46
16	30	40	52
18	32	45	59
20	35	50	65

- G. Backfilling and compacting shall be performed in accordance with the provisions of the Section "Trench Excavation, Backfilling and Compaction".
- H. Where proposed manholes are indicated on the Contract Drawings to be constructed over existing sewers, the existing sewer pipe shall be left undisturbed and the flow maintained through it until the manhole has been completed and accepted. Unless otherwise specified, required or ordered, the Contractor shall carefully excavate around and properly support the existing sewer pipe. The base section of the manhole shall be cast-in-place and shall have a ring-formed joint cast or formed in the base section which shall be compatible with the corresponding precast manhole riser sections. On completion and acceptance of the manhole, the top portion of the existing sewer pipe shall be carefully removed and the water table formed to the limits in accordance with the details shown on the Contract Drawings or as directed by the Engineer.

PART 4 - METHOD OF MEASUREMENT AND BASIS OF PAYMENT

4.1 METHOD OF MEASUREMENT

- A. There shall be no separate measurement for payment for work under this Section. The cost of this work shall be included in the lump sum bid for this project.

END OF SECTION 02735

SECTION 02745 – FORCE MAIN

PART 1 – GENERAL

1.1 RELATED DOCUMENTS

- A. The Contract Drawing, General Conditions and Supplementary General Conditions apply to this Section of the Specifications.

1.2 SUMMARY

- A. The work under this Section shall consist of the construction of force mains in accordance with these specifications and the Contract Drawings including all necessary valves and fittings.
- B. Work under this Section will not include the piping, joints and fittings interior to structures; such piping which will be as specified elsewhere.

PART 2 – PRODUCTS

2.1 MATERIALS

A. GENERAL:

1. The general methods for the manufacture and transportation of force main pipe shall be subject to the approval of the Engineer.
2. All pipe shall be the product manufactured by an organization of good reputation, experienced in the manufacture of ductile iron pipe. The Contractor shall submit to the Engineer for approval the manufacturer's name with details of the pipe, fittings, and joint offered before ordering. The Engineer reserves the right to have the manufacturer submit a printed certified set of material specifications certifying to the manufacturer's conformity with these specifications.
3. Preliminary passing of tests or acceptance of pipe at the manufacturer's plant or storage yard shall not constitute final acceptance of pipe. Pipe, if at any time is found defective and/or damaged in any way, prior to being set in place or final acceptance may be rejected. The Engineer may reject an entire lot of pipe should the sample pipe from such lot fail to meet requirements.
4. Spot test, at the expense of the Contractor and witnessed by the Engineer or his authorized agent, on random lengths of pipe as selected by the Engineer, may be made at any time to insure compliance with these specifications.
5. Pipe shall be handled and transported with care by experienced personnel. Methods and equipment for storing, loading, and transporting the pipe from the manufacturing yard to the site and for the unloading and handling of the pipe shall be such as to insure the pipe against injury.

B. DUCTILE IRON PIPE (DIP)

1. All force main pipe fittings and accessories installed for this project shall utilize joint restraint. Restrained push-on joint pipe and fittings utilizing ductile iron components shall be provided throughout.
2. Description:
 - a. All ductile iron pipe shall conform to ANSI A21.51. The thickness class shall be Class 54 unless indicated otherwise on the Contract Drawings or specified elsewhere. All pipe shall be lined with double-thickness, cement-mortar in accordance with ANSI/AWWA C104/A21.4-80 and Section 51-8.1 of ANSI/AWWA C151/A21.51-81. The standard interior and exterior bituminous coatings will be applied to exterior piping. The outside of pipe and fittings within the structures shall not be coated with bituminous coating, but shall be thoroughly cleaned and given one shop coat of Inertol Rustinhibitive Primer 621 made by Koppers Co., Inc. Chromax 13B50 primer made by Mobil Chemical Co., or an acceptable equivalent product.
 - b. Ferrous surfaces which will be submerged shall be shop primed immediately after blast-cleaning to near-white metal, with one coat of polyamide epoxy having not less than 43 mils dry film thickness, and which shall be Koppers 654 Primer made by Koppers Co., Inc. Tremec 66-1211 made by Tremec Co., Inc. or an acceptable equivalent product.
3. Joints
 - a. Joints shall be rubber gasket joints of either the push-on restrained or mechanical type unless otherwise specified or indicated on the Contract Drawings and shall conform to ANSI A21.11.
4. Fittings
 - a. All fittings shall be as called for on the Contract Drawings or required to complete the work and shall conform to the requirements of ANSI A21.10 and as approved by the Technical Representative. Joints on all fittings shall be Class 250 and of the same type as used on the main pipeline unless otherwise specified or noted on the Contract Drawings or directed by the Technical Representative.

C. Bedding Material

1. Bedding Material for the force main where indicated on the Contract Drawings or ordered by the Technical Representative shall conform to the material requirements specified under the respective Sections for the materials used.

PART 3- EXECUTION

CONSTRUCTION METHODS

1. General

- a. Force main pipe shall be of the sizes, types and materials indicated by the Contract documents with no substitutions. All pipe shall be laid, supported, jointed, tested, and trenches backfilled as indicated for the location or condition on the Contract Drawings. All pipe, when in place, shall be to the line and grade as shown on the Contract Drawings or directed by the Technical Representative.
- b. When the Contractor is in a position to start laying pipe, he shall have a representative of the supplying pipe company come to the job and instruct the Contractor, his men and the Inspector in the proper methods of laying said pipe. The Contractor shall notify his men who are actually doing the laying that this method shall be strictly enforced unless otherwise specified or directed by the Technical Representative.
- c. Pipe shall be laid and the joints made in the manner set forth by the manufacturer. Where applicable, immediately after pipes are put together, the position of rubber ring and the joint shall be inspected to be sure it has been properly put together. Gauges shall be furnished to the Contractor and the Engineer by the Manufacturer for this purpose, and all joints shall be corrected immediately.
- d. If at any time during the pipe laying operations, instructions or advice is required from a pipe representative, he shall be notified and shall come to the site of pipe laying operations for consultation before any further pipe is laid involving any such problems.

2. Inspection:

a. Field Inspection

- i. All pipe and accessories shall be laid, joined, and tested under pressure for defects and leakage in the manner herein specified and in the presence of, and as approved by, the Technical Representative.

3. Alignment and Grade

- a. The Contract Drawings show the proposed line and grade and the location of appurtenances. The line and grade shown may be modified as necessary by the Technical Representative in order to meet field conditions. Whenever obstructions are encountered which require a change to the Contract Drawings, the Technical Representative shall have the authority to change the Contract Drawings or arrange for the removal, relocation, or reconstruction of the obstruction. However, the minimum cover as specified or shown on the Contract Drawings shall be maintained unless otherwise directed by the Technical Representative.

4. Hauling and Distribution of Pipe

- a. Pipe, fittings, valves and accessories shall be loaded and unloaded with hoists or skidding to avoid damage. Under no circumstances shall such materials be dropped. Pipe handled

on skidways shall not be skidded or rolled against pipe already on the ground. In distributing the material at the site of the work each piece shall be unloaded opposite or near at the place where it is to be laid in the trench.

5. Dewatering
 - a. The Contractor shall provide all necessary pumps, dams, drains, ditches, flumes, well points and other means for excluding and removing water from trenches and other parts of the work, and for preventing the slopes from sliding or caving all in accordance with the Section “Trench Excavation, Backfilling and Compaction”.
6. Excavation and Backfill
 - a. Methods of excavation and backfilling shall be in conformance with the applicable sections of the Section “Trench Excavation, Backfilling and Compaction”.
7. Laying of Pipe
 - a. Pipe Laid on foundation Stone or Other Bedding Material
 - a. Foundations of foundation stone or other bedding materials required by the Contract Drawings or ordered by the Technical Representative, shall be constructed as required and in accordance with the respective Section for the material used and the Section “Trench Excavation, Backfilling and Compaction”. The top of the material shall be brought carefully to the proper grade well tamped or compacted as may be directed and shaped for the barrel of the pipe and the pipe laid thereon.
8. Lowering of Force Main Material Into Trench
 - a. Proper implements, tools and facilities satisfactory to the Engineer shall be provided and used by the Contractor for the safe and convenient performance of the work. All pipe, fittings, and valves shall be carefully lowered into the trench piece by piece by means of a derrick, ropes or other suitable tools or equipment, in such a manner as to prevent damage to the materials and protective coatings and linings. Under no circumstances shall materials be dropped or dumped into the trench.
 - b. If damage occurs to any pipe, fittings, valves, or accessories in handling, the damage shall be immediately brought to the Engineer’s attention. The Engineer shall prescribe corrective repairs or rejection of the damaged items.
9. Inspection Before Installation
 - a. All pipe and fittings shall be carefully examined for cracks and other defects while suspended above the trench immediately before installation in final position, as specified. Spigot ends shall be examined with particular care as this area is the most vulnerable to damage from handling. Defective pipe or fittings shall be laid aside for inspection by the Engineer, who will prescribe corrective repairs or rejection.

10. Cleaning of Pipe and Fittings
 - a. All lumps, blisters and excess coating shall be removed from the bell-and-spigot end of each pipe, and the outside of the spigot and the inside of the bell shall be wire brushed and wiped clean and dry and free from oil and grease before the pipe is laid.

11. Pipe Installation:
 - a. Every precaution shall be taken to prevent foreign material from entering the pipe while it is being placed in the line. During laying operations, no debris, tools, clothing, or other materials shall be placed in the pipe.
 - b. As each length of pipe is placed in the trench, the spigot end shall be centered in the bell and the pipe forced home and brought to correct line and grade. Eight inch and smaller pipes can usually be pushed home with a heavy crow bar. Larger pipes must be jacked home with a jacking device made for this purpose. Pipes shall not be pushed home with the shovel bucket. Cut pipe shall be rebeveled with a suitable file. The pipe shall be secured in place with approved backfill material tamped under it except at the bells. Precautions shall be taken to prevent dirt from entering the joint space.
 - c. At time when pipe laying is not in progress, the open ends of pipe shall be kept plugged and watertight with rubber and metal pipe stoppers or other means approved by the Engineer and the Contractor shall have two of each size required on the job. This provision shall apply during the noon hour as well as overnight. If water is in the trench, the seal shall remain in place until the trench is pumped completely dry.

12. Cutting the Pipe (DIP)
 - a. The cutting of pipe for valves, fittings or closure pieces shall be done in neat and workmanlike manner without damage to the pipe so as to leave the end at right angles to the axis of the pipe. All cut edges shall be smoothed and for push-on type joints the cut edge shall be beveled slightly.
 - b. Ductile iron pipe shall be cut only by means of abrasive wheels, hack saws, wheel type cutters, or milling type cutter. The use of "Squeeze" type pipe cutters, cutting torches, diamond points and drop chisels will not be permitted. This work shall be done by the Contractor in a manner satisfactory to the Technical Representative and only experienced men shall be engaged thereon.

13. Bell Ends to Face Direction of Laying
 - a. Pipe shall be laid with bell ends facing in the direction of laying, unless otherwise directed by the Engineer. Where pipe is laid on a grade of 10 percent or greater, the laying shall start at the bottom and shall proceed upward with the bell ends of the pipe upgrade.

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14. Permissible Deflection at Joints
- a. Wherever it is necessary to deflect from a straight line, either in the vertical or horizontal plane, to avoid obstruction or where long-radius curves are permitted, the amount of deflection allowed shall not exceed that required for the joint, and shall be approved by the Engineer.
 - a. Maximum deflection for ductile iron pipe shall not exceed those specified in AWWA C600 for the type of joint used, and the pipe manufacturer's recommendations.
15. Pipe Jointing
- a. Ductile Iron Pipe – Mechanical Joint
 - a. The last 8 inches outside of the spigot and inside of the bell of mechanical joint pipe shall be thoroughly cleaned to remove oil, grit excess coating, and other foreign matter from the joint, and then painted with a soap solution made by dissolving one-half cup of granulated soap in 1 gal. of water. The cast-iron gland shall then be slipped on the spigot end of the pipe with the lip extension of the gland toward the socket, or bell end. The rubber gasket shall be painted with the soap solution and placed on the spigot end with the thick edge toward the gland.
 - b. The entire section of the pipe shall be pushed forward to seat the spigot end in the bell. The gasket shall then be pressed into place within the bell; care shall be taken to locate the gasket evenly around the entire joint. The gland shall be moved along the pipe into position for bolting, all of the bolts inserted, and the nuts screwed up tightly with the fingers. All nuts shall be tightened with a suitable wrench. The torque for various sizes of bolts shall be as recommended by the pipe manufacturer.
 - c. Nuts spaced 180 degrees apart shall be tightened alternately in order to produce an equal pressure on all parts of the gland.
16. Joint Restraints and Thrust Blocks
- a. Joint restraints and/or thrust blocks shall be installed at the location and in accordance with the details shown on the Contract Drawings, or as directed by the Technical Representative.
17. Testing
- a. Pressure systems shall be subjected to a hydrostatic pressure test of 150 psi for a period of 2 hours. Test results shall be measured at the lower end of the system.
 - b. The tests shall be performed by an approved company experienced with the procedure.

PART 4 – METHOD OF MEASUREMENT AND BASIS FOR PAYMENT

4.1 MEASUREMENT AND PAYMENT

- A. There shall be no separate measurement for payment for work under this Section. The cost of this work shall be included in the lump sum bid for this project.

END OF SECTION 02745

SECTION 02855 – SIGNS AND PAVEMENT MARKINGS

PART 1 - GENERAL

1.1 RELATED DOCUMENTS

- A. The Contract Drawings, General Conditions and Supplementary General Conditions apply to this Section of the Specifications.

1.2 SUMMARY

- A. The work of this Section shall consist of furnishing and installing signs and supports, painted pavement markings, centerlines, edge-lines, painted legend, arrows and markings, of the type and color specified at the locations indicated on the Plans and in conformity with the Plans, these Specifications and as directed by the Technical Representative.
- B. Painted legend, arrows and markings includes paint installed with a hand striping machine such as: stop bars, crosswalks, parking stalls, and lane arrows. All painted pavement markings, with the exception of parking stalls, shall be reflectorized.
- C. The work of this Section shall also consist of furnishing and installing sheet aluminum/reflective sheeting signs and galvanized steel support posts as indicated on the plans.

1.3 QUALITY ASSURANCE

- A. Codes and Standards: Comply with provisions of following, except otherwise indicated:
 - 1. References to "Form 816" means the State of Connecticut Department of Transportation "Standard Specification for Roads, Bridges and Incidental Construction, 2004", including any interim and supplemental specifications.

PART 2 - PRODUCTS

2.1 MATERIALS

- A. Pavement marking paint shall conform to the requirements of Article M.07.20 of "Form 816".
- B. Glass beads shall conform to the requirements of Article M.07.30 of "Form 816".
- C. Signs and support posts shall conform to the requirements of Article 12.08.02 of "Form 816".

PART 3 - EXECUTION

3.1 CONSTRUCTION METHODS

- A. Pavement markings shall be applied in accordance with Article 12.09.03 of "Form 816" and as modified herein.

- B. Pavement markings shall be applied at the locations and in accordance with the details shown on the Plans.
- C. The pavement surface shall be cleaned at the direction of the Technical Representative just prior to application. Pavement cleaning shall consist of at least brushing with rotary broom (non-metallic), and additionally as recommended by the material manufacturer.
- D. Signs and support posts shall be installed in accordance with Article 12.08.03 of "Form 816".

PART 4 - METHOD OF MEASUREMENT AND BASIS OF PAYMENT

4.1 MEASUREMENT AND PAYMENT

- A. There shall be no separate measurement for payment for work under this Section. The cost of this work shall be included in the lump sum bid for this project.

END OF SECTION 02855

SECTION 02936 - TURF AND GRASSES

PART 1 - GENERAL

1.1 RELATED DOCUMENTS

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

1.2 SUMMARY

- A. Section Includes:
 - 1. Seeding.
 - 2. Hydroseeding.
 - 3. Sodding.
- B. Related Requirements:
 - 1. Section 02100 "Clearing and Grubbing" for topsoil stripping and stockpiling.
 - 2. Section 02939 "Topsoil and Planting Mix".
 - 3. Section 02940 "Landscape Maintenance".

1.3 DEFINITIONS

- A. Duff Layer: The surface layer of native topsoil that is composed of mostly decayed leaves, twigs, and detritus.
- B. Finish Grade: Elevation of finished surface of planting soil.
- C. Manufactured Topsoil: Soil produced off-site by homogeneously blending mineral soils or sand with stabilized organic soil amendments to produce topsoil or planting soil.
- D. Pesticide: A substance or mixture intended for preventing, destroying, repelling, or mitigating a pest. This includes insecticides, miticides, herbicides, fungicides, rodenticides, and molluscicides. It also includes substances or mixtures intended for use as a plant regulator, defoliant, or desiccant.
- E. Pests: Living organisms that occur where they are not desired or that cause damage to plants, animals, or people. These include insects, mites, grubs, mollusks (snails and slugs), rodents (gophers, moles, and mice), unwanted plants (weeds), fungi, bacteria, and viruses.
- F. Subgrade: Surface or elevation of subsoil remaining after excavation is complete, or top surface of a fill or backfill before planting soil is placed.
- G. Subsoil: All soil beneath the topsoil layer of the soil profile, and typified by the lack of organic matter and soil organisms.

- H. Surface Soil: Soil that is present at the top layer of the existing soil profile at the Project site. In undisturbed areas, the surface soil is typically topsoil, but in disturbed areas such as urban environments, the surface soil can be subsoil.

1.4 ACTION SUBMITTALS

- A. Product Data: For each type of product indicated.
 - 1. Pesticides and Herbicides: Include product label and manufacturer's application instructions specific to this Project.

1.5 INFORMATIONAL SUBMITTALS

- A. Certification of Grass Seed: From seed vendor for each grass-seed monostand or mixture stating the botanical and common name, percentage by weight of each species and variety, and percentage of purity, germination, and weed seed. Include the year of production and date of packaging.
 - 1. Certification of each seed mixture for turfgrass sod. Include identification of source and name and telephone number of supplier.
- B. Qualification Data: For qualified landscape Installer.
- C. Product Certificates: For soil amendments and fertilizers, from manufacturer.
- D. Material Test Reports: For standardized ASTM D 5268 topsoil existing native surface topsoil existing in-place surface soil and imported or manufactured topsoil.
- E. Maintenance Instructions: Recommended procedures to be established by Owner for maintenance of turf during a calendar year. Submit before expiration of required initial maintenance periods.

1.6 QUALITY ASSURANCE

- A. Installer Qualifications: A qualified landscape Installer whose work has resulted in successful turf establishment.
 - 1. Professional Membership: Installer shall be a member in good standing of either the Professional Landcare Network or the American Nursery and Landscape Association.
 - 2. Experience: Five years' experience in turf installation in addition to requirements in Division 01 Section "Quality Requirements."
 - 3. Installer's Field Supervision: Require Installer to maintain an experienced full-time supervisor on Project site when work is in progress.
 - 4. Maintenance Proximity: Not more than two hours' normal travel time from Installer's place of business to Project site.
 - 5. Pesticide Applicator: State licensed, commercial.
- B. Soil-Testing Laboratory Qualifications: An independent laboratory or university laboratory, recognized by the State Department of Agriculture, with the experience and capability to conduct the testing indicated and that specializes in types of tests to be performed.

- C. Soil Analysis: For each unamended soil type, furnish soil analysis and a written report by a qualified soil-testing laboratory stating percentages of organic matter; gradation of sand, silt, and clay content; cation exchange capacity; sodium absorption ratio; deleterious material; pH; and mineral and plant-nutrient content of the soil.
1. Testing methods and written recommendations shall comply with USDA's Handbook No. 60.
 2. The soil-testing laboratory shall oversee soil sampling, with depth, location, and number of samples to be taken per instructions from Architect. A minimum of three representative samples shall be taken from varied locations for each soil to be used or amended for planting purposes.
 3. Report suitability of tested soil for turf growth.
 - a) Based on the test results, state recommendations for soil treatments and soil amendments to be incorporated. State recommendations in weight per 1000 sq. ft. or volume per cu. yd. for nitrogen, phosphorus, and potash nutrients and soil amendments to be added to produce satisfactory planting soil suitable for healthy, viable plants.
 - b) Report presence of problem salts, minerals, or heavy metals, including aluminum, arsenic, barium, cadmium, chromium, cobalt, lead, lithium, and vanadium. If such problem materials are present, provide additional recommendations for corrective action.

1.7 DELIVERY, STORAGE, AND HANDLING

- A. Seed and Other Packaged Materials: Deliver packaged materials in original, unopened containers showing weight, certified analysis, name and address of manufacturer, and indication of conformance with state and federal laws, as applicable.
- B. Sod: Harvest, deliver, store, and handle sod according to requirements in "Specifications for Turfgrass Sod Materials" and "Specifications for Turfgrass Sod Transplanting and Installation" in TPI's "Guideline Specifications to Turfgrass Sodding." Deliver sod in time for planting within 24 hours of harvesting. Protect sod from breakage and drying.
- C. Bulk Materials:
1. Do not dump or store bulk materials near structures, utilities, walkways and pavements, or on existing turf areas or plants.
 2. Provide erosion-control measures to prevent erosion or displacement of bulk materials, discharge of soil-bearing water runoff, and airborne dust reaching adjacent properties, water conveyance systems, or walkways.
 3. Accompany each delivery of bulk fertilizers, lime, and soil amendments with appropriate certificates.

1.8 PROJECT CONDITIONS

- A. Planting Restrictions: Plant during one of the following periods. Coordinate planting periods with initial maintenance periods to provide required maintenance from date of Substantial Completion
- B. Seeding Season
1. Spring Planting: April 15 to June 1
 2. Fall Planting: September 1 to October 15

C. Sod Installation Season

1. Spring: April 15 to July 15
2. Fall: August 15 to November 1

D. Weather Limitations: Proceed with planting only when existing and forecasted weather conditions permit planting to be performed when beneficial and optimum results may be obtained. Apply products during favorable weather conditions according to manufacturer's written instructions.

1.9 MAINTENANCE SERVICE

A. Initial Turf Maintenance Service: Provide full maintenance by skilled employees of landscape Installer. Maintain as required in Part 3. Begin maintenance immediately after each area is planted and continue until acceptable turf is established but for not less than the following periods:

1. Seeded Turf: 60 days from date of Substantial Completion or acceptance
 - a) When initial maintenance period has not elapsed before end of planting season, or if turf is not fully established, continue maintenance during next planting season.
2. Sodded Turf: 60 days from date of Substantial Completion or acceptance

PART 2 - PRODUCTS

2.1 SEED

A. Grass Seed: Fresh, clean, dry, new-crop seed complying with AOSA's "Journal of Seed Technology; Rules for Testing Seeds" for purity and germination tolerances.

B. Seed Species: State-certified seed of grass species as follows:

1. Full Sun:
 - 30% Creeping Red Fescue (2 - improved varieties)
 - 30% Perennial Ryegrass (2 improved, grey leaf spot resistant varieties)
 - 20% Kentucky bluegrass (1 improved, Mid Atlantic type)
 - 20% Kentucky bluegrass (1 improved elite type)

2. Shade:

- 30% Hard fescue (2 - improved varieties)
- 20% Kentucky bluegrass (2-improved, shade tolerant varieties)**
- 20% Creeping Red Fescue (2 -improved varieties)
- 20% Chewings Fescue (2 - improved varieties)
- 10% Perennial Ryegrass (improved, grey leaf spot resistant varieties)

2.2 TURFGRASS SOD

- A. Turfgrass Sod: Certified complying with "Specifications for Turfgrass Sod Materials" in TPI's "Guideline Specifications to Turfgrass Sodding." Furnish viable sod of uniform density, color, and texture, strongly rooted, and capable of vigorous growth and development when planted.
- B. Large roll sod shall be utilized in large open areas to minimize seams.
- C. All sod shall be from the same farm and field. Inconsistently colored sod is not acceptable.
- D. Turfgrass Species: Closely match seed species above or 70/30 Blend Available from winding Brook Turf Farm, Wethersfield, CT <http://www.windingbrookturf.net/>
 - 30% Lacrosse Chewings Fescue
 - 20% Excursion Kentucky Bluegrass
 - 20% Shamrock Kentucky Bluegrass
 - 15% Diva Kentucky Bluegrass
 - 15% Sudden Impact Kentucky Bluegrass

2.3 INORGANIC SOIL AMENDMENTS

- A. Lime: ASTM C 602, agricultural liming material containing a minimum of 80 percent calcium carbonate equivalent and as follows:
 - 1. Class: T, with a minimum of 99 percent passing through No. 8 sieve and a minimum of 75 percent passing through No. 60 sieve.
 - 2. Class: O, with a minimum of 95 percent passing through No. 8 sieve and a minimum of 55 percent passing through No. 60 sieve.
 - 3. Provide lime in form of ground dolomitic limestone.
 - 4. Retain one or more of first three paragraphs below. Sulfur is used to lower pH and neutralize alkaline soils. Revise descriptions and insert proprietary products if required.
- B. Sulfur: Granular, biodegradable, containing a minimum of 90 percent sulfur, and with a minimum of 99 percent passing through No. 6 sieve and a maximum of 10 percent passing through No. 40 sieve.
- C. Iron Sulfate: Granulated ferrous sulfate containing a minimum of 20 percent iron and 10 percent sulfur.
- D. Aluminum Sulfate: Commercial grade, unadulterated.

- E. Perlite: Horticultural perlite, soil amendment grade.
- F. Agricultural Gypsum: Minimum 90 percent calcium sulfate, finely ground with 90 percent passing through No. 50 sieve.
- G. Sand: Clean, washed, natural or manufactured, and free of toxic materials.
- H. Diatomaceous Earth: Calcined, 90 percent silica, with approximately 140 percent water absorption capacity by weight.
- I. Zeolites: Mineral clinoptilolite with at least 60 percent water absorption by weight.

2.4 ORGANIC SOIL AMENDMENTS

- A. Compost: Well-composted, stable, and weed-free organic matter, pH range of 5.5 to 8; moisture content 35 to 55 percent by weight; 100 percent passing through 1 inch sieve; soluble salt content of 5 to 10 decisiemens/m; not exceeding 0.5 percent inert contaminants and free of substances toxic to plantings; and as follows:
 - 1. Organic Matter Content: 50 to 60 percent of dry weight.
 - 2. Feedstock: Agricultural, food, or industrial residuals; biosolids; yard trimmings; or source-separated or compostable mixed solid waste.
- B. Sphagnum Peat: Partially decomposed sphagnum peat moss, finely divided or of granular texture, with a pH range of 3.4 to 4.8.
- C. Muck Peat: Partially decomposed moss peat, native peat, or reed-sedge peat, finely divided or of granular texture, with a pH range of 6 to 7.5, and having a water-absorbing capacity of 1100 to 2000 percent.

2.5 FERTILIZERS

- A. Bonemeal: Commercial, raw or steamed, finely ground; a minimum of 1 percent nitrogen and 10 percent phosphoric acid.
- B. Superphosphate: Commercial, phosphate mixture, soluble; a minimum of 20 percent available phosphoric acid.
- C. Commercial Fertilizer: Commercial-grade complete fertilizer of neutral character, consisting of fast- and slow-release nitrogen, 50 percent derived from natural organic sources of urea formaldehyde, phosphorous, and potassium in the following composition:
 - 1. Composition: 1 lb/1000 sq ft of actual nitrogen, 4 percent phosphorous, and 2 percent potassium, by weight.
 - 2. Composition: Nitrogen, phosphorous, and potassium in amounts recommended in soil reports from a qualified soil-testing laboratory.
- D. Slow-Release Fertilizer: Granular or pelleted fertilizer consisting of 50 percent water-insoluble nitrogen, phosphorus, and potassium in the following composition:
 - 1. Composition: 20 percent nitrogen, 10 percent phosphorous, and 10 percent potassium, by weight.

2. Composition: Nitrogen, phosphorous, and potassium in amounts recommended in soil reports from a qualified soil-testing laboratory.

2.6 MULCHES

- A. Straw Mulch: Provide air-dry, clean, mildew- and seed-free, salt hay or threshed straw of wheat, rye, oats, or barley.
- B. Sphagnum Peat Mulch: Partially decomposed sphagnum peat moss, finely divided or of granular texture, and with a pH range of 3.4 to 4.8.
- C. Muck Peat Mulch: Partially decomposed moss peat, native peat, or reed-sedge peat, finely divided or of granular texture, with a pH range of 6 to 7.5, and having a water-absorbing capacity of 1100 to 2000 percent.
- D. Fiber Mulch: Biodegradable, dyed-wood, cellulose-fiber mulch; nontoxic and free of plant-growth or germination inhibitors; with a maximum moisture content of 15 percent and a pH range of 4.5 to 6.5.

2.7 WEED CONTROL

- A. Sodded and seeded areas shall receive a treatment of selective pre-emergent weed control.

2.8 PESTICIDES

- A. General: Pesticide, registered and approved by EPA, acceptable to authorities having jurisdiction, and of type recommended by manufacturer for each specific problem and as required for Project conditions and application. Do not use restricted pesticides unless authorized in writing by authorities having jurisdiction.
- B. Pre-Emergent Herbicide (Selective and Non-Selective): Effective for controlling the germination or growth of weeds within planted areas at the soil level directly below the mulch layer.
- C. Post-Emergent Herbicide (Selective and Non-Selective): Effective for controlling weed growth that has already germinated.

2.9 EROSION-CONTROL MATERIALS

- A. All seeded and/or hydroseeded areas shall receive erosion control blankets.
- B. Erosion-Control Blankets: Biodegradable wood excelsior, straw, or coconut-fiber mat enclosed in a mesh. Include manufacturer's recommended steel wire staples, 6 inches long. All erosion control blankets shall be 100% natural materials. No plastic netting will be accepted.

2.9 WATER

- A. Water: Furnished by Contractor, not from University supplies or public waterways, suitable for irrigation and free from ingredients harmful to plant life.
- B. Hoses and other watering equipment to be furnished by Contractor.
- C. Turf watering shall be scheduled to be completed by 10 AM and watering in the afternoon from 5 – 7 PM.
- D. Watering schedule shall be submitted to the Owner for approval. Watering schedule shall be deep watering to promote strong drought resistant root growth.

2.10 TURF PROTECTION

- A. Turf protection shall be provided along all seeded and sodded edges to protect against foot traffic.
- B. Turf protection stakes shall be 32” high, reinforced polymer with 8” long x 3/8” diameter galvanized spikes, color green, 8’-0” on center, as manufactured by Standardgolf model number 37750, or approved equal.
- C. Turf protection rope shall be 1/4” polypropylene braided rope, color green as manufactured by Standardgolf model number 37200, or approved equal.

PART 3 - EXECUTION

3.1 EXAMINATION

- A. Examine areas to be planted for compliance with requirements and other conditions affecting performance.
 - 1. Verify that no foreign or deleterious material or liquid such as paint, paint washout, concrete slurry, concrete layers or chunks, cement, plaster, oils, gasoline, diesel fuel, paint thinner, turpentine, tar, roofing compound, or acid has been deposited in soil within a planting area.
 - 2. Do not mix or place soils and soil amendments in frozen, wet, or muddy conditions.
 - 3. Suspend soil spreading, grading, and tilling operations during periods of excessive soil moisture until the moisture content reaches acceptable levels to attain the required results.
 - 4. Uniformly moisten excessively dry soil that is not workable and which is too dusty.
- B. Proceed with installation only after unsatisfactory conditions have been corrected.
- C. If contamination by foreign or deleterious material or liquid is present in soil within a planting area, remove the soil and contamination as directed by Architect and replace with new planting soil.

3.2 PREPARATION

- A. Protect structures, utilities, sidewalks, pavements, and other facilities, trees, shrubs, and plantings from damage caused by planting operations.
 - 1. Protect adjacent and adjoining areas from hydroseeding and hydromulching overspray.
 - 2. Protect grade stakes set by others until directed to remove them.
- B. Install erosion-control measures to prevent erosion or displacement of soils and discharge of soil-bearing water runoff or airborne dust to adjacent properties and walkways.

3.3 TURF AREA PREPARATION

- A. Limit turf subgrade preparation to areas to be planted.
- B. Hand-dig or air spade in all areas under the drip line of existing trees.
- C. Newly Graded Subgrades: Loosen subgrade to a minimum depth of 8 inches. Remove stones larger than 1 inch in any dimension and sticks, roots, rubbish, and other extraneous matter and legally dispose of them off Owner's property.
 - 1. Spread topsoil, apply soil amendments and fertilizer on surface, and thoroughly blend planting soil.
 - a) Delay mixing fertilizer with planting soil if planting will not proceed within a few days.
 - b) Mix lime with dry soil before mixing fertilizer.
 - 2. Spread planting soil to a depth of 8 inches but not less than required to meet finish grades after light rolling and natural settlement. Do not spread if planting soil or subgrade is frozen, muddy, or excessively wet.
- D. Unchanged Subgrades: If turf is to be planted in areas unaltered or undisturbed by excavating, grading, or surface-soil stripping operations, prepare surface soil as follows:
 - 1. Remove existing grass, vegetation, and turf. Do not mix into surface soil.
 - 2. Loosen surface soil to a depth of at least 8 inches. Apply soil amendments and fertilizers according to planting soil mix proportions and mix thoroughly into top 8 inches. Till soil to a homogeneous mixture of fine texture.
 - 3. Remove stones larger than 1 inch in any dimension and sticks, roots, trash, and other extraneous matter.
 - 4. Legally dispose of waste material, including grass, vegetation, and turf, off Owner's property.
- E. Finish Grading: Grade planting areas to a smooth, uniform surface plane with loose, uniformly fine texture. Grade to within plus or minus ½ inch of finish elevation. Roll and rake, remove ridges, and fill depressions to meet finish grades. Limit finish grading to areas that can be planted in the immediate future.
- F. Moisten prepared area before planting if soil is dry. Water thoroughly and allow surface to dry before planting. Do not create muddy soil.
- G. Before planting, obtain Architect's acceptance of finish grading; restore planting areas if eroded or otherwise disturbed after finish grading.

3.4 SEEDING

- A. Sow seed with spreader or seeding machine. Do not broadcast or drop seed when wind velocity exceeds 5 mph. Evenly distribute seed by sowing equal quantities in two directions at right angles to each other.
 - 1. Do not use wet seed or seed that is moldy or otherwise damaged.
 - 2. Do not seed against existing trees. Limit extent of seed to outside edge of planting saucer.
- B. Rake seed lightly into top 1/8 inch of soil, roll lightly, and water with fine spray.
- C. Protect seeded areas with slopes exceeding 1:4 with erosion-control blankets and 1:6 with erosion-control fiber mesh installed and stapled according to manufacturer's written instructions.
- D. Protect seeded areas with erosion-control mats where shown on Drawings; install and anchor according to manufacturer's written instructions.
- E. Protect seeded areas with slopes not exceeding 1:6 by spreading straw mulch. Spread uniformly at a minimum rate of 2 tons/acre to form a continuous blanket 1-1/2 inches in loose thickness over seeded areas. Spread by hand, blower, or other suitable equipment.
 - 1. Anchor straw mulch by crimping into soil with suitable mechanical equipment.
- F. Protect seeded areas from hot, dry weather or drying winds by applying mulch within 24 hours after completing seeding operations.

3.5 HYDROSEEDING

- A. Hydroseeding: Mix specified seed, fertilizer, and fiber mulch in water, using equipment specifically designed for hydroseed application. Continue mixing until uniformly blended into homogeneous slurry suitable for hydraulic application.
 - 1. Mix slurry with fiber-mulch manufacturer's recommended tackifier.
 - 2. Apply slurry uniformly to all areas to be seeded in a one-step process.
 - 3. Apply slurry uniformly to all areas to be seeded in a two-step process.
- B. Protect seeded areas with slopes not exceeding 1:6 by spreading straw mulch. Spread uniformly at a minimum rate of 2 tons/acre to form a continuous blanket 1-1/2 inches in loose thickness over seeded areas. Spread by hand, blower, or other suitable equipment.
 - 1. Anchor straw mulch by crimping into soil with suitable mechanical equipment.
- C. Protect seeded areas from hot, dry weather or drying winds by applying mulch within 24 hours after completing seeding operations.

3.6 SODDING

- A. Lay sod within 24 hours of harvesting. Do not lay sod if dormant or if ground is frozen or muddy.

- B. Lay sod to form a solid mass with tightly fitted joints. Butt ends and sides of sod; do not stretch or overlap. Stagger sod strips or pads to offset joints in adjacent courses. Avoid damage to subgrade or sod during installation. Tamp and roll lightly to ensure contact with subgrade, eliminate air pockets, and form a smooth surface. Work sifted soil or fine sand into minor cracks between pieces of sod; remove excess to avoid smothering sod and adjacent grass.
 - 1. Lay sod across angle of slopes exceeding 1:3.
 - 2. Anchor sod on slopes exceeding 1:6 with wood pegs spaced as recommended by sod manufacturer but not less than 2 anchors per sod strip to prevent slippage.
- C. Saturate sod with fine water spray within two hours of planting. During first week after planting, water daily or more frequently as necessary to maintain moist soil to a minimum depth of 1-1/2 inches below sod.

3.7 TURF MAINTENANCE

- A. Maintain and establish turf by watering, fertilizing, weeding, mowing, trimming, replanting, and performing other operations as required to establish healthy, viable turf. Roll, regrade, and replant bare or eroded areas and remulch to produce a uniformly smooth turf. Provide materials and installation the same as those used in the original installation.
 - 1. Fill in as necessary soil subsidence that may occur because of settling or other processes. Replace materials and turf damaged or lost in areas of subsidence.
 - 2. In areas where mulch has been disturbed by wind or maintenance operations, add new mulch and anchor as required to prevent displacement.
 - 3. Apply treatments as required to keep turf and soil free of pests and pathogens or disease. Use integrated pest management practices whenever possible to minimize the use of pesticides and reduce hazards.
- B. Watering: Install and maintain temporary piping, hoses, and turf-watering equipment to convey water from sources and to keep turf uniformly moist to a depth of 4 inches.
 - 1. Schedule watering to prevent wilting, puddling, erosion, and displacement of seed or mulch. Lay out temporary watering system to avoid walking over muddy or newly planted areas.
 - 2. Water turf with fine spray at a minimum rate of 1 inch per week unless rainfall precipitation is adequate.
- C. Mow turf as soon as top growth is tall enough to cut. Repeat mowing to maintain specified height without cutting more than 1/3 of grass height. Remove no more than 1/3 of grass-leaf growth in initial or subsequent mowings. Do not delay mowing until grass blades bend over and become matted. Do not mow when grass is wet. Schedule initial and subsequent mowings to maintain the following grass height: 2 – 3”
- D. Turf Post fertilization: Apply fertilizer after initial mowing and when grass is dry.
 - 1. Use fertilizer that will provide actual nitrogen of at least 1 lb/1000 sq. ft. to turf area.

3.8 SATISFACTORY TURF

- A. Turf installations shall meet the following criteria as determined by Architect:

1. Satisfactory Seeded Turf: At end of maintenance period, a healthy, uniform, close stand of grass has been established, free of weeds and surface irregularities, with coverage exceeding 90 percent over any 10 sq. ft. and bare spots not exceeding 5 by 5 inches.
 2. Satisfactory Sodded Turf: At end of maintenance period, a healthy, well-rooted, even-colored, viable turf has been established, free of weeds, open joints, bare areas, and surface irregularities.
- B. Use specified materials to reestablish turf that does not comply with requirements and continue maintenance until turf is satisfactory.

3.9 PESTICIDE APPLICATION

- A. Apply pesticides and other chemical products and biological control agents in accordance with requirements of authorities having jurisdiction and manufacturer's written recommendations. Coordinate applications with Owner's operations and others in proximity to the Work. Notify Owner before each application is performed.
- B. Post-Emergent Herbicides (Selective and Non-Selective): Apply only as necessary to treat already-germinated weeds and in accordance with manufacturer's written recommendations.

3.10 CLEANUP AND PROTECTION

- A. Promptly remove soil and debris created by turf work from paved areas. Clean wheels of vehicles before leaving site to avoid tracking soil onto roads, walks, or other paved areas.
- B. Erect temporary fencing or barricades and warning signs as required to protect newly planted areas from traffic. Maintain fencing and barricades throughout initial maintenance period and remove after plantings are established.
- C. Remove nondegradable erosion-control measures after grass establishment period.

PART 4 - METHOD OF MEASUREMENT AND BASIS OF PAYMENT

4.1 MEASUREMENT AND PAYMENT

- A. Turf establishment shall be by means of seeding or hydroseeding unless indicated otherwise by the Owner.
- B. There shall be no separate measurement for payment for turf establishment by seeding or hydroseeding under this Section. The cost of turf establishment by seeding or hydroseeding shall be included in the lump sum bid for this project.
- C. Sodding shall be paid for under the Unit Price No. 3 "Turf Establishment By Means Of Sodding", only if directed by the Owner.

END OF SECTION

SECTION 02937 - TREE PROTECTION AND PRESERVATION

PART 1 - GENERAL

1.1 RELATED DOCUMENTS

Drawings and general provisions of the Contract, including General and Supplementary Conditions and Division I Specifications Sections, apply to this Section.

1.2 SUMMARY

- A. This Section includes the protection and stress reduction of existing trees and vegetation that interfere with, or are affected by, execution of the Work, whether temporary or permanent. Work is to be coordinated with Site & Landscape Improvements and Tree Preservation and Transplant Plans.
- B. The following specifications apply to work of the Contract Arborist related to Protection and Stress Reduction Measures and coordination and oversight of the Tree Protection and Preservation Program by the Project Arborist. This work includes but is not limited to the following:
 - 1. Coordination of Temporary Tree and Plant Protection
 - 2. Selective tree removals for “Removal By Arborist” (RBA) (Contract Arborist) within Tree Protection Areas (TPAs).
 - 3. Crown Pruning and Supportive cabling.
 - 4. Root Pruning
 - 5. Temporary Site and Tree protection fencing and temporary sign installation
 - 6. Root Protection Matting for temporary construction access in TPAs
 - 7. Root Aeration Matting for permanent grade fills
 - 8. Composted Mulching
 - 9. Liquid subsurface fertilization
 - 10. Tree Growth Regulator (Paclobutrazol)
 - 11. Soil Nutrient Testing
 - 12. Super Silt Fence / Silt Fence “Trenchless Attachment” to Root Protection Matting (RPM) and Root Aeration Matting (RAM)
 - 13. Temporary Limb Guying or Clearance Pruning for construction access
 - 14. Seasonal Supplemental Watering
 - 15. Monitoring and Treatment of Tree Health
 - 16. Soil Decompression with SuperSonic Air Tool (SSAT) within CRZs of Designated Trees
 - 17. Supersonic Air Tool (SSAT) and Hand Excavation within the Critical Root Zones (CRZs)

1.3 DEFINITIONS

- A. Certified Arborist: Credential of an individual arborist issued and administered by the International Society of Arboriculture. This credential must be current and valid to qualify to use the copyrighted designation of "Certified Arborist". Refer to www.isa-arbor.com for additional information.
- B. Project Arborist: Arboricultural firm contracted to provide planning and design services, technical assistance and advice to the owner and design team. Duties include but are not limited to the following: site investigation and documentation (design phase inventories, assessments, root investigations, etc.); develop tree preservation plans, methods, details and specifications; and provide final document review and monitoring of the Contract Arborist. Project Arborist is contracted directly to the owner or owner representative and acts specifically on behalf of the owner concerning tree related issues. Project Arborist shall have authority over the Contract Arborist and any disputes shall be decided by the Project Arborist and Engineer.
- C. Contract Arborist: Arboricultural firm contracted to implement the approved tree preservation plans on site. All crews conducting arboricultural operations on site shall consist of at least one Certified Arborist who directly oversees all work by that crew. Arboricultural operations include, but are not limited to, pruning, tree protection device installation and maintenance (fence, matting, etc.), root pruning, air tool root excavation/exploration (SSAT), soil care activities, soil testing, mulch application, tree inspections, pesticide/chemical applications and tree removal. Special qualifications submittal is required for review and approval below. Contract Arborist will be sub-contracted by the general contractor.
- D. Tree Protection Area (TPA): Area indicated on Drawings surrounding individual trees or groups of trees to be protected during construction.
- E. Critical Root Zone (CRZ): Area shown on Drawings for all trees within scope of this project with a circle. Estimated area is based upon an industry standard "rule of thumb" of 1.5 feet of radius per inch of diameter at breast height (DBH). CRZ is described as the minimum area of tree roots required to be protected to maintain tree health. Any impacts within the CRZ must be mitigated based on severity up to and including tree removal if the impact is severe.
- F. Tree Protection Action Key (TPAK): Matrix provided on Plan sheets for each tree indicating designated protection and stress reduction measures specified in this document.
- G. Supersonic Air Tool (SSAT): Hand held tool designed to focus highly compressed air (90-125 psi) provided from a large air compressor (185-375 cfm) at speeds close to 1400 mph at the tip of the tool. Widely used by arboricultural firms and consultants for multiple purposes including but not limited to: root collar investigation, CRZ investigation, root pruning (especially large roots > 1.5" diameter or where existing underground cables or conduits are located), radial mulching and restoration of compacted soils, excavation for utilities within protected CRZs to minimize root damage from constriction.
- H. Tree Removal by Arborist: Action whereby the Contract Arborist removes trees designated for "Removal by Arborist" selected from inside the TPAs. Trees shall be taken down by hand sectionally, or directionally felled to minimize damage to adjacent tree canopies, root systems, or adjacent structures. Work shall be completed by a qualified Contract Arborist.
- I. Crown Pruning: Action by the Contract Arborist of pruning specific tree limbs to improve tree health, reduce hazard, and / or provide construction clearance.
- J. Supportive Cabling: Installation of supportive cabling for designated tree branches due to weak branch attachments.

- K. Root Pruning: Action indicated on Drawings to provide a more suitable cut for protected tree roots to minimize ripped or torn roots during excavations and grading with standard construction equipment. Various methods may be used.
- L. Mulching of Trees: Application of a wood mulch product to areas surrounding designated trees. Mulch increases moisture-holding capacity, helps mitigate soil compaction, and increases needed soil organic composition.
- M. Soil Amendments: Various product components applied to existing soil environment of protected trees, as indicated on Plan notes.
- N. Tree Growth Regulator (*Paclobutrazol*): Products applied to designated trees used to regulate plant growth in such a way as to restrict canopy growth and free stored or produced energy for other uses in the tree. For highly impacted trees, more energy may be made available for fibrous root growth (to combat root loss), thicker darker leaves (allowing for increased photosynthesis, and increased drought tolerance), and pest tolerance (often an issue with construction stressed trees); among other potential benefits.
- O. Limits of Disturbance (LOD) (also called Limits of Construction): Specific outer limits of all construction activities for the entire project.
- P. DBH (Diameter at Breast Height): Tree trunk diameter measured at 4.5 feet above grade.
- Q. Soil Decompaction with SuperSonic Airtool (SSAT) within CRZs of Designated Trees: This work is typically prescribed for urban park or campus trees where existing compacted soils and associated trees will benefit. It involves pneumatic de-compaction in the upper soils using Supersonic Air tools (SSAT) by trained and qualified arborists. Amendments as specified are mixed into the soils.

1.4 SUBMITTALS

The Contract Arborist shall provide submittals as follows:

- A. Product Data: For each type of product indicated.
- B. Certification: For each phase, the Contract Arborist shall certify for each tree designated to remain has been protected during construction according to recognized standards and that trees were promptly and properly treated and repaired when damaged. Damages to tree crowns, trunk, and root system shall be noted. Damages to include incursion of vehicles, staging, or stockpile within designated Tree Protection Areas without authorization.
- C. Qualification Data: For Contract Arborist Firm Qualifications, submit firm and individual qualifications as follows.
 - 1. Submit a minimum of two resumes and detailed qualifications from staff or team individuals assigned to this project as detailed under Quality Assurance below. Due to the complexity of this project, standard arboricultural experience may not qualify.
 - 2. Provide references for above from a minimum of three commercial, nongovernmental or governmental projects for whom similar tree preservation programs have been successfully implemented. Include the following information:
 - a. Project name, size and scope
 - b. Number and species of trees involved

- c. Relevant photos or aerials
 - d. Tree preservation budget
 - e. Scope of services provided
 - f. Name and contact for project owner, designer, or contractor
- D. Pedestrian/Property Protection Plan: Contract Arborist to submit a written plan describing all protective measures proposed to be used to minimize potential impact to pedestrians, parked cars, workers and other public and private property. Protection measures shall be required for all on-site tree care activities including but not limited to Supersonic Air Tool excavation, root pruning, canopy pruning, etc.
- E. Maintenance Prescription: Contract Arborist shall submit for care and protection of trees as a result of construction, changes in weather patterns or events, and response in health from individual trees during and after completing the Work.
- F. Soil Samples: Submit soil sample for analysis during site work phase of this project. Take the samples during April through October. Take representative soil samples from all areas of protected trees (landscape areas and street tree planting pits). Samples and procedures per local cooperative extension shall be followed. Forward reports to Engineer and Project Arborist.
- G. Soil Amendments: Contract Arborist shall submit specific fertilizer formulations, application rates and methods for review by Project Arborist. All fertilization and soil amendments shall be in conformance with soil test results.
- H. Site Documentation: Submit weekly reports to owner and Project Arborist containing complete documentation of all tree impacts and tree preservation activities including but not limited to: root pruning, tree protection fencing, excavation within critical root zones, tree fertilization or other treatments, etc. Documentation shall include tree numbers of trees impacted and/or treated. Complete daily photographic record is also required.
- I. Existing Conditions: Documentation of existing trees and plantings indicated to remain, which establishes preconstruction conditions that might be misconstrued as damage caused by construction activities.
1. Use sufficiently detailed photographs or videotape.
 2. Include plans and notations to indicate specific wounds and damage conditions of each tree or other plants designated to remain.

1.5 QUALITY ASSURANCE

- A. On-site Arborist (individual) Qualifications: An arborist certified by the International Society of Arboriculture (ISA) and licensed in the jurisdiction where project is located. All work performed by Contract Arborist including any oversight and documentation work, shall be performed or directly supervised by at least one on-site arborist with these minimum qualifications.
- B. Contract Arborist Firm Qualifications:
1. Contract Arborist Firm shall comply with the following:
 - a. Established business with documented experience of at least five years.
 - b. Experience working on a minimum of three commercial, nongovernmental or governmental projects where similar tree preservation programs have been successfully implemented.

- c. Properly licensed and insured to perform arboricultural work in the jurisdiction where the project is located.
 2. Provide names of each individual to comply with the following:
 - a. Minimum BS degree in forestry, arboriculture, or related field
 - b. Certification by ISA (Certified Arborist or Board Certified Master Arborist)
 - c. Resumes should reflect combined 10 years full time experience on similar tree preservation projects.
 - d. Provide individual(s) names, certifications, and each anticipated role in this project. "Role(s)" shall be defined as one or more of the following:
 - i. Project Manager
 - ii. Technical oversight
 - iii. Field Arborist / Technician
 3. For each staff member, list a minimum of three construction projects and a minimum three years experience in the following technical applications:
 - a. Soil amendment prescriptions and applications
 - b. Supersonic Air Tool Excavations for underground utilities exceeding 24" depth
 - c. Root Protection Matting or similar applications
 - d. Root Aeration Matting or similar applications
 - e. Construction oversight and monitoring on large projects
 - f. Coordination of arboricultural activities with construction project managers on large projects
 - C. Publications listed herein are part of this work to extent referenced:
 1. ANSI A300 Standard Practices for Trees, Shrubs, and Other Woody Plant Maintenance
 2. Part 1-2001, Tree Pruning;
 3. Part 2-3004, Fertilization;
 4. Part 3-2000, Cabling, Bracing, Guying of Established Trees;
 5. Part 4-2002, Lightning Protection Systems.
 6. ANSI Z133.1 - 1994 and most recent updates, Tree Care Operations - Safety Requirements
 - D. Fertilizer and pesticides will be applied in strict accordance with the manufacturers label instructions and applicable federal, state, and local requirements. Fertilizer, soil conditioners, and pesticide applications must be approved by the owner prior to application. Material Safety Data Sheets (MSDS) will be available for fertilizers and pesticides in the Contract Arborists' possession while on the site.
 - E. Pre-Construction Meeting: Conduct meeting at the project site prior to commencement of any project related site activities.
 1. Contract Arborist, Project Arborist, Project Design Team, Owner and Contractors shall attend.

2. Review methods and procedures related to tree protection and preservation including, but not limited to, the following:
 - a. Construction schedule - verify availability of materials, personnel, and equipment needed to make progress and avoid delays.
 - b. Enforcement of requirements for tree protection areas
 - c. Responsibilities of all parties, including coordination, access and timing requirements
 - d. Field quality control

1.6 PROJECT CONDITIONS

- A. The following practices are prohibited within all tree protection areas except as specifically indicated herein:
 1. Storage or stockpiling of construction materials, fuels, chemicals, debris, or excavated materials
 2. Parking vehicles, trailers, generators or equipment
 3. Foot traffic
 4. Erection of sheds or structures
 5. Impoundment or discharge of water
 6. Excavation or other digging unless otherwise indicated
 7. Attachment of signs or other materials to, or wrapping materials around trees or plants unless otherwise indicated
- B. Do not direct vehicle or equipment exhaust toward protection zones.
- C. Prohibit heat sources, flames, ignition sources, and smoking within or near protection zones and organic mulch.

PART 2 - PRODUCTS

2.1 MATERIALS

- A. Temporary Root Protection Matting (RPM): geocomposite material comprised of a tri-planar geonet structure with thermally bonded nonwoven geotextiles on both sides.
 1. Material shall be SynTec ROADRAIN T-7 or approved equivalent.
 2. AlturnaMATS® or 1" thick steel plates may be used in lieu of RPM.
 3. Submit shop drawings / cut sheets and material samples for review by Project Arborist and project civil.
 4. Wood chip mulch and/or gravel is required with these materials.
- B. Temporary Trunk/Limb Protection Wrap: to provide specific protection to tree trunks when construction activities are expected to be in close proximity.
 1. Material shall be SynTec ROADRAIN T-7 or approved equivalent.
 2. Alternative methods and materials may be submitted for review.

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- C. Permanent Root Aeration Matting (RAM): geocomposite material comprised of a tri-planar geonet structure with thermally bonded nonwoven geotextiles on both sides.
1. Material shall be SynTec ROADRAIN T-7 or approved equivalent.
 2. Submit shop drawings / cut sheets and material samples for review by Project Arborist and project civil.
- D. Temporary Tree Protection Fence
1. Chain-Link Fence: Galvanized steel chain-link fence fabric of 10- 11 gauge wire fabric; 6 feet high; with 1.9-inch- diameter line posts; 2-3/8-inch- diameter terminal and corner posts; with tie wires, hog ring ties, gates, and other accessories for a temporary fence system.
 2. Welded Wire Fence: 48” ht, 14 gauge, 4”x2” galvanized fabric with 6’ steel T-posts, metal wire clips, tree protection signs.
- E. Silt Soxx - Woven Silt Tube-three-dimensional tubular sediment control and storm water runoff filtration device typically used for perimeter control of sediment and soluble pollutants (such as phosphorus and petroleum hydrocarbons), on and around construction activities.
1. Refer to manufacturer’s instructions for materials and installation: www.filtrexx.com or equivalent.
- F. Wood Chip Mulch
1. Double ground hardwood, aged a minimum 6 months from production, free from deleterious materials. Green chips, chips from alien invasive species, or mulch aged less than 6 months shall not be used. Walnut mulch shall not be used. Submittal shall include original material source(s), number and type of grindings / chippings, duration of aging, timing of turning /aeration.
- G. Hardwood Destructive Borer /Beetle Control: Bifenthrin, such as *Onyx* or equivalent. Applied per label.
- H. Tree Growth Regulator (*Paclobutrazol*)
1. Paclobutrazol is a compound used to regulate plant growth in such a way as to restrict canopy growth and free stored or produced energy for other uses in the tree. For highly impacted trees, this means more energy may be made available for fibrous root growth (to combat root loss), thicker darker leaves (allowing for increased photosynthesis, and increased drought tolerance), and pest suppression (often an issue with construction stressed trees); among countless other potential benefits. Trade name Cambistat® or equal.
- I. Soil Care/Soil Amendments
1. Fertilizer and soil amendment selection shall be based upon soil test results and recommendations.
- J. Mycorrhizal fungi:
1. Soil conditioner, beneficial mycorrhizal fungi and bacteria with the following minimum live spore or live bacteria count:
 - a. VA Endomycorrhizal Fungi: 300 spores Vesicular Arbuscula fungi/ 60z
 - b. Pt Ectomycorrhizal Fungi: 40 million spores Pisolithus tinctorius fungi/ 6 0z
 - c. Nitrogen fixing bacteria: Approximately 100 million per pound

- d. Phosphorous Solubilizing bacteria: Approximately 100 million per pound
 - e. Growth Promoting Bacteria: Approximately 100 million per pound
 - 2. Soil conditioners shall include humic acid (30% by weight), complex carbohydrates, dried yeast, amino acids, yucca plant extract, sea kelp and Terra-Sorb.
 - 3. Mycorrhiza shall be Mycor Tree, Root Saver, as manufactured by Plant Health Care, Inc. Pittsburgh, PA; 800 421 9051 or approved equal.
- K. Expanded Shale:
- 1. Rotary kiln expanded shale or slate, ASTM C-330-89. No by-product slags or cinders permitted.
 - 2. Non-corrosive with less than 100 PPM chloride.
 - 3. Sieve Size: 3/8" - #8
- | <u>Sieve Designation</u> | <u>Percent Passing</u> |
|--------------------------|------------------------|
| 3/8 inch | 100% |
| #4 | 77% |
| #8 | 47% |
| #16 | 30% |
- 4. Dry loose unit weight shall be less than 55 Lb./cf. (880 kg/m3)
 - 5. Expanded shale shall be "Solite" as manufactured by Solite Corporation, Richmond, Va., or approved equal.
- L. Organic Matter:
- 1. Leaf matter and yard waste composted sufficiently to break down all woody fibers, seeds and leaf structures, free of toxic and non-organic matter. Organic Matter shall be commercially prepared compost "Uaja Compost" by Bluemont Quarry or "Leaf Gro Compost" or approved equal. Submit a one-pound sample and supplier's literature for approval.
- M. Soil Decompaction Backfill Mix:
- 1. A mixture of two parts Expanded Shale, one part Organic matter. To the mix, add Mycorrhiza and fertilizer at rates as recommended by the Mycorrhiza manufacturer. Mycorrhiza and fertilizer shall be added to the mix just prior to pouring the mixture into the vertical mulch hole.

PART 3 - EXECUTION

3.1 TREE REMOVAL

- A. All trees and shrubs or hedges designated for removal shall be marked in red for review and approval by Engineer.
- B. All trees designated for removal, shall be taken down sectionally, or directionally felled to minimize damage to adjacent tree canopies or root systems by a qualified Contract Arborist. Gouges in turf from impacts shall be filled with topsoil and seeded at the direction of the Owner. Damage to

adjacent trees shall be reviewed by Project Arborist and Owner for remedial recommendations or replacement.

- C. All work shall be done by hand, bucket truck or crane operated equipment.
- D. Motorized equipment shall operate on existing pavement and not enter tree preservation areas without prior approval. Temporary root protection matting may be required for such access to prevent rutting and compaction.
- E. Stumps shall be ground to 8” below grade and grindings raked and removed from site; backfill holes with approved topsoil and mulch or seed per Owner. Coordinate with underground utilities locators prior to grinding. All stump grinding shall be performed by the Contract Arborist.
 - 1. For tree pits where a new tree is proposed, the stump may be ground out completely (as determined by the Contract Arborist) to allow the proposed tree to be planted. Backfill as above.
 - 2. Only trees with stumps within deep excavations may have stumps removed by excavator. Stump excavation to be performed by Site Contractor and under the direct supervision of the Contract Arborist.
- F. Removal of shrubs and hedges designated for removal for each phase shall be cut and stumps ground out or hand dug to remove stumps. Prior to removal, verify with Engineer.
- G. Remove all wood debris from site promptly. All wood debris shall be removed by each day unless directed otherwise by Owner.

3.2 TREE PROTECTION AND STRESS REDUCTION MEASURES

- A. General
 - 1. Refer to the TPAK for specific measures determined for each tree.
 - 2. Installation/implementation of the following measures shall be performed in the field by an ISA Certified Arborist as provided by the Contract Arborist.
 - 3. All work, substitutions and/or modifications shall be subject to review and approval by the Owner and Project Arborist.
 - 4. All work shall conform to applicable federal, state and local regulations and industry standards.
 - 5. The Contract Arborist shall be responsible for all items in this section.
- B. Coordination of Temporary Tree and Plant Protection and Transplants. The work of the Contract Arborist coordination to include but not limited to the following:
 - 1. Existing underground utility marker conflicts brought to the attention of the Contractor for resolution as well uncovered underground utilities as a result of work.
 - 2. Coordinate necessary survey layout of proposed construction elements in order to provide accurate locations for tree protection measures.
 - 3. Layout location of designated tree protection based upon proposed construction and methods of construction for that area.
 - 4. Site walk with Project Arborist and Site Superintendent to verify location of all tree protection measures prior to execution.

5. Notify Site Superintendent and Project Arborist if construction adjacent to tree protection does not appear to follow specifications or prior agreement or conflicts with tree protection seem eminent.
 6. Coordinate with Site Superintendent, Construction Managers, Owner, and Security for access of deliveries, crews, equipment, start up, and clean up of each item of work.
 7. Provide “as built” of any change to location of tree protection.
 8. Attend progress meetings as requested.
 9. Provide submittals as required.
 10. Notify Superintendent and Project Arborist of any breach or damage to tree protection requiring attention
- C. Pruning and Supportive Cabling
1. Specific canopy pruning for tree health, risk reduction, and construction clearance per Plan documents.
 2. Size, health, species, and impact from proposed construction will be taken into consideration in determining pruning type for each designated tree. Risk Reduction Pruning will remove dead, dying, and declining limbs 2” diameter and larger. No interior green branching including sprouts will be removed unless approved by Project Arborist.
 3. Contractor, Contract Arborist, and Engineer shall meet at site to determine overhead clearance conflicts between trees and construction equipment/activities to prevent breakage, impacts, or aesthetic concerns. Project Arborist may be consulted if questions arise.
 4. All work shall conform to ANSI A-300 arboricultural standards. An aerial assessment shall be made for all trees climbed to report any structural weakness of concern to the Project Arborist and Owner.
 5. Prior to climbing any tree a risk assessment will be performed using visual, sounding, or basic drilling as needed by the Contract Arborist. Trees deemed high risk should not be climbed; alternative methods should be used and the tree reported to the Project Arborist and Owner immediately.
 6. Supportive Cabling of weak unions may be recommended by the Contract Arborist if the need is discovered during pruning operations. ANSI Standards apply. Cabling may be included only if submitted to the Engineer and Add Alts approved by the Owner.
- D. Root Prune
1. Purpose of the root pruning is to provide a more suitable cut so as to not rip or tear roots during excavations and grading with standard construction equipment. The exact location and depth along the LOD or edge of utility excavation will be determined during the layout by an ISA Certified Arborist.
 2. Root Pruning for urban sites with specimen trees or for transplanting requires the use of SSAT excavation for hand pruning. Refer to SSAT specifications in this section.
 3. Sufficient moisture is necessary for reducing the level of dust, increase work efficiency, and provide a hospitable environment for the tree roots and pedestrians.
 4. At a pre-work site inspection by the Contract Arborist more than 72 hours in advance of work start, subsurface probing to 24-36” with a tile probe or similar method will determine if sufficient soil moisture exists. If sufficient moisture is not found, immediate

coordination with the site managers shall be made to irrigate the proposed work areas. Methodology may be soaker hose, sprinklers, soaker cans with small drilled holes to release water slowly or other methods. A second follow up inspection shall be made to determine final sufficiency to begin.

5. All root pruning operations shall be performed by the Contract Arborist and directed in the field by an ISA Certified Arborist with documented experience in similar SSAT excavation and root pruning.

E. Temporary Tree Protection Fence

1. Type and placement of fence to be designated on Plans and Details.
2. Attach tree protection area signs @ 30' spacing facing construction LOD. For fence lower than 6' in height, attach minimum 3 strips glow-flagging 2' long for each fence panel.
3. Tree protection area signs shall be high visibility and all weather to last the duration of the project / phase. Phone number of responsible contact person shall be included on sign.
4. Install after root pruning if shown, and prior to demolition, clearing & excavation.
5. Install at 6"-12" outside (construction side) of the Root Prune line or within the Root Prune trench.
6. Silt fence will be outside (construction side) the tree protection fence, unless super silt fence is used in lieu of tree protection. Trenchless installation method shall be employed per Detail if Root Protection Matting is designated.
7. Exact placement of fence will be determined in walk through with Contractor, Project Arborist, Contract Arborist, Engineer and Owner.
8. Sequencing of the tree protection fence will be determined during the initial site walk. In any case, no construction activities shall occur in each phase or section until approved protection is installed.

F. Root Protection Mat (RPM)

1. The purpose of the RPM is to reduce compaction, rutting, and contamination of soils and root systems of trees to be retained should staging, temporary stockpile, or equipment access be required within the CRZ areas due to extreme site constraints.
2. RPM shall be used for all access within CRZ areas of trees to remain. Matting is not required where existing pavement or concrete will remain undisturbed.
3. Trees anticipated receiving temporary or repetitive materials staging, footing traffic, or equipment access within protected root zone are to receive RPM. Wood chip mulch 4-6" shall be installed under matting to further protect soils and roots.
4. If short duration access is needed, such as one day or less, the use of "AlturnaMATS", 1" steel plate, or approved equal may be needed to avoid rutting and compaction. These materials may be shifted and re-used as work progresses.
5. All-weather staging, stockpile, or other repetitive construction operations may require 12" stone layer over RPM to allow heavy vehicles have the potential to cause dynamic compaction yet without rutting original surface soils and roots. In this situation, the stone may be contained by silt fence or super silt fence where adjacent to or within a TPA.

6. All temporary RPM areas to be used beyond a single day or beyond continuous on site supervision of the Contract Arborist shall be surrounded by temporary tree protection fence as per specifications. For temporary staging of soils beyond 24 hours “trenchless” silt fence fabric shall be installed on the lower / downhill side or as directed by the Project Arborist.
 7. If Silt Fence is required for Erosion Control in RPM areas, installation of silt fence shall be coordinated with the Contract Arborist and must be performed by the Contract Arborist to prevent damage to tree roots from trenching operations. Erosion control socks may be used in lieu of silt fabric if approved by the Engineer.
- G. Root Aeration Matting (RAM)
1. The purpose of the RAM is to reduce compaction of existing soils and tree roots from permanent grade fills and provide separation from newly placed and compacted materials. It also provides an opportunity for air and water exchange to the existing soils where roots exist.
 2. Areas to receive RAM shall be protected from disturbance prior to the specific RAM and fill placement. Temporary Tree Protection Fence shall be used for this purpose.
 3. If temporary access is needed within RAM areas prior to the time of RAM and fill placement, a temporary placement of Root Protection Matting (RPM) with mulch shall be made to prevent soil compaction. Steel Plates or other temporary protection methods for short-term use may be used. Refer to “Root Protection Matting” in this section for additional detail.
 4. Sites shall be prepared by the Contract Arborist. Any debris shall be removed by hand. Existing soils shall remain undisturbed and un-compacted unless otherwise approved. If site preparation (grading, excavation, etc.) is needed, all work shall be done in accordance with this section. Refer to “Excavation for Proposed Sidewalk within Tree Protection Areas” in this section.
 5. RAM material shall be placed on undisturbed and un-compacted soil except as described herein. RAM placement shall be made by the Contract Arborist.
 6. RAM material shall extend to the toe of the proposed slope and “daylight”.
 7. RAM shall be pinned to the ground to prevent it from moving during fill placement. Pins shall be 12” “landscape nails” or approved alternative.
 8. Seams within the RAM placement shall overlap by at least 2’ or be connected or installed as designated by the manufacturer.
 9. Fill materials (aggregate, soil, or other approved fill) shall be placed directly on the RAM and compacted only to the minimum necessary as directed by the Engineer.
 10. RAM shall remain in place permanently and shall not be removed or disturbed by the contractor.
 11. Filter fabric (silt fence fabric) shall be installed in 2 layers as shown in the detail (not trenched) to protect the RAM core from contamination. Installation of silt fence for erosion control shall be coordinated with the Contract Arborist and must be performed by the Contract Arborist to prevent damage to tree roots from trenching operations. Erosion control socks may be used in lieu of silt fabric if approved by the Engineer.
- H. Temporary Tree Trunk and Limb Protection Wrap

1. Temporary trunk protection to cover the root flare and up to 12' height, or to the scaffold branches, or as determined for the situation.
 2. Tree trunk (or limbs, as determined by Project Arborist) shall be wrapped with geocomposite material. More than one layer may be installed to reach suitable protection from the equipment or operations designated for work in the area. Attach with banding or strong tape that will not girdle the tree during the project timeframe. No nails or other devices are to penetrate the trunk.
 3. Wrap shall be removed promptly after construction is complete.
- I. Hand Excavation within Tree Protection Areas
1. For excavation within CRZ areas of trees to remain, the intent is to minimize tree and root damage from excavation activities.
 2. Excavation shall be performed using SSAT, hand tools (shovels, etc), or other approved non-damaging method. Roots shall not be damaged by the excavation except for approved root pruning.
 3. Refer to “Supersonic Air Tool Excavation” and “Construction Oversight by Arborist” specifications in this section for additional requirements.
 4. All work shall be directly supervised by ISA Certified Arborist (provided by the Contract Arborist) in collaboration with the Owner’s trades and sub-contractors.
 5. RPM shall be installed along trench sides to allow for temporary soil stockpile and access.
 6. Excavate along the edge of the proposed trench closest to the trees to be protected as shown on the plans. Roots shall be uncovered and care taken to avoid damage to roots and bark.
 7. Contract Arborist shall prune the exposed roots. Excavation shall not extend beyond the line where roots were pruned.
 8. Contractor may proceed with conventional excavation methods or with hand excavation methods if clearance to the tree is inadequate for equipment access.
 9. No roots may be cut by the contractor.
- J. Supersonic Air Tool (SSAT) Excavation
1. Refer to “Hand Excavation within Tree Protection Areas” specification in this section for additional requirements.
 2. At a minimum, all SSAT work shall include the use of a barrier system such as temporary walls or tents to protect property and pedestrians from flying debris.
 3. Excavate along the edge of the proposed trench closest to the trees to be protected as shown on the plans. Roots shall be uncovered and care taken to avoid damage to roots and bark.
 4. Excavation shall proceed per the “Hand Excavation within Tree Protection Areas” specification in this section.
- K. Special Demolition of Hardscape within Tree Protection Areas
1. Sidewalks and other hardscape items to be removed from within Tree Protection Areas (TPAs) shall be removed under direct supervision of the Contract Arborist. Site restoration, if required, shall also be supervised by the Contract Arborist.

2. No mechanized equipment shall enter the TPAs. All work shall be either done by hand (with hand-operated equipment such as jackhammers) or with equipment staged outside the TPA. Alternatives for specific situations shall be reviewed by Project Arborist and Engineer.
 3. Sequence of work shall be reviewed and coordinated with the work of the Contract Arborist by the construction manager, contractor, Contract Arborist, Project Arborist, Engineer, and owner as appropriate for the project. Methods of protection of overhead branches, trunks, and roots shall be reviewed. Refer to specifications for approved methods of temporary wrapping, or selective pruning.
 4. Small equipment may operate upon existing hardscape or upon designated root protection matting if approved by the Project Arborist and Engineer. All staging or stockpiling of materials shall occur outside the TPA.
 5. Demolition of paving shall not damage protected roots outside the limit of work nor below existing hardscape. Approved options include jackhammer and pick up by hand or break up by small excavator operating upon existing hardscape. Once hardscape is removed, no equipment shall operate upon stone base unless inspected and approved by arborist as roots may have grown into base below hardscape.
 6. Refer to “Hand Excavation within Tree Protection Areas” and “Supersonic Airtool Excavation” specifications in this section.
- L. Excavation for Proposed Sidewalk within Tree Protection Areas
1. Excavation for site preparation shall be done by SSAT or by hand.
 2. Excavation shall be done by the Contract Arborist or with direct supervision by the Contract Arborist.
 3. Excavation for base preparation shall not damage tree roots, trunks or branches. Areas shall be assessed for overhead clearance prior to commencement.
 4. Excavation shall be the minimum necessary to achieve the required grades for the new sidewalk section. Sidewalk section and required grades shall be determined by the Engineer.
 5. Root Aeration Matting (RAM) shall be installed once lowest grade is reached and aggregate base for sidewalk section shall be placed on this RAM. Ram must “daylight” out at the toe of the final proposed fill slope. Refer to “Root Aeration Matting” specifications in this section.
 6. Compaction of the new aggregate base shall be the minimum necessary as dictated by the Engineer.
 7. Refer to “Hand Excavation within Tree Protection Areas” and “Supersonic Airtool Excavation” specifications in this section.
- M. Wood chip mulch
1. Mulching for the duration of construction for protection and stress reduction. Mulching will increase moisture-holding capacity, minimize soil compaction, and increase needed organic composition.
 2. Mulch area options:
 - a. For individual trees designated on the TPAK within the TPA or curvilinear TPA install mulch to a radius equal to trunk diameter inches equated to mulch ring diameter in feet (24” trunk diameter = 24’ diameter mulch ring). Where

- planting pit areas are restricted by hardscape or other restrictions, mulch the greatest area possible.
- b. For linear TPAs along LOD Install mulch strips a minimum 10' wide the length of critical root zones along the outside of the LOD/ Root Prune line (just inside the Tree Protection Zone) for designated significant trees impacted by proposed construction.
 - c. Either option may be used as appropriate for the area.
3. For privately owned trees, any installation is contingent upon receipt of owner's permission. Owners may decline.
 4. Motorized equipment shall not enter the TPA unless specifically approved by the Project Arborist and specific conditions met (RPM, AlturnaMATS, etc). Any such motorized equipment shall be operated by a certified arborist while inside the TPA.
 5. Do not allow mulch to contact trunk/ root flare.
 6. Mulch depth shall be 3" – 4".
 7. Mulch shall remain for the duration of construction and may remain permanently if the owner approves.
 8. If the mulch is to be removed after construction, it must be removed by hand only. No equipment may be used.
- N. Tree Growth Regulator (*Paclobutrazol*)
1. Paclobutrazol is a compound used to regulate plant growth in such a way as to restrict canopy growth and free stored or produced energy for other uses in the tree. For highly impacted trees, this means more energy may be made available for fibrous root growth (to combat root loss), thicker darker leaves allowing for increased photosynthesis, and increased drought tolerance.
 2. Specific methods and dosages are contained on the label and are determined by size and species, and applied by a state licensed pesticide applicator. Designated trees are shown on the TPAK.
- O. Supplemental Watering
1. This action is for high impact trees of significance during seasonal drought times of project construction. Based upon the number and size of trees various strategies can be considered to maintain adequate soil moisture during these times. These strategies may include but are not limited to the following:
 - a. Fire hydrant connection battery powered timer and drip irrigation hose / tubing
 - b. Water tank trunk and hand applied as directed;
 - c. Temporary above grade poly tank with battery-powered timers for drip or soaker hoses at each TPA.
 - d. 30-50 gallon watering cans with 6-8 drilled holes in bottom to allow slow seeping of water; spacing and rotation to reach desired gallons. Equivalent means of effectively watering trees as approved by Engineer or Project Arborist

2. Trees requiring this treatment are indicated in the TPAK. Other trees will not receive this treatment.
 3. Drought times shall be defined as:
 - a. Periods during the growing season of two weeks or longer, where daytime high temperatures reach 80 degrees Fahrenheit or higher and less than ¾" rainfall is recorded per week. Or,
 - b. Periods during the growing season designated as "abnormally dry" or "drought" of any severity, by the U.S. Drought Monitor: (<http://www.drought.unl.edu/dm/monitor.html>). Or,
 - c. Any period of extraordinary circumstance, as determined by the Project Arborist or Owner.
 4. A prescription for the number of gallons and strategy for watering designated trees will be developed. Large mature trees with impacts to root systems require as much as 100-250 gallons per week during 90 degree days during summer drought times.
 5. Periodic inspections by an ISA Certified Arborist (provided by the Contract Arborist) at this time are critical. Depth of moisture in soils shall be determined by soil sample tube or other exploratory means.
 6. Minimum watering shall be considered to be 6 applications per growing season typically July thru October with the exact timing and duration to be determined by the ISA Arborist in conjunction with the Engineer. Additional unit costs per watering designated trees at prescribed rates one time.
- P. Overhead Clearance
1. Trees to remain shall be assessed prior to construction for overhead clearance for construction activities. Contract Arborist shall recommend either canopy pruning, temporary guying/tying of select limbs, or alternative construction methods.
 2. Pruning for clearance shall not remove branches above 12' or over 6" diameter.
 3. All pruning proposed by the Contractor and/or Contract Arborist shall first be reviewed and approved by the Owner and Project Arborist.
 4. Equipment exhaust should be directed away from trees as much as possible. Stationary equipment shall not exhaust directly under or towards trees.
 5. Contractor shall use appropriate equipment near trees to ensure that trees are not damaged by construction. Contractor shall provide any specialized equipment needed at no additional cost to the owner.
 6. Any pruning shall also conform to the pruning specifications in this section.
- Q. Soil Tests and Soil Care/Fertilization
1. Initial soil testing within tree protection areas is required. Conduct individual soil tests for separate tree protection areas (small adjacent areas may be tested together). Soil test shall be a representative sample from each area. Soil testing shall include a texture analysis (sand, silt, and clay percentages), soluble salts, and sodium tests.
 2. Treatments to the tree protection areas for specified trees (see TPAK) shall be based on the results of the soil analysis. Fertilization should be consistent with the recommendations of the ANSI A-300 (Part 2) Tree, Shrub, and Other Woody Plant Maintenance – Standard Practices (Fertilization) 2004, except as described herein.

3. Application rates shall not exceed a rate of 1 pound of actual nitrogen per 1,000 square feet annually.
 4. Fertilizer used should include humic acids, soluble seaweed extracts and soil biological inoculants (mycorrhizae, etc.). Applications to confined areas (i.e. street tree planting pits) should be made by soil injection. In areas where adequate application rates cannot be achieved, injection should be made to the point of refusal.
- R. Soil Decompression with SuperSonic Airtool (SSAT) within CRZs of Designated.
1. This work is typically prescribed for urban park or campus trees where existing compacted soils and associated trees will benefit. It involves pneumatic de-compaction in the upper soils using Supersonic Air tools (SSAT) by trained and qualified arborists.
 2. This work may be also prescribed as "Contingency or Remedial Work" due to unwarranted construction incursion into the protected TPAs.
 3. This work has several benefits:
 - a. Allows prior root damage open to examination.
 - b. Allows the arborist get a "feel" for the soil layers, level of quality, contamination, and composition.
 - c. Provides vertical and horizontal aeration to compacted soils
 - d. Allows backfill of suitable organic compost and aggregate amendments
 4. Refer to plan drawings for indicated area / trees for this work. The Contract Arborist shall layout the boundaries with wire flagging for review by the Architect and Project Arborist. The Architect and Project Arborist shall review the startup of work and determine any adjustments to the width, depth, or approach.
 5. The work consists of using the SSAT in a parallel series of linear trenches to fracture the upper soil layers down to significant root zones. The size of the trench is generally 12-15" deep and 9-12" wide, although fracturing of horizontal soil layers may extend beyond this dimension. .
 6. Do not perform this operation during drought months without adequate supplemental moisture in order to reach a minimum of 50% field capacity prior to the work. Pre-start up testing of soil shall be done using a sharp probe, surveyors pin or long screwdriver. Penetration should meet 10" depth with hand probing only.
 7. Do not dispose of the excavated soils. Dispose of exposed trash or debris encountered. Mark exposed utilities and irrigation lines.
 8. Soil amendments shall be worked into the trenches during the SSAT work to mix and distribute the material or spread and then "stirred" with the SSAT to mix into existing soils. Backfill each trench prior to the end of workday unless approved otherwise by the Architect and Project Arborist.
 9. Rough grading with hand rakes shall be done by the Landscape Contractor unless otherwise directed by the Architect or Owner.
 10. Refer to the MATERIALS section for the amended backfill.
- S. SSAT Landscape Planting Excavation

1. Proposed landscape planting of B&B plants within critical root zones within TPAs shall be reviewed by the Contract Arborist, contractor, and owner in the field to determine potential for damage to priority roots of select trees and layout the limit of work.
2. Pre-watering of the proposed areas of excavation during summer and fall months is recommended to maintain root / soil moisture.
3. The Contract Arborist shall provide a qualified arborist crew experienced with the SSAT and landscape planting excavation to protect adjacent natural resources and construction work, open the excavation, hand prune minor roots, and identify and protect priority roots to remain. Coordination with the appropriate sub-contractor shall be made to determine appropriate width, depth, and sequencing.

3.3 FIELD QUALITY CONTROL AND MONITORING

A. Tree Condition Monitoring

1. An ISA Certified Arborist (provided by the Contract Arborist) shall perform monitoring twice per month year round to monitor insects, disease, soil moisture levels, weather, and health changes on all trees designated on Tree Protection Action Key.
2. The monitoring will include a report that details problematic areas that have been addressed, treatments provided to reduce the problem, and anticipated treatments forecast for 30 days. This report will be forwarded to the Project Arborist, Engineer and Owner for documentation.
3. Any treatments recommended by the Contract Arborist not already included in the project scope shall be noted in the reports for review by the Project Arborist, Engineer and Owner. No additional work is to be performed unless approved in writing by the Owner.

B. Construction Oversight by Contract Arborist

1. Any work within CRZs of retained trees shall be directly supervised by the Contract Arborist.
2. If roots are encountered during excavations, work shall progress as directed by the Contract Arborist. Contract Arborist, in coordination with the construction and design teams, shall determine appropriate means and methods to address the roots. Options may include, but not be limited to, severing the roots, hand or SSAT excavation. Contractor shall not cut roots.
3. Refer to “Hand Excavation within Tree Protection Areas” specification in this section.
4. All work shall be documented thoroughly, including photo documentation. Refer to site documentation submittal requirements.

3.4 CONTRACTOR DAMAGES AND PENALTIES

A. Remedial Measures

1. Any damage caused to the trees by the work of this contract through negligence by the contractor shall be immediately remedied by the contractor. Contractor shall be responsible for any associated costs.
2. Remedial work may include pruning, cabling, or any other measures up to and including removal and replacement, as determined by the Project Arborist and Engineer.

3. Remedial work shall be performed by the Contract Arborist, as approved by the Project Arborist and Engineer.
 4. All required remedial work shall be performed to the satisfaction of the Project Arborist and Engineer, at no additional cost to the owner.
- B. Tree Replacement
1. If damage to any tree is severe, because of negligence by the contractor as determined by the Project Arborist and Engineer, it shall be replaced with a new tree of equal size caliper and species as that of the damaged tree.
 2. If a replacement tree of equal size caliper is not possible as determined by the Project Arborist and Engineer, it shall be replaced on an inch for inch basis with new trees of a minimum caliper size of 2-3”.
 3. Replacement trees shall be supplied and installed at no additional costs to the owner, including all incidental costs including the costs of inspection of the tree at the nursery and any other incidental costs associated with tree replacement.

PART 4 - METHOD OF MEASUREMENT AND BASIS OF PAYMENT

4.1 MEASUREMENT AND PAYMENT

- A. There shall be no separate measurement for payment for work under this Section. The cost of this work shall be included in the lump sum bid for this project.

END OF SECTION

SECTION 02938 - PLANTING

PART 1 - GENERAL

1.1 RELATED DOCUMENTS

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

1.2 SUMMARY

- A. This Section includes the following:

1. Tree, shrub, groundcover, perennial and bulb installation.
2. Fertilizing, mulching, trimming, guying, wrapping and edging.
3. Maintenance of installed plant material.
4. Warranty.

- B. Related Sections: The following Sections contain requirements that relate to this Section:

1. Division 2 Section 02221“Trench Excavation , Backfilling and Compaction” for excavation, filling, rough grading, and subsurface aggregate drainage and drainage backfill.
2. Division 2 Section 02936“Turf and Grasses” for coordination with lawn establishment.
3. Division 2 Section 02940 “Landscape Maintenance” for plant material maintenance.

1.3 REFERENCES

- A. American Joint Committee on Horticultural Nomenclature Publication: Standardized Plant Names.
- B. ANSI Z60.1 - American Standard for Nursery Stock.
- C. ASTM D2607 - Classification of Peats, Mosses, Humus and Related Products.
- D. FS 0-F-241 - Fertilizers, Mixed, Commercial.

1.4 SUBMITTALS

- A. General: Submit each item in this Article according to the Conditions of the Contract and Division 1 Specification Sections.
- B. Submit complete list of plant material growers 4 weeks prior to digging of plants. List is to include names of individuals to contact, phone numbers, addresses and latest possible date for completion of tagging.
- C. Submit waterproof tags prior to tagging trip. Tags to contain following information:
1. Contractor’s name.
 2. Plant genus, species and cultivar/variety.
 3. Plant common name.
 4. Name of nursery.
 5. Size of plant.
 6. Quantity of plant (i.e. 2 of 10)

- D. Submit proposed planting schedule, indicating dates for each type of landscape work during normal seasons for such work in area of site. Correlate with specified maintenance periods to provide maintenance from date of substantial completion. Once accepted, revise dates only as approved in writing, after documentation of reasons of delay.
- E. Submit schedule of arrival of “specimen plant material”.
- F. Submit instructions for continuing Owner maintenance. Include pruning and trimming methods and types, application frequency and recommended coverage of fertilizer; and water requirements for year-round care of installed plants. Document is to be in bound 8 ½" x 11" format. Submit prior to expiration of required maintenance period(s).
- G. Submit for approval a proposed maintenance procedure and schedule of the storage of plant materials. Trees, shrubs, groundcover and perennials stored on and off site shall be maintained by watering, fertilizing, mulching, and spraying for infestation and disease to maintain these plants in a healthy condition. Plants stored off site shall be available for inspection by the Landscape Architect.
- H. Samples of each of the following:
 - 1. 5 lb (2 kg) of mulch for each type required for the Project, in labeled plastic bags.
 - 2. Edging materials and accessories to verify color selected.
- I. Qualification data for firms and persons specified in the “Quality Assurance” Article to demonstrate their capabilities and experience. Include lists of completed projects with project names and addresses, names and addresses of Landscape Architects and Owners, and other information specified.

1.5 QUALITY ASSURANCE

- A. Prior to being approved, the successful bidder will be required to submit to the Landscape Architect a statement of qualifications listing the names of contact references for at least three jobs of similar scope that have been completed in the last five years. Attention is called to the fact that the installation will not be awarded to a firm that does not possess the required technical expertise and construction organization.
- B. Allow Landscape Architect option of traveling to growers facility to select trees from available stock.
- C. Allow four weeks, after receipt of list of growers, to finish tagging trees.
- D. Trees dug prior to tagging by Landscape Architect are subject to rejection.
- E. Landscape Architect will confirm the trees satisfy the requirements of ANSI Z60.1 and all special conditions stated in project manual and drawings.
- F. Measure trees and shrubs according to ANSI Z60.1 with branches and trunks or canes in their normal position. Do not prune to obtain required sizes. Take caliper measurements 6 inches (150mm) above ground for trees up to 4-inch (100-mm) caliper size, and 12 inches (300-mm) above ground for larger sizes. Measure main body of tree or shrub for height and spread; do not measure branches or roots tip-to-tip.
- G. Unacceptable trees will not be tagged and a different Grower will be selected by Contractor at no expense to Owner. A second tagging trip will then be scheduled.
- H. Decision by Landscape Architect to forego tagging trip does not release Contractor from responsibility of obtaining plant material which meets standards and conditions stated in project manual and drawings.

- I. Minimum three years experience installing plant material of this type required of Installer.
- J. Minimum five years experience specializing in growing and cultivating the specified material is required by of Grower.

1.6 REGULATORY REQUIREMENTS

- A. Comply with regulatory requirements for fertilizer and herbicide composition.

1.7 DELIVERY, STORAGE, AND HANDLING

- A. Plant material is to be covered with tarpaulin during transport.
- B. Deliver soil conditioners and fertilizer in unopened waterproof bags showing weight, chemical analysis, and name of manufacturer. Keep materials in dry storage away from contaminants.
- C. Provide freshly dug trees and shrubs. Do not prune prior to delivery unless otherwise approved by Landscape Architect. Do not bend or bind tie trees or shrubs in such a manner as to damage bark, break branches, or destroy natural shape. Do not drop balled and burlapped stock during delivery. Protect plants until planted to prevent damage to root balls or desiccation of leaves.
- D. Deliver trees and shrubs after preparations for planting have been completed and plant immediately. If planting is delayed more than six hours after delivery, set trees and shrubs in shade, protect from weather and mechanical damage, and keep roots moist by covering with mulch, burlap or other acceptable means of retaining moisture.
- E. Provide water to staged material as required to keep root balls moist.
- F. Do not remove container-grown stock from containers until planting time.

1.8 ENVIRONMENTAL REQUIREMENTS

- A. Do not install plant life when ambient temperatures may drop below 30 degrees F or above 90 degrees F.
- B. Do not install plants when wind velocity exceeds 30 mph.
- C. Planting shall be done when the ground is not frozen, snow covered, or in an otherwise unsuitable condition for planting.
- D. Conduct planting operations during recommended planting seasons. Preferable planting season is March 15 to May 30 and October 15 to December 1, inclusive.
- E. At the Subcontractor's option and full responsibility, planting operations may be conducted under unseasonable conditions without additional compensation.

1.9 JOB CONDITIONS

- A. Locate above grade and underground utilities and perform Work in manner which will avoid damage. Hand excavate, as required.
- B. Maintain grade stakes set by others until removal is mutually agreed upon by concerned parties.
- C. Notify Landscape Architect, before proceeding, when conditions detrimental to plant growth are encountered, such as rubble fill or adverse drainage conditions.

- D. Install plants after final grades are established and prior to establishment of lawns, unless otherwise approved by Landscape Architect. If planting occurs in undisturbed lawn areas or after lawn work, protect lawn areas and promptly repair damage to lawns resulting from planting operations.

1.10 SEQUENCING AND SCHEDULING

- A. Coordinate the Work of this Section with installation of underground utilities, sodding and remainder of Work associated with this Project.
- B. Proceed with and complete landscape work as rapidly as portions of site become available, working within seasonal limitations.

1.11 MAINTENANCE

- A. Contractor shall maintain plant material until completion of two year guarantee period and Final Acceptance of work, as described in Part 3 of this Section

1.12 GUARANTEE

- A. Plants shall be guaranteed for a period of two years after the date of Acceptance by the Owner.
 - 1. When the work is accepted in parts, the guarantee periods shall extend from each of the partial acceptances to the terminal date of the last guarantee period. Thus, all guarantee periods terminate at one time.
- B. Plants shall be healthy, free of pests and disease, and in flourishing condition at the end of the guarantee period. Plants shall be free of dead and dying branches and branch tips, and shall bear foliage of normal density, size and color.
- C. Replace dead plants and all plants not in vigorous, thriving condition, as determined by the Architect during and at the end of the guarantee period, without cost to the Owner as soon as weather conditions permit and within the specified planting window.
 - 1. Replacements shall closely match adjacent specimens of the same species. Replacements shall be subject to all requirements stated in this Specification.
 - 2. Make all necessary repairs due to plant replacements. Such repairs shall be done at no extra cost to the Owner.
 - 3. The guarantee of all replacement plants shall extend for an additional one year period from the date of their acceptance after replacement. In the event that a replacement plant is not acceptable during or at the end of the said extended guarantee period, the Owner may elect one more replacement or credit for each item.
- D. At the end of the guarantee period, and no less than five days prior to final inspection, staking and guying materials, and tree wrap and ties shall be removed from the site.
- E. All bulbs shall be guaranteed to bloom vigorously the first respective blooming season after planting. Bulbs that do not bloom shall be replaced. Replacement costs shall be borne by the Landscape Contractor.

1.13 FINAL INSPECTION AND FINAL ACCEPTANCE

- A. At the end of the two year guarantee period, the Architect will, upon written notice of guarantee period inspect the work for Final Acceptance. Requests shall be received at least ten calendar days before the anticipated date for Final Inspection.
- B. Upon completion and reinspection of full repairs or replacements necessary in the judgment of the Architect at that time, the Architect will recommend to the Owner that Final Acceptance of the Work of this Section be given.

PART 2 - PRODUCTS

2.1 TREES, SHRUBS, GROUND COVER AND BEDDING PLANTS

- A. Plant material to be nursery grown stock conforming to ANSI Z60.1.
- B. Publication for Standardized Plant Names will govern nomenclature issues.
- C. Plans will supersede planting material schedule where a discrepancy in quantity occurs.
- D. Provide plant material which is well branched and formed, sound, vigorous, healthy, and free from disease, sun-scald, windburn, abrasion, and harmful insects, eggs, larvae and such defects as knots sun scald, injuries, abrasions and disfigurement, and shall have healthy, normal, and unbroken root systems.
- E. Provide symmetrically developed plant material, of uniform habit with straight boles and free from objectionable disfigurements. Tree leader shoots shall not be cut or broken.
- F. Where formal arrangements or consecutive order of trees or shrubs are shown, select stock for uniform height and spread, and label with number to assure symmetry in planting.
- G. Provide vigorous ground covers and vines with number and length of runners and clump size specified and proper age for the grade of plants specified. Use only vines and ground cover plants well established in removable containers, integral containers, or formed homogeneous soil sections.
- H. Plants shall have been grown in the same or colder climatic zone of this project.
- I. Provide plants according to measurements indicated. Measure sizes before pruning and with branches in normal position. Plants larger in size than specified may be used as approved.
- J. Spray plants, budding into leaf or having soft growth, with an anti-desiccant at the nursery or collecting field before digging.

2.2 SOIL AMENDMENT MATERIALS

- A. See section 02939 Topsoil and Planting Mix

2.3 MULCH MATERIALS

- A. Shredded, dark brown/black, native hemlock mulch free of growth or germination inhibiting ingredients.

2.4 MISCELLANEOUS MATERIALS

- A. Anti-Desiccant: Emulsion type, film-forming agent, designed to permit transpiration but retard excessive loss of moisture from plants. Deliver in manufacturer's fully identified containers and mix in accordance with manufacturer's instructions.
- B. Aluminum Edging: Edging shall be 3/16" x 6" aluminum painted black . Edging shall be installed according to manufacturer's instructions.

PART 3 - EXECUTION

3.1 EXAMINATION

- A. Verify site is ready to accept Work of this section.
- B. Test drainage of plant beds and pits by filling with water twice in succession. Notify Landscape Architect of conditions permitting the retention of water in planting beds for more than twenty-four (24) hours.
- C. Prior to the excavation of planting pits, or placing tree stakes, the Contractor shall ascertain the location of utility lines, electric cables and conduits, so that proper precautions may be taken not to disturb or damage subsurface improvements. Should obstructions be found, the Contractor shall promptly notify the Landscape Architect.
- D. Beginning of installation means acceptance of existing conditions.

3.2 PREPARATION OF PLANT PITS AND BEDS

- A. Plant Pits: Dig to produce vertical sides and flat, undisturbed bottoms. Scarify glazed side surfaces of pits. Size plant pits as shown on drawings.
- B. Shrub masses, hedges, groundcover and perennial beds shall be entirely excavated edge to edge and backfilled with specified backfill mixture; they shall not be treated as individual planting pits.
- C. Remove all sticks, stones, roots and other objectionable materials during tilling operations larger than one inch in diameter.
- D. Damage to paving, sidewalks or other materials shall be removed and replaced at the Contractor's expense and to the satisfaction of the Landscape Architect.

3.3 LAYOUT

- A. Stake tree and shrub locations with 3/4" x 2" x 18" wood stakes driven into the soil at center points of plants. Paint tops of stakes representing tree locations a color different from the stakes locating shrubs. Contractor may stake continuous uninterrupted straight runs of shrubs at each end. Outline ground cover beds.
- B. Mark all underground utilities.
- C. Notify Owner's Representative, in writing, of portions of plant material which have been staked. Allow one week for Landscape Architect to review and adjust stake locations.
- D. Plants which are planted prior to contractor receiving Landscape Architect's approval of staking and bed outlines are subject to being relocated at no cost to Owner.

3.4 PLANTING

- A. Setting Plants: Handle balled and burlapped and container-grown plants by ball or container. Set plants and hold in plumb position until sufficient soil has been firmly placed around roots or ball. Set plants in relation to surrounding grade so that they are even with depth at which they were grown in nursery, collecting field, or container.
- B. Place fertilizer prior to backfilling and in accordance with the manufacturer's recommendations. Ground cover plants may be planted after mulch is in place. Take care to avoid contaminating mulch with planting soil.
- C. Backfill excavations for balled and burlapped stock with planting soil mixture to approximately half the depth of the ball and then tamp and water. Carefully remove, open or fold back burlap and tying materials. Completely remove plastic wrap before the placement of backfill. Finish backfilling and tamp. Form earth saucers around isolated plants of size ample enough to hold at least 2-1/2 gallons for shrubs or 5 gallons for trees. Do not use planting stock if ball is cracked or broken before or during planting operation.
- D. Bulbs shall be planted in the locations and at the spacing indicated on the Drawings. Plant bulbs at the depths and orientation recommended by the Supplier. Do not remove the leaves until after they have lost their green color. Remove leaves by cutting.

3.5 FERTILIZATION, WATERING, EDGING, AND MULCHING

- A. Trees, Shrubs and perennials: Fertilize according to manufacturer's recommendations.
- B. Ground Cover Beds: Topdress beds
- C. Watering: Provide uniform coverage which will not cause erosion or damage to the finished surface. Water sufficiently to penetrate the planting bed to a depth of 4 inches.
- D. Uniformly edge beds or individual plants using a sharp tool to provide a clear cut division line between the planted area and the adjacent lawn. Refer to drawings for bed shape. Provide plant pits circular in shape for individual pits.
- E. Mulch within 24 hours after planting. Spread to uniform thickness as indicated on drawings.

3.6 PLANT SUPPORT

- A. Tree Anchors: Playtpus Tree Anchoring System - Rootball Fixing or approved equal. Size anchors based on tree caliper size. Install per manufacturer's instructions.

3.7 PRUNING AND REPAIR

- A. Plants shall be neatly pruned and or clipped to preserve the natural character of the plants (with exception to clipped shrub hedges); in a manner appropriate to the particular requirements of each plant and to the satisfaction of the Landscape Architect. Unless otherwise directed by Landscape Architect, do not cut tree leaders; remove only injured or dead branches.
- B. Remove broken or badly bruised branches with a clean cut. All pruning shall be done with sharp tools in accordance with instructions of the Owner. Accidental damage to trees occurring during the course of planting operations which is not so great as to necessitate removal of a branch or replacement of a plant shall promptly be treated as required in accordance with recognized horticultural practices.

3.8 CLEANING

- A. Keep worksite in clean and orderly condition as Work progresses. Leave worksite "broom clean" at end of Work.

3.9 MAINTENANCE

- A. See Section 02940 Landscape Maintenance

PART 4 - METHOD OF MEASUREMENT AND BASIS OF PAYMENT

4.1 MEASUREMENT AND PAYMENT

- A. There shall be no separate measurement for payment for work under this Section. The cost of this work shall be included in the lump sum bid for this project.

END OF SECTION

SECTION 02939 – TOPSOIL AND PLANTING MIX

PART 1 - GENERAL

1.1 RELATED DOCUMENTS

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

1.2 SUMMARY

- A. Section includes:
 - 1. Planting soils specified by composition of the mixes.
 - 2. Testing and amending of existing topsoil.
 - 3. Spreading of topsoil.
- B. Related Requirements:
 - 1. Section 02100 "Clearing and Grubbing" for topsoil stripping and stockpiling.
 - 2. Section 02936 "Turf and Grasses" for turf and grasses.
 - 3. Section 02938 "Planting" for trees and groundcover.

1.3 DEFINITIONS

- A. AAPFCO: Association of American Plant Food Control Officials.
- B. Backfill: The earth used to replace or the act of replacing earth in an excavation. This can be amended or unamended soil as indicated.
- C. CEC: Cation exchange capacity.
- D. Compost: The product resulting from the controlled biological decomposition of organic material that has been sanitized through the generation of heat and stabilized to the point that it is beneficial to plant growth.
- E. Duff Layer: A surface layer of soil, typical of forested areas, that is composed of mostly decayed leaves, twigs, and detritus.
- F. Imported Soil: Soil that is transported to Project site for use.
- G. NAPT: North American Proficiency Testing Program. An SSSA program to assist soil-, plant-, and water-testing laboratories through interlaboratory sample exchanges and statistical evaluation of analytical data.
- H. Organic Matter: The total of organic materials in soil exclusive of undecayed plant and animal tissues, their partial decomposition products, and the soil biomass; also called "humus" or "soil organic matter."

- I. Planting Soil: Existing, on-site soil; imported soil; or manufactured soil that has been modified as specified with soil amendments and perhaps fertilizers to produce a soil mixture best for plant growth.
- J. RCRA Metals: Hazardous metals identified by the EPA under the Resource Conservation and Recovery Act.
- K. SSSA: Soil Science Society of America.
- L. Subgrade: Surface or elevation of subsoil remaining after excavation is complete, or the top surface of a fill or backfill before planting soil is placed.
- M. Subsoil: Soil beneath the level of subgrade; soil beneath the topsoil layers of a naturally occurring soil profile, typified by less than 1 percent organic matter and few soil organisms.
- N. Surface Soil: Soil that is present at the top layer of the existing soil profile. In undisturbed areas, surface soil is typically called "topsoil"; but in disturbed areas such as urban environments, the surface soil can be subsoil.
- O. USCC: U.S. Composting Council.

1.4 PREINSTALLATION MEETINGS

- A. Preinstallation Conference: Conduct conference at Project site.

1.5 ACTION SUBMITTALS

- A. Product Data: For each type of product.
 - 1. Include recommendations for application and use.
 - 2. Include test data substantiating that products comply with requirements.
 - 3. Include sieve analyses for aggregate materials.
 - 4. Material Certificates: For each type of soil amendment and fertilizer before delivery to the site, according to the following:
 - a. Manufacturer's qualified testing agency's certified analysis of standard products.
 - b. Analysis of fertilizers, by a qualified testing agency, made according to AAPFCO methods for testing and labeling and according to AAPFCO's SUIP #25.
 - c. Analysis of nonstandard materials, by a qualified testing agency, made according to SSSA methods, where applicable.
- B. Samples: For each bulk-supplied material, 1-quart (1-L) volume of each in sealed containers labeled with content, source, and date obtained. Each Sample shall be typical of the lot of material to be furnished; provide an accurate representation of composition, color, and texture.

1.6 INFORMATIONAL SUBMITTALS

- A. Qualification Data: For each testing agency.

- B. Field quality-control reports.

1.7 QUALITY ASSURANCE

- A. Testing Agency Qualifications: An independent, state-operated, or university-operated laboratory; experienced in soil science, soil testing, and plant nutrition; with the experience and capability to conduct the testing indicated; and that specializes in types of tests to be performed.
 - 1. Laboratories: Subject to compliance with requirements, provide testing by one of the following:
 - a. Soil and Plant Tissue Laboratory, West Experiment Station, 682 North Pleasant Street, Amherst, MA 01003, (413) 545-2311, website: www.umass.edu/plsoils/soiltest.
 - b. University of Connecticut, Department of Plant Science, Soil Nutrient Analysis Laboratory, 6 Sherman Place, U-5102, CT 06269-5102, (860) 486-4274, <http://www.soiltest.uconn.edu/>
 - 2. Multiple Laboratories: At Contractor's option, work may be divided among qualified testing laboratories specializing in physical testing, chemical testing, and fertility testing.

1.8 SOIL-SAMPLING REQUIREMENTS

- A. General: Extract soil samples according to requirements in this article.
- B. Sample Collection and Labeling: Have samples taken and labeled by soil scientist (CPSS) certified by SSSA, soil classifier (CPSC) certified by SSSA, soil scientist (RPSS) registered by the National Society of Consulting Soil Scientists or state-certified, -licensed, or -registered soil scientist under the direction of the testing agency.
 - 1. Number and Location of Samples: Minimum of six representative soil samples from varied locations for each soil to be used or amended for landscaping purposes.
 - 2. Procedures and Depth of Samples: According to USDA-NRCS's "Field Book for Describing and Sampling Soils."
 - 3. Division of Samples: Split each sample into two, equal parts. Send half to the testing agency and half to Owner for its records.
 - 4. Labeling: Label each sample with the date, location keyed to a site plan or other location system, visible soil condition, and sampling depth.

1.9 TESTING REQUIREMENTS

- A. General: Perform tests on soil samples according to requirements in this article.
- B. Physical Testing:
 - 1. Soil Texture: Soil-particle, size-distribution analysis by[one of] the following methods according to SSSA's "Methods of Soil Analysis - Part 1-Physical and Mineralogical Methods":

- a. Sieving Method: Report sand-gradation percentages for very coarse, coarse, medium, fine, and very fine sand; and fragment-gradation (gravel) percentages for fine, medium, and coarse fragments; according to USDA sand and fragment sizes.
 - b. Hydrometer Method: Report percentages of sand, silt, and clay.
2. Total Porosity: Calculate using particle density and bulk density according to SSSA's "Methods of Soil Analysis - Part 1-Physical and Mineralogical Methods."
 3. Water Retention: According to SSSA's "Methods of Soil Analysis - Part 1-Physical and Mineralogical Methods."
 4. Saturated Hydraulic Conductivity: According to SSSA's "Methods of Soil Analysis - Part 1-Physical and Mineralogical Methods"; at 85% compaction according to ASTM D 698 (Standard Proctor).
- C. Chemical Testing:
1. CEC: Analysis by sodium saturation at pH 7 according to SSSA's "Methods of Soil Analysis - Part 3- Chemical Methods."
 2. Clay Mineralogy: Analysis and estimated percentage of expandable clay minerals using CEC by ammonium saturation at pH 7 according to SSSA's "Methods of Soil Analysis - Part 1- Physical and Mineralogical Methods."
 3. Metals Hazardous to Human Health: Test for presence and quantities of RCRA metals including aluminum, arsenic, barium, copper, cadmium, chromium, cobalt, lead, lithium, and vanadium. If RCRA metals are present, include recommendations for corrective action.
 4. Phytotoxicity: Test for plant-available concentrations of phytotoxic minerals including aluminum, arsenic, barium, cadmium, chlorides, chromium, cobalt, copper, lead, lithium, mercury, nickel, selenium, silver, sodium, strontium, tin, titanium, vanadium, and zinc.
- D. Fertility Testing: Soil-fertility analysis according to standard laboratory protocol of SSSA NAPT NEC-67, including the following:
1. Percentage of organic matter.
 2. CEC, calcium percent of CEC, and magnesium percent of CEC.
 3. Soil reaction (acidity/alkalinity pH value).
 4. Buffered acidity or alkalinity.
 5. Nitrogen ppm.
 6. Phosphorous ppm.
 7. Potassium ppm.
 8. Manganese ppm.
 9. Manganese-availability ppm.
 10. Zinc ppm.
 11. Zinc availability ppm.
 12. Copper ppm.
 13. Sodium ppm and sodium absorption ratio.
 14. Soluble-salts ppm.
 15. Presence and quantities of problem materials including salts and metals cited in the Standard protocol. If such problem materials are present, provide additional recommendations for corrective action.
 16. Other deleterious materials, including their characteristics and content of each.
- E. Organic-Matter Content: Analysis using loss-by-ignition method according to SSSA's "Methods of Soil Analysis - Part 3- Chemical Methods."

- F. Recommendations: Based on the test results, state recommendations for soil treatments and soil amendments to be incorporated to produce satisfactory planting soil suitable for healthy, viable plants indicated. Include, at a minimum, recommendations for nitrogen, phosphorous, and potassium fertilization, and for micronutrients.
1. Fertilizers and Soil Amendment Rates: State recommendations in weight per 1000 sq. ft. (100 sq. m) for 6-inch (150-mm) depth of soil.
 2. Soil Reaction: State the recommended liming rates for raising pH or sulfur for lowering pH according to the buffered acidity or buffered alkalinity in weight per 1000 sq. ft. (100 sq. m) for 6-inch (150-mm) depth of soil.

1.10 DELIVERY, STORAGE, AND HANDLING

- A. Packaged Materials: Deliver packaged materials in original, unopened containers showing weight, certified analysis, name and address of manufacturer, and compliance with state and Federal laws if applicable.
- B. Bulk Materials:
1. Do not dump or store bulk materials near structures, utilities, walkways and pavements, or on existing turf areas or plants.
 2. Provide erosion-control measures to prevent erosion or displacement of bulk materials, discharge of soil-bearing water runoff, and airborne dust reaching adjacent properties, water conveyance systems, or walkways.
 3. Do not move or handle materials when they are wet or frozen.
 4. Accompany each delivery of bulk fertilizers and soil amendments with appropriate certificates.

PART 2 - PRODUCTS

2.1 MATERIALS

- A. Regional Materials: Soil amendments and fertilizers shall be manufactured within 500 miles (800 km) of Project site from materials that have been extracted, harvested, or recovered, as well as manufactured, within 500 miles (800 km) of Project site.

2.2 PLANTING SOILS SPECIFIED BY COMPOSITION

- A. General: Soil amendments, fertilizers, and rates of application specified in this article are guidelines that may need revision based on testing laboratory's recommendations after preconstruction soil analyses are performed.
- B. Planting-Soil Type: Existing, on-site surface soil, with the duff layer, if any, retained; and stockpiled on-site; modified to produce viable planting soil. Blend existing, on-site surface soil with the following soil amendments and fertilizers in the following quantities to produce planting soil:
1. Ratio of Loose Compost to Soil: 1:3 by volume.

2. Additional Properties of Soil before Amending: Soil reaction of pH 6 to 7 and minimum of 6 percent organic-matter content, friable, and with sufficient structure to give good tilth and aeration.
3. Unacceptable Properties: Clean soil of the following:
 - a. Unacceptable Materials: Concrete slurry, concrete layers or chunks, cement, plaster, building debris, oils, gasoline, diesel fuel, paint thinner, turpentine, tar, roofing compound, acid, and other extraneous materials that are harmful to plant growth.
 - b. Unsuitable Materials: Stones, roots, plants, sod, clay lumps, and pockets of coarse sand that exceed a combined maximum of 8 percent by dry weight of the imported soil.
 - c. Large Materials: Stones, clods, roots, clay lumps, and pockets of coarse sand exceeding 2 inches (50 mm) in any dimension.

2.3 INORGANIC SOIL AMENDMENTS

- A. Lime: ASTM C 602, agricultural liming material containing a minimum of 80 percent calcium carbonate equivalent and as follows:
 1. Class: T, with a minimum of 99 percent passing through a No. 8 (2.36-mm) sieve and a minimum of 75 percent passing through a No. 60 (0.25-mm) sieve.
 2. Form: Provide lime in form of ground dolomitic limestone.
- B. Sulfur: Granular, biodegradable, and containing a minimum of 90 percent elemental sulfur, with a minimum of 99 percent passing through a No. 6 (3.35-mm) sieve and a maximum of 10 percent passing through a No. 40 (0.425-mm) sieve.
- C. Iron Sulfate: Granulated ferrous sulfate containing a minimum of 20 percent iron and 10 percent sulfur.
- D. Agricultural Gypsum: Minimum 90 percent calcium sulfate, finely ground with 90 percent passing through a No. 50 (0.30-mm) sieve.
- E. Recycled Gypsum: Ground-up, recycled gypsum board debris with a minimum 90 percent calcium sulfate, finely ground with 90 percent passing through a No. 50 (0.30-mm) sieve
- F. Sand: Clean, washed, natural or manufactured, free of toxic materials, and according to ASTM C 33/C 33M.

2.4 ORGANIC SOIL AMENDMENTS

- A. The following organic soil amendments may be added to planting soil as recommended by topsoil analysis:
 1. Compost: Well-composted, stable, and weed-free organic matter produced by composting feedstock, and bearing USCC's "Seal of Testing Assurance," and as follows:
 - a. Feedstock: May include sewage sludge or animal waste.
 - b. Reaction: pH of 5.5 to 8.
 - c. Soluble-Salt Concentration: Less than 4 dS/m.
 - d. Moisture Content: 35 to 55 percent by weight.
 - e. Organic-Matter Content: 50 to 60 percent of dry weight.

- f. Particle Size: Minimum of 98 percent passing through a 1/2-inch (13-mm) sieve.
2. Sphagnum Peat: Partially decomposed sphagnum peat moss, finely divided or of granular texture with 100 percent passing through a 1/2-inch (13-mm) sieve, a pH of 3.4 to 4.8, and a soluble-salt content measured by electrical conductivity of maximum 5 dS/m.
3. Muck Peat: Partially decomposed moss peat, native peat, or reed-sedge peat, finely divided or of granular texture with 100 percent passing through a 1/2-inch (13-mm) sieve, a pH of 6 to 7.5, a soluble-salt content measured by electrical conductivity of maximum 5 dS/m, having a water-absorbing capacity of 1100 to 2000 percent, and containing no sand.
4. Wood Derivatives: Shredded and composted, nitrogen-treated sawdust, ground bark, or wood waste; of uniform texture and free of chips, stones, sticks, soil, or toxic materials.
5. Manure: Well-rotted, unleached, stable or cattle manure containing not more than 25 percent by volume of straw, sawdust, or other bedding materials; free of toxic substances, stones, sticks, soil, weed seed, debris, and material harmful to plant growth.

2.5 FERTILIZERS

- A. The following fertilizers may be added to planting soil as recommended by topsoil analysis and if allowed by authorities having jurisdiction:
 1. Superphosphate: Commercial, phosphate mixture, soluble; a minimum of 20 percent available phosphoric acid.
 2. Commercial Fertilizer: Commercial-grade complete fertilizer of neutral character, consisting of fast- and slow-release nitrogen, 50 percent derived from natural organic sources of urea formaldehyde, phosphorous, and potassium in the following composition:
 - a. Composition: Nitrogen, phosphorous, and potassium in amounts recommended in soil reports from a qualified testing agency.
 3. Slow-Release Fertilizer: Granular or pelleted fertilizer consisting of 50 percent water-insoluble nitrogen, phosphorus, and potassium in the following composition:
 - a. Composition: Nitrogen, phosphorous, and potassium in amounts recommended in soil reports from a qualified testing agency.
 4. Chelated Iron: Commercial-grade FeEDDHA for dicots and woody plants, and commercial-grade FeDTPA for ornamental grasses and monocots.

PART 3 - EXECUTION

3.1 GENERAL

- A. General: Apply and mix unamended soil with amendments on-site to produce required planting soil according to Section "Turf and Grasses". Do not apply materials or till if existing soil or subgrade is frozen, muddy, or excessively wet.

- B. Place planting soil and fertilizers according to requirements in Sections “Turf and Grasses”.
- C. Topsoil will not be permitted to be spread until topsoil test reports and amendments have been submitted and approved.
- D. Amend topsoil per the direction of the test report.

3.2 PREPARATION OF UNAMENDED, ON-SITE SOIL BEFORE AMENDING

- A. Unacceptable Materials: Clean soil of concrete slurry, concrete layers or chunks, cement, plaster, building debris, oils, gasoline, diesel fuel, paint thinner, turpentine, tar, roofing compound, acid, and other extraneous materials that are harmful to plant growth.
- B. Unsuitable Materials: Clean soil to contain a maximum of 8 percent by dry weight of stones, roots, plants, sod, clay lumps, and pockets of coarse sand.
- C. Screening: Pass unamended soil through a 3-inch (75-mm) sieve to remove large materials.

3.3 PLACING AND MIXING PLANTING SOIL OVER EXPOSED SUBGRADE

- A. General: Apply and mix unamended soil with amendments on-site to produce required planting soil. Do not apply materials or till if existing soil or subgrade is frozen, muddy, or excessively wet.
- B. Subgrade Preparation: Till subgrade to a minimum depth of 4 inches (100 mm). Remove stones larger than 2 inches (50 mm) in any dimension and sticks, roots, rubbish, and other extraneous matter and legally dispose of them off Owner's property.
 - 1. Apply, add soil amendments, and mix approximately half the thickness of unamended soil over prepared, loosened subgrade according to "Mixing" Paragraph below. Mix thoroughly into top 4 inches (100 mm) of subgrade. Spread remainder of planting soil.
- C. Mixing: Spread unamended soil to total depth of 6 inches (150 mm), but not less than required to meet finish grades after mixing with amendments and natural settlement. Do not spread if soil or subgrade is frozen, muddy, or excessively wet.
 - 1. Amendments: Apply soil amendments and fertilizer, if required, evenly on surface, and thoroughly blend them with unamended soil to produce planting soil.
 - a. Mix lime and sulfur with dry soil before mixing fertilizer as required by the soil test results.
 - b. Mix fertilizer with planting soil no more than seven days before planting.
 - 2. Lifts: Apply and mix unamended soil and amendments in lifts not exceeding 8 inches (200 mm) in loose depth for material compacted by compaction equipment, and not more than 4 inches (100 mm) in loose depth for material compacted by hand-operated tampers.
- D. Compaction: Compact each blended lift of planting soil to 75 to 82 percent of maximum Standard Proctor density according to ASTM D 698 and tested in-place except where a different compaction value is indicated on Drawings.

- E. Finish Grading: Grade planting soil to a smooth, uniform surface plane with loose, uniformly fine texture. Roll and rake, remove ridges, and fill depressions to meet finish grades.

3.4 PLACING PREBLENDED PLANTING SOIL OVER EXPOSED SUBGRADE

- A. General: Apply amended soil on-site in its final, blended condition. Do not apply materials or till if existing soil or subgrade is frozen, muddy, or excessively wet.
- B. Subgrade Preparation: Till subgrade to a minimum depth of **6 inches (150 mm)**. Remove stones larger than **3 inches (75 mm)** in any dimension and sticks, roots, rubbish, and other extraneous matter and legally dispose of them off Owner's property.
 - 1. Apply approximately half the thickness of amended planting soil over prepared, loosened subgrade. Mix thoroughly into top **4 inches (100 mm)** of subgrade. Spread remainder of planting soil.
- C. Application: Spread planting soil to total minimum depth of **18 inches (450 mm) according to the planting details as indicated on the Drawings**, but not less than required to meet finish grades after natural settlement. Do not spread if soil or subgrade is frozen, muddy, or excessively wet.
 - 1. Lifts: Apply planting soil in lifts not exceeding **12 inches (300 mm)** in loose depth for material compacted by compaction equipment, and not more than **6 inches (150 mm)** in loose depth for material compacted by hand-operated tampers.
- D. Compaction: Compact each lift of planting soil to **75 to 82** percent of maximum Standard Proctor density according to ASTM D.
- E. Finish Grading: Grade planting soil to a smooth, uniform surface plane with loose, uniformly fine texture. Roll and rake, remove ridges, and fill depressions to meet finish grades.

3.5 FIELD QUALITY CONTROL

- A. Testing Agency: Owner will engage a qualified testing agency to perform tests and inspections.
 - 1. Compaction: Test planting-soil compaction after placing each lift and at completion using a densitometer or soil-compaction meter calibrated to a reference test value based on laboratory testing according to ASTM D 698. Space tests at no less than one for each 1000 sq. ft. (100 sq. m) of in-place soil or part thereof.
- B. Soil will be considered defective if it does not pass tests and inspections.
- C. Prepare test[and inspection] reports.
- D. Label each sample and test report with the date, location keyed to a site plan or other location system, visible conditions when and where sample was taken, and sampling depth.

3.6 PROTECTION

- A. Protection Zone: Identify protection zones according to Division 1 Section "Temporary Tree and Plant Protection."
- B. Protect areas of in-place soil from additional compaction, disturbance, and contamination. Prohibit the following practices within these areas except as required to perform planting operations:
 - 1. Storage of construction materials, debris, or excavated material.
 - 2. Parking vehicles or equipment.
 - 3. Vehicle traffic.
 - 4. Foot traffic.
 - 5. Erection of sheds or structures.
 - 6. Impoundment of water.
 - 7. Excavation or other digging unless otherwise indicated.
- C. If planting soil or subgrade is overcompacted, disturbed, or contaminated by foreign or deleterious materials or liquids, remove the planting soil and contamination; restore the subgrade as directed by Architect and replace contaminated planting soil with new planting soil.

3.7 CLEANING

- A. Protect areas adjacent to planting-soil preparation and placement areas from contamination. Keep adjacent paving and construction clean and work area in an orderly condition.

3.8 Remove surplus soil and waste material including excess subsoil, unsuitable materials, trash, and debris and legally dispose of them off Owner's property unless otherwise indicated.

3.9 EXCESS STOCKPILED TOPSOIL

- A. Remains property of Owner and is to be deposited or spread by the Contractor in an approved location unless approved otherwise.

PART 4 - METHOD OF MEASUREMENT AND BASIS OF PAYMENT

4.1 MEASUREMENT AND PAYMENT

- A. There shall be no separate measurement for payment for work under this Section. The cost of this work shall be included in the lump sum bid for this project.

END OF SECTION 02939

SECTION 02940 - LANDSCAPE MAINTENANCE

PART 1- GENERAL

1.1 SUMMARY

- A. Provide labor, materials, equipment, services and transportation to complete work.
 - 1. Plant and turf maintenance including pruning, watering, drainage, irrigation, fertilizing, weed and pest control, and adjusting tree guys.
 - 2. Guaranty and replacement of unacceptable plants.
 - 3. Providing Owner with Maintenance Manual.

- B. Related Sections including the following
 - 1. Division 2 Section 02939“Topsoil and Planting Mix” for fertilizers and soil amendments
 - 2. Division 2 Section 02936 “Turf and Grasses” for related practices.

1.2 REFERENCES

- A. Comply with applicable requirements of:
 - 1. State of Connecticut Department of Transportation (ConnDOT) Standard Specifications for Roads, Bridges and Incidental Construction, Latest addition
 - 2. American Association of Nurserymen, American Standards for Nursery Stock, (ANSI Z60.1), latest edition, published by the American Association of Nurserymen, 1250 I Street, N.W., Suite 500 Washington, D.C. 20005.

1.3 DEFINITIONS

- A. Maintenance: consists of keeping turf , woody, perennial and annual plants in healthy growing condition including watering, weeding, cultivating, remulching, tightening and repairing of guys, removal and replacement of dead plant material, resetting plants to proper grades or upright positions and maintaining saucer.

1.4 SUBMITTALS

- A. Submittals: in accordance with Division 01Section “Submittal Procedures.”

- B. Materials List: provide list of materials to be used in maintenance; materials shall be the same as approved in related sections.

- C. Pest and Disease Treatment
 - 1. Submit plan for pest and disease treatment; identify proposed materials and methods.
 - 2. Explain why a problem does or may exist.

D. Maintenance Manual

1. Provide a maintenance manual to Owner describing operations for on-going upkeep of the installed plants. The manual shall address itself to specified types and uses of plants installed, and provide information for care of both newly installed plants and long-term maintenance.
2. Provide specific information on the following items:
 - a. Watering: Watering season; diagnosis of watering need; frequency of watering; amount; time of day; methods and equipment; equipment maintenance.
 - b. Fertilization: Fertilizing seasons; analysis for fertilizer selection; application rates and methods; preparation and conditions; application times; application equipment; post-application operations and care; precautions for fertilizer use.
 - c. Liming: Liming season; analysis for liming; application rate; method and equipment for application.
 - d. Pruning: Pruning goals and purposes; methods and techniques (relate to species); equipment; season; cleanup and disposal; precautions.
 - e. Mulching of beds: Depths of mulch; refreshment and replacement of mulch.
 - f. Miscellaneous plant maintenance: Weeding and weed control; pest and disease control; leaf and litter removal; bed edging; professional assistance for plant care; and plant replacement as necessary.
3. Include a month-by-month calendar of maintenance procedures, indicating operations listed above.
4. Include a developed Record Keeping document to be completed by the maintenance staff and submitted weekly to the Owner's Representative during active maintenance period.
5. Submit a copy of maintenance manual to Owner's Representative for approval. Submit prior to planting completion. Owner's Representative may request revisions to manual to meet intent of project design.
6. Submit three copies of manual to Owner at acceptance meeting for planting work. Acceptance shall not be granted until manual has been submitted and approved.

1.5 QUALITY ASSURANCE

- A. Qualifications: contractor shall have minimum five years experience in landscape maintenance.
- B. Regulatory Requirements
 1. Secure permits, licenses, and pay fees including traffic control.
 2. Comply with laws, regulations, and quarantines for agricultural and horticultural products.

1.6 DELIVERY, STORAGE AND HANDLING

- A. Packing and Shipping: deliver materials in unopened containers bearing the manufacturer's name. Transport materials without damage. Protect finishes from abrasion, dirt, oils, grease, and chemicals. Pack materials to protect from weather.
- B. Acceptance at Site: verify in writing that delivered materials conform to specifications and approved submittals.
- C. Storage and Protection:
 1. The University will not provide areas of storage for the maintenance contractor.

2. Store materials in dry place, on pallets, off the ground; protect from sun.
3. Protect materials from theft, damage, weather, dirt, oils, grease, and construction.

1.7 PROJECT/SITE CONDITIONS

- A. Environmental Requirements: do not work soils when dry, wet, or frozen.
 1. Field Test
 - a. Form soil in palm of hand, if soil retains shape and crumbles upon touching, the soil may be worked.
 - b. If soil will not retain shape it is too dry and should not be worked.
 - c. If soil retains shape and will not crumble, it is too wet and should not be worked.
- B. Planting Seasons: see Section 02936 “Turf and Grasses.”

1.8 SUBSTANTIAL COMPLETION

- A. Upon completion of planting, request Owner’s Representative’s review to determine if work is substantially complete. If work is complete, Owner’s Representative will issue a Letter of Substantial Completion that establishes the effective date of the start of the 60 day Maintenance Period for turf, and 18 months for all plantings.
 1. If work is not substantially complete, Owner’s Representative will make a list of outstanding work to be done on a timely schedule agreed upon by Contractor and Owner’s Representative.
 2. Contractor shall notify Owner’s Representative when outstanding work is accomplished and ready for review. When outstanding work is complete, in the judgment of Owner’s Representative, a Letter of Substantial Completion will be issued.

1.9 PRELIMINARY ACCEPTANCE

- A. After the Letter of Substantial Completeness the work will be reviewed for completeness and of Preliminary Acceptance
- B. Plantings and turf shall be in thriving and vigorous condition at the time of review for Preliminary Acceptance. If plantings and turf are acceptable, Owner’s Representative will issue a Letter of Preliminary Acceptance establishing the effective date of the Guaranty Period.
 1. If plantings are not thriving, in the judgment of Owner’s Representative, remedial actions by Contractor will be required to repair or replace plantings.
 2. Remedial work shall be done immediately and in accordance with related work of other sections.
 3. At the conclusion of remedial work, Owner’s Representative will review work and extend the Guaranty Period to incorporate new plantings.

1.10 FINAL ACCEPTANCE

- A. After the 90 day / 2 year Maintenance and Guaranty Period, turf / plantings will be reviewed.
- B. Plantings and turf shall be in thriving and vigorous condition at the time of review for Final Acceptance. If plantings and turf are acceptable, Owner’s Representative will issue a Letter of Final Acceptance.

1. If plantings and turf are not thriving, in the judgment of Owner's Representative, remedial actions by Contractor will be required to replace plantings.
2. Remedial work shall be done immediately and in accordance with related work of other sections.
3. At the conclusion of remedial work, Owner's Representative will review work and extend the Maintenance and Guaranty Period until plantings are deemed acceptable.

PART 2 - MATERIALS

2.1 MATERIALS

- A. Materials utilized during the maintenance period shall be the same specified in the work of the related sections:
 1. Fertilizers, soil amendments, testing, see Section 02939 "Topsoil and Planting Mix."
 2. Turf and related materials, see Section 02936 "Turf and Grasses."
 3. Trees and groundcover, see Section 02938 "Planting."

2.2 BIOLOGICAL, HORTICULTURAL, HERBICIDAL AND OTHER PEST CONTROL

- A. Material Specification: shall be by a licensed pest control operator, with authority to purchase, utilize, and specify agricultural chemicals and agricultural products.
- B. Use the least hazardous, least intrusive materials and methods.

2.3 EQUIPMENT

- A. Vehicles: in good working order so oil and grease does not stain pavements and poison plantings. Signs identifying the vehicles shall be clearly displayed.
- B. Machinery: in good working order so oil and grease does not stain pavements and poison plantings.

2.4 WATER

- A. Water: Furnished by Contractor, suitable for irrigation and free from ingredients harmful to plant life.
- B. Hoses and other watering equipment to be furnished by Contractor.

PART 3 - EXECUTION

3.1 REASONABLE MAINTENANCE PRACTICES

- A. Contractor shall be responsible for all maintenance activities that will promote good plant growth. Reasonable maintenance practices may be dictated by the University.

3.2 EXAMINATION

- A. Verification of Conditions: in the event field conditions are not as shown on Drawings and outlined in the Specifications, notify Owner's Representative in writing.

3.3 PREPARATION

- A. Protection:
 - 1. Agricultural Chemicals: protect site improvements from contact with agricultural chemicals, soil amendments, and fertilizers.

3.4 DRAINAGE

- A. Observe drainage in plant pits with hand soil augur.
- B. Verify plant pits are draining; plant pits not draining shall be identified on the plan and brought to the attention of Owner's Representative.

3.5 IRRIGATION

- A. Water at a rate of one inch of water every five to seven days. Apply water such that it penetrates the soil to a depth of 6".
- B. Trees require a minimum of ten gallons each and shrubs a minimum of five gallons each per week.
- C. If spring or fall months experience below average rainfall, periodic watering could be extended as part of this contract and at no additional charge as requested by Owner's Representative.
- D. If natural rainfall provides water to meet watering requirements, weekly watering could be reduced but only at the request of Owner's Representative.
- E. Water trucks shall **NOT** be allowed to drive on sidewalks to water turf and plantings. Temporary irrigation shall be provided to minimize site and user impacts.
- F. Watering schedule shall be deep watering to promote strong drought resistant root growth.

3.6 FINISH GRADE

- A. Maintain finish grades around plantings, at pavement edges, and at irrigation fixtures.

3.7 MULCH

- A. Maintain mulch at 2" depth in planting areas with the exception of at stems and trunks of plants where mulch to be placed to a 0" depth and increasing to a depth of 2" at edge of rootballs and beyond.

3.8 MOWING

- A. Mow turf as soon as top growth is tall enough to cut. Repeat mowing to maintain specified height without cutting more than 1/3 of grass height. Remove no more than 1/3 of grass-leaf growth in initial or subsequent mowing. Do not delay mowing until grass blades bend over and become matted. Do not mow when grass is wet. Schedule initial and subsequent mowing to maintain the following grass height: Mow to a height of 2 ½ inches to 3 inches.

3.9 TREATMENT OF PEST AND DISEASES

- A. Spray for both insect pests and diseases during maintenance period with notification and permission of Owner's Representative. Apply herbicides, insecticides and fungicides as prescribed by their manufacturer and in accordance with State laws. Contractor shall possess from the State of Connecticut the proper registrations and permits for application of materials or have applications made by approved, qualified firm holding registrations and permits. Furnish copies of permits in connection with materials to Owner's Representative. Spraying to be considered only after full consideration has been given to alternative pest control strategies. The least toxic approach to pest control shall be used.

3.10 FIELD QUALITY CONTROL

- A. Post Plant Soil Tests: see Section 02939 "Topsoil and Planting Mix."

3.11 ADJUSTING

- A. Re-set settled plants to proper grade and position.
- B. Restore planting saucer and adjacent material.

3.12 CLEANING

- A. Clean up, remove and dispose off-site excess planting mixture, soil and debris generated under work of this section.
- B. Remove and dispose of stakes, guys and other accessories at end of Guaranty Period.
- C. Wash and sweep clean site improvements and building surfaces. Clean spills and oversprays immediately.
- D. Repair damage caused by maintenance operations.

3.13 PROTECTION

- A. Protect work of this section until Final Acceptance.
- B. Protect planted areas and soils from compaction by construction traffic and from contamination by construction materials.

PART 4 - METHOD OF MEASUREMENT AND BASIS OF PAYMENT

4.1 MEASUREMENT AND PAYMENT

- A. There shall be no separate measurement for payment for work under this Section. The cost of this work shall be included in the lump sum bid for this project.

END OF SECTION 02940

SECTION 329643 - TREE TRANSPLANTING

PART 1 - GENERAL

1.1 SUMMARY

- A. Section includes requirements for transplanting trees.

1.2 SUBMITTALS

- A. Product Data: For each type of product indicated.
- B. Qualifications: Statement of qualifications including not less than five years experience in tree transplantation in the State of Connecticut
- C. Samples of mineral mulch.
- D. Product certificates.
- E. Planting Schedule: Indicating anticipated planting dates for transplanting trees including:
 - 1. Time of year for transplanting.
 - 2. Transplanting methods.
 - 3. Follow-up care and maintenance.
- F. Maintenance Instructions: Recommended procedures to be established by Owner for maintenance of exterior plants during a calendar year.

1.3 QUALITY ASSURANCE

- A. Installer's Field Supervision: Require Installer to maintain an experienced full-time supervisor on Project site when planting is in progress.
- B. Topsoil Analysis: Furnish soil analysis by a qualified soil-testing laboratory.
 - 1. Report suitability of topsoil for plant growth. State-recommended quantities of nitrogen, phosphorus, and potash nutrients and soil amendments to be added to produce satisfactory topsoil.
- C. Provide quality, size, genus, species, and variety of exterior plants indicated, complying with applicable requirements in ANSI Z60.1, "American Standard for Nursery Stock."
- D. Pre-installation Conference: Conduct conference at [Project site] <Insert location>.

1.4 DELIVERY, STORAGE, AND HANDLING

- A. Do not prune trees before delivery. Protect bark, branches, and root systems from sun scald, drying, sweating, whipping, and other handling and tying damage. Do not bend or bind-tie trees in such a manner as to destroy their natural shape. Provide protective covering of trees during delivery. Do not drop during delivery and handling.
- B. Handle planting stock by root ball.
- C. Deliver trees after preparations for planting have been completed and install immediately. If planting is delayed more than six hours after delivery, set exterior trees in shade, protect from weather and mechanical damage, and keep roots moist.

1.5 SEQUENCING AND SCHEDULING

- A. Proceed and coordinate work as the site becomes available, consistent with seasonal limitations for transplanting.
- B. Owner's representative will select and tag at the site, those plants to be transplanted to new locations.
- C. Transplant trees during cool weather. Avoid moving plants on very hot, dry, or windy days.

1.6 FINAL ACCEPTANCE

- A. Work under this Section will be accepted by Landscape Architect upon satisfactory completion of all work including maintenance, but exclusive of replacement of plant materials under warranty period. Upon Final Acceptance, Owner will assume responsibility of maintenance of the work.

1.7 WARRANTY

- A. Special Warranty: Installer's standard form in which Installer agrees to repair or replace plantings which fail in materials, workmanship, or growth within specified warranty period.
 - 1. Failures include, but are not limited to, the following:
 - a. Death and unsatisfactory growth, except for defects resulting from lack of adequate maintenance, neglect, abuse by Owner, or incidents that are beyond Contractor's control.
 - b. Structural failures including plantings falling or blowing over.
 - 2. Any delay in completion of planting operations which extends planting into more than one planting season shall extend Warranty Period correspondingly.
 - 3. Warranty Periods from Date of Substantial Completion:

- a. Warrant that all trees planted under this Contract will be healthy and in flourishing condition of active growth one year from date of Final Acceptance.
- B. Replace, without cost to Owner, and as soon as weather conditions permit, all dead plants and all plants not in vigorous, thriving condition as determined by Owner during and at the end of Warranty Period. Plants shall be free of dead or dying branches and branch tips, and shall bear foliage of a normal density, size, and color. Replacements shall closely match adjacent specimens of the same species and shall be subject to all specified requirements.

1.8 MAINTENANCE SERVICE

- A. Initial Maintenance Service: Provide full maintenance by skilled employees of landscape Installer. Maintain as required in Part 3. Begin maintenance immediately after each area is planted and continue until plantings are acceptably healthy and well established, but for not less than maintenance period below.
 1. Maintenance Period for Trees and Shrubs: 12 months from date of planting completion.

PART 2 - PRODUCTS

2.1 TREE MATERIAL

- A. General: Furnish nursery-grown or field collected trees with healthy root systems developed by transplanting or root pruning. Provide well-shaped, fully branched, healthy, vigorous stock free of disease, insects, eggs, larvae, and defects such as knots, sun scald, injuries, abrasions, and disfigurement.
- B. Root-Ball Depth: Furnish trees and shrubs with root balls measured from top of root ball, which shall begin at root flare according to ANSI Z60.1. Root flare shall be visible before planting.
- C. Provide balled and burlapped trees.

2.2 FERTILIZER

- A. Tree Planting Fertilizer: Davey Arborgreen Organic Liquid Soil or approved equal injected at 115 psi. Apply at manufacturer's recommended rates.

2.3 FERTILIZER INJECTOR

- A. Power injector capable of delivering 225 to 250 psi at nozzle.
- B. Hydraulic, agitated mixing tank.
- C. Nozzle point with three distribution orifices 120 degrees apart, capable of delivering fluid perpendicular to direction of shaft.

- D. Adjustable or permanent stop plate nozzle shaft to stop shaft at required depth.
- E. Ability to meter amount of material applied per injection.

2.4 INSECTICIDE

- A. Ortho “Lindane Borer and Leaf Miner Spray” or approved equal.

2.5 MULCHES

- A. Organic Mulch: Shredded hardwood, free of debris, deciduous leaves, and sticks. Bark chips shall not exceed 1-1/2 inch in size.

2.6 SAND

- A. The following requirements apply to sand:

Physical Properties - Grading

<u>U.S. Sieve</u>	<u>Percent Passing</u>
No. 4	100
No. 10	95-100
No. 18	90-100
No. 35	65-100
No. 140	0-20
No. 270	0-7

<u>Chemistry</u>	<u>Range</u>
Saturation Extract Conductivity (ECC)	Nil-3.0
Sodium Absorption Ratio (SAR)	Nil-6.0
Boron-ppm in saturation extract solution	Nil-1.0
Reaction (pH)	6.0-7.5
Available calcium-sodium acetate extractable- ppm dry weight	Nil-2000

2.7 EQUIPMENT

- A. Pruning Tools: Use only sharp, clean tools, sterilized prior to use.

- B. Transplanting Tools: Size of Vermeer Spade, if used is to be large enough to encompass fibrous feeder roots of each plant, consistent with standard nursery sizes for plant being relocated.
- C. Watering Tubes: Gray, perforated SDR PVC drainage pipe, four inches in diameter.
- D. Vehicles: Do not drive onto or operate a vehicle on jobsite carrying dirt or plant debris from another site. Wash all dirt and mud from tires prior to entering jobsite.

PART 3 - EXECUTION

3.1 PREPARATION

- A. Verify with Owner all plants to be transplanted prior to beginning work.
- B. Stake plant layout for adjustment and approval prior to transplanting.
- C. Transplant all plantings as shown on Drawings. Proceed with transplanting operations based upon Owner accepted schedule and methods.
- D. Rootball Size: Minimum 10-inches in diameter per 1-inch tree caliper.
- E. Crown Pruning: Upon award of contract, prune trees back about 1/4th. Prune side branches only. Do not cut leaders.

3.2 MECHANICAL TRANSPLANTING OF TREES

- A. Use machinery in good condition with a minimum tolerance (max 2") between cutting blades. All blades shall be true to their designed shape and free of bends, which could interfere with their operation. Mount tree spade on a suitable stable machine capable of supporting the weight of all removed material and heavy enough to force the blades into the soil.
- B. Machine transplant trees in accordance with the following criteria:

<u>Caliper</u>	<u>Minimum Machine Size</u>	<u>Manufacturer</u>
Under 3"	44"	Vermeer, Davy, or approved equal
3"-5"	60"	Vermeer or approved equal
5"-8"	90"	Big John, Vermeer, or approved equal
8"-16"	12' Box	

- C. Do not excavate tree pits more than 24 hours prior to transplanting.
- D. Cut and remove all vines and underbrush from the trunk and branches of the tree to facilitate access by machine.

- E. Prune and thin the tree by removing interior branches and entangled limbs. Remove not less than 10 percent of all branching before digging but not more than 20 percent. Do not indiscriminately cut branch tips to achieve the above percentages.
- F. Use the same machine to dig receiving hole and to dig tree for transplanting.
- G. Reroute irrigation lines transplanting operation to maintain integrity of receiving hole.
- H. After tree is placed in hole, immediately fill all crevices with sand and water to fill all voids. Apply 4-inches of mulch.
- I. Provide periodic watering and misting of main foliage.
- J. Spray trunks with Lindane or Dursban for control of borers and wrap hardwoods to first branch.

3.3 DIGGING FOR BOX TRANSPLANTATION

- A. Trenching: Dig trench outside trench previously dug for root pruning.
- B. Do not damage new roots. Do not permit cracking of rootball or loss of soil.
 - 1. Protect rootball by completely wrapping with burlap per standard nursery practice.

3.4 POST PLANTING FERTILIZATION

- A. Apply fertilization 30-45 days after installation.
- B. Inject specified material with high pressure injector into soil at depth and diameter shown below:

<u>Tree Caliper</u>	<u>Application Point</u>	<u>Depth</u>	<u>Radius</u>	<u>App. Rates per tree</u>
Under 2"	3	4"-6"	16"-18"	1-1/2 Gal
2"-4"	3	4"-6"	18"-24"	2 Gal
4"-5"	4	4"-6"	2'-3'	2-1/2 Gal
5"-6"	5	4"-6"	3'-4'	3 Gal
Above 6"	3' o.c.	4"-6"	Dripline	5 Gal/100 sf of root area

3.5 TREE PRUNING

- A. Remove only dead, dying, or broken branches. Do not prune for shape.

- B. Prune, thin, and shape trees and shrubs according to standard horticultural practice. Prune trees to retain required height and spread. Do not cut tree leaders; remove only injured or dead branches from flowering trees. Prune shrubs to retain natural character.
- C. Paint cuts over 3/4-inches in diameter with tree paint, covering all exposed, living tissue.

3.6 PLANT MAINTENANCE

- A. Tree and Shrub Maintenance: Maintain plantings by pruning, cultivating, watering, weeding, fertilizing, restoring planting saucers, and resetting to proper grades or vertical position, as required to establish healthy, viable plantings. Spray or treat as required to keep trees and shrubs free of insects and disease.
- B. Protect exterior plants from damage due to landscape operations, operations by other contractors and trades, and others. Maintain protection during installation and maintenance periods. Treat, repair, or replace damaged plantings.

3.7 FIELD QUALITY CONTROL

- A. Make written request for inspection after planting operations are complete.
- B. Submit requests for inspection to Owner at least two (2) days prior to anticipated inspection date.

3.8 CLEANING

- A. Clean all areas as required for complete and acceptable inspection.

PART 4 - METHOD OF MEASUREMENT AND BASIS OF PAYMENT

4.1 MEASUREMENT AND PAYMENT

- A. There shall be no separate measurement for payment for work under this Section. The cost of this work shall be included in the lump sum bid for this project.

END OF SECTION

SECTION 03420 - PRECAST REINFORCED CONCRETE VAULTS

PART 1 - GENERAL

1.01 DESCRIPTION:

- A. This section includes materials, design, and installation of factory-built precast reinforced concrete underground vaults and chambers.

1.02 REFERENCES:

- A. American Association of State Highway and Transportation Officials (AASHTO):
1. HB: Standard Specifications for Highway Bridges.
 2. M198: Standard Specification for Joints for Concrete Pipe, Manholes, and Precast Box Sections Using Preformed Flexible Joint Sealants
- B. American Concrete Institute (ACI):
1. 318: Building Code Requirements for Structural Concrete and Commentary
- C. American Society for Testing and Materials International (ASTM):
1. A48: Standard Specification for Gray Iron Castings.
 2. A615: Standard Specification for General Requirements for Stainless Steel Wire and Wire Rods.
 3. C31: Practice for Making and Curing Concrete Test Specimens in the Field
 4. C33: Specification for Concrete Aggregates
 5. C39: Test Method for Compressive Strength of Cylindrical Concrete Specimens
 6. C143: Test method for Slump of Hydraulic Cement Concrete
 7. C150: Specification for Portland Cement
 8. C172: Practice for Sampling Freshly Mixed Concrete
 9. C192: Practice for Making and Curing Concrete Test Specimens in the Laboratory
 10. C231: Test Method for Air Content of Freshly Mixed Concrete by the Pressure Method
 11. C260: Specification for Air-Entraining Admixtures for Concrete
 12. C494: Specification for Chemical Admixtures for Concrete
 13. C857: Practice for Minimum Structural Design Loading for Underground Precast Concrete Utility Structures.
 14. C858: Specification for Underground Precast Utility Chambers
 15. C1064: Test Method for Temperature of Freshly Mixed Portland Cement Concrete
 16. D75: Practice for Sampling Aggregates
 17. D4101: Standard Specification for Polypropylene Injection and Extrusion Materials

1.03 SUBMITTALS:

- A. Shop Drawings: Submit the following:
1. Completely detailed shop drawings for precast concrete vaults. Indicate all dimensions, details, reinforcing steel, inserts, connections, openings and lifting devices. Mark each component for identification. Show mark on erection plan and place legibly on unit at time of manufacture.
- B. Drawings of modifications or changes in features or details, which are necessitated by design requirements. Make such modifications without additional compensation.
- C. Do not fabricate precast concrete vaults before shop drawings are approved by the Engineer.

- D. Certification, signed and sealed by a Professional Structural Engineer registered in the State of Connecticut and employed by the vault manufacturer and stating:
 - 1. Elements and connections are designed to withstand required loads and forces
 - 2. Structure is not affected by buoyant forces.
 - 3. Codes and specifications to which structural design conforms.
- 1.04 QUALITY ASSURANCE:
 - A. Vault design and construction comply with the specified design load conditions, ASTM C858 and as specified herein.
- 1.05 DELIVERY, STORAGE AND HANDLING:
 - A. Store vaults on clean blocking, off the ground and protected from rain and ground splatter.

PART 2 - PRODUCTS

2.01 PRECAST REINFORCED CONCRETE VAULTS:

- A. Manufacturers:
 - 1. Oldcastle Precast, Inc.
 - 2. Connecticut Precast Corp.
 - 3. United Concrete Products
- B. Materials:
 - 1. Minimum concrete compressive strength of 5,000 psi at 28 days conforming to Section 02510.
 - 3. Portland Cement: ASTM C150, Type II.
 - 4. Coarse Aggregate and sand conforming to Section 02510.
 - 5. Steel reinforcement conforming to ASTM A615, Grade 60.
 - 6. Water: Potable.
 - 7. Butyl rubber-based sealants conforming to AASHTO M198, Type B but with no bitumen content.
 - 8. Non-Shrink Grout:
 - a. BASF Chemical Company; Masterflow 713 Plus
 - b. The Euclid Chemical Co.; Euco NS Grout
 - c. Sika Corporation; SikaGrout 212
- C. Design Criteria. Use design loads according to ASTM C857 or as indicated below, whichever produces the more severe conditions:
 - 1. Design precast reinforced concrete vault to withstand earth and groundwater loads. Assume groundwater elevation to be at the top of the vault..
 - 2. Design precast reinforced concrete vault to withstand internal hydrostatic and seismic loading. Assume internal fluid level to be at the top of the vault.
 - 3. Design precast reinforced concrete vault to withstand vehicle loading with an impact factor as prescribed in ASTM C857 but a minimum of 250 psf surcharge. Account for vehicle positions both above and alongside vault including directly on each manhole cover.
 - 4. Design precast reinforced concrete vault ceiling to withstand additional concentrated loads from lifting hooks located directly above each valve, meter or other equipment. Provide lifting hook capable of supporting the load, but not less than 2,500 pounds each hook.
 - 5. Design and install vaults to withstand hydrostatic uplift caused by a groundwater elevation at grade level or equal to the top of the vault, whichever produces the most severe condition. Use only the weight of the vault and hold-down slab to resist hydrostatic uplift with a minimum safety factory of 1.15. Do not include side friction of soil on walls.

6. Walls and floor slab: minimum of 8 inches in thickness. Cast lower wall section and floor slab together in one placement.
7. Precast reinforced concrete vault roof: minimum of 8 inches in thickness.
8. Design vault to withstand the load condition where the vault roof is removed while the structure is backfilled to grade and subject to live and dead loads.
9. Provide precast reinforced concrete vault as indicated on the drawings. Provide a watertight vault enclosure including sumps and entrance tubes as indicated.
10. Fabricate precast reinforced concrete vault in sections as required for installation.
11. Provide pipe sleeves with water stops, rubber pipe boots or other devices at pipe penetrations as indicated.
12. Provide reinforced concrete vertical entrance tube with inside dimensions as indicated.

2.02 MANHOLE FRAMES AND COVERS:

- A. Conform to requirements of ASTM A48.
- B. Manufacturers:
 1. Neenah Foundry
 2. Campbell Foundry
- C. Castings to be free from scale, lumps, blisters and sandholes.
- D. Machine contact surfaces to prevent rocking.
- E. Thoroughly clean and hammer inspect.
- F. Capable of withstanding AASHTO H-20 loading unless otherwise indicated or specified.

2.03 ALTERNATE MANHOLE FRAMES AND COVERS

- A. Manhole frames and covers shall be fiberglass.
- B. Manhole frames and covers shall be watertight..
- C. Free from scale, lumps, blisters and sandholes.
- D. Contact surfaces shall be manufactured to prevent rocking.
- E. Thoroughly clean and hammer inspect.
- F. Capable of withstanding AASHTO H-20 loading unless otherwise indicated or specified.

2.04 BITUMINOUS WATERPROOFING MATERIAL:

- A. Manufacturers:
 1. Tnemec Company, Inc.; Series 46-465 H.B. Tnemecol
 2. PPG Industries; Amercoat 78HB.
 3. Carboline; Bitumastic 300M
- B. Apply waterproofing to outside of walls, floor, and ceiling.

2.05 ALTERNATE HDPE MEMBRANE WATERPROOFING SYSTEM

- A. Suitable for vertical and horizontal applications.
- B. Apply waterproofing to outside of walls, floor, and ceiling.
- C. Apply in accordance with manufacturer recommendations.
- D. Self adhering.
- E. Vapor Barrier Permeability: 0.05 perms
- F. Membrane tensile strength: 325 psi
- G. Thickness: 60 mils
- H. Manufacture
 - 1. MiraDri by Carlisle Coatings and Waterproofing
 - 2. Bituthene 4000 by Grace Construction Products

2.06 ALTERNATE BENTONITE MEMBRANE WATERPROOFING SYSTEM

- A. Suitable for vertical and horizontal applications.
- B. Apply waterproofing to outside of walls, floor, and ceiling.
- C. Apply in accordance with manufacturer recommendations.
- D. Self adhering.
- E. Bentonite clay encased between two layers of geotextile fabric.
- F. Manufacture
 - 1. Voltex by CETCO
 - 2. Miraclay by Carlisle Coatings and Waterproofing

2.07 ACCESS LADDERS:

- A. Comply with ANSI A14.3.
- B. Siderails: Continuous, ½ by 2-½ inch steel flat bars, with eased edges, spaced 18 inches apart.
- C. Bar Rungs: ¾ inch diameter steel bars, spaced 12 inches on center.
- D. Fit rungs in centerline of side rails; plug-weld and grind smooth on outer rail fences.
- E. Support each ladder at top and bottom and not more than 60 inches on center with weld or bolted steel brackets. Size brackets and fasteners to support design loads specified in ANSI A14.3.

- F. Provide non-slip surfaces on top of each rung, either by coating rung with aluminum-oxide granules set in epoxy-resin adhesive or by using a type of manufactured rung filled with aluminum-oxide grout.
- G. Galvanized ladders, including brackets and fasteners, to G-90 at all locations.
- H. Provide extension egress sections (ladder extension safety posts) to all ladders similar to “Bilco Ladder-Up” or approved equal.

PART 3 - EXECUTION

3.01 INSTALLATION:

- A. Install precast reinforced concrete vault, and related appurtenances in accordance with manufacturer's instructions.
- B. Place precast reinforced concrete vault onto level prepared bedding as indicated. Provide uniform bearing over entire base of vault.
- C. Seal all joints inside and out with specified sealant to ensure joints are waterproof.
- D. Repair or replace damaged waterproofing.
- E. Backfill vault excavation uniformly and in such a manner so as not to damage the waterproofing.

3.02 CLOSEOUT ACTIVITIES:

- A. Provide in accordance with Section 01-7700.

PART 4 - METHOD OF MEASUREMENT AND BASIS OF PAYMENT

4.1 MEASUREMENT AND PAYMENT

- A. There shall be no separate measurement for payment for work under this section. The cost of this work shall be included in the lump sum bid for this project.

END OF SECTION

SECTION 15082 - PIPING INSULATION

PART 1 - GENERAL

1.01 DESCRIPTION:

- A. Provide new and modify existing field-applied insulation. The Work of this Section shall include all labor, materials, tools, equipment and appurtenances, and performing all operations necessary to furnish and install complete systems in accordance with this Section of these Specifications, the Drawings, and the codes and standards listed herein.
- B. Limits of Work shall be as indicated on the Drawings. Items of Work shall consist of the following:
 - 1. Insulate installed piping and equipment in buildings and steam vaults.

1.02 REFERENCES:

- A. Except as specified herein, the latest edition of the standards listed below form a part of this Specification to the extent referenced in this Section. Where earlier editions of standards are adopted as referenced in applicable codes, those shall govern. The publications are referred to within the text by the basic designation only.
- B. In each of the standards referred to herein, consider the advisory provisions to be mandatory, as though the word, "shall" had been substituted for "should" wherever it appears.
- C. American Society for Testing Materials (ASTM):
 - 1. [C547](#): Mineral Fiber Pipe Insulation
 - 2. [C552](#): Cellular Glass Thermal Insulation
 - 3. [C916](#): Adhesives for Duct Thermal Insulation
 - 4. [C1136](#): Flexible, Low Permeance Vapor Retarders for Thermal Insulation
 - 5. [E 84](#): Surface Burning Characteristics of Building Materials
- D. National Fire Protection Association (NFPA):
 - 1. [255](#): Method of Test of Surface Burning Characteristics of Building Materials
- E. Underwriters Laboratories (UL):
 - 1. [723](#): Test for Surface Burning Characteristics of Building Materials

1.03 SUBMITTALS:

- A. Submit the following in accordance with Section 01-3300:
 - 1. Product Data - Annotate descriptive data to show the specific manufacturer, material and specifications, thicknesses, etc. of each item.

- a. Piping insulation and jackets
 - b. Equipment insulation
 - c. Adhesives, sealants, and coating compounds
 - d. Accessory materials
2. Certificates and Licenses - Prepare as specified in Part 1 of this Section.
 - a. Qualifications of Installer

1.04 QUALITY ASSURANCE:

A. Qualifications of Installer

1. Prior to installation, submit data showing the name and license of the installing contractor and that he has successfully installed systems of the same type and design as specified herein. Data shall include names and locations of at least two installations of such systems. Indicate type and design of each system and certify that each system has performed satisfactorily in the manner intended for not less than 18 months. The installing contractor shall be licensed to perform applicable insulation installation in the State of Connecticut.

1.05 DELIVERY, STORAGE AND HANDLING:

A. Provide in accordance with Section 01-6000 and as specified herein.

B. Shipping:

1. All material shall be shipped, stored, handled and installed in such a manner as not to degrade quality, serviceability, or appearance. Material warranties shall not be voided by actions of the Contractor.

C. Receiving:

1. All material shall be delivered to the site in original packages or containers bearing the manufacturer's labels and product identification.
2. Inspect for damage and correctness, and inventory items, upon delivery to site.
3. Store and safeguard material in accordance with manufacturer's recommendations.

1.06 COOPERATION AND COORDINATION WITH OTHER TRADES:

A. Work shall be performed in cooperation with other trades on the project and so scheduled as to allow efficient completion of the project. Materials and equipment shall be installed as fast as conditions will permit, and installed properly when and as directed.

B. Furnish to all other trades advance layout information and shop drawings necessary to permit other trades affected by the Work to install their work properly coordinated and without delay.

C. Where there is evidence that Work installed interferes with the work of other Sections, assist in working out space conditions to make satisfactory adjustments.

- D. With the approval of the Engineer and without extra cost to the Owner, make reasonable modifications in Work specified under this Section of the Specifications required to coordinate with normal structural interference's, or for proper execution of specified work.
 - E. If Work is installed before coordinating with other trades so as to cause interference with the work of such trades, make all necessary changes in Work under this Section of the Specifications at no additional cost to the Owner.
 - F. Protect all materials and work of other trades from damage that may be caused by the Work required under this Section of the Specifications and be responsible for repairing any damages caused by such work without any additional cost to the Owner.
 - G. Attend regular coordination and job progress meetings required.
- 1.07 REMOVAL WORK:
- A. Particular care shall be taken to avoid creating hazards on the site or causing disruption of service in the buildings.
 - B. All existing insulation materials indicated to be removed shall be done in a neat and workmanlike manner. All insulation material shall be removed from the premises.
 - C. Remove insulation from all abandoned ductwork, piping, and equipment not built into building construction.
 - D. Should any asbestos and/or asbestos related products or materials be encountered during the performance of the Work, stop work immediately and inform the Engineer and the Owner of the presence of asbestos.
- 1.08 CODES, PERMITS AND FEES:
- A. Except for additional requirements as specified or indicated under the Work of this Section, materials, workmanship and equipment shall conform with the governing edition of the following regulations, and agency requirements.
 - 1. State and Local Building Codes, including but not limited to, State of Connecticut Energy Conservation Code.
 - 2. Connecticut Department of Energy and Environmental Protection.
 - 3. Local Fire Department
 - 4. Occupational Safety and Health Administration (OSHA)
 - 5. Any other local codes or requirements of Authorities Having Jurisdiction.
 - B. Pay for all fees and give all notices, file all plans, obtain all permits and licenses, and obtain all necessary approvals from Authorities Having Jurisdiction. Deliver all certificates of inspection to the Authorities Having Jurisdiction. No work shall be covered before examination and approval by Authorities Having Jurisdiction. Replace imperfect or condemned work to conform to inspectional requirements, satisfactory to the Architect, Owner, Engineer and Authorities Having Jurisdiction without extra cost to the Owner. If Work is covered before inspection and approval, pay costs of uncovering and reinstalling the covering, whether it meets contract requirements or not.

PART 2 - PRODUCTS

2.01 GENERAL:

A. Packaging and Labeling:

1. Every package or standard container of insulation, jackets, cements, adhesives, and coatings delivered to project site shall have manufacturer's stamp or label attached giving name of manufacturer, brand and description of material. Insulation materials shall be asbestos-free.

B. Surface Burning Characteristics:

1. Materials shall have a flame-spread rating of not more than 25 and a smoke-developed rating of not more than 50, when tested in accordance with NFPA 255, ASTM E84 or UL 723. Insulation materials located exterior to the building perimeter are not required to be fire-rated.

C. Recycled Materials:

1. Provide thermal insulation containing recycled materials to the extent practicable, provided that the materials meet all other requirements of this Section. The minimum recycled material content of the following insulation types are:

- a. Fiberglass: 20 to 25 percent glass cullet by weight

D. Insulation material shall conform to Table 15082-1. Insulation thickness shall be as listed in Table 15082-1. Insulate all piping listed in these tables. Where piping is located in unheated spaces such as crawl spaces, provide insulation thickness one inch thick greater than indicated in Table 15082-1. Insulation exterior shall be factory cleanable, grease resistant, non-flaking and non-peeling.

E. Fittings Insulation:

1. Factory premolded insulation inserts for pipe fittings, flanges and valves shaped to fit the specific fitting to be insulated. Inserts shall be of same material as the straight pipe. Inserts shall be of same thickness as the straight pipe insulation.

F. Piping Insulation Jackets:

1. All-Purpose Jackets:

- a. Insulation manufacturer's standard reinforced fire retardant jacket with or without integral vapor barrier as required by the service. Provide jackets in exposed locations with a white surface suitable for field painting.

2. PVC Jackets:

- a. ASTM D1784 polyvinyl chloride (PVC) jackets, minimum 20 mil thick, and factory premolded PVC fitting covers, UV-resistant, gloss white finish. Provide compatible vapor barrier tape.
 - 1.) Operating Temperature: Rated to 150 deg F.
 - 2.) Flame Spread: < 25
 - 3.) Smoke Developed: < 50
 - 4.) Johns Manville Zeston 300 Series PVC or approved equal.

3. Metal Jackets:

- a. Aluminum Jackets: ASTM B209, Temper H14, minimum thickness of 27 gage (0.016 inch), with factory-applied polyethylene and kraft paper moisture barrier on inside surface. Provide smooth surface jackets for jacket outside diameters less than 8 inches (DN 200). Provide corrugated surface jackets for jacket outside diameters 8 inches (DN 200) and larger. Provide stainless steel bands, minimum width of 1/2-inch and 0.020 inch thick and maximum 12" on center. Provide factory prefabricated aluminum covers for insulation on fittings, valves, and flanges. Covers shall be same thickness and material as jackets on adjacent piping.

2.02 MANUFACTURERS

- A. Subject to compliance with requirements, manufacturer's offering products which may be incorporated in the work include the following:

Certain Teed Corp
Johns Manville Products Corp.
Owens-Corning Fiberglass Corp
Pittsburgh Corning Corp.
Knauf Insulation Co.

2.03 GLASS FIBER INSULATION

- A. Material: Inorganic glass fibers, bonded with a thermosetting resin.
- B. Jacket: All-purpose, factory applied, laminated glass-fiber-reinforced, flame retardant kraft paper and aluminum foil having self-sealing lap.
- C. Pre-formed Pipe Insulation: ASTM C 547, Class 1, rigid pipe insulation, rated for 850 deg F, jacketed.
 1. Thermal Conductivity: 0.24 average maximum at 100 deg F mean temperature per ASTM C335.
 2. Density: Average Maximum: 10; Nominal:4

2.04 CALCIUM SILICATE INSULATION

- A. Material: ASTM C 533, Type I; inorganic, hydrous calcium silicate, non-asbestos fibrous reinforcement; incombustible.
- B. Form: Pre-formed pipe sections.
- C. Maximum service temperature of 1200 deg F.
- D. Thermal Conductivity: 0.67 at 700 deg F per ASTM C335.
- E. Dry Density: 15.0 pcf maximum.
- F. Compressive Strength: 60 psi minimum at 5% deformation.
- G. Linear shrinkage: < 1%.

- H. Fire Performance Characteristics: Provide materials identical to those whose fire performance characteristics have been determined, per test method indicated below, by UL or other testing and inspecting organization acceptable to authorities having jurisdiction.
1. Test Method: ASTM E 84
 2. Flame Spread: 0.
 3. Smoke Developed: 0.
- 2.05 EQUIPMENT INSULATION:
- A. Insulate equipment and accessories as specified in Table 15082-1. In outside locations, provide insulation one (1) inch thicker than specified. Increase the specified insulation thickness for equipment where necessary to equal the thickness of angles or other structural members to make a smooth, exterior surface.
- 2.06 ADHESIVES, SEALANTS, AND COATING COMPOUNDS:
- A. Insulation and Vapor Barrier Adhesive: ASTM C916, Type I adhesive for securing insulation to metal surfaces and for vapor barrier lap only in building interior.
- B. Lagging Adhesive: Fire resistant, for pipe and duct insulation.
1. Provide appropriate class recommended by insulation manufacturer for bonding fibrous glass cloth to unfaced fibrous glass insulation; for bonding cotton brattice cloth to faced and unfaced fibrous glass insulation board; for sealing edges of and bonding fibrous glass tape to joints of fibrous glass board; or for bonding lagging cloth to thermal insulation.
 2. Provide appropriate class for attaching fibrous glass insulation to metal surfaces.
- C. Vapor Barrier Coating: Provide in accordance with insulation manufacturers' recommendations.
- D. Weatherproof Coating: For outside applications, provide in accordance with insulation and jacket manufacturer's recommendations.
- 2.07 ACCESSORY MATERIALS:
- A. Staples: ASTM A167, Type 304 or 316 stainless steel outside-clinch type.
- B. Insulation Bands: 1/2-inch wide; 26 gage stainless steel.
- C. Metal Bands: 3/8-inch minimum width; 24 gage aluminum.
- D. Fibrous Glass Cloth and Tape: 20 by 20 maximum size mesh. Tape shall be 4 inch wide rolls. Tape shall be 4.5 ounces per square yard. In lieu of glass cloth and tape, open weave glass membrane may be provided.
- E. Wire: Soft annealed stainless steel, 16 gage.
- F. PVC Pipe Fitting Cover and Its Vapor Barrier Tape: Provide PVC fitting covers with insulation inserts of same material and thickness as pipe insulation.
- G. Vapor Barrier Materials: ASTM C1136. Resistant to flame, moisture penetration, and mold growth, color white.

PART 3 - EXECUTION

3.01 GENERAL:

- A. Do not insulate the following:
 - 1. Unions
 - 2. ASME stamps
 - 3. Cleanouts or handholes
 - 4. Manufacturer's nameplates
 - 5. Flexible connectors

3.02 PIPING INSULATION:

- A. Insulation:
 - 1. Insulation within steam vaults shall be calcium silicate with metal jacket.
 - 2. Insulation on piping within buildings shall be fiberglass, with PVC jacket.
 - 3. Place sections of insulation around pipe and joints tightly butted into place. Draw jacket tight and smooth. Secure jacket with fire resistant adhesive, factory-applied self-sealing lap, or stainless steel outward clinching staples spaced not over 4 inches on center and 1/2-inch minimum from edge of lap. Cover circumferential joints with butt strips, not less than 3 inches wide, of material identical to jacket material. Overlap longitudinal laps of jacket material not less than 1-1/2 inches. Adhesive used to secure butt strip shall be same as that used to secure jacket laps. Apply staples to both edges of butt strips.
 - 4. Vapor Barrier Jacket: When a vapor barrier jacket is required on ends of sections of insulation that butt against flanges, unions, valves, fittings, and joints, provide a vapor barrier coating, or manufacturer's weatherproof coating for outside service, unless pipe insulation is supplied with factory-applied self-seal lap. Apply vapor barrier coating at longitudinal and circumferential laps. Patch damaged jacket material by wrapping a strip of jacket material around the pipe and cementing, stapling, and coating as specified for butt strips. Extend patch not less than 1-1/2 inches past the break in both directions. At penetrations by pressure gages, thermometers, etc. fill voids with vapor barrier coating for outside service. Seal with a brush coat of the same coating.
- B. Fiberglass and Calcium Silicate Insulation:
 - 1. Provide in accordance with manufacturer's printed instructions.
- C. Piping Insulation Jackets:
 - 1. All-Purpose Jackets:
 - a. Provide all-purpose jackets and PVC fitting covers for all piping except as otherwise specified herein.

2. Polyvinyl Chloride (PVC) Jackets:
 - a. Provide PVC jacketing system to cover all straight runs, pipe fittings, flanges and valves of services to be insulated inside of buildings. Do not provide PVC jacketing where exposed to weather. Provide PVC jacketing only in ambient temperatures below 150 degrees F. Do not provide PVC jacketing at insulated pipe through-penetrations.
 - b. Secure jacketing with stapling, with metal or plastic tacks made for securing PVC jackets, or with jacket manufacturer's solvent welding adhesive to seal all lap joints in the system. For services where vapor barrier is required, provide vapor retarder mastic compatible with PVC as recommended by the jacket manufacturer applied over all lap joints in the jacketing system, or provide taping with PVC vapor barrier tape. Provide factory prefabricated PVC covers for insulation on fittings, valves, and flanges.
3. Metal Jackets:
 - a. Provide metal jacketing system to cover all straight runs, pipe fittings, flanges and valves of services to be insulated within steam vaults. Provide metal jacketing at insulated pipe through-penetrations.
 - b. Provide stainless steel bands to secure jackets to insulation. Provide factory prefabricated metal covers for insulation on fittings, valves, and flanges.

D. Hangers and Anchors:

1. Pipe insulation shall be continuous through pipe hangers. Where pipe is supported by insulation, provide galvanized steel shields or protection saddles.
2. Where shields are used on pipes 2 inches (DN 50) and larger, provide insulation inserts at points of hangers and supports. Insulation inserts shall be of calcium silicate, cellular glass, molded glass fiber, rigid foam or other approved material, all minimum 15 pounds per square inch compressive strength, of the same thickness as adjacent insulation. Insulation inserts shall cover bottom half of pipe circumference and be not less in length than the protection shield. Vapor-barrier facing of insert shall be of same material as facing on adjacent insulation. Seal inserts into insulation with vapor barrier coating or weatherproof coating as applicable.
3. Where protection saddles are used, fill voids with same insulation material as used on adjacent pipe. Protection saddles shall not be used on piping carrying medium less than 60 degrees F unless otherwise indicated.
4. Where anchors are secured to piping carrying medium less than 60 degrees F that is to be insulated, insulate anchors same as piping for a distance not less than four times the insulation thickness to prevent condensation. Vapor seal insulation around anchors.

E. Through-Penetrations:

1. Where interior wall is penetrated, extend a metal jacket 2 inches out on either side of wall and secure on each end with a metal band. Where floor is penetrated, extend a metal jacket from a point below the floor slab to a point 10 inches above floor with one metal band at the floor and one not more than one inch from end of metal jacket. Where exterior wall is penetrated, extend metal jacket through sleeve to a point 2 inches beyond interior surface of wall.

2. Provide insulation inserts beneath the metal jacket. Insulation inserts shall be of calcium silicate or cellular glass of the same thickness as adjacent insulation. Insulation inserts shall cover full pipe circumference and be not less in length than the metal jacket. Vapor-barrier facing of insert shall be of same material as facing on adjacent insulation. Seal inserts into insulation with vapor barrier coating.

F. Flanges, Unions, Valves and Fittings for Piping:

1. Factory fabricated removable and reusable insulation inserts shall be used. When nesting size insulation is used, overlap 2 inches or one pipe diameter, whichever is larger. Use insulating cement to fill voids. On pipe sizes larger than 2-1/2 inches, elbows insulated using insulation segments shall not have less than three segments per elbow. Place and join segments with manufacturer's recommended water-vapor resistant, fire retardant adhesive appropriate for the temperature limit of the service. Overlap tape seams one inch. Total dry film thickness shall be not less than 1/16-inch. Unions are not to be insulated; taper insulation to union at a 45 degree angle.
2. Provide finish of one of the following:
 - a. PVC Fitting Covers: Secure covers with stapling, taping with PVC vapor barrier tape, or with metal or plastic tacks made for securing PVC fitting covers. Do not provide PVC fitting covers where exposed to weather.
 - b. Metal Jacket Fitting Covers: Secure covers with stainless steel bands. Provide minimum 2 bands per fitting cover unless more are prescribed per manufacturer instructions.

G. Piping Within Steam Vaults

1. Metal Jackets: Provide over insulation. Machine cut jacket to smooth edge of circumferential joints. Overlap jacket not less than 2 inches at longitudinal and circumferential joints and secure with metal bands at not more than 9 inch centers. Overlap longitudinal joints down to shed water. Seal joints with a coating recommended by insulation manufacturer for weatherproofing.
2. Flanges, Unions, Valves, Fittings, and Accessories: Insulate and finish as specified hereinbefore for applicable service. Apply two coats of an emulsion type weatherproof mastic for hot service and vapor barrier mastic for cold service recommended by insulation manufacturer. Embed glass tape in the first coat. Overlap tape not less than 1 inch and the adjoining metal jacket not less than 2 inches.

3.03 FIELD QUALITY CONTROL:

- A. Except as otherwise permitted herein, Mechanical systems shall be cleaned and tested prior to application of insulation. Obtain Engineer's approval of systems before applying field insulation. Visually inspect to ensure that insulation materials provided conform to Specifications. Inspect installation of insulation for compliance with requirements.
 1. Piping systems shall not be insulated before systems pressure testing and related inspections.

3.04 CLOSEOUT ACTIVITIES:

- A. Provide in accordance with Section 01-7700.

PART 4 - METHOD OF MEASUREMENT AND BASIS OF PAYMENT

4.1 MEASUREMENT AND PAYMENT

- A. There shall be no separate measurement for payment for work under this section. The cost of this work shall be included in the lump sum bid for this project.

END OF SECTION

TABLE 15082-1						
INSULATION AND THICKNESS (INCHES) FOR BUILDING AND STEAM VAULT PIPING						
Service & Surface Temperature Range (Degrees F)	Material	Outside Diameter (Inches)				
		1/4 – 1-1/4	1-1/2 - 3	3-1/2 - 5	6 - 10	11 - 36
Plumbing Domestic Cold Water Piping	Fiberglass	0.75	1	1	1	1
High Pressure Steam and High Pressure Condensate	Fiberglass (Building)	1	1.5	2	2.5	2.5
	Calcium Silicate (Steam Vault)	1	2	2.5	3	3.5
Condensate Return	Fiberglass (Building)	1	1	1	1.5	1.5
	Calcium Silicate (Steam Vault)	1	1	1	1.5	1.5

END OF SECTION

SECTION 15183 – INTERIOR STEAM AND CONDENSATE PIPING

PART 1 - GENERAL

1.01 DESCRIPTION:

- A. Provide steam and condensate piping in buildings and steam vaults as indicated and in compliance with Contract Documents.

1.02 REFERENCES:

- A. American Society of Mechanical Engineers (ASME):
 - 1. B16.4: Gray Iron Threaded Fittings Classes 125 and 250.
- B. American Society for Testing and Materials International (ASTM):
 - 1. A53: Standard Specification for Pipe, Steel, Black and Hot-Dipped, Zinc-Coated, Welded and Seamless
 - 2. A105: Standard Specification for Carbon Steel Forgings for Piping Applications
 - 3. A234: Standard Specification for Piping Fittings of Wrought Carbon Steel and Alloy Steel for Moderate and High Temperature Service

1.03 SUBMITTALS:

- A. Submit the following shop drawings in accordance with Section 01-3300.
- B. Shop Drawings: Submit shop drawings for all products specified in this Section except piping and unions.

1.04 QUALITY ASSURANCE:

- A. Comply with the requirements specified in Section 01-4000.

1.05 DELIVERY STORAGE AND HANDLING:

- A. Comply with the requirements specified in Section 01-6000.

PART 2 - PRODUCTS

2.01 PIPE, FITTINGS AND JOINTS:

- A. Black Steel - Screwed Joint: Mild black carbon steel, Grade B, ASTM A53, complete with Class 125 or Class 250 cast iron threaded fittings to ANSI/ASME B16.4, and screwed joints.
- B. Black Steel - Welded Joint: Mild black carbon steel, Grade B, ASTM A53, mill or site beveled, complete with factory made seamless carbon steel butt welding fittings to ASTM A234, Grade WPB with a wall thickness to match the pipe, and welded joints.

2.02 PIPING UNIONS:

- A. Screwed Condensate Piping: Malleable iron, ground joint, factory tested "RAILROAD" type screwed unions and union elbows with a brass to iron seat and a minimum pressure rating of 600 psi WOG (non-shock).
- B. Screwed High Pressure Steam Piping: "RAILROAD" type screwed unions as specified above for screwed condensate piping.
- C. Welded Condensate Piping: Forged carbon steel slip-on raised face welding flange unions to ASTM A105, 300 pound Class.
- D. Welded High Pressure Steam and Condensate High Pressure Piping: 300 pound Class welding flange unions as specified for welded condensate piping.

2.03 FLEXIBLE PIPE CONNECTIONS:

- A. Flexible metal hose assemblies each complete with annular corrugated unbraided Type 321 stainless steel inner core, braided Type 321 seamless steel hose, and a collar and flange at each end, all suitable for twice the working pressure of the system. Acceptable products are:
 - 1. Thornburg Equipment Inc. corrugated metal hose
 - 2. Senior Flexonics Inc. A1 and A6 Series

2.04 PIPE ANCHORS:

- A. Welded structural black steel anchors of a size and type to securely anchor the pipe at the point shown. Each anchor is to be designed and detailed by a professional structural engineer registered in the State of Connecticut. Submit anchor shop drawings, stamped by the design engineer, for review. Anchors to be painted black with two (2) coats of epoxy paint.

2.05 SHUT-OFF VALVES:

- A. Low Pressure Condensate: Ball, gate or globe type valves suitable in all respects for steam and condensate service, and as follows:
 - 1. Ball Type to (2 inches): Forged brass or bronze full bore ball valve, (150 psi) WSP rated, complete with a chrome plated forged brass ball, PTFE seat and gland packing, screwed ends and a carbon steel handle. Where piping is insulated provide stem extensions to clear insulation. Acceptable products are:
 - a. Conbraco
 - b. Neles-Jamesbury
 - c. Worcester
 - d. Hibco
 - 2. Ball Type (2-1/2 inches) and Larger: Carbon steel, flanged, (150 psi) WSP rated ball valve with a cast iron Teflon fused ball or stainless steel ball, blow-out proof stainless steel stem, reinforced Teflon seats, and steel handle which is lockable in fully open and fully closed positions. Acceptable products are:
 - a. Conbraco
 - b. Neles-Jamesbury
 - c. Worcester

- d. Hibco
- 3. Bronze Gate to (2 inches): Cast bronze, screwed, (150 psi) WSP rated rising stem gate valve with a screwed-in cast bronze bonnet, cast bronze disc, and zinc or aluminum die-cast hand wheel. Acceptable products are:
 - a. Crane
 - b. Walworth
 - c. Hibco
 - d. Stockham
- 4. Bronze Globe to (2 inches): Cast bronze, screwed, (150 psi) WSP rated rising stem globe valve with a union bonnet, reinforced PTFE disc, and zinc or aluminum die-cast hand wheel. Acceptable products are:
 - a. Smith
 - b. Stockham
- 5. Cast Iron Gate 75 mm (2 ½ inches) and Larger: Class 250 cast iron bronze mounted rising stem flanged gate valves, each equipped with a bronze disc and a cast or ductile iron handwheel. Acceptable products are:
 - a. Crane
 - b. Walworth
 - c. Hibco
 - d. Stockham
- 6. Cast Iron Globe (2 1/2 inches) and Larger: Class 250 cast iron bronze fitted flanged globe valves, each equipped with a bronze disc and a cast or ductile iron hand wheel. Acceptable products are:
 - a. Smith
 - b. Stockham
- B. High Pressure Steam High Pressure Condensate: Gate or globe type valves suitable in all respect for steam and condensate service, and as follows:
 - 1. Bronze Gate to (2 inches): Class 150 cast bronze gate valves, each equipped with screwed ends, rising stem, cast bronze disc, and cast zinc, or aluminum hand wheel. Acceptable products are:
 - a. Crane
 - b. Walworth
 - c. Hibco
 - d. Stockham
 - 2. Bronze Globe to (2 inches): Class 150 cast bronze globe valves, each equipped with screwed ends, rising stem, non-metallic disc, and cast zinc or aluminum hand wheel. Acceptable products are:
 - a. Smith
 - b. Stockham
 - 3. Cast Steel Gate (2-1/2 inches) and Larger: Class 150 OS & Y, rising stem, bolted bonnet cast steel gate valve with plain solid wedge or flexible solid wedge depending on valve size, flanged ends, and ductile iron hand wheel. Acceptable products are:
 - a. Crane

- b. Walworth
- c. Hiboc
- d. Stockham

- 4. Cast Steel Globe (2-1/2 inches) and Larger: Class 150 OS&Y, rising stem, bolted bonnet cast steel globe valve with swivel disc, flanged ends, and ductile iron hand wheel. Acceptable products are:
 - a. Smith
 - b. Stockham

2.06 DRAIN VALVES:

- A. Minimum (150 psi) steam rated, 3/4-inch diameter straight pattern bronze or brass ball valves, each complete with stainless steel ball and stem, multi filled seats and packing, a threaded outlet suitable for coupling connection of (3/4-inch) garden hose, locking handle and a cap and chain. Acceptable products are:
 - 1. Smith
 - 2. Stockham

2.07 STEAM SEPARATORS:

- A. Cast iron baffle type steam separators, sized to the condensate pipe size, each complete with screwed or flanged ends as required, and a float thermostatic steam trap module. Acceptable products are:
 - 1. Spirax Sarco Model S1 or Model S3
 - 2. Gestra
 - 3. Spirax Sarco Canada Ltd. Type 299
 - 4. Gestra

2.08 STRAINERS:

- A. Cast iron or bronze wye shaped strainers, minimum (125 psi) rated and complete with a removable type 304 stainless steel screen with perforations sized to suit the application, and, for strainers (2 inch) diameter and larger, a blowdown pipe connection tapping. Acceptable products are:
 - 1. Spirax Sarco
 - 2. Mueller
 - 3. Armstrong International Inc.
 - 4. Watts Water Technologies

2.09 STEAM DRIP TRAPS:

- A. Steam drip traps are to be selected to suit the inlet pipe size and inlet steam pressure, and are to be as follows:
 - 1. Thermodynamic Traps: maximum (600 psi) rated, integral seat design stainless steel thermodynamic type traps, each complete with an integral strainer and insulating cover. Acceptable products are:
 - a. Spirax Sarco
 - b. Gestra
 - c. Armstrong International Inc.
 - d. Yarway

2. Float and Thermostatic Traps: Modulating discharge mechanical ball float type, each complete with a cast iron or steel body, stainless steel trim, screwed or flanged ends as required, and an integral thermostatic air vent. Acceptable products are:
 - a. Spirax Sarco
 - b. Gestra
 - c. Armstrong International Inc.

2.10 PAINTING:

- A. All steam and condensate piping within steam vaults, including pipe, fittings, valves, flanges, connections, anchors, trap assemblies, vent piping and accessories shall be painted prior to the application of insulation and jackets.
- B. Paint shall be epoxy based formulated for use under thermal insulation at elevated temperatures and for immersion service in water:
 1. Temperature resistant to 450 deg F.
 2. Self priming.
 3. Chemical resistant.
 4. Resistant to thermal shock.
 5. Ambient temperature cure.
- C. Paint shall be COR-Cote HT FF Hi-Temp Coating as manufactured by Sherwin Williams, or approved equal.
 1. Two (2) coats @ 4.0 – 5.0 mils each
- D. Surface preparation:
 1. SSPC-SP6 Commercial Blast Cleaning, or
 2. SSPC-SP11 Power Tool Cleaning to Bare Metal
- E. Manufacturer's Recommendations:
 1. Provide surface preparation and paint application in accordance with manufacturer's recommendations.

PART 3 - EXECUTION

3.01 DEMOLITION:

- A. At the proper time disconnect (mechanically) and remove existing obsolete piping, equipment and accessories.

3.02 STEAM AND CONDENSATE PIPING INSTALLATION REQUIREMENTS

- A. Provide all required steam and condensate piping.
- B. Piping, unless otherwise specified, is to be mild black steel, screwed for pipe to and including (2 inch) diameter, welded for pipe (2-1/2 inch) diameter and larger, and as follows:
 1. High Pressure Steam – screwed: Schedule 40, complete with Class 250 screwed fittings.

-
2. Condensate, all pressures – screwed: Schedule 80, complete with Class 250 screwed fittings.
 3. High Pressure Steam – welded: Schedule 40 with butt weld fittings.
 4. Condensate, all pressures welded: Schedule 80 with butt weld fittings.
- C. Unless otherwise specified, slope horizontal steam mains down (1 inch) in (20 feet) in the direction of flow. Steam mains may be run level if frequently and adequately dripped with equal tee connections and trapped at end through riser connections, however, slope such steam mains, if no branches are connected thereto for more than (25 feet), (1 inches) in a (20 feet) as specified above. Provide equal tee drip stations every (115 feet to 150 feet) in steam mains greater than (4 inch) diameter.
- D. Unless otherwise approved, slope horizontal condensate return mains (2-1/2 inch) diameter and larger (1 inch) in a (20 feet). Slope smaller condensate return lines and condensate drip piping not less than (1 inches) in (10 feet). Slope all condensate piping in the direction of flow.
- E. Slope steam supply and condensate return branch connections to and from equipment a minimum of (1 inch) in (6 feet), the slope being downward to the risers to which the branch piping connects. Increase this slope wherever necessary to prevent trapping due to expansion of the risers, or provide steam drip trap assemblies.
- F. Extend branch steam supply piping off the top of horizontal mains, either vertically (90°) or at a 45° angle, as space permits.
- G. Make all changes in pipe size in horizontal steam and condensate piping with eccentric fittings flush with the pipe on the bottom. Do not use bushings in any piping.
- H. Install automatic control valves, piping wells and similar piping and/or equipment mounted control components required for automatic temperature control systems.
- I. Include for all required steam and condensate piping and accessories for connections to the Owner's equipment as shown and/or scheduled.
- 3.03 INSTALLATION OF UNIONS:
- A. Provide screwed unions or weld-on flange joint unions in all piping connections to valves, strainers and similar piping system components which may need maintenance or repair, at all equipment connections, in long runs of piping exceeding (30 feet) at (15 foot) intervals to permit removal of sections of piping, and wherever else indicated on the Drawings.
- 3.04 INSTALLATION OF FLEXIBLE PIPING CONNECTIONS:
- A. Provide flexible connections in steam and feedwater connections to each steam boiler.
- B. Install flexible connections in accordance with the manufacturer's instructions.
- 3.05 INSTALLATION OF EXPANSION COMPENSATORS AND PIPE GUIDES:
- A. Provide expansion compensators in the piping where shown on the Drawings. Install in accordance with the manufacturer's instructions.

-
- B. Provide pipe alignment guides where shown, including double guides at each side of expansion compensators, with exact locations in accordance with the expansion compensator supplier's recommendations.
- 3.06 INSTALLATION OF PIPE ANCHORS:
- A. Provide anchors to secure pipework to the structure where shown and/or specified. Anchors are to be in accordance with reviewed shop drawings.
- 3.07 INSTALLATION OF SHUT-OFF VALVES:
- A. Provide a shut-off valve in each steam and condensate piping connection to equipment whether shown on the Drawings or not, at the base of each piping riser, and wherever else shown or specified.
- B. Low Pressure Condensate: Valves in piping where a throttling or balancing action is required are to be globe type. All other valves are to be ball or gate type.
- C. High Pressure Steam and High Pressure Condensate: Valves in piping where a throttling or balancing action is required are to be globe type. All other valves are to be gate type.
- D. Locate all valves so that they are easily accessible. Whenever possible, install valves at uniform height. Provide chain operators for valves which are inaccessible for operation from floor level.
- 3.08 INSTALLATION OF DRAIN VALVES:
- A. Provide a drain valve at the base of each piping riser, in drain connections to equipment, and wherever else shown and/or specified. At the bottom of risers provide minimum (8 inches) long, minimum (1 inch) diameter capped dirt pockets with drain valves.
- 3.09 INSTALLATION OF STEAM SEPARATORS:
- A. Provide a steam separator assembly with float and thermostatic steam trap module upstream of each steam pressure reducing station as shown.
- B. Each separator is to be the full line size of the pressure reducing station.
- 3.10 INSTALLATION OF DRIP PAN ELBOWS:
- A. Provide a drip pan elbow as close as possible to the discharge of each steam pressure relief valve. Install each drip pan elbow in accordance with the manufacturer's instructions. Provide drain piping at the bottom of the elbow, and ensure that the steam vent pipe to atmosphere is rigidly supported independent of the drip pan elbow.
- 3.11 INSTALLATION OF STRAINERS:
- A. Provide a strainer at each steam drip trap, and in piping where shown. Locate strainers so that baskets are easily removable. Clean strainer baskets after piping system flushing and cleaning is complete.

3.12 INSTALLATION OF STEAM DRIP TRAPS:

- A. Provide a steam drip trap assembly in the condensate return piping from each piece of equipment, at the base of each riser, in horizontal steam mains as specified, and wherever it is necessary to raise the piping to avoid a reduction in ceiling height or minimum headroom allowances. Size drip traps to correspond with condensate return piping sizes unless otherwise specified. Equip each drip trap with shut-off valve(s), two unions located immediately upstream and downstream of the trap, a strainer, sensing chamber, and a dirt pocket.
- B. Thermodynamic Traps: Drip traps in steam mains with a working pressure greater than (20 psi) and (20 psi) and greater piping to equipment, unless otherwise specified, are to be thermodynamic type traps.
- C. Float & Thermostatic Traps: Drip traps in low pressure (20 psi) steam mains and in (20 psi) or less piping to equipment, unless otherwise specified, are to be float and thermostatic type traps.
- D. Balanced Pressure Thermostatic Traps: Drip traps for direct steam radiation units are to be balanced pressure thermostatic type.
- E. Connect low pressure condensate drip piping from steam drip trap assemblies into condensate return piping unless otherwise shown on the Drawings or specified herein. Do not connect condensate return piping into the discharge of traps draining steam mains.

3.13 INSTALLATION OF STEAM DRIP TRAP TESTING COMPONENTS:

- A. Provide a drip trap testing sensor chamber in piping downstream of each trap to be tested as indicated on the Drawings.
- B. For each trap which is to be tested but is inaccessible (concealed, or exposed but located at high level or otherwise inaccessible), provide a wall mounting remote test point and accurately identify the test point to indicate the trap and sensor chamber it is associated with. Connect the sensor chamber and remote test point with conduit and wiring of a type recommended by the test equipment manufacturer. Provide terminal strips for connecting conductors. Neatly secure wiring in place at close intervals.
- C. For groups of traps which are to be tested but are inaccessible, provide a wall mounting remote multiple test point. Connect sensor chambers associated with the remote traps to test point terminals with wire of a type recommended by the test equipment manufacturer. Provide terminal strips for connecting conductors. Neatly secure wiring in place at close intervals. Provide a typed, glazed and framed directory adjacent the remote multiple test point to indicate the traps connected to the test point selector dial.
- D. Confirm test point locations prior to roughing-in.
- E. Supply a hand-held test indicator with battery and turn the unit over to the Owner prior to application for Substantial Performance.

3.14 CLOSEOUT ACTIVITIES:

- A. Provide in accordance with Section 01-7700.

N. EAGLEVILLE RD INFRA. R/R
PHASE II – YOUNG QUAD UTILITIES
AT THE UNIVERSITY OF CONNECTICUT
STORRS, CT
UCONN PROJ. #901954
URS JOB #36940200

INTERIOR STEAM AND CONDENSATE PIPING

15183-9

PART 4 - METHOD OF MEASUREMENT AND BASIS OF PAYMENT

4.1 MEASUREMENT AND PAYMENT

- A. There shall be no separate measurement for payment for work under this section. The cost of this work shall be included in the lump sum bid for this project.

END OF SECTION

SECTION 16100 – RACEWAYS - UNDERGROUND

PART 1 - GENERAL

1.1 RELATED DOCUMENTS

- A. Drawings and general provisions of the Contract, including General and Supplementary Conditions, Division 1 apply to this Section.
- B. Refer to University Planning and Design Standards, Division 16, for additional requirements.

1.2 SUMMARY

- A. This Section includes raceways for electrical wiring.
- B. Raceways include the following:
 - 1. Rigid non-metallic conduit.

1.3 SUBMITTALS

- A. General: Submit for review, each item in this Article according to the Conditions of the Contract, Division 1.
 - 1. Product data for conduit, conduit bodies and fittings.

1.4 QUALITY ASSURANCE

- A. Comply with NFPA 70 "National Electrical Code" for components and installation.
- B. Listing and Labeling: Provide products specified in this Section that are "Listed and Labeled" as defined in the National Electrical Code, Article 100.
- C. Comply with NECA "Standard of Installation."

PART 2 – PRODUCTS

2.1 STANDARDS

- A. Underground Electrical Raceways:
 - 1. All underground electrical raceways shall be in accordance with Attachment "A" – "Specification For Electric Utility Underground Construction And Maintenance Work For The Connecticut Light And Power Company" of this specification section.
 - 2. All underground electrical raceways shall be subject to field inspection and approval by Eversource personell.

A. Underground Telecommunication Raceways:

1. All underground telecommunication raceways shall be in accordance with the notes and details provided on Sheet C-26 – Telecommunication Details.
2. All underground telecommunication raceways shall be subject to field inspection and approval by UCONN UITS personnel.

2.2 MANUFACTURERS

A. Available Manufacturers: Subject to compliance with requirements, manufacturers offering Products that may be incorporated in the Work include, but are not limited to, the following:

1. Non-Metallic Conduit:
 - a. American International.
 - b. Anamet Electrical, Inc.; Anaconda Metal Hose.
 - c. Arnco Corp.
 - d. Cantex, Inc.
 - e. Certainteed Corp.; Pipe & Plastics Group.
 - f. Lamson & Sessions; Carlon Electrical Products.
 - g. Thomas & Betts Corporation.

2.3 NON-METALLIC CONDUIT AND TUBING

- A. Rigid Plastic Conduit, Schedule 40 PVC, and/or “Carlon” make type “EB”, ETL listed TC-8, EB-35/ASTM, F-512 heavy wall pvc.
 1. Underground telephone service duct bank encased in concrete in accordance with UITS Design Guidelines & Standards.
- B. Rigid Non-Metallic Conduit Fittings: NEMA TC 3; match to conduit or tubing type and material.

PART 3 - EXECUTION

3.1 EXAMINATION

- A. Examine surfaces to receive raceways, boxes and enclosures for compliance with installation tolerances and other conditions affecting performance of the raceway system. Do not proceed with installation until unsatisfactory conditions have been corrected.

3.2 INSTALLATION

- A. Underground duct bank shall be installed minimum of 30” below grade to top of bank, whenever

possible. If 30" is not possible, concrete encased ducts may be installed to minimum burial depth stipulated in NEC. Underground runs cable markers shall be installed for all direct buried cables and cables in non-metallic and metallic raceways. Marker shall be located directly over buried lines at 8 to 10 inches below finished grade.

- B. Install raceways as indicated and according to manufacturer's written instructions.
- C. Install raceways level and square and at proper elevations.
- D. Use temporary closures to prevent foreign matter from entering raceway.
- E. Make bends and offsets so the inside diameter is not reduced. Unless otherwise indicated, keep the legs of a bend in the same plane and the straight legs of offsets parallel.
- F. Join raceways with fittings designed and approved for the purpose and make joints tight.
 - 1. Make raceway terminations tight. Use bonding bushings or wedges at connections subject to vibration. Use bonding jumpers where joints cannot be made tight.
 - 2. Use raceway fittings compatible with raceway and suitable for use and location. For intermediate steel conduit, use threaded rigid steel conduit fittings.
- G. Provide marker tape above all underground ductbanks per UConn Standards.

3.3 CLEANING

- A. Upon completion of installation of system, including outlet fittings and devices, inspect exposed finish. Remove burrs, dirt, and construction debris and repair damaged finish, including chips, scratches, and abrasions.

PART 4 - METHOD OF MEASUREMENT AND BASIS OF PAYMENT

4.1 MEASUREMENT AND PAYMENT

- A. There shall be no separate measurement for payment for work under this Section. The cost of this work shall be included in the lump sum bid for this project.

-END OF SECTION 16100-

ATTACHMENT “A”

**SPECIFICATION FOR UNDERGROUND CONSTRUCTION AND MAINTENANCE
WORK FOR THE CONNECTICUT LIGHT AND POWER COMPANY**

NORTHEAST UTILITIES SERVICE COMPANY

SPECIFICATION FOR
ELECTRIC UTILITY UNDERGROUND CONSTRUCTION
AND MAINTENANCE WORK FOR
THE CONNECTICUT LIGHT AND POWER COMPANY

December 20, 2004


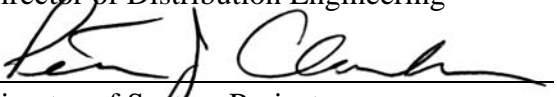
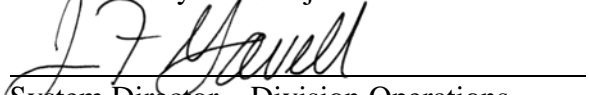
Approvals:  Date: 12/22/04
Director of Distribution Engineering
 Date: 12/21/04
Director of System Projects
 Date: 12/21/04
System Director – Division Operations

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GENERAL TECHNICAL SPECIFICATION

PART 1 GENERAL

1.0 SCOPE

This Specification provides general direction in performing work involving the Conventional Underground Distribution System (manhole and concrete encased duct). General Conditions and Special Terms and Conditions may be added to further identify and define the work scope and practices. This specification may be applied to customer installed facilities.

This Technical Specification does not address Direct Buried or cable in conduit with no concrete encasement (Direct Buried in Conduit).

1.1 DEFINITIONS

Owner -	The Connecticut Light and Power Company (CL&P) or Northeast Utilities Service Company
Owner's Construction Representative -	Individual designated by CL&P to Oversee the Work.
CDOT -	Connecticut Department of Transportation.
Work -	Materials, equipment, engineering, construction or other services provide by the Contractor and any subcontractors under the Contract or Purchase Order.

1.2 REFERENCES

- A. Form 814A, State of Connecticut Department of Transportation. Standard specifications for Roads, Bridges, and Incidental Construction, 1995.
- B. AASHTO: American Association of State Highway and Transportation Officials Standards and Supplements, (Latest Edition).
- C. ASTM: American Society of Testing Materials.
- D. Soil Conservation Service's "Erosion and Sediment Control Handbook (Latest Edition)
- E. Northeast Utilities Underground Distribution Standards

1.3 MATERIAL AND SERVICES FURNISHED BY OWNER

Materials and services identified as follows shall be furnished by the Owner or as otherwise identified.

- A. All conduits, bends, reducers, couplings, adapters, pull line, plastic spacers, and plugs required for complete installation of underground conduit runs.
- B. Cast-iron manhole and service box frames and covers, steel beams, pulling eyes, grounding devices, vault gratings and frames, bolts, steel wedges, and precast concrete manhole extension rings.
- C. Hexagonal holes, service boxes, pads, frames, covers, ground wire and anodes.
- D. Precast manholes, and vaults will be furnished and installed at the Owner's expense in an excavation provided by the Contractor.
- E. Owner reserves the right to furnish backfill material or order use of substitute materials or methods described herein or detailed in the project specification and drawings.

1.4 MATERIAL AND SERVICES FURNISHED BY CONTRACTOR

- A. All labor, equipment, and material not supplied by Owner necessary for the complete installation of the underground facilities shall be provided by the Contractor unless otherwise identified.
- B. Tools necessary for cutting, shaping, or preparing various types of conduit.
- C. When required, the Contractor will furnish and operate trucks and trailers for transporting of conduits and other associated materials from the Owner's storeroom to job site. All such materials will be loaded on Contractor's transportation equipment by the Owner. Contractor's transportation equipment shall be satisfactory to Construction Representative, and all materials shall be handled and transported in a manner not to cause any damage to conduit, pre-cast concrete structures or any other materials.

PART 2 PRODUCTS

2.0 MATERIALS

A. Submittals: Product Data

1. Contractor shall submit a complete materials list of all items proposed to be furnished and installed but not provided by Owner or by Owner's approved vendors as identified in Appendix A.
2. Contractor shall submit Manufacturer's specifications and other data required to demonstrate compliance with the specified requirements.

B. Fill and Backfill Material

1. Approval Required: All fill and backfill material shall be subject to the approval of the Owner's Representative.
2. On-Site Fill Material: Except as noted below, it is the intent that all excavated material with rock size less than 4 inches in greatest dimension shall be used as fill and backfill. Fill shall be free from lumps of clay, debris, organic matter, frozen material and other deleterious substances.
3. Imported Fill Material: In the event of a deficit of suitable on-site material, imported material may be used. Imported material shall be predominantly sand and gravel mix or bank-run gravel which is free from lumps of clay, organic matter, frozen material and other deleterious substances. It shall contain no rocks or lumps over 4 inches in greatest dimension and not more than 15% of the particles shall be larger than 2 inches in greatest dimension. It shall be well graded between its maximum and minimum particle sizes with not more than 15% by weight passing the No. 200 mesh sieve.
4. All Fill Materials, either On-Site or Imported, shall comply with all environmental regulations.

B. Conduit, Fittings, Bends, and Cement

1. General Requirements

- a. Size of conduits, fittings and bends, locations and duct configuration shall be as shown on approved design drawings.
- b. All materials shall be provided from Northeast Utilities approved manufacturers and/or vendors in accordance with Appendix A unless stated otherwise.
- c. PVC Conduits are shipped either in framed units or in bulk. Framed units and single conduits should not be dropped from the truck bed. Avoid prolonged storage of a bulk shipment on truck as excessive weight may cause deformation of the bottom conduits. Some materials tend to become brittle in cold weather; therefore, extra care should be exercised when handling conduit in freezing temperature.

2. Conduit, PVC, Encased Buried

Conduit shall be encased buried type polyvinyl chloride. Conduit shall have one bell end and meet NEMA TC 6 & 8 - 2003 for EB-20 Conduit.

3. Bends, Couplings, Adapters, PVC

Conduit fittings shall be encased buried type polyvinyl chloride. Conduit fittings, bends and adapters shall meet the requirements of NEMA TC 9 – 2004.

4. Cement, Conduit, PVC

Conduit Cement shall be all-weather, quick-set cement for joining PVC conduit

5. Bends, Conduit, Steel

Steel Conduit Bends shall be galvanized and threaded in accordance with the requirements of ANSI C80.1 – 1983. Sizes and quantity required shall be as per drawings.

6. Couplings, Conduit, Steel

Conduit Couplings shall be galvanized. Sizes and quantities required shall be per Drawings.

7. Plug, Conduit, Plastic

Plastic Conduit plugs shall be provided for sealing ends of all empty conduits.

8. Conduit Spacers

Conduit bank spacers shall be base and intermediate type with plastic construction, installed as indicated on the drawings. Spacers shall provide minimum separation between conduits of 1-1/2” for 3” to 5” conduits and 2” separation between conduits for 6” conduits.

C. Vault, Network, Concrete, Precast, Roadway or Sidewalk

1. Precast Concrete Network Vaults shall be manufactured in accordance with Northeast Utilities Specification SPC V-029 and SPC V-030 (Appendix P).
2. Frame and Covers shall be manufactured in accordance with Northeast Utilities Specifications SPC F-498 (Appendix Q) and SPC C-717 (Appendix R) respectively.
3. Grates shall be manufactured in accordance with Northeast Utilities Specifications SPC G-013 (Appendix S) for Roadway Vaults and SPC G-014 (Appendix T) for Sidewalk Vaults.
4. Support beams used to support the covers, shall be manufactured in accordance with Northeast Utilities Specification SPC B-163 (Appendix U). Beams shall be selected for the specific application, “Roadway” or “Sidewalk”.

5. Expansion Joints shall be asphalt impregnated cane fiber with dimensions of five inches tall, one half inch thick, 10 feet long.

D. Manhole, Concrete, Precast, Distribution

1. Precast Concrete Distribution Manholes shall be manufactured in accordance with Northeast Utilities Specifications as identified in the following table:

Width	Length	Height	Aprox. Wgt. Per Section	Northeast Utilities Specification Number
5'-0"	10'-0"	7'-0"	6 ton	SPC M-023 and SPC M-024 (Appendix B)
6'-0"	14'-0"	7'-0"	9 ton	SPC M-031 and SPC M-032 (Appendix C)
8'-0"	14'-0"	7'-0"	12 ton	SPC M-039 and SPC M-040 (Appendix D)
8'-0"	14'-0"	7'-0"	12 ton	SPC M-069 and SPC M-070 (Switchgear) (Appendix E)
8'-0"	14'-0"	7'-0"	12 ton	SPC M-073 and SPC M-074 (Switchgear) (Appendix F)

E. Vault, Concrete, Precast

Precast Concrete Vaults shall be manufactured in accordance with Northeast Utilities Specification SPC V-035 and Specification SPC V-036 (Appendix G).

F. Pad (Top and Bottom), Concrete, Precast, Switchgear

Precast concrete switchgear pads shall conform to the following Northeast Utilities Specifications and shall be manufactured by a Northeast Utilities approved manufacturer as identified in Appendix A.

	Length	Width	Depth	Aprox. Weight	Northeast Utilities Specification Number
Top	93"	80"	6"	3,200 lb	SPC P-019 (Appendix H)
Bottom	76"	70"	30"	3,000 lb	SPC P-015 & SPC P-016 (Appendix I)

G. Hexagonal Handholes, Concrete, Precast

Precast, concrete, hexagonal handholes shall be manufactured in accordance with Northeast Utilities Specification SPC H-019 (Appendix J) and shall be manufactured by a Northeast Utilities approved manufacturer/Vendor as identified in Appendix A.

H. Box, Service, Concrete, Precast

Precast Concrete Service Boxes shall be manufactured in accordance with Northeast Utilities Specification as identified in the following table, and shall be manufactured by a Northeast Utilities approved Manufacturer/Vendor as identified in Appendix A.

Width	Length	Height	Aprox. Wgt. Per Section	Northeast Utilities Specification Number
4'-0"	6'-0"	4'-0"	2.7 ton	SPC B-649 and SPC B-650 (Appendix K)
4'-0"	6'-0"	6'-4"	3.6 ton	SPC B-651 and SPC B-652 (Appendix L)

I. Frame, Manhole, Gray Cast Iron, Heavy Duty

1. Manhole Frames shall be manufactured in accordance with Northeast Utilities Specification SPC F-495 (Appendix M) and Specification SPC F-497 (Appendix N). Manhole frames shall be manufactured by a Northeast Utilities approved Manufacturer/Vendor as identified in Appendix A.

2. Size and location of manhole frames shall be identified on and installed in accordance with Drawings.

J. Cover, Manhole, Gray Cast Iron, Heavy Duty

1. Manhole Covers shall be manufactured in accordance with ASTM A48-1993, Class 30B and Northeast Utilities Specification SPC C-709 (Appendix O).
2. Size and location of covers shall be identified on and installed in accordance with Drawings.

K. Extension, Manhole, Concrete, Precast

Manhole extensions shall be constructed of concrete with a 38” inner diameter and 50” outside diameter. The extension rings shall be constructed in segments of ¼ of a circle. The height of the extension shall be two (2) inches or four (4) inches and shall be manufactured by a Northeast Utilities approved Manufacturer/Vendor as identified in Appendix A.

- L. Gravel sub-base under bituminous concrete pavement shall comply with Article M.02.02 of CDOT Form 814A, Grading “A” and/or in accordance with the latest CDOT requirements.

- M. Gravel base under bituminous concrete pavement shall comply with Article M.02.03 of CDOT Form 814A, Grading “C” and/or in accordance with the latest CDOT requirements.

N. Bituminous Concrete and Curbs

1. Mixtures, sources of supply, formula for mix, mix tolerances, approval of mix formula and control of mixture of bituminous pavements and curb shall conform to the requirements of Section M.04.01 of Form 814A and/or in accordance with the latest CDOT requirements.
2. Classification of bituminous concrete shall conform to the following classes as required in Section M.04.01 of Form 814A and/or in accordance with the latest CDOT requirements
 - a. Bottom binder course – Class 1: 1½” Thick.
 - b. Top wearing course – Class 1: 1½” Thick.
 - c. Bituminous Curb – Class 12: Match Existing.

O. Concrete

The concrete used to form the envelope shall attain a minimum compressive strength of 2500 psi at the end of 28 days. Course aggregate shall be no larger than ½”. Concreting shall follow closely behind the laying of the conduit. Concrete shall be of such consistency that continuous spading will insure the flowing of the concrete between and under the individual plastic conduits, and still not be so wet or sloppy that it will lift or float the conduits out of position. The top of the concrete envelope shall be tamped lightly to insure an even surface.

P. Other Materials

All other materials not specifically described, but required for proper and complete installation of the work, shall be as selected by the Contractor subject to the approval of the Owner's Representative.

PART 3 INSTALLATION

3.0 GENERAL

- a. Familiarization: Prior to beginning work, the Contractor shall become thoroughly familiar with the site, the site conditions, and all portions of the work. The Contractor shall notify the Owner's Representative of any apparent discrepancies and adjustment will be made. If this is not done, existing drawing will be considered correct.
- b. All lines and grade work shall be laid out by the Contractor in accordance with the Drawings & Specification. The Contractor shall maintain all established bounds and bench marks, and replace, as directed, any which may be disturbed or destroyed.
- c. When Work is to conform to state requirements, Contractor shall be acquainted with same and execute Work accordingly.
- d. Contractor shall use all means necessary to control dust on and near the work and on and near all off-site borrow areas if such dust is caused by the Contractor's operations during performance of the work or is resulting from the condition in which the Contractor leaves the site.
- e. Contractor shall thoroughly moisten all surfaces as required to prevent dust being a nuisance to the public, neighbors, and concurrent performance of other work on the site.
- f. Backfilling Prior to Approvals
 1. Do not allow or cause any of the work performed or installed to be covered up or enclosed prior to all required inspections, test, and approvals.
 2. Should any of work be so enclosed or covered up before it has been approved, the Contractor shall uncover all such work at no additional cost to the Owner.
 3. After the Work has been completely uncovered, tested, inspected, and approved, the Contractor shall make all repairs and replacements necessary to restore the Work to the condition in which it was found at the time of uncovering, all at no additional cost to the Owner.

3.1 QUALITY ASSURANCE

- A. Contractor shall use adequate numbers of skilled work-persons who are thoroughly trained and experienced in the necessary crafts and who are completely familiar with the specified requirements and the methods needed for proper performance of the Work.
- B. Contractor shall use equipment adequate in size, capacity, and numbers to accomplish the Work in a safe and timely manner.
- C. When required, testing of compacted fill materials will be performed by an independent soils laboratory employed by the Owner. Testing will be performed so as to minimize interference with the Work.
 - 1. When the Work is completed, Contractor shall notify the testing laboratory to perform density tests. Contractor shall not proceed with additional portions of Work until results have been verified by Owner's Representative.
 - 2. If, during progress of Work, tests indicate that compacted materials do not meet specified requirements, Contractor shall notify Owner's Representative as to direction to proceed. If required by Owner's Representative, Contractor will remove defective Work, replace and retest at no cost to the Owner.
 - 3. Contractor shall ensure compacted fills are tested before proceeding with placement of surface materials.
- D. Contractor shall examine present and finish grades as shown on grading plan and excavate and fill as indicated on plans and elevations. Contractor shall protect and maintain site boundaries and grading limits during construction. If disturbed, destroyed, or exceeded, Contractor shall replace in accordance with Section 3.30, "Restoration of Disturbed Surfaces" or as directed.
- E. Suitable precautions and safeguards shall be used in operating heavy equipment so pavement adjacent to trench areas is not damaged. Any damages to adjacent sidewalk flags, curbs and roadways caused by the Contractor's method of operation are to be restored at no additional cost to the Owner.
- F. Contractor will be liable for any sunken cut or trenches resulting from deficiencies in backfill compaction or base concrete/binder for a period of two years from date of completion. Sunken cuts or trenches will be re-excavated, re-compacted and re-based at no cost to the Owner. Re-paving shall not result in additional costs to the Owner. Maintenance of lawn area will be the responsibility of the Contractor until May 1 of the year following completion of the Work.

3.2 LINES AND GRADES

- A. The Contractor will establish and maintain all necessary lines and grades for openings, trenches and piping, including test holes. Any deviations will be brought to the attention of the Construction Representative for final evaluation and approval. Failure to comply with lines and grades during installation will be at the Contractor's cost for required rework.

- B. The Owner's Construction Representative will furnish the Contractor the grade to which casting or frames are to be raised or lowered on existing structures.

3.3 PROTECTION

- A. The Contractor shall use all means necessary to identify the location of, and protect during construction, all existing underground utilities, that are to remain. The Contractor shall adhere to all requirements of the Connecticut State, Call Before You Dig (CBYD) Regulations.
- B. The Contractor shall use all means necessary to protect all materials before, during, and after installation and to protect all objects designated to remain.
- C. In the event of damage, the Contractor shall immediately notify the Owners Representative. The Contractor shall make all repairs and replacements necessary to the approval of the Damaged Facilities Owner's Representative and at no additional cost to the Damaged Facilities Owner or Owner.
- D. The Contractor shall use all means necessary to control erosion and sedimentation during and after Work in accordance with the Soil Conservation Service's "Erosion and Sediment Control Handbook," (Latest Edition).
- E. The Contractor shall barricade open holes and depressions occurring as part of the Work, and provide for protection of public safety and as otherwise required.
- F. Cleanup: No on-site burning or burying of material spoil or debris is allowed.
- G. Contractor shall maintain access for emergency vehicles to the site at all times.

3.4 EARTH EXCAVATION

- A. The Contractor shall make all required excavations for the underground facilities.
- B. The Contractor shall excavate to grades shown on the Drawings. Where excavation grades are not shown on the Drawings, excavate as required to accommodate the installation.
- C. Trenches for conduit runs in state highways between curb lines and street lines are to be excavated to a depth necessary to provide a minimum cover of 36 inches over the top of the conduit encasement or as otherwise stated in the specific job specifications. Excavations in sidewalks and other areas within highway limits but outside of curb lines are to be made in depths such that future highway widening will still leave the minimum specified cover over the installations.
- D. Trench excavation shall not exceed 3 inches on each side of required concrete envelope of conduit bank except in areas authorize by Owner's representative.
- E. The excavation shall provide for a minimum 6" clearance from all rocks, boulders, and concrete obstructions.

- F. All Existing Utilities shall be identified, located, protected and adequate clearances shall be maintained.
- G. Removal of boulders, stones, rock, concrete, and masonry removed by normal methods shall be considered earth excavation.
- H. Where depressions result from, or have resulted from, the removal of surface or subsurface obstructions, open the depression to equipment working width and remove all debris and soft material as directed by the Owner's Representative.
- I. Over-excavation shall be back filled and compacted in accordance with Section 3.8 at no additional cost to the Owner.
- J. The Contractor shall take any and all precautions to prevent undue damage to, or undermining of pavement adjacent to, the trench.
- K. Any preventable damage to structures which result from Contractor's operations shall be repaired or replaced, as necessary, at Contractor's expense.

3.5 SHORING AND SHEETING

- A. Excavations shall be shored, sheeted, braced or sloped to the angle of repose where a danger of slides or cave-in exist as identified by a competent individual in accordance with OSHA, state and local regulations. Sides of trenches in unstable or soft material shall be shored, sheeted, braced, sloped or otherwise supported by means of sufficient strength to protect employees working within them. Materials used for sheeting and sheet piling, bracing, shoring and underpinning shall be sound and in good serviceable condition and shall be installed and effective to the bottom of excavation.
- B. Trenches for conduit runs will also be excavated so that the conduits pitch uniformly at a minimum pitch of 4 inches per hundred feet toward vaults, manholes, or service boxes.

3.6 EXISTING UNDERGROUND UTILITIES AND FACILITIES

- A. Contractor shall not alter or remove any portion of interfering surface, or subsurface structures until approval is obtained from Construction Representative, who will obtain permission for such alterations. Contractor shall properly support and protect surface and subsurface structures. Owner will decide whether Contractor shall eliminate interfering structures or whether interference shall be eliminated by the Owner or by others. Contractor shall permit Owner or others to perform Work required to eliminate interference and to occupy the opening or trench in so doing.
- B. Upon approval by Construction Representative, the Contractor shall be responsible for relocating existing underground facilities within his excavation and proceed with his Work in such a manner as not to damage or disturb such facilities. Where an energized or de-energized conductor is to be exposed, its exact location shall be determined by careful hand excavation to prevent damage to existing conductors.

- C. Any damages to existing underground facilities caused by the Contractor in the performance of his Work will be paid for by the Contractor.
- D. All water, gas, or other pipes, mains, services, conduits, or fixtures which may be uncovered or interfered with, and any excavations made in connection with this specification shall be properly supported and maintained in position. Backfill shall be installed around foreign utilities in such a manner as to maintain support and prevent settlement.
- E. Where tiers of conduit have to be separated for the passage of foreign pipes, 3" in diameter or less, such pipes shall be encased with a suitable material authorized by the Construction Representative of a diameter approximately twice that of the foreign pipe.
- F. The encasing material is to be covered with cement mortar or concrete of a thickness sufficient to leave a permanently strong concrete shell around the pipe. The conduit lines will be split around the foreign pipe by gradually grading with concrete between the conduit layers.
- G. Where clearances around existing pipes are to be other than as above, the Contractor will be so informed by the Construction Representative.

3.7 EXCESS WATER CONTROL

- A. Unfavorable Weather: Do not place, spread, or roll fill material during unfavorable weather conditions. Do not resume operations until moisture content and fill density are satisfactory to the Owner's Representative.
- B. Flooding: Provide adequate means to prevent flooding of sub-grade excavations. Promptly remove all water collecting in depressions.
- C. Softened Sub-grade: Where soil has been softened or eroded by flooding or placement during unfavorable weather, remove all damaged areas and re-compact as specified for fill and compaction below.
- D. Dewatering

Contractor shall provide necessary personnel and pumping equipment to properly de-water all excavated trenches, openings and existing structures and shall keep them free of water during such time as Work is being performed by the Contractor. Contractor shall keep all gutters and drains clear and open to prevent flooding of adjacent property. No separate payments will be made, unless agreed on prior to commencement of Work, for providing and maintaining temporary drainage, removing frozen earth or for any Work required resulting from rain, snow, freezing temperatures or other conditions caused by weather.

3.8 FILL, BACKFILL, AND COMPACTION

- A. Backfilling shall commence only when directed by the Construction Representative at the Owner's convenience.

- B. When state or local regulations do not permit the use of the excavated material for backfill or when the excavated material is deemed unsuitable for backfill by the Construction Representative, additional approved material required to complete the backfill will be supplied by the Contractor.
- C. The first twelve (12) inches of backfill over the ductbank shall be sand or fill which contains no material or stones larger than two (2) inches in maximum dimension.
- D. Imported fill shall be well-graded sand or gravel with a high mineral content in order to facilitate dissipation of heat which can build up in heavily loaded cables.
- E. The Contractor shall not use any kind of acid-producing material as backfill in a conduit trench under any circumstances.
- F. All backfill shall be placed in lifts no greater than 6" in depth and be thoroughly compacted with a mechanical vibrating compactor so as to prevent settlement of pavement after completion.
- G. The backfill material shall be compacted by mechanical means to a density of at least 95% of the maximum density obtained in the standard compaction test (ASTM D1557).
- H. Moisture-Conditioning: Water or aerate the fill material as necessary, and thoroughly mix to obtain a moisture content which will permit proper compaction.
- I. Frozen Material shall not be placed in fills nor shall the fill be placed on frozen material. If during construction of a fill, the top layer becomes frozen, the frozen material shall be removed before a succeeding layer of material is placed. Frozen excavated material which will be suitable when dry shall be allowed to thaw and to dry before being placed.

3.9 DUCT BANK INSTALLATION

A. General

1. The preferred number of ducts and duct bank configuration, shall be as specified in Northeast Utilities, Designs and Application Standards, DTR 73.209 (Appendix AA) and/or as specified on the Drawings. No deviation will be allowed without the approval of the Owner's Representative.
2. Duct Bank Construction shall be performed in accordance with Northeast Utilities, Design and Application Standards, DTR 84.811 and 84.812 (Appendix AF) or as otherwise specified in this specification, design drawings or special conditions.
3. Conduit bank spacers shall be installed at a maximum of 8 foot intervals and at both sides of horizontal bends.
4. The Contractor shall install and furnish a pull rope in each conduit, terminating 12 inches behind the conduit ends. The rope shall be 3/32 inch diameter polyethylene braided.

5. Bends in conduit runs shall be made by gradually bending EB conduit using a minimum of a 15 foot radius in accordance with Northeast Utilities, Design and Application Standards, DTR 84.811 and DTR 84.812 or as specified on the Drawings. No deviation will be allowed without prior approval of the Owner's Representative.

B. Conduit Installation

1. Conduit Installation at Manhole

- a. Conduits shall be installed level and perpendicular to the manhole. The conduits shall enter the manhole at designated windows only, with belled ends placed flush with the inside face of the knockout. No deviation shall be made without the approval of the Owner's Representative.
- b. All conduits will be laid so as to pitch uniformly to manholes, vaults, or service boxes so that no sags or pockets are formed in the conduit line and in accordance with the requirements of Northeast Utilities, Design and Application Standard, DTR 84.811 and DTR 84.812 (Appendix AF).

2. Cutting the Conduit

Cut conduit square with a hand saw, power saw, or rotary cutter. Remove the burs left by sawing and the ridges left by a rotary cutter with a knife or file. Break all sharp edges on the exterior and interior surface of the conduit at the cut, with a knife, file, or other beveling tool to prevent possible damage to the hands during handling and prevent damage to cable coverings during subsequent cable pulls.

3. Cleaning Joint Surfaces

Surfaces to be joined shall be clean and dry before application of the cement. Clean the outside surface of the duct spigot (for the depth of the socket), and the inside surface of the socket with a clean dry cloth.

4. Cementing Conduit Joints

- a. Observe the Manufacturer's label instructions for PVC cement application methods and handling safety precautions.
- b. Cements should be applied with a natural bristle or nylon brush or roller applicator of appropriate size to easily and rapidly coat the surfaces to be joined. As a guide, a brush width at least $\frac{1}{2}$ the nominal conduit size is recommended, except that with 6" or larger conduit, a $2\frac{1}{2}$ " brush width is adequate.
- c. Solvent cements are fast drying and should be applied as quickly as possible consistent with good workmanship.
 1. PVC cement shall be evenly applied to the outside surface of the conduit spigot. PVC Cement shall not be applied to the inside surface of the conduit socket.
 2. Immediately, while the spigot surface is still wet with cement, insert the duct spigot with a slight twisting motion into the socket until it bottoms home at the

socket shoulder. Do not twist or turn the duct after it has bottomed on the shoulder. The slight twisting motion used during insertion helps to distribute the cement evenly, but if twisted after bottoming, the initial bond could be impaired.

3. Assembly of a cemented joint should be completed within 15 seconds after the last application of cement to ensure a solid connection. Initial bonding begins immediately when the cement-coated surfaces are in position.
4. If there is any sign of drying of the cement surfaces prior to assembly, due to delay in assembly, recoat the conduit spigot with a heavy even coat of cement and immediately, while cement is still wet, insert the spigot into the socket.
5. After assembly, wipe excess cement from the duct at the end of the socket, to prevent excessive cement from dropping on and possibly weakening other ducts.

5. Conduit Identification

Each end of the conduits shall be marked, with its identification number, on the exterior surface of the conduit.

C. Concrete Envelope

1. General

- a. Conduit shall be installed with a minimum cover over the top of the concrete envelope for the installation location in accordance with Northeast Utilities, Design and Application Standard, DTR 73.209 (Appendix AA) or as specified on the drawings.
- b. The surface of the concrete, perpendicular to the longitudinal forms, at the end of a pour, shall not be terminated in a vertical plane as obtained by the use of an end form. The concrete at the end of a pour shall be sloped at an angle corresponding approximately to its angle of repose and the surface shall be made rough to facilitate bond with the next pour.
- c. Concrete encasement of conduit bank shall not be tied into boulders, stones, rock, concrete, and masonry adjacent to the excavation.
- d. A 2" minimum sand interface shall be used on the bottom of the trench and along the sides of the conduit bank to eliminate the possibility of bond between the concrete and rock face.

2. Method of Installation

a. Tier Method - Procedure

1. The tier method of conduit installation shall be in a previously excavated and prepared trench, free of stones and sufficiently level to prevent dips or depressions in the duct bank.

2. A no-slump mixture of concrete, placed directly from the mixer, shall be spread on the bottom of the trench to a depth of 3", raked, and compacted with a wood tamp to provide a level work area. The concrete used for encasement shall attain a 28-day compressive strength of 2500 psi and shall have a maximum aggregate size of ½".
3. Conduit, inspected and clean, shall be laid on the prepared base with staggered ends and a spacing of 2" between conduits and between conduit and side walls of trench.
4. Concrete placed directly from the mixer shall be spread over and spaded between conduits.
5. Additional concrete shall be laid to a depth sufficient to provide a vertical separation of 2" of compacted concrete to the next layer of conduit.
6. Concrete shall be tamped, and the next layer of conduit set in place.
7. The complete concrete envelope shall provide a 3" base, 2" side, and a 3" cap of compacted, no-slump concrete. All measurements are from the OD of the conduit. All joints shall be staggered at least 6" both horizontally and vertically. Bends, other than standard 45 or 90°, shall be formed by the use of angle couplings, 5° bend sections and short pieces of conduit arranged to provide the radius or sweep as shown on Owner's drawings or as directed by Construction Representative. If spacers are needed for any reason, concrete brick shall be used. Wood spacers or combs, if used, must be removed and voids filled with concrete.

b. Monolithic Pour Method - Procedure

1. Monolithic method of conduit installation may be used on runs not more than eight (8) conduit with a concrete slump of 6 - 9 inches. Conduit shall be spaced as previously described using plastic spacers and secured to prevent it from floating during pour or until after initial set of concrete has taken place. Forms shall be used to obtain the 2" side cover of concrete.
2. The width of the concrete envelope corresponds to the total width of the spacers, plus 1½" on each side of the envelope.
3. The total height of the concrete envelope for the conduits corresponds, in even inches, to the total depth of the conduit spacers, with the spacer base resting on the ground. The top of the envelope shall be flush with the top of the uppermost spacer.
4. Conduit runs of more than eight (8) ducts shall not be poured monolithically without the approval of the owner's representative.
5. It is important that the bottom tier of conduits does not bear the weight of all the upper conduit tiers. Every spacer shall be locked to the adjacent spacers. Some spacers provide vertical openings on either side of the spacer bank through which reinforcing rods can be passed and driven into the trench floor sufficiently

to grip the spacer bank, and thus prevent the duct bank from moving in any direction during the concrete pour. In areas where soil conditions make it impossible to drive a rod deep enough to gain an effective anchoring, it is recommended that a trench jack be firmly placed directly over the spacer location and adjustable wedges be used to wedge down the duct bank.

3.10 PLACEMENT OF CONDUIT BANK PROTECTION

- A. A 12" thick layer of the specified sand fill shall be placed immediately above the concrete envelope as indicated in section 3.8.C.
- B. The sand may be installed before the concrete has cured, but no compaction shall be allowed within 24-hours of pour.
- C. Contractor shall install a continuous warning tape supplied by CL&P, immediately above the sand layer.
- D. Conduit Plugs

Each end of the conduit, including the ends within the manhole, shall be sealed with a conduit plug. Pull ropes shall be secured to the conduit plug in accordance with the requirement of DTR 84.812 (Appendix AF).

3.11 STEEL CONDUIT INSTALLATION

- A. Steel conduit shall be installed in trenches of sufficient depth to provide a minimum of 24 inches between the top of the conduit and finish grade. Backfill shall be thoroughly compacted, with no stone over 3" within 6" of the conduit.
- B. Steel conduit shall not be encased in concrete unless indicated on Owner's drawings or as directed by Construction Representative.
- C. Threads of steel conduit will not be painted or lubricated when assembling in order to ensure good electrical contact. Ends of steel conduits will be reamed before assembling to ensure a smooth interior surface. Joints will be made up tightly to ensure a strong connection, and exposed threads will be painted with a matching touch-up paint. The Contractor shall be responsible for all cutting, threading, and bending.
- D. All steel conduit shall be connected to the manhole or vault grounding system or shall have its own ground if steel conduit is used in duct line where no ground is available. Steel Conduit shall be grounded in accordance with the requirements of DTR 12.009 thru DTR 12.011 (Appendix AG).

3.12 FIBERGLASS CONDUIT INSTALLATION

- A. Where fiberglass conduit is to be installed, it shall be transported, stored, and placed in a manner to prevent abrasion to the exterior resin coating. The use of strap wrenches is required.

- B. The conduit and racks shall be constructed in a manner to maximize the use of factory installed threaded couplings.
- C. The installation of couplings in the field and the placing of expansion joints will be according to the manufacturer's specifications with the approval of the Construction Representative.

3.13 CONDUIT IN BRIDGE STRUCTURES

Fiberglass conduit shall be installed in bridge structures. All couplings shall be cemented with the conduit manufacturer's bonding material with the exception of expansion couplings. Expansion couplings will be installed in sections not exceeding 200 feet.

3.14 CONDUIT RISERS

- A. All conduit risers shall be provided by the Owner. Connections to conduit shall be made with the proper adapter provided by the Owner. Risers must be plumb and shall project above grade as indicated on the drawings.
- B. No less than $\frac{1}{4}$ cubic yard of concrete shall be placed on the radius of the riser so as to secure it permanently in place.

3.15 CONDUIT WITHOUT ENCASEMENT

Where conduit is installed without concrete encasement, the conduit is to be laid on a trench bottom which has been graded true and free from stones. A 6" layer of compacted sand shall be placed above the conduit. The remainder of the backfill will be compacted in accordance with Section 3.8. A 2" horizontal separation must be maintained in multiple conduit installations with vertical stacking not allowed unless terminating the conduits at different locations.

3.16 PROTECTION OF STUBBED CONDUITS

The free ends of all conduits in trenches are to be firmly plugged when the Work is left at night. These plugs are to be left permanently in place at ends of all conduits not terminating in a manhole, vault, or service box.

3.17 CLEANING AND INTERNAL INSPECTION OF DUCT LINES

All conduits in manhole duct systems are to be rodded after completion of the installation with test mandrels in the presence of the Construction Representative. All conduits will be brushed clean with a stiff wire brush before mandrels are passed through. These mandrels must pass freely through the installed conduit. Pull lines furnished by the Owner are to be left in conduits after rodding. All mandrels, brushes, and other rodding equipment are to be furnished by the Contractor. Mandrels are to be $\frac{1}{4}$ " less diameter than the inside diameter of the conduit and are to be a minimum of 12" long, except that 4" long mandrels may be used for radius bends.

3.18 SPLICE BOXES AND PADS

The Contractor shall provide the excavation for, haul, and place such items at locations shown on the developer/utility-approved plan. The Contractor will place anodes and ground wires at each location and a 6" base of compacted gravel as directed by the utility representative. The final grade of the work area shall determine the depth of all installations.

3.19 PRECAST – GENERAL

- A. Precast manholes and vaults shall be installed by the Contractor in a hole which has been previously excavated and prepared.
- B. Location shall be as indicated on Owner's drawings and shall be changed only by the Construction Representative to eliminate conflicts with other utilities.
- C. Excavation for precast items shall not exceed 18" outside neat lines of concrete unless authorized by Owner's Representative and excavation is to be to a depth sufficient to provide 6" maximum neck on manhole
- D. A 6" base of sand, stone, or concrete, if required to properly prepare the base of the hole, shall be authorized by the Construction Representative.
- E. Standard ground wire supplied by the Owner will be placed with sufficient length under manhole before placement on prepared base. Six foot (72") ends are to be brought into both ends of manhole. Ground wire shall be one continuous piece.
- F. The Contractor shall back fill the excavation and set manhole cover casting, vault grating, or other hardware after the Construction Representative has acknowledged acceptance of the installed precast manhole or vault by the supplier.
- G. The backfill shall be accepted material and shall be compacted by mechanical means of methods approved by Construction Representative to prevent settlement of pavement after completion.

3.20 PRECAST CONCRETE HEXAGONAL HANDHOLE INSTALLATION

- A. The Contractor shall install the precast concrete hexagonal handhole in accordance with Northeast Utilities, Construction Standard, DTR 76.623 (Appendix AD)
- B. The Contractor shall drive two galvanized steel ground rods in a trench near the hexagonal handhole in accordance with Northeast Utilities, Construction Standard, DTR 76.623 (Appendix AD) and DTR 56.221 (Appendix AE).

3.21 MANHOLE, AND SWITCHGEAR PAD INSTALLATION

A. Manhole, and Switchgear Pad Delivery and Installation

The Contractor shall coordinate the delivery and installation of the pre-cast concrete manholes and switchgear pads in the pits. It will be the responsibility of the Contractor to supervise the placement of the pre-cast items for proper elevation and orientation. The bottom of the excavation shall be level and adequately tamped to prevent settlement.

B. Manhole Cover Installation

The Contractor shall install the manhole cover and cover extension as required. The Contractor shall furnish the material for the cover extension. All extension must be adequate for AASHTO HS20 Loading.

C. Grounding of Manholes and Switchgear Pads

The Contractor shall comply with provisions of Northeast Utilities, Construction Standard, DTR 76.451, Figure 1 (Appendix AB). Grounds must be brought through the manhole window at opposite ends, allowing for minimum 6' tail inside the manhole.

3.22 NETWORK VAULT INSTALLATION

A. Network Vault Installation

The Contractor shall coordinate the delivery and installation of the pre-cast concrete vaults in the pits. It will be the responsibility of the Contractor to supervise the placement of the pre-cast items for proper elevation and orientation. The bottom of the excavation shall be level and adequately tamped to prevent settlement.

B. Installation of Network Beams, Covers and Grates

The Contractor shall comply with the provisions of Northeast Utilities, Construction Specification, DTR 76.419 (Appendix AC).

C. Grounding of Network Vaults

The Contractor shall comply with provisions of Northeast Utilities, Construction Standard, DTR 76.451, Figure 1 (Appendix AB). Grounds must be brought through the vault window at opposite ends, allowing for minimum 6' tail inside the manhole.

3.23 POUR-IN-PLACE MANHOLES

Construction methods for these manholes will be provided by the Owner at the time of construction.

3.24 FORMS

Forms, if required, shall be furnished, installed, and removed by the Contractor. Forms will be set to provide the minimum specified envelope at all locations, with no extra payment for concrete in excess of this amount. Forms shall be sufficiently tight to prevent leakage, adequately braced and placed to conform to lines and dimensions shown on drawings. Forms shall not be removed until concrete has cured sufficiently to ensure safety of workers, the public and structure. All concrete shall conform to codes and standards of American Concrete Institute.

3.25 CONCRETE ADDITIONS

No chemical additives of any kind shall be added to the concrete to be used for conduit encasement without approval of the Construction Representative.

3.26 CLEANING AND POINTING OF PRECAST ITEMS

- A. The Contractor shall point up all conduits entering precast items to ensure a smooth, clean face recessed 3 inches from the interior walls of the item.
- B. The Contractor shall leave the interior of all precast items free from excess concrete, lumber, or other debris.

3.27 ADJUSTING FRAMES AND COVERS ON EXISTING MANHOLES AND BOXES

Contractor will be responsible for the removal and installation of frames and covers on existing manholes and boxes. This Work includes breaking pavement and associated excavation, placing of temporary pavement, removal of covers or grating, installation of mortar beds, resetting frames and castings on new chimney or on existing manholes and boxes and all incidental Work required to remove and reinstall castings and frames at the new grade. The Construction Representative will furnish the Contractor the grade to which castings or frames are to be raised or lowered.

3.28 FINAL PREPARATION OF SUB-GRADE IN PAVEMENT AREA

- A. After the site has been excavated, thoroughly moisture condition and compact to the requirements specified below.
- B. Leveling: Remove all ruts, hummocks, and uneven surfaces by surface grading prior to placement of base material.
- C. Compact areas to be covered with bituminous concrete paving to a smooth, hard, even surface of 95% optimum density (ASTM D1557).
- D. No Work shall be performed on saturated or frozen sub-grade.

3.29 RESTORATION OF DISTURBED SURFACES

- A. The Contractor is responsible for the cleanup and restoration of the Work area to its original condition, subject to approval by the Construction Representative.
- B. As directed by Construction Representative, or as required by state or local regulations, Contractor shall, after backfilling all trenches and openings, furnish, deliver, and immediately install temporary pavement to the grade of the existing surface to ensure the public's safety or access to private property. When Contractor is ordered to install permanent paving base, all temporary pavement, broken pieces of pavement, or other materials with which trenches and openings have been temporarily surfaced or backfilled, shall be removed and disposed.
- C. Concrete pavement base shall be furnished and placed only when ordered by Owner's Construction Representative. Quality of materials and workmanship shall meet all requirements or regulatory authorities having jurisdiction.
- D. All treated areas shall be allowed to cure until such time as the Owner's Representative permits their opening to traffic.
- E. Roadways, Curbs, Walks and Adjacent Properties
 - 1. The Contractor will repave and resurface, in accordance with state or local regulations, (i.e. CDOT 8.14A), all bituminous and/or concrete streets, alleys, and driveways disturbed by the Work performed under this contract, including that pavement replacement required by state or local regulations for cutbacks around excavations.
 - 2. Replacing pavements up to a cutback of one foot on all sides of the authorized excavation will be included in the installed cost for underground facilities.
 - 3. Pavement replacement beyond the one-foot cutback must be authorized by the Construction Representative.
 - 4. Curbing disturbed or removed in the process of installing the underground facilities shall be repaired or replaced to original condition.
 - 5. When roads, curbs, walks, or property adjacent to the Work are damaged, only that portion of the damage deemed by the Construction Representative to be unavoidable in a prudent execution of the Work will be paid for by the Owner.
 - 6. Any unnecessary damage to roadways, sidewalks, curbs, or adjacent property, as determined by the Owner's representative to have been caused by the Contractor's carelessness or to serve his convenience, will be repaired by the Contractor at his expense.

F. Earth or Grassed Areas

Grass, sod and shrubbery shall be restored or replaced. Where Work requires, the Contractor shall remove and restore or replace shrubs, sod, topsoil, terraces, trees (root systems or branches shall not be disturbed or removed unless approved by the agency having jurisdiction), etc., and any other landscaping that may be disturbed due to installation of Owner facilities as directed by the Construction Representative. Work site shall be restored to its original condition satisfactory to the Construction Representative. When established lawns are disturbed, sod shall be removed carefully and set aside for reuse whenever possible. Contractor shall also maintain, replace and restore grounds in a condition satisfactory to authorities and person(s) having jurisdiction until May 1 of the year following completion of the Work.

3.30 DRAWINGS

All subsurface drawings furnished are supplied to provide only general information regarding existing subsurface conditions. Elevations and covers over facilities shown thereon have been obtained from records. Actual conditions may vary from those shown. Drawings typically do not show all existing facilities such as general services, laterals, etc., crossing or parallel with proposed trenches. Actual elevations at which facilities will be installed and cover placed over such facilities will be determined from conditions disclosed by test pits which the Contractor shall make at various locations upon request of Construction Representative.

3.31 AS-BUILT DRAWINGS

The Contractor shall provide signed as-built drawings to the Owner within 14 days following completion. As-built drawings shall reflect all field changes that occurred during the installation. As-built drawings shall reference dimensions to known fixed points to locate facilities.

Appendix A

Approved Vendor/Manufacturer List

Section 2.0 Item Number	Material	Description	Approved Manufacturer/Vendors
B2	Conduit, PVC, TC6, EB20 (All Sizes)	As per description in Section 2.0.B.2	American Pipe and Plastics, Cantex, Carlon
B3	Bends, Couplings, Adapters, TC 9 for use with EB conduit, PVC	As per description in Section 2.0.B.3	American Pipe and Plastics, Cantex, Carlon
B4	Cement, conduit, PVC	As per description in Section 2.0.B.4	American Pipe and Plastics, Carlon
B5	Bends, Conduit, Steel	As per described in Section 2.0.B.5	Conduit Pipe Products, Electrical Fittings Corp., Gwilliam Manufacturing & Supply, Pipe Coupling Manufacturers, Wheatland Tube Co.
B6	Couplings, Conduit, Steel	As per described in Section 2.0.B.6	Allied Tube & Conduit, Republic Steel, Triangle, Wheatland Tube Co.
B7	Plug, Conduit, Plastic	As per described in Section 2.0.B.6	Carlon, Cooper Power Systems, Kyova, Underground Products Co.
B8	Conduit Spacers	As per described in Section 2.0.B.7	Carlon, UG Products
D1	Manhole, Concrete, Precast, Distribution, 5'-0"W x 10'0" L x 7'0" H	Northeast Utilities Specification SPC M-023 and M-024 (Appendix B)	Arrow CPI, Rotundo
D1	Manhole, Concrete, Precast, Distribution, 6'-0"W x 14'0" L x 7'0" H	Northeast Utilities Specification SPC M-031 and M-032 (Appendix C)	Arrow CPI, Granstone, Rotundo
D1	Manhole, Concrete, Precast, Distribution, 8'-0"W x 14'0" L x 7'0" H	Northeast Utilities Specification SPC M-039 and M-040 (Appendix D)	Arrow CPI, Rotundo
D1	Manhole, Concrete, Precast, Distribution, 8'-0"W x 14'0" L x 7'0" H (Switchgear)	Northeast Utilities Specification SPC M-069 and M-070 (Appendix E)	Arrow CPI, Rotundo
D1	Manhole, Concrete, Precast, Distribution, 5'-0"W x 10'0" L x 7'0" H (Switchgear)	Northeast Utilities Specification SPC M-073 and M-074 (Appendix F)	Arrow CPI, Rotundo
E1	Vault, Concrete, Precast	Northeast Utilities Specification SPC V-035 and V-036 (Appendix G)	Arrow CPI, Rotundo
F	Pad (Top) Concrete, Precast, Switchgear 93"L x 80"W x 6"D	Northeast Utilities Specification SPC P-019 (Top) (Appendix H)	Arrow CPI, Atlas, Connecticut Precast, Jolley Precast, Rotundo, United
F	Pad (Bottom) Concrete, Precast, Switchgear 76"L x 70"W x 30"D	Northeast Utilities Specification SPC P-015 and P-016(Appendix I)	Arrow CPI, Atlas, Connecticut Precast, Jolley Precast, Rotundo, United

Appendix B

Northeast Utilities Material Specification

SPC M-023

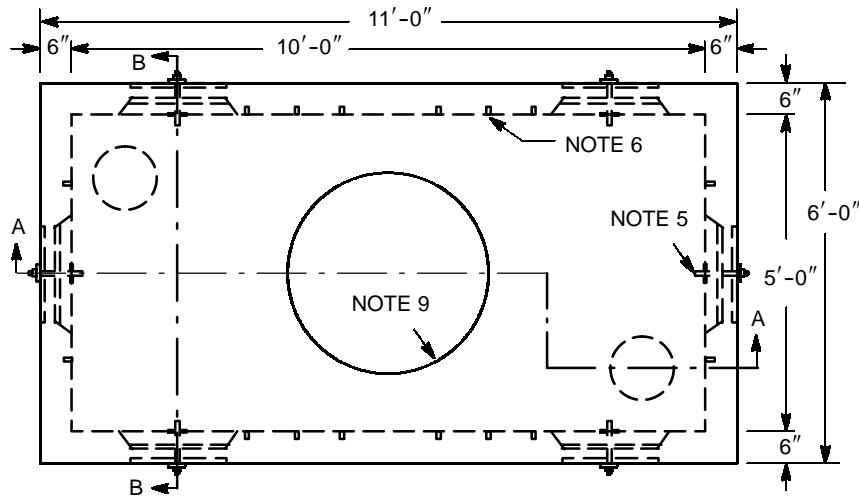
and

SPC M-024

Manhole – Precast Reinforced Concrete

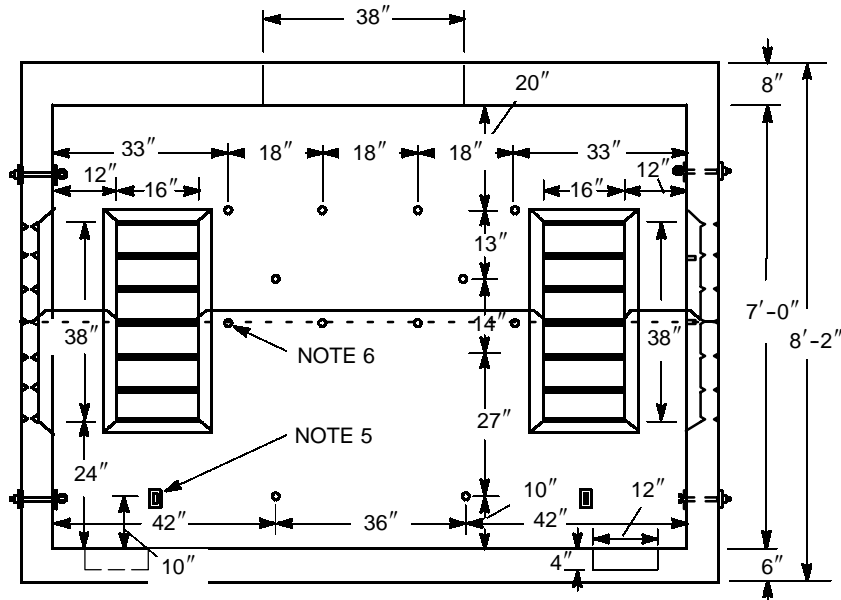
5'-0" x 10'-0" x 7'-0" Inside

ORIGINAL	MANHOLE - PRECAST REINFORCED CONCRETE
8/23/73	
APPROVED	
11/1/01	5'-0" X 10'-0" X 7'-0" INSIDE
NORTHEAST UTILITIES	
MATERIAL SPECIFICATION	
SPC M-023	
10	

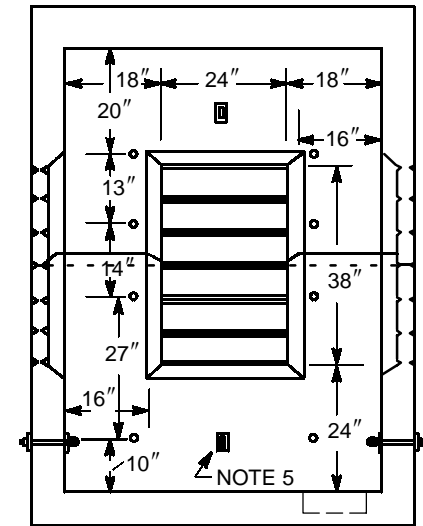


PLAN VIEW

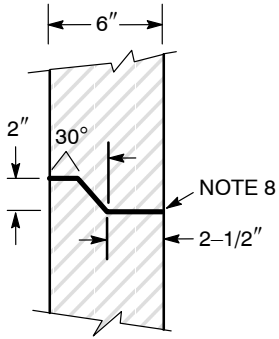
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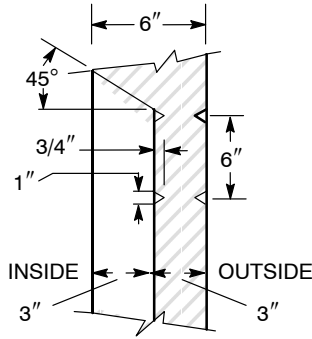
SECTION A-A



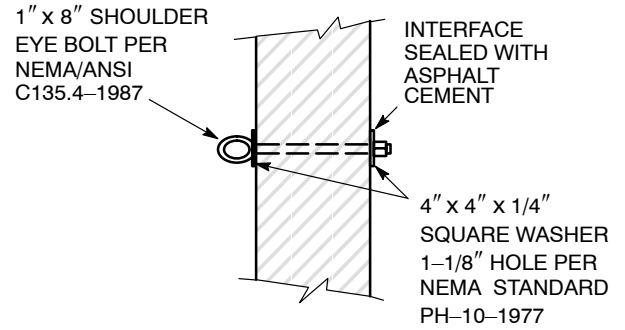
SECTION B-B



JOINT DETAIL



WINDOW KNOCKOUT DETAIL



PULLING EYEBOLT DETAIL

Notes

1. Manhole shall be designed for the following loads:
 - a. The roof shall be designed for AASHTO HS20-1996 direct wheel load.
 - b. The walls shall be designed for the summation of the following:
 - 1) Soil pressure of not less than an equivalent fluid pressure of 33 pcf.
 - 2) Hydrostatic pressure of 5 feet measured from the base of the manhole.
 - 3) A surcharge of 2.5 feet of soil weighing 120 pcf.
 - c. The floor shall be designed to resist the hydrostatic pressure resulting from the 5-foot head called for in 1.b.2) above.
2. Concrete and concrete design shall be in accordance with ACI 318-1999.
3. Concrete shall have a minimum and maximum 28-day strength of 4000 and 5000 psi respectively.
4. Steel reinforcing bars shall conform to ASTM A615-1992 Grade 40 or 60. Welded wire mesh shall conform to ASTM A185-1997 or A497-1999.
5. Pulling eyebolts, with a minimum 8000-pound pulling strength, shall be installed adjacent to window knockouts at eight places.
6. Zinc alloy inserts 1/2 inch - 13 x 1-1/2 inch shall be installed at 40 places.
7. Openings and knockouts shall be clear of reinforcement.
8. Construction joint shall be sealed with asphalt cement or equivalent.
9. Manufacturer's identification and month/year when manufactured shall be legibly marked in/on concrete in the side of the 38-inch opening.

ORIGINAL	MANHOLE – PRECAST REINFORCED CONCRETE 5'-0" x 10'-0" x 7'-0" INSIDE			
8/23/73				
APPROVED				
11/1/01	NORTHEAST UTILITIES	MATERIAL SPECIFICATION	SPC M-024	10

Appendix C

Northeast Utilities Material Specification

SPC M-031

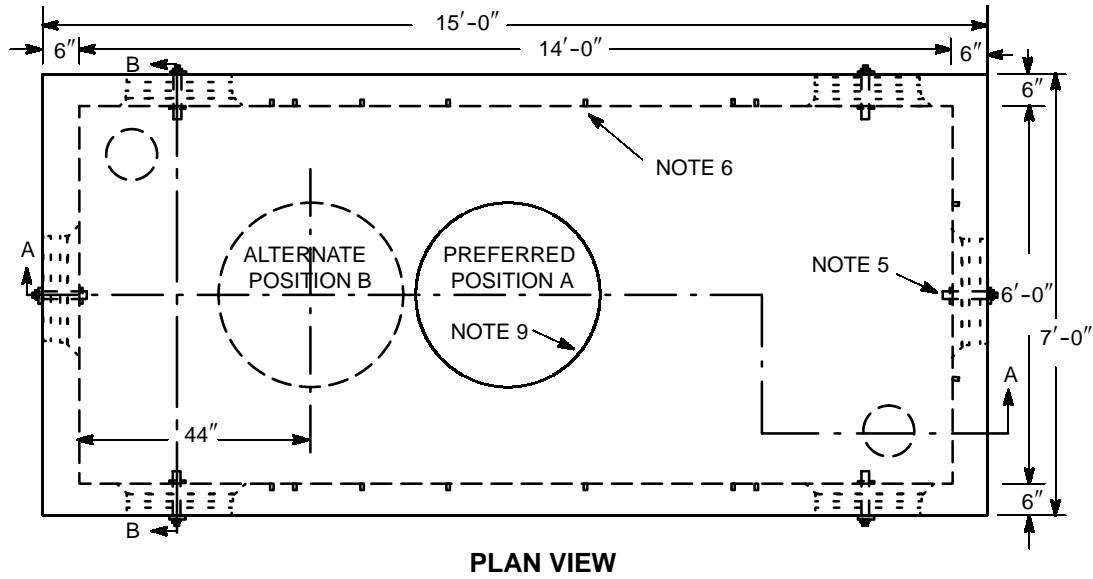
and

SPC M-032

Manhole – Precast Reinforced Concrete

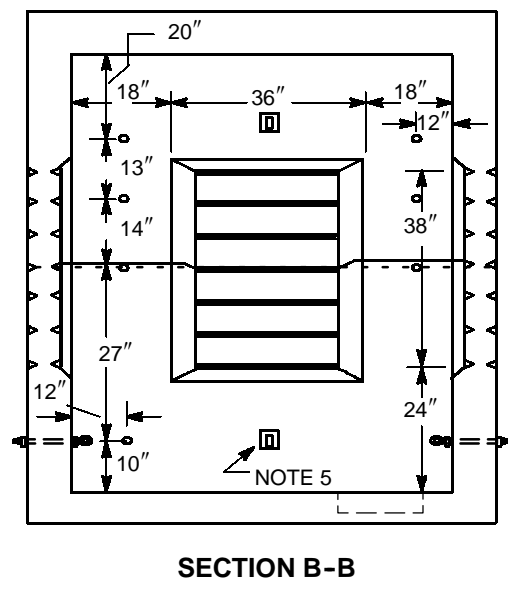
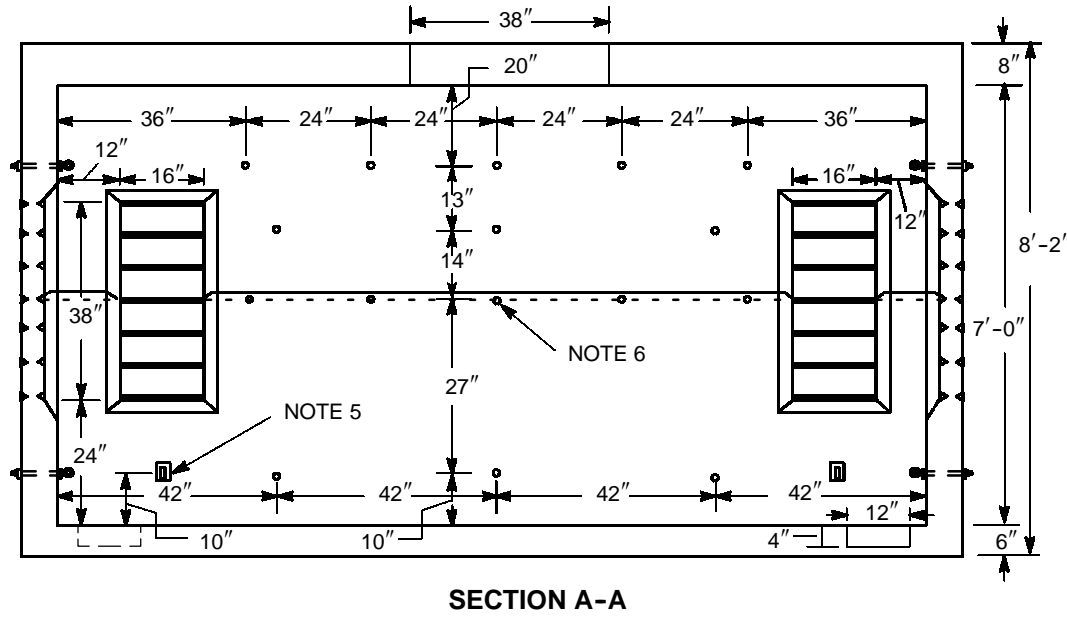
6'-0" x 14'-0" x 7'-0" Inside

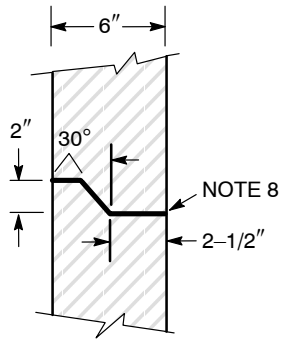
ORIGINAL	MANHOLE - PRECAST REINFORCED CONCRETE	NORTHEAST UTILITIES
8/23/73		
APPROVED		
11/1/01	6'-0" X 14'-0" X 7'-0" INSIDE	MATERIAL SPECIFICATION
	SPC M-031	
	11	



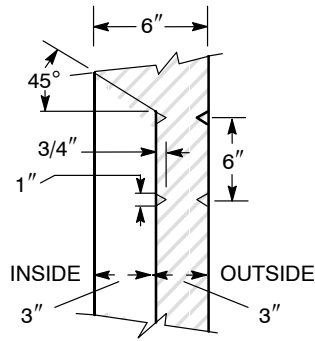
See **Details** and **Notes** on reverse side.

Alternate - Position C
Two 38" openings on C 44" from inside end of walls.

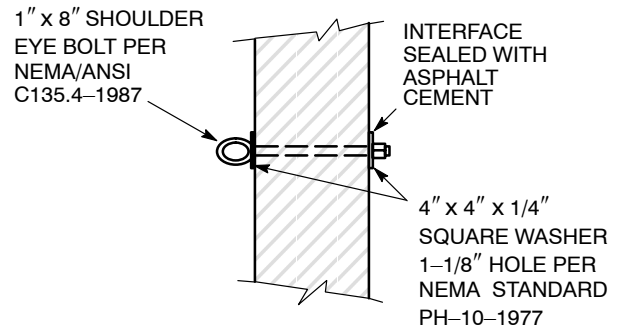




JOINT DETAIL



WINDOW KNOCKOUT DETAIL



PULLING EYEBOLT DETAIL

Notes

1. Manhole shall be designed for the following loads:
 - a. The roof shall be designed for AASHTO HS20–1996 direct wheel load.
 - b. The walls shall be designed for the summation of the following:
 - 1) Soil pressure of not less than an equivalent fluid pressure of 33 pcf.
 - 2) Hydrostatic pressure of 5 feet measured from the base of the manhole.
 - 3) A surcharge of 2.5 feet of soil weighing 120 pcf.
 - c. The floor shall be designed to resist the hydrostatic pressure resulting from the 5-foot head called for in 1.b.2) above.
2. Concrete and concrete design shall be in accordance with ACI 318–1999.
3. Concrete shall have a minimum and maximum 28-day strength of 4000 and 5000 psi respectively.
4. Steel reinforcing bars shall conform to ASTM A615–1992 Grade 40 or 60. Welded wire mesh shall conform to ASTM A185–1997 or A497–1999.
5. Pulling eyebolts, with a minimum 8000-pound pulling strength, shall be installed adjacent to window knockouts, eight places.
6. Zinc alloy inserts 1/2 inch – 13 x 1–1/2 inch shall be installed at 48 places.
7. Openings and knockouts shall be clear of reinforcement.
8. Construction joint shall be sealed with asphalt cement or equivalent.
9. Manufacturer’s identification and month/year when manufactured shall be legibly marked in/on concrete in the side of the 38-inch opening.

ORIGINAL	MANHOLE – PRECAST REINFORCED CONCRETE			
8/23/73				
APPROVED				
11/1/01	6'-0" x 14'-0" x 7'-0" INSIDE			
	NORTHEAST UTILITIES	MATERIAL SPECIFICATION	SPC M-032	11

Appendix D

Northeast Utilities Material Specification

SPC M-039

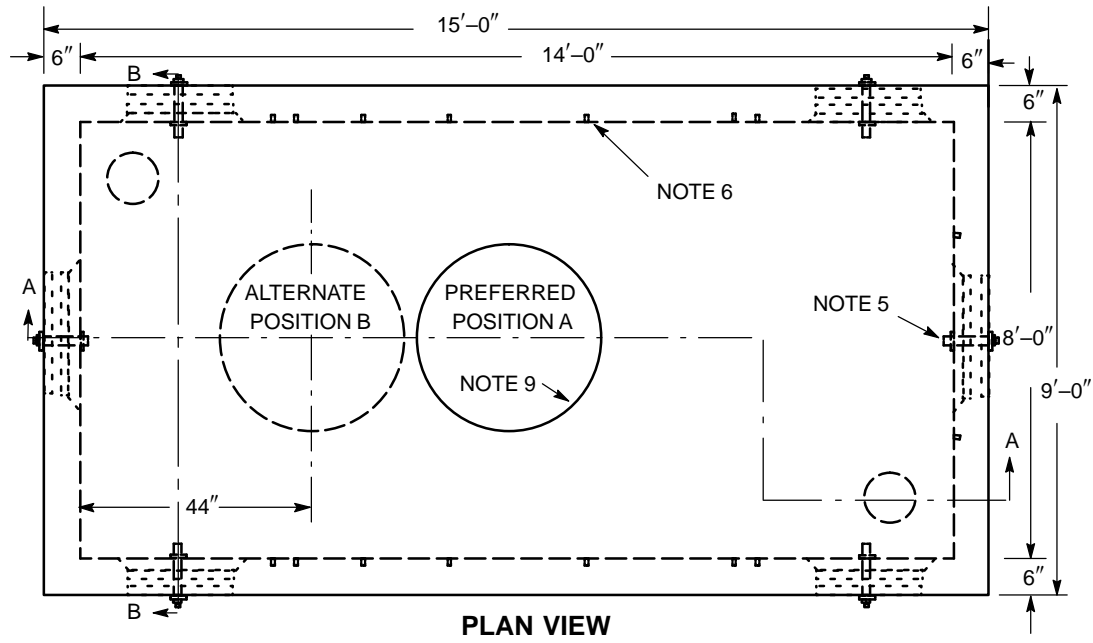
and

SPC M-040

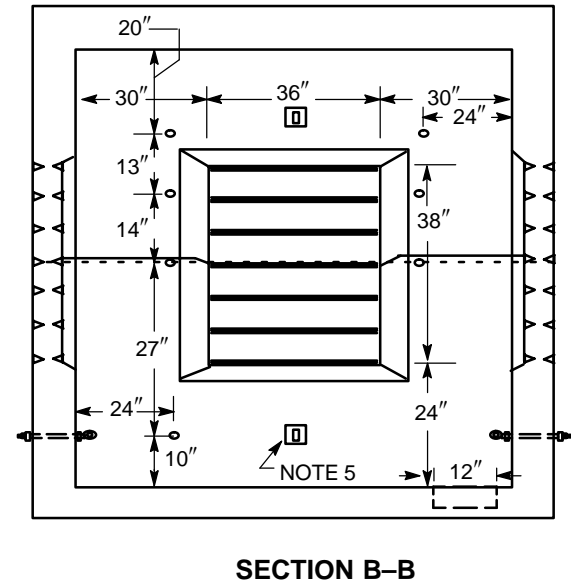
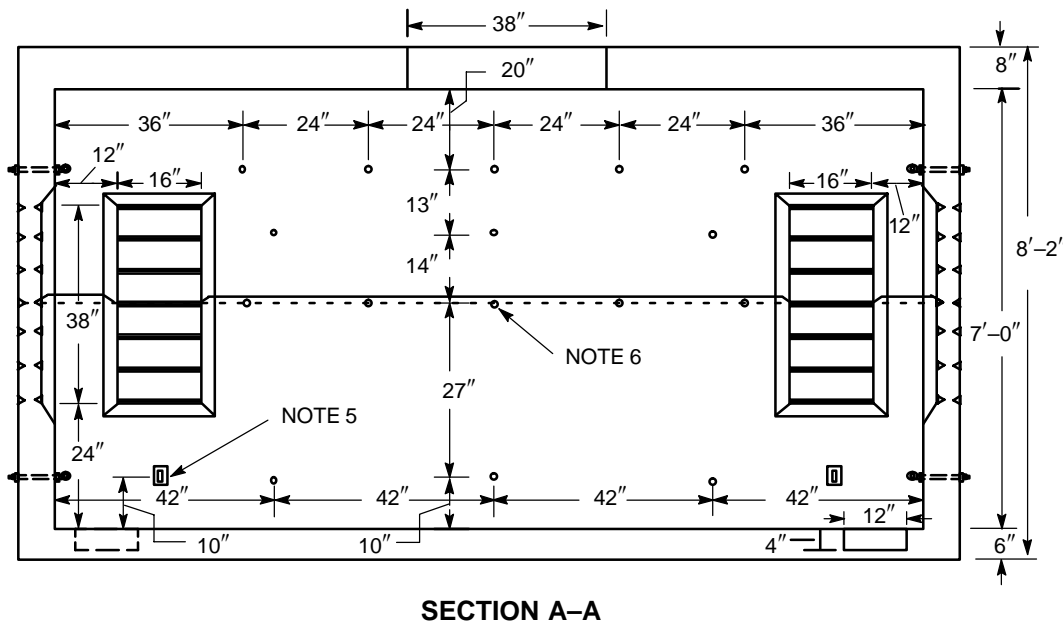
Manhole – Precast Reinforced Concrete

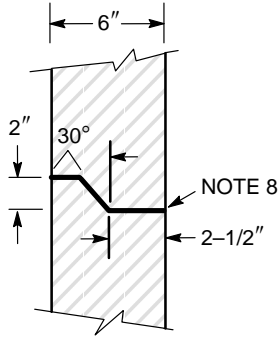
8'-0" x 14'-0" x 7'-0" Inside

ORIGINAL	MANHOLE-PRECAST REINFORCED CONCRETE
5/29/75	
APPROVED	8'-0" x 14'-0" x 7'-0" INSIDE
3/1/02	
NORTHEAST UTILITIES	
MATERIAL SPECIFICATION	
SPC M-039	
8	

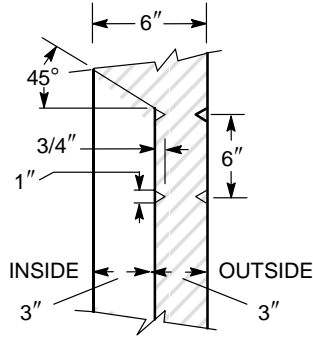


See DETAILS and NOTES on reverse side.

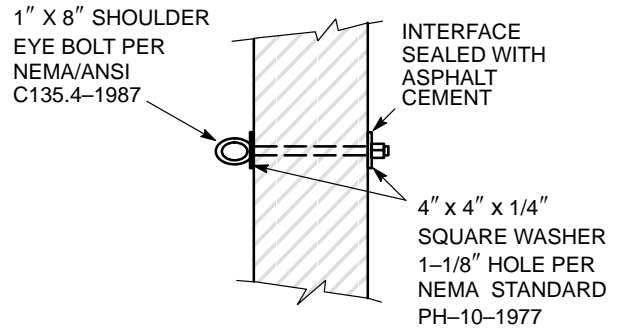




JOINT DETAIL



WINDOW KNOCKOUT DETAIL



PULLING EYEBOLT DETAIL

Notes

1. Manhole shall be designed for the following loads:
 - a. The roof shall be designed for AASHTO HS20-1996 direct wheel load.
 - b. The walls shall be designed for the summation of the following:
 - 1) Soil pressure of not less than an equivalent fluid pressure of 33 pcf.
 - 2) Hydrostatic pressure of 5 feet measured from the base of the manhole.
 - 3) A surcharge of 2.5 feet of soil weighing 120 pcf.
 - c. The floor shall be designed to resist the hydrostatic pressure resulting from the 5-foot head called for in 1.b.2) above.
2. Concrete and concrete design shall be in accordance with ACI 318-1999.
3. Concrete shall have a minimum and maximum 28-day strength of 4000 and 5000 psi respectively.
4. Steel reinforcing bars shall conform to ASTM A615-1992 Grade 40 or 60. Welded wire mesh shall conform to ASTM A185-1997 or A497-1999.
5. Pulling eyebolts, with a minimum 8000-pound pulling strength, shall be installed adjacent to window knockouts, at eight places.
6. Zinc alloy inserts 1/2 inch - 13 x 1-1/2 inch shall be installed at 48 places.
7. Openings and knockouts shall be clear of reinforcement.
8. Construction joint shall be sealed with asphalt cement or equivalent.
9. Manufacturer's identification and month/year when manufactured shall be legibly marked in/on concrete in the side of the 38-inch opening.
10. This is an oversized manhole only to be used in special cases. A crane will be needed to set both sections of this manhole.

ORIGINAL	MANHOLE – PRECAST REINFORCED CONCRETE			
5/29/75				
APPROVED				
3/1/02	8'-0" x 14'-0" x 7'-0" INSIDE			
	NORTHEAST UTILITIES	MATERIAL SPECIFICATION	SPC M-040	8

Appendix E

Northeast Utilities Material Specification

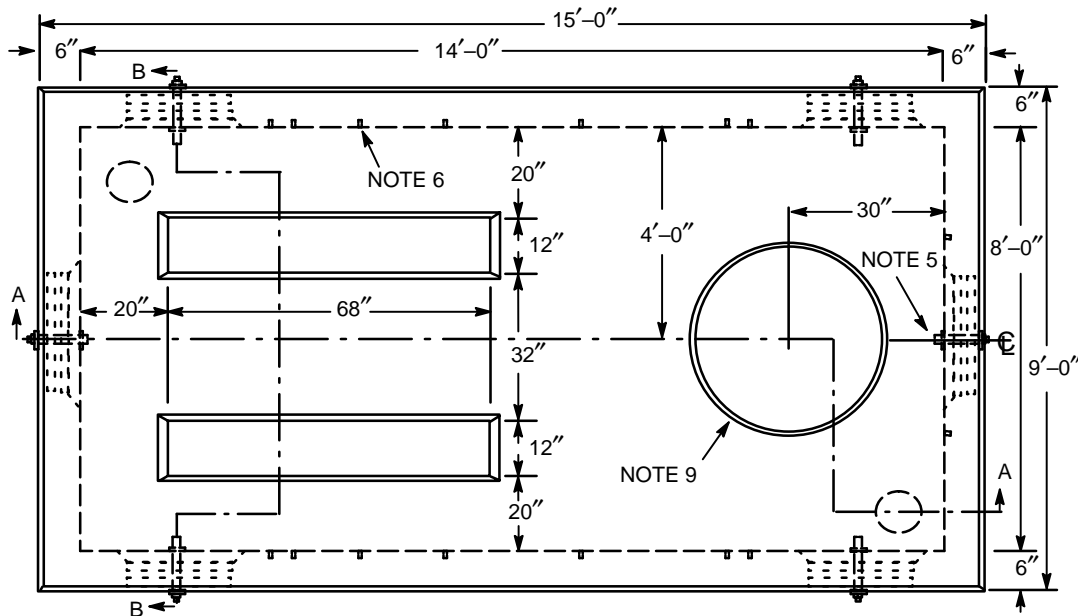
SPC M-069

and

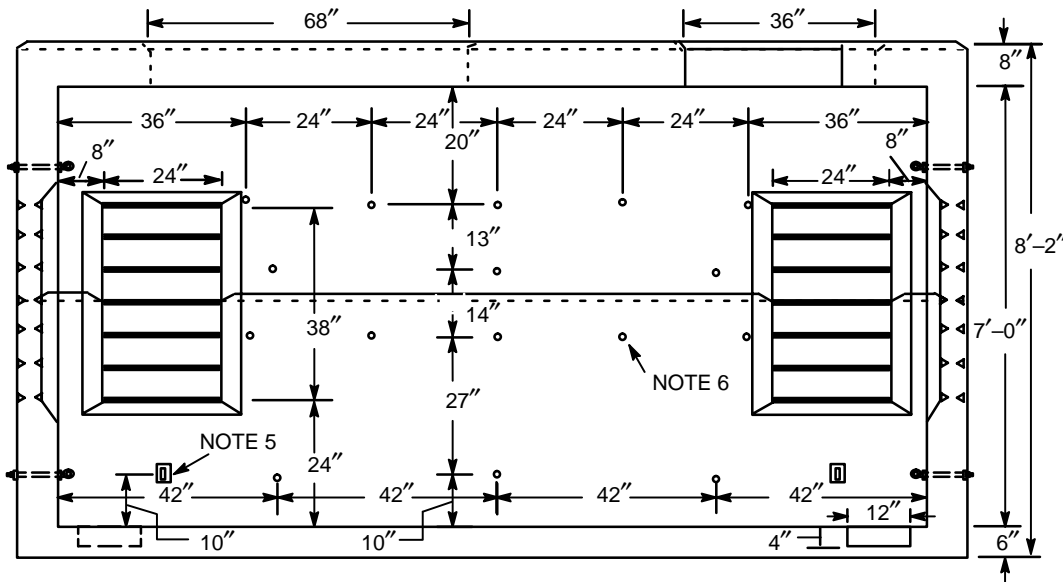
SPC M-070

**Manhole – Precast Reinforced Concrete –
Three – Phase Switchgear –
8'-0" x 14'-0" x 7'-0" Inside**

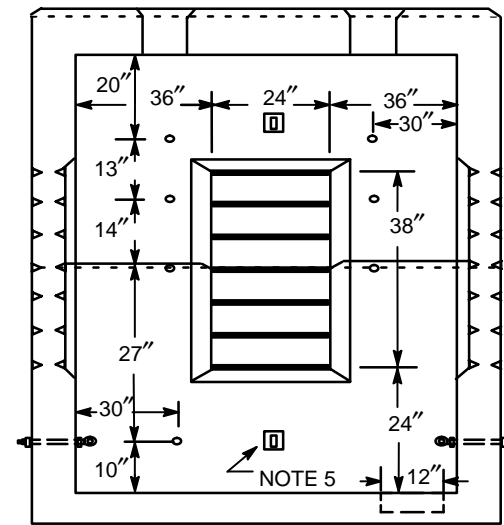
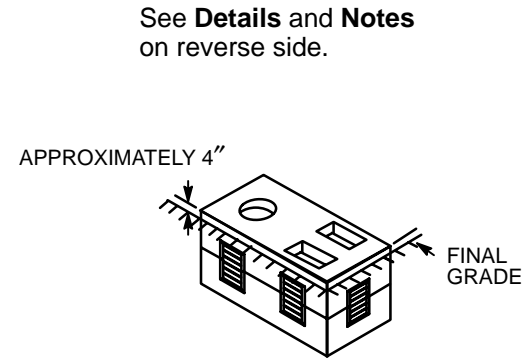
ORIGINAL	12/15/86	MANHOLE - PRECAST REINFORCED CONCRETE - THREE-PHASE SWITCHGEAR - 8'-0" X 14'-0" X 7'-0" INSIDE
APPROVED	11/2/88	
NORTHEAST UTILITIES		MATERIAL SPECIFICATION
SPC M-069		8



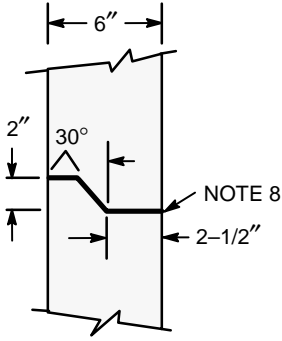
PLAN VIEW



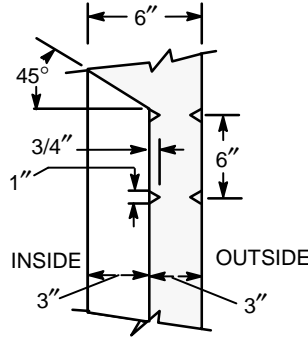
SECTION A-A



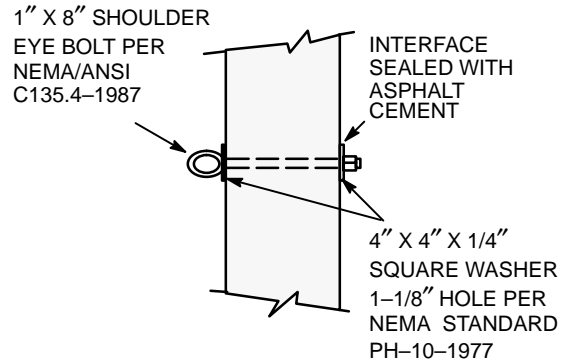
SECTION B-B



JOINT DETAIL



WINDOW KNOCKOUT DETAIL



PULLING EYEBOLT DETAIL

Notes

1. Manhole shall be designed for the following loads:
 - a. The roof shall be designed for 4000 LBS loading over any square foot of roof area.
 - b. The walls shall be designed for the summation of the following:
 - 1) Soil pressure of not less than an equivalent fluid pressure of 33 pcf.
 - 2) Hydrostatic pressure of 5 feet measured from the base of the manhole.
 - 3) A surcharge of 2.5 feet of soil weighing 120 pcf.
 - c. The floor shall be designed to resist the hydrostatic pressure resulting from the 5-foot head called for in 1.b.2) above.
2. Concrete and concrete design shall be in accordance with ACI 318-1986.
3. Concrete shall have a minimum and maximum 28-day strength of 4000 and 5000 psi respectively.
4. Steel reinforcing bars shall conform to ASTM A615-1987A Grade 40 or 60. Welded wire mesh shall conform to ASTM A185-1985E1 or A497-1986.
5. Pulling eyebolts, with a minimum 8000-pound pulling strength, shall be installed adjacent to window knockouts, 8 places.
6. Zinc alloy inserts 1/2 inch - 13 X 1-1/2" shall be installed at 48 places.
7. Openings and knockouts shall be clear of reinforcement.
8. Construction joint shall be sealed with asphalt cement or equivalent.
9. Manhole frame extension for 38-inch cover (**SPC E-945, SC 0174868**) shall be cast into top section where shown. Manufacturer's identification and month/year when manufactured shall be legibly marked in/on concrete in the side of the 36-inch opening.
10. Top of MH shall have a smooth finish. Top of MH to be 4 inches above final grade.

ORIGINAL	MANHOLE – PRECAST REINFORCED CONCRETE – THREE-PHASE SWITCHGEAR – 8'- 0" X 14'- 0" X 7'- 0" INSIDE			
12/15/86				
APPROVED				
11/2/98	NORTHEAST UTILITIES	MATERIAL SPECIFICATION	SPC M-070	8

Appendix F

Northeast Utilities Material Specification

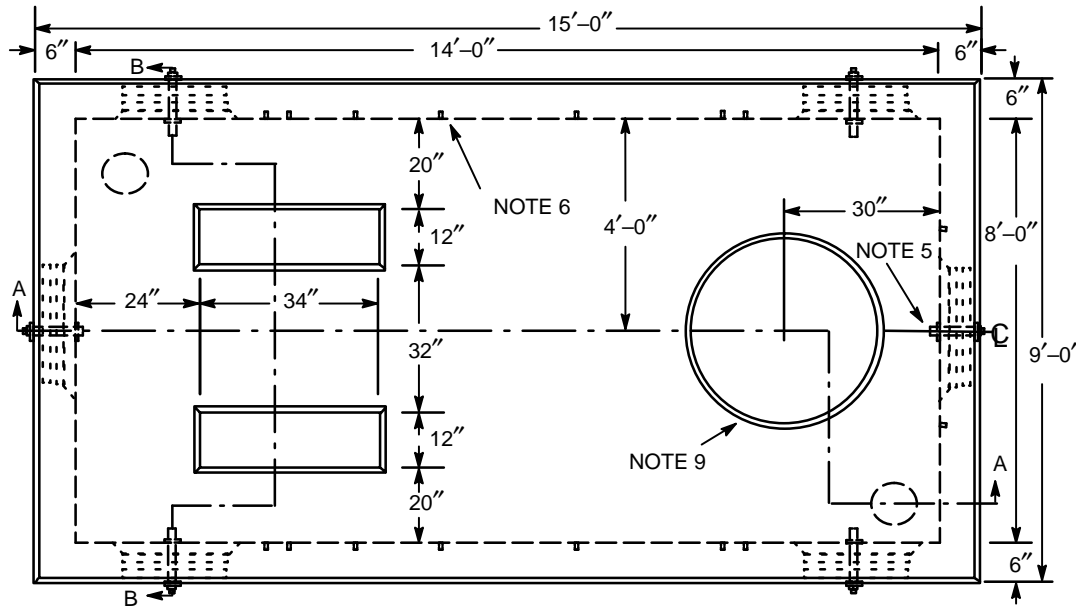
SPC M-073

and

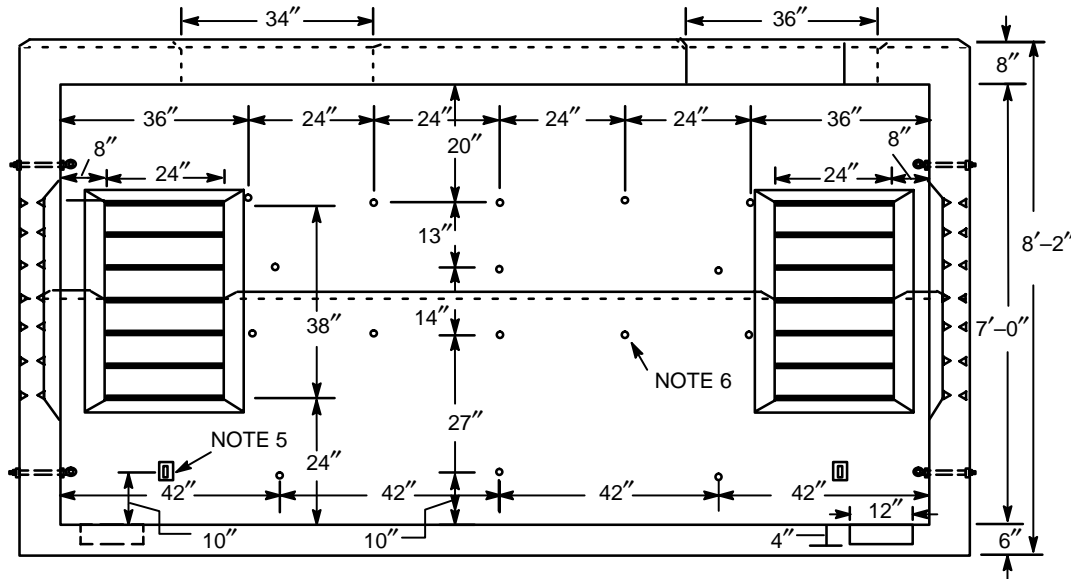
SPC M-074

**Manhole – Precast Reinforced Concrete –
Three – Phase Switchgear –
8'-0" x 14'-0" x 7'-0" Inside**

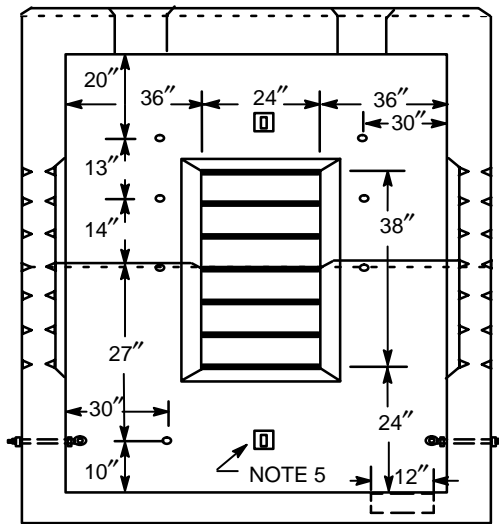
ORIGINAL	12/15/86	MANHOLE - PRECAST REINFORCED CONCRETE - THREE-PHASE SWITCHGEAR - 8'-0" X 14'-0" X 7'-0" INSIDE
APPROVED	11/2/88	
NORTHEAST UTILITIES		MATERIAL SPECIFICATION
SPC M-073		8



PLAN VIEW

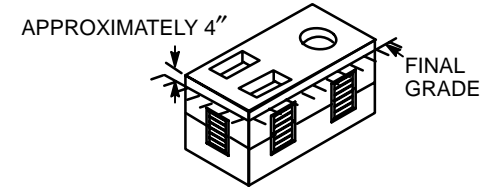


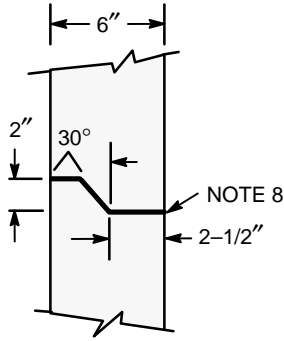
SECTION A-A



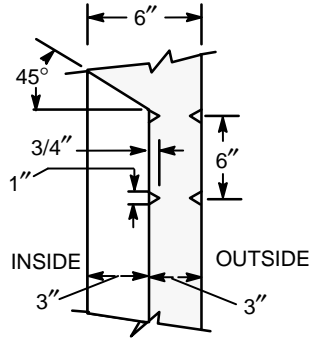
SECTION B-B

See **Details** and **Notes** on reverse side.

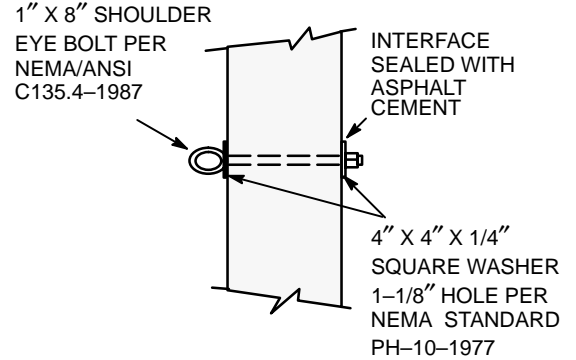




JOINT DETAIL



WINDOW KNOCKOUT DETAIL



PULLING EYEBOLT DETAIL

Notes

1. Manhole shall be designed for the following loads:
 - a. The roof shall be designed for 4000 lbs loading over any square foot of roof area.
 - b. The walls shall be designed for the summation of the following:
 - 1) Soil pressure of not less than an equivalent fluid pressure of 33 pcf.
 - 2) Hydrostatic pressure of 5 feet measured from the base of the manhole.
 - 3) A surcharge of 2.5 feet of soil weighing 120 pcf.
 - c. The floor shall be designed to resist the hydrostatic pressure resulting from the 5-foot head called for in 1.b.2. above.
2. Concrete and concrete design shall be in accordance with ACI 318-1986.
3. Concrete shall have a minimum and maximum 28-day strength of 4000 and 5000 psi respectively.
4. Steel reinforcing bars shall conform to ASTM A615-1987A Grade 40 or 60. Welded wire mesh shall conform to ASTM A185-1985E1 or A497-1986.
5. Pulling eyebolts, with a minimum 8000-pound pulling strength, shall be installed adjacent to window knockouts at 8 places.
6. Zinc alloy inserts 1/2 inch - 13 X 1-1/2 inch shall be installed at 48 places.
7. Openings and knockouts shall be clear of reinforcement.
8. Construction joint shall be sealed with asphalt cement or equivalent.
9. Manhole frame extension for 38-inch cover (**SPC E-945, SC 0174868**) shall be cast into top section where shown. Manufacturer's identification and month/year when manufactured shall be legibly marked in/on concrete in the side of the 36-inch opening.
10. Top of MH shall have a smooth finish. Top of MH to be 4 inches above final grade.

ORIGINAL	MANHOLE – PRECAST REINFORCED CONCRETE –THREE–PHASE SWITCHGEAR – 8’– 0” X 14’– 0” X 7’– 0” INSIDE			
12/15/86				
APPROVED				
11/2/98	NORTHEAST UTILITIES	MATERIAL SPECIFICATION	SPC M-074	8

Appendix G

Northeast Utilities Material Specification

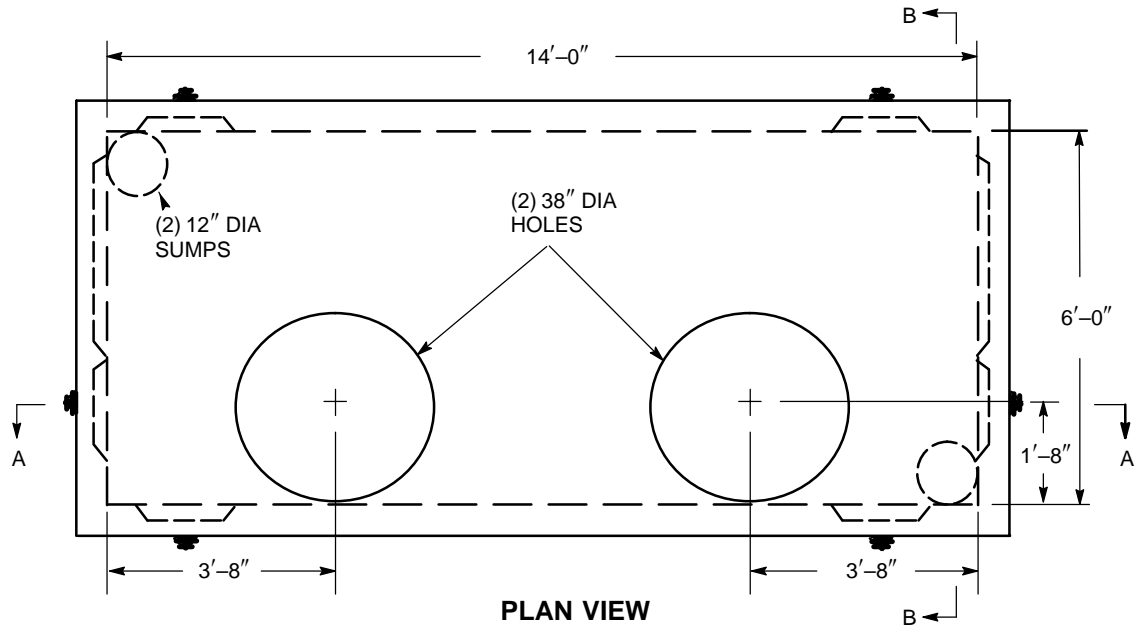
SPC V-035

and

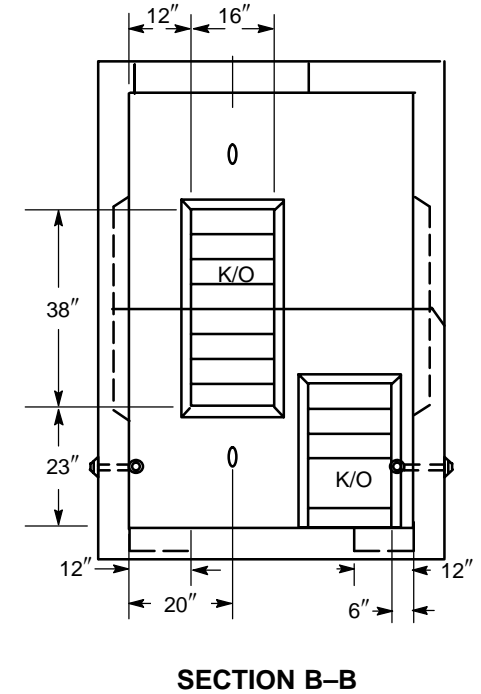
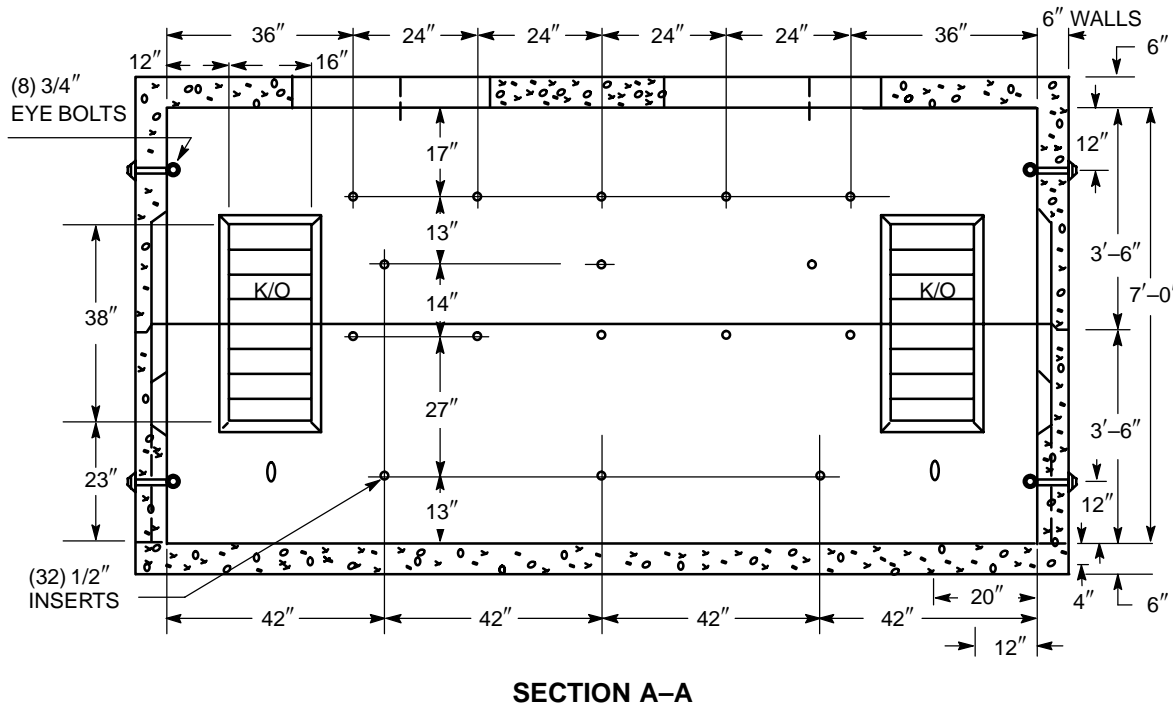
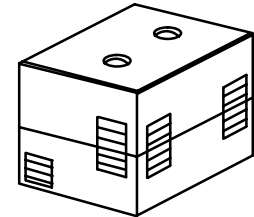
SPC V-036

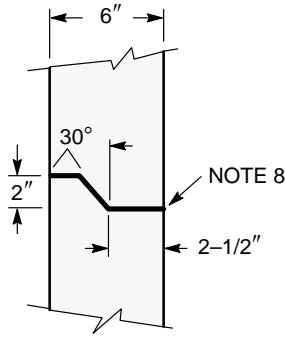
**Vault – Precast Reinforced Concrete
6'-0" x 14'-0" x 7'-0" Inside**

ORIGINAL	8/11/87	VAULT - PRECAST REINFORCED CONCRETE	NORTHEAST UTILITIES	MATERIAL SPECIFICATION	SPC V-035	4
APPROVED	3/1/02					
6'-0" X 14'-0" X 7'-0" INSIDE						

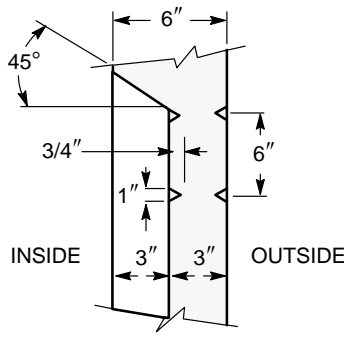


See DETAILS and NOTES on reverse side.

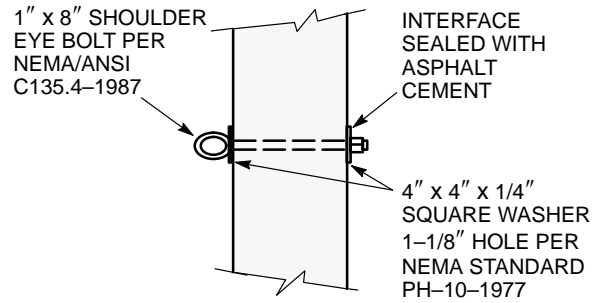




JOINT DETAIL



WINDOW KNOCKOUT DETAIL



PULLING EYEBOLT DETAIL

Notes

1. Vault shall be designed for the following loads:
 - a. The roof shall be designed for AASHTO HS20–1996 direct wheel load.
 - b. The walls shall be designed for the summation of the following:
 - 1) Soil pressure of not less than an equivalent fluid pressure of 33 pcf.
 - 2) Hydrostatic pressure of 5 feet measured from the base of the vault.
 - 3) A surcharge of 2.5 feet of soil weighing 120 pcf.
 - c. The floor shall be designed to resist the hydrostatic pressure resulting from the 5–foot head called for in 1.b.2) above.
2. Concrete and concrete design shall be in accordance with ACI 318–1999.
3. Concrete shall have a minimum and maximum 28–day strength of 4000 and 5000 psi respectively.
4. Steel reinforcing bars shall conform to ASTM A615–1992, Grade 40 or 60. Welded wire mesh shall conform to ASTM A185–1997 or A497–1999.
5. Pulling eyebolts, with a minimum 8000–pound pulling strength, shall be installed adjacent to window knockouts, at eight places.
6. Zinc alloy inserts 1/2 inch – 13 x 1–1/2 inch shall be installed at 32 places.
7. Openings and knockouts shall be clear of reinforcement.
8. Construction joint shall be sealed with asphalt cement or equivalent.
9. Manufacturer’s identification and month/year when manufactured shall be legibly marked in/on concrete in the side of the 38–inch opening as indicated.

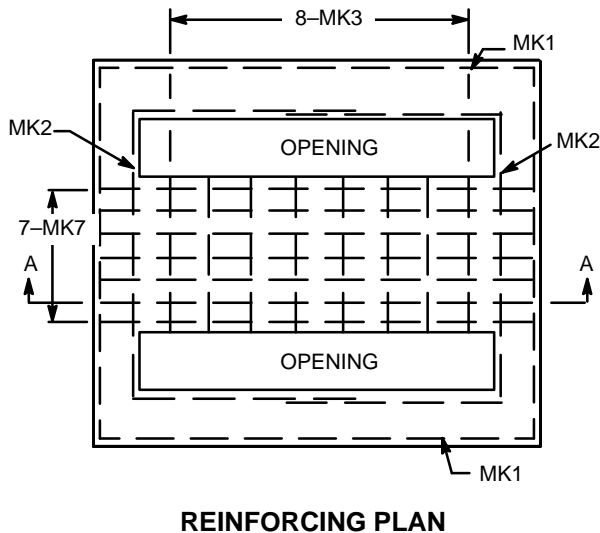
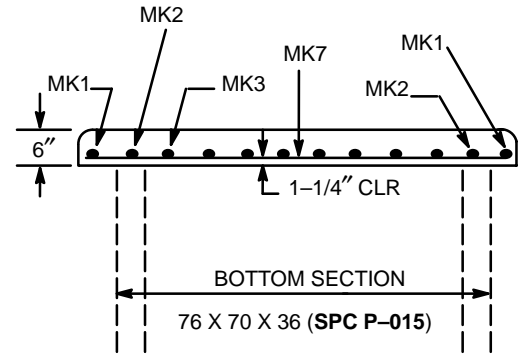
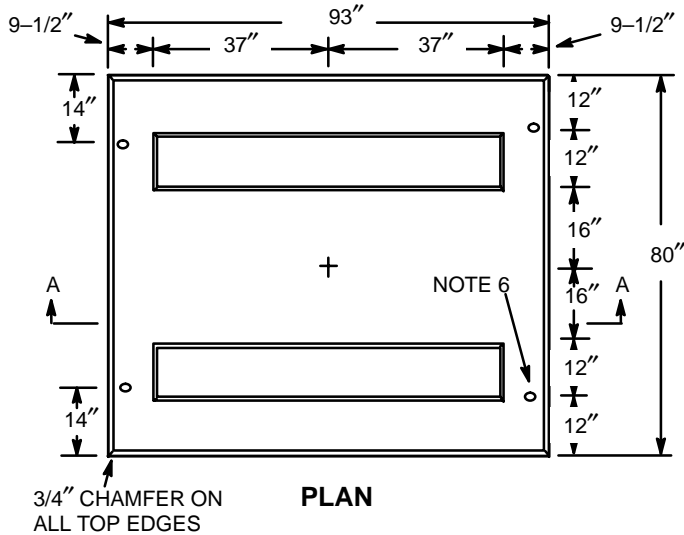
ORIGINAL	VAULT – PRECAST REINFORCED CONCRETE			
8/11/87				
APPROVED				
3/1/02	6’–0” x 14’–0” x 7’–0” INSIDE			
	NORTHEAST UTILITIES	MATERIAL SPECIFICATION	SPC V–036	4

Appendix H

Northeast Utilities Material Specification

SPC P-019

**Pad (Top) – Precast Concrete –
Three – Phase Switchgear
93” x 80” x 6”
With 74” x 12” Openings**



BAR SCHEDULE				
MK NO	MK1	MK2	MK3	MK7
SIZE	#4	#4	#3	#5
NO REQ'D	2	2	8	5
DIMENSIONS	90-1/2" 46-3/4"	58-1/2" 46"	29-1/2"	90-1/2"

Notes

1. ROOF DESIGN LOAD: 4000 pounds spread over 1 foot square area anywhere on roof.
2. WALLS: For design and details see NU Material **SPCs P-015-016**.
3. CONCRETE: 4000 psi at 28 days. Entrained air 6-9 percent.
4. REINFORCING STEEL: ASTM A615-1987A, Grade 60.
5. All concrete and reinforcing in accordance with ACI 318-1986.
6. For lifting top, cast in four 3/4-inch diameter Dayton Suregrip (or approved equal) coil loop inserts, galvanized, with T21 plastic setting plugs. Catalog Type B16, 3/4-inch diameter X 4 inches long. Inserts are to be secured in place with rebar.
7. Provide 3-inch-long groove (3/4 inch X 1 inch) for lifting sling at each corner.
8. Manufacturer's identification and month/year when manufactured shall be legibly marked in/on concrete in the side of the rectangular opening. NU **SC 0175093** shall also be applicably marked.

ORIGINAL	PAD (TOP) – PRECAST CONCRETE – THREE PHASE SWITCHGEAR				
8/20/87					
APPROVED					
3/1/97	NORTHEAST UTILITIES		MATERIAL SPECIFICATION	SPC P-019	5

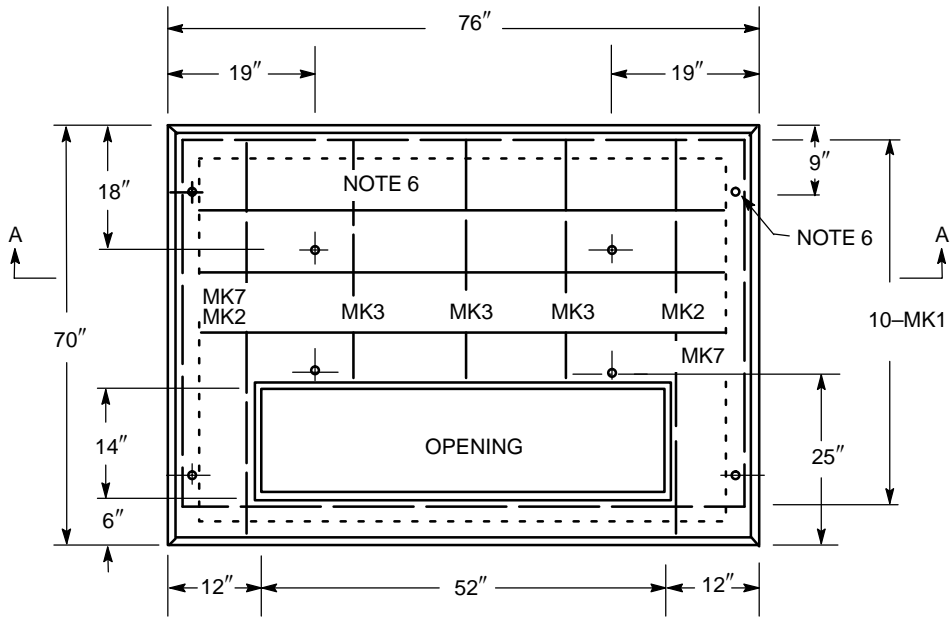
Appendix I

Northeast Utilities Material Specification

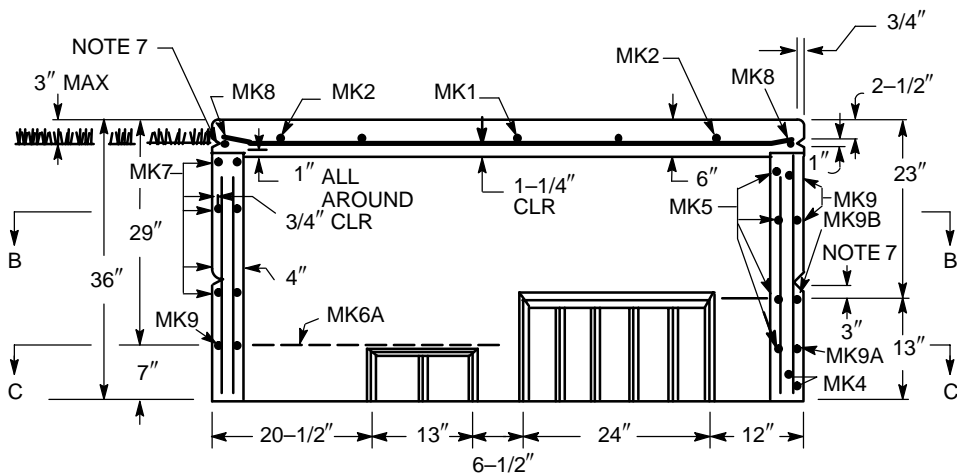
**SPC P-015
and
SPC P-016**

**Pad – Precast Concrete –
Three – Phase Transformer
500 – 2500 Kva – 76” x 70” x 36”**

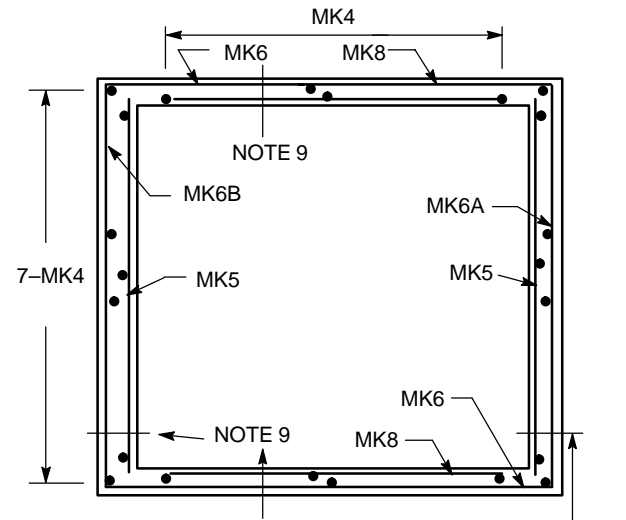
ORIGINAL	PAD - PRECAST CONCRETE - THREE-PHASE TRANSFORMER	NORTHEAST UTILITIES
12/21/78		
APPROVED		
3/1/02	500-2500 KVA-76" X 70" X 36"	MATERIAL SPECIFICATION
	SPC P-015	7



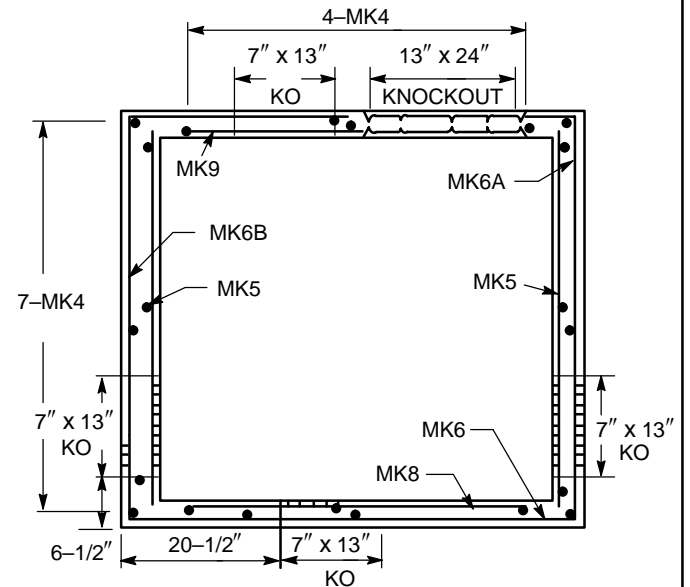
TOP PLAN



SECTION A-A

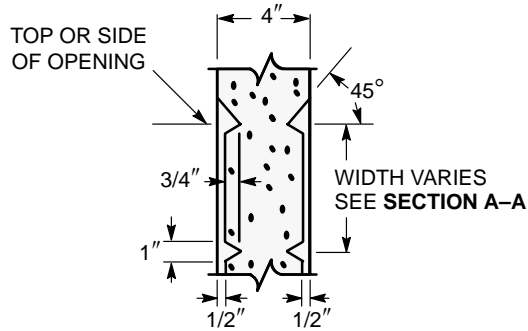


SECTION B-B



SECTION C-C

BAR SCHEDULE											
MARK NO	MK1	MK2	MK3	MK4	MK5	MK6	MK6A	MK6B	MK7	MK8	MK9
SIZE	#6	#4	#4	#3	#4	#4	#4	#4	#4	#4	#4
NO OF BARS	10	2	3	22	8	7	1	1	2	7	1
DIMENSIONS											



WINDOW KNOCKOUT DETAIL

Notes

- Roof Design Load:** 4000 lbs spread over 1-foot-square area anywhere on roof.
- Walls:** Soil pressure of equivalent fluid pressure of 33 pcf. Surcharge of 2.5 feet of soil weighing 120 pcf.
- Concrete:** 4000 psi at 28 days. Entrained air 6-9 percent.
- Steel:** ASTM A615-1992, Grade 40.
- All concrete and reinforcement in accordance with ACI 318-1999.
- For lifting top or bottom sections, cast in four 3/4-inch-diameter Dayton Suregrip (or approved equal) coil loop inserts, galvanized, with T21 plastic setting plugs. Inserts are to be secured in place with rebar.
Top: Catalog Type B16, 3/4 inch diameter x 4 inches long
Bottom: Catalog Type B16, 3/4 inch diameter x 6 inches long
- Provide 3-inch-long groove (3/4 inch x 1 inch) for lifting sling at each corner, each side.
- Manufacturer's identification and month/year when manufactured shall be legibly marked in/on concrete in the side.
- Zinc alloy inserts 3/4 inch - 10 inches x 3 inches for cable pulling. To be located 4 inches above (7 inch x 13 inch) knockouts (four).

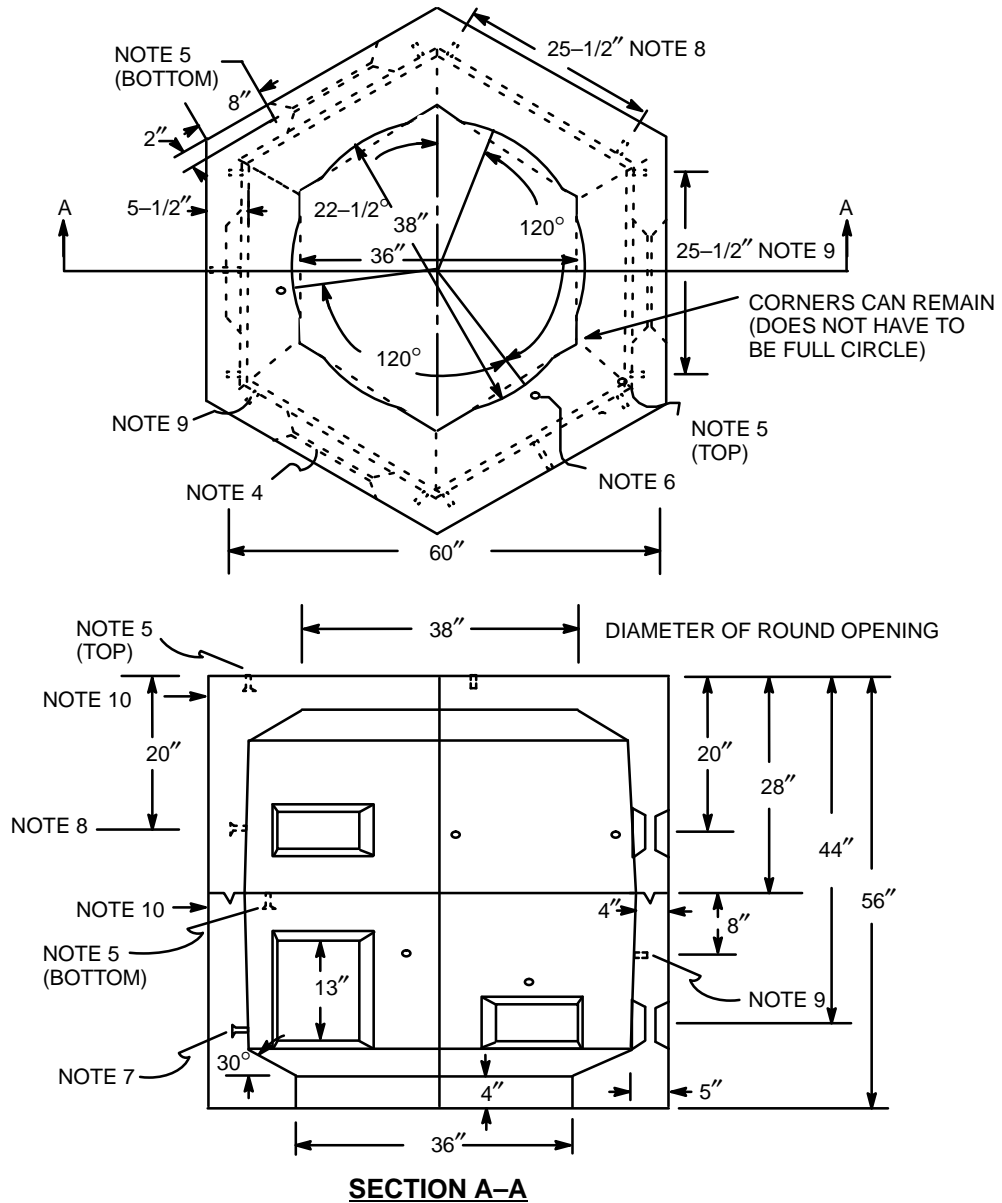
ORIGINAL	PAD – PRECAST CONCRETE – THREE-PHASE TRANSFORMER 500-2500 KVA – 76" x 70" x 36"			
3/12/82				
APPROVED				
3/1/02	NORTHEAST UTILITIES	MATERIAL SPECIFICATION	SPC P-016	7

Appendix J

Northeast Utilities Material Specification

SPC H-019

**Hexagonal – Precast Concrete
60” Wide x 56” High Outside**



NOTES

1. Design loading shall be in accordance with AASHTO HS20-1983.
2. Concrete and concrete design shall be in accordance with ACI 318-1986.
3. Concrete shall have a minimum 28 day strength of 4000 psi and a maximum 28 day strength of 5000 psi.
4. Five inch x 12 inch knockouts, (3) in the top, (3) in the bottom and (1) 12 inch x 13 inch knockout in the bottom shall be clear of reinforcement.
5. 3/4 inch – coil loop inserts – 6 inch – (Dayton B-16) with insert locator plug (Dayton T-21). Two each in top and bottom sections for lifting with swivel plate. Inserts are to be secured in place with rebar.
6. Zinc alloy inserts 5/8 inch – 11 x 1-1/2 inches for extension (3) on 41 inch bolt circle.
7. Zinc alloy inserts 3/4 inch – 10 x 3 inches for cable pulling (4) opposite knockouts in bottom section.
8. Zinc alloy inserts 1/2 inch – 13 x 1-1/2 inches (6) for mounting junction connectors.
9. Zinc alloy inserts 3/8 inch – 16 x 1-1/2 inches (6) for supporting ground bus.
10. Manufacturer's identification and month/year when manufactured shall be legibly marked in/on concrete on the outside upper part.

ORIGINAL	HANDHOLE – HEXAGONAL – PRECAST CONCRETE			
10/3/75	60" WIDE X 56" HIGH OUTSIDE			
APPROVED				
12/13/90	NORTHEAST UTILITIES	MATERIAL SPECIFICATION	SPC H-019	8

Appendix K

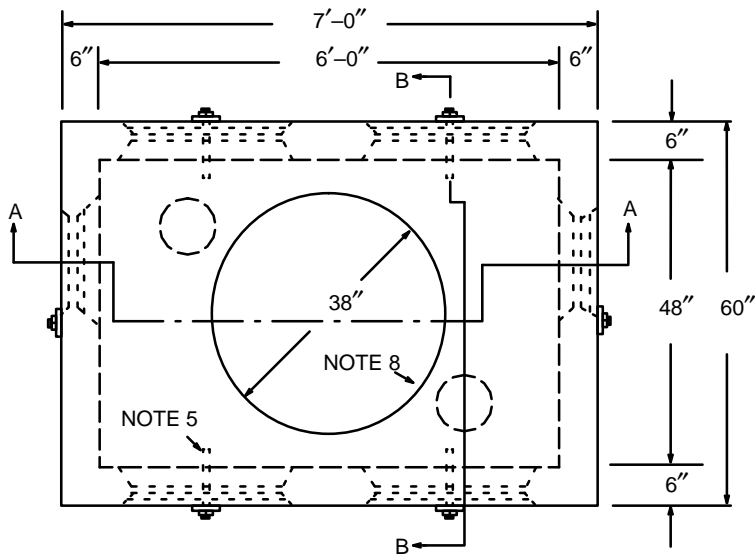
Northeast Utilities Material Specification

SPC B-649

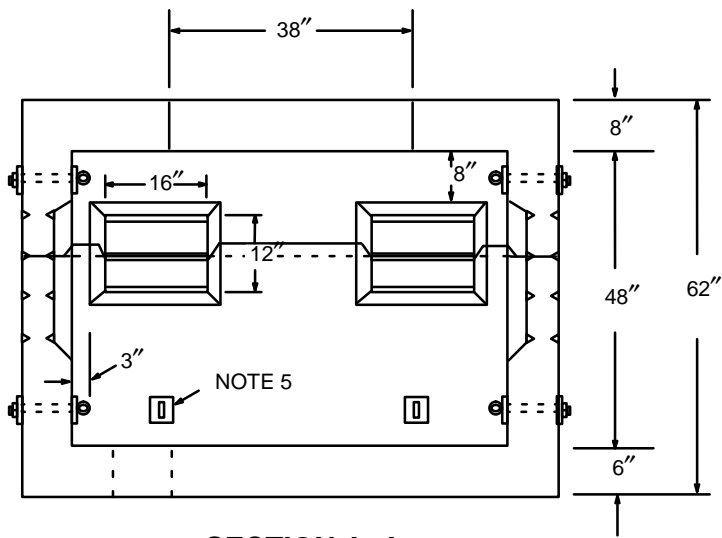
and

SPC B-650

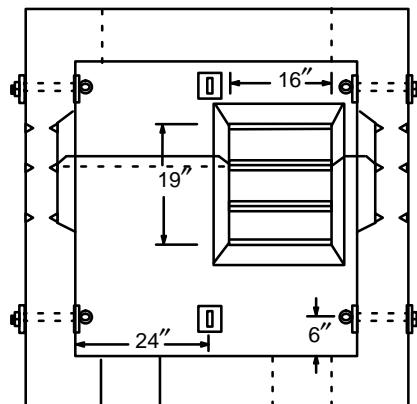
**Box – Service – Precast Reinforced Concrete
Underground Network –
4'-0" x 6'-0" x 4'-0"**



PLAN VIEW

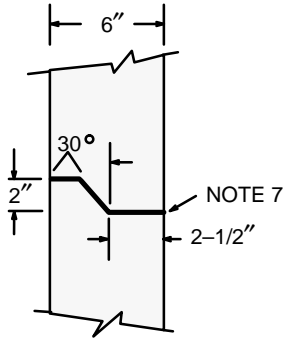


SECTION A-A

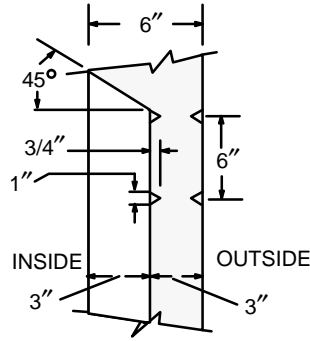


SECTION B-B

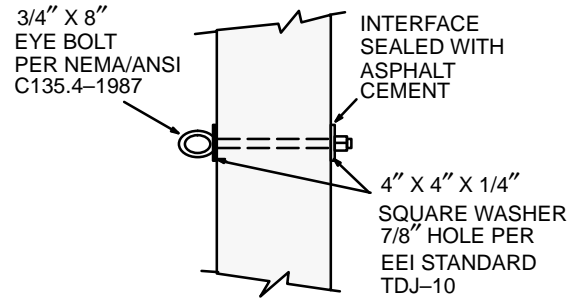
ORIGINAL	BOX – SERVICE – PRECAST REINFORCED CONCRETE UNDERGROUND NETWORK – 4'-0" X 6'-0" X 4'-0"			
3/17/86				
APPROVED				
6/1/91	NORTHEAST UTILITIES	MATERIAL SPECIFICATION	SPC B-649	3



JOINT DETAIL



WINDOW KNOCKOUT DETAIL



PULLING EYEBOLT DETAIL

NOTES

1. Service box shall be designed for the following loads:
 - a. The roof shall be designed for AASHTO HS20–1983 direct wheel load.
 - b. The walls shall be designed for the summation of the following:
 1. Soil pressure of not less than an equivalent fluid pressure of 33 pcf.
 2. Hydrostatic head of 4’ measured at the base of the service box.
 3. A surcharge of 2.5’ of soil weighing 120 pcf.
 - c. The floor shall be designed to resist the hydrostatic pressure resulting from the 4’ head called for in 1.b.2. above.
2. Concrete and concrete design shall be in accordance with ACI Code 318–1986.
3. Concrete shall have a minimum and maximum 28 day strength of 4000 and 5000 psi respectively.
4. Steel reinforcing bars shall conform to ASTM A615–1987A Grade 40 or 60. Welded wire mesh shall conform to ASTM A185–1985E1 or A497–1986.
5. Pulling eyebolts shall be installed adjacent to window knockouts, 8 places.
6. Openings and knockouts shall be clear of reinforcement.
7. The construction joint shall be sealed with asphalt cement or equivalent.
8. Manufacturer’s identification and month/year when manufactured shall be legibly marked in/on concrete in the side of the 38” opening.

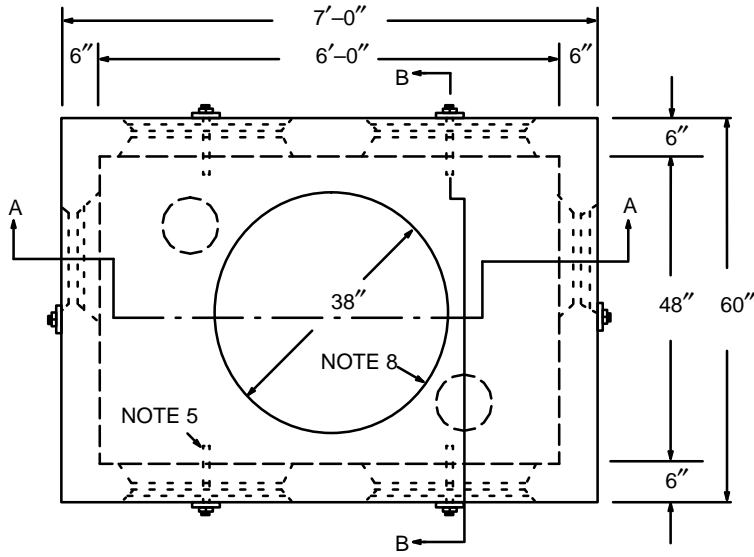
ORIGINAL	BOX – SERVICE – PRECAST REINFORCED CONCRETE			
3/17/86				
APPROVED	UNDERGROUND NETWORK – 4’-0” X 6’-0” X 4’-0”			
6/1/91				
	NORTHEAST UTILITIES	MATERIAL SPECIFICATION	SPC B-650	2

Appendix L

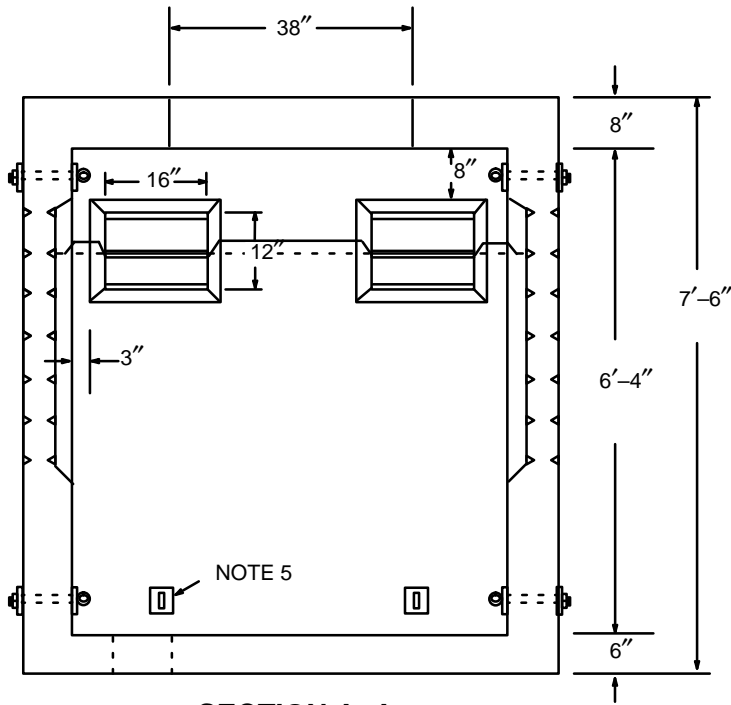
Northeast Utilities Material Specification

**SPC B-651
and
SPC B-652**

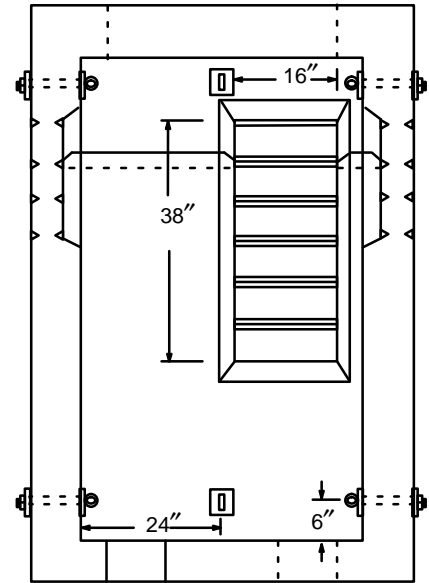
**Box – Service – Precast Reinforced Concrete
Underground Network –
4'-0" x 6'-0" x 6'-4"**



PLAN VIEW

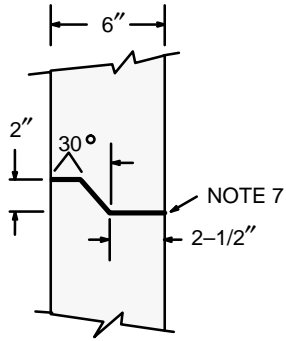


SECTION A-A

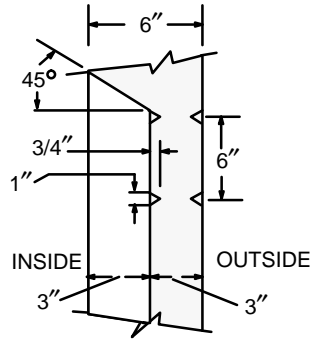


SECTION B-B

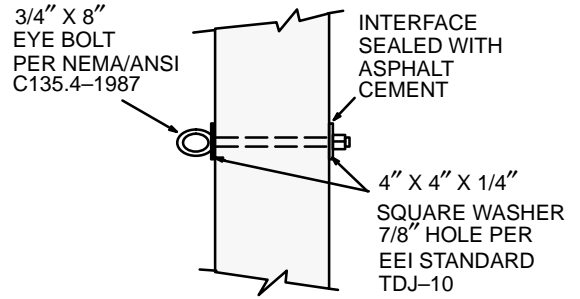
ORIGINAL	BOX – SERVICE – PRECAST REINFORCED CONCRETE UNDERGROUND NETWORK – 4'-0" X 6'-0" X 6'-4"			
3/17/86				
APPROVED				
6/1/91	NORTHEAST UTILITIES	MATERIAL SPECIFICATION	SPC B-651	2



JOINT DETAIL



WINDOW KNOCKOUT DETAIL



PULLING EYEBOLT DETAIL

NOTES

1. Service box shall be designed for the following loads:
 - a. The roof shall be designed for AASHTO HS20–1983 direct wheel load.
 - b. The walls shall be designed for the summation of the following:
 1. Soil pressure of not less than an equivalent fluid pressure of 33 pcf.
 2. Hydrostatic head of 4’ measured at the base of the service box.
 3. A surcharge of 2.5’ of soil weighing 120 pcf.
 - c. The floor shall be designed to resist the hydrostatic pressure resulting from the 4’ head called for in 1.b.2. above.
2. Concrete and concrete design shall be in accordance with ACI Code 318–1986.
3. Concrete shall have a minimum and maximum 28 day strength of 4000 and 5000 psi respectively.
4. Steel reinforcing bars shall conform to ASTM A615–1987A Grade 40 or 60. Welded wire mesh shall conform to ASTM A185–1985E1 or A497–1986.
5. Pulling eyebolts shall be installed adjacent to window knockouts, 8 places.
6. Openings and knockouts shall be clear of reinforcement.
7. The construction joint shall be sealed with asphalt cement or equivalent.
8. Manufacturer’s identification and month/year when manufactured shall be legibly marked in/on concrete in the side of the 38” opening.

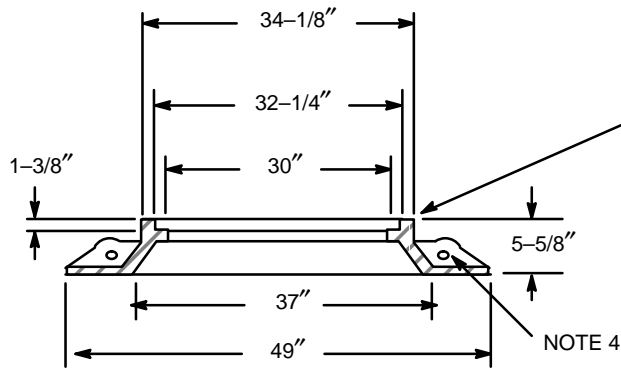
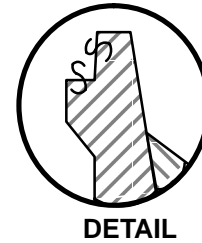
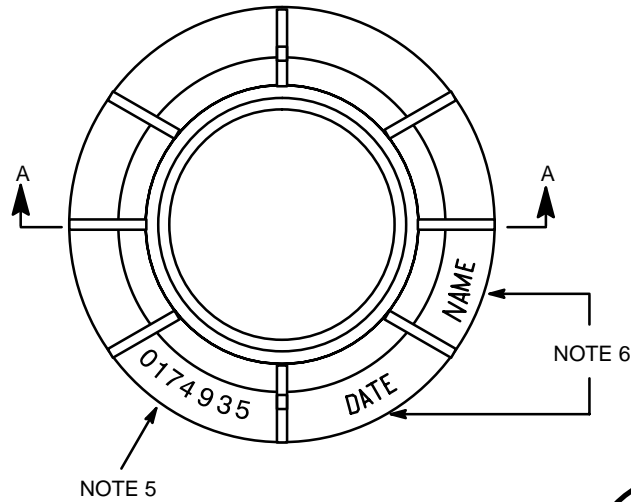
ORIGINAL	BOX – SERVICE – PRECAST REINFORCED CONCRETE UNDERGROUND NETWORK – 4’- 0” X 6’- 0” X 6’- 4”			
3/17/86				
APPROVED				
6/1/91	NORTHEAST UTILITIES	MATERIAL SPECIFICATION	SPC B-652	3

Appendix M

Northeast Utilities Material Specification

SPC F-495

Frame – Manhole – Cast Iron 30” Clear Inside Dimension



SECTION A-A

Notes

1. The gray cast iron shall conform to the latest edition of ASTM A48-1983 Class 30B castings.
2. Design loading shall be in accordance with the latest edition of AASHTO HS20-1983.
3. Bearing and side surfaces of frames for cover seat shall be machine finished with tolerances of +1/16 inch -0 inches.
4. Four lifting holes (alternate ribs). 1-1/4 inch diameter with center 1-1/4 inch from base and side of frame.
5. NU **SC 0174935** shall be cast in the flange.
6. Foundry name or insigne and date (year) shall be cast in the flange adjacent to NU stock code.
7. The 30-inch frame requires a 32-inch cover.
8. Weight of 30-inch frame is approximately 400 pounds.

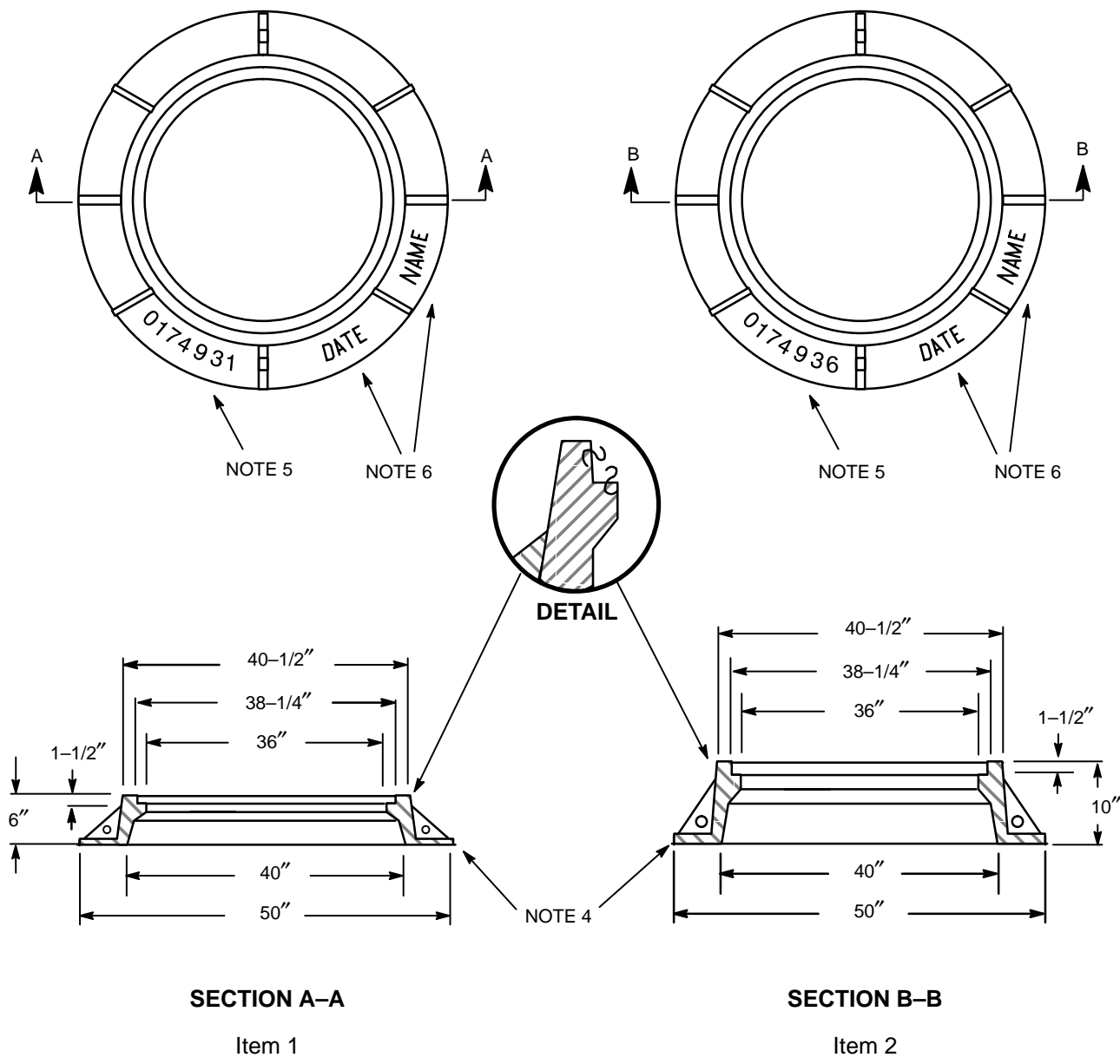
ORIGINAL	FRAME – MANHOLE – CAST IRON			
3/1/94				
APPROVED	30" CLEAR INSIDE DIAMETER			
3/1/97				
	NORTHEAST UTILITIES	MATERIAL SPECIFICATION	SPC F-495	1

Appendix N

Northeast Utilities Material Specification

SPC F-497

**Frame – Manhole – Cast Iron
36” Clear Inside Diameter – 6” and 10” Rise**



Notes

1. The gray cast iron shall conform to the latest edition of ASTM A48-1983 Class 30B castings.
2. Design loading shall be in accordance with the latest edition of AASHTO HS20-1983.
3. Bearing and side surfaces of frames for cover seat shall be machine finished with tolerances of +1/16 inch -0 inches.
4. Four lifting holes (alternate ribs). 1-1/4 inch diameter with center 1-1/4 inch from base and side of frame.
5. NU **SC 0174936** shall be cast in the flange.
6. Foundry name or insigne and date (year) shall be cast in the flange adjacent to NU stock code.
7. The 36 inch-frame requires a 38-inch cover.
8. Weight of 36-inch frame is approximately 550 pounds.

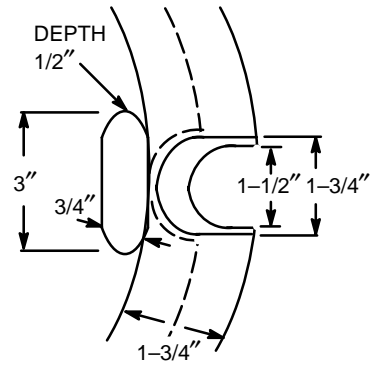
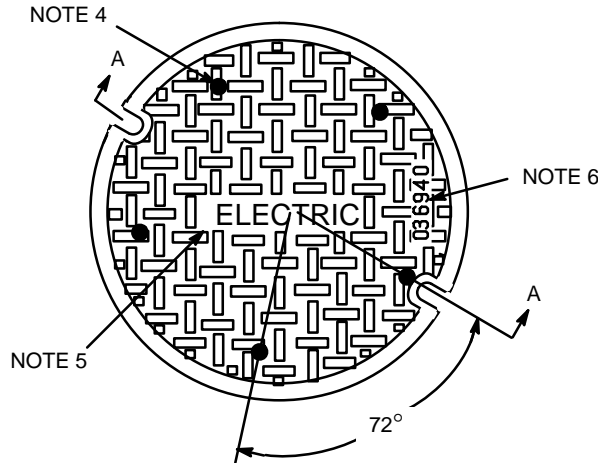
ORIGINAL	FRAME – MANHOLE – CAST IRON			
7/2/75				
APPROVED				
3/1/97	36" CLEAR INSIDE DIAMETER – 6" AND 10" RISE			
	NORTHEAST UTILITIES	MATERIAL SPECIFICATION	SPC F-497	6

Appendix O

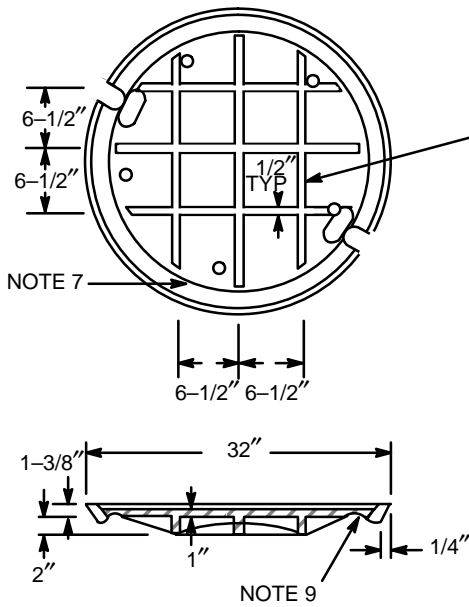
Northeast Utilities Material Specification

SPC C-709

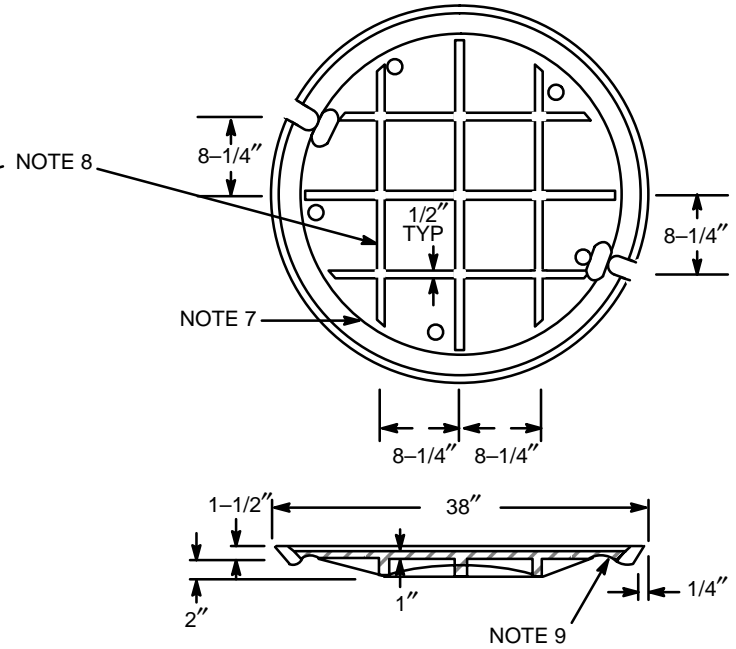
Covers – Manhole – Cast Iron 32” and 38” Diameter



PICK HOLE AND LIFTING NOTCH DETAIL



SECTION A-A



SECTION A-A

Notes

1. The gray cast iron shall conform to ASTM A48-1983 Class 30-B.
2. Design loading shall be in accordance with AASHTO HS20-1983.
3. Bearing surfaces of cover shall be machine finished with tolerance of 1/16 inch +0 inches.
4. Five 1-1/4-inch diameter holes, 5 inches from edge and 72 degrees apart.
5. "ELECTRIC" letters 2-1/2 inches high.
6. NU stock code shall be cast in cover between pick holes, 32 inch **SC 0174820**, 38 inch **SC 0174821**.
7. Foundry name or insignia and date (year when manufactured) shall be cast in the underside of cover.
8. Ribs to be tapered from 1/2 inch to 3/4 inch.
9. Lifting notch adjacent to each pick hole.
10. The 32-inch cover fits into the 30-inch frame. The 38-inch cover fits into the 36-inch frame. Weight of 32-inch cover approximately 265 pounds and 38-inch cover approximately 365 pounds.

ORIGINAL	COVERS – MANHOLE – CAST IRON 32" AND 38" DIAMETER			
7/2/75				
APPROVED				
3/1/97				
NORTHEAST UTILITIES	MATERIAL SPECIFICATION	SPC C-709	8	

Appendix P

Northeast Utilities Material Specification

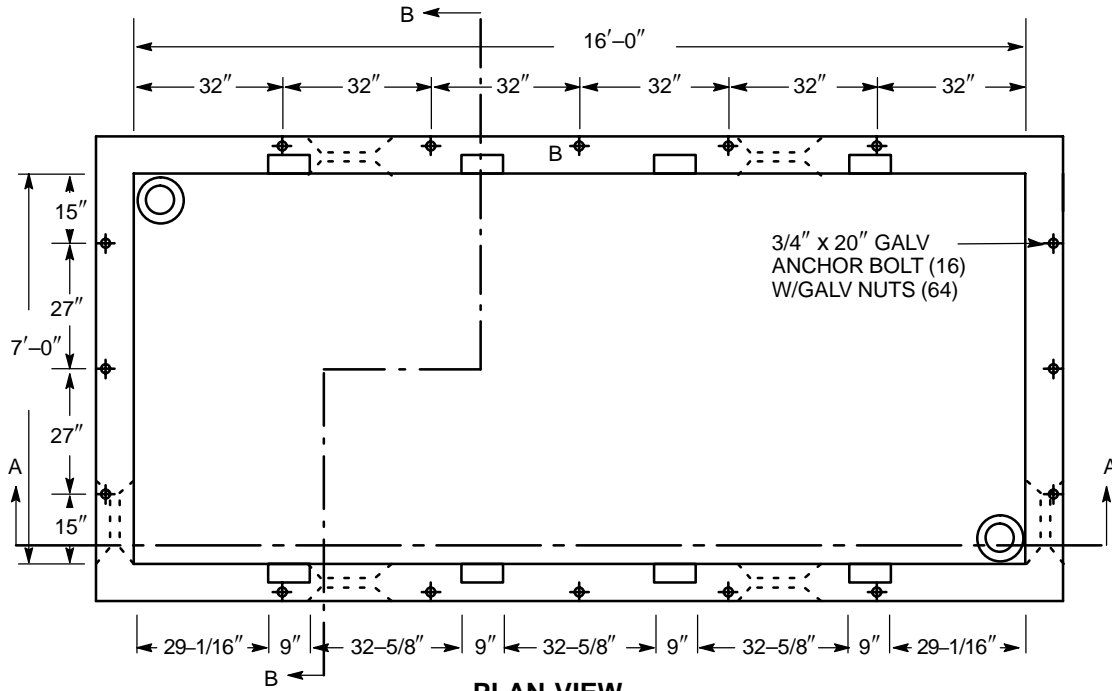
SPC V-029

and

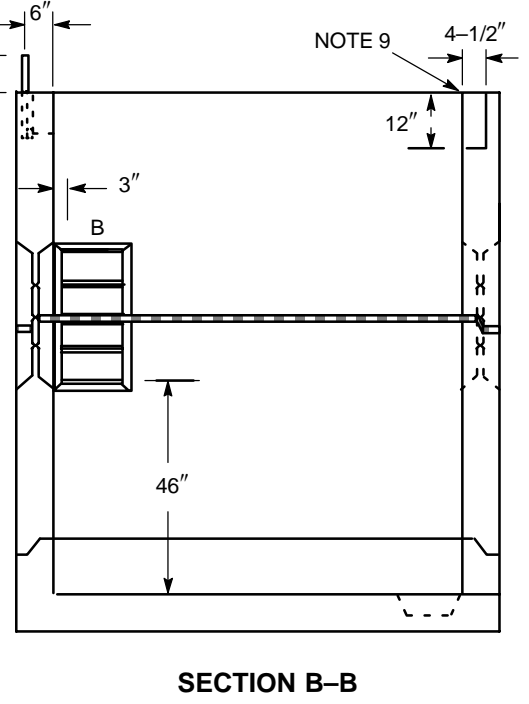
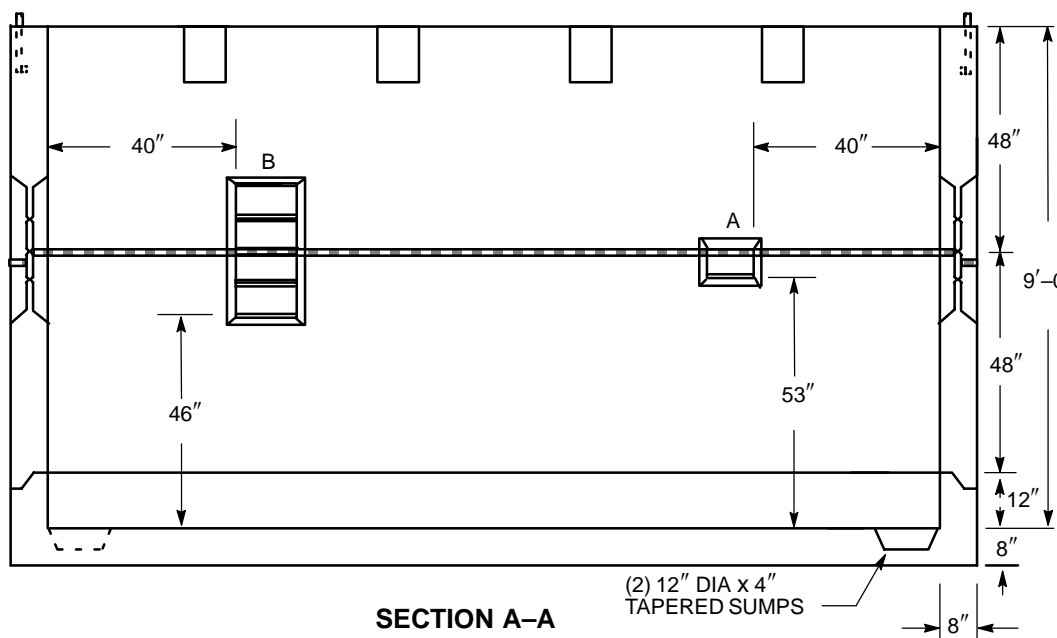
SPC V-030

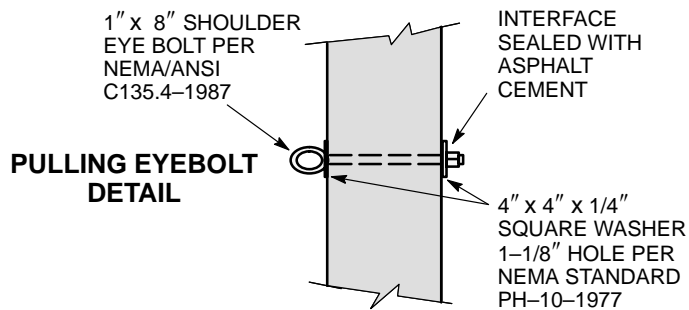
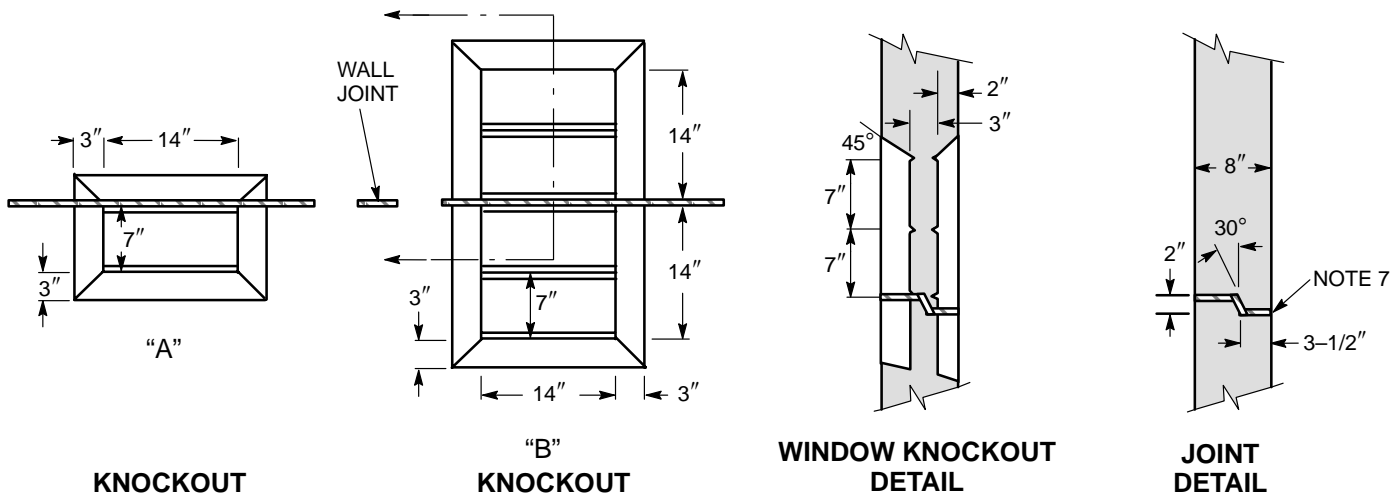
**Vault – Network – Precast – Reinforced
Concrete - Roadway or Sidewalk, Floor and
Walls**

ORIGINAL	8/11/80	VAULT-NETWORK-PRECAST REINFORCED CONCRETE FLOOR AND WALLS - ROADWAY OR SIDEWALK - 7' X 16'
APPROVED	3/1/02	
NORTHEAST UTILITIES		MATERIAL SPECIFICATION
SPC V-029		5



See DETAILS and NOTES on reverse side. Standard knockout locations are shown. If other knockouts are needed, specify them on purchase order.





Notes

1. Vault shall be designed for the following loads:
 - a. The roof shall be designed for AASHTO HS20-1996 direct wheel load.
 - b. The walls shall be designed for the summation of the following:
 - 1) Soil pressure of not less than an equivalent fluid pressure of 33 pcf.
 - 2) Hydrostatic pressure of 5 feet measured from the base of the vault.
 - 3) A surcharge of 2.5 feet of soil weighing 120 pcf.
 - c. The floor shall be designed to resist the hydrostatic pressure resulting from the 5-foot head called for in 1.b.2) above.
2. Concrete and concrete design shall be in accordance with ACI 318-1999.
3. Concrete shall have a minimum and maximum 28-day strength of 4000 and 5000 psi respectively.
4. Steel reinforcing bars shall conform to ASTM A615-1992, Grade 40 or 60. Welded wire mesh shall conform to ASTM A185-1997 or A497-1999.
5. Pulling eyebolts, with a minimum 8000-pound pulling strength, shall be installed adjacent to window knockouts at four places.
6. Openings and knockouts shall be clear of reinforcing.
7. Construction joint shall be sealed with asphalt cement or equivalent.
8. Manufacturer's identification and month/year when manufactured shall be legibly marked in/on concrete inside at top of end wall.
9. Insert 4-inch precast concrete shim and grout in a sidewalk vault.

ORIGINAL	VAULT-NETWORK-PRECAST REINFORCED CONCRETE FLOOR AND WALLS - ROADWAY OR SIDEWALK - 7' x 16'			
8/11/80				
APPROVED				
3/1/02	NORTHEAST UTILITIES	MATERIAL SPECIFICATION	SPC V-030	5

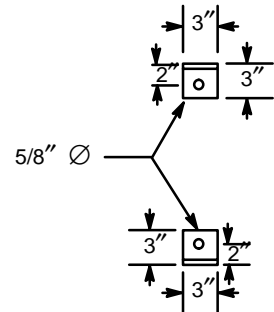
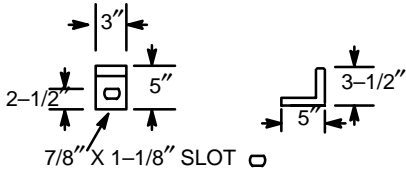
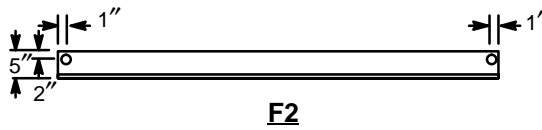
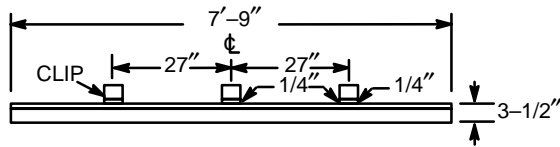
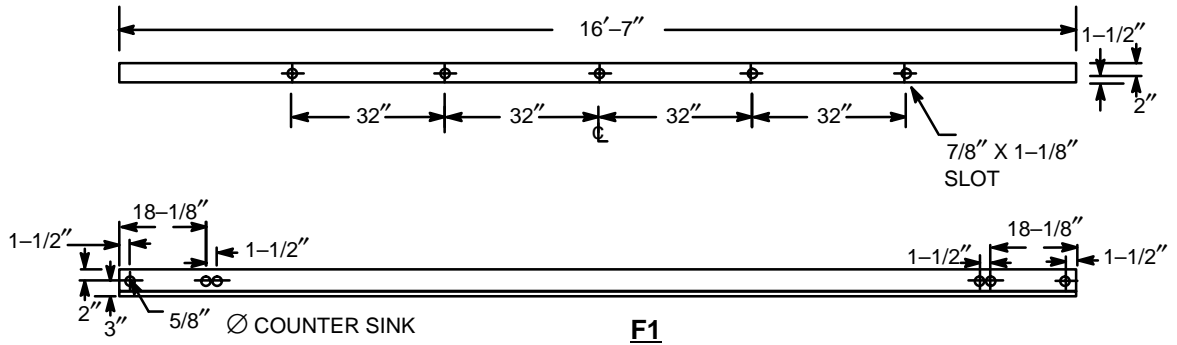
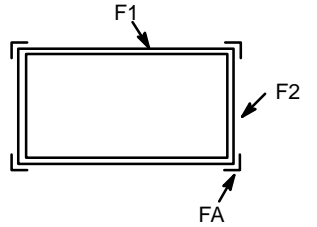
Appendix Q

Northeast Utilities Material Specification

SPC F-498

Frame - Roadway or Sidewalk, 7' x 16' Network Vault

LAYOUT DETAIL



CLIP

FA

MATERIAL			
Part	Size	Length	Req No
F1	∠ 5" x 3-1/2" x 1/2"	16'-7"	2
F2	∠ 5" x 3-1/2" x 1/2"	7'-9"	2
Clip	∠ 3-1/2" x 5" x 1/2"	0'-3"	6
FA	∠ 3" x 3" x 1/2"	0'-3"	4
Bolt	2" x 1/2" Flush Head N&W (Galv)		8
Pkg	Galv Steel Shims 4" x 4" x 1/8"		16

NOTE

1. All frame members to be hot dip galvanized after welding.

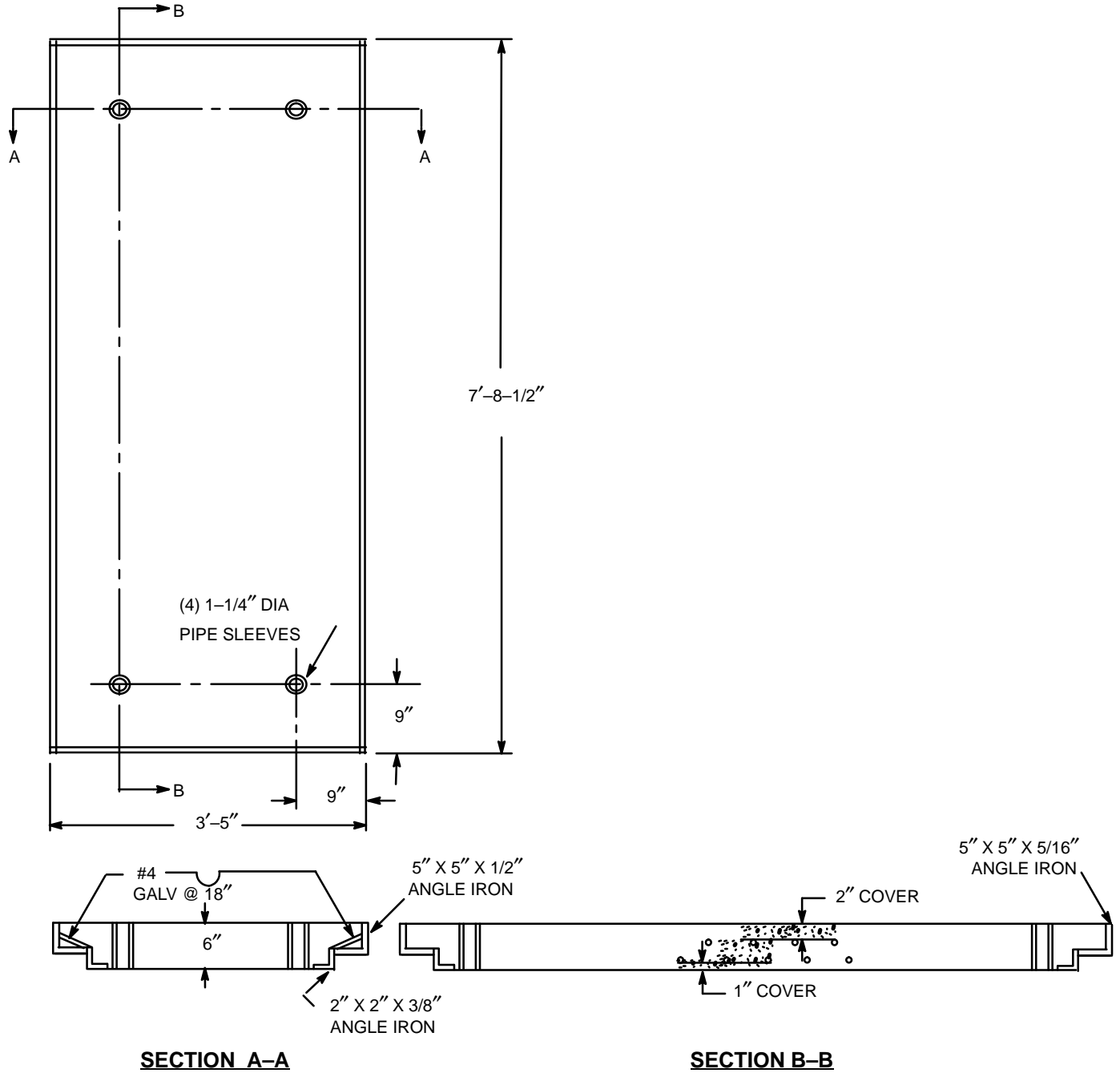
ORIGINAL	FRAME – ROADWAY OR SIDEWALK – 7' X 16' NETWORK VAULT			
5/13/86				
APPROVED				
6/1/91	NORTHEAST UTILITIES	MATERIAL SPECIFICATION	SPC F-498	2

Appendix R

Northeast Utilities Material Specification

SPC C-717

Cover - Vault – Precast Concrete - Roadway or Sidewalk, 7' x 16' Network Vault



NOTES

1. Concrete Minimum Strength – 5000 PSI @ 28 days, 6 to 9 per cent air entrained.
2. Steel Reinforcement – ASTM A615–1987A, Grade 60.
3. Design Loading – AASHTO HS20–1983, Direct Wheel Load; plus 30 per cent impact allowance.
4. Angle Iron Frame to be hot dip galvanized.
5. Weight Per Slab – 2120#.
6. Three covers required per vault.
7. Concrete will be in accordance with the latest revision of ACI 318–1986.

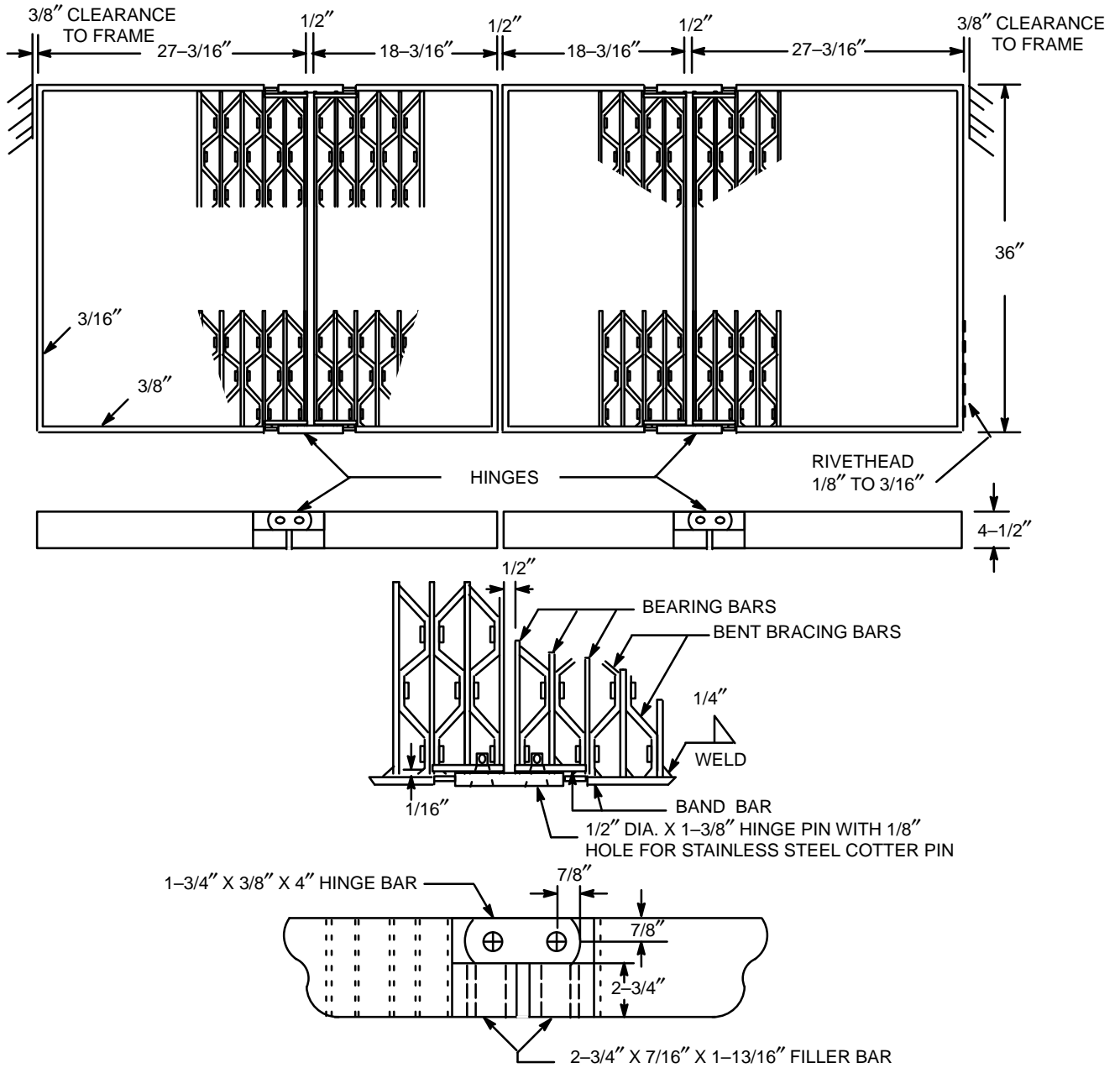
ORIGINAL	COVER – VAULT – PRECAST CONCRETE – ROADWAY OR SIDEWALK 7' X 16' NETWORK VAULT			
8/1/89				
APPROVED				
6/1/91	NORTHEAST UTILITIES	MATERIAL SPECIFICATION	SPC C-717	1

Appendix S

Northeast Utilities Material Specification

SPC G-013

Grate - Roadway – 7' x 16' Network Vault



HINGE DETAILS

NOTES

1. Grating – Loading – AASHTO HS20–1983 + 30 per cent impact allowance.
2. Weight per set 1334 lb. Two sets required per vault.
3. Grating Components:
 - a. Bearing Bars – 4–1/2 inches x 3/16 inch, spaced 13/16 inch.
 - b. Bent Bracing Bars – 2 inches x 3/16 inch, flush top, riveted to Bearing Bars every 1–3/4 inches with 3/8 inch rivets.
 - c. Band Bar – 4–1/2 inches x 3/8 inch.
 - d. Hot dip galvanized finish.
 - e. Cotter Pins for hinge to be stainless steel.

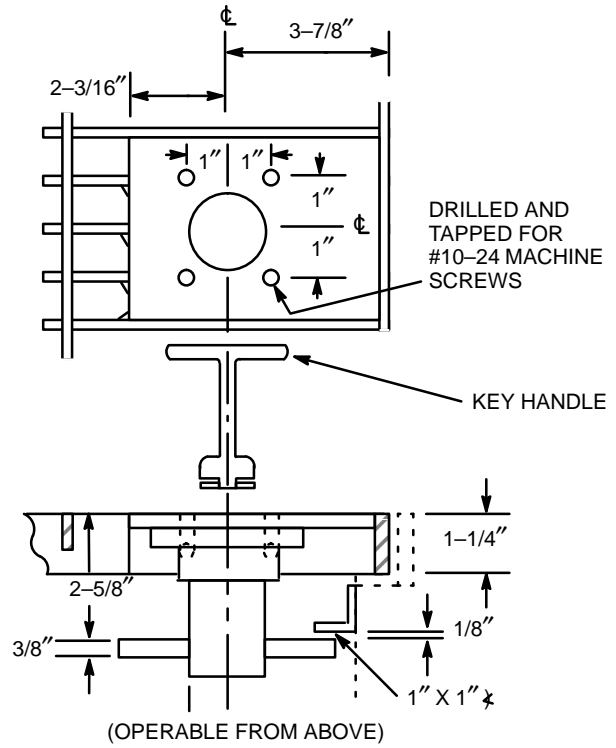
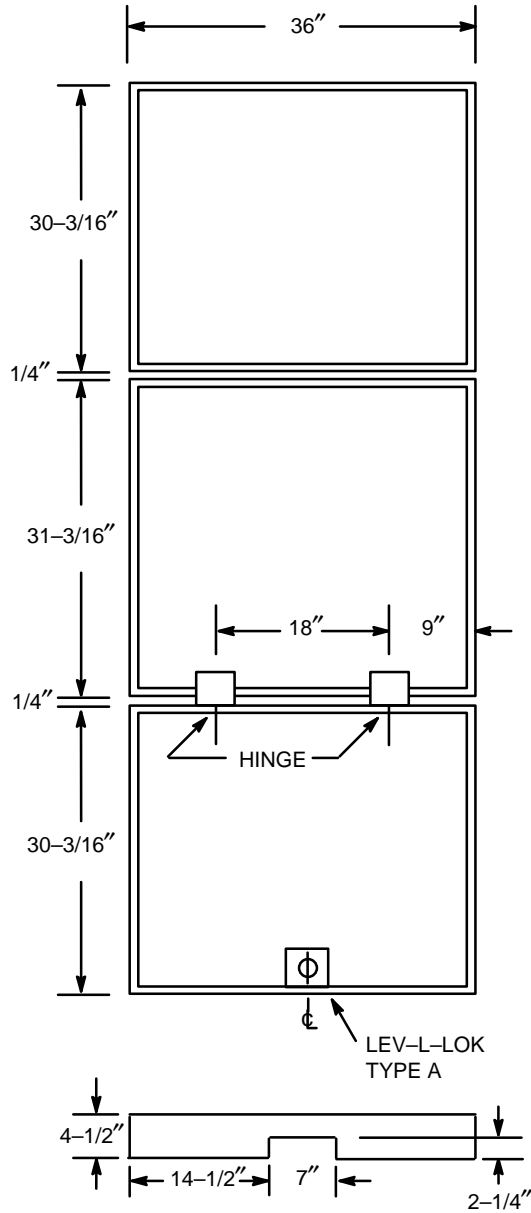
ORIGINAL	GRATE – ROADWAY – 7' X 16' NETWORK VAULT			
8/11/80				
APPROVED				
6/1/91	NORTHEAST UTILITIES	MATERIAL SPECIFICATION	SPC G-013	2

Appendix T

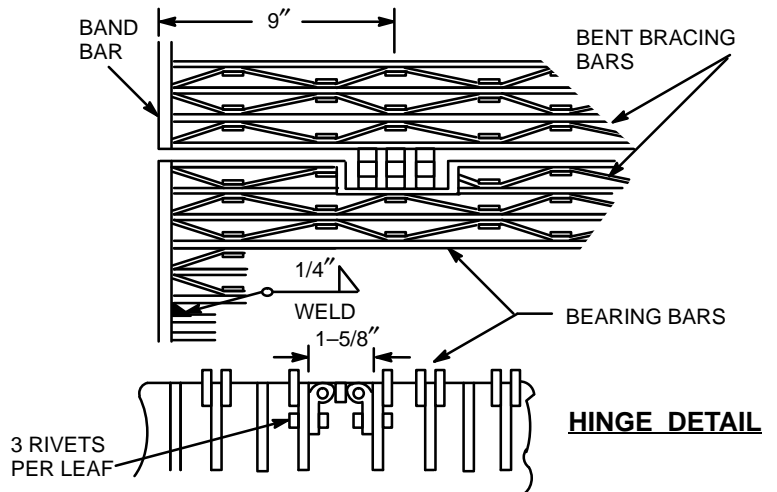
Northeast Utilities Material Specification

SPC G-014

Grate - Sidewalk – 7' x 16' Network Vault



LEV-L-LOK DETAIL TYPE A
WT 3.25#



NOTES

1. Grating – Loading – AASHTO H15–1983 plus 30% impact allowance.
2. Weight per set 590 lbs. Two sets required per vault.
3. Grating Components
 - a. Bearing Bars – 2" x 3/16", spaced 9/16"
 - b. Bent Bracing Bars – 1" x 1/8", serrated and raised 1/16" above and riveted to Bearing Bar every 7"
 - c. Band Bar – 4-1/2" x 1/4"
 - d. Lev-L-Lok Type A with lock striker
 - e. Hot dip galvanized finish
 - f. Bronze Butt Hinges, 180 degree

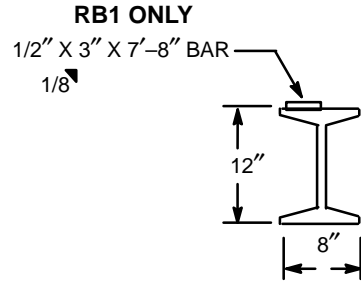
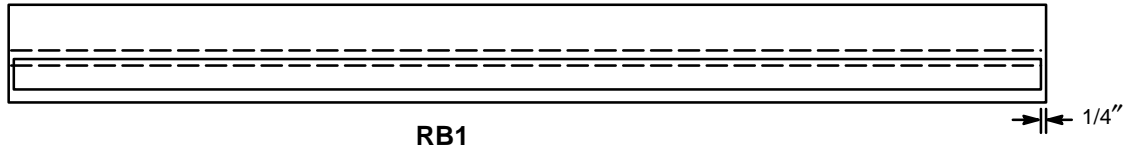
ORIGINAL	GRATE – SIDEWALK – 7' X 16' NETWORK VAULT			
8/11/80				
APPROVED				
11/1/93	NORTHEAST UTILITIES	MATERIAL SPECIFICATION	SPC G-014	4

Appendix U

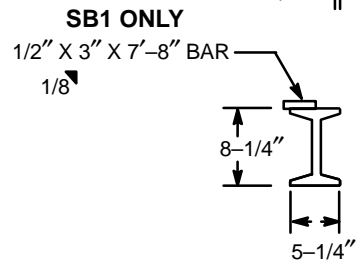
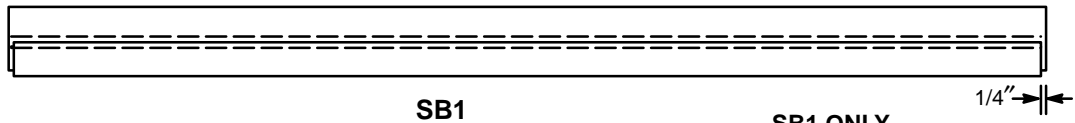
Northeast Utilities Material Specification

SPC B-163

Beam – Support – Roadway or Sidewalk 7' x 16' Network Vault



Roadway Beam Material			
Part	Size	Length	No Req
RB1	12WF 40#	7'-8-1/2"	2
RB2	12WF 40#	7'-8-1/2"	2



Sidewalk Beam Material			
Part	Size	Length	No Req
SB1	8WF 21#	7'-8-1/2"	2
SB2	8WF 21#	7'-8-1/2"	2

NOTE

1. All beams to be hot dip galvanized after cutting and welding.

ORIGINAL	BEAM – SUPPORT – ROADWAY OR SIDEWALK			
8/11/80				
APPROVED				
6/1/91	7'-0" X 16'-0" NETWORK VAULT			
	NORTHEAST UTILITIES	MATERIAL SPECIFICATION	SPC B-163	3

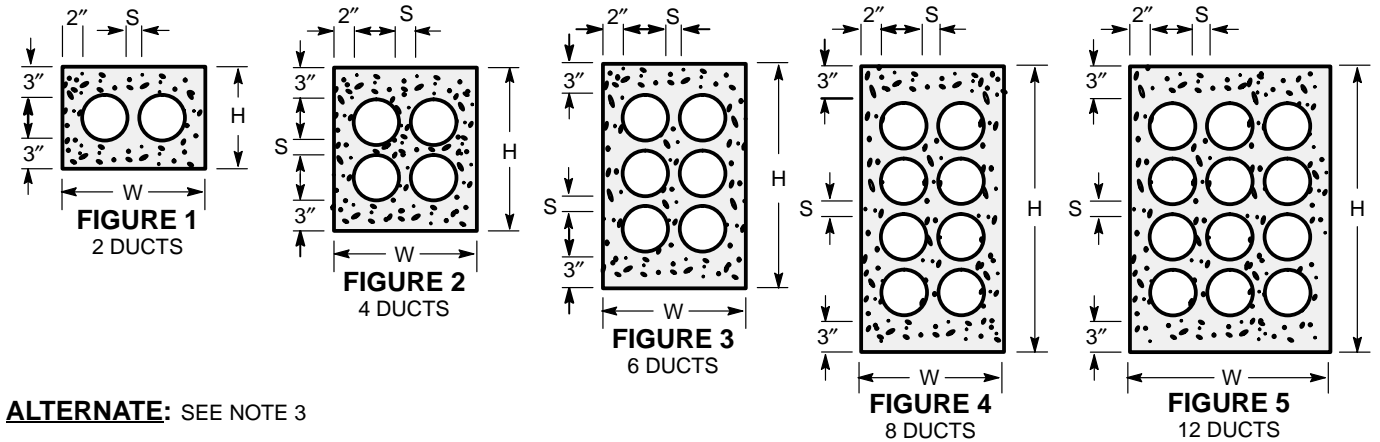
Appendix AA

Northeast Utilities
Design and Application Standards

DTR 73.209

Conduit Duct Bank Construction

PREFERRED:



ALTERNATE: SEE NOTE 3

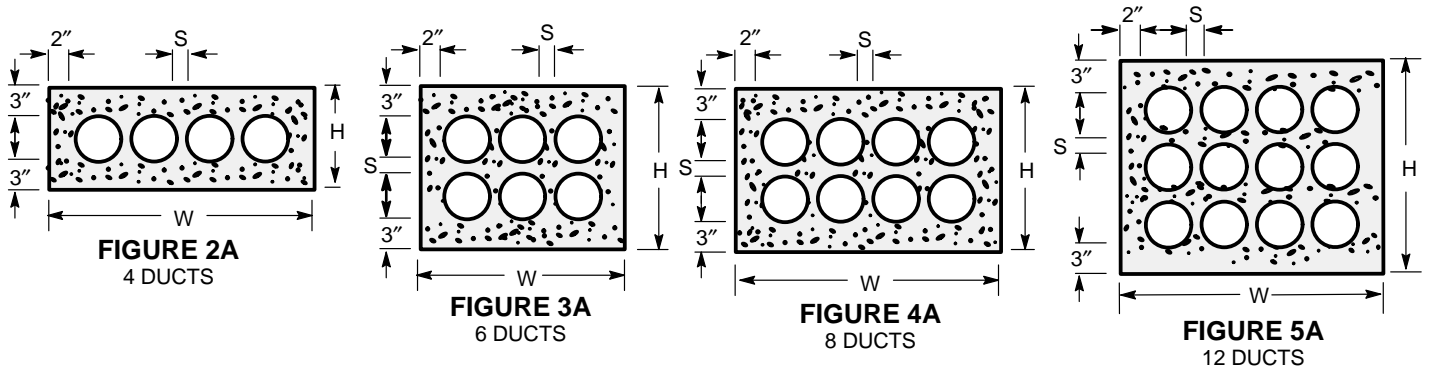


Fig	Dimensions In Inches								
	4" Duct			5" Duct			6" Duct		
	W	H	S	W	H	S	W	H	S
1	14-1/2	10-1/2	1-1/2	16-1/2	11-1/2	1-1/2	19	12-1/2	2
2	14-1/2	16-1/2	1-1/2	16-1/2	18-1/2	1-1/2	19	21	2
2A	26-1/2	10-1/2	1-1/2	30-1/2	11-1/2	1-1/2	36	12-1/2	2
3	14-1/2	22-1/2	1-1/2	16-1/2	25-1/2	1-1/2	19	29-1/2	2
3A	20-1/2	16-1/2	1-1/2	23-1/2	18-1/2	1-1/2	27-1/2	21	2
4	14-1/2	28-1/2	1-1/2	16-1/2	32-1/2	1-1/2	19	38	2
4A	26-1/2	16-1/2	1-1/2	30-1/2	18-1/2	1-1/2	36	21	2
5	20-1/2	28-1/2	1-1/2	23-1/2	32-1/2	1-1/2	27-1/2	38	2
5A	26-1/2	22-1/2	1-1/2	30-1/2	25-1/2	1-1/2	36	29-1/2	2

Notes

- At manholes conduit banks shall be per Figures 1, 2, 3, 4, or 5.
- Minimum cover from top of a conduit bank to the pavement or earth surface shall be:
 - State highways – 36 inches
 - Railroad tracks – 60 inches
 - All other areas – 24 inches
- In the conduit run between manholes if obstructions are encountered or to reduce trench depth, Figures 2A, 3A, 4A, or 5A are permissible.
- Concrete shall be 2500 psi, 1/2 inch maximum stone, 6–9 inches slump of such consistency that spading will ensure the flow of concrete between and under the individual ducts, but not so wet as to float the ducts. For tier buildup construction a stiffer consistency should be used.

ORIGINAL	CONDUIT BANK CONSTRUCTION			
5/29/75				
APPROVED				
11/2/99				
NORTHEAST UTILITIES	DESIGN & APPLICATION STANDARD	DTR 73.209	5	

Appendix AB

Northeast Utilities Design and Application Standards

DTR 76.451

Conduit System – Grounding Below Grade Manholes and Vaults

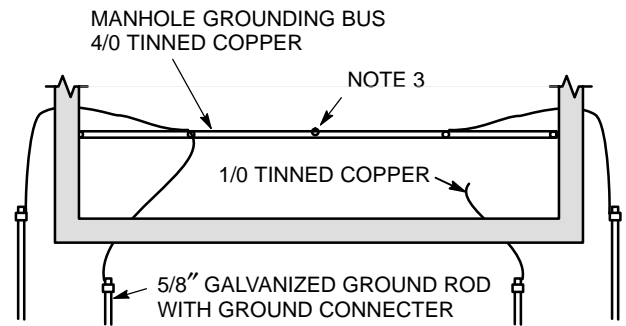
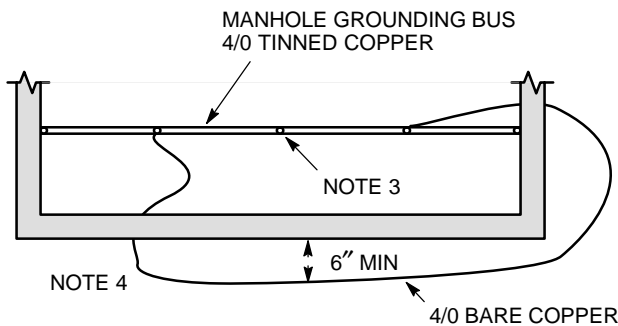
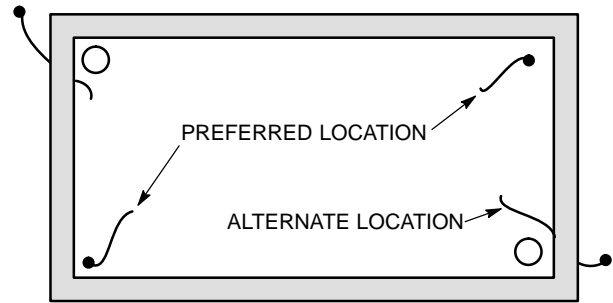
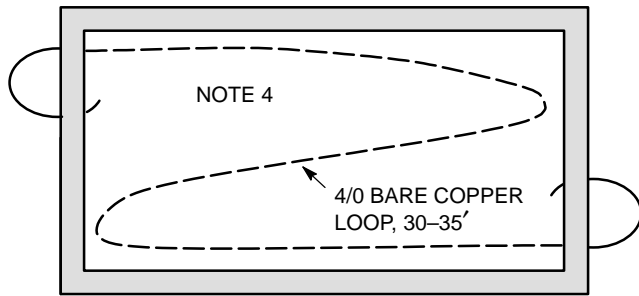


FIGURE 1

FIGURE 2

FIGURE 1 – Use when bottom of manhole or vault will be below permanent water level.

- a. Install 4/0 bare copper wire, 30 to 35 feet long, a minimum of 6 inches below floor.
- b. In areas with a high water table, the 4/0 ground wire should be sealed. This is done by adding a compression sleeve with an oil stop **SC 0388244** and placing the sleeve in the concrete or joint grout.

FIGURE 2 – Use when bottom of manhole or vault is above permanent water level or in rocky soil.

- a. Install two 5/8" x 8' galvanized steel ground rods below floor (preferred) or adjacent to walls (alternate).
- b. Drive ground rods sideways, if necessary, in rocky soil.

Notes

1. Install all loop wires or grounds to 25 ohms or less.
2. Connect grounds to 4/0 copper bus in manhole or vault.
3. Install manhole grounding bus with 4–4/0, 4–way compression branch connectors, **SC 0178522**.
4. For poured in place manholes, or overcast, grounding tail can be brought into the manhole through the floor. For all other manholes, bring two (2) tails through duct opening or through split between top and bottom halves.

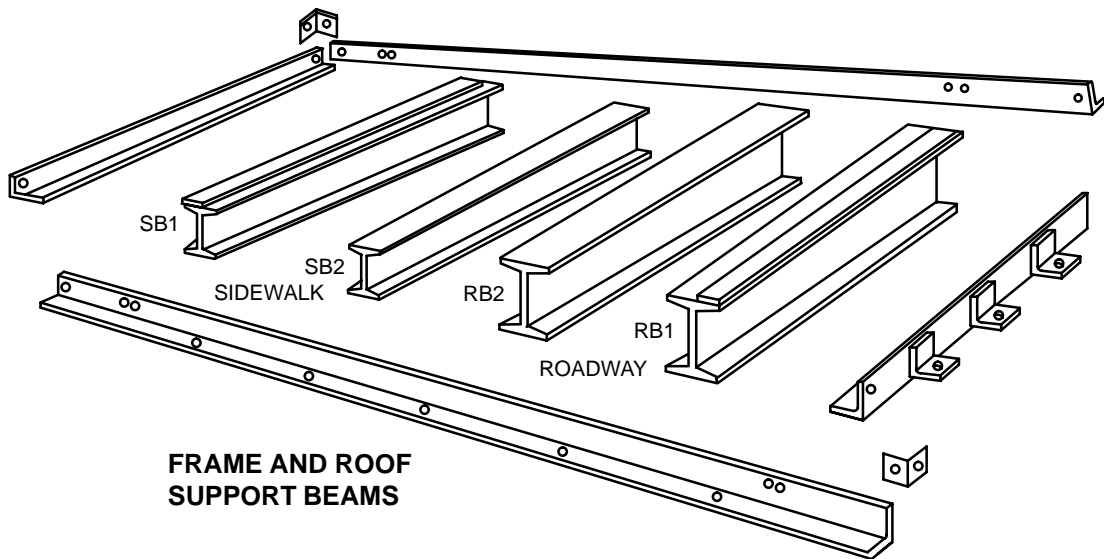
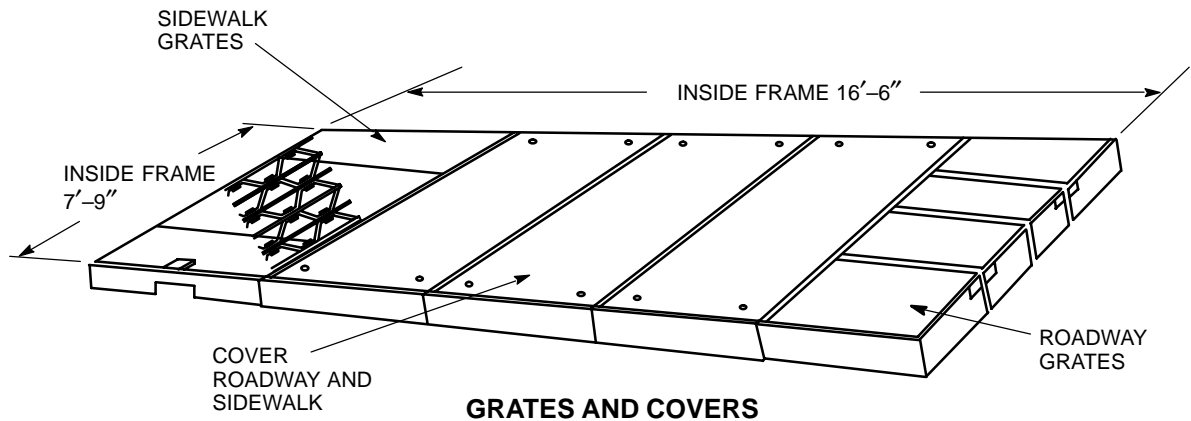
ORIGINAL	CONDUIT SYSTEM – GROUNDING BELOW GRADE MANHOLES AND VAULTS			
11/28/84				
APPROVED				
12/18/00				
	NORTHEAST UTILITIES	CONSTRUCTION STANDARD	DTR 76.451	6

Appendix AC

Northeast Utilities Design and Application Standards

DTR 76.419

7' x 16' Network Vault – Roadway and Sidewalk Assembly of Support Beams – Frames – Covers - Grates



Notes

1. Frame and covers are the same for both roadway and sidewalk. For details see **SPC's C-717 and F-498**.
2. Support beams – For details see **SPC B-163**.
3. Grates – For details see **SPC G-013**, roadway, and **SPC G-014**, sidewalk.
4. Expansion joint material must be installed between slabs and grates. Four pieces 5" x 7'-8" x 1/2" cut from **SC 0174862**.
5. Precast concrete vault – For details see **SPC's V-029 and V-030**.

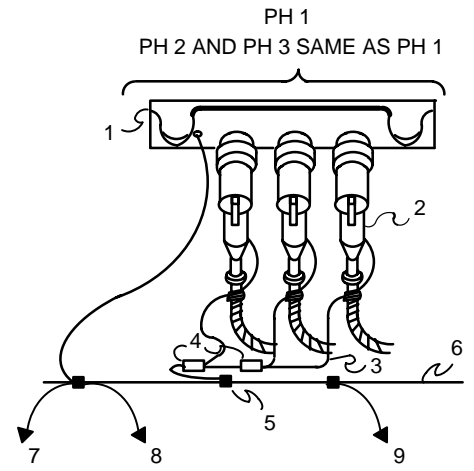
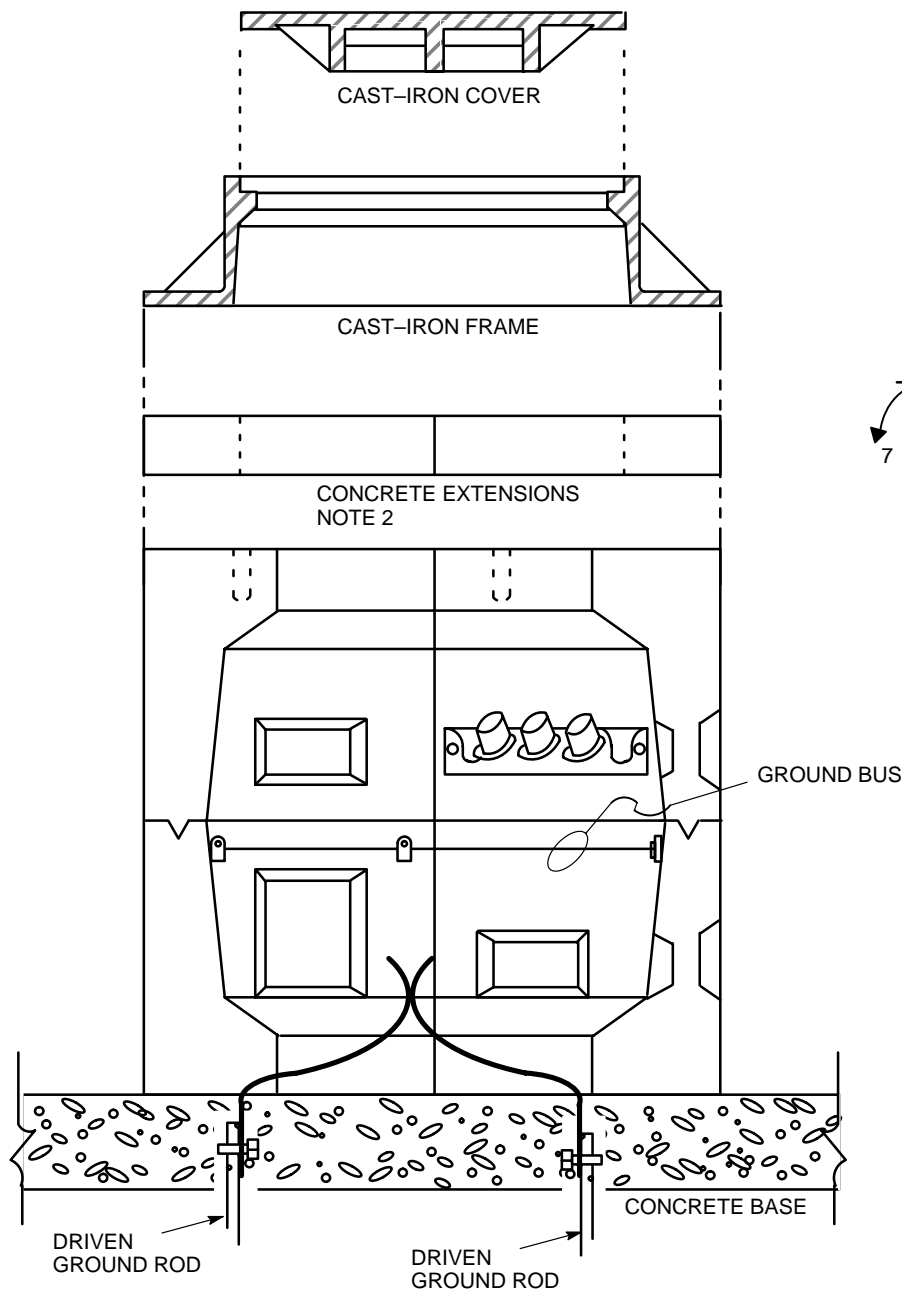
ORIGINAL	7' x 16' NETWORK VAULT – ROADWAY AND SIDEWALK ASSEMBLY OF SUPPORT BEAMS – FRAME – COVERS AND GRATES			
8/11/80				
APPROVED				
11/2/99				
	NORTHEAST UTILITIES	CONSTRUCTION STANDARD	DTR 76.419	4

Appendix AD

Northeast Utilities
Design and Application Standards

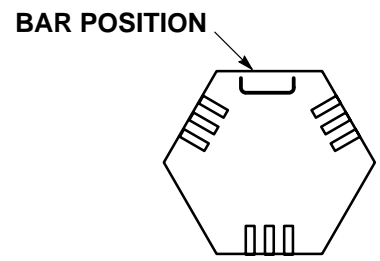
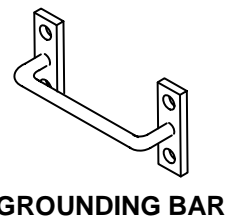
DTR 76.623

**15 or 23 kV Multigrounded –
3PH –Conventional UG System
Hexagonal Handhole with
Loadbreak Junction Connectors**



1. JUNCTION CONNECTOR
2. ELBOW CONNECTOR
3. CONCENTRIC NEUTRAL
4. COMPRESSION CONNECTOR
5. BOLTED CONNECTOR
6. TO JCT CONN GRND LUG
7. TO TELEPHONE CO
8. TO GROUND RODS - NOTE 5
9. TO GROUNDING BAR

GROUNDING DIAGRAM



Notes

1. Use concrete extension segments, 2-inch **SC 0174902** or 4-inch **SC 0174903** (each segment is a quarter circle), if required to adjust frame to road grade.
2. For roadway installations, install a concrete base to support hexagonal handhole. Concrete to be 8-inch minimum depth with strength of 3500 psi.
3. In order to gain increased flexibility of jacketed concentric neutral cable to allow easier operation of elbows: Strip the cable jacket back to the duct entrance, seal the jacket in accordance with **DTR 33.411**, and then re-wrap the concentric neutral wires back to within 1 foot of the elbow connector.
4. Install a grounding bar **SC 0177525** on clear surface adjacent to junction connectors. Ground the bar by connecting it to the concentric neutrals with a #2 AWG solid copper grounding wire.
5. Drive two galvanized steel ground rods in trench near handhole and connect as shown in grounding diagram. Minimum separation of ground rods is 8 feet. See **DTR 56.221**.

ORIGINAL	15 OR 23 KV MULTIGROUNDED – 3 PH – CONVENTIONAL UG SYSTEM HEXAGONAL HANDHOLE WITH LOADBREAK JUNCTION CONNECTORS			
11/15/96				
APPROVED				
11/2/99				
	NORTHEAST UTILITIES	CONSTRUCTION STANDARD	DTR 76.623	2

Appendix AE

Northeast Utilities Design and Application Standards

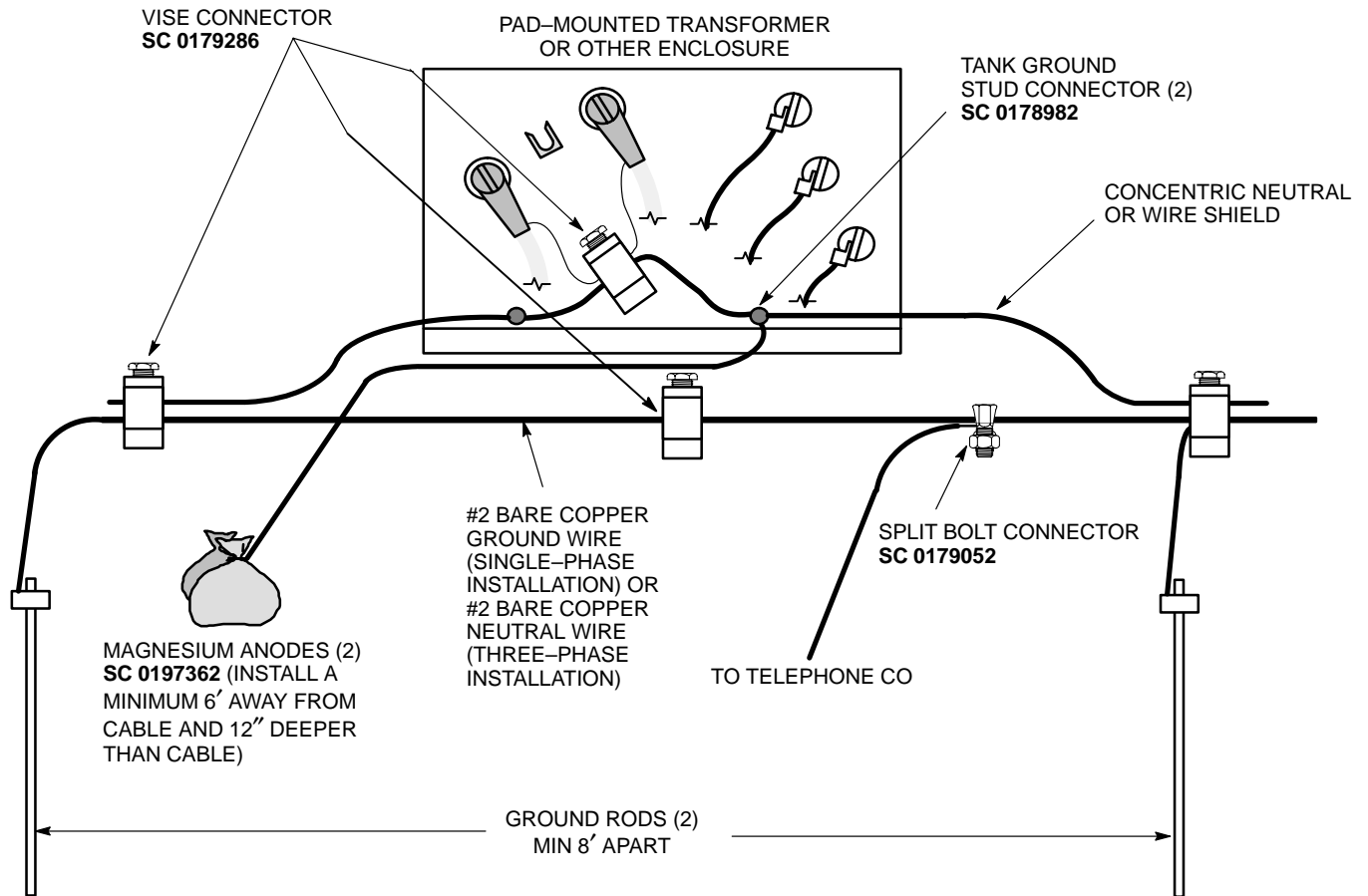
DTR 56.221

Jacketed Primary Cable - Grounding

SCOPE – Since concentric neutrals or wire shields of high-voltage jacketed cables are not in contact with the earth, other means must be employed to assure that a low-resistance grounding system is established. Therefore, all grounding shall be installed as shown in the diagram below.

INSTALLATION – All neutrals and bare wires shall be interconnected. The #2 bare copper ground wire and the concentric neutrals or wire shields shall be sleeved through with vise connectors except when bare wire is not required, as indicated in **DTR 44.101**. When bare wire is not required, attach the ground rods to the concentric neutral, wire shield, or tank ground stud connector.

Magnesium anodes shall be installed for corrosion protection of the bare #2 copper ground wire and any exposed neutral wire. Two (2) Type H-1, 17-pound, magnesium bag anodes **SC 0197362** shall be installed at each transformer or switching enclosure, below-grade or pad-mounted, at a depth of no less than 42 inches, or 12 inches below the installed cable depth, and at least 6 feet away from the cable. To allow for ease of testing, the lead wire from each anode shall be connected to the system neutral by means of a connector at the low-voltage tank ground of pad-mounted transformers, and to the neutrals or ground wire in switching enclosures.



Notes

1. All ground connections to be #6 solid copper **SC 0177657**.
2. To facilitate testing of anode, connect anode lead wire to transformer secondary ground stud or to the bare #2 copper wire in the switching enclosure with a split bolt conector.
3. Galvanized steel ground rods are to be installed in the trench adjacent to the handhole. Do not install the ground rods in the handhole underneath the transformer.
4. Neutral and ground wire are to be crimped to prevent inadvertent opening.

ORIGINAL	JACKETED PRIMARY CABLE – GROUNDING			CT/MA
2/4/91				
APPROVED				
11/2/99				
NORTHEAST UTILITIES	CONSTRUCTION STANDARD	DTR 56.221	6	

Appendix AF

Northeast Utilities Design & Application Standards

DTR 84.811 and DTR 84.812

Customer Service Underground Conduit Installation

GENERAL

1. The customer (contractor) shall be responsible for service trench, conduit, concrete encasement and conduit inspections.
2. NU shall be responsible for sealing the inside of the conduit.
3. NU shall not be responsible for any leak between the conduit and the wall.

SERVICE TRENCH – Trench location, as specified by NU, shall be in as direct a line as possible without reverse curves from the distribution facility to the customer service entrance.

Trench shall be excavated and backfilled by the customer.

Corrosive fill such as cinders shall not be used.

The backfill within 6 inches of conduit shall not contain any large or sharp rocks or other objects that might damage conduit.

The trench shall have a 24–inch minimum cover over supply conduit to finish grade, except where ledge is encountered, then the cover may be reduced to 18 inches if steel is used.

The trench shall have a 4–inch–per–100–foot downward pitch toward distribution facility, if physically possible.

Maintain a 12–inch minimum separation from other facilities except for communication conduit which may have 3 inches of concrete separation.

CONDUIT – Conduit shall be as specified by NU but supplied and installed by customer.

	Steel Galv	IMC	PVC Schedule 40	PVC Type EB*
Direct–Buried (DB)	X	X	X	X
Disturbed Earth (i.e., Filled Area)	X	X	–	X
Delta Primary (i.e., 4.8 kV)	X	X	–	X
*Must be encased in concrete				

For a discussion of the types of conduit and their applications, see **DTR 44.351**.

Sweeps in the conduit run, achieved by forcing a gradual bend in a length of Type EB PVC conduit, shall have a minimum radius of 15 feet. Manufactured bends in the conduit run shall have a minimum radius of 48 inches. This requirement does not include the bends used at riser poles or equipment pads where the bend radius shall be a minimum of 24 inches, with 36 inches preferred.

There must be a seal between conduit and building wall.

ORIGINAL	CUSTOMER SERVICE UNDERGROUND CONDUIT INSTALLATION			
4/21/80				
APPROVED				
12/18/00	NORTHEAST UTILITIES	DESIGN & APPLICATION STANDARD	DTR 84.811	5

CONCRETE ENCASEMENT – Concrete shall be 2,000 psi, 28 day strength with 1/2–inch maximum aggregate.

A stiff field mix of 1 part cement, 3 parts sand, 5 parts stone (1:3:5) will be acceptable.

Encasement shall be 3 inches top and bottom, 2 inches sides and 1–1/2 inches between conduits (except 2 inches between 6–inch conduit). All dimensions are minimum.

When steel conduit and PVC conduit are joined the encasement should be extended 1 foot onto the steel conduit.

CONDUIT INSPECTION

1. Conduit(s) shall be cleaned with a wire brush of the same diameter as the conduit.
2. A test shall be made by pulling a 17–inch–long flexible mandrel through the conduit, equal to diameter of the conduit. NU reserves the right to witness the cleaning and testing.
3. A 1/4–inch–diameter nylon pull line shall be placed in the conduit, including 10 feet of slack, and secured to a plastic conduit plug at each end of the conduit run.

CONDUIT SEALING – Conduit occupied with cable is to be sealed by NU at the customer service entrance with jute and duct sealing putty. The water–path in bare standard neutral cable will be sealed by splicing a piece of covered cable onto the bare neutral using a waterstop connector (See **DTR 73.251–.252**).

Empty conduit shall be sealed at the customer service entrance with a plastic plug to prevent the possible entry by water or gas. If physical conditions require conduit to slope toward the customers facilities additional seals will be required at the distribution facilities, i.e., manhole or other types of UG structures.

ORIGINAL	CUSTOMER SERVICE UNDERGROUND CONDUIT INSTALLATION			
4/21/80				
APPROVED				
12/18/00	NORTHEAST UTILITIES	DESIGN & APPLICATION STANDARD	DTR 84.812	5

Appendix AG

Northeast Utilities
Design & Application Standards

DTR 12.009
thru
DTR 12.010

Cable Riser Guide

GENERAL – The following outline serves as a guide to determine which combinations of primary and secondary risers are allowed on a single pole.

For purposes of this Standard, the guidelines which apply to three-phase primary risers also apply to two-phase primary and single-phase delta primary risers.

Combinations Allowed When Attaching Directly to Pole

1. One primary and one secondary (both, either single- or three-phase)
2. Two single-phase primaries (allowed but not recommended)
3. Any combination of two secondaries (single-phase or three-phase).

Combinations Allowed When Using Standoff Brackets – New Hampshire Only

1. Either one three-phase primary **or** two single-phase primaries, and up to four secondary conduits (single- or three-phase) depending on the size used
2. Any combination of single- or three-phase secondaries up to six conduits depending on the size used.

Combinations Not Allowed

1. Two three-phase primaries
2. One three-phase primary and one single-phase primary.

When other utilities must attach their risers to the pole and standoff brackets cannot be used, it may be desirable to limit the number of NU risers to one in order to minimize pole congestion.

Separate riser conduits shall always be installed for each riser.

When multiple customers must be served from a given pole, and additional risers and standoff brackets cannot be installed, secondary or primary handholes may need to be installed and riser cables upgraded to accommodate the additional load.

Existing Risers – Work on existing installations may entail asbestos-containing materials. Sufficient precautions should be taken to prevent the asbestos from becoming friable. For further information, refer to **DSEM Section 06.32**.

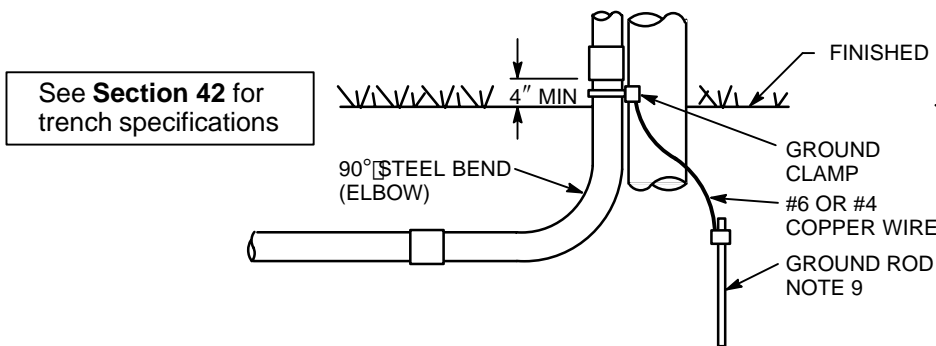
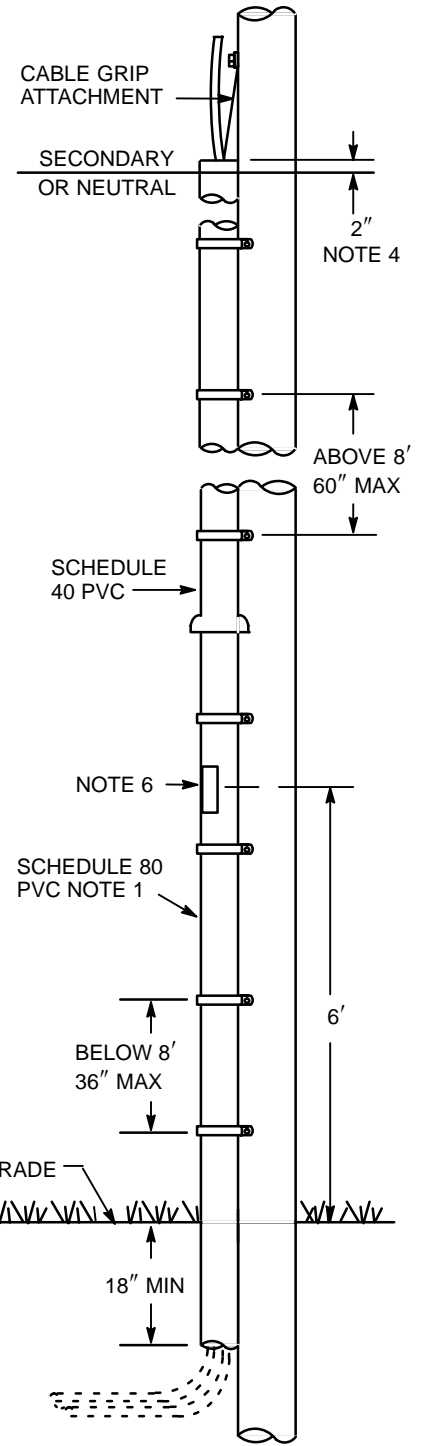
ORIGINAL	CABLE RISER GUIDE			
8/6/91				
APPROVED				
1/25/02	NORTHEAST UTILITIES	DESIGN & APPLICATION STANDARD	DTR 12.009	9

Notes

1. The first 10 feet of the riser conduit is to be sunlight resistant Schedule 80 PVC installed, bell end down. (In New Hampshire use steel conduit in areas where excessive traffic and pole placement might endanger the riser and cable from being hit by a moving vehicle.) When Schedule 80 PVC is used for UG, the bell end is installed over the steel bend at the base of the pole and is sealed with putty **SC 0183689**. When connecting two pieces of steel conduit, fittings shall be sealed with pipe compound **SC 0184994**.
2. a. If the UG portion of the conduit is steel, the bend is to be connected by a steel coupling.
b. If EB or DB type conduits are used, connect conduit to the steel bend with a PVC coupling (socket-female).
3. From the top of the Schedule 80 conduit, extend upward with Schedule 40 PVC conduit, bell end down.
4. The top of the conduit shall extend at least 2 inches above the secondary or neutral attachment height (see **DTR 04.047**). In an all-conduit installation, the top of the conduit shall be sealed with putty **SC 0183689** and jute **SC 0180305**, to prevent water from entering.
5. To select proper conduit size, see **DTR 12.011**, check overall cable(s) diameter (see **DTR's 32.019 thru .021**).

Conduit Size In Inches	Cable Diameter Range In Inches
2	0.5 – 1.4
3	1.4 – 2.4
4	2.4 – 2.9
5	2.9 – 4.0
6	4.0 – 5.0

6. Attach 2-1/2" X 2-1/2" adhesive backed "SIGN, WARNING, UNDERGROUND CABLE" approximately 6 feet above ground on the riser conduit (see **SPC S-471** in Material Book).
7. Riser shall be installed on the field side of the pole opposite the direction of traffic.
8. Contact the toll-free telephone number to locate buried cables before driving ground rods.
9. Steel conduit must be grounded. If the steel elbow is installed in a nonmetallic conduit installation, it must also be grounded. Use 5/8" X 8' galvanized steel ground rod.



UG CONDUIT INSTALLATION

DIRECT-BURIED CABLE

ORIGINAL	CABLE RISER GUIDE			
8/6/91				
APPROVED				
1/25/02				
	NORTHEAST UTILITIES	DESIGN & APPLICATION STANDARD	DTR 12.010	9

SOLID DIELECTRIC CABLE

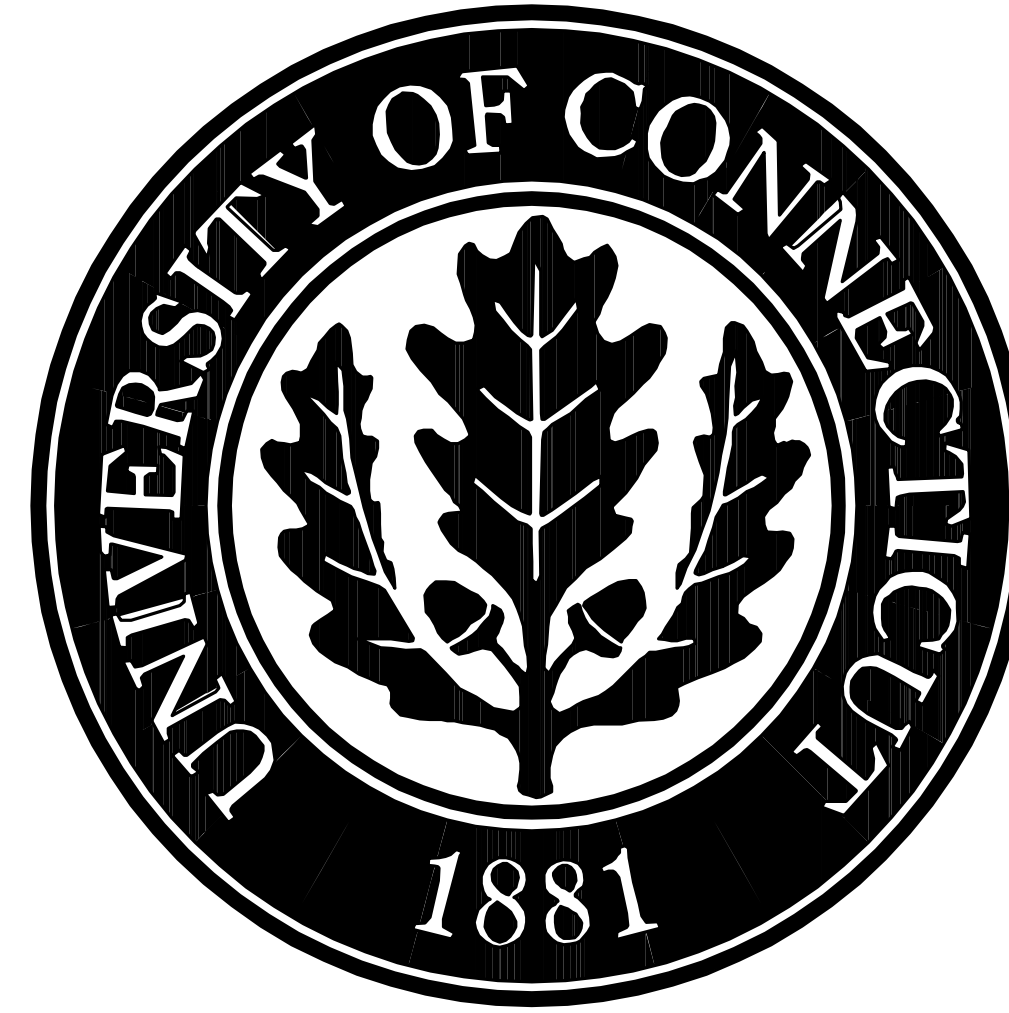
Phase	kV	Cable Size	Conduit Size-Inches	Terminator Stock Code	Grip Stock Code
Single Phase	4.8 Future 15	#1	3	0180298	0179529
		#1 Jkt	3		0179530
	15	#1	2		0179525
		#1 Jkt	2		0179526
	4.8 Future 23	#1	3		0180301
23	#1 Jkt	4	0179531		
	#1	2	0179526		
Three Phase	15	#1	3	0180298	0179529
		#1 Jkt	4		0179530
		4/0	4		0179530
	23	4/0 Jkt	4	0179531	
		350 kcmil Jkt	5	0180299	0179532
	500 kcmil Jkt	5	0179532		
	23	750 kcmil Jkt	5	0180300	0179533
		1000 kcmil Jkt	5		0179460
		#1	3		0180301
	#1 Jkt	4	0179531		
	4/0	4	0179531		
	4/0 Jkt	5	0179532		
	30	350 kcmil Jkt	5	0180301	0179533
		500 kcmil Jkt	5	0180302	0179533
		750 kcmil Jkt	6	0180302	0179460
1000 kcmil Jkt		6	0180304	0179461	
35	#2 Jkt	4	0180301	0179531	
	750 kcmil Jkt	6	0180302	0179460	
	1000 kcmil Jkt	6	0180304	0179461	
35	1/0 Jkt	5	0180301	0179535	
	500 kcmil Jkt	6	0180302	0179537	
	1000 kcmil Jkt	6	0180304	0179461	

Notes

1. See **DTR 33.451** for terminator connectors.
2. See **DTR 33.411** for sealing open ends of jacketed cables.

ORIGINAL	CABLE RISER GUIDE			
8/6/91				
APPROVED				
1/25/02				
	NORTHEAST UTILITIES	DESIGN & APPLICATION STANDARD	DTR 12.011	9

STATE OF CONNECTICUT UNIVERSITY OF CONNECTICUT



SUSAN HERBST
PRESIDENT

NORTH EAGLEVILLE ROAD AREA
INFRASTRUCTURE REPAIR/REPLACEMENT AND UPGRADE
PHASE II - YOUNG QUAD UTILITIES

STORRS CAMPUS

CONTRACT DOCUMENTS

PROJECT NO. 901954

PREPARED FOR:

PLANNING, ARCHITECTURAL & ENGINEERING SERVICES

31 LEDOYT RD. UNIT 3038
STORRS, CT 06269
860-486-3127

APRIL 21, 2015

PROJECT CONSULTANT

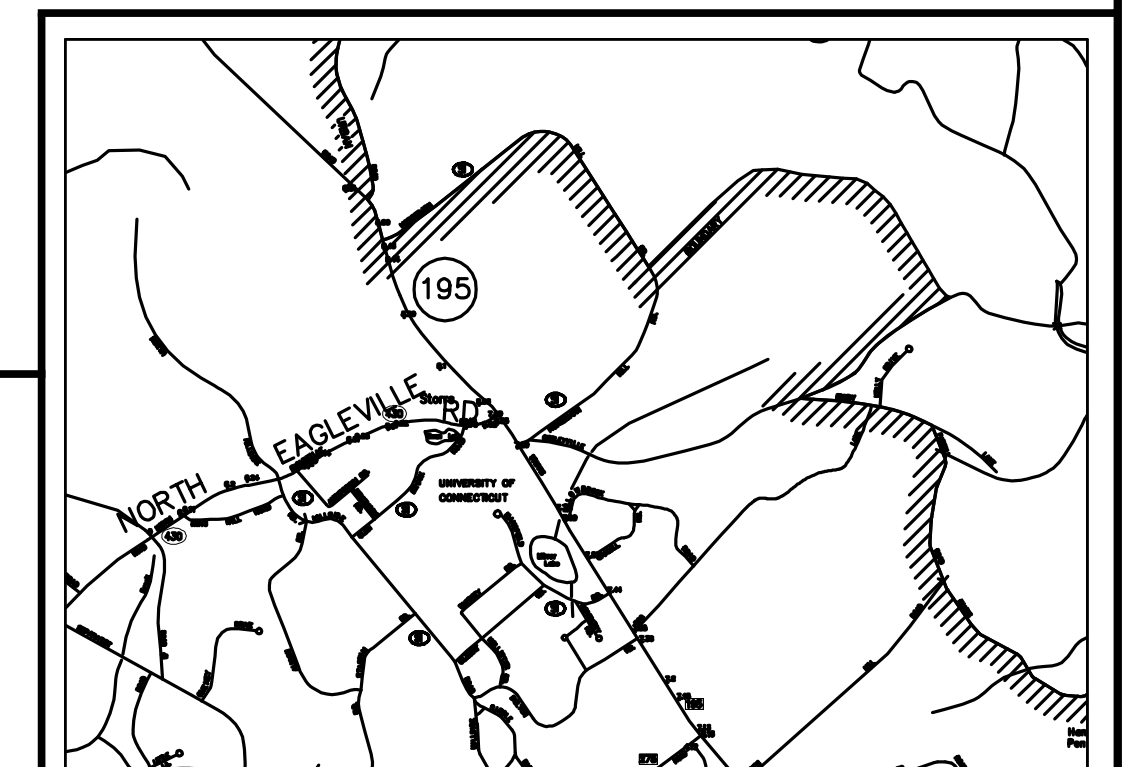
Civil Engineer:

AECOM

500 ENTERPRISE DRIVE
ROCKY HILL, CT 06067
1-(860)-529-8882

CONTRACT DRAWINGS

T1	TITLE SHEET
C-1	LEGEND, SURVEY CONTROL & GENERAL NOTES
C-2	EXISTING CONDITIONS PLAN
C-3	COMPOSITE UTILITY PLAN
C-4	SANITARY FORCE MAIN PLAN AND PROFILE
C-5	SANITARY SEWER PLAN AND PROFILE
C-6	WATER MAIN PLAN AND PROFILE
C-7	STEAM AND CONDENSATE PLAN AND PROFILE
C-8	ELECTRICAL DUCTBANK PLAN AND PROFILE
C-9	TELE-COMMUNICATION DUCTBANK PLAN AND PROFILE
C-10	SUPPLEMENTAL UTILITY PROFILES
C-11	GRADING PLAN
C-12	SITE MATERIALS PLAN
C-13	HICKS ARENA SITE PLAN
C-14	SOIL EROSION AND SEDIMENTATION CONTROL PLAN
C-15	SANITARY FORCE MAIN DETAILS
C-16	SANITARY AND STORM SEWER DETAILS
C-17	WATER MAIN DETAILS
C-18	WATER MAIN CONNECTION DETAILS
C-19	STEAM AND CONDENSATE DETAILS
C-20	STEAM AND CONDENSATE CONNECTION DETAILS
C-21	STEAM AND CONDENSATE CONNECTION DETAILS
C-22	STEAM VAULT B-6
C-23	SOUTH STEAM VAULT
C-24	ELECTRICAL DETAILS
C-25	ELECTRICAL AND TELECOMMUNICATION DUCTBANK DETAILS
C-26	TELE-COMMUNICATION DETAILS
C-27	MISCELLANEOUS SITE DETAILS
C-28	MISCELLANEOUS SITE DETAILS
C-29	MISCELLANEOUS SITE DETAILS
C-30	SOIL EROSION AND SEDIMENTATION CONTROL DETAILS
L-01	TREE PROTECTION AND PRESERVATION PLAN
L-02	TREE PROTECTION DETAILS
L-03	LANDSCAPE PLAN AND DETAILS
M-01	PEDESTRIAN DETOUR PLAN STAGE 1 CONSTRUCTION
M-02	PEDESTRIAN DETOUR PLAN STAGE 2 CONSTRUCTION
M-03	PEDESTRIAN DETOUR PLAN STAGE 3 CONSTRUCTION
M-04	MAINTENANCE AND PROTECTION OF TRAFFIC ROUTE 195
M-05	MAINTENANCE AND PROTECTION OF TRAFFIC ROUTE 195 DETAILS



PROJECT SITE LOCATION
NO SCALE

GENERAL NOTES

- UNDERGROUND UTILITY, STRUCTURE AND FACILITY LOCATIONS DEPICTED ON THE CONTRACT DRAWINGS HAVE BEEN COMPILED, IN PART, FROM RECORD MAPPING AND OTHER DATA APPLIED BY RESPECTIVE UTILITY COMPANIES, AND/OR OTHER SOURCES. THESE LOCATIONS MUST BE CONSIDERED APPROXIMATE IN NATURE. ADDITIONALLY, OTHER UTILITY AND UNDERGROUND FEATURES, WHICH ARE UNKNOWN TO AECOM, MAY EXIST ON THE SITE. THE PRESENCE, SIZE AND LOCATION OF ALL UNDERGROUND FEATURES MUST BE DETERMINED AND VERIFIED IN THE FIELD BY THE APPROPRIATE AUTHORITIES PRIOR TO CONSTRUCTION. THE CONTRACTOR SHALL REQUEST MARK OUT OF UTILITY LOCATION FROM CALL BEFORE YOU DIG (1-800-922-4455 OR 811) AT LEAST 48 HOURS PRIOR TO ANY EXCAVATION OPERATION.
- AS CONSTRUCTION IS COMPLETED, THE CONTRACTOR SHALL REMOVE ALL EXCESS MATERIAL, DEBRIS, ETC. AND RESTORE AND/OR REPAIR ANY DAMAGE TO LANDSCAPING.
- ANY PIPE LENGTHS SHOWN ARE MEASURED FROM CENTER TO CENTER OF FITTINGS.
- AREAS OUTSIDE THE WORK LIMITS INCLUDING BUT NOT LIMITED TO DRIVEWAYS, ROADS, STAIRS AND SIDEWALKS, THAT ARE DISTURBED BY CONSTRUCTION SHALL BE RETURNED TO THEIR ORIGINAL CONDITION OR BETTER AND SHALL BE GRADED TO MEET PROPOSED CONSTRUCTION AS DIRECTED BY THE ENGINEER. COST FOR THIS WORK SHALL BE BORNE BY THE CONTRACTOR AT NO ADDITIONAL COST TO THE UNIVERSITY.
- THE CONTRACTOR SHALL PROCURE ALL THE NECESSARY PERMITS AND LICENSES, AT THE TIME REQUIRED, PAY ALL CHARGES AND FEES, AND GIVE NOTICES NECESSARY AND DUE IN CONNECTION WITH THE LAWFUL EXECUTION OF THE WORK AT NO ADDITIONAL COST TO THE UNIVERSITY. THE CONTRACTOR WILL BE REQUIRED TO SECURE AN ENCROACHMENT PERMIT FROM THE STATE OF CONNECTICUT DEPARTMENT OF TRANSPORTATION - DISTRICT 2, FOR ALL WORK WITHIN THE STATE RIGHT-OF-WAY FOR ROUTE 195.
- EXCAVATION OF ANY TYPE SHALL BE ACCOMPLISHED IN SUCH A MANNER THAT UNDERGROUND UTILITIES OR STRUCTURES ARE NOT DAMAGED. IT SHALL BE THE CONTRACTOR'S SOLE RESPONSIBILITY FOR ANY DAMAGE INCURRED DURING EXCAVATION OPERATIONS. ALL EXCAVATION SHALL BE IN CONFORMANCE WITH THE LATEST OSHA REQUIREMENTS.
- ALL UTILITY BOXES, FRAMES, GRATES, ETC. AFFECTED BY THE CONSTRUCTION ACTIVITIES, SHALL BE RESET TO THE PROPER GRADE. ALL COST RELATED TO SUCH WORK SHALL BE CONSIDERED TO BE INCLUDED IN THE LUMP SUM BID.
- ALL COORDINATION BETWEEN THE CONTRACTOR AND THE UNIVERSITY SHALL BE THROUGH THE UNIVERSITY OF CONNECTICUT CONSTRUCTION PROJECT MANAGER ASSIGNED TO THIS PROJECT.
- ANY UTILITY SERVICE CONNECTIONS (GAS, STEAM, WATER, SEWAGE, ELECTRIC, TELECOMMUNICATIONS, ETC.) DISTURBED BY THE CONSTRUCTION ACTIVITIES SHALL BE REPAIRED AND SERVICE RESTORED. AT NO TIME SHALL ANY EXISTING BUILDING BE WITHOUT SERVICES (INCLUDING FIRE PROTECTION) WITHOUT PRIOR CONSENT FROM THE PARTICULAR UTILITY AUTHORITY. NO FIRE PROTECTION UTILITIES OF ANY KIND WILL BE DISRUPTED WITHOUT PERMISSION FROM THE FIRE MARSHALL. THE CONTRACTOR SHALL COORDINATE HIS WORK, PRIOR TO A UTILITY SHUTDOWN, WITH THE UTILITY COMPANY AND THE UNIVERSITY.
- THE CONTRACTOR SHALL SUFFICIENTLY COVER ALL DISTURBED AREAS AT THE END OF EACH WORK DAY TO AVOID ANY RISK OF INJURY TO PEDESTRIAN OR VEHICULAR TRAFFIC. THE CONTRACTOR SHALL INSTALL TEMPORARY SUPPORT SYSTEMS OVER TRENCH EXCAVATIONS THAT ARE TAMPER RESISTANT AND SAFE FOR VEHICULAR AND PEDESTRIAN TRAFFIC. THE CONTRACTOR SHALL INSTALL BARRICADES TO PROTECT AGAINST PEDESTRIAN ACCESS. THE CONTRACTOR SHALL OBTAIN APPROVAL OF THE TEMPORARY SAFETY MEASURES BY THE ENGINEER AND THE UNIVERSITY.
- THE STANDARD SPECIFICATIONS (FOR SITE WORK) SHALL MEAN THE STATE OF CONNECTICUT DEPARTMENT OF TRANSPORTATION, STANDARD SPECIFICATIONS FOR ROADS, BRIDGES, AND INCIDENTAL CONSTRUCTION, FORM 816 2004, INCLUDING ALL SUPPLEMENTS THERETO.
- ALL DISTURBED AREAS, NOT PROVIDED WITH SPECIFIC SURFACE IMPROVEMENTS (PAVING, SIDEWALK, LANDSCAPING, ETC.) SHALL HAVE TOPSOIL AND TURF ESTABLISHED IN ACCORDANCE WITH THE SPECIFICATIONS.
- LOCATION AND ELEVATION OF ALL UNDERGROUND UTILITIES INSTALLED OR FOUND DURING CONSTRUCTION SHALL BE INDICATED BY THE CONTRACTOR ON RECORD DRAWINGS, MEASURED FROM PERMANENT SURFACE FEATURES.
- THE CRITICAL ROOT ZONE OF EXISTING TREES IN PROXIMITY TO THE PROJECT AREA ARE SHOWN ON SHEET C-02. ALL WORK WITHIN THE DRIP LINES OF EXISTING TREES SHALL BE DONE IN ACCORDANCE WITH THE RECOMMENDATIONS OF THE CONTRACTOR'S CERTIFIED ARBORIST. ALL WORK WITHIN THE CRITICAL ROOT ZONE OF EXISTING TREES SHALL BE ACCOMPLISHED IN ACCORDANCE WITH THE REQUIREMENTS OF SECTION 02937-"TREE PROTECTION AND PRESERVATION".
- THE CONTRACTOR IS REQUIRED TO EXCAVATE TEST PITS AS SHOWN ON THE PLAN SHEETS. THIS WORK SHALL BE COMPLETED AS GENERAL EXCAVATION AND SHALL BE COMPLETED A MINIMUM OF TWO WEEKS PRIOR TO THE START OF EXCAVATION. THE CONTRACTOR SHALL NOTIFY THE ENGINEER IF EXISTING CONDITIONS CONFLICT WITH PROPOSED WORK AS SHOWN HEREON.
- THE EXISTING UTILITIES AND FACILITIES WILL BE IN CONTINUOUS OPERATION DURING THE EXECUTION OF THE WORK. THE CONTRACTOR SHALL COORDINATE ALL ACTIVITIES TO MINIMIZE DISRUPTIONS TO THE UTILITIES AND FACILITIES. THE CONTRACTOR SHALL COORDINATE ALL WORK AND WORK PROCEDURES WITH THE REQUIREMENTS OF THE LOCAL AUTHORITIES AND THE UNIVERSITY. BEFORE ANY WORK PROCEEDS, NOTIFY THE ENGINEER/UNIVERSITY OF THE PROPOSED SCHEDULE. DISRUPTION OF UTILITY OPERATIONS SHALL BE MINIMAL AND THE SAFETY OF EMPLOYEES AND THE PUBLIC SHALL BE MAINTAINED.
- THE CONTRACTOR SHALL PERFORM ALL OPERATIONS OF DEMOLITION AND REMOVAL AS MAY BE REQUIRED FOR HIS WORK. THE EXISTING UTILITIES SHALL BE CAPPED AND ABANDONED IN PLACE WITH OUT FILLING UNLESS NOTED OTHERWISE ON THE CONTRACT DRAWINGS.
- THE CONTRACTOR SHALL COMPLETE ALL WORK SO THAT ANY MATERIALS WHICH ARE TO REMAIN IN PLACE OR WHICH ARE TO REMAIN THE PROPERTY OF THE UNIVERSITY, WILL NOT BE DAMAGED. IF THE CONTRACTOR DAMAGES ANY MATERIALS WHICH ARE TO REMAIN, OR WHICH ARE TO REMAIN THE PROPERTY OF THE UNIVERSITY, THE DAMAGED MATERIALS SHALL BE REPLACED TO THE SATISFACTION OF THE ENGINEER/UNIVERSITY AT THE EXPENSE OF THE CONTRACTOR.

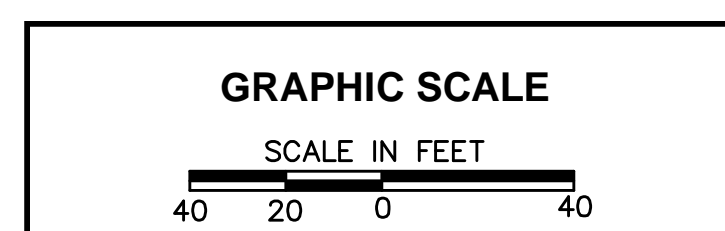
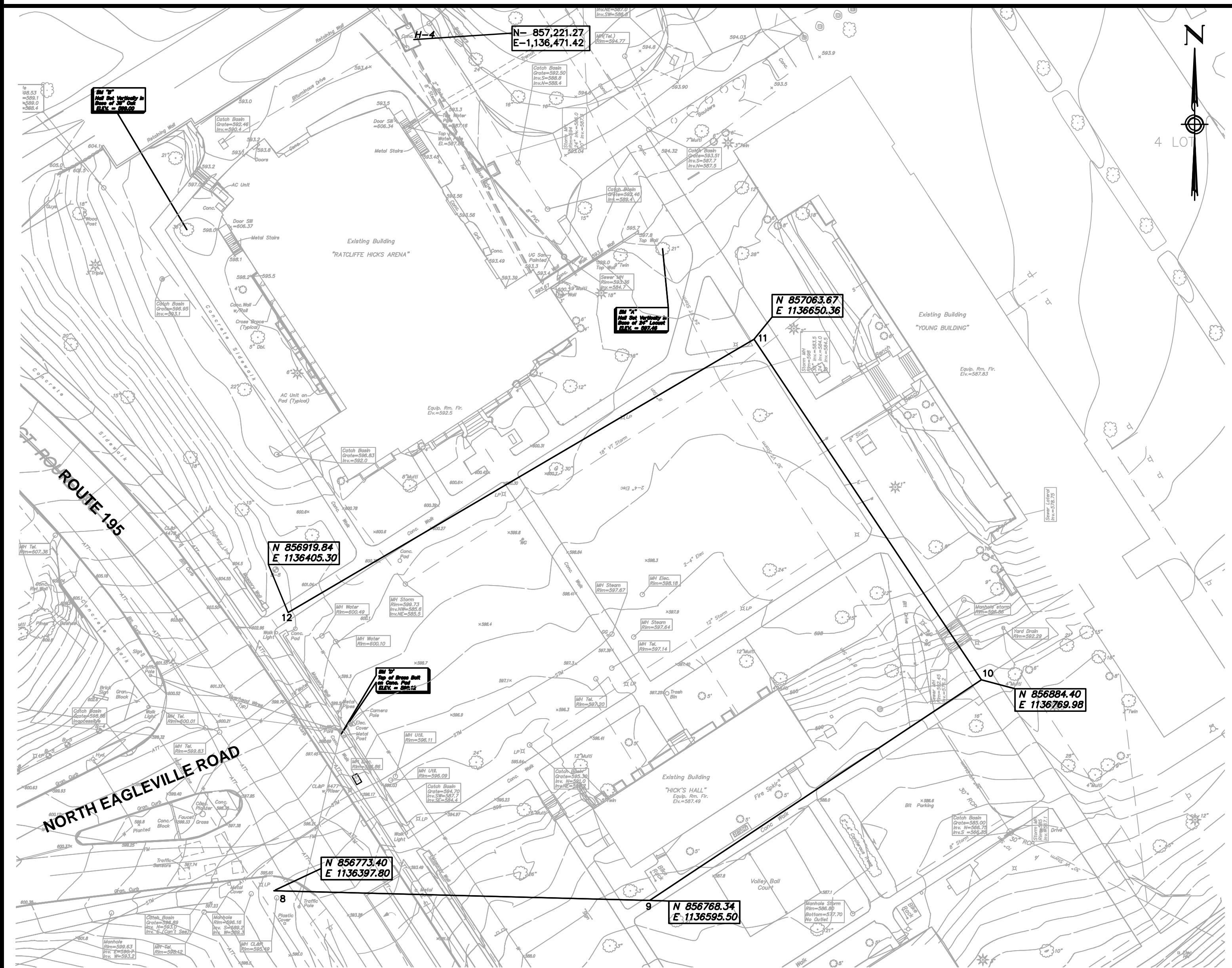
- NO MATERIAL SHALL BE STORED ON SITE UNLESS THE PROPOSED STORAGE LOCATION IS APPROVED BY THE OWNER'S REPRESENTATIVE.
- AFTER THE CONSTRUCTION HAS BEEN COMPLETED, THE CONTRACTOR SHALL REMOVE ALL EXCESS MATERIAL, DEBRIS, ETC. AND RESTORE OR REPAIR ANY DAMAGE TO LANDSCAPING AS DIRECTED BY THE OWNER'S REPRESENTATIVE.
- PROTECT EXISTING TREES OR SHRUBS TO REMAIN NEAR CONSTRUCTION OPERATIONS BY BOXING OR FENCING IN ACCORDANCE WITH THE "CONNECTICUT GUIDELINES FOR SOIL EROSION AND SEDIMENT CONTROL" REVISED 2002 AND THE SPECIFICATION.
- SOIL EROSION AND SEDIMENT CONTROL MEASURES SHALL CONFORM TO THE "CONNECTICUT GUIDELINES FOR SOIL EROSION AND SEDIMENT CONTROL" REVISED 2002.
- ALL PROPOSED WORK MAY BE VARIED IN THE FIELD BY THE OWNER'S REPRESENTATIVE TO MEET EXISTING CONDITIONS.
- THE CONTRACTOR SHOULD ANTICIPATE IN HIS BID THAT THE AREA OF HIS PROPOSED WORK MAY BE ENCUMBERED BY UTILITY COMPANIES FOR THE REMOVAL/RELOCATION/ADJUSTMENT/CONSTRUCTION OF UTILITIES. THE CONTRACTOR'S ATTENTION IS DIRECTED TO THE REQUIRED NOTIFICATIONS. THE CONTRACTOR SHALL COORDINATE ALL ASPECTS OF HIS WORK WITH SAID UTILITY COMPANIES.
- ASBESTOS MATERIAL MAY BE ENCOUNTERED WHEN WORKING IN BUILDINGS, STEAM VAULTS OR IN THE VICINITY OF EXISTING STEAM/CONDENSATE PIPES. IF ENCOUNTERED, THE CONTRACTOR SHALL STOP WORK IN THIS AREA AND INFORM THE OWNER. THE OWNER SHALL BE RESPONSIBLE FOR ASBESTOS REMOVAL. THE CONTRACTOR SHALL BE RESPONSIBLE FOR COORDINATING THE WORK WITH THE OWNER'S ASBESTOS REMOVAL WORK.
- THE CONTRACTOR SHALL ANTICIPATE THAT ADDITIONAL WORK WILL BE ONGOING IN THE VICINITY OF THE PROJECT SITE, AND THE CONTRACTOR SHALL COORDINATE ALL ASPECTS OF HIS WORK WITH SAID SURROUNDING WORK, INCLUDING BUT NOT LIMITED TO:
 - * YOUNG BUILDING ENVELOPE PROJECT - BUILDING ENVELOPE AND ROOF IMPROVEMENTS.
 - * GURLEVILLE ROAD PUMP STATION PROJECT - UPGRADE THE PUMP STATION AND MODIFICATIONS TO SANITARY FORCE MAIN IN HORSE BARN HILL ROAD.
 - * FLOOR REPLACEMENT PROJECT RATCLIFFE HICKS BUILDING.
 - * HICKS ARENA RETAINING WALL STABILIZATION PROJECT - STABILIZE RETAINING WALL NORTH SIDE OF ARENA.

STANDARD ABBREVIATIONS

ASTM	AMERICAN STANDARDS FOR TESTING MATERIALS	LT	LEFT LOCATION
BM	BENCH MARK	LP	LIGHT POLE
BIT	BITUMINOUS	MAX	MAXIMUM
CIP	CAST IRON PIPE	MIN	MINIMUM
CB	CATCH BASIN	MH	MANHOLE
C/L	CENTER LINE	MISC	MISCELLANEOUS
CL & P	CONNECTICUT LIGHT& POWER	MJ	MECHANICAL JOINT
CMP	CORRUGATED METAL PIPE	MON	MONUMENT
CONN / CT	CONNECTICUT	NIC	NOT IN CONTRACT
CONC	CONCRETE	N	NORTH
CPP	CORRUGATED POLYETHYLENE PIPE	NTS	NOT TO SCALE
CSW	CONCRETE SIDEWALK	N/A	NOT APPLICABLE
CWC	CONNECTICUT WATER CO.	N/F	NOW OR FORMERLY
CY	CUBIC YARDS	OH	OVERHEAD
DIA	DIAMETER	PROP	PROPOSED
DIM	DIMENSION	REINF	REINFORCED
DI	DUCTILE IRON	RCP	REINFC CONC PIPE
DIP	DUCTILE IRON PIPE DEPARTMENT OF TRANSPORTATION	REV	REVISION
DOT	DRAWING	ROW	RIGHT OF WAY
DWG	DRAWING	RT	RIGHT
E	EAST / ELECTRIC	SAN	SANITARY
EOP	EDGE OF PAVEMENT	SCH	SCHEDULE
ELEC	ELECTRIC	SF	SQUARE FEET
EL/ELEV	ELEVATION	S	SOUTH / SANITARY MH
EMH	ELECTRIC MANHOLE	STA	STATION
EX/EXIST	EXISTING	STD	STANDARD
FES	FLARED END SECTION	STRM/ST	STORM
G	GAS	TB	THRUST BLOCK
GG	GAS GATE	TF	TOP OF FRAME
HYD	HYDRANT	TYP	TYPICAL
IN	INCHES	USA	UNITED STATES OF AMERICA
INC	INCORPORATED	W	WATER
INV	INVERT	WG/WV	WATER GATE/WATER VALVE
		&	AND

LEGEND

DESCRIPTIONS	EXISTING	PROPOSED
TREELINE		
BUSHES		
TREES		
ABANDON PIPE/STRUCTURE		
REMOVE PIPE/STRUCTURE		
SILT FENCE		
HAYBALE COFFERDAM		
INLET PROTECTION		
STORM PIPE		
STORM PIPE		
WATER PIPE		
HYDRANT		
WATER BUTTERFLY VALVE		
WATER GATE VALVE		
SIGN		
UTILITY POLE		
TEST PIT		



SURVEY CONTROL

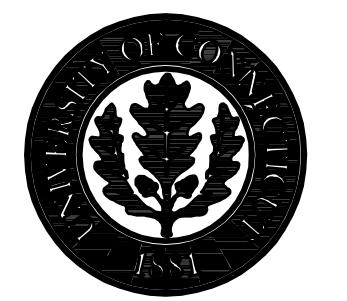
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AECOM
 500 ENTERPRISE DRIVE
 ROCKY HILL, CT 06067
 1-(860)-529-8882

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 PLANNING, ARCHITECTURAL & ENGINEERING SERVICES
 31 LEDOYT ROAD UNIT 3038
 STORRS, CONNECTICUT 06269-3038
 TELEPHONE: (860) 486-3127
 FACSIMILE: (860) 486-3177

PROJECT:
 NORTH EAGLEVILLE ROAD AREA
 INFRASTRUCTURE REPAIR/REPLACEMENT
 PHASE II
 YOUNG QUAD UTILITIES

PROJECT NO: 901954
 WORK ORDER NO:
 FILE NAME:
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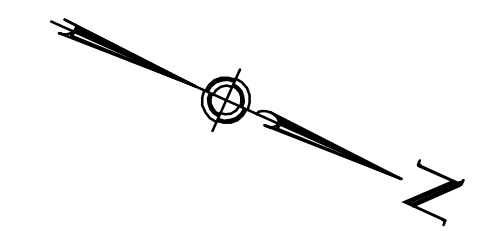
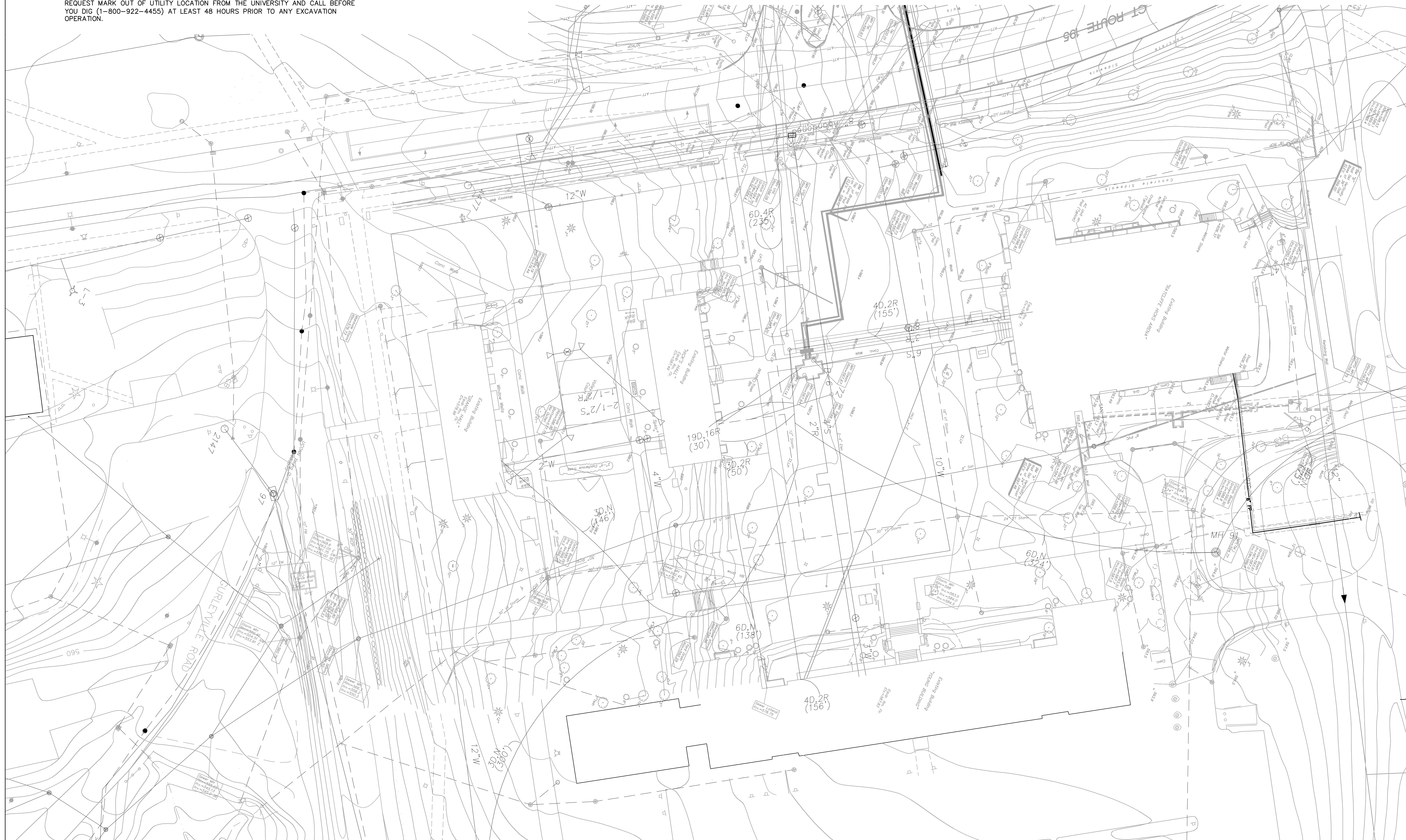
AUTHOR: PETER SAMMIS
 DRAFTER: KEVIN MCKENNA
 SCALE: AS NOTED
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 SHEET TITLE:

LEGEND, SURVEY CONTROL & GENERAL NOTES

SHEET:
C-01
 SHEET: _ of _

NOTES:

1. UNDERGROUND UTILITY, STRUCTURE AND FACILITY LOCATIONS DEPICTED ON THE CONTRACT DRAWINGS HAVE BEEN COMPILED, IN PART, FROM RECORD MAPPING AND OTHER DATA SUPPLIED BY RESPECTIVE UTILITY COMPANIES, AND/OR OTHER SOURCES. THESE LOCATIONS MUST BE CONSIDERED APPROXIMATE IN NATURE. ADDITIONALLY, OTHER UTILITY AND UNDERGROUND FEATURES, WHICH ARE UNKNOWN TO AECOM, MAY EXIST ON THE SITE. THE PRESENCE, SIZE AND LOCATION OF ALL UNDERGROUND FEATURES MUST BE DETERMINED AND VERIFIED IN THE FIELD BY THE APPROPRIATE AUTHORITIES PRIOR TO CONSTRUCTION. THE CONTRACTOR SHALL REQUEST MARK OUT OF UTILITY LOCATION FROM THE UNIVERSITY AND CALL BEFORE YOU DIG (1-800-922-4455) AT LEAST 48 HOURS PRIOR TO ANY EXCAVATION OPERATION.



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AECOM
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STORRS, CONNECTICUT 06269-3038
TELEPHONE: (860) 486-3127
FACSIMILE: (860) 486-3177

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PROJECT NO: 901954
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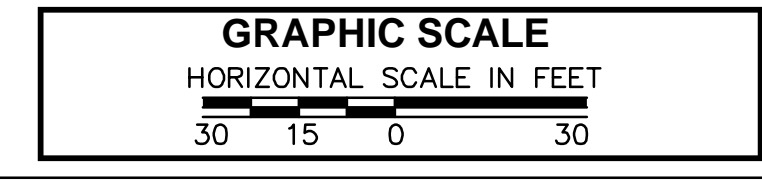
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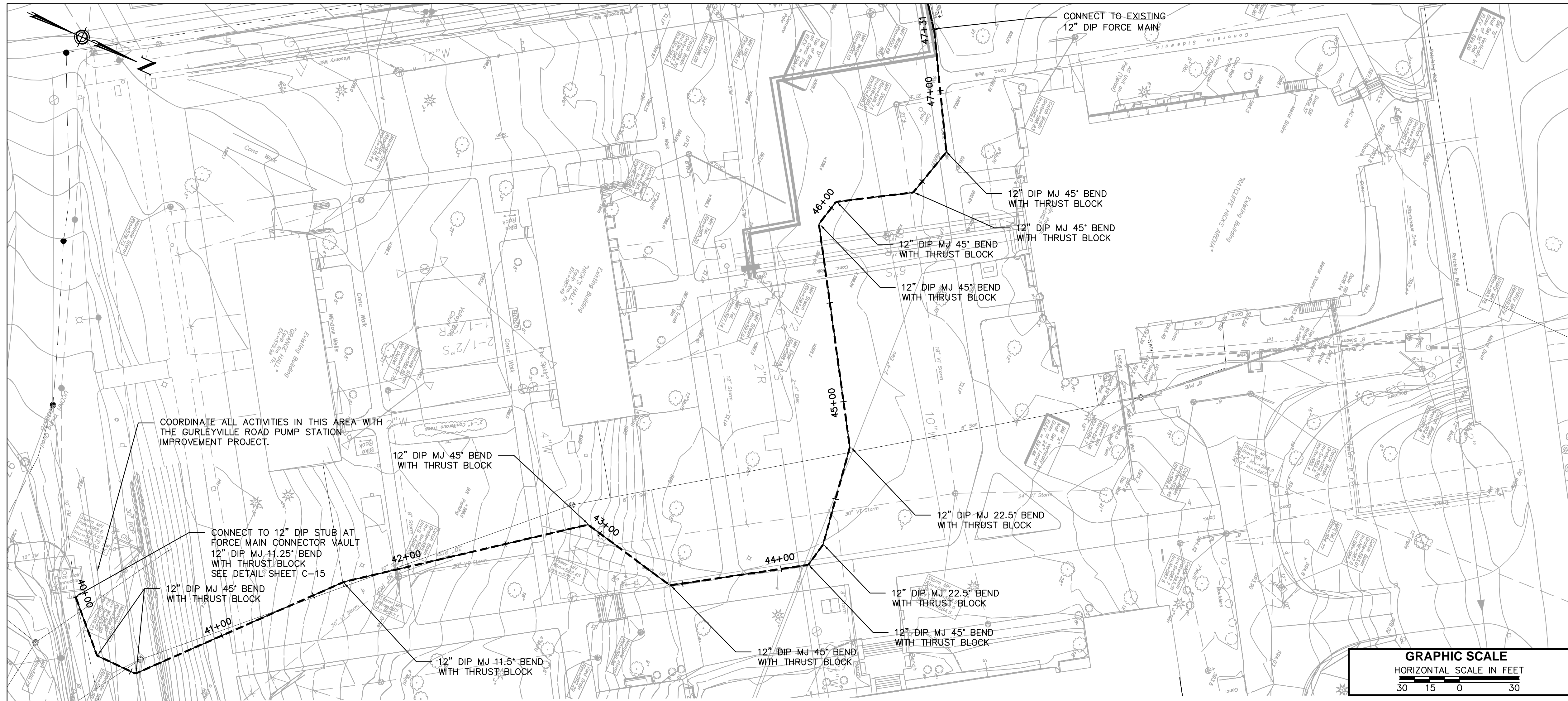
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C-02

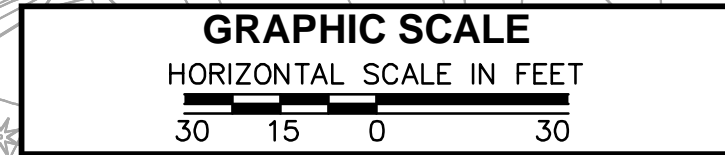
SHEET: _ of _





**SANITARY SEWER FORCE MAIN
GENERAL NOTES:**

1. SUBMIT AND OBTAIN APPROVAL OF SHOP DRAWINGS FOR ALL MATERIALS USED IN THE FORCE MAIN RELOCATION.
2. PROVIDE A MAXIMUM OF 2' DEFLECTION AT EACH PIPE JOINT TO ACHIEVE HORIZONTAL AND VERTICAL ALIGNMENT.
3. PROVIDE CONSTANT UPWARD SLOPE FROM STATION 40+00 TO HIGH POINT AT STATION 47+42.
4. ALL PIPE AND FITTINGS SHALL BE DUCTILE IRON CLASS 54, DOUBLE CEMENT LINED AND POLY WRAPPED.
5. ALL PIPE AND FITTINGS SHALL HAVE RESTRAINED JOINTS.
6. REFER TO COMPOSITE UTILITY PLAN SHEET C-03 FOR RELATIONSHIP BETWEEN PROPOSED FORCE MAIN AND OTHER IMPROVEMENTS.
7. REFER TO SHEET C-15 FOR SANITARY FORCE MAIN DETAILS.
8. NOT ALL UTILITY CROSSINGS ARE SHOWN ON PROFILES FOR CLARITY PURPOSES. SEE SHEET C-03 FOR EXISTING AND PROPOSED UTILITY CROSSINGS. ELEVATIONS OF EXISTING UTILITIES ARE APPROXIMATE.



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31 LEDOYT ROAD UNIT 3038
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TELEPHONE: (860) 486-3127
FACSIMILE: (860) 486-3177

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PROJECT NO: 901954
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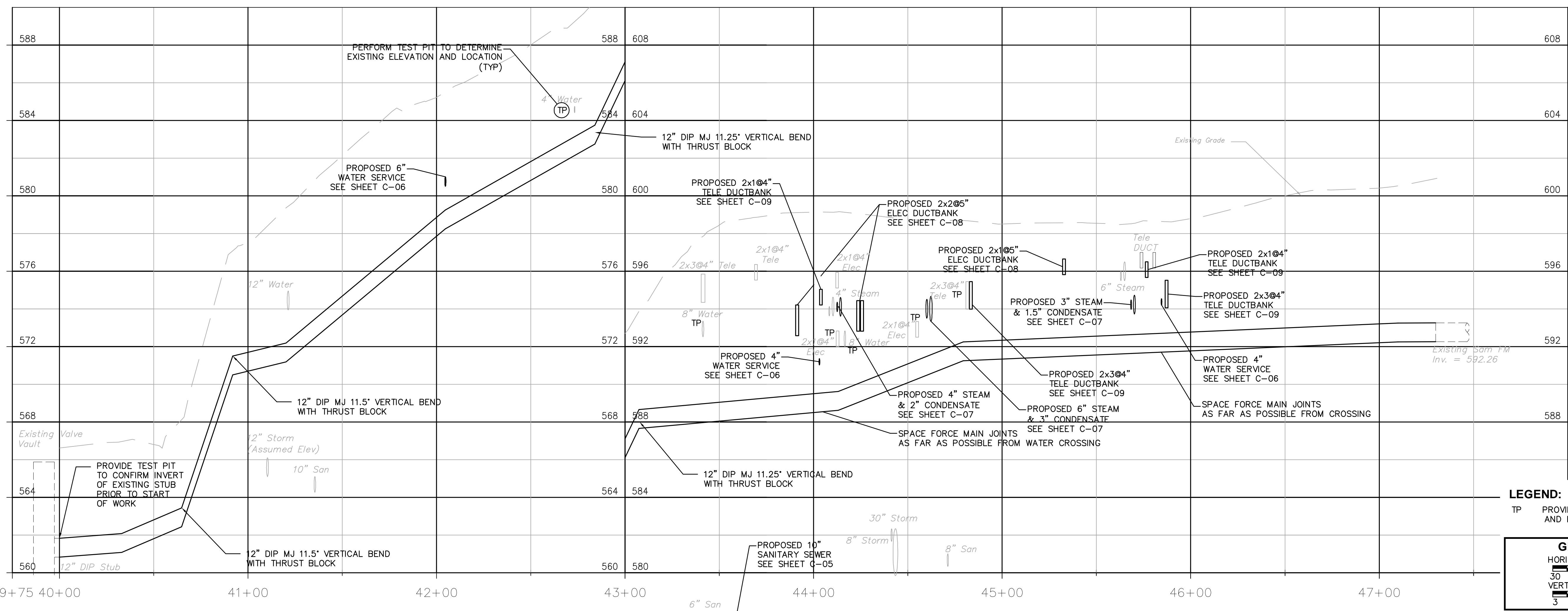
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**SANITARY SEWER FORCE MAIN
PLAN AND PROFILE**

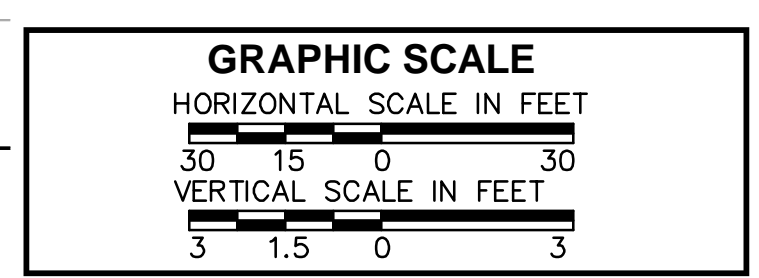
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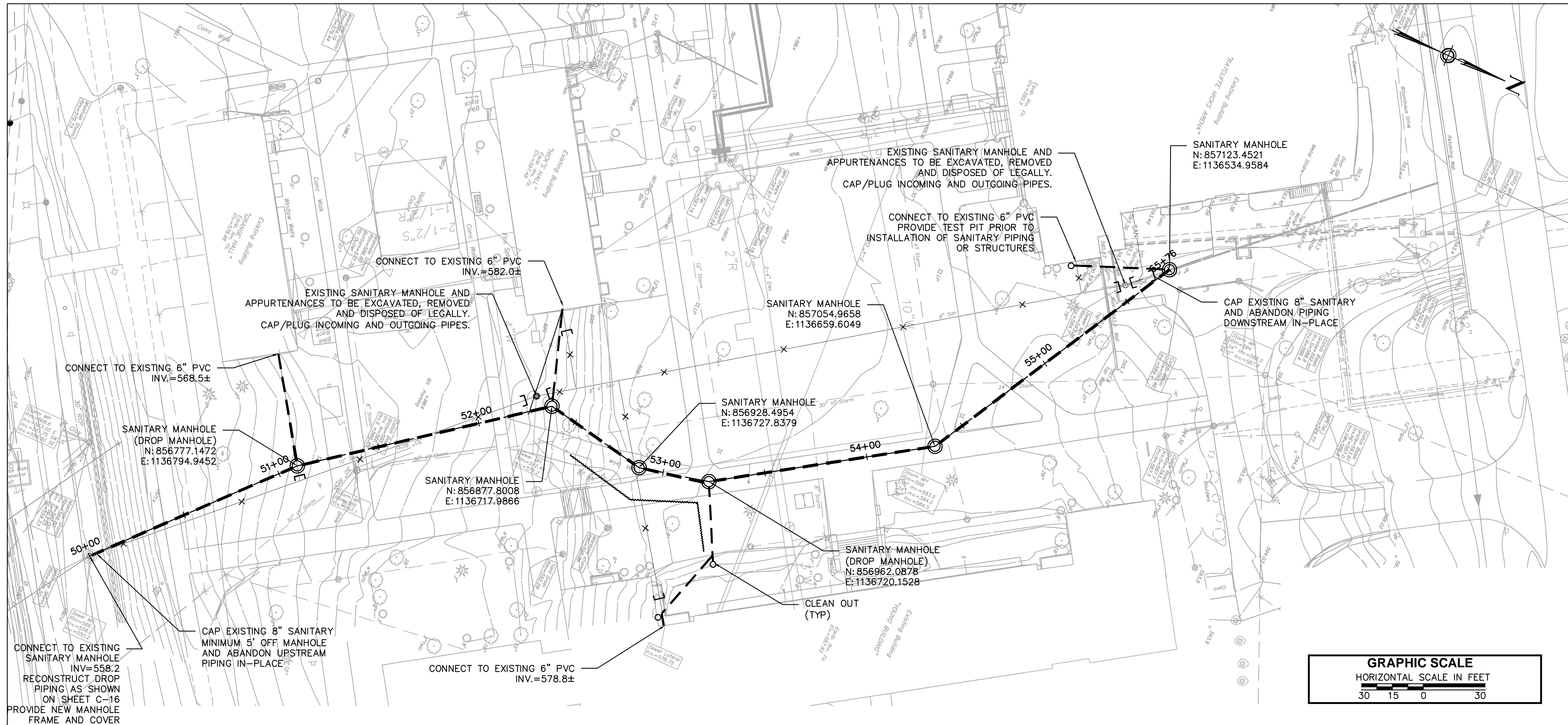
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SHEET: _ of _



LEGEND:
TP PROVIDE TEST PIT TO CONFIRM LOCATION AND ELEVATION OF EXISTING UTILITY



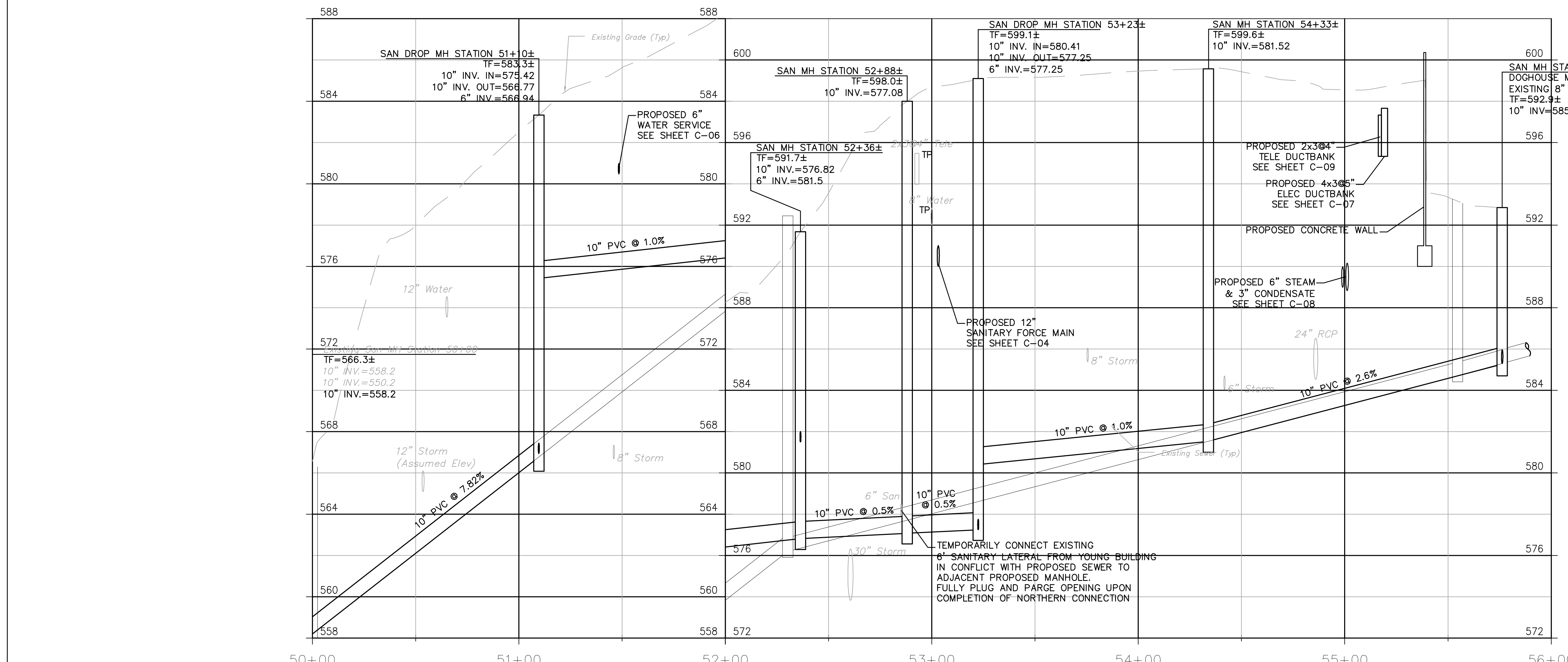
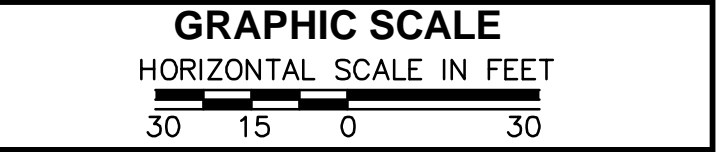


SANITARY SEWER INSTALLATION NOTES

- SANITARY SEWERS ARE FOR SANITARY SEWAGE ONLY. ALL STORM WATER, COOLING WATER, SUBSOIL DRAINAGE AND OBJECTIONABLE INDUSTRIAL WASTES ARE EXCLUDED FROM SANITARY SEWERS.
- SUBSOIL AND SURFACE DRAINAGE SHALL BE CONNECTED TO THE NEAREST STORM DRAIN OR WATERCOURSE, AS APPROVED BY THE APPROPRIATE AUTHORITY.
- BACKFILL IN TRENCHES IN TRAVELED WAY, UNDER AREAS TO BE PAVED, OR UNDER WALKS SHALL BE COMPACTED GRANULAR FILL. PRIOR TO PLACING BACKFILL, THE CRUSHED STONE FOUNDATION AND THE STONE HAUNCHING ALONG THE SEWER PIPES SHALL BE WRAPPED IN FILTER FABRIC AND SHALL BE LAPPED CLOSED AT THE TOP A MINIMUM OF ONE FOOT. THE FILTER FABRIC SHALL BE PLACED UNDER THE CRUSHED STONE FOUNDATION FOR MANHOLES AND EXTENDED ABOVE THE PIPE.
- AFTER PLACING APPROXIMATELY TWO FEET OF BACKFILL OVER ALL UTILITY PIPING, THE CONTRACTOR SHALL PLACE A SIX INCH WIDE STRIP OF DURABLE COLOR CODED (GREEN) FOR SANITARY AND STORM SEWER) DETECTABLE, UNDERGROUND UTILITY LOCATION TAPE IMPRINTED WITH AN APPROPRIATE WARNING INDICATING THE PRESENCE OF THE BURIED UTILITY CONDUIT.
- THE SEWER LINE SHALL BE TESTED FOR LEAKAGE USING LOW PRESSURE AIR IN ACCORDANCE WITH THE PROJECT SPECIFICATIONS. ANY SECTION OF PIPELINE FAILING THE TEST SHALL BE REPAIRED OR REPLACED AND RETESTED BEFORE CONNECTIONS WILL BE PERMITTED.
- PIPE DESIGNATIONS:
 D-3034 ASTM D-3034 TYPE PSM POLYVINYL CHLORIDE (PVC) SEWER PIPE AND FITTINGS, DESIGNATION SDR-35 (6", 8", 10", 12", AND 15").
 F-789 ASTM F-789 TYPE PS-46 POLYVINYL CHLORIDE (PVC) PLASTIC GRAVITY FLOW SEWER PIPE AND FITTINGS (6", 8", 10", 12" AND 15").
- REFER TO COMPOSITE UTILITY PLAN SHEET C-03 FOR RELATIONSHIP BETWEEN PROPOSED SANITARY SEWER AND OTHER IMPROVEMENTS.
- REFER TO SHEET C-16 FOR SANITARY SEWER DETAILS.
- PROPOSED MANHOLE COVERS LOCATED IN SIDEWALKS AREAS SHALL BE LOCATED SUCH THAT THE ENTIRE FRAME IS WITHIN THE SIDEWALK, WITH A MINIMUM OF 3" CLEARANCE TO THE EDGE OF THE SIDEWALK.
- NOT ALL UTILITY CROSSINGS ARE SHOWN ON PROFILES FOR CLARITY PURPOSES. SEE SHEET C-03 FOR EXISTING AND PROPOSED UTILITY CROSSINGS. ELEVATIONS OF EXISTING UTILITIES ARE APPROXIMATE.

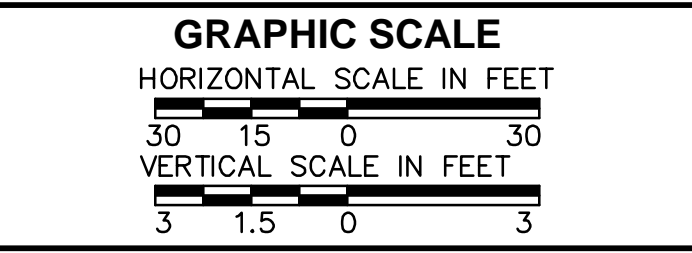
LEGEND:

- x-x- ABANDON EXISTING PIPE IN-PLACE
-] CAP EXISTING PIPE



LEGEND:

- TP PROVIDE TEST PIT TO CONFIRM LOCATION AND ELEVATION OF EXISTING UTILITY



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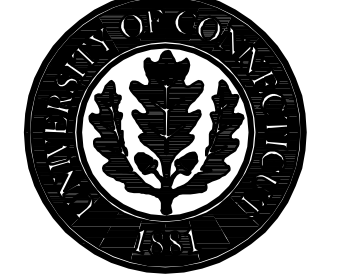
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 STORRS, CONNECTICUT 06269-3038
 TELEPHONE: (860) 486-3127
 FACSIMILE: (860) 486-3177

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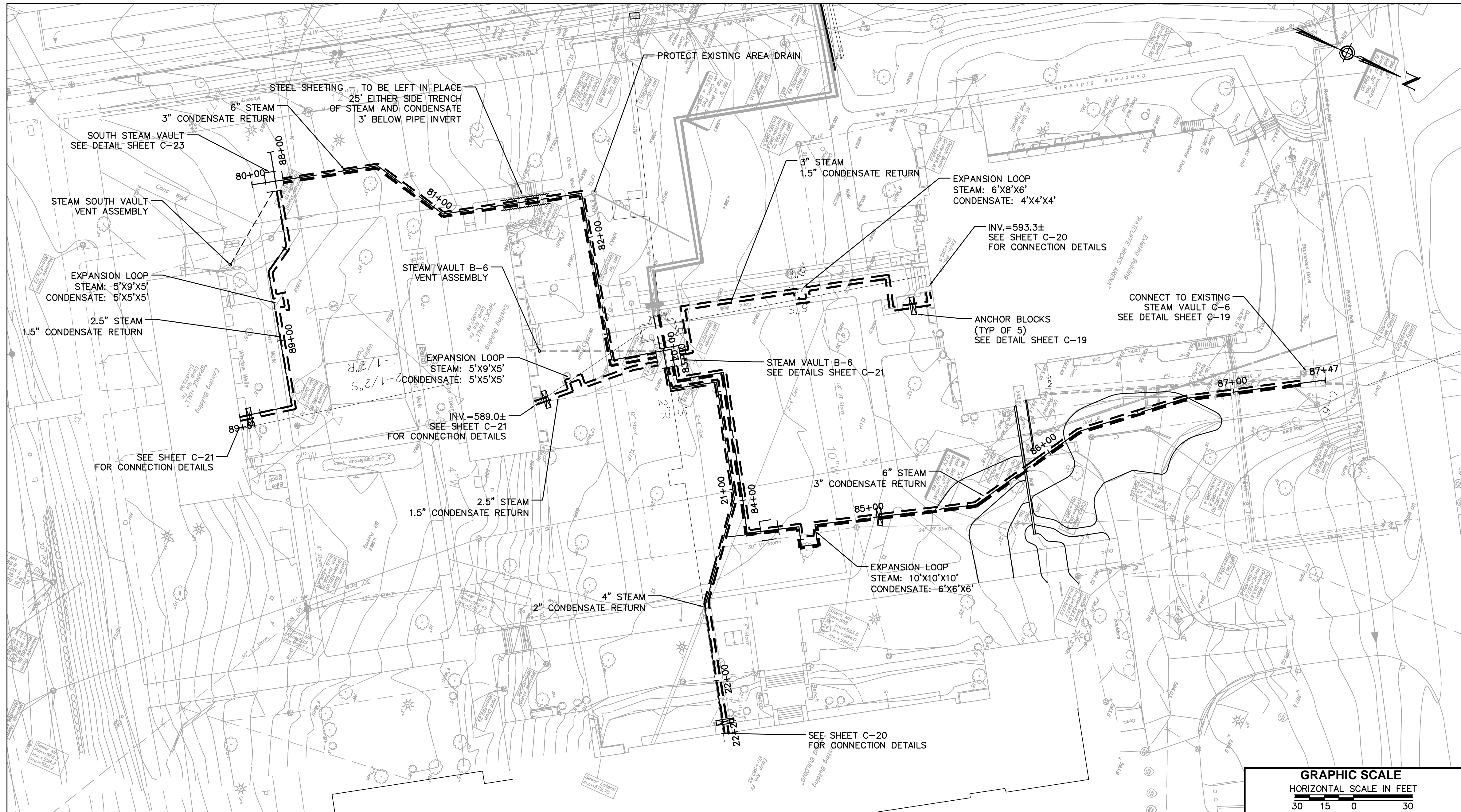
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SANITARY SEWER PLAN AND PROFILE

SHEET:

C-05

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MECHANICAL DRAWING NOTES

- CONTRACTOR SHALL PROVIDE ALL PIPING, VALVES, FITTINGS, EXPANSION LOOPS, ANCHORS, AND ETC. AS NECESSARY TO PROVIDE A FULLY FUNCTIONAL STEAM SYSTEM IN ACCORDANCE WITH REQUIREMENTS AS DETERMINED IN NOTE #2.
- CONTRACTOR SHALL PROVIDE AND SUBMIT THERMAL EXPANSION CALCULATIONS SIGNED BY AN ENGINEER LICENSED IN CONNECTICUT. A DESIGN PRESSURE OF 125 PSIG STEAM SHALL BE UTILIZED.
- CONTRACTOR SHALL PROVIDE LINK-SEAL AT ALL VAULT PENETRATIONS FOR THE PROPOSED STEAM AND CONDENSATE PIPING.
- FINAL LOCATION OF PIPING TERMINATIONS TO BE COORDINATED. REQUIRED ROUTING TO BE COORDINATED WITH SITE UTILITIES.
- SEE SHEETS C-19, C-20 & C-21 FOR ADDITIONAL GENERAL NOTES AND DETAILS.
- REFER TO COMPOSITE UTILITY PLAN SHEET C-03 FOR RELATIONSHIP BETWEEN PROPOSED STEAM AND CONDENSATE PIPING AND OTHER IMPROVEMENTS.
- ALL EXTERIOR STEAM AND CONDENSATE PIPING SHALL BE PRE-INSULATED.
- SHEETING SHALL BE CUT OFF AND REMOVED AT THREE (3) FEET BELOW FINAL GRADE.
- NOT ALL UTILITY CROSSINGS ARE SHOWN ON PROFILES FOR CLARITY PURPOSES. SEE SHEET C-03 FOR EXISTING AND PROPOSED UTILITY CROSSINGS. ELEVATIONS OF EXISTING UTILITIES ARE APPROXIMATE.
- THE INTENT OF THE PRE-INSULATED PIPING SYSTEM IS TO ANCHOR PIPING INSIDE THE VAULT AND ACCOMMODATE THERMAL EXPANSION MOVEMENT IN THE VARIOUS PROPOSED L BEND, Z BEND AND LOOPS OUTSIDE THE VAULT.
- THE PRE-INSULATED PIPING SUPPLIER SHALL PROVIDE A STRESS ANALYSIS OF BOTH PROPOSED UNDERGROUND AND STEAM VAULT PIPING, AND MAKE RECOMMENDATIONS FOR STEAM VAULT PIPING MODIFICATIONS TO ACCOMMODATE THERMAL EXPANSION.
- ANCHORS, ANCHOR BLOCKS AND ANCHOR BLOCK REINFORCEMENT SHOWN ARE APPROXIMATE, AND MAY CHANGE BASED ON THE STRESS ANALYSIS PROVIDED BY THE PRE-INSULATED PIPING SYSTEM SUPPLIER.
- THE ENGINEER SHALL RE-EVALUATE ANCHORS, ANCHOR BLOCKS AND ANCHOR BLOCK REINFORCEMENT BASED ON THE STRESS ANALYSIS PROVIDED BY THE PRE-INSULATED PIPING SYSTEM SUPPLIER.

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AECOM
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ROCKY HILL, CT 06067
1-(860)-529-8882

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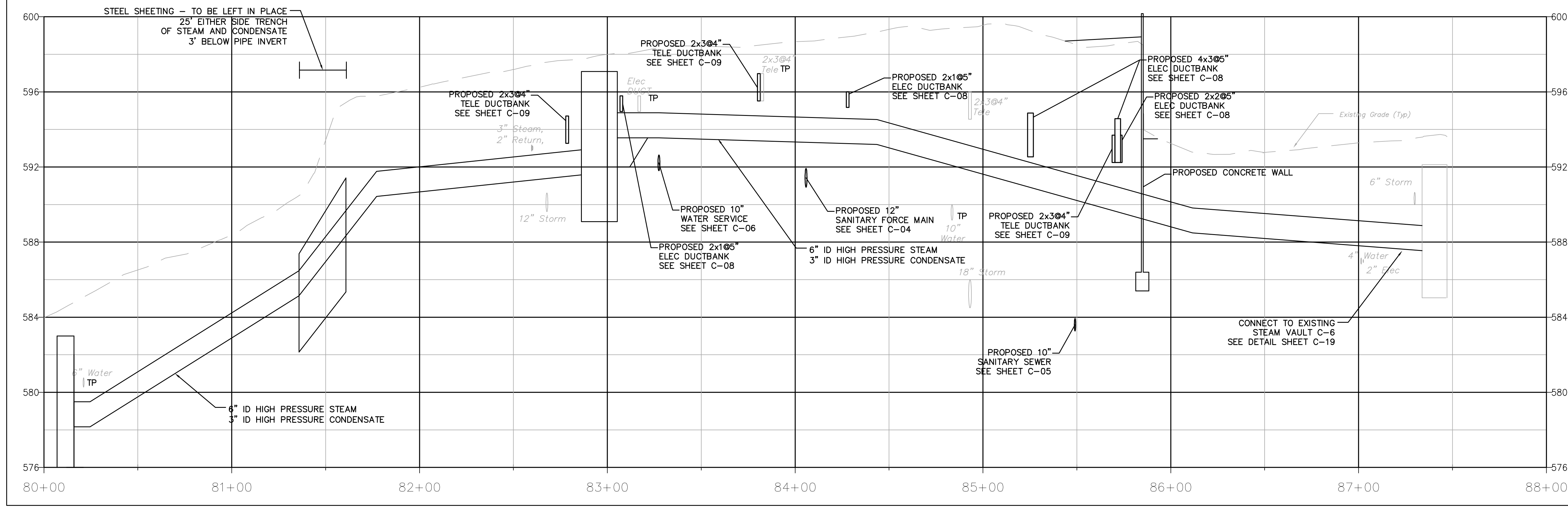


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PLANNING, ARCHITECTURAL & ENGINEERING SERVICES
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STORRS, CONNECTICUT 06269-3038
TELEPHONE: (860) 486-3127
FACSIMILE: (860) 486-3177

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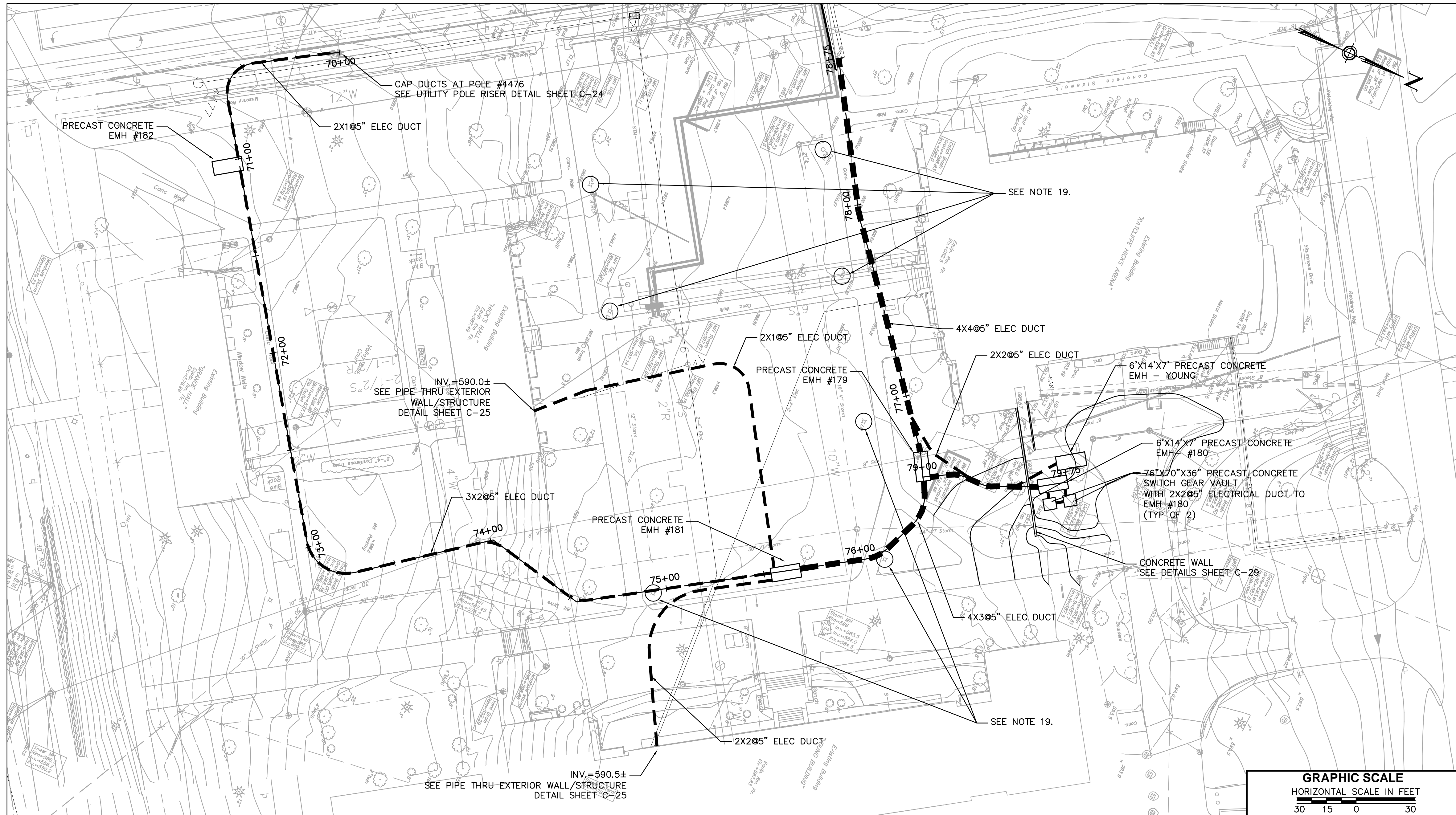
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SHEET TITLE:
STEAM AND CONDENSATE PLAN AND PROFILE



SHEET: C-07

SHEET: ___ of ___



ELECTRICAL GENERAL NOTES

1. ALL DUCT BANKS SHALL BE CONCRETE ENCASED.
2. ALL DUCT BANKS SHALL BE FORMED ON SIDES.
3. DUCT BANKS SHALL BE PITCHED TOWARD MANHOLES, TO THE EXTENT POSSIBLE.
4. WHERE EXISTING UTILITIES ARE LIKELY TO BE ENCOUNTERED, CONTRACTOR SHALL HAND DIG AND PROTECT EXISTING UTILITIES.
5. FILL UNDER PAVED AREAS, SIDEWALKS, WALLS, ETC. TO BE COMPACTED TO 95% MAXIMUM DENSITY (ASTM D1557).
6. ALL CONDUIT IN DUCTBANKS SHALL BE SCHEDULE 40 PVC UNLESS NOTED OTHERWISE.
7. ALL SWEEPS AND RISER CONDUITS SHALL BE RIGID GALVANIZED STEEL CONDUIT UNLESS NOTED OTHERWISE.
8. ALL CONDUITS, INCLUDING SPARE AND UNUSED CONDUITS, SHALL BE PROVIDED WITH A 3/8" NYLON DRAG LINE.
9. DISTANCE BETWEEN CONDUIT CENTERS SHALL BE 7 1/2 INCHES FOR 4 INCH CONDUIT AND 8 1/2 INCH FOR 5 INCH CONDUIT.
10. COORDINATE ALL CUTTING AND CAPPING OF THE EXISTING ELECTRICAL CONDUIT WITH UCONN UTILITIES AT LEAST 48 HOURS PRIOR TO PERFORMING WORK.
11. EXISTING ELECTRICAL SERVICE SHALL NOT BE ABANDONED UNTIL THE PROPOSED ELECTRICAL SERVICES ARE OPERATIONAL.
12. INSTALLATION OF ALL CABLE AND SPLICING BY OTHERS.
13. SEE SHEET C-24 & C-25 FOR ADDITIONAL DETAILS.
14. REFER TO COMPOSITE UTILITY PLAN SHEET C-03 FOR RELATIONSHIP BETWEEN PROPOSED ELECTRICAL DUCTBANKS AND OTHER IMPROVEMENTS.
15. ALL ELECTRICAL DUCT BENDS SHALL BE INSTALLED WITH A MINIMUM OF 15' RADIUS PVC CONDUIT.
16. EMH - DESIGNATION FOR A PRECAST CONCRETE ELECTRIC MANHOLE.
17. ALL UNDERGROUND ELECTRICAL DUCTBANKS, INCLUDING MANHOLES SHALL BE IN ACCORDANCE WITH ATTACHMENT A TO SPECIFICATION SECTION 16100 - "SPECIFICATION FOR ELECTRICAL UTILITY UNDERGROUND CONSTRUCTION AND MAINTENANCE WORK FOR CONNECTICUT LIGHT AND POWER COMPANY".
18. NOT ALL UTILITY CROSSINGS ARE SHOWN ON PROFILES FOR CLARITY PURPOSES. SEE SHEET C-03 FOR EXISTING AND PROPOSED UTILITY CROSSINGS. ELEVATIONS OF EXISTING UTILITIES ARE APPROXIMATE.
19. PROTECT OR REMOVE AND REPLACE EXISTING PEDESTRIAN LIGHTING. LIGHTING STANDARDS REMOVED SHALL BE PROTECTED AND STORED BY CONTRACTOR. FOUNDATIONS REMOVED SHALL BE REPLACED IN KIND. WIRING SHALL BE IN KIND. ANY BROKEN PARTS SHALL BE REPLACED PRIOR TO RE-INSTALLATION. SEE SHEET C-24 FOR LIGHTING BASE DETAILS.

CERTIFICATION:

STATUS:
Not for Construction

CONSULTANT:

AECOM
500 ENTERPRISE DRIVE
ROCKY HILL, CT 06067
1-(860)-529-8882

REVISIONS:

MARK	DATE	DESCRIPTION



UNIVERSITY OF CONNECTICUT
PLANNING, ARCHITECTURAL & ENGINEERING SERVICES
31 LEDOYT ROAD UNIT 3038
STORRS, CONNECTICUT 06269-3038
TELEPHONE: (860) 486-3127
FACSIMILE: (860) 486-3177

PROJECT:

NORTH EAGLEVILLE ROAD AREA
INFRASTRUCTURE REPAIR/REPLACEMENT
PHASE II
YOUNG QUAD UTILITIES

PROJECT NO: 901954
WORK ORDER NO:
FILE NAME:
P:\CIVIL\YOUNG QUAD\SHEETS\C-08

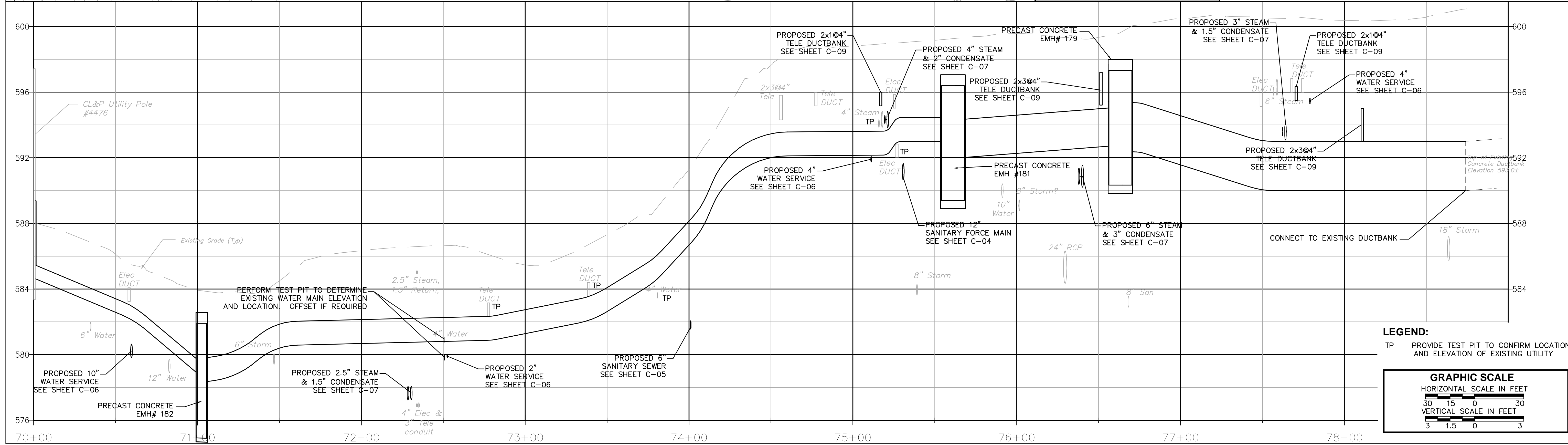
AUTHOR: PETER SAMMIS
DRAFTER: KEVIN MCKENNA
SCALE: AS NOTED
PRINT DATE: APRIL 21, 2015
SHEET TITLE:

ELECTRIC DUCTBANK PLAN AND PROFILE

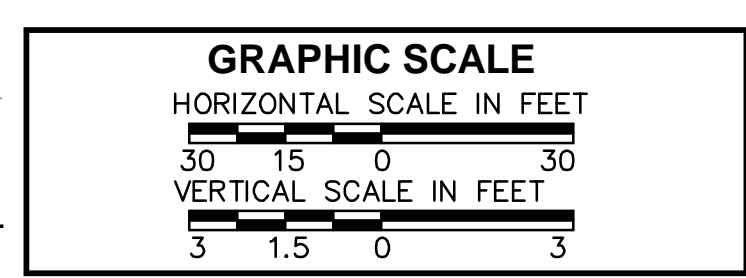
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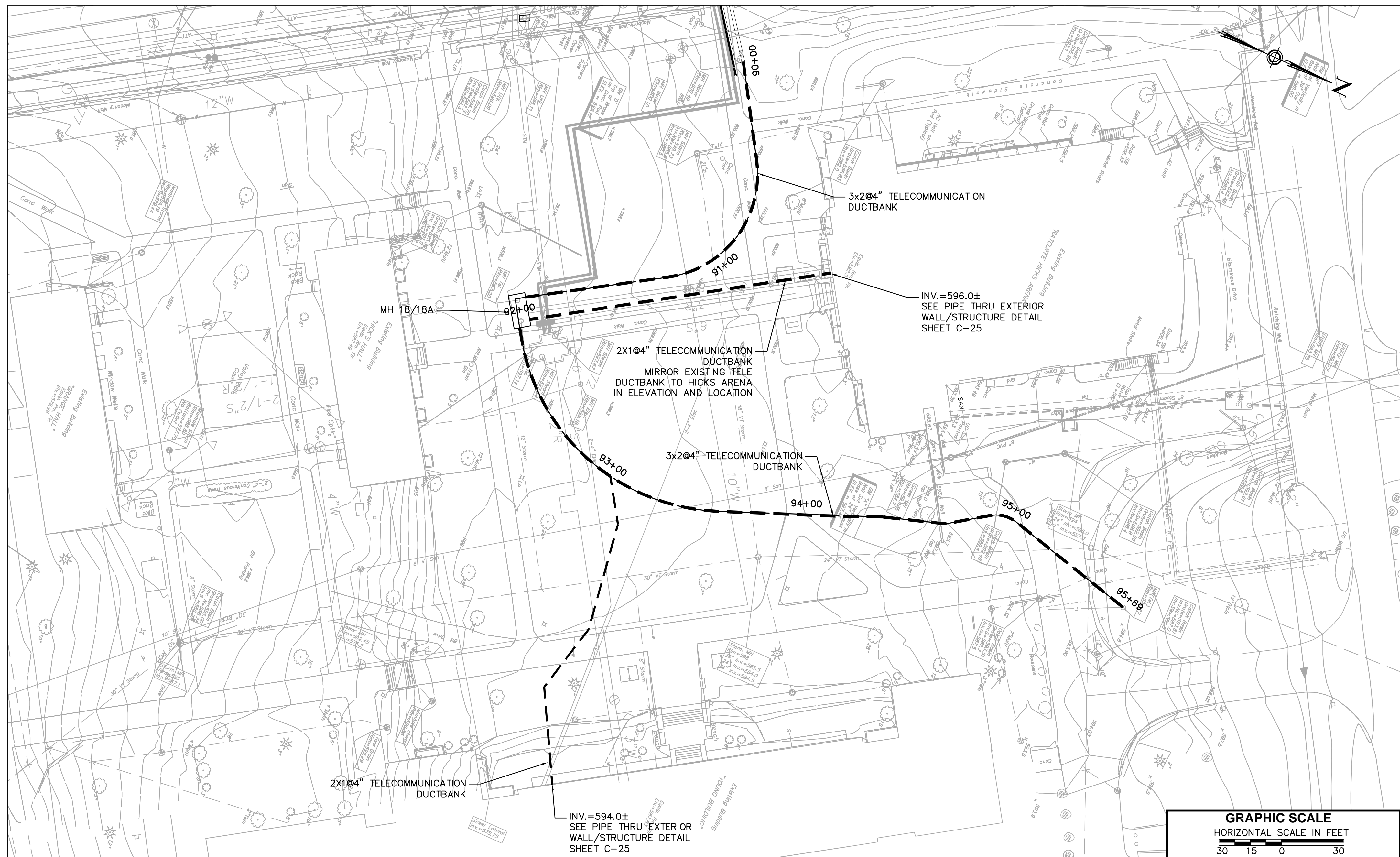
C-08

SHEET: ___ of ___



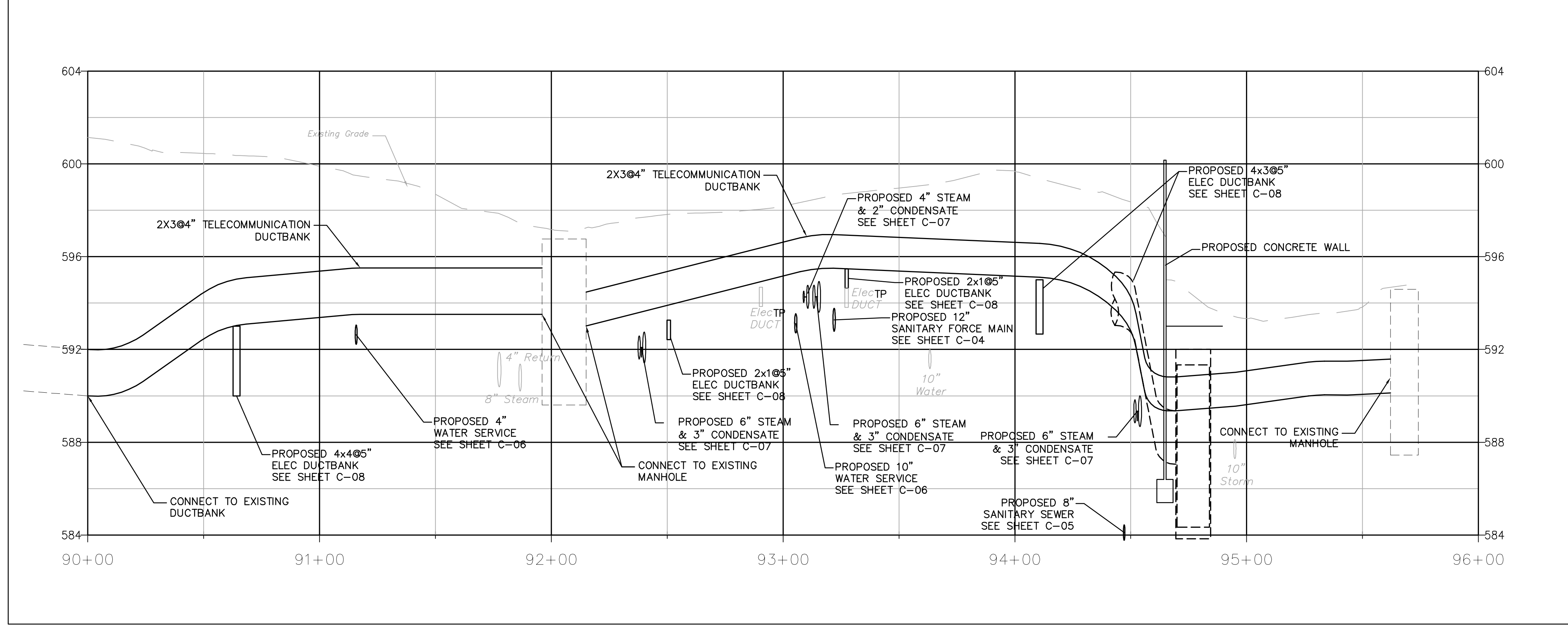
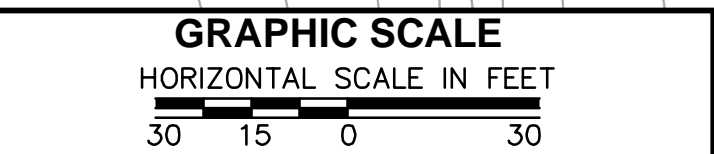
LEGEND:
TP PROVIDE TEST PIT TO CONFIRM LOCATION AND ELEVATION OF EXISTING UTILITY



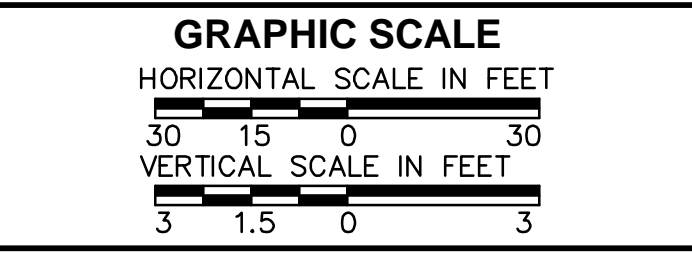


DUCTBANK GENERAL NOTES

1. ALL DUCT BANKS SHALL BE CONCRETE ENCASED.
2. ALL DUCT BANKS SHALL BE FORMED ON SIDES.
3. DUCT BANKS SHALL BE PITCHED TOWARD BUILDINGS, TO THE EXTENT POSSIBLE.
4. WHERE EXISTING UTILITIES ARE LIKELY TO BE ENCOUNTERED, CONTRACTOR SHALL HAND DIG AND PROTECT EXISTING UTILITIES.
5. FILL UNDER PAVED AREAS, SIDEWALKS, WALLS, ETC. TO BE COMPACTED TO 95% MAXIMUM DENSITY (ASTM D1557).
6. ALL CONDUIT IN DUCTBANKS SHALL BE SCHEDULE 40 PVC UNLESS NOTED OTHERWISE.
7. ALL SWEEPS AND RISER CONDUITS SHALL BE RIGID GALVANIZED STEEL CONDUIT UNLESS NOTED OTHERWISE.
8. ALL CONDUITS, INCLUDING SPARE AND UNUSED CONDUITS, SHALL BE PROVIDED WITH A 3/8" NYLON DRAG LINE.
9. DISTANCE BETWEEN CONDUIT CENTERS SHALL BE 7 1/2 INCHES FOR 4 INCH CONDUIT AND 8 1/2 INCH FOR 5 INCH CONDUIT.
10. MINIMUM SEPARATION BETWEEN ELECTRICAL AND TELE-COMMUNICATION DUCTBANKS SHALL BE 12".
11. SEE SHEET C-25 & C-26 FOR ADDITIONAL GENERAL NOTES AND DETAILS.
12. REFER TO COMPOSITE UTILITY PLAN SHEET C-03 FOR RELATIONSHIP BETWEEN PROPOSED TELE COMMUNICATION DUCT BANKS AND OTHER IMPROVEMENTS.
13. ALL TELECOMMUNICATION DUCTBANKS SHALL BE IN ACCORDANCE WITH NOTES AND DETAILS ON SHEET C-26.
14. NOT ALL UTILITY CROSSINGS ARE SHOWN ON PROFILES FOR CLARITY PURPOSES. SEE SHEET C-03 FOR EXISTING AND PROPOSED UTILITY CROSSINGS. ELEVATIONS OF EXISTING UTILITIES ARE APPROXIMATE.



LEGEND:
 TP PROVIDE TEST PIT TO CONFIRM LOCATION AND ELEVATION OF EXISTING UTILITY



CERTIFICATION:

 STATUS:
 Not for Construction
 CONSULTANT:
AECOM
 500 ENTERPRISE DRIVE
 ROCKY HILL, CT 06067
 1-(860)-529-8882

REVISIONS:

MARK	DATE	DESCRIPTION


UNIVERSITY OF CONNECTICUT
 PLANNING, ARCHITECTURAL & ENGINEERING SERVICES
 31 LEDOYT ROAD UNIT 3038
 STORRS, CONNECTICUT 06269-3038
 TELEPHONE: (860) 486-3127
 FACSIMILE: (860) 486-3177

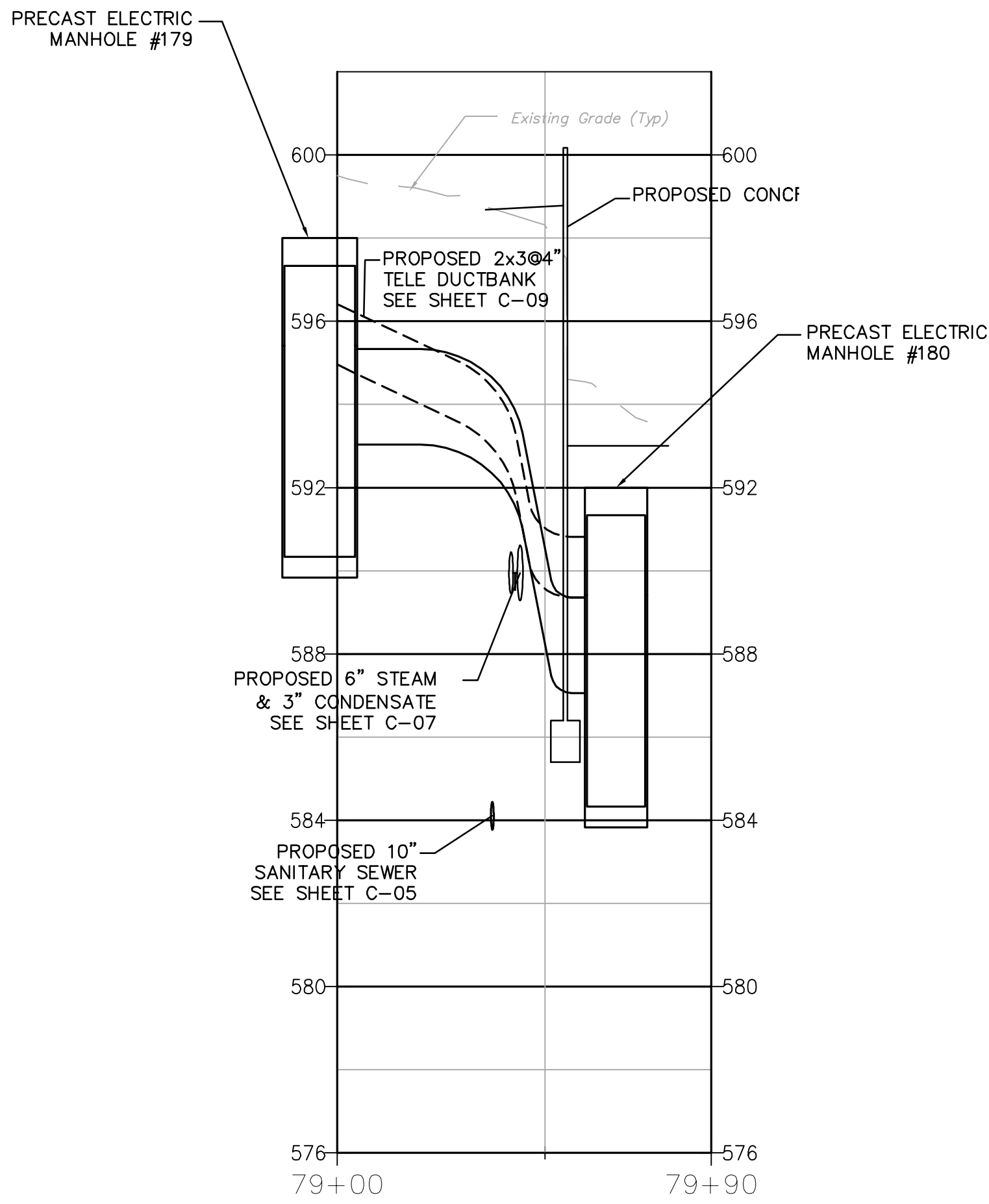
PROJECT:

 NORTH EAGLEVILLE ROAD AREA
 INFRASTRUCTURE REPAIR/REPLACEMENT
 PHASE II
 YOUNG QUAD UTILITIES

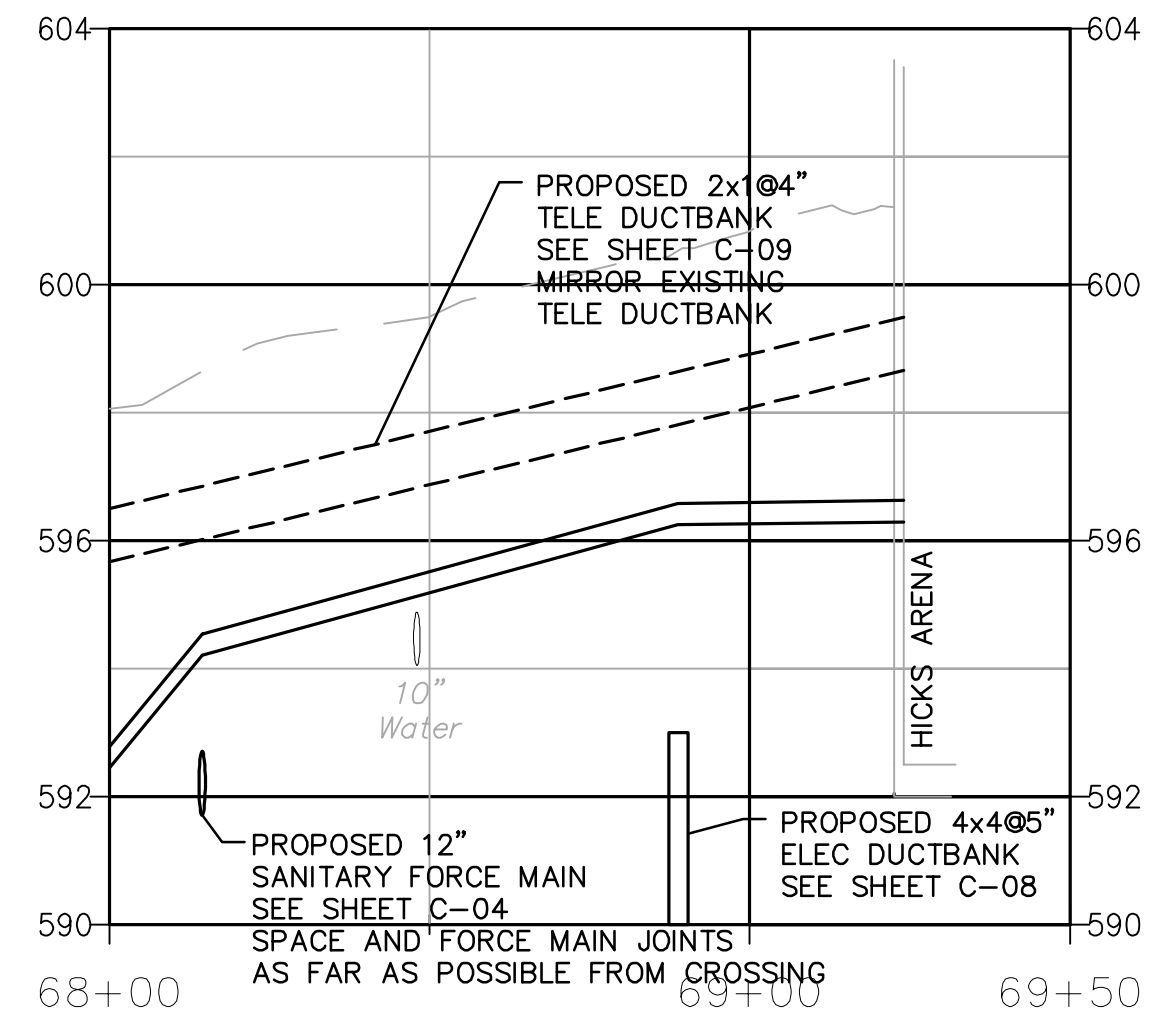
PROJECT NO: 901954
 WORK ORDER NO:
 FILE NAME: P:\CIVIL\YOUNG QUAD\SHEETS\C-09

AUTHOR: PETER SAMMIS
 DRAFTER: KEVIN MCKENNA
 SCALE: AS NOTED
 PRINT DATE: APRIL 21, 2015
 SHEET TITLE:

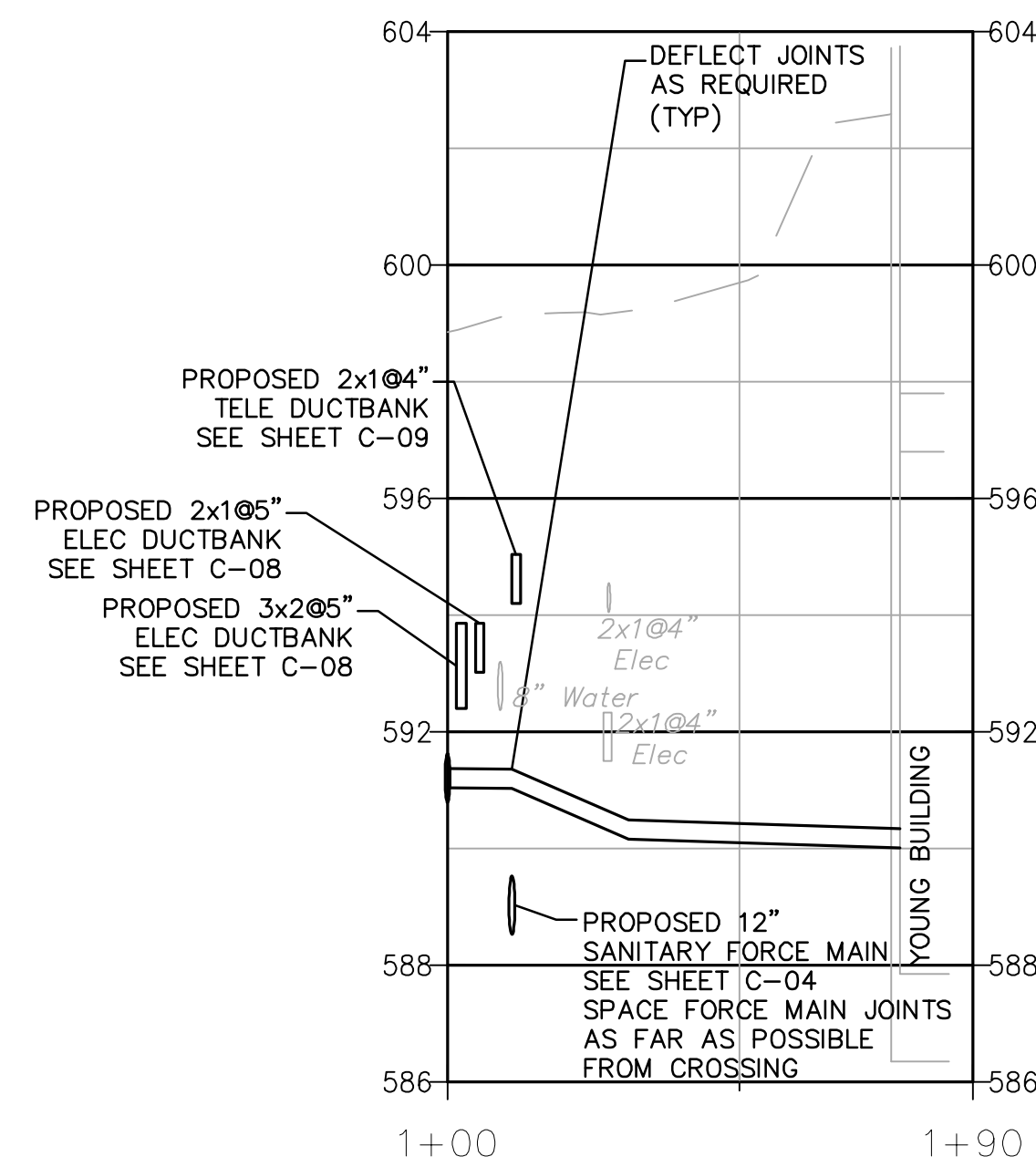
TELE-COMMUNICATION PLAN AND PROFILE
 SHEET:
C-09
 SHEET: _ of _



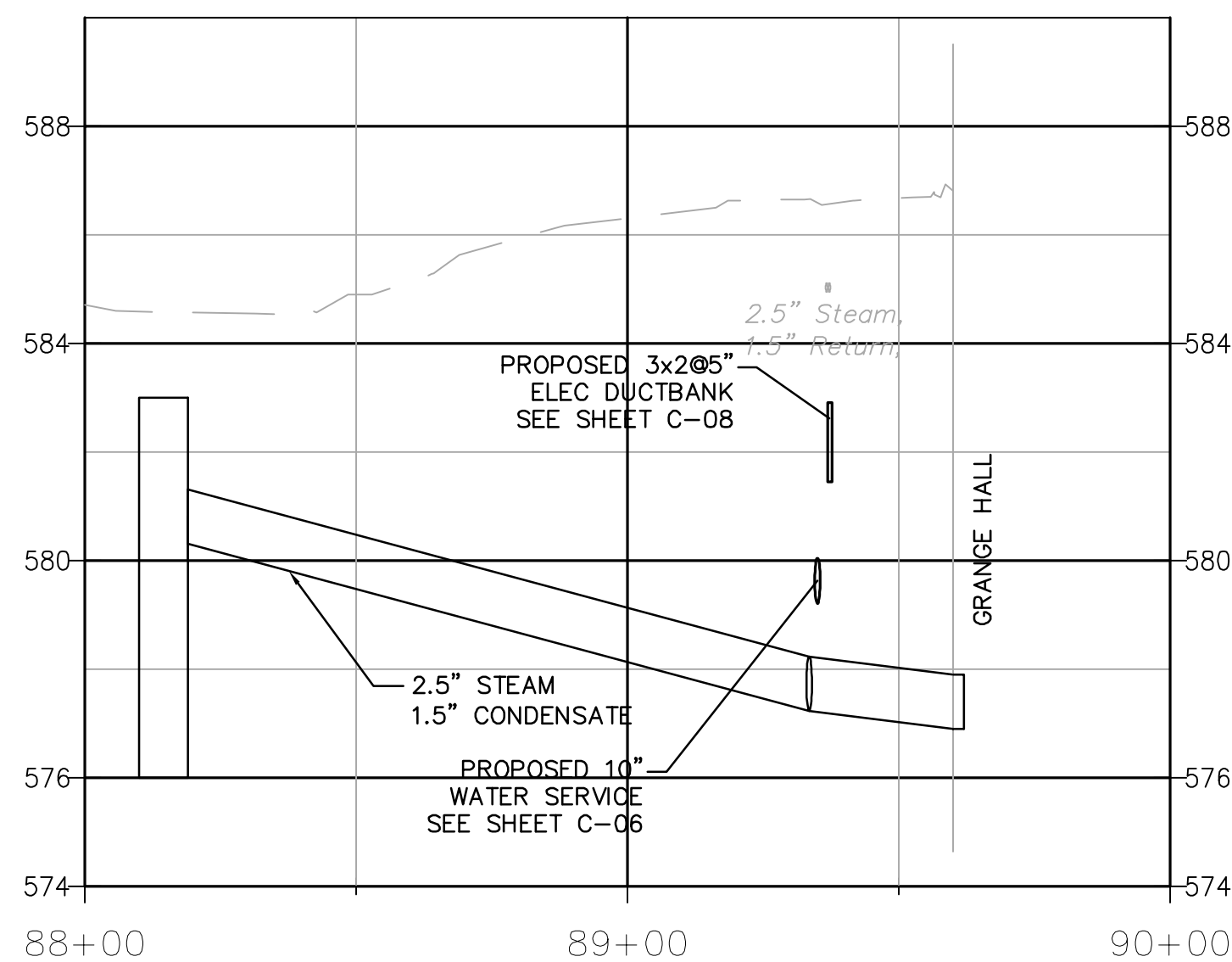
ELECTRICAL MANHOLE #3 TO MANHOLE #4



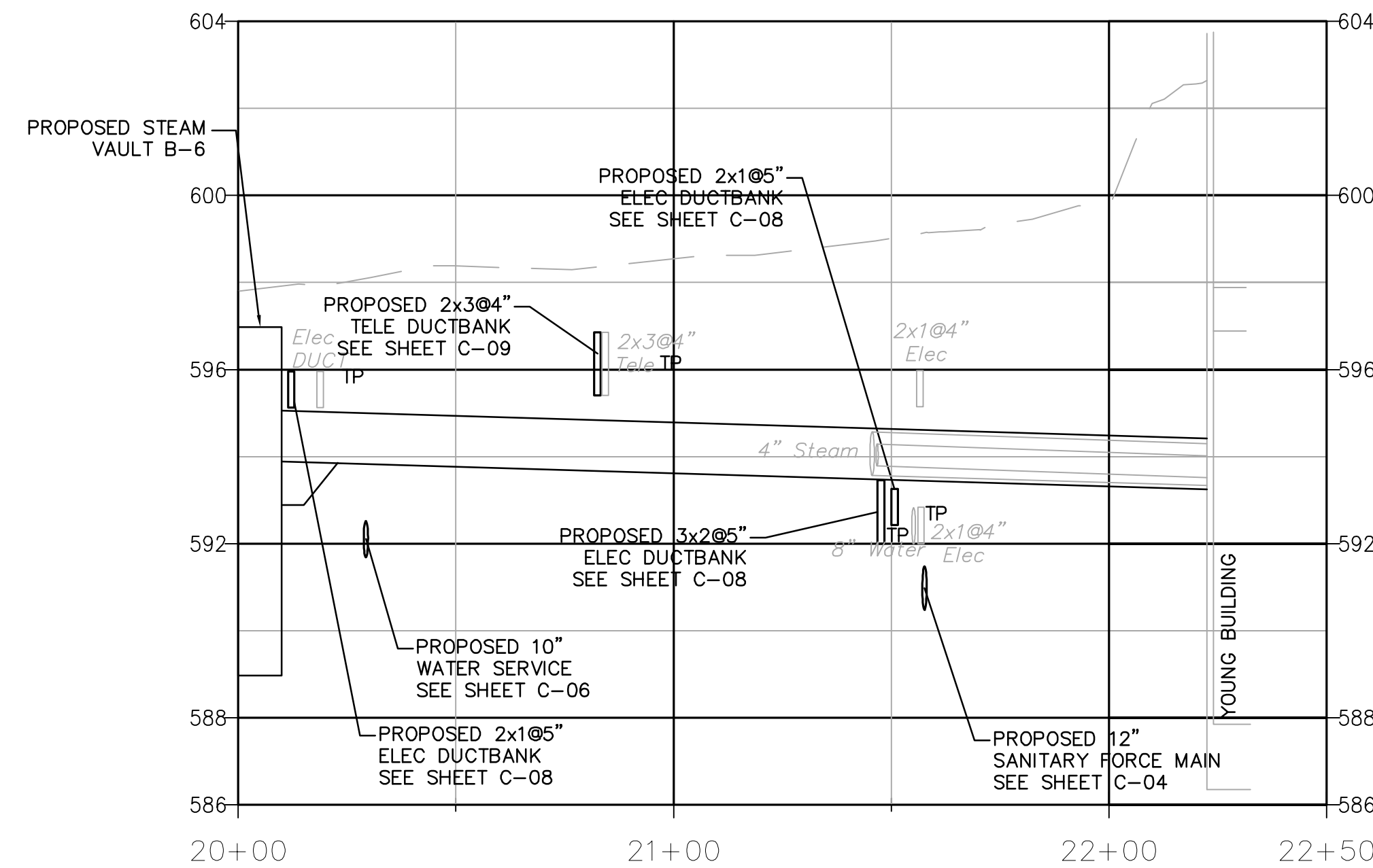
4" WATER TO HICKS ARENA



4" WATER TO YOUNG BUILDING



STEAM SOUTH VAULT TO GRANGE HALL



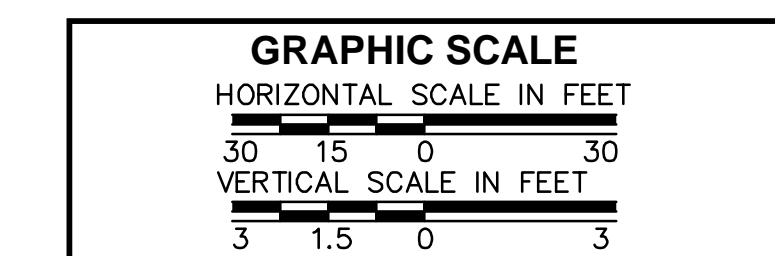
4" STEAM AND 2" CONDENSATE TO YOUNG BUILDING

NOTES:

1. UNDERGROUND UTILITY, STRUCTURE AND FACILITY LOCATIONS DEPICTED ON THE CONTRACT DRAWINGS HAVE BEEN COMPILED, IN PART, FROM RECORD MAPPING AND OTHER DATA SUPPLIED BY RESPECTIVE UTILITY COMPANIES, AND/OR OTHER SOURCES. THESE LOCATIONS MUST BE CONSIDERED APPROXIMATE IN NATURE. ADDITIONALLY, OTHER UTILITY AND UNDERGROUND FEATURES, WHICH ARE UNKNOWN TO AECOM, MAY EXIST ON THE SITE. THE PRESENCE, SIZE AND LOCATION OF ALL UNDERGROUND FEATURES MUST BE DETERMINED AND VERIFIED IN THE FIELD BY THE APPROPRIATE AUTHORITIES PRIOR TO CONSTRUCTION. THE CONTRACTOR SHALL REQUEST MARK OUT OF UTILITY LOCATION FROM THE UNIVERSITY AND CALL BEFORE YOU DIG (1-800-922-4455) AT LEAST 48 HOURS PRIOR TO ANY EXCAVATION OPERATION.
2. ALL BUILDING AND STRUCTURE ENTRY LOCATIONS AND ELEVATIONS ARE APPROXIMATE. THE CONTRACTOR SHALL CONFIRM ALL ENTRY LOCATIONS AND ELEVATIONS, AS WELL AS CONNECTION POINT LOCATIONS AND ELEVATIONS, PRIOR TO THE START OF WORK.
3. NOT ALL UTILITY CROSSINGS ARE SHOWN ON PROFILES FOR CLARITY PURPOSES. SEE SHEET C-03 FOR EXISTING AND PROPOSED UTILITY CROSSINGS. ELEVATIONS OF EXISTING UTILITIES ARE APPROXIMATE.

LEGEND:

TP PROVIDE TEST PIT TO CONFIRM LOCATION AND ELEVATION OF EXISTING UTILITY



CERTIFICATION:

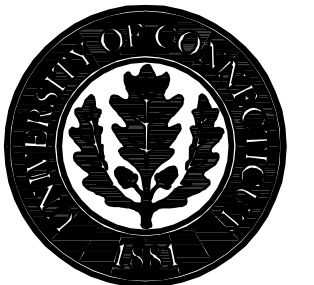
STATUS:
Not for Construction

CONSULTANT:

AECOM
500 ENTERPRISE DRIVE
ROCKY HILL, CT 06067
1-(860)-529-8882

REVISIONS:

MARK	DATE	DESCRIPTION



UNIVERSITY OF CONNECTICUT
PLANNING, ARCHITECTURAL & ENGINEERING SERVICES
31 LEDOYT ROAD UNIT 3038
STORRS, CONNECTICUT 06269-3038
TELEPHONE: (860) 486-3127
FACSIMILE: (860) 486-3177

PROJECT:

NORTH EAGLEVILLE ROAD AREA INFRASTRUCTURE REPAIR/REPLACEMENT PHASE II YOUNG QUAD UTILITIES

PROJECT NO: 901954

WORK ORDER NO:

FILE NAME:
P:\CIVIL\YOUNG QUAD\SHEETS\C-10

AUTHOR: PETER SAMMIS

DRAFTER: KEVIN MCKENNA

SCALE: AS NOTED

PRINT DATE: APRIL 21, 2015

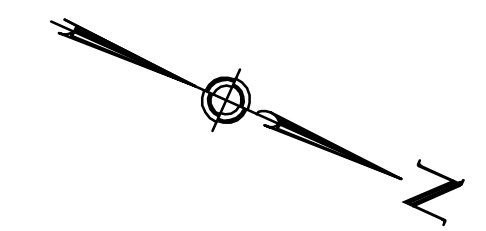
SHEET TITLE:

SUPPLEMENTAL UTILITY PROFILES

SHEET:

C-10

SHEET: _ of _



NOTES:

1. ALL WORK WITHIN DRIP LINES OF THE EXISTING TREES TO REMAIN SHALL BE REVIEWED BY LANDSCAPE ARBORIST AND RECOMMENDATIONS INCORPORATED INTO THE PROJECT. ALL WORK WITHIN THE DRIP LINES OF THE EXISTING TREES SHALL BE ACCOMPLISHED IN ACCORDANCE WITH THE REQUIREMENTS OF SECTION 02937-"TREE PROTECTION AND PRESERVATION".
2. SEE SHEET C-21 FOR LANDSCAPE DETAILS
3. AREAS OUTSIDE THE WORK LIMITS INCLUDING BUT NOT LIMITED TO DRIVEWAYS, ROADS, STAIRS, WALLS AND SIDEWALKS, THAT ARE DISTURBED BY CONSTRUCTION SHALL BE RETURNED TO THEIR ORIGINAL CONDITION OR BETTER AND SHALL BE GRADED TO MEET PROPOSED CONSTRUCTION AS DIRECTED BY THE ENGINEER. COST FOR THIS WORK SHALL BE BORNE BY THE CONTRACTOR AT NO ADDITIONAL COST TO THE UNIVERSITY.
4. ALL DISTURBED AREAS, NOT PROVIDED WITH SPECIFIC SURFACE IMPROVEMENTS (PAVING, SIDEWALK, LANDSCAPING, ETC.) SHALL HAVE TOPSOIL AND TURF ESTABLISHED IN ACCORDANCE WITH THE SPECIFICATIONS.
5. INTERSECTIONS OF ALL PROPOSED SIDEWALKS SHALL BE WITH 5' A MINIMUM RADIUS CONCRETE, UNLESS OTHERWISE NOTED,
6. SIDEWALKS LEADING TO STAIRS AND PLATFORMS SHALL BE SET IN ELEVATION TO ACHIEVE EQUAL RISER HEIGHTS ON STAIRS. SIDEWALKS SHALL BE DOWELED INTO THE BOTTOM OF STEPS WITH 1/2" EXPANSION JOINT BETWEEN SIDEWALK AND STAIRS.



CERTIFICATION:

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 500 ENTERPRISE DRIVE
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 PLANNING, ARCHITECTURAL & ENGINEERING SERVICES
 31 LEDOYT ROAD UNIT 3038
 STORRS, CONNECTICUT 06269-3038
 TELEPHONE: (860) 486-3127
 FACSIMILE: (860) 486-3177

PROJECT:

 NORTH EAGLEVILLE ROAD AREA
 INFRASTRUCTURE REPAIR/REPLACEMENT
 PHASE II
 YOUNG QUAD UTILITIES

PROJECT NO: 901954
 WORK ORDER NO:
 FILE NAME:
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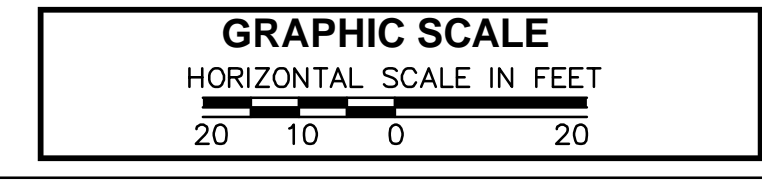
AUTHOR: PETER SAMMIS
 DRAFTER: KEVIN MCKENNA
 SCALE: AS NOTED
 PRINT DATE: APRIL 21, 2015
 SHEET TITLE:

GRADING PLAN

SHEET:

C-11

SHEET: _ of _





NOTES:

1. SEE SHEET C-25 FOR STRUCTURAL DETAILS.
2. MATCH EXISTING SURFACE GRADES UNLESS OTHERWISE NOTED.
3. ALL AREAS NOT PROVIDED WITH SPECIFIC SURFACE IMPROVEMENTS (PAVING, SIDEWALK, LANDSCAPING) SHALL HAVE TOPSOIL AND TURF ESTABLISHED IN ACCORDANCE WITH THE SPECIFICATIONS.
4. SEE SHEET C-3 FOR ADDITIONAL UNDERGROUND UTILITY WORK IN THE HICKS ARENA AREA.

CERTIFICATION:

STATUS
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AECOM
500 ENTERPRISE DRIVE
ROCKY HILL, CT 06067
1-(860)-529-8882

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31 LEDOYT ROAD UNIT 3038
STORRS, CONNECTICUT 06269-3038
TELEPHONE: (860) 486-3127
FACSIMILE: (860) 486-3177

PROJECT:

NORTH EAGLEVILLE ROAD AREA
INFRASTRUCTURE REPAIR/REPLACEMENT
PHASE II
YOUNG QUAD UTILITIES

PROJECT NO: 901954

WORK ORDER NO:

FILE NAME:
P:\GIVELY\YOUNG QUAD\SHEETS\C-13

AUTHOR: PETER SAMMIS

DRAFTER: KEVIN MCKENNA

SCALE: AS NOTED

PRINT DATE: APRIL 21, 2015

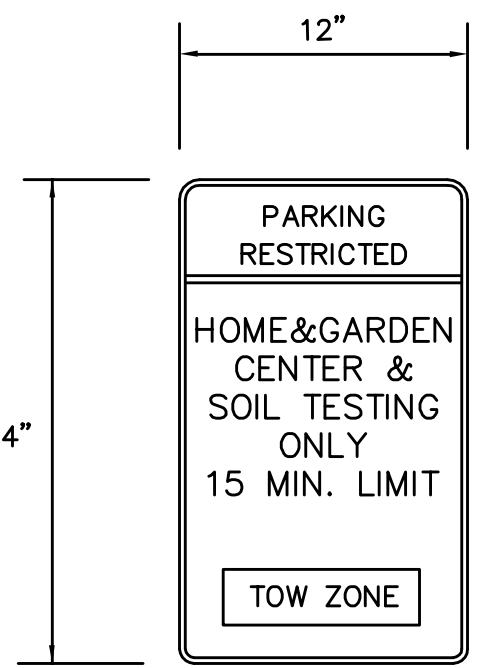
SHEET TITLE:

**HICKS ARENA
SITE PLAN**

SHEET:

C-13

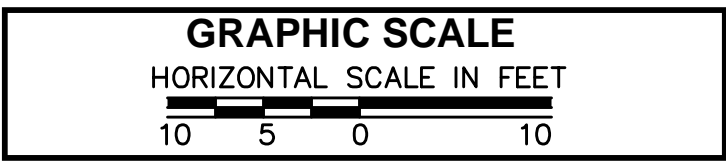
SHEET: _ of _



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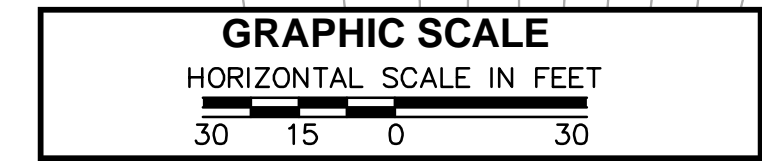
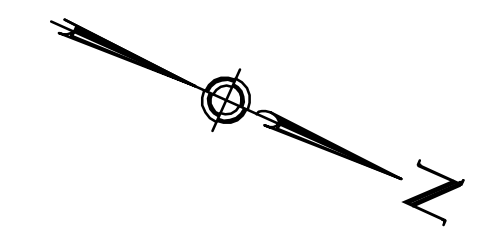
NOTE:
SEE SIGN AND MOUNTING
DETAIL SHEET C-27

**SIGN DETAIL
NTS**



SOIL EROSION AND SEDIMENTATION CONTROL NOTES

1. CONTRACTOR SHALL CONTACT "CALL BEFORE YOU DIG" (1-800-922-4455) AND UCONN, OFFICE OF FACILITIES AT LEAST 48 HOURS PRIOR TO ANY FILL OR EXCAVATION OPERATION.
2. IMPLEMENTATION OF ALL SEDIMENTATION AND EROSION CONTROL MEASURES SHALL CONFORM TO THE CONTRACT DRAWINGS AND SPECIFICATIONS OR TO THE CTDEEP "CONNECTICUT GUIDELINES FOR SOIL EROSION AND SEDIMENT CONTROL," REVISED 2002, WHICHEVER IS MORE STRINGENT.
3. CONSTRUCTION ENTRANCES, PERIMETER SEDIMENTATION BARRIERS AND PROTECTION AT EXISTING INLETS SHALL BE INSTALLED PRIOR TO ANY EXCAVATION (INCLUDING THE REMOVAL OF STUMPS).
4. IT IS THE INTENT OF THESE PLANS TO SHOW THE INITIAL SOIL EROSION AND SEDIMENTATION CONTROL MEASURES REQUIRED. ACTUAL LOCATIONS OF CONTROLS MAY CHANGE AS CONSTRUCTION PROCEEDS. THE CONTRACTOR SHALL BE RESPONSIBLE FOR PROVIDING ADDITIONAL CONTROL MEASURES AS REQUIRED OR AS DIRECTED BY THE OWNER'S REPRESENTATIVE.
5. SEE SHEET C-22 FOR ADDITIONAL SOIL EROSION AND SEDIMENTATION CONTROL NOTES AND DETAILS.
6. USE OF A TYPE 1 PUMPING SETTLING BASIN SHALL BE REQUIRED AS DIRECTED BY THE ENGINEER DURING CONSTRUCTION ACTIVITIES, FOR DEWATERING OPERATIONS.
7. THE CONTRACTOR SHALL COMPLY WITH ALL REQUIREMENTS OF THE CTDEEP GENERAL PERMIT FOR THE DISCHARGE OF STORMWATER AND DEWATERING WASTEWATERS FROM CONSTRUCTION ACTIVITIES, INCLUDING BUT NOT LIMITED TO THE STORMWATER POLLUTION CONTROL PLAN PREPARED FOR THIS PROJECT.



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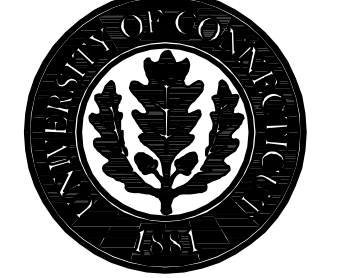
STATUS:
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CONSULTANT:

AECOM
500 ENTERPRISE DRIVE
ROCKY HILL, CT 06067
1-(860)-529-8882

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31 LEDOYT ROAD UNIT 3038
STORRS, CONNECTICUT 06269-3038
TELEPHONE: (860) 486-3127
FACSIMILE: (860) 486-3177

PROJECT:

NORTH EAGLEVILLE ROAD AREA
INFRASTRUCTURE REPAIR/REPLACEMENT
PHASE II
YOUNG QUAD UTILITIES

PROJECT NO: 901954

WORK ORDER NO:

FILE NAME:
P:\CIVIL\YOUNG QUAD\SHEETS\C-14

AUTHOR: PETER SAMMIS

DRAFTER: KEVIN MCKENNA

SCALE: AS NOTED

PRINT DATE: APRIL 21, 2015

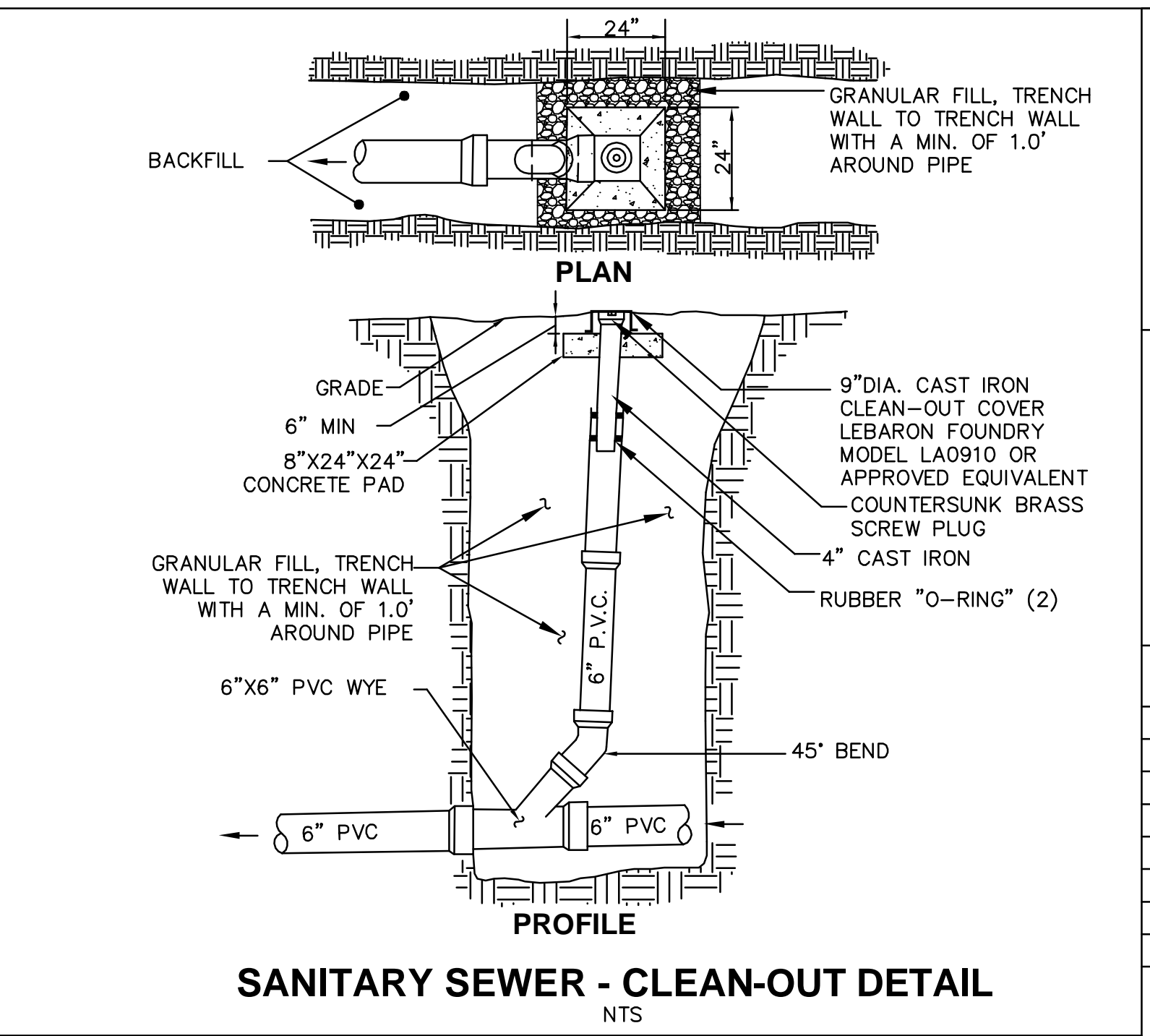
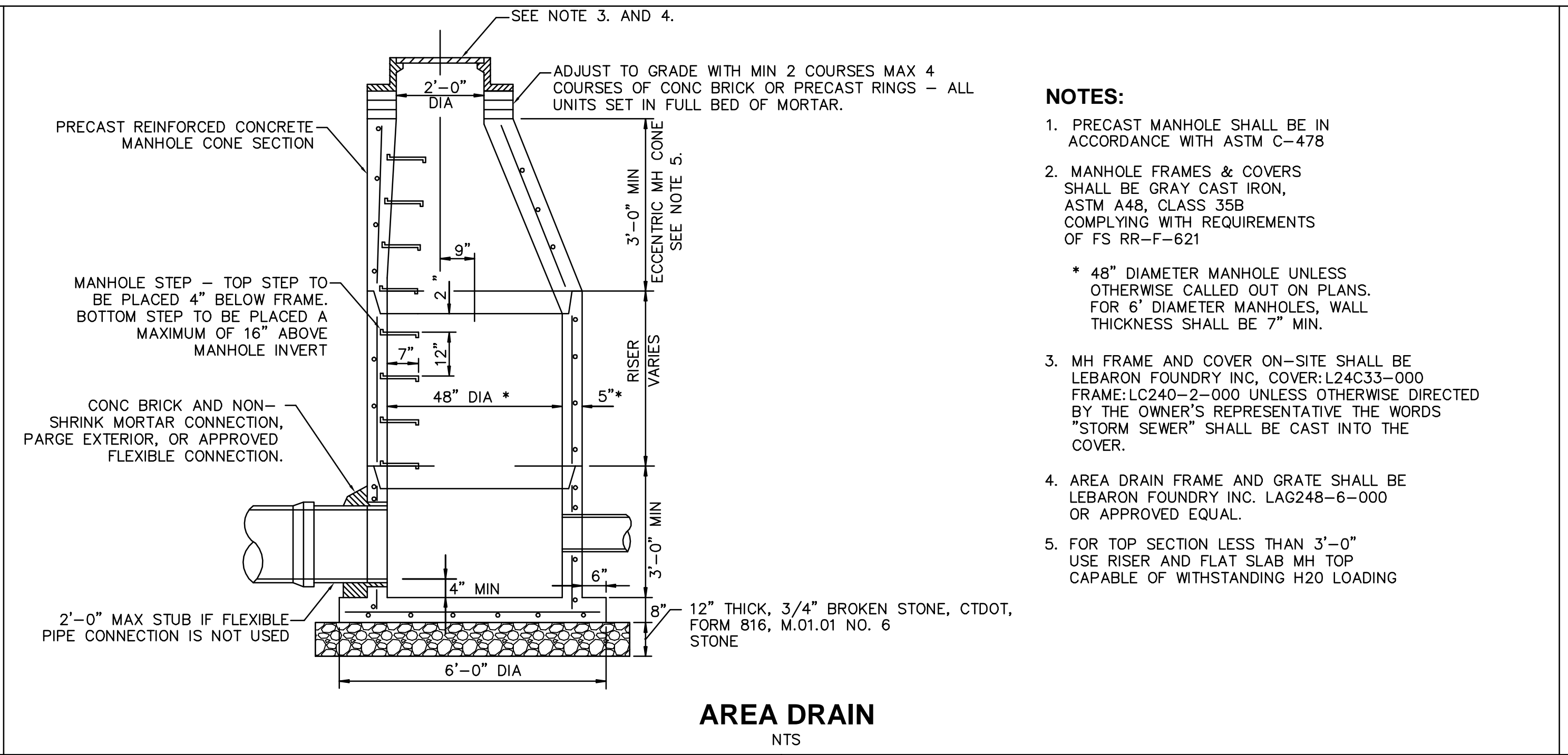
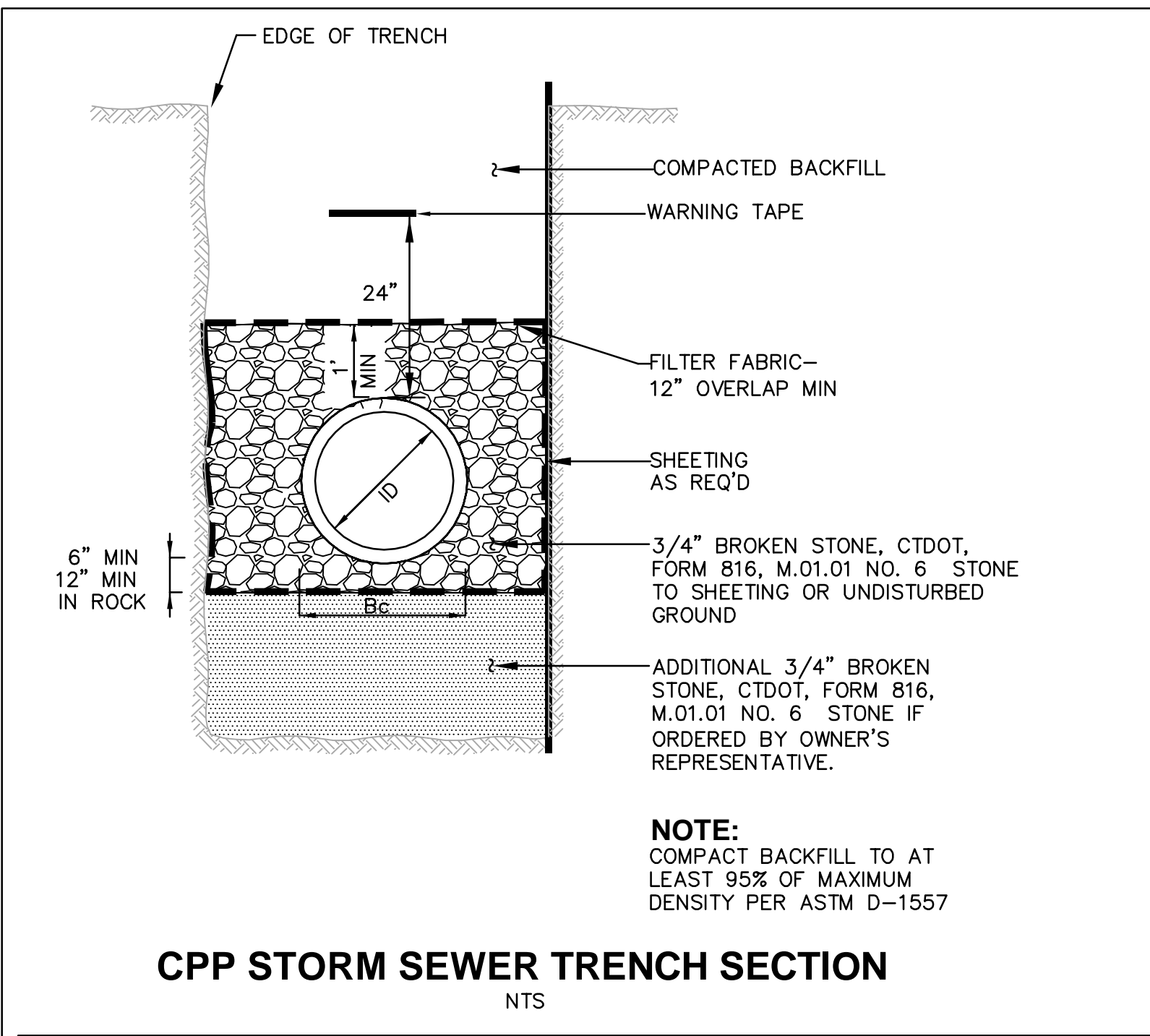
SHEET TITLE:

SOIL EROSION AND SEDIMENTATION CONTROL PLAN

SHEET:

C-14

SHEET: _ of _



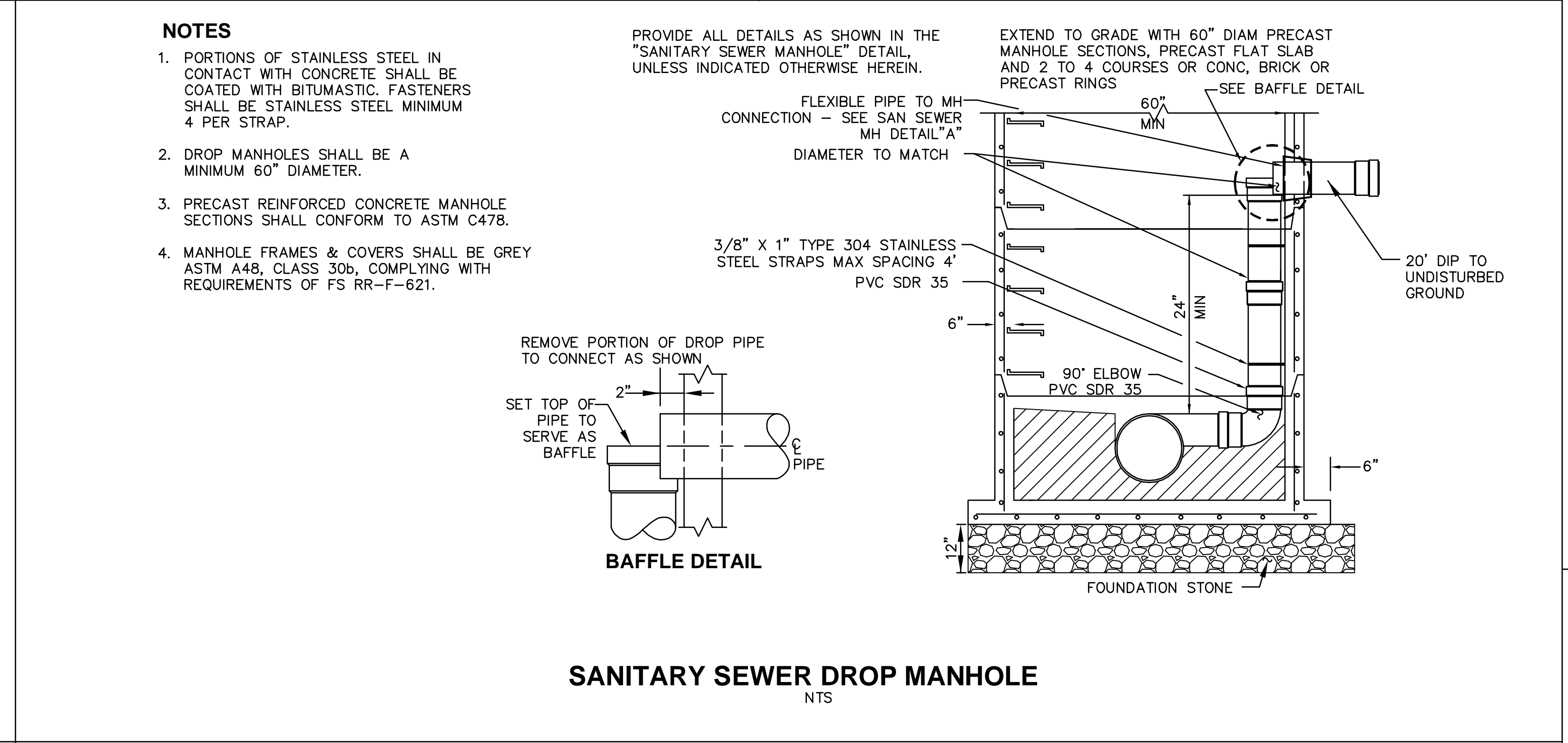
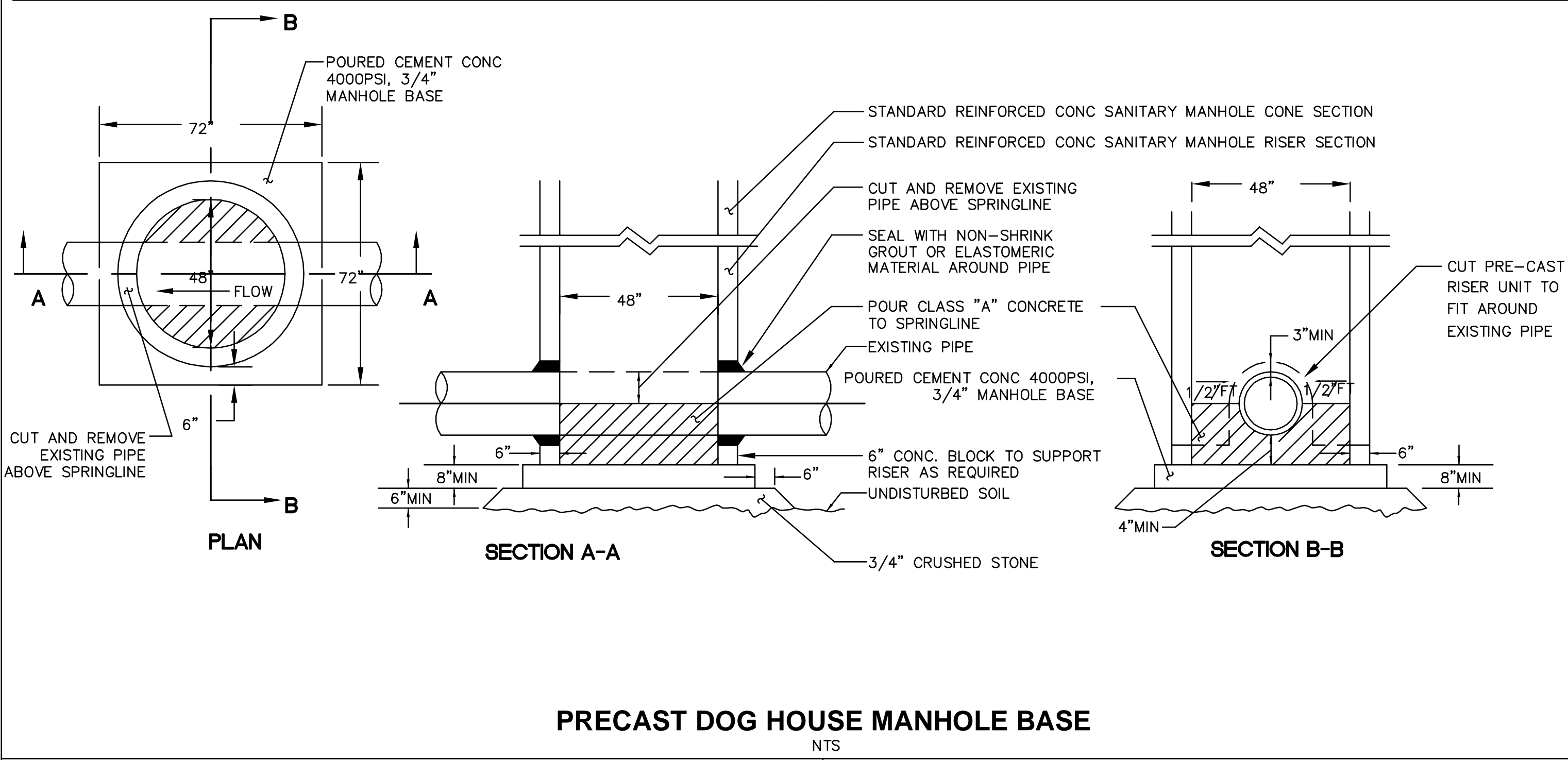
CERTIFICATION:

STATUS:
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AECOM
500 ENTERPRISE DRIVE
ROCKY HILL, CT 06067
1-(860)-529-8882

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PLANNING, ARCHITECTURAL & ENGINEERING SERVICES

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STORRS, CONNECTICUT 06269-3038
TELEPHONE: (860) 486-3127
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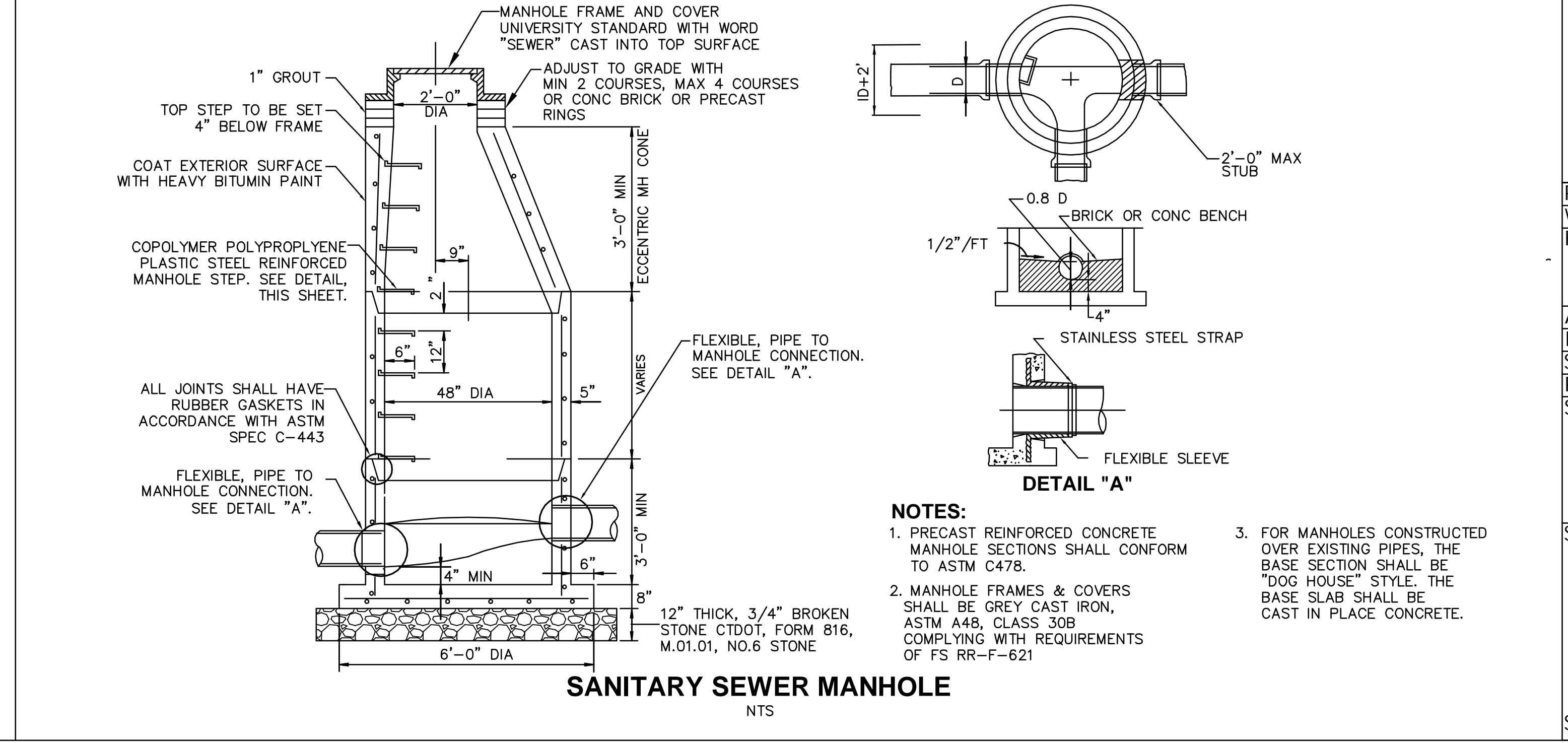
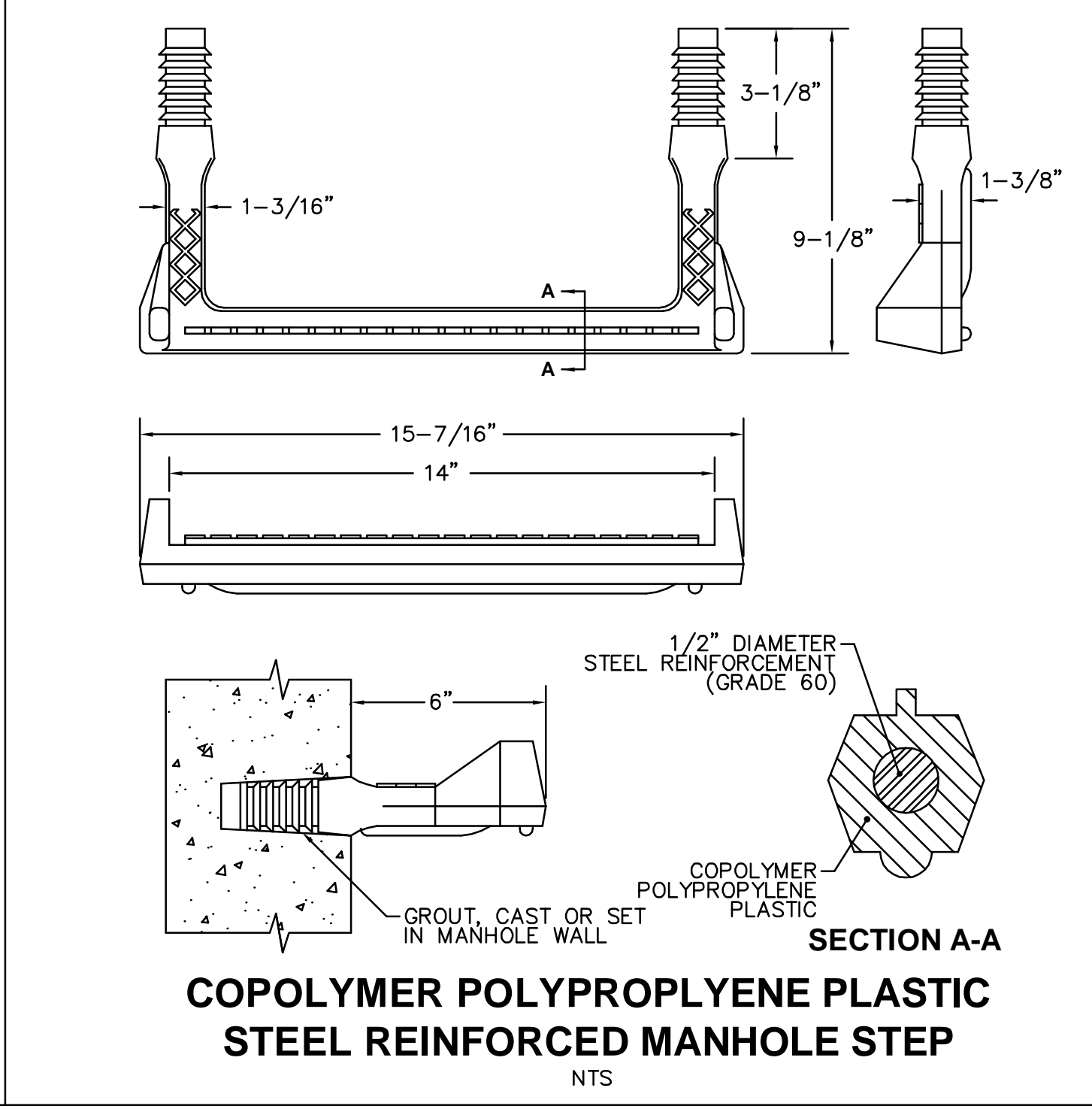
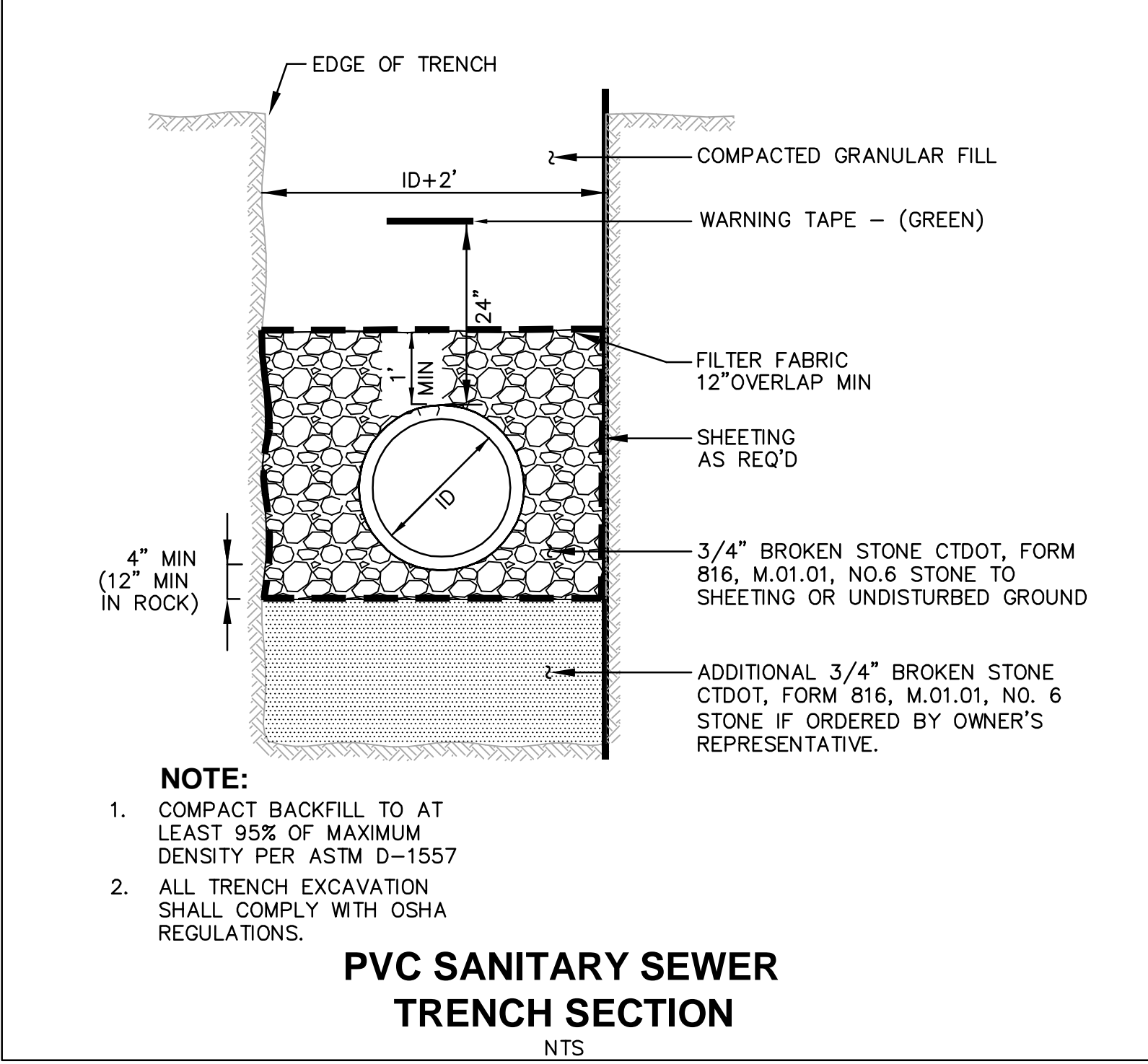
PROJECT:

NORTH EAGLEVILLE ROAD AREA
INFRASTRUCTURE REPAIR/REPLACEMENT
PHASE II
YOUNG QUAD UTILITIES

PROJECT NO: 901954
WORK ORDER NO:
FILE NAME:
P:\CIVIL\YOUNG QUAD\SHEETS\C-16

AUTHOR: PETER SAMMIS
DRAFTER: KEVIN MCKENNA
SCALE: AS NOTED
PRINT DATE: APRIL 21, 2015
SHEET TITLE:
SANITARY AND STORM SEWER DETAILS

SHEET: _____ of _____

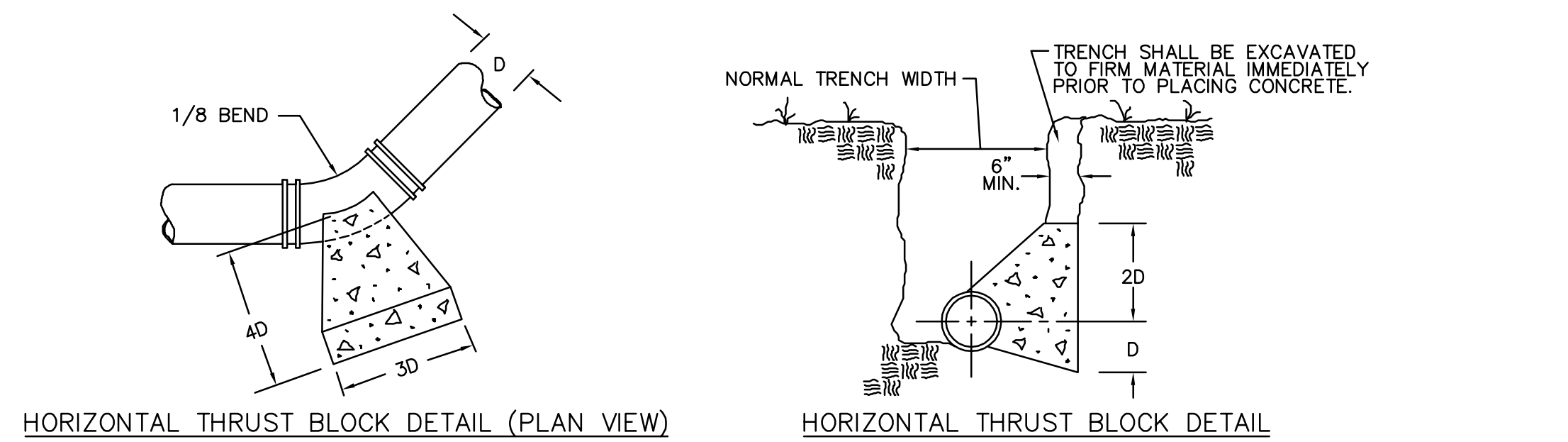


PROJECT NO: 901954
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P:\CIVIL\YOUNG QUAD\SHEETS\C-16

AUTHOR: PETER SAMMIS
DRAFTER: KEVIN MCKENNA
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SANITARY AND STORM SEWER DETAILS

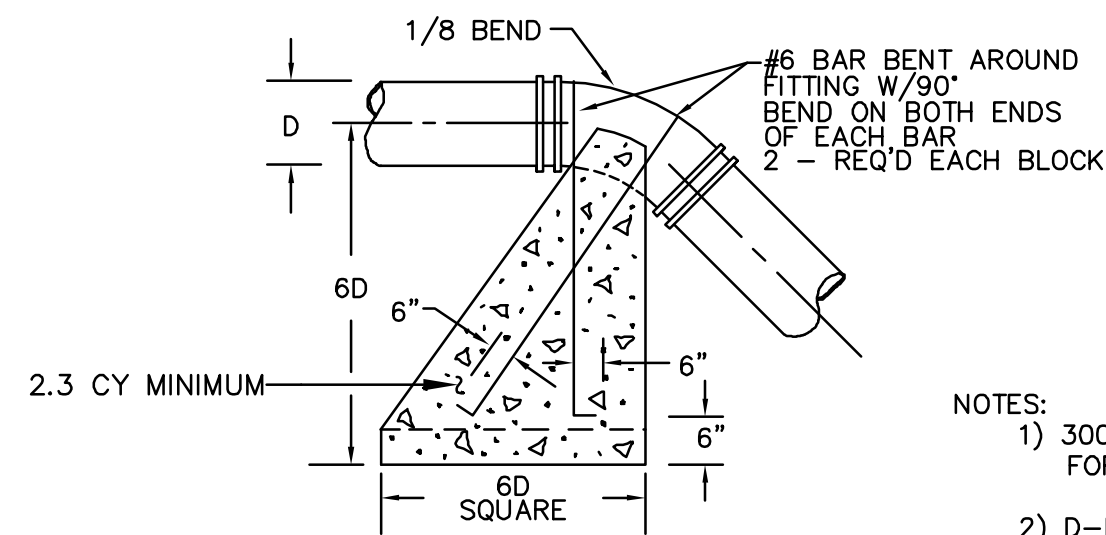
SHEET: _____ of _____

C-16



HORIZONTAL THRUST BLOCK DETAIL (PLAN VIEW)

HORIZONTAL THRUST BLOCK DETAIL

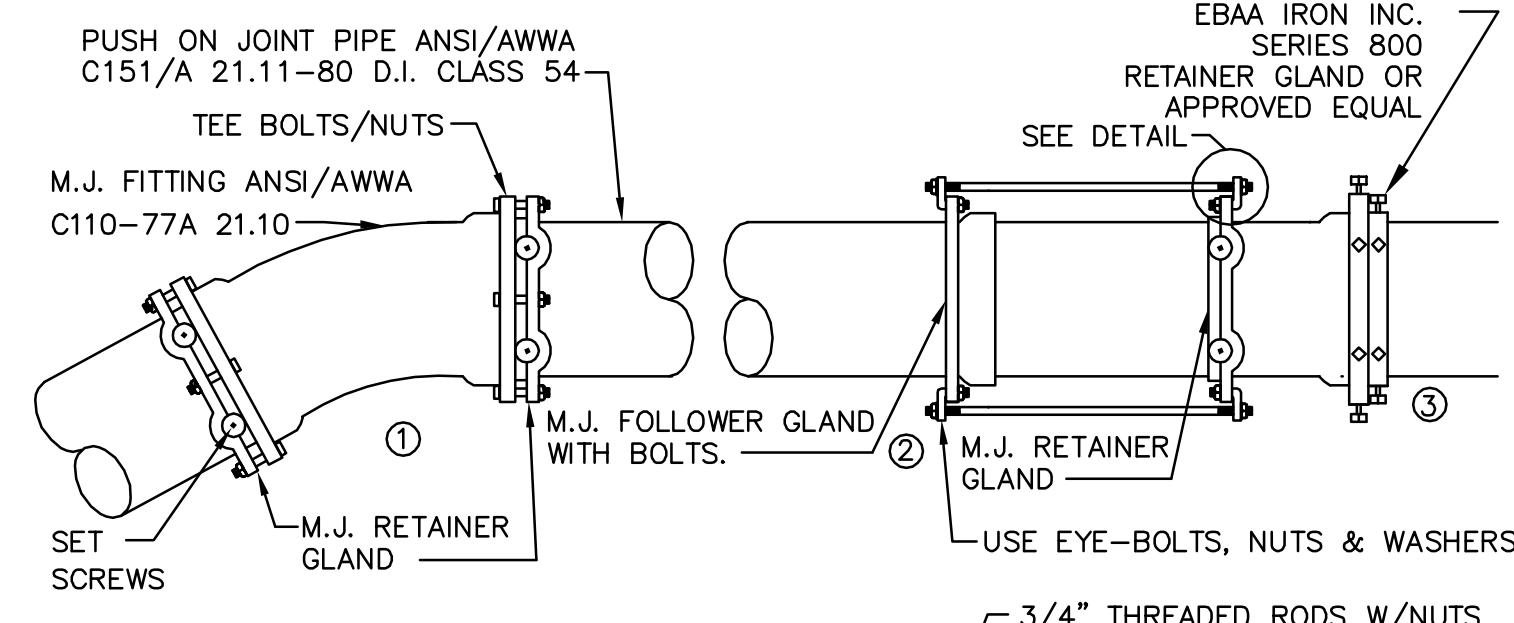


VERTICAL THRUST BLOCK DETAIL

THRUST BLOCK DETAILS

NTS

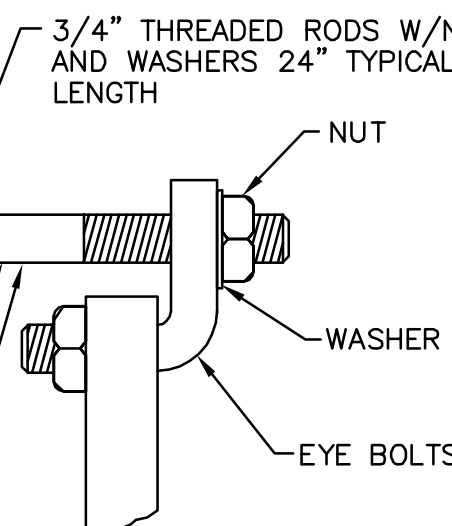
- NOTES:
- 3000 PSI CONCRETE TO BE USED FOR THRUST BLOCKS.
 - D-DIAMETER OF WATER MAIN.
 - THE OUTSIDE OF ALL THRUST BLOCKS SHALL BE POURED AGAINST UNDISTURBED EARTH.



THRUST RESTRAINT-RESTRAINED JOINT METHODS

- MECHANICAL JOINT RETAINER GLANDS
- PUSH-ON JOINT RESTRAINT USING MECHANICAL JOINT RETAINER GLANDS AND LACING
- PUSH-ON JOINT RETAINER GLANDS

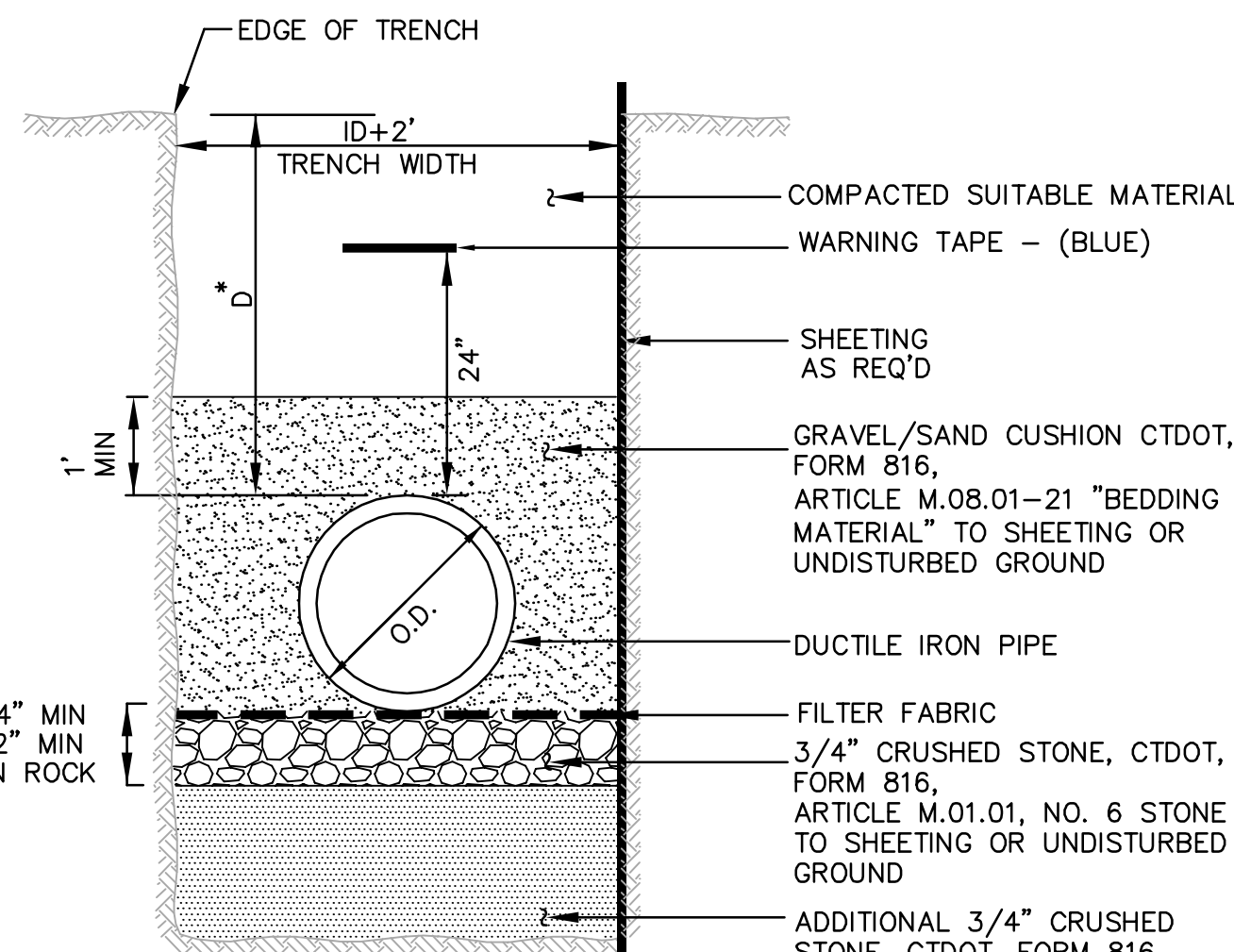
ALL LACING RODS SHALL RECEIVE TWO-COATS OF RUST INHIBITING PAINT AFTER ASSEMBLY



DETAIL

TYPICAL WATER MAIN RESTRAINED JOINT

NTS



NOTE
COMPACT BACKFILL TO AT LEAST 95% OF MAXIMUM DENSITY PER ASTM D-1557

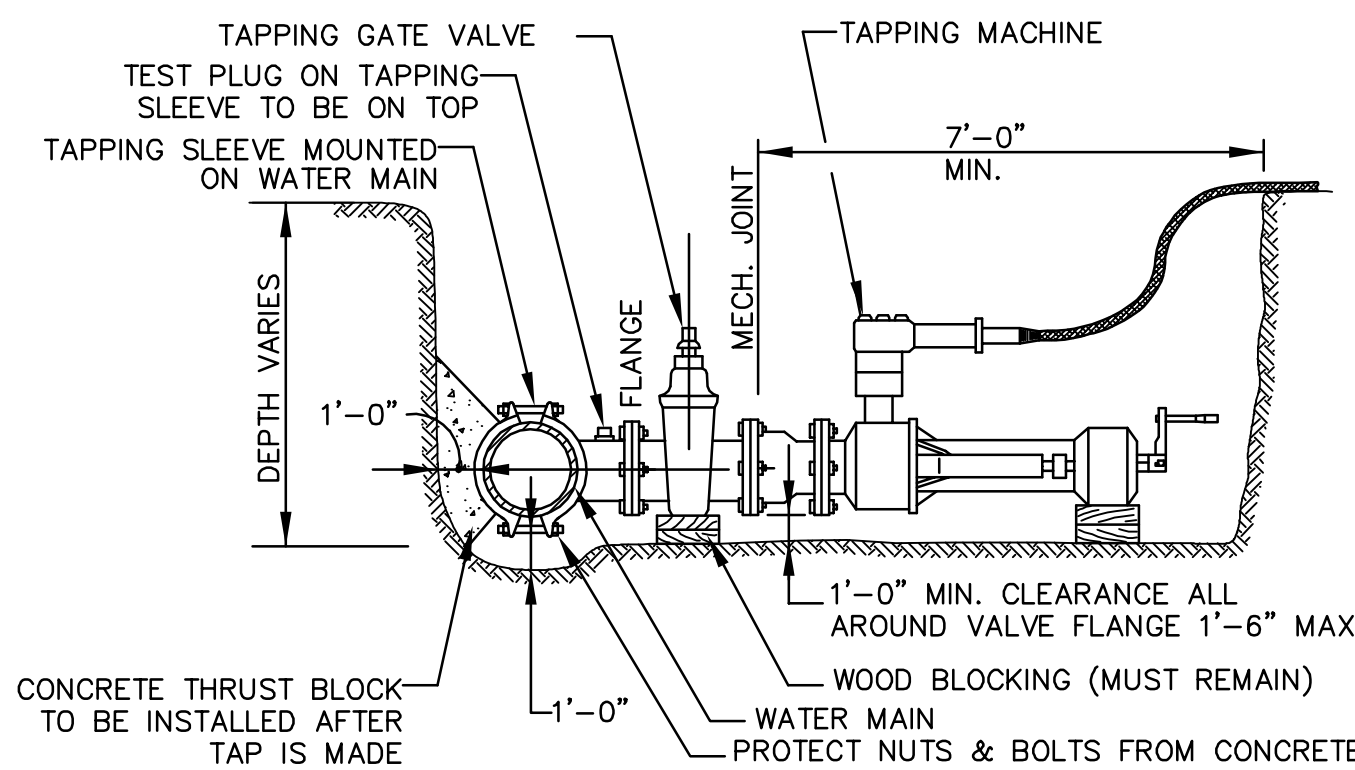
* MINIMUM DEPTH OF COVER SHALL BE 4.5 FEET OVER PROPOSED DOMESTIC SUPPLY WATER MAIN AND 5 FEET FOR PROPOSED FIRE PROTECTION MAIN.

TYPICAL DIP WATER MAIN TRENCH

NTS

WATER MAIN INSTALLATION NOTES

- AFTER PLACING APPROXIMATELY 2 FEET OF BACKFILL MATERIAL OVER ALL UTILITY PIPING, THE CONTRACTOR SHALL PLACE A 6" WIDE STRIP OF DURABLE, COLOR CODED (BLUE FOR WATER) UNDERGROUND UTILITY IDENTIFICATION TAPE IMPRINTED WITH AN APPROPRIATE WARNING INDICATING THE PRESENCE OF THE BURIED UTILITY.
- WHEN CROSSING A SEWER, WATER MAIN JOINTS SHALL BE SPACED A MINIMUM OF 9' FROM THE INTERSECTION WITH THE SEWER.
- ALL VALVES SHALL BE MECHANICAL JOINTS, SHALL OPEN-LEFT (COUNTER-CLOCKWISE), AND SHALL BE INSTALLED IN A SLIDE TYPE GATE BOX COMPLETE WITH COVER.
- CONTRACTOR SHALL EXCAVATE TEST PITS AT LOCATIONS SHOWN ON THE CONTRACT DRAWINGS WELL IN ADVANCE OF PIPE LAYING OPERATIONS TO CHECK FOR POSSIBLE CONFLICTS AND SUBSEQUENT METHODS OF REMEDY, AS DETERMINED BY THE OWNER'S REPRESENTATIVE, SHOULD CONFLICTS EXIST. ALL COST FOR TEST PITS SHALL BE INCLUDED IN THE PRICE BID FOR THE CONTRACT
- ALL JOINTS SHALL BE RESTRAINED WITH RETAINER GLANDS (MEGALUG SERIES 1100, MANUFACTURED BY EBAA IRON SALES, INC. OR APPROVED EQUIVALENT).
- ALL FITTINGS SHALL BE MECHANICAL JOINT WITH RETAINER GLANDS IN EACH DIRECTION. ALL FOLLOWER GLANDS SHALL BE REPLACED WITH RETAINER GLANDS.
- INSTALLATION OF DUCTILE IRON PIPE, FITTINGS, BLOW-OFFS, PIPE SUPPORTS AND APPURTENANCES SHALL BE IN ACCORDANCE WITH THE UNIVERSITY STANDARDS.
- THE WATER MAIN SHALL BE DUCTILE IRON PIPE CLASS 54, POLYETHYLENE ENCASED LINED, WITH DOUBLE THICKNESS CEMENT MORTAR, IN ACCORDANCE WITH ANSI/AWWA C151/A21.51-81, AND SPECIFICATIONS INCLUDED IN THIS CONTRACT.
- ALL EXISTING STRUCTURES, INCLUDING BUT NOT LIMITED TO SANITARY SEWERS, LATERALS, STORM SEWERS, CATCH BASINS, MANHOLES, UTILITY POLES, STEAM AND CONDENSATE PIPING, ELECTRICAL AND TELE-COMMUNICATION CONDUIT, WHICH DURING THE EXECUTION WILL BE CONSIDERED BY THE OWNER'S REPRESENTATIVE AS BEING DISTURBED OR DAMAGED BY THE WATER MAIN INSTALLATION SHALL BE RESTORED OR REPLACED BY THE CONTRACTOR IN ACCORDANCE WITH THE TECHNICAL SPECIFICATIONS WHICH GOVERNED THE CONSTRUCTION OF THAT STRUCTURE AND TO THE SATISFACTION OF THE AUTHORITY HAVING JURISDICTION AND/OR THE OWNER'S REPRESENTATIVE. ALL COSTS FOR SUCH WORK, INCLUDING TEMPORARY RELOCATION OF THE FOREMENTIONED STRUCTURES, SHALL BE CONSIDERED AS HAVING BEEN INCLUDED IN THE LUMP SUM CONTRACT PRICE.
- ANY DEFLECTION OF THE WATER MAIN SHALL BE MADE ACCORDING TO THE RECOMMENDATIONS CONTAINED IN THE DUCTILE IRON PIPE RESEARCH ASSOCIATION STANDARDS.
- UNDERGROUND UTILITY, STRUCTURE AND FACILITY LOCATIONS DEPICTED ON THE CONTRACT DRAWINGS HAVE BEEN COMPILED, IN PART, FROM RECORD MAPPING AND OTHER DATA SUPPLIED BY RESPECTIVE UTILITY COMPANIES, AND/OR OTHER SOURCES. THESE LOCATIONS MUST BE CONSIDERED APPROXIMATE IN NATURE. ADDITIONALLY, OTHER UTILITY AND UNDERGROUND FEATURES, WHICH ARE UNKNOWN TO AECOM, MAY EXIST ON THE SITE. THE PRESENCE, SIZE AND LOCATION OF ALL UNDERGROUND FEATURES MUST BE DETERMINED AND VERIFIED IN THE FIELD BY THE APPROPRIATE AUTHORITIES PRIOR TO CONSTRUCTION. THE CONTRACTOR SHALL REQUEST MARK OUT OF UTILITY LOCATION FROM THE UNIVERSITY AND CALL BEFORE YOU DIG (1-800-922-4455) AT LEAST 48 HOURS PRIOR TO ANY EXCAVATION OPERATION.
- MINIMUM DEPTH OF COVER OVER PROPOSED DOMESTIC WATER MAIN SHALL BE 4.5 FEET.
- MINIMUM DEPTH OF COVER OVER PROPOSED FIRE PROTECTION MAIN SHALL BE 5.0 FEET.
- ALL INSTALLED WATER MAIN SHALL BE TESTED ACCORDING TO THE SPECIFICATIONS. TEST PRESSURE FOR THE WATER MAIN IS 200 PSI.
- SEE SHEET C-17 FOR INSTALLATION DETAIL OF WATER MAIN THROUGH EXISTING FOUNDATION WALL.



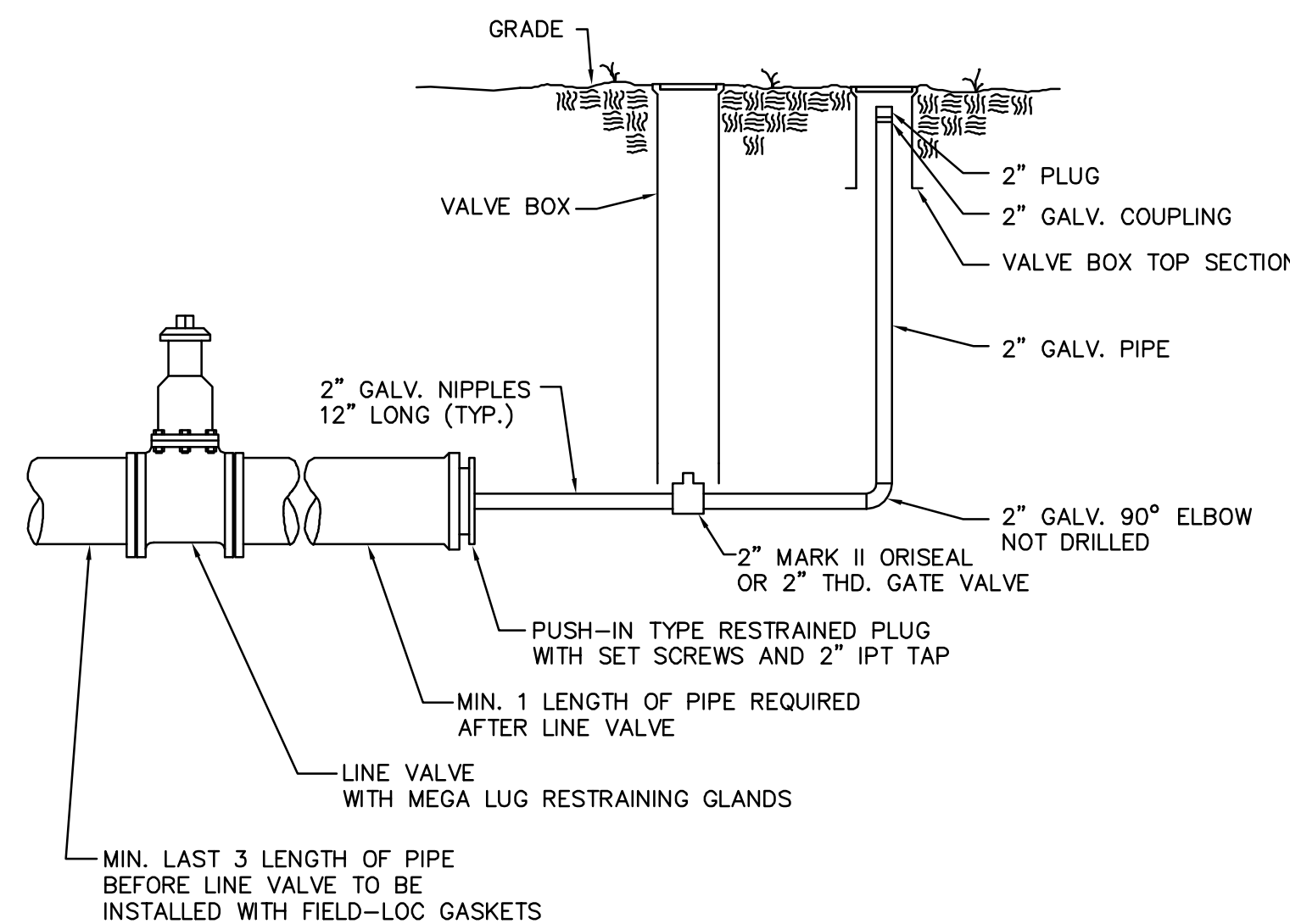
NOTES:

- TAPPING SLEEVE & TAPPING GATE VALVE TO BE INSTALLED ON WATER MAIN BY THE CONTRACTOR. THE CONTRACTOR SHALL TEST THE INSTALLATION PRIOR TO MAKING TAP. NO TAP WILL BE PERMITTED IF THERE IS NO TEST PLUG.
- TAPPING GATE VALVE OPEN LEFT AS DIRECTED BY THE UNIVERSITY. IF VALVE HAND OF OPERATION IS NOT CORRECT, NO TAP WILL BE PERMITTED.
- TRENCH TO BE DEWATERED AND IN COMPLIANCE WITH OSHA REQUIREMENTS FOR TRENCH EXCAVATION.

TRENCH REQUIREMENTS FOR MAKING 4 INCH TO 12 INCH TAP ON WATER MAIN

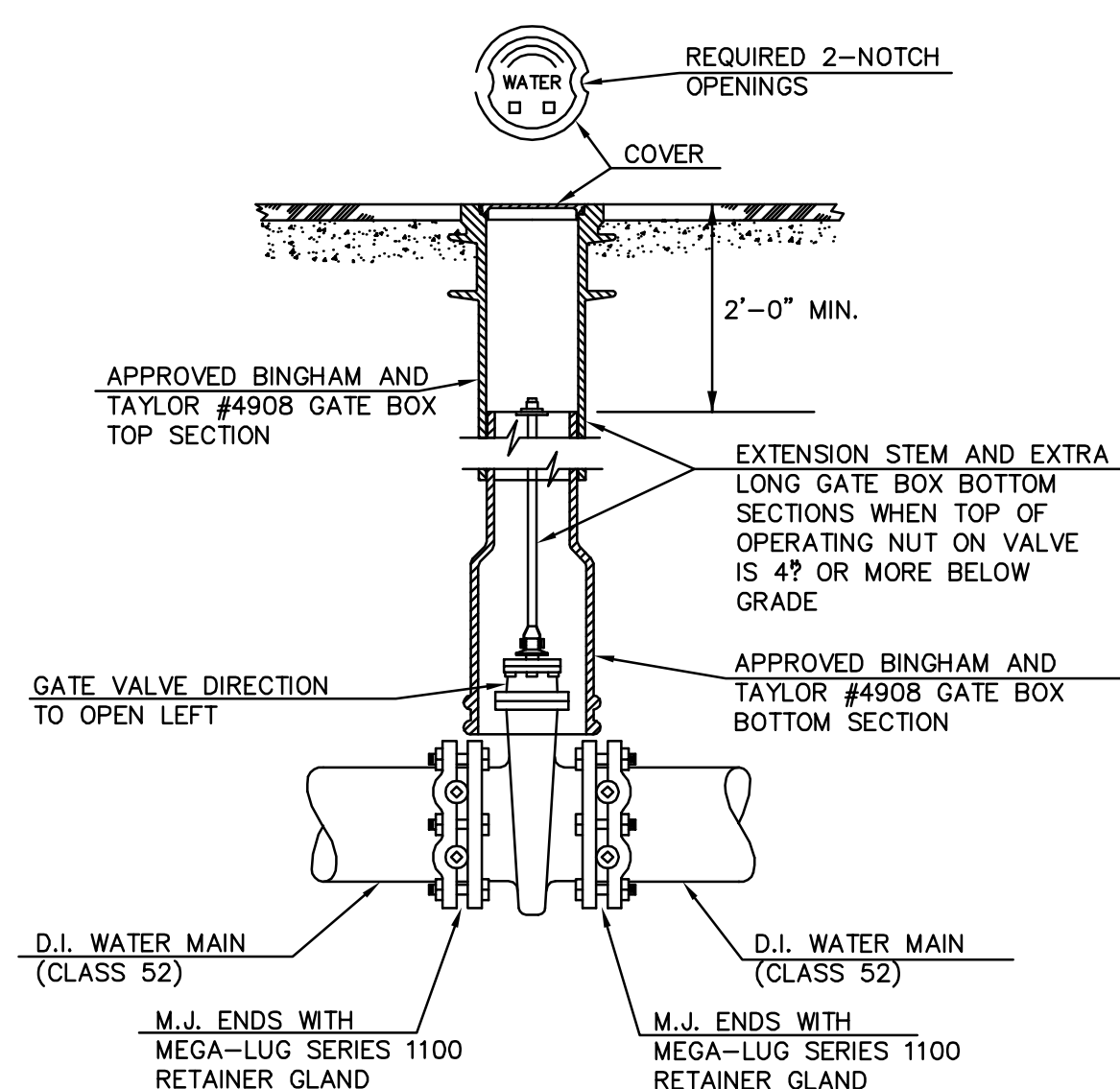
NTS

- NOTES:
- IF BLOW-OFF IS NOT REQUIRED, STANDARD PUSH IN PLUG OR CAP CAN BE INSTALLED WITH A THRUST BLOCK.
 - VALVE BOX AT BLOW-OFF VALVE CAN BE REPLACED WITH A CURB BOX AT THE INSPECTOR'S OPTION.
 - NO SERVICE CONNECTIONS BETWEEN LINE VALVE AND BLOW-OFF ASSEMBLY.



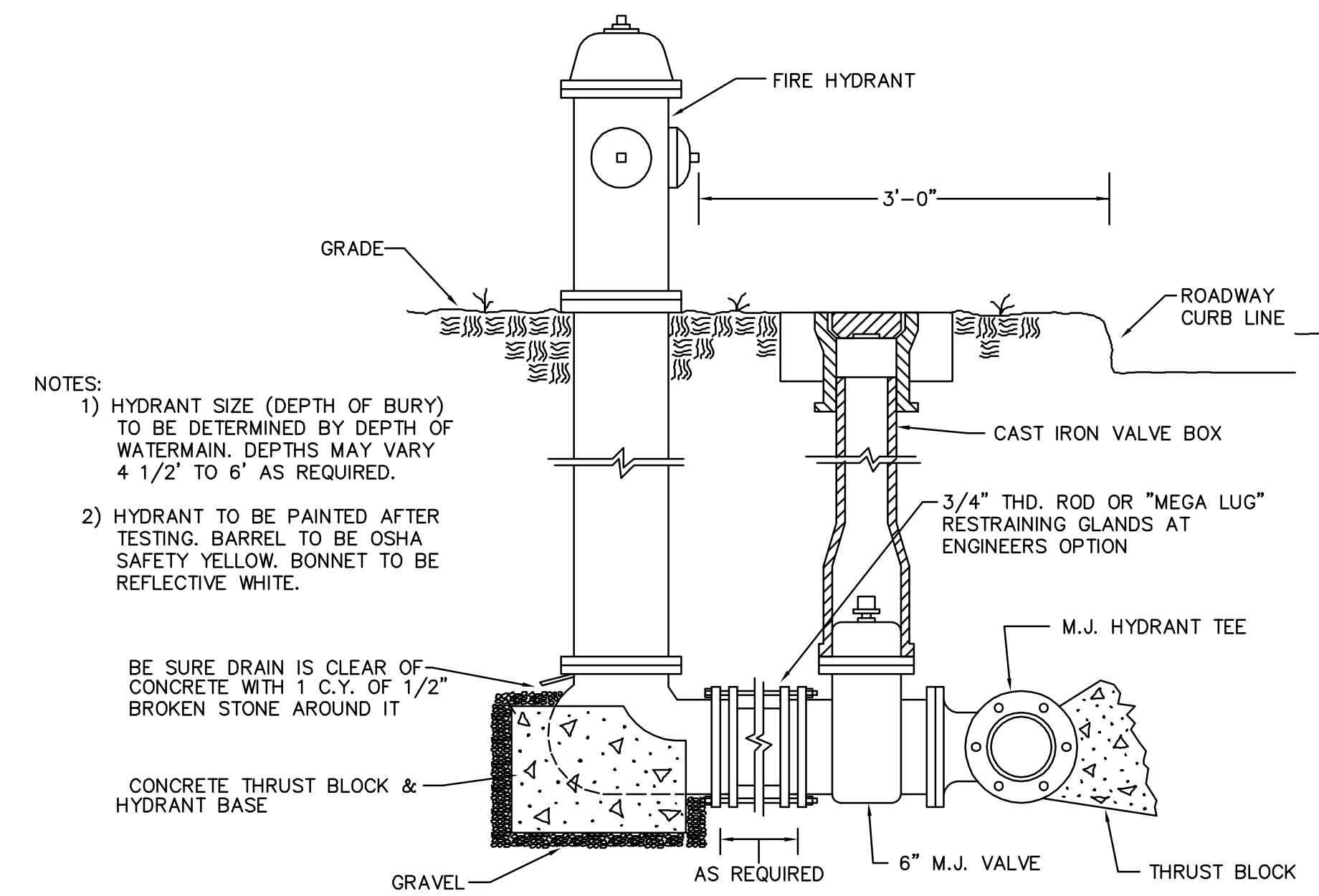
DEAD END BLOW-OFF DETAIL 4" - 12" WATER MAINS

NTS



TYPICAL GATE VALVE INSTALLATION 12" & SMALLER

NTS



- NOTES:
- HYDRANT SIZE (DEPTH OF BURY) TO BE DETERMINED BY DEPTH OF WATERMAIN. DEPTHS MAY VARY 4 1/2' TO 6' AS REQUIRED.
 - HYDRANT TO BE PAINTED AFTER TESTING. BARREL TO BE OSHA SAFETY YELLOW. BONNET TO BE REFLECTIVE WHITE.

BE SURE DRAIN IS CLEAR OF CONCRETE WITH 1 C.Y. OF 1/2" BROKEN STONE AROUND IT

CONCRETE THRUST BLOCK & HYDRANT BASE

HYDRANT INSTALLATION DETAIL

NTS

CERTIFICATION:

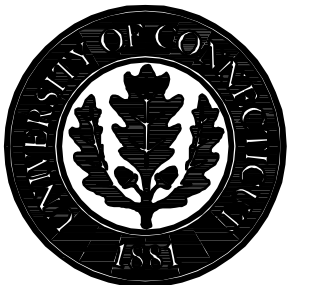
STATUS:
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CONSULTANT:

AECOM
500 ENTERPRISE DRIVE
ROCKY HILL, CT 06067
1-(860)-529-8882

REVISIONS:

MARK	DATE	DESCRIPTION



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PLANNING, ARCHITECTURAL & ENGINEERING SERVICES
31 LEDOYT ROAD UNIT 3038
STORRS, CONNECTICUT 06269-3038
TELEPHONE: (860) 486-3127
FACSIMILE: (860) 486-3177

PROJECT:

NORTH EAGLEVILLE ROAD AREA
INFRASTRUCTURE REPAIR/REPLACEMENT
PHASE II
YOUNG QUAD UTILITIES

PROJECT NO: 901954

WORK ORDER NO:

FILE NAME:
P:\CIVIL\YOUNG QUAD\SHEETS\C-17

AUTHOR: PETER SAMMIS

DRAFTER: KEVIN MCKENNA

SCALE: AS NOTED

PRINT DATE: APRIL 21, 2015

SHEET TITLE:

WATER MAIN DETAILS

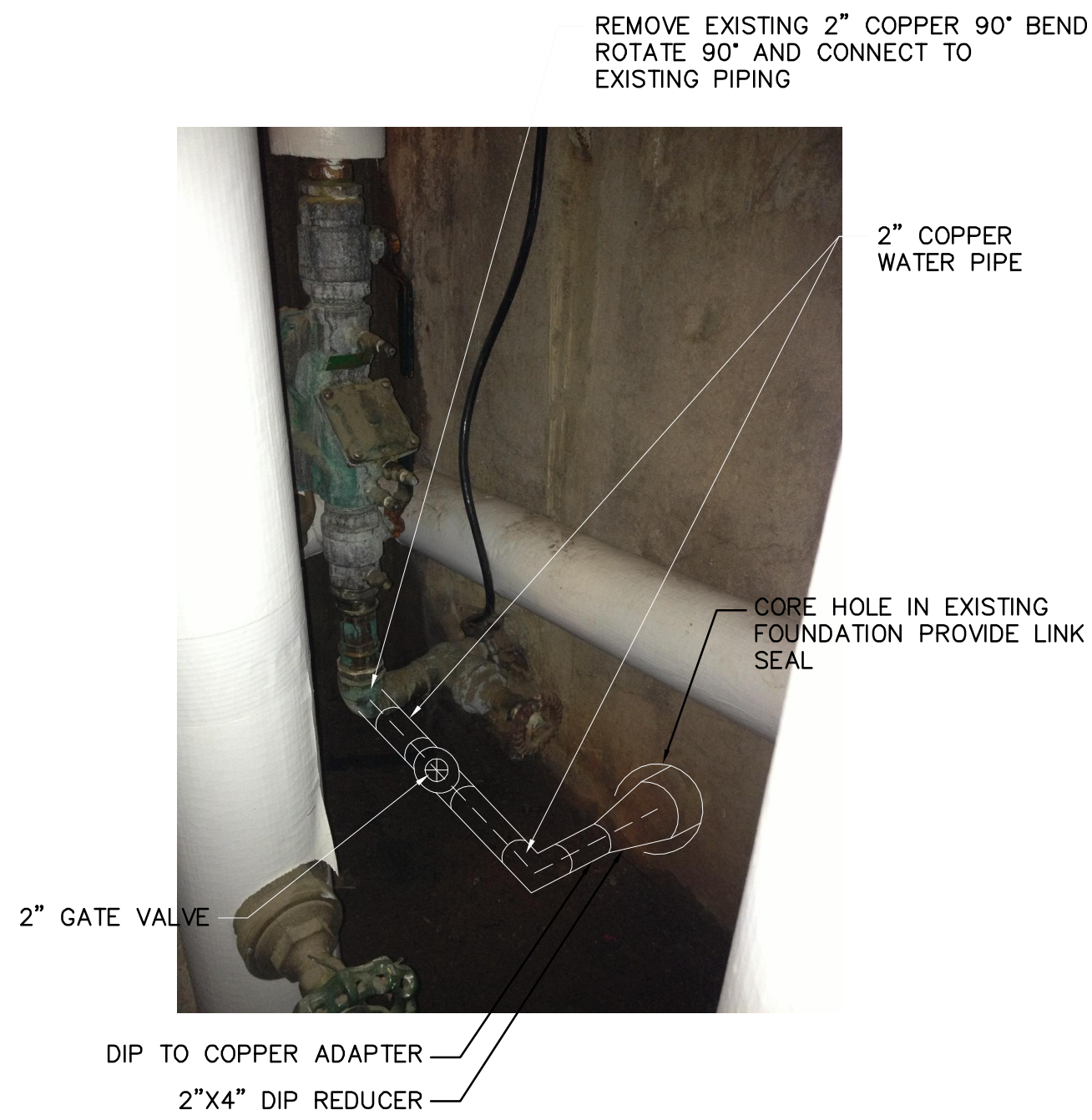
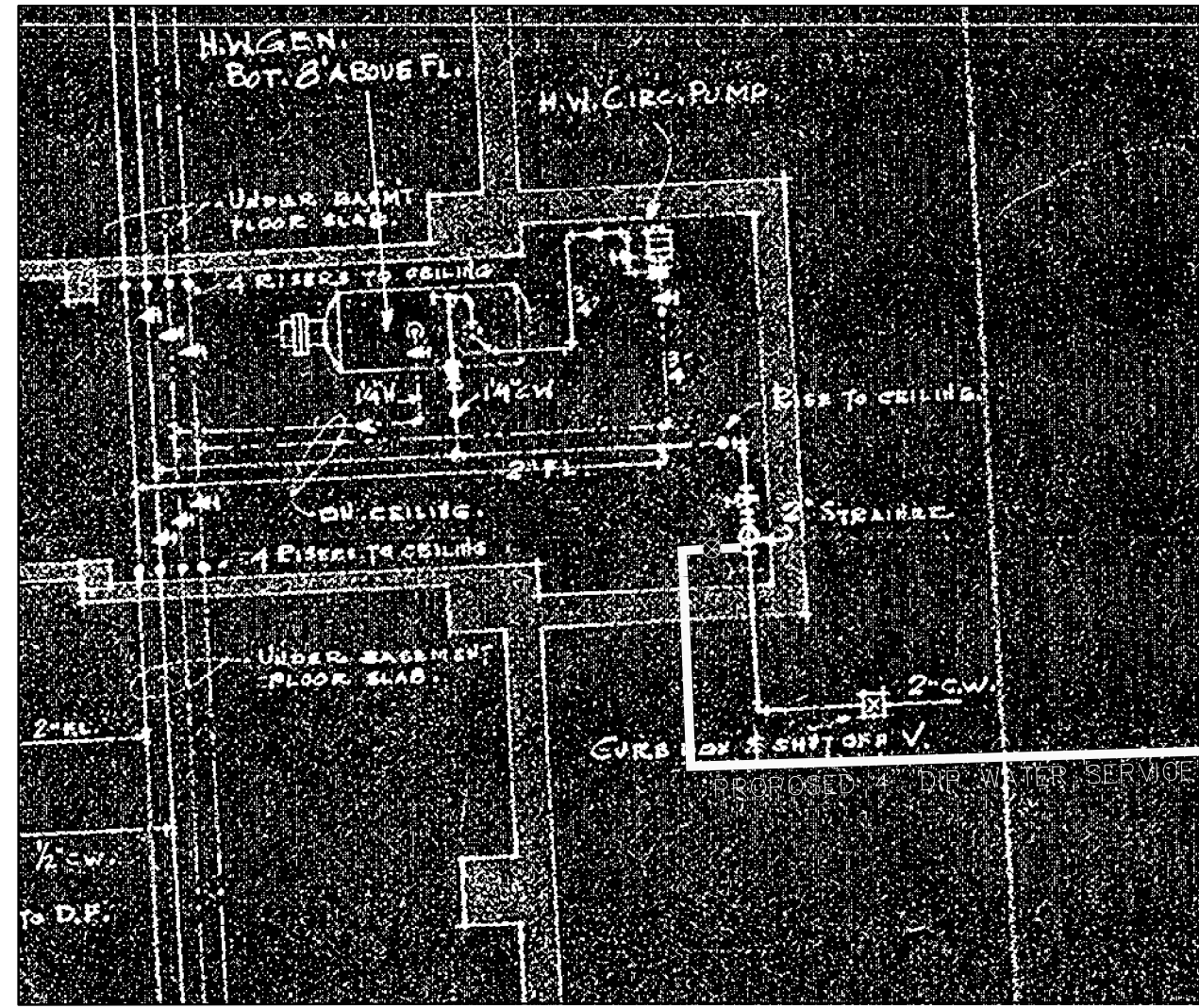
SHEET:

C-17

SHEET: ___ of ___

NOTES:

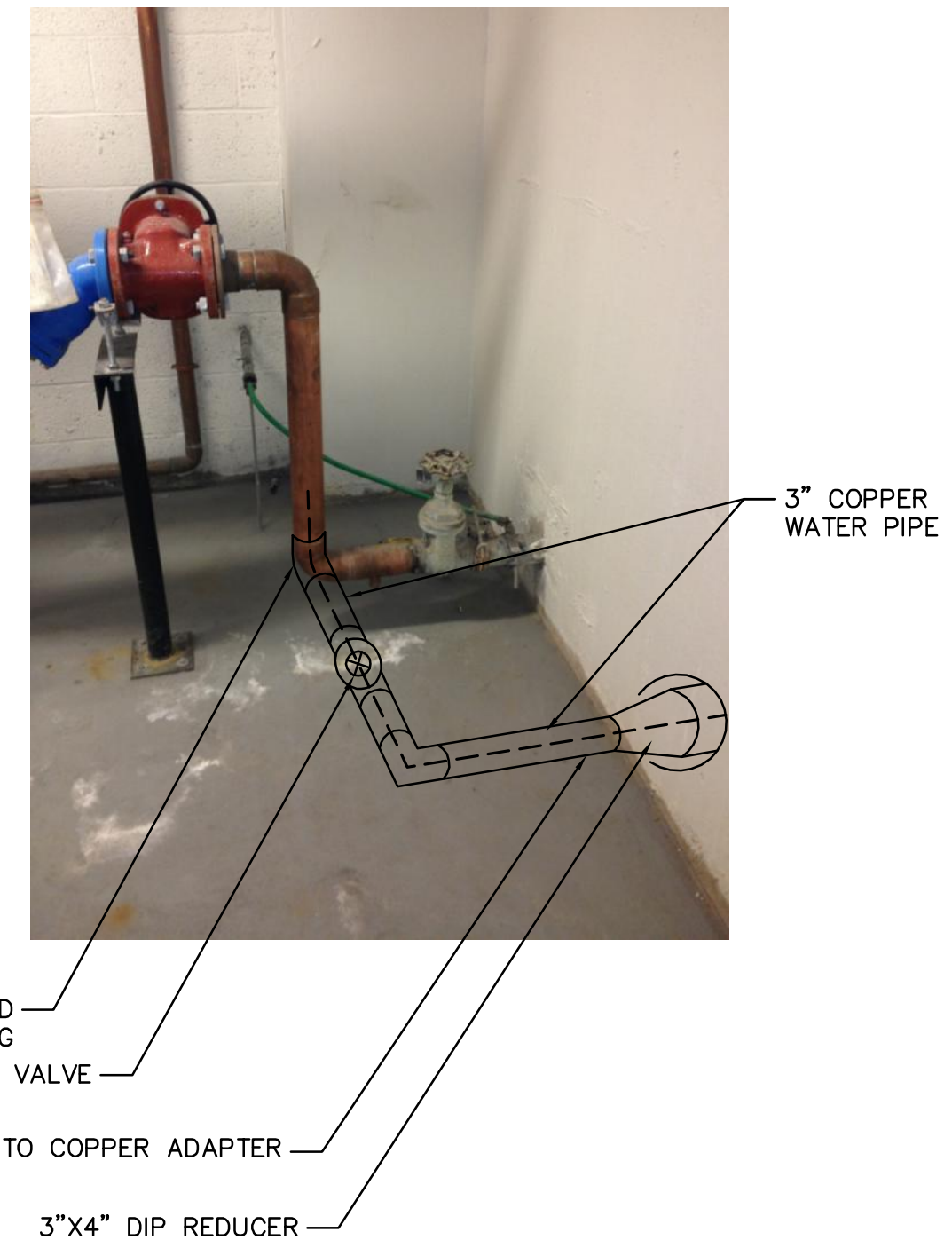
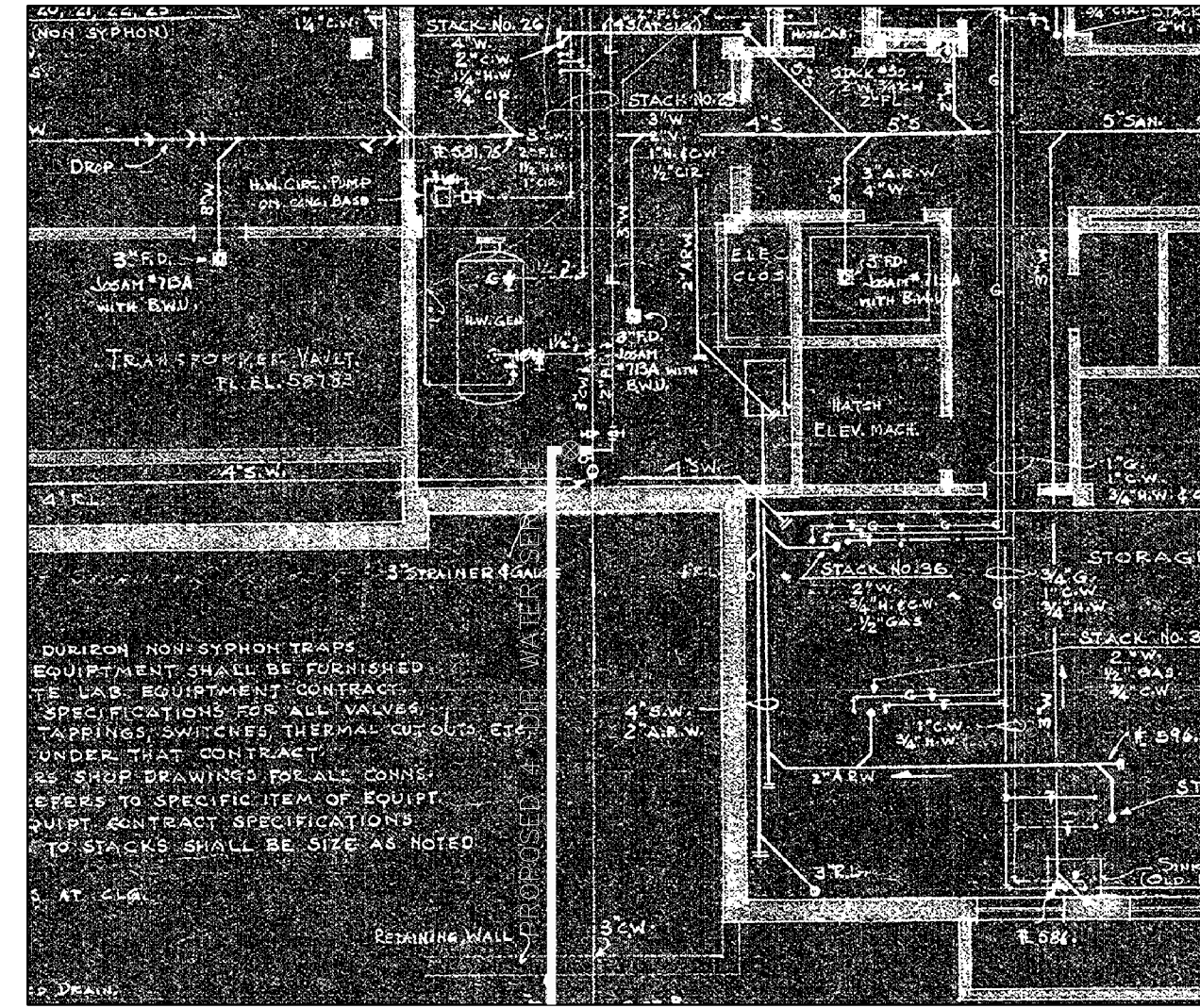
1. SEE SHEET C-25 FOR INSTALLATION DETAIL OF WATER MAIN THROUGH EXISTING FOUNDATION WALL.
2. PROVIDE HANGERS AND SUPPORTS AS REQUIRED.
3. ALL BUILDING AND STRUCTURE ENTRY LOCATIONS AND ELEVATIONS ARE APPROXIMATE. THE CONTRACTOR SHALL CONFIRM ALL ENTRY LOCATIONS AND ELEVATIONS, AS WELL AS CONNECTION POINT LOCATIONS AND ELEVATIONS, PRIOR TO THE START OF WORK.



HICKS ARENA

NOTES:

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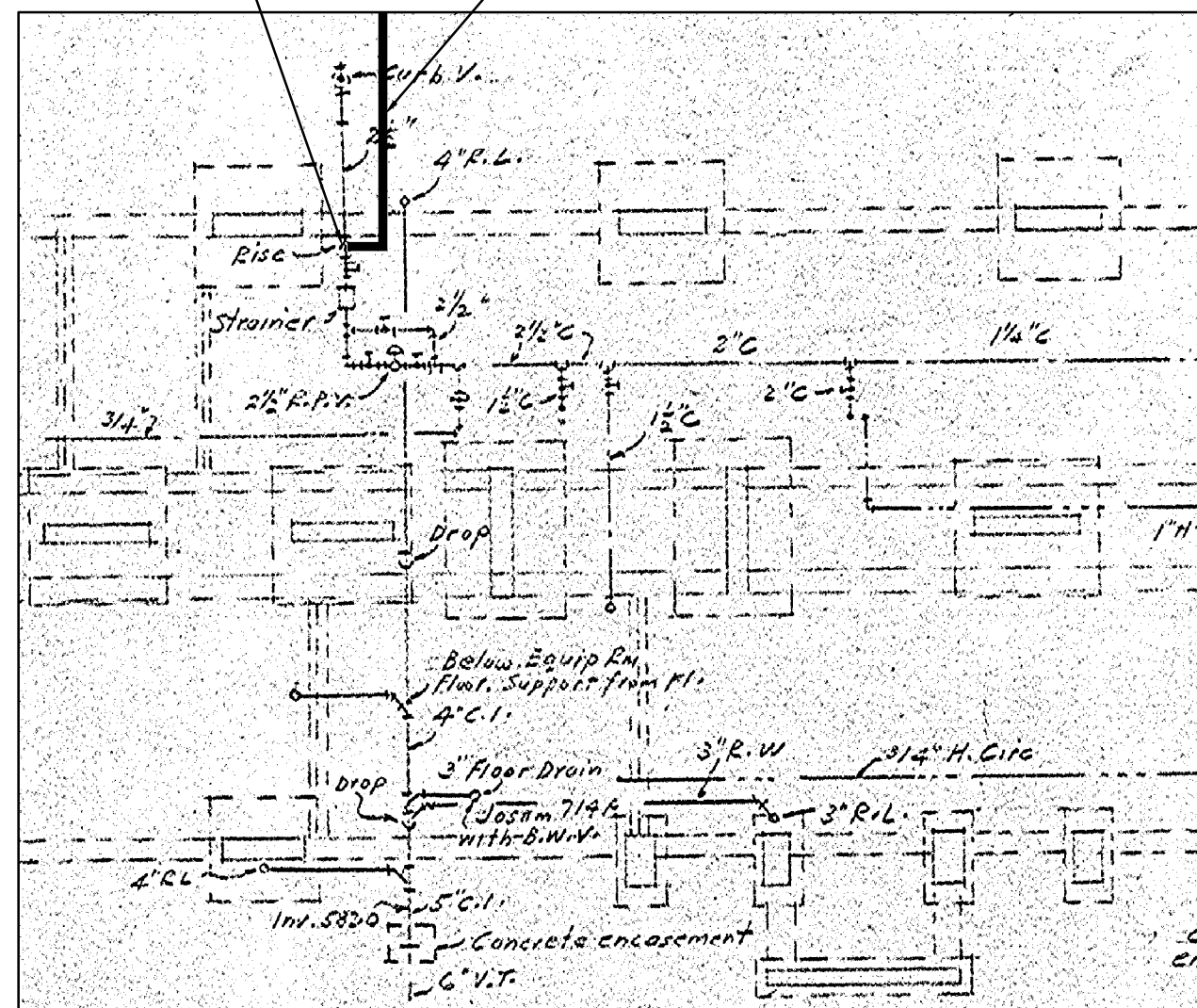
YOUNG BUILDING

NOTES:

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REMOVE EXISTING 2.5" COPPER 90° BEND CONNECT TO EXISTING PIPING

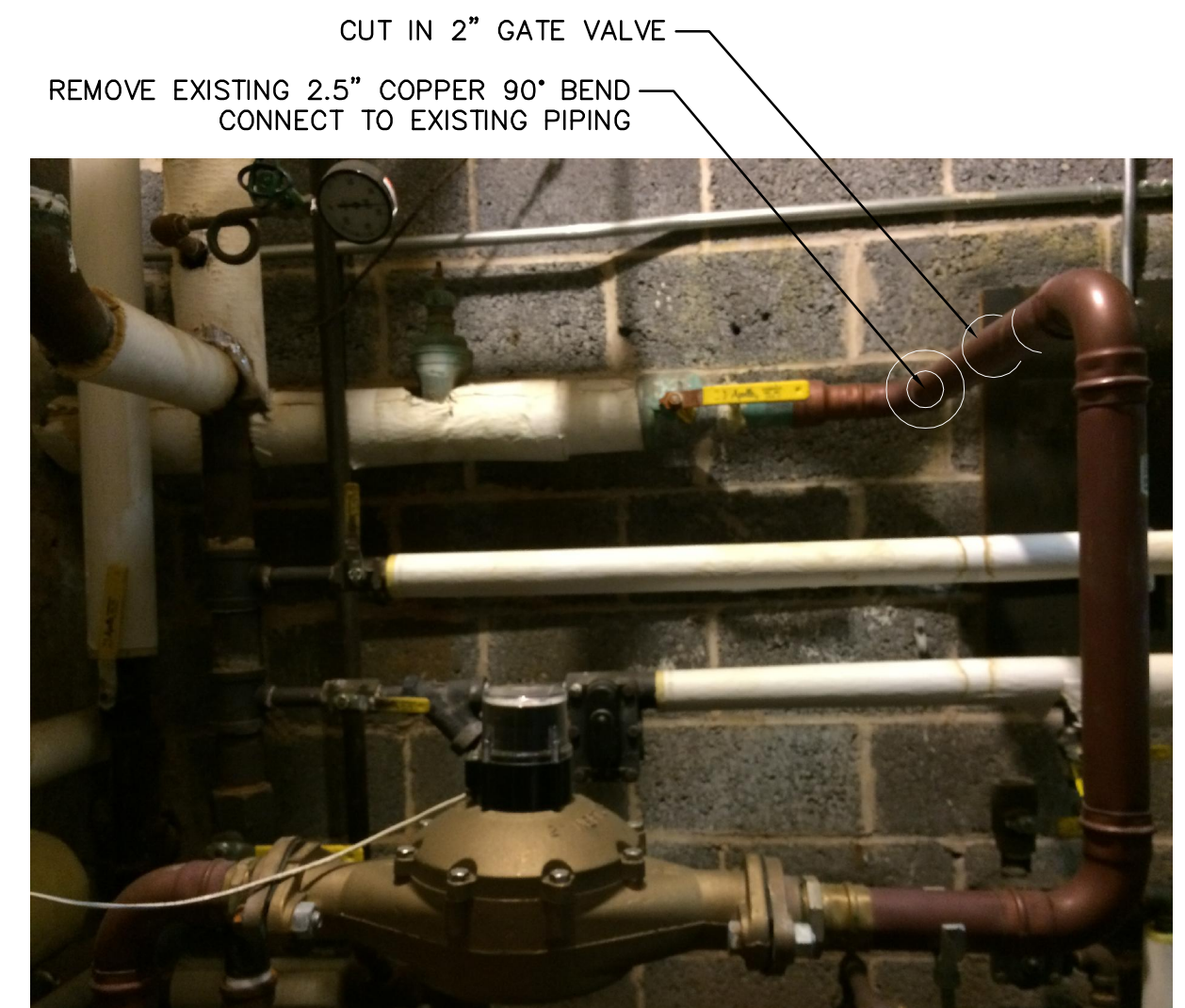
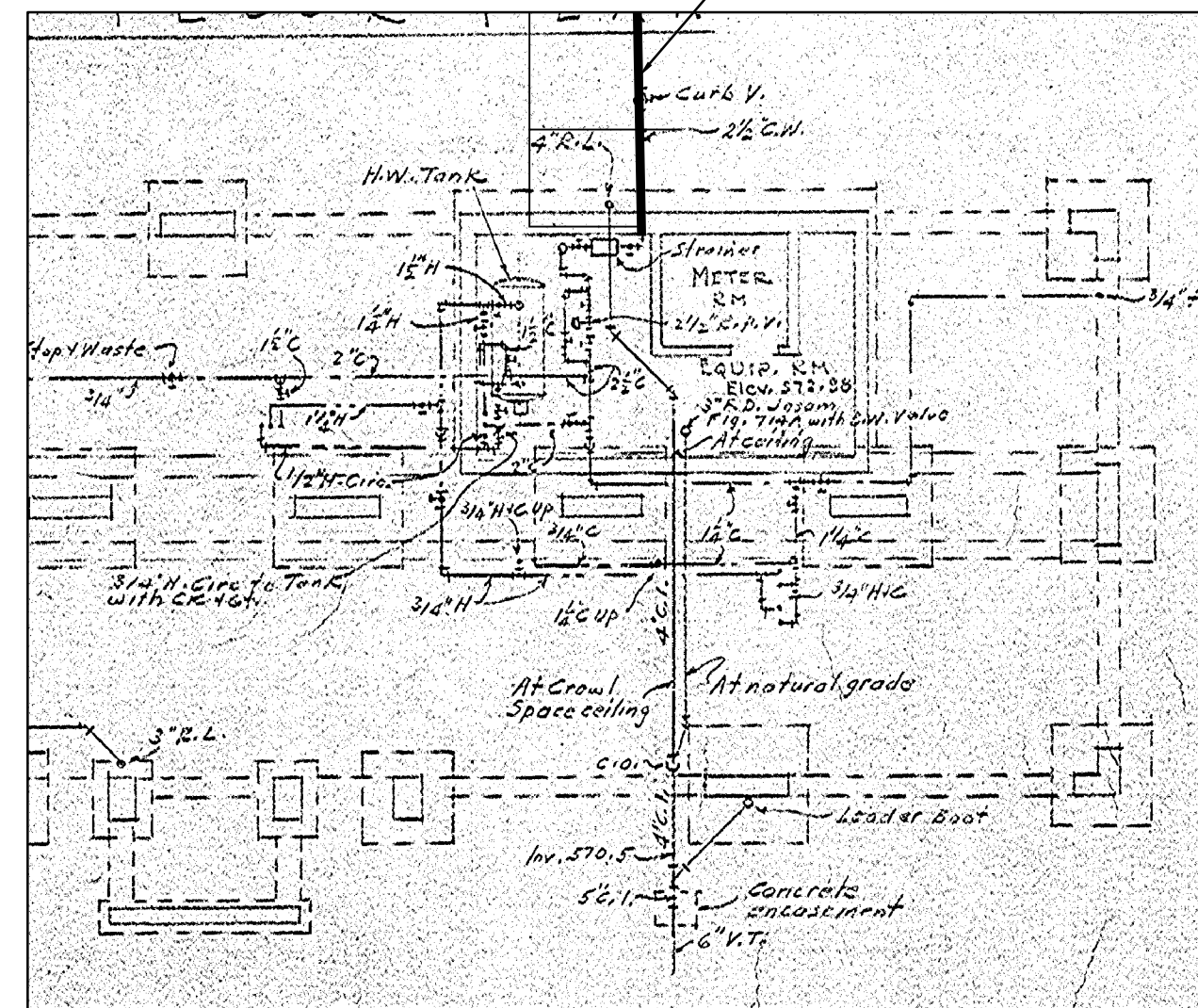
2.5" COPPER K WATER SERVICE



HICKS HALL

NOTES:

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2. PROVIDE HANGERS AND SUPPORTS AS REQUIRED.
3. ALL BUILDING AND STRUCTURE ENTRY LOCATIONS AND ELEVATIONS ARE APPROXIMATE. THE CONTRACTOR SHALL CONFIRM ALL ENTRY LOCATIONS AND ELEVATIONS, AS WELL AS CONNECTION POINT LOCATIONS AND ELEVATIONS, PRIOR TO THE START OF WORK.



GRANGE HALL

CERTIFICATION:

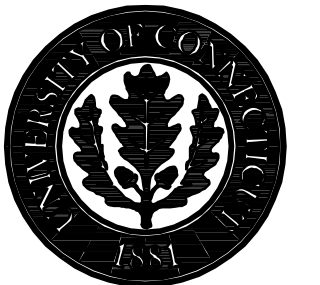
STATUS:
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CONSULTANT:

AECOM
500 ENTERPRISE DRIVE
ROCKY HILL, CT 06067
1-(860)-529-8882

REVISIONS:

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UNIVERSITY OF CONNECTICUT
PLANNING, ARCHITECTURAL & ENGINEERING SERVICES
31 LEDOYT ROAD UNIT 3038
STORRS, CONNECTICUT 06269-3038
TELEPHONE: (860) 486-3127
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NORTH EAGLEVILLE ROAD AREA
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PHASE II
YOUNG QUAD UTILITIES

PROJECT NO: 901954

WORK ORDER NO:

FILE NAME:
P:\CIVIL\YOUNG QUAD\SHEETS\C-18

AUTHOR: PETER SAMMIS

DRAFTER: KEVIN MCKENNA

SCALE: AS NOTED

PRINT DATE: APRIL 21, 2015

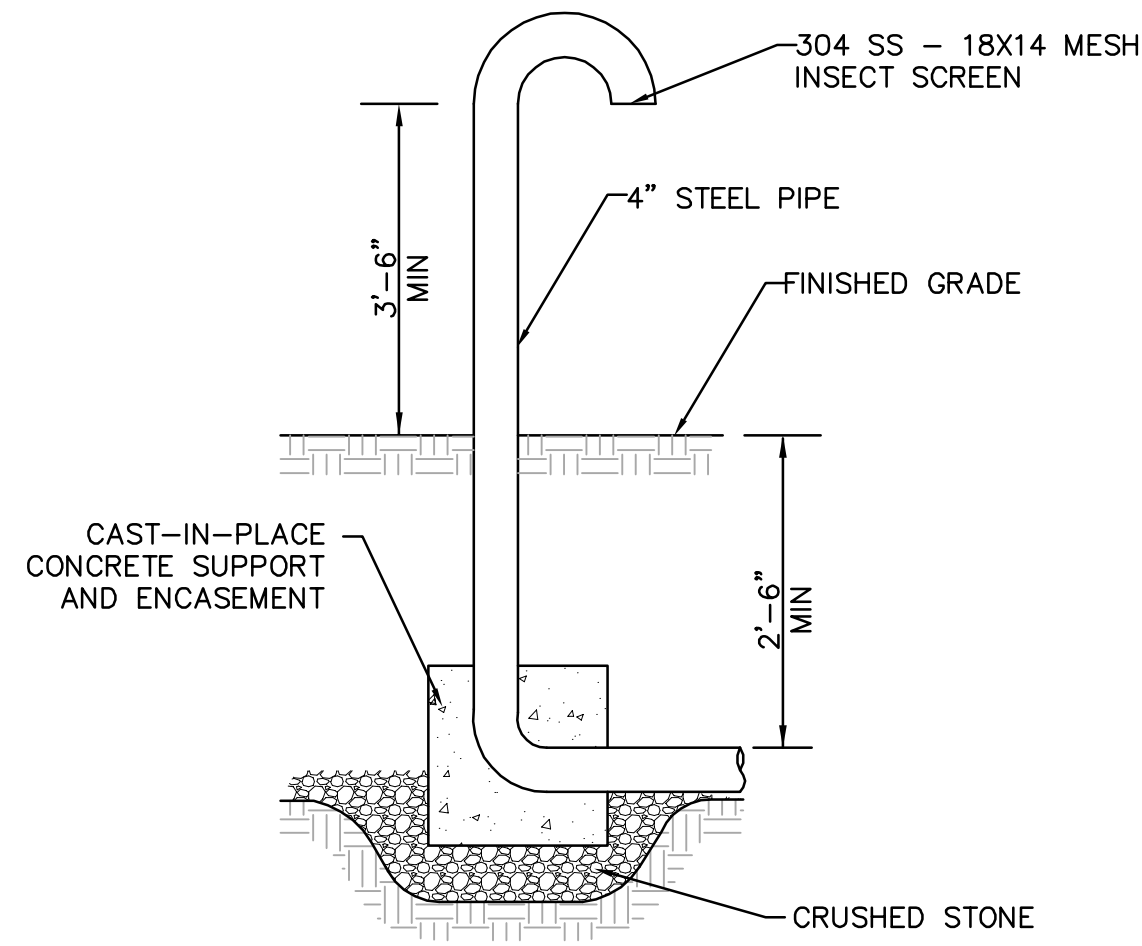
SHEET TITLE:

WATER MAIN CONNECTION DETAILS

SHEET:

C-18

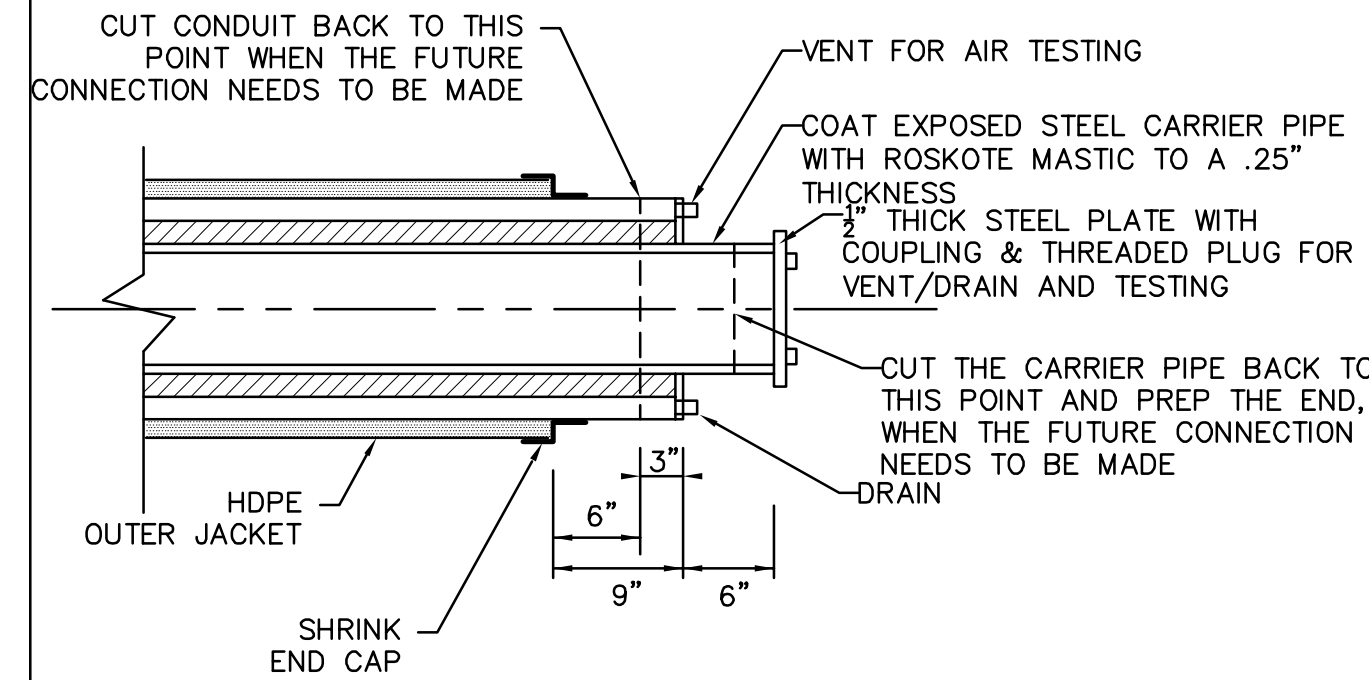
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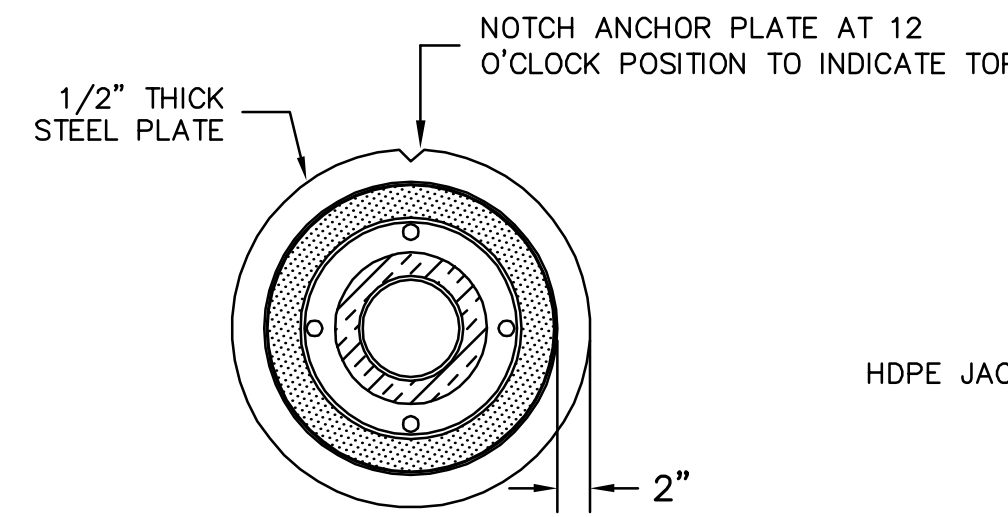
NOTE:
ABOVE-GRADE PIPING SHALL RECEIVE TWO COATS OF TNEPEC N69 EPOXY FINISH, OR EQUAL AFTER INSTALLATION. COLOR SHALL BE BLACK.

STEAM VAULT VENT ASSEMBLY
NTS

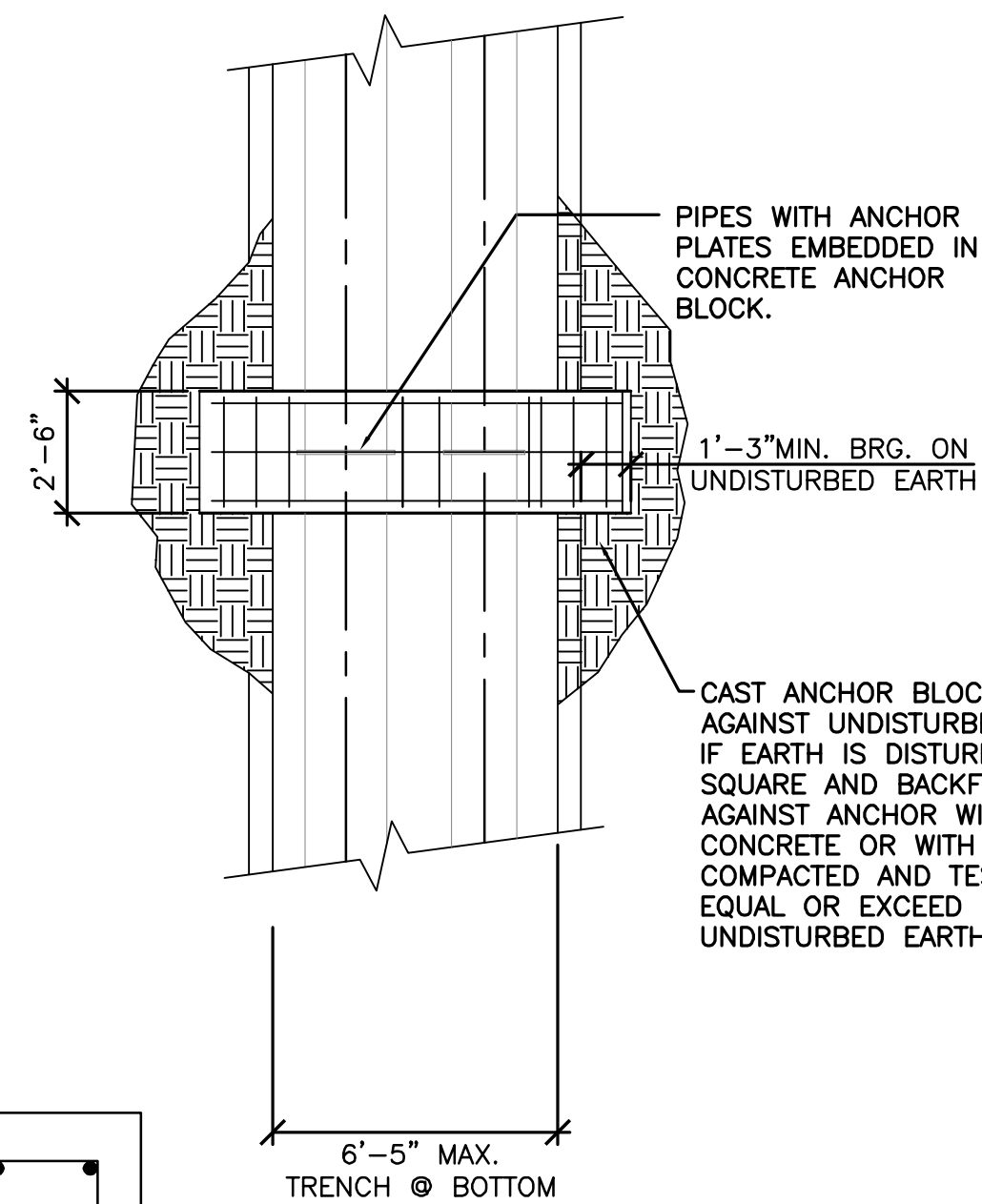
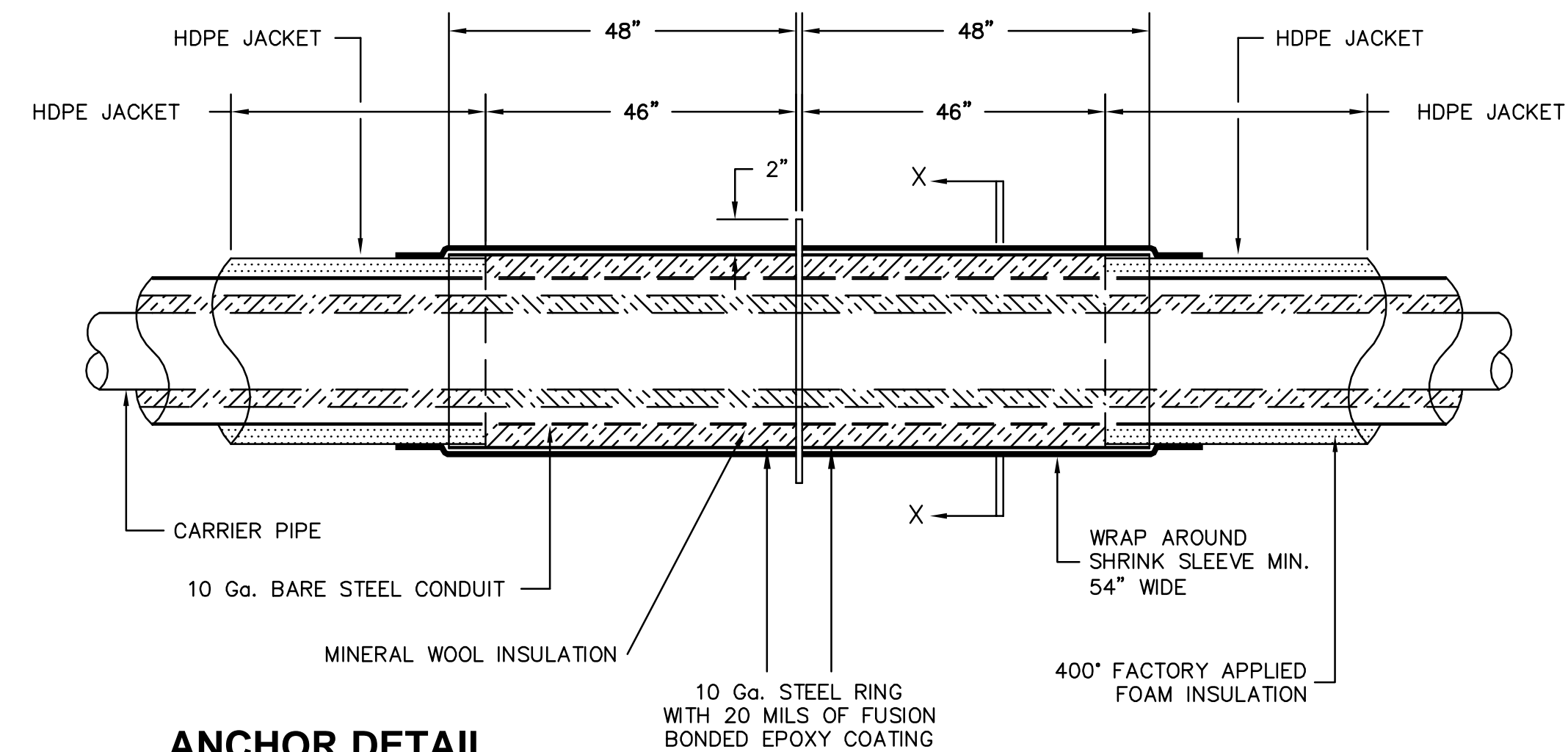
NOTE:
WRAP ENTIRE END CAP WITH 20 MIL POLYETHYLENE AND SEAL WITH STAINLESS STEEL STRAP TO HDPE JACKET PRIOR TO BURIAL.



PRE-INSULATED PIPE BURIED END CAP FOR FUTURE CONNECTION
NTS

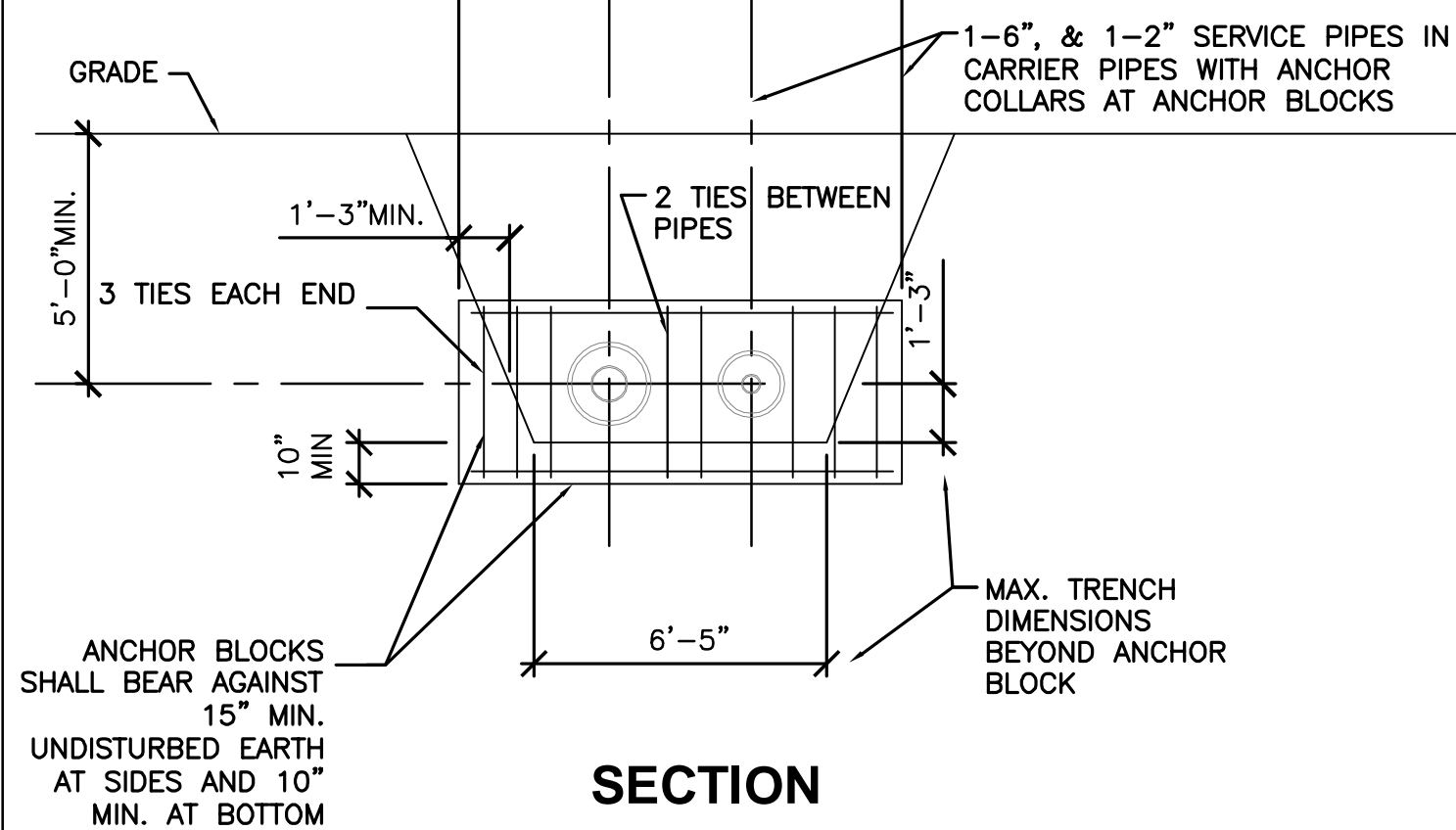


ANCHOR DETAIL
NTS

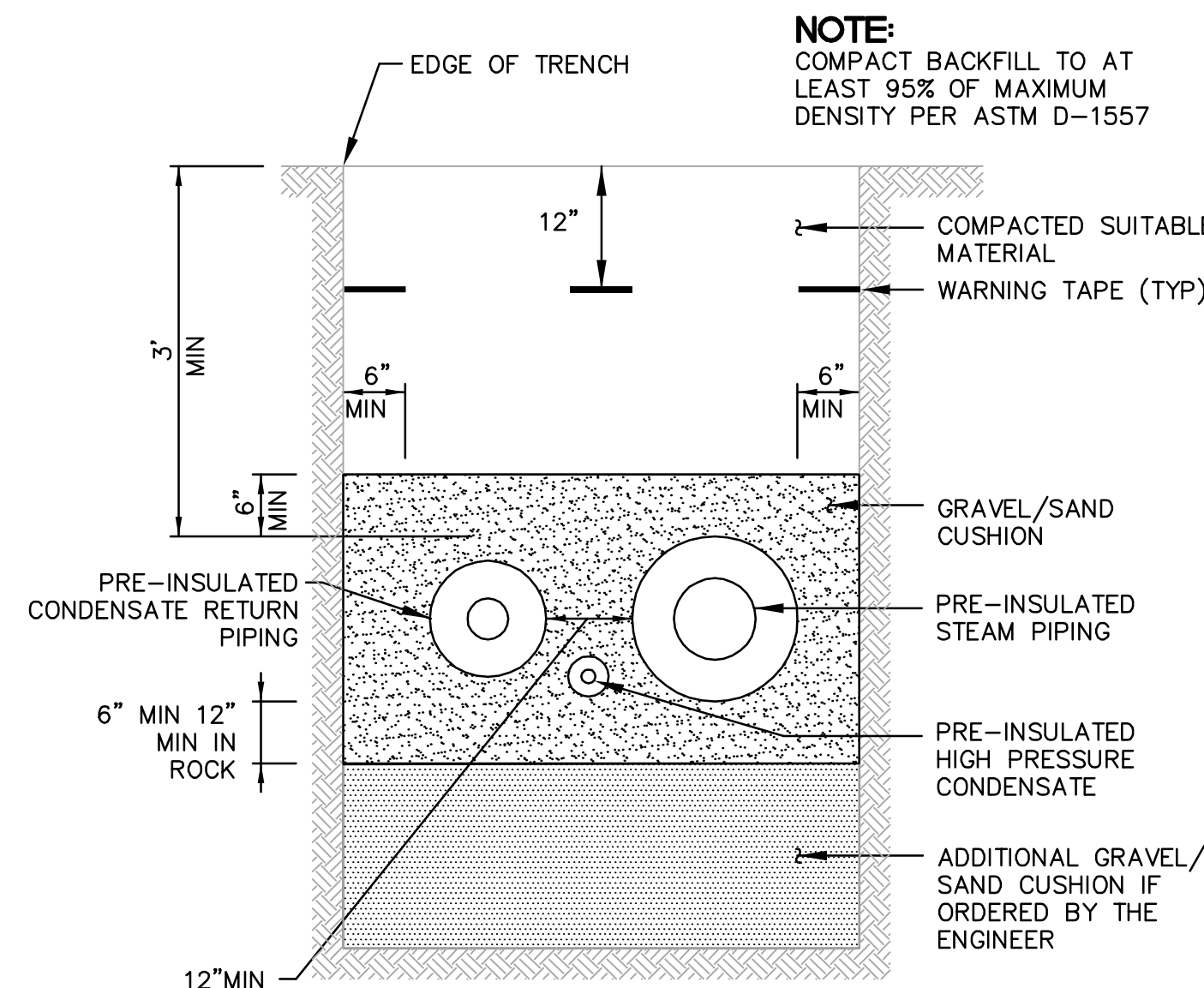


PLAN

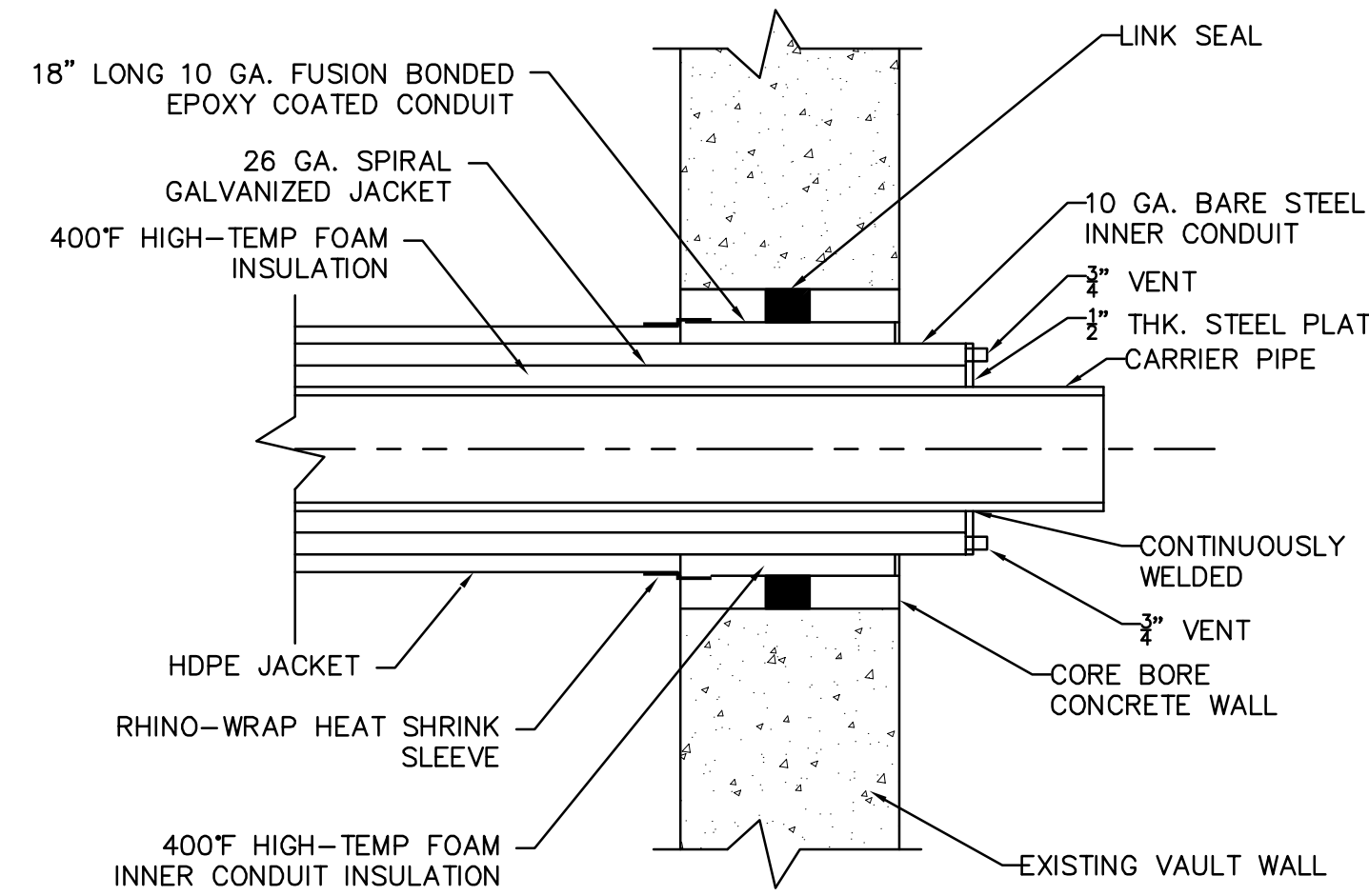
SECTION



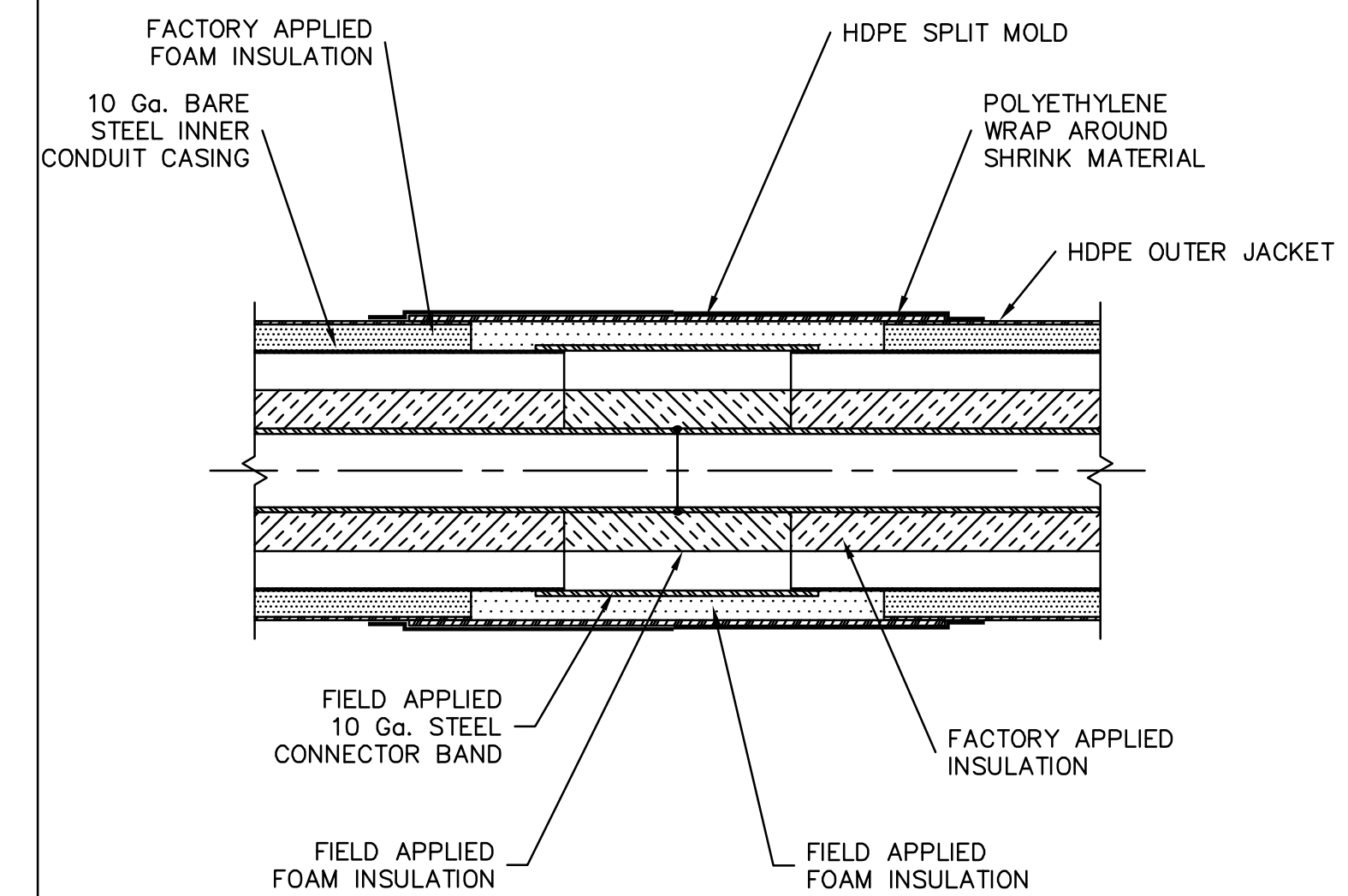
SECTION AT IN-LINE BURIED ANCHOR BLOCKS
NTS



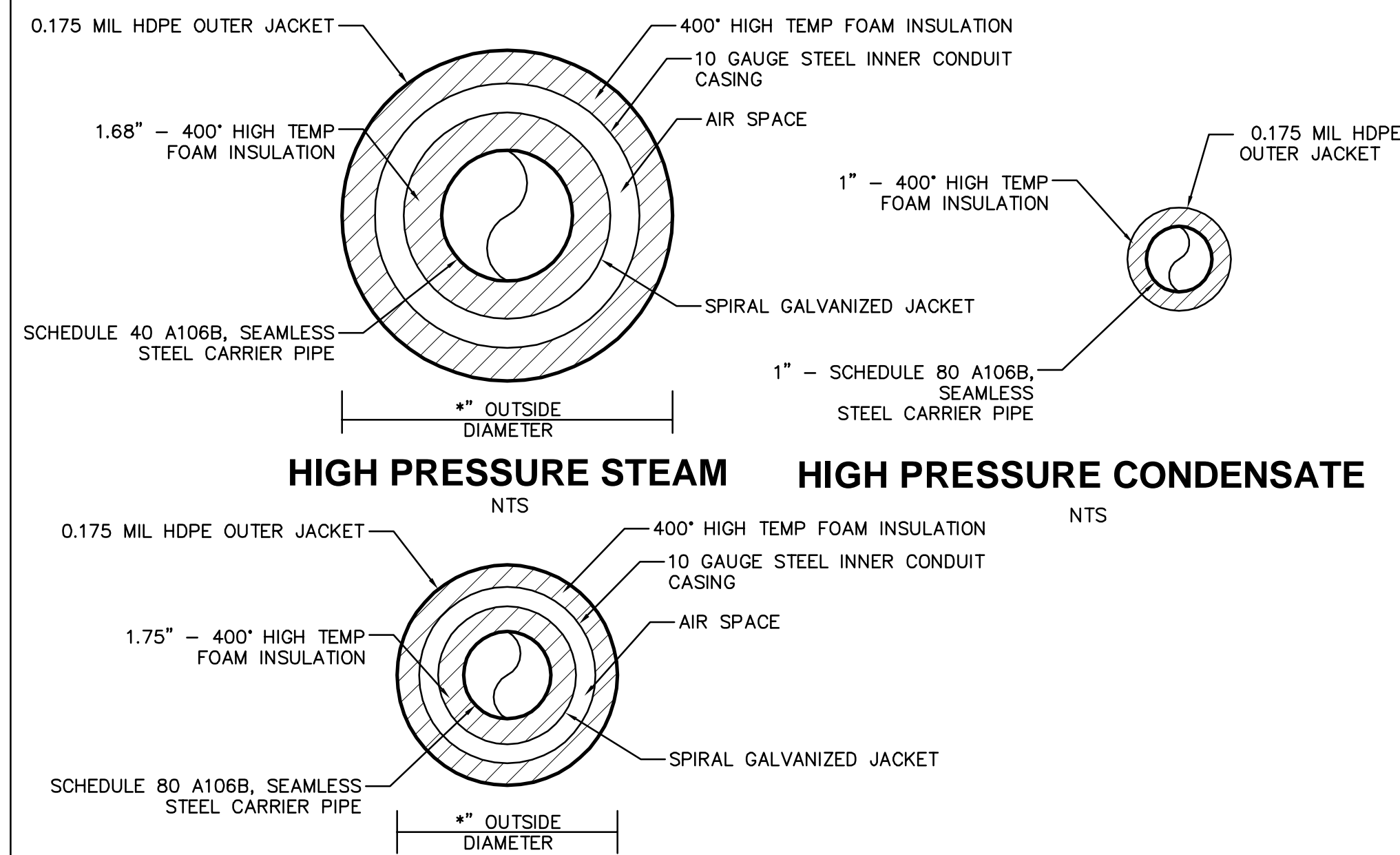
UNDERGROUND PRE-INSULATED PIPING TRENCH SECTION
NTS



WALL PENETRATION DETAIL
NTS

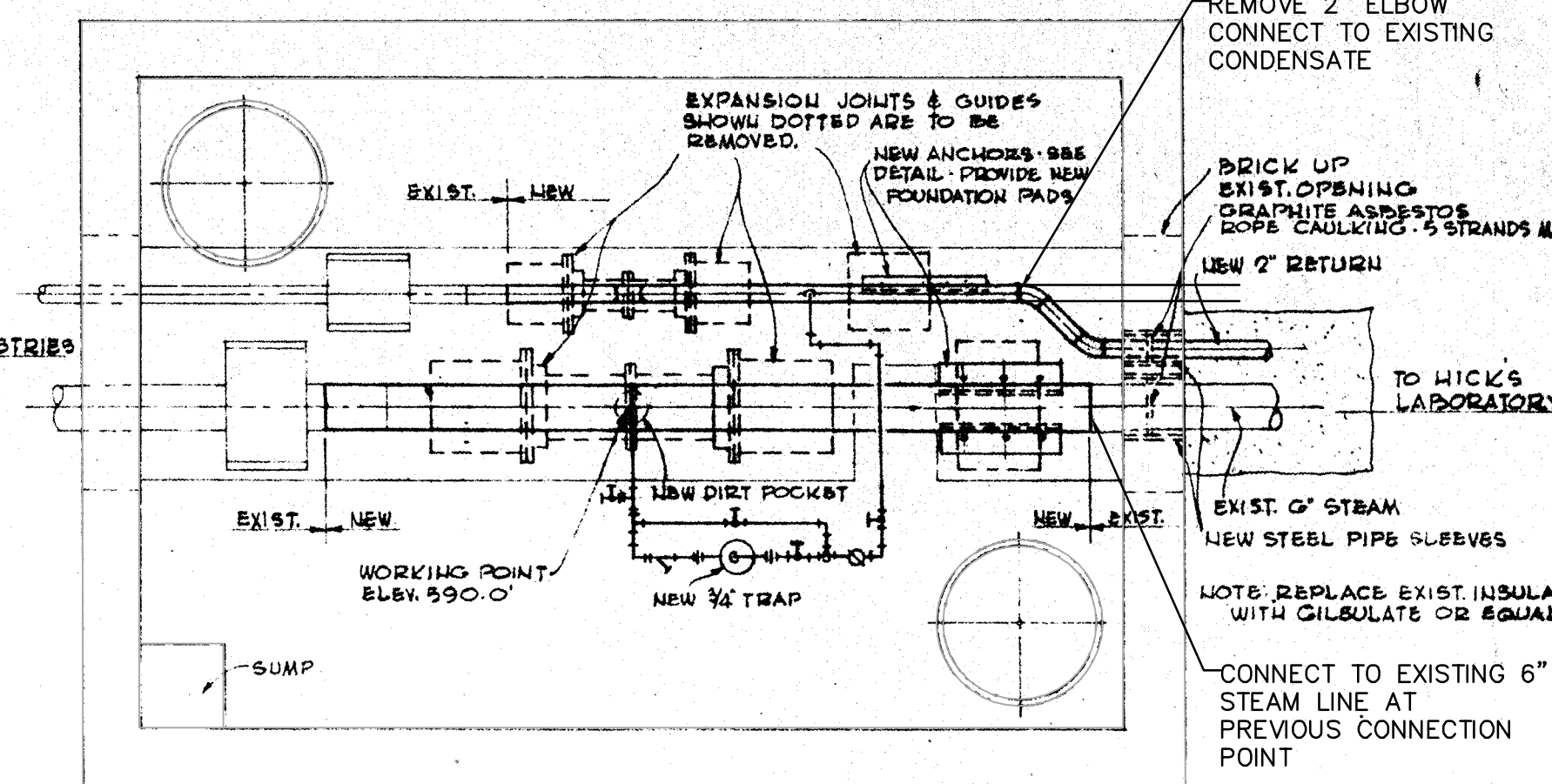


PRE-INSULATED PIPING FIELD JOINT
NTS



PUMPED CONDENSATE RETURN
NTS

- NOTE:**
- CONTRACTOR SHALL INSPECT STEAM VAULT C-6 PRIOR TO THE START OF WORK TO CONFIRM CONNECTION POINT LOCATIONS AND ELEVATIONS.
 - PROVIDE INSULATION AND JACKETS ON THE EXISTING PIPING IN THE STEAM VAULT C-6.
 - PROVIDE 1" HIGH PRESSURE CONDENSATE LINE FROM C-6 TO B-6.
 - DISCONNECT THE STEAM TRAP DISCHARGE FROM THE CONDENSATE RETURN, AND RECONNECT TO THE NEW HIGH PRESSURE CONDENSATE LINE.
 - PROVIDE DIRECT BURIED 2" PVC CONDUIT AT 30" MINIMUM COVER FROM C-6 TO B-6 FOR LOW VOLTAGE ELECTRIC AND SIGNAL CABLE.



STEAM VAULT C-6 - CONNECTION DETAIL
NTS

CERTIFICATION:

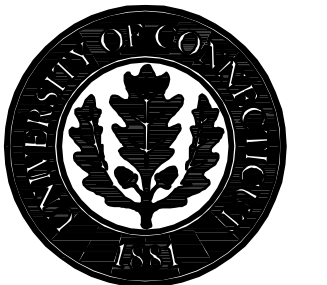
STATUS:
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CONSULTANT:

AECOM
500 ENTERPRISE DRIVE
ROCKY HILL, CT 06067
1-(860)-529-8882

REVISIONS:

MARK	DATE	DESCRIPTION



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31 LEDOYT ROAD UNIT 3038
STORRS, CONNECTICUT 06269-3038
TELEPHONE: (860) 486-3127
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PROJECT:

NORTH EAGLEVILLE ROAD AREA
INFRASTRUCTURE REPAIR/REPLACEMENT
PHASE II
YOUNG QUAD UTILITIES

PROJECT NO: 901954

WORK ORDER NO:

FILE NAME:

P:\CIVIL\YOUNG QUAD\SHETS\VC-19

AUTHOR: PETER SAMMIS

DRAFTER: KEVIN MCKENNA

SCALE: AS NOTED

PRINT DATE: APRIL 21, 2015

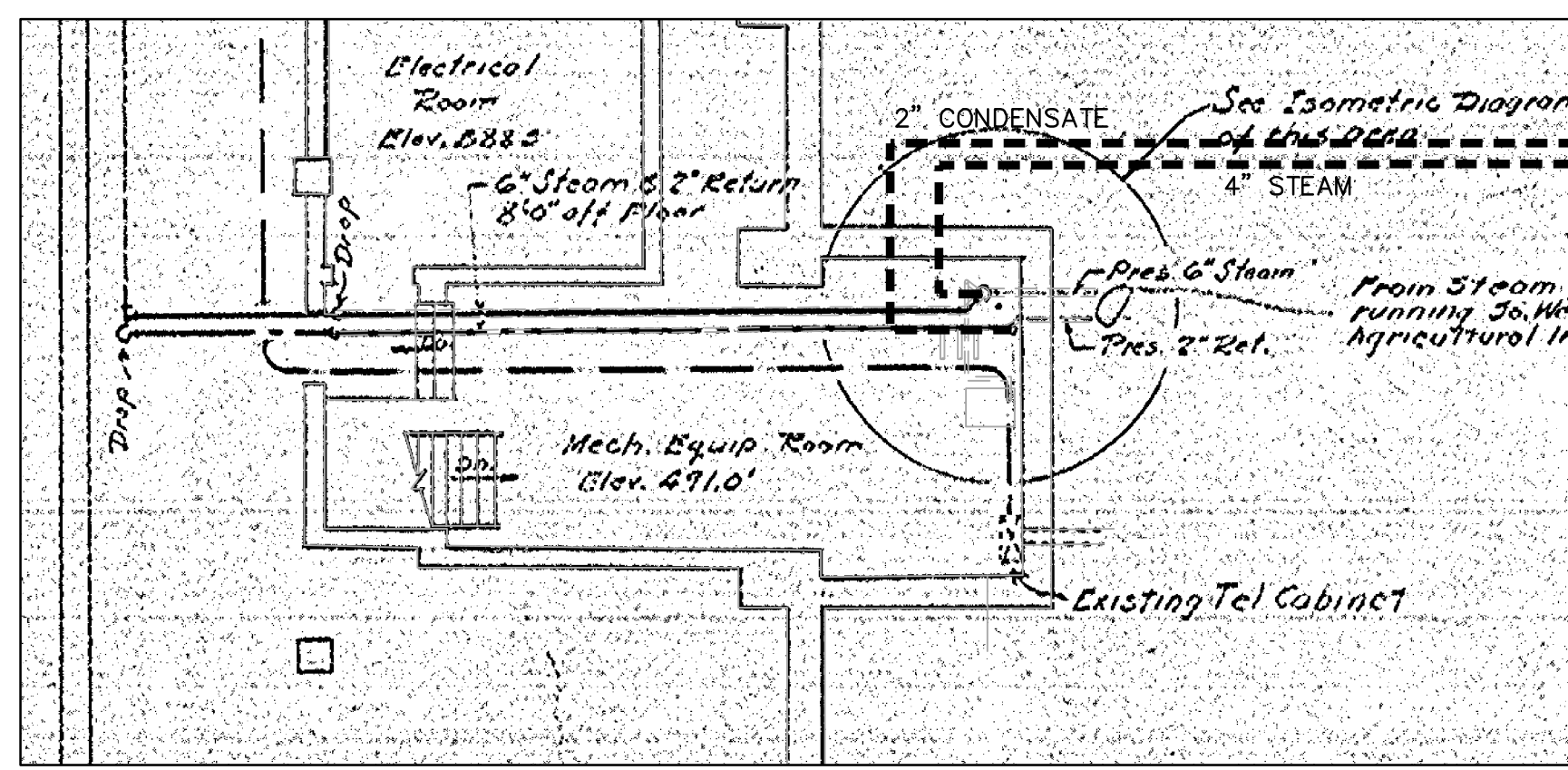
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STEAM AND CONDENSATE DETAILS

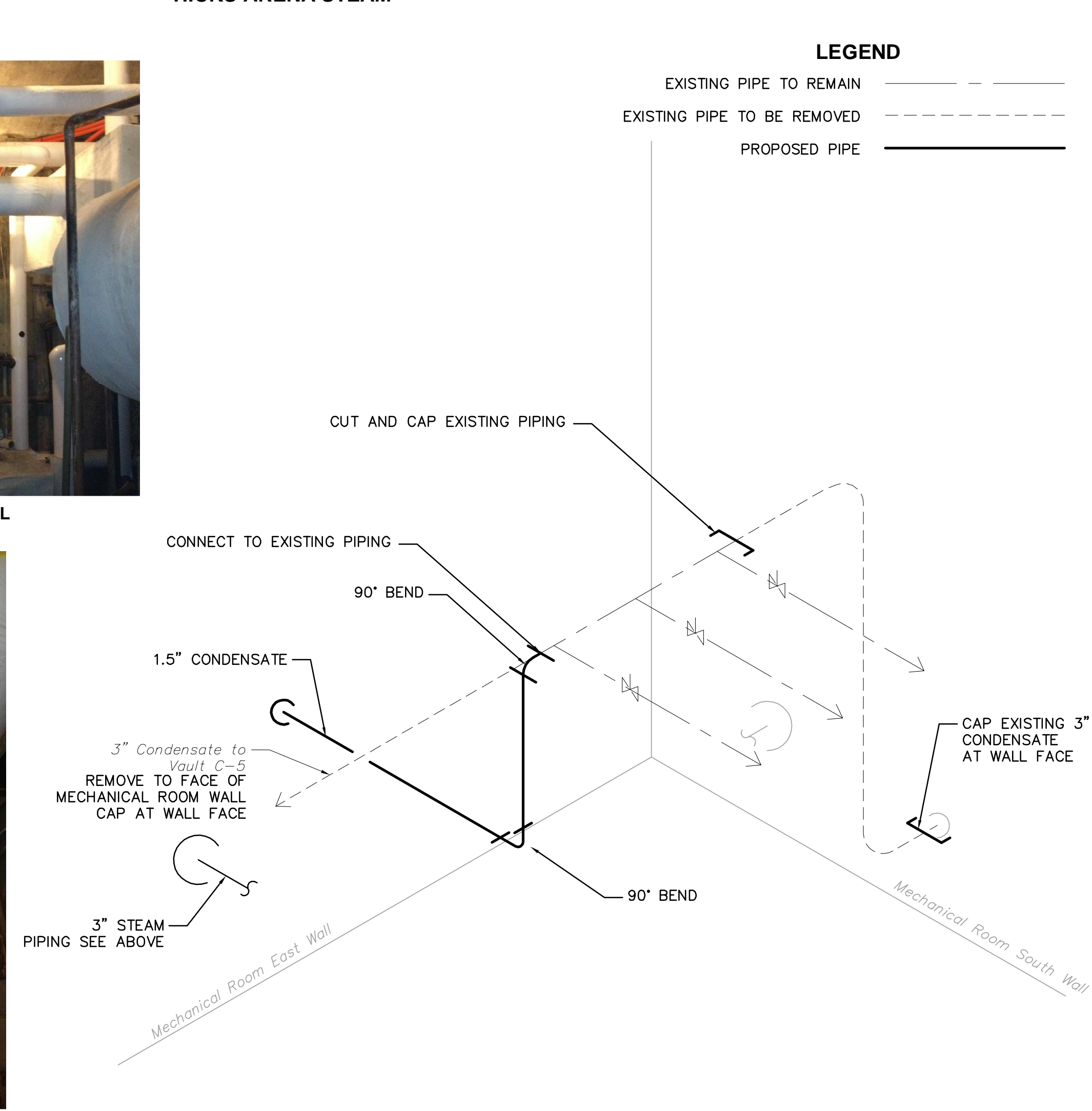
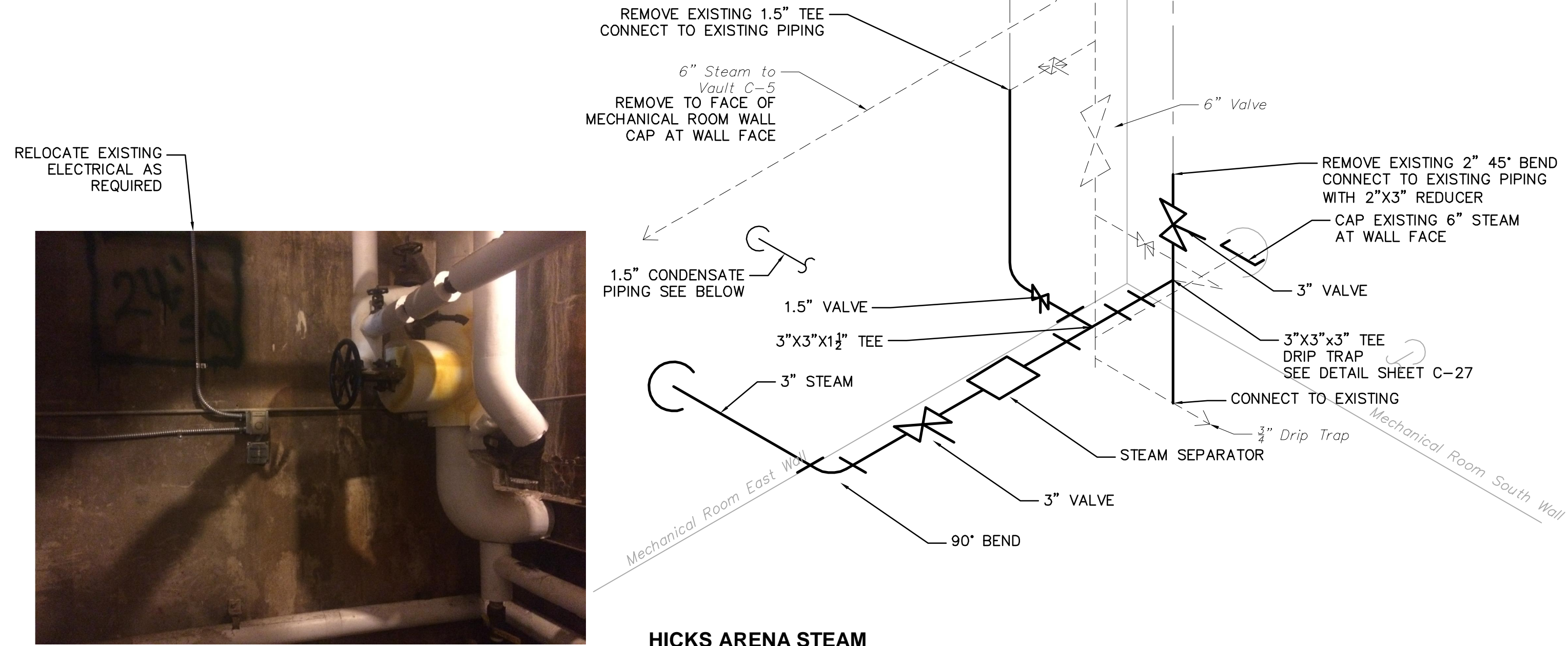
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C-19

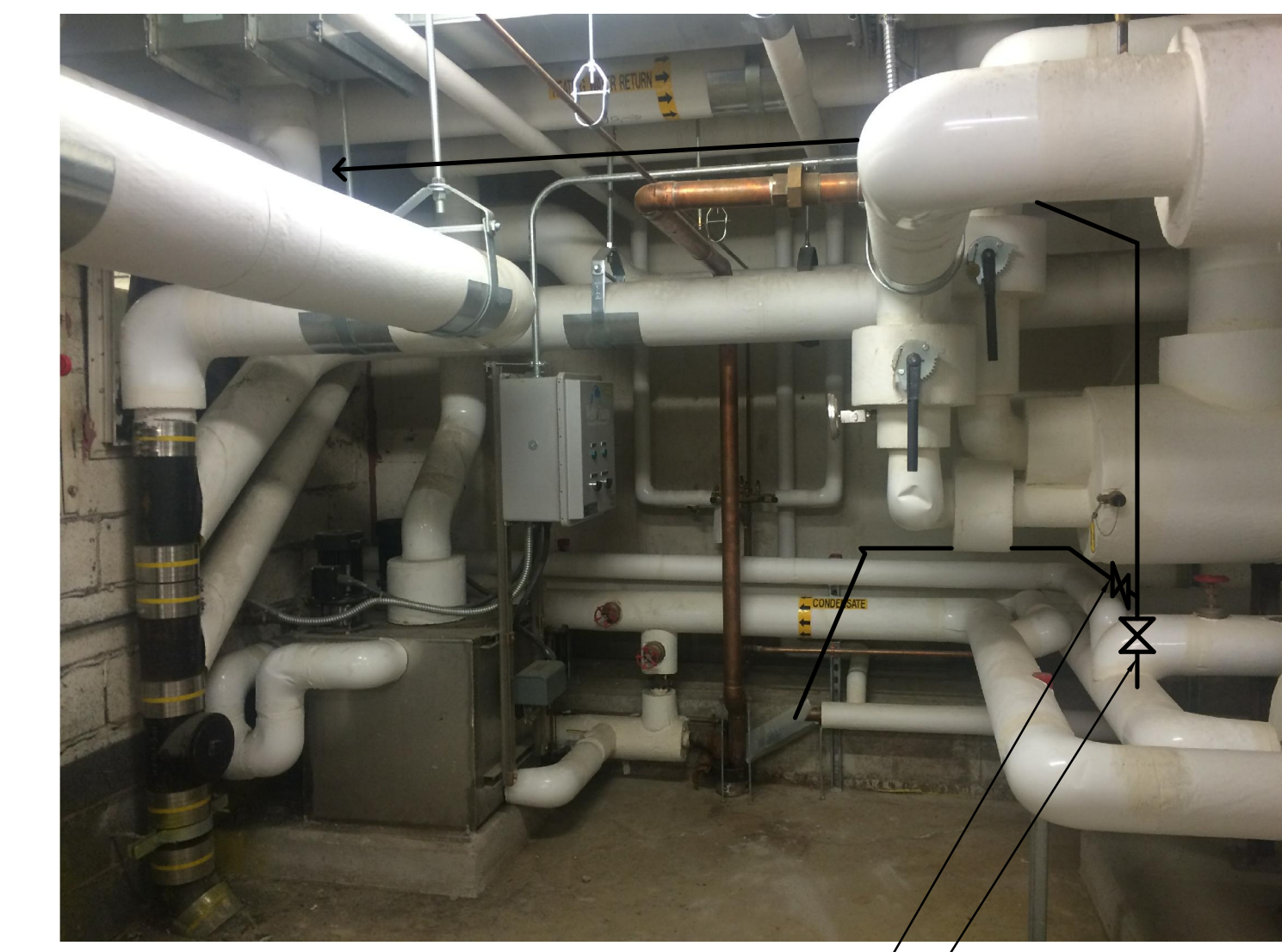
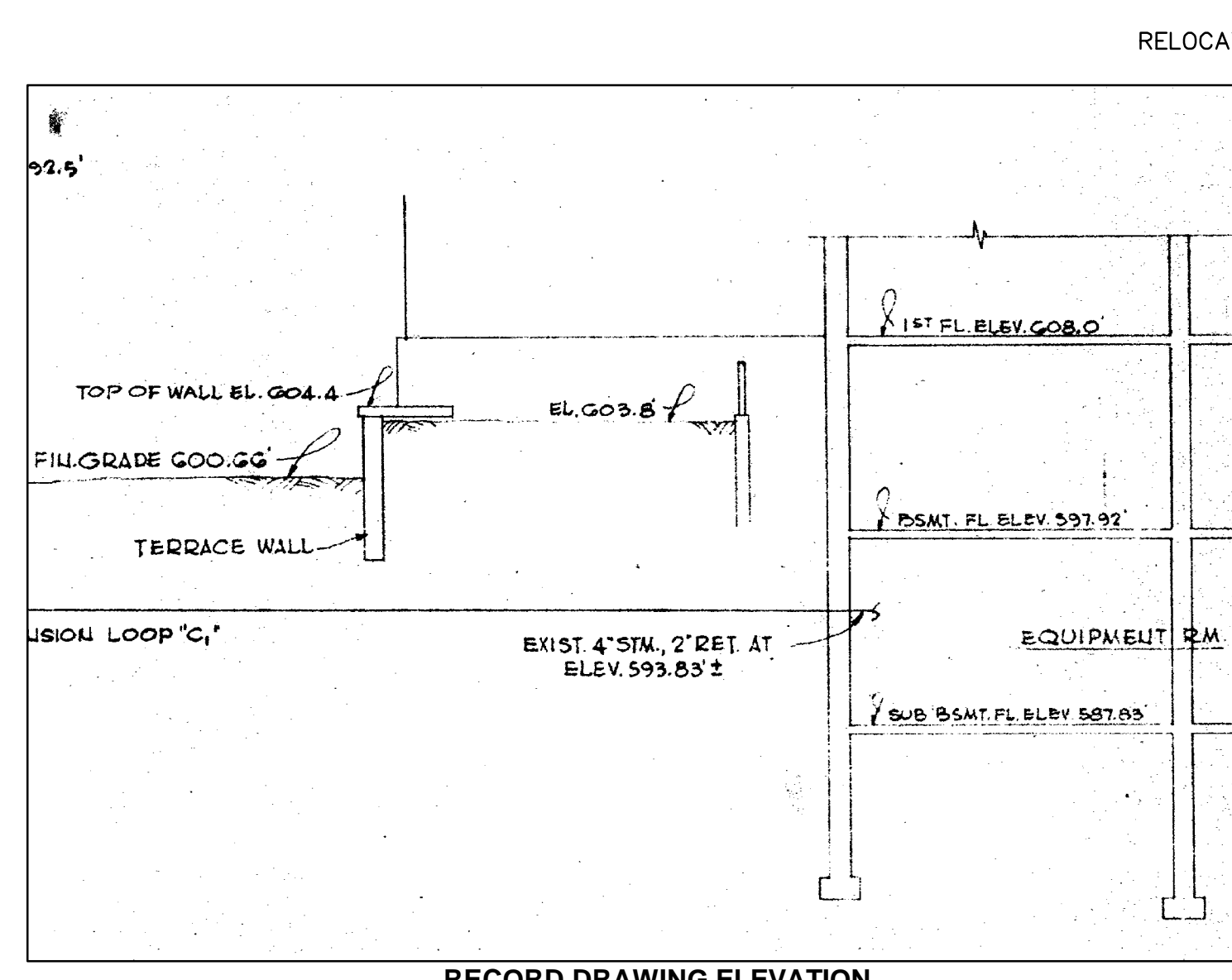
SHEET: ___ of ___



- NOTES:**
1. ALL INTERIOR BUILDING STEAM AND CONDENSATE PIPING SHALL HAVE FIBERGLASS INSULATION AND PVC JACKET.
 2. PROVIDE HANGERS AND SUPPORTS AS REQUIRED.
 3. ALL BUILDING AND STRUCTURE ENTRY LOCATIONS AND ELEVATIONS ARE APPROXIMATE. THE CONTRACTOR SHALL CONFIRM ALL ENTRY LOCATIONS AND ELEVATIONS, AS WELL AS CONNECTION POINT LOCATIONS AND ELEVATIONS, PRIOR TO THE START OF WORK.



- LEGEND**
- EXISTING PIPE TO REMAIN (solid line)
 - EXISTING PIPE TO BE REMOVED (dashed line)
 - PROPOSED PIPE (solid line with arrow)

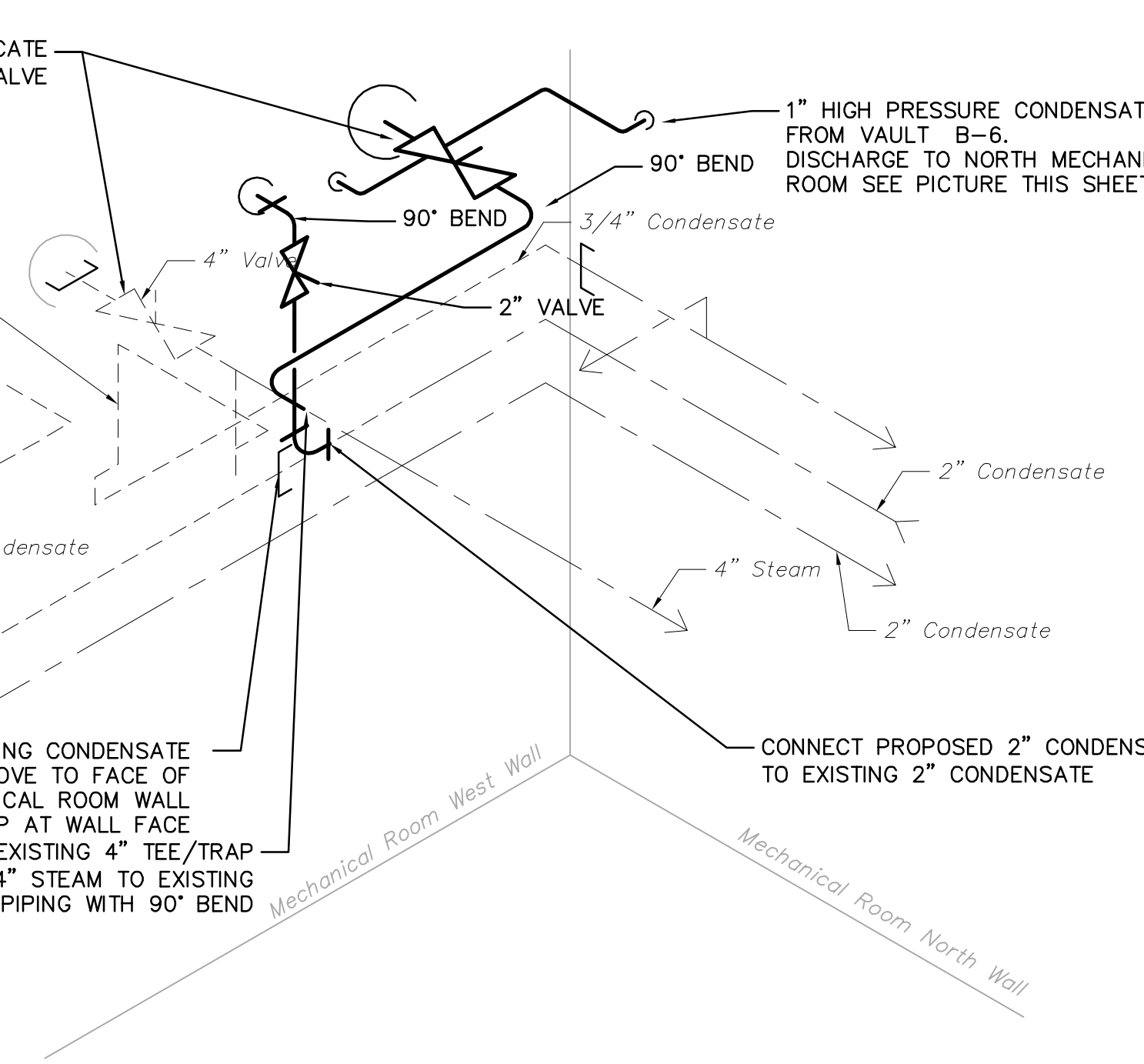


- LEGEND**
- EXISTING PIPE TO REMAIN (solid line)
 - EXISTING PIPE TO BE REMOVED (dashed line)
 - PROPOSED PIPE (solid line with arrow)
- 3/4" HIGH PRESSURE CONDENSATE BLOW OFF TO DRAIN WITH VALVE
- 1" SCH. 80 WITH 1" INSULATION AND VALVE HIGH PRESSURE CONDENSATE FROM VAULT B-6 CONNECT UPSTREAM OF EXISTING FLASH TANK.

- NOTES:**
1. ALL INTERIOR BUILDING STEAM AND CONDENSATE PIPING SHALL HAVE FIBERGLASS INSULATION AND PVC JACKET.
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 - EXISTING PIPE TO BE REMOVED (dashed line)
 - PROPOSED PIPE (solid line with arrow)



- NOTES:**
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AECOM
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NORTH EAGLEVILLE ROAD AREA
INFRASTRUCTURE REPAIR/REPLACEMENT
PHASE II
YOUNG QUAD UTILITIES

PROJECT NO: 901954
WORK ORDER NO:
FILE NAME: P:\CIVIL\YOUNG QUAD\SHEETS\C-20

AUTHOR: PETER SAMMIS
DRAFTER: KEVIN MCKENNA
SCALE: AS NOTED
PRINT DATE: APRIL 21, 2015
SHEET TITLE:

STEAM AND CONDENSATE CONNECTION DETAILS

SHEET:
C-20
SHEET: _ of _

CERTIFICATION:

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PROJECT NO: 901954
WORK ORDER NO:
FILE NAME: P:\CIVIL\YOUNG QUAD\SHEETS\C-22
AUTHOR: PETER SAMMIS
DRAFTER: KEVIN MCKENNA
SCALE: AS NOTED
PRINT DATE: APRIL 21, 2015
SHEET TITLE:

STEAM VAULT B-6

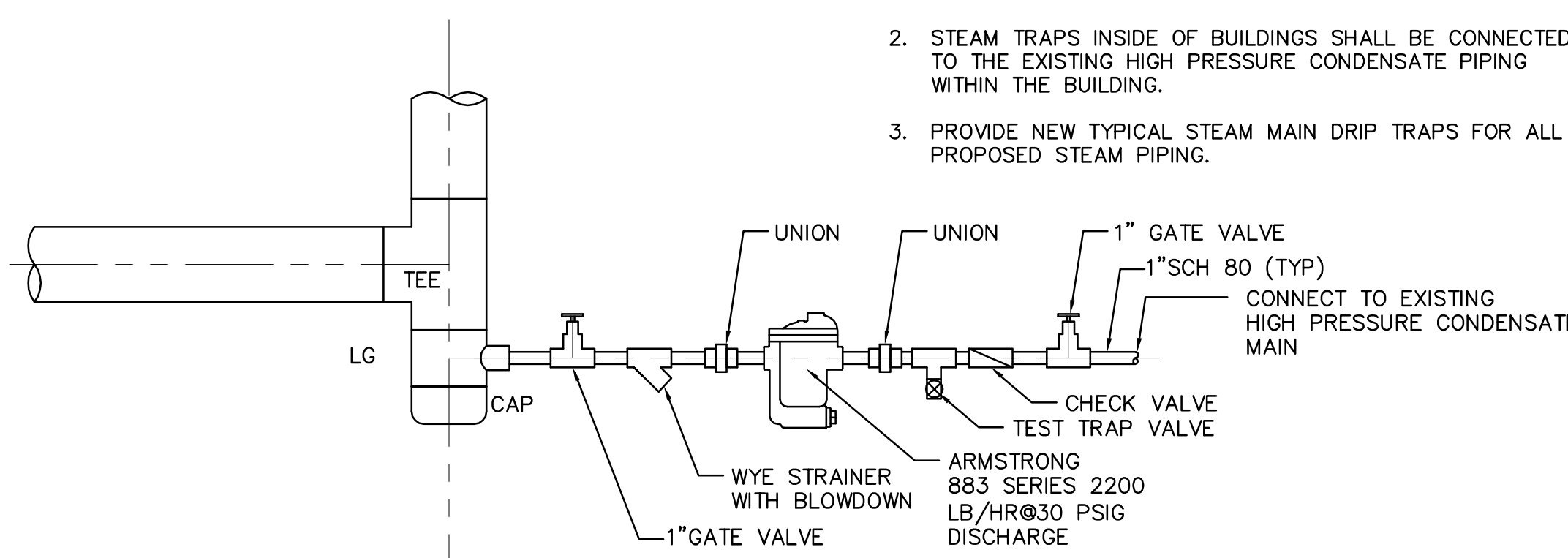
SHEET:

C-22

SHEET: _ of _

NOTE:

1. STEAM TRAPS INSIDE OF ALL STEAM VAULTS SHALL BE CONNECTED TO THE HIGH PRESSURE CONDENSATE PIPE DISCHARGING AT YOUNG BUILDING.
2. STEAM TRAPS INSIDE OF BUILDINGS SHALL BE CONNECTED TO THE EXISTING HIGH PRESSURE CONDENSATE PIPING WITHIN THE BUILDING.
3. PROVIDE NEW TYPICAL STEAM MAIN DRIP TRAP FOR ALL PROPOSED STEAM PIPING.

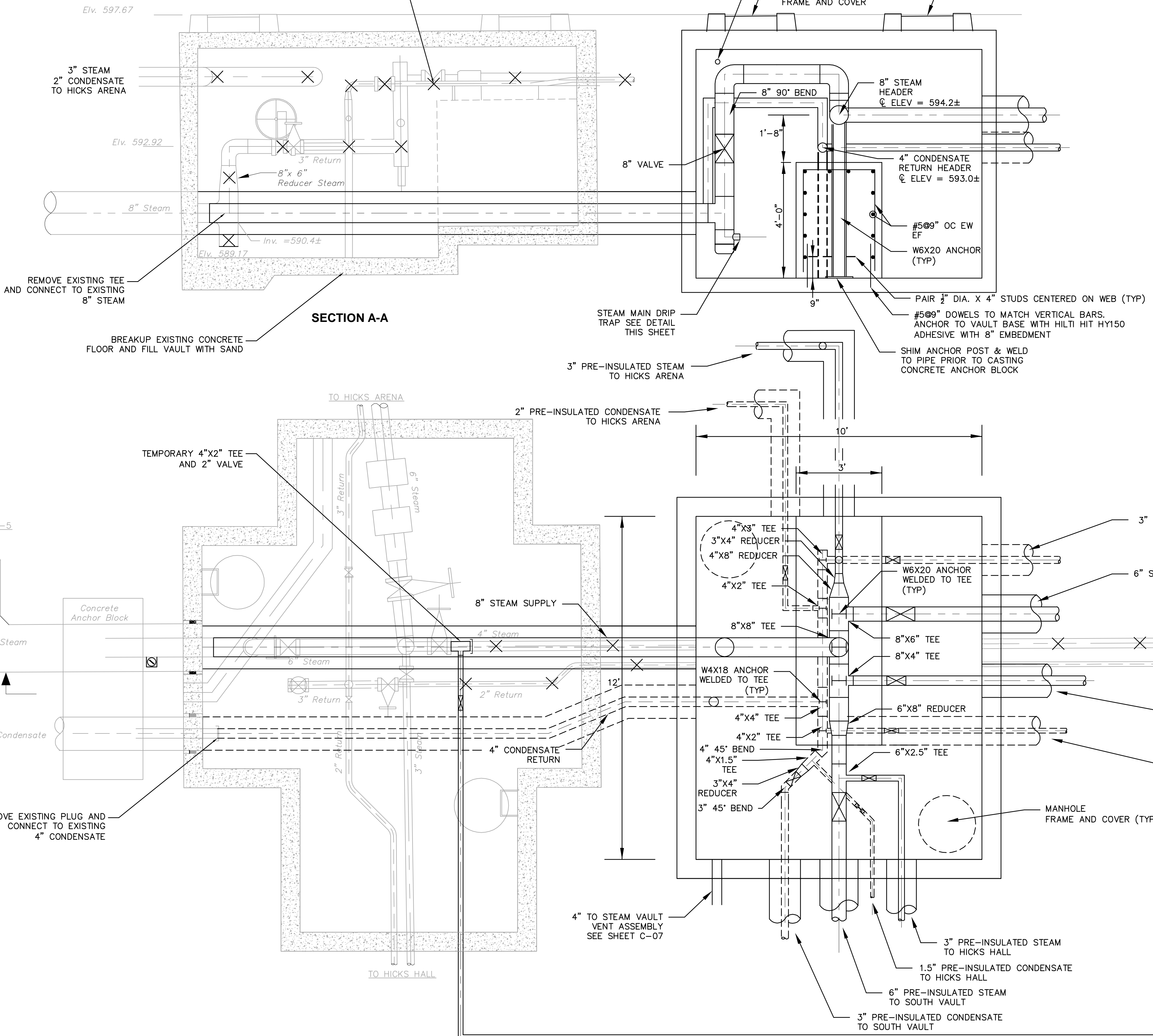


TYPICAL STEAM MAIN DRIP TRAP DETAIL
NTS

NOTES:

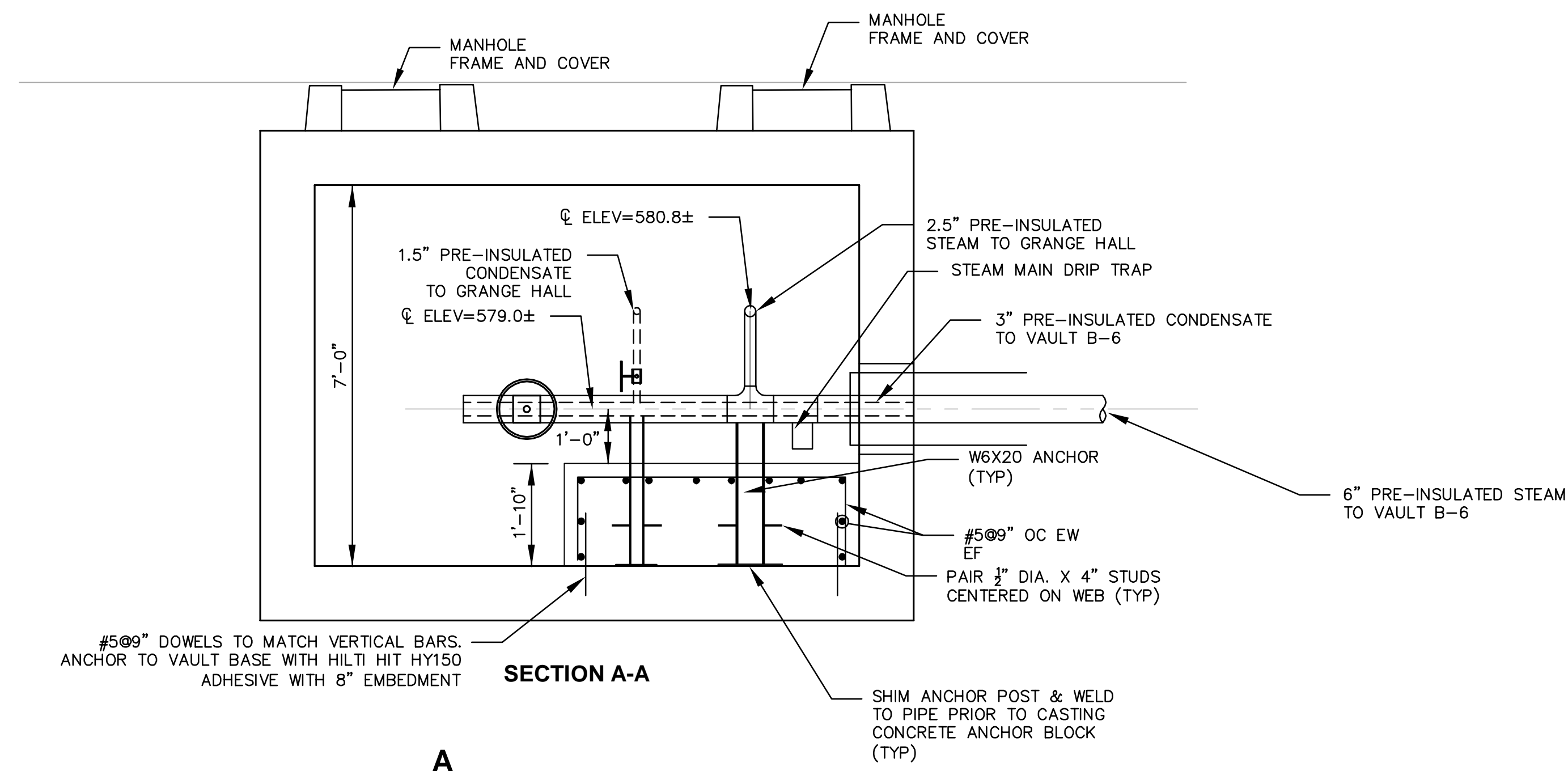
1. EXISTING VAULT B-6 INCLUDING ALL PIPING SHALL REMAIN ACTIVE UNTIL PROPOSED ADJACENT VAULT IS ACTIVE.
2. STEAM PIPING SHALL BE SCHEDULE 40, A106B, SEAMLESS.
3. CONDENSATE PIPING SHALL BE SCHEDULE 80, A106B, SEAMLESS.
4. REMOVE 2" TEMPORARY STEAM BYPASS, ALL ACCESSORIES AND PLUG ALL OPENINGS AFTER THE PROPOSED STEAM PIPING IS OPERATIONAL.
5. PROVIDE 1" HIGH PRESSURE CONDENSATE LINE FROM STEAM VAULT B-6 TO YOUNG BUILDING. MAKE CONNECTIONS WITH THE HIGH PRESSURE CONDENSATE LINES FROM C-6 AND THE SOUTH VAULT.
6. PROVIDE DIRECT BURIED 2" PVC CONDUIT AT 30" MINIMUM COVER FROM B-6 TO YOUNG BUILDING FOR LOW VOLTAGE ELECTRIC AND SIGNAL CABLE.
7. THE INTENT OF THE PRE-INSULATED PIPING SYSTEM IS TO ANCHOR PIPING INSIDE THE VAULT AND ACCOMMODATE THERMAL EXPANSION MOVEMENT IN THE VARIOUS PROPOSED L BEND, Z BEND AND LOOPS OUTSIDE THE VAULT.
8. THE PRE-INSULATED PIPING SUPPLIER SHALL PROVIDE A STRESS ANALYSIS OF BOTH PROPOSED UNDERGROUND AND STEAM VAULT PIPING, AND MAKE RECOMMENDATIONS FOR STEAM VAULT PIPING MODIFICATIONS TO ACCOMMODATE THERMAL EXPANSION.
9. ANCHORS, ANCHOR BLOCKS AND ANCHOR BLOCK REINFORCEMENT SHOWN ARE APPROXIMATE, AND MAY CHANGE BASED ON THE STRESS ANALYSIS PROVIDED BY THE PRE-INSULATED PIPING SYSTEM SUPPLIER.
10. THE ENGINEER SHALL RE-EVALUATE ANCHORS, ANCHOR BLOCKS AND ANCHOR BLOCK REINFORCEMENT BASED ON THE STRESS ANALYSIS PROVIDED BY THE PRE-INSULATED PIPING SYSTEM SUPPLIER.
11. ANNULAR SPACE VENT OF PRE-INSULATED PIPING SHALL BE PIPED INTO STEAM VAULT VENT.

REMOVE AND DISPOSE OF ALL INTERIOR PIPING AND FITTINGS CAP AND ABANDON IN-PLACE ALL EXTERIOR PIPING



PIPING PLAN STEAM VAULT B-6

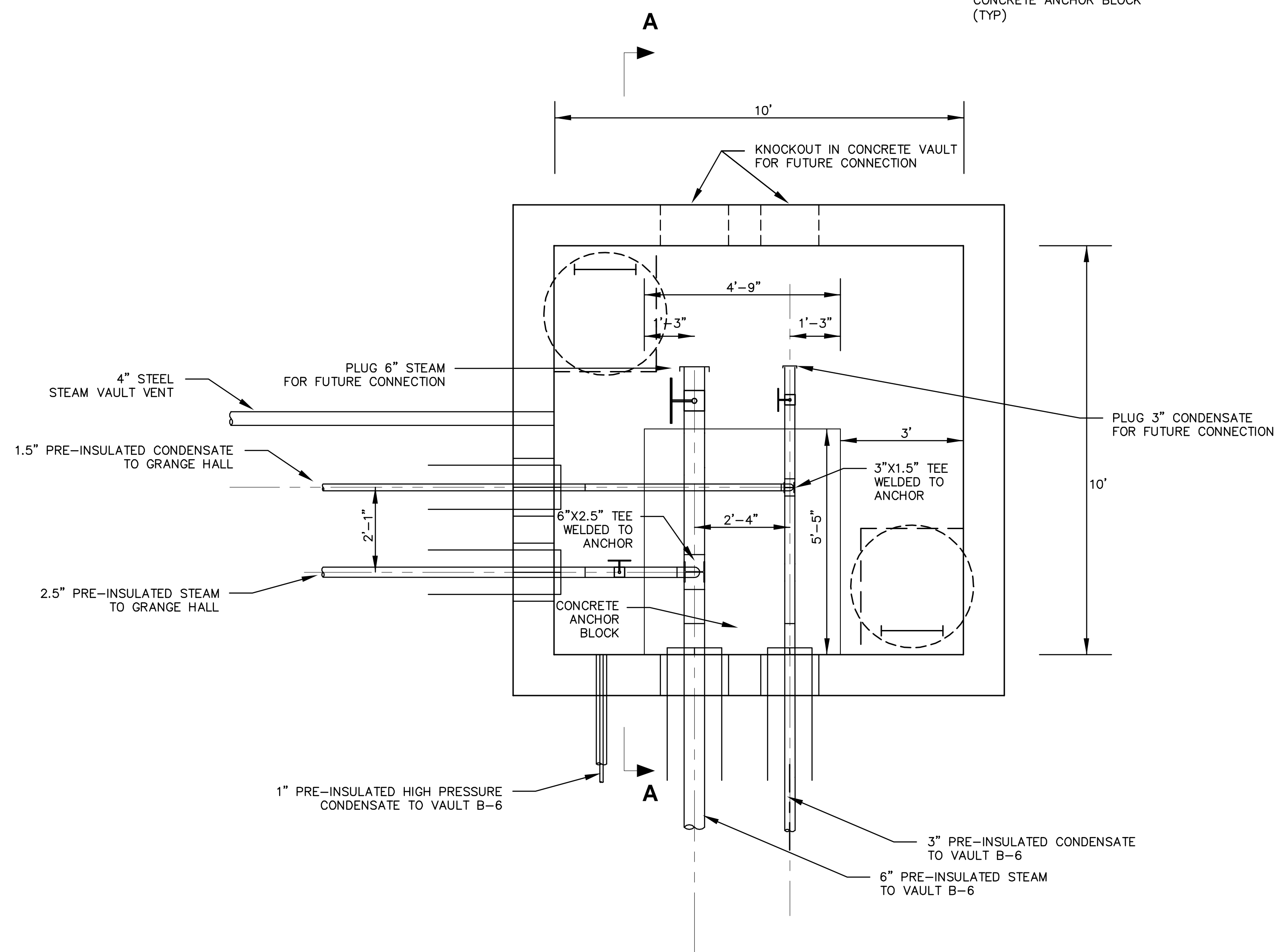
SCALE: 1"=2'



#509" DOWELS TO MATCH VERTICAL BARS. ANCHOR TO VAULT BASE WITH HILTI HIT HY150 ADHESIVE WITH 8" EMBEDMENT

SECTION A-A

SHIM ANCHOR POST & WELD TO PIPE PRIOR TO CASTING CONCRETE ANCHOR BLOCK (TYP)



PIPING PLAN SOUTH STEAM VAULT

SCALE: 1"=2'

- NOTE:**
1. PROVIDE 1" HIGH PRESSURE CONDENSATE LINE FROM SOUTH STEAM VAULT TO VAULT B-6.
 2. STEAM PIPING SHALL BE SCHEDULE 40, A106B, SEAMLESS.
 3. CONDENSATE PIPING SHALL BE SCHEDULE 80, A106B, SEAMLESS.
 4. SEE SHEET C-22 FOR DRIP TRAP DETAIL.
 5. SEE SHEET C-19 FOR STEAM VAULT VENT ASSEMBLY.
 6. PROVIDE DIRECT BURIED 2" PVC CONDUIT AT 30" MINIMUM COVER FROM SOUTH STEAM VAULT TO VAULT B-6 FOR LOW VOLTAGE ELECTRICAL AND SIGNAL CABLE.
 7. THE INTENT OF THE PRE-INSULATED PIPING SYSTEM IS TO ANCHOR PIPING INSIDE THE VAULT AND ACCOMMODATE THERMAL EXPANSION MOVEMENT IN THE VARIOUS PROPOSED L BEND, Z BEND AND LOOPS OUTSIDE THE VAULT.
 8. THE PRE-INSULATED PIPING SUPPLIER SHALL PROVIDE A STRESS ANALYSIS OF BOTH PROPOSED UNDERGROUND AND STEAM VAULT PIPING, AND MAKE RECOMMENDATIONS FOR STEAM VAULT PIPING MODIFICATIONS TO ACCOMMODATE THERMAL EXPANSION.
 9. ANCHORS, ANCHOR BLOCKS AND ANCHOR BLOCK REINFORCEMENT SHOWN ARE APPROXIMATE, AND MAY CHANGE BASED ON THE STRESS ANALYSIS PROVIDED BY THE PRE-INSULATED PIPING SYSTEM SUPPLIER.
 10. THE ENGINEER SHALL RE-EVALUATE ANCHORS, ANCHOR BLOCKS AND ANCHOR BLOCK REINFORCEMENT BASED ON THE STRESS ANALYSIS PROVIDED BY THE PRE-INSULATED PIPING SYSTEM SUPPLIER.
 11. CONNECT STEAM TRAP TO HIGH PRESSURE CONDENSATE DISCHARGING AT YOUNG BUILDING.
 12. ANNULAR SPACE VENT OF THE PRE-INSULATED PIPING SHALL BE PIPED INTO THE STEAM VAULT VENT

CERTIFICATION:

STATUS:
Not for Construction

CONSULTANT:
AECOM
500 ENTERPRISE DRIVE
ROCKY HILL, CT 06067
1-(860)-529-8882

REVISIONS:

MARK	DATE	DESCRIPTION



UNIVERSITY OF CONNECTICUT
PLANNING, ARCHITECTURAL & ENGINEERING SERVICES
31 LEDOYT ROAD UNIT 3038
STORRS, CONNECTICUT 06269-3038
TELEPHONE: (860) 486-3127
FACSIMILE: (860) 486-3177

PROJECT:

NORTH EAGLEVILLE ROAD AREA
INFRASTRUCTURE REPAIR/REPLACEMENT
PHASE II
YOUNG QUAD UTILITIES

PROJECT NO: 901954
WORK ORDER NO:
FILE NAME:
P:\CIVIL\YOUNG QUAD\SHEETS\C-23

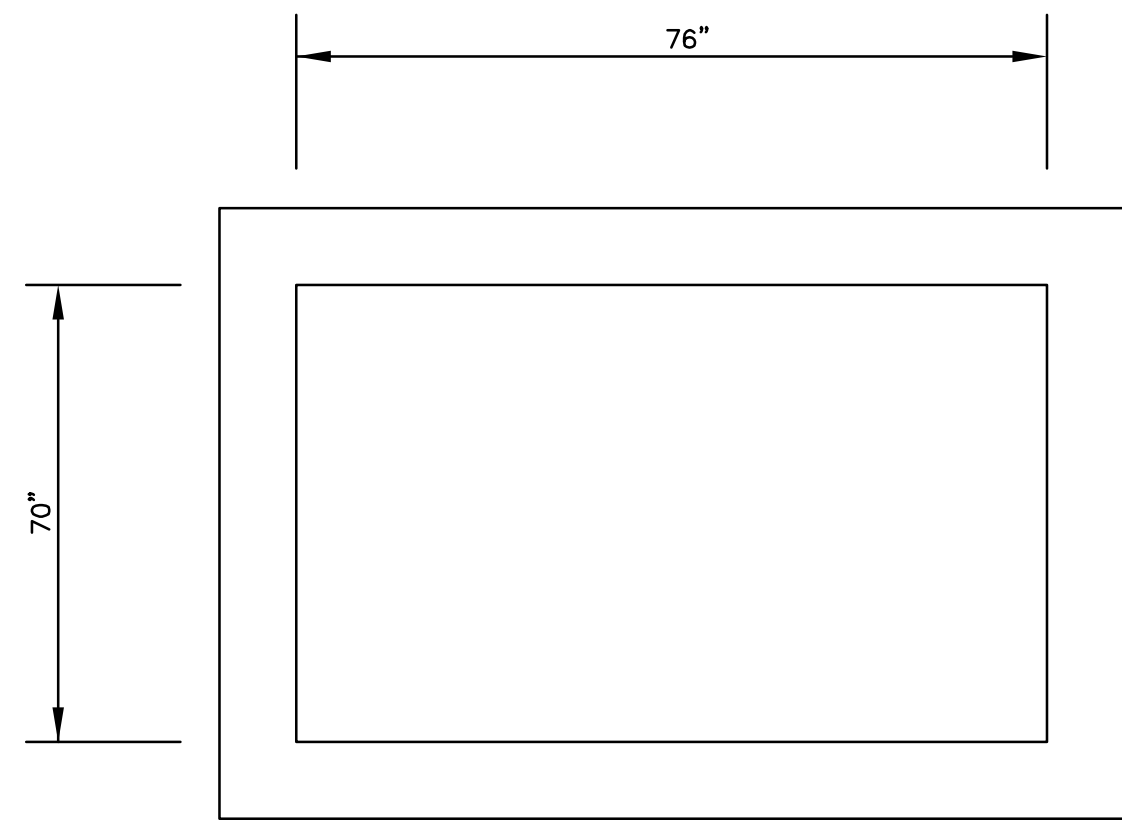
AUTHOR: PETER SAMMIS
DRAFTER: KEVIN MCKENNA
SCALE: AS NOTED
PRINT DATE: APRIL 21, 2015
SHEET TITLE:

SOUTH STEAM VAULT

SHEET:

C-23

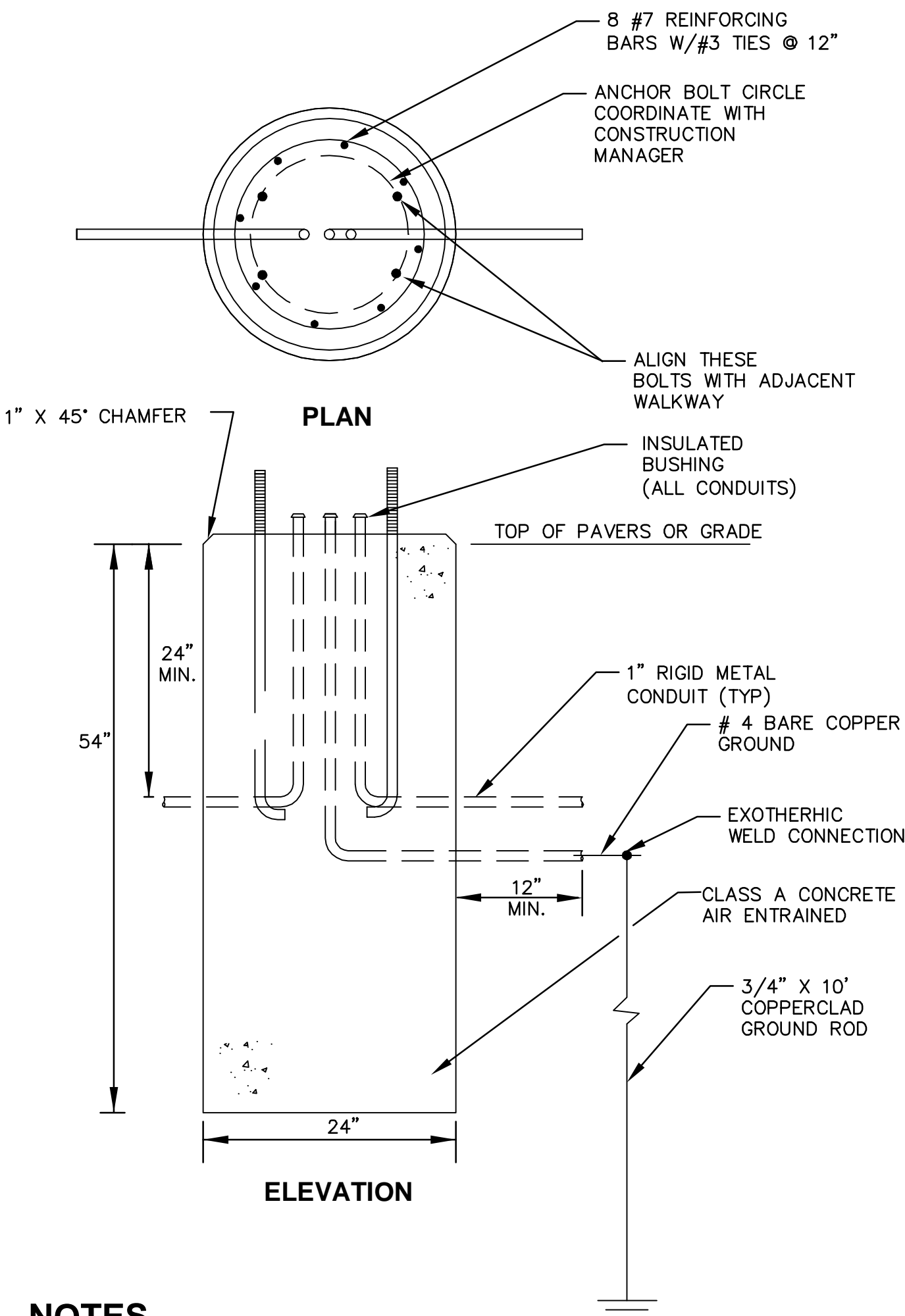
SHEET: ___ of ___



NOTES:

1. PRECAST SWITCH GEAR VAULT SHALL BE IN ACCORDANCE WITH EVERSOURCE DETAILS SPC P-015 AND SPC P-016. PROVIDE GROUNDING IN ACCORDANCE WITH DTR 76.451.

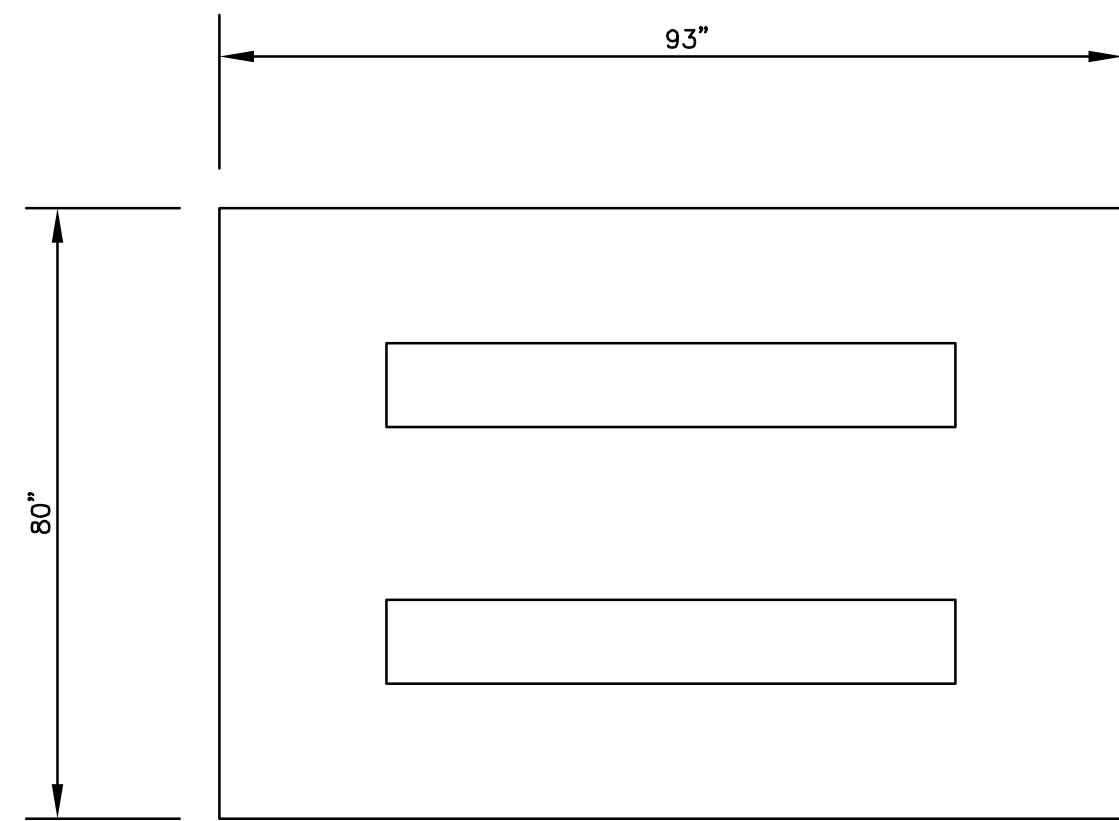
76"X70"X36" SWITCH GEAR VAULT BASE
NTS



NOTES:

1. SALVAGED AND NEW LIGHT POLES STANCHIONS OF TWO DIFFERENT HEIGHTS WILL BE MOUNTED ON THESE BASES. COORDINATE WITH CONSTRUCTION MANAGER TO CONFIRM OVERALL DIAMETER AND ANCHOR BOLT CIRCLE PRIOR TO CONSTRUCTING BASES.
2. CONDUIT SHALL BE GALVANIZED RIGID STEEL.
3. ANCHOR BOLTS SHALL BE A36 STEEL, HOT DIPPED GALVANIZED, 3/4" X 24" L-TYPE. BOLTS WITH DOUBLE NUTS AND WASHERS SHALL BE SUPPLIED BY THE CONTRACTOR.
4. ANCHOR BOLTS SHALL BE PLACED TO EXTEND 6" ABOVE THE TOP OF THE FOUNDATION. THE EXPOSED PORTION OF ANCHOR BOLT SHALL BE THREADED.
5. COORDINATE WITH MEP DRAWINGS FOR CABLING REQUIREMENTS.
6. COORDINATE WITH LANDSCAPE DRAWINGS FOR TREATMENT OF ADJACENT SURFACE.

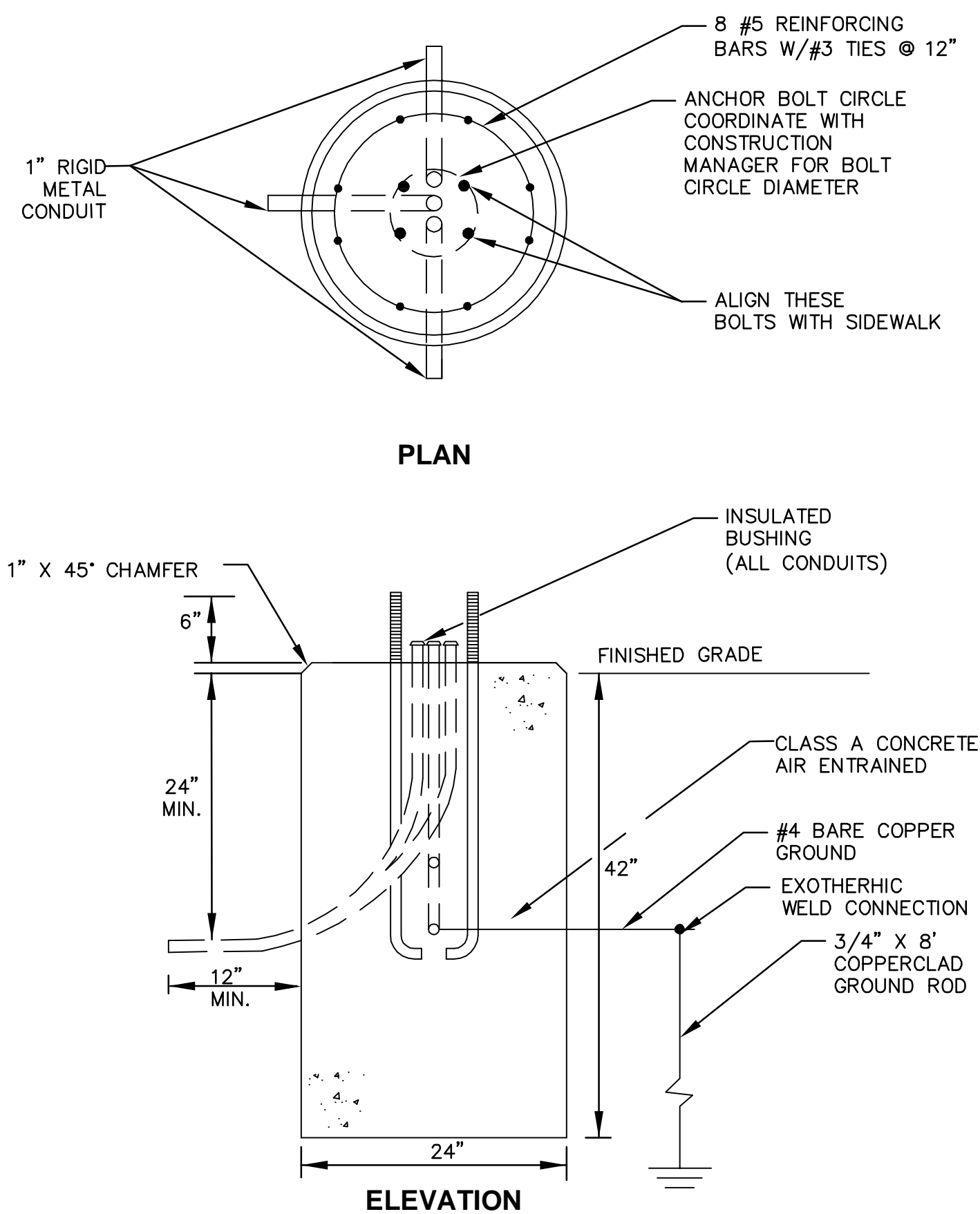
BASE FOR SITE LIGHTING
SCALE: 1" = 1'



NOTES:

1. PRECAST SWITCH GEAR VAULT SHALL BE IN ACCORDANCE WITH EVERSOURCE DETAIL SPC P-019. PROVIDE GALVANIZED STEEL PLATE SECURED OVER OPENINGS.

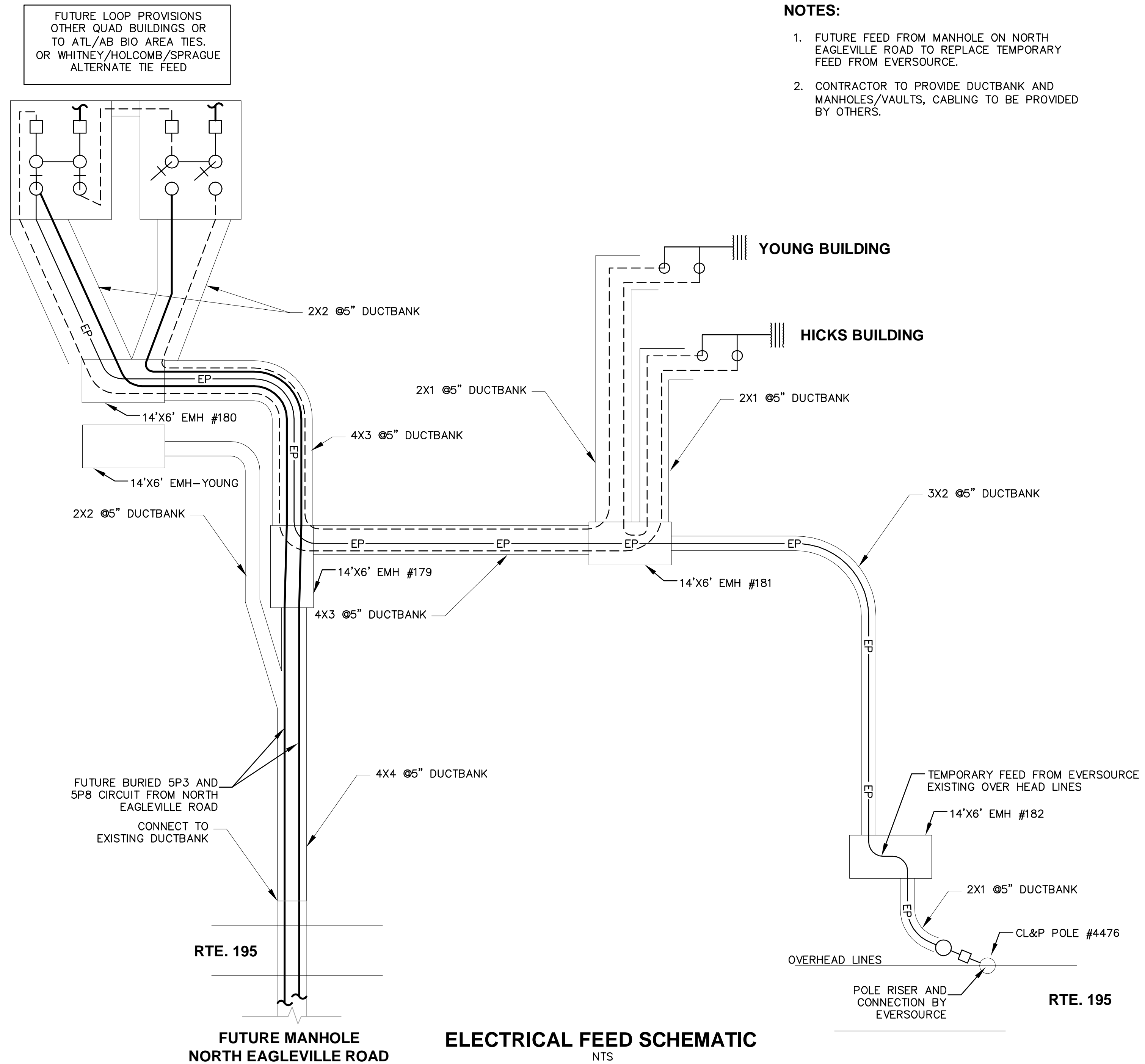
93"X80"X6" SWITCH GEAR VAULT TOP
NTS



NOTES:

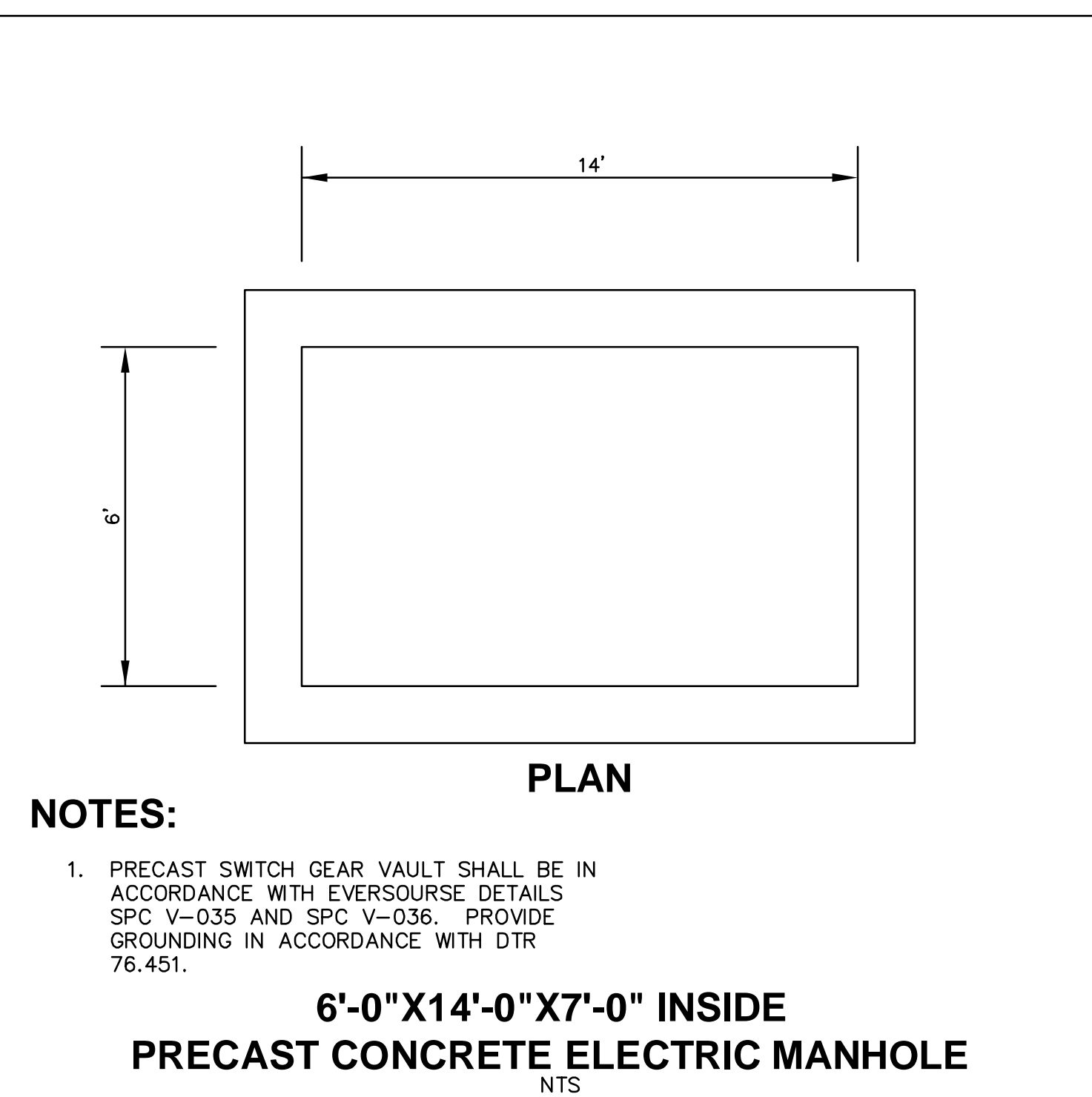
1. SALVAGED EMERGENCY PHONE STANCHIONS WILL BE MOUNTED ON THESE BASES. COORDINATE WITH CONSTRUCTION MANAGER TO CONFIRM OVERALL DIAMETER AND ANCHOR BOLT CIRCLE PRIOR TO CONSTRUCTING BASE.
2. CONDUIT SHALL BE GALVANIZED RIGID STEEL AND SHALL EXTEND 3" ABOVE TOP OF BASE.
3. ANCHOR BOLTS SHALL BE A36 STEEL, HOT DIPPED GALVANIZED, 3/4" X 24". BOLTS WITH DOUBLE NUTS AND WASHERS SHALL BE SUPPLIED BY THE CONTRACTOR.
4. ANCHOR BOLTS SHALL BE PLACED TO EXTEND 6" ABOVE THE TOP OF THE FOUNDATION. THE EXPOSED PORTION OF ANCHOR BOLT SHALL BE THREADED.
5. COORDINATE WITH LANDSCAPE DRAWINGS FOR TREATMENT OF ADJACENT SURFACE.

BASE FOR EMERGENCY PHONE
SCALE: 1" = 1'



NOTES:

1. FUTURE FEED FROM MANHOLE ON NORTH EAGLEVILLE ROAD TO REPLACE TEMPORARY FEED FROM EVERSOURCE.
2. CONTRACTOR TO PROVIDE DUCTBANK AND MANHOLES/VAULTS, CABLING TO BE PROVIDED BY OTHERS.



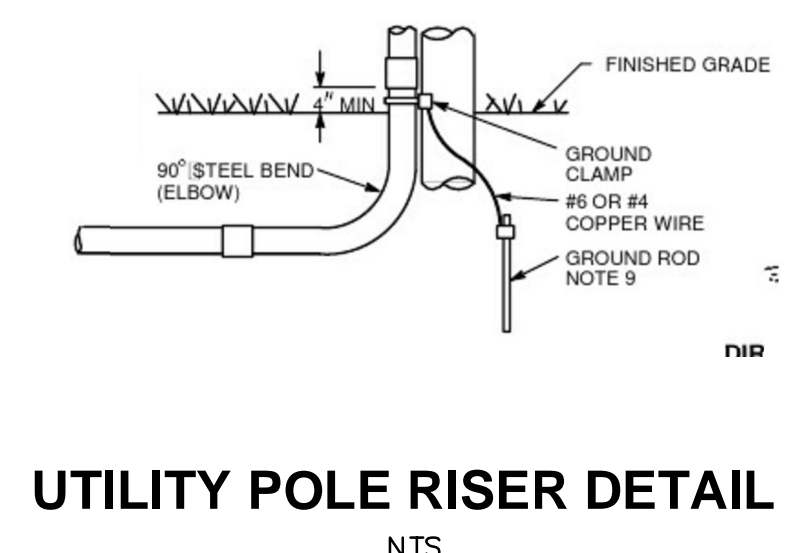
NOTES:

1. PRECAST SWITCH GEAR VAULT SHALL BE IN ACCORDANCE WITH EVERSOURCE DETAILS SPC V-035 AND SPC V-036. PROVIDE GROUNDING IN ACCORDANCE WITH DTR 76.451.

6'-0"X14'-0"X7'-0" INSIDE PRECAST CONCRETE ELECTRIC MANHOLE
NTS

NOTES:

1. CONTRACTOR SHALL CAP DUCTS 18" ABOVE GRADE AT POLE. EVERSOURCE SHALL PROVIDE RISER UP POLE.



UTILITY POLE RISER DETAIL
NTS

CERTIFICATION:

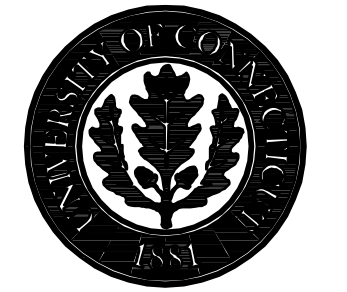
STATUS:
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CONSULTANT:

AECOM
500 ENTERPRISE DRIVE
ROCKY HILL, CT 06067
1-(860)-529-8882

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PLANNING, ARCHITECTURAL & ENGINEERING SERVICES
31 LEDOYT ROAD UNIT 3038
STORRS, CONNECTICUT 06269-3038
TELEPHONE: (860) 486-3127
FACSIMILE: (860) 486-3177

PROJECT:

NORTH EAGLEVILLE ROAD AREA
INFRASTRUCTURE REPAIR/REPLACEMENT
PHASE II
YOUNG QUAD UTILITIES

PROJECT NO: 901954

WORK ORDER NO:

FILE NAME:
P:\CIVIL\YOUNG QUAD\SHEETS\C-24

AUTHOR: PETER SAMMIS

DRAFTER: KEVIN MCKENNA

SCALE: AS NOTED

PRINT DATE: APRIL 21, 2015

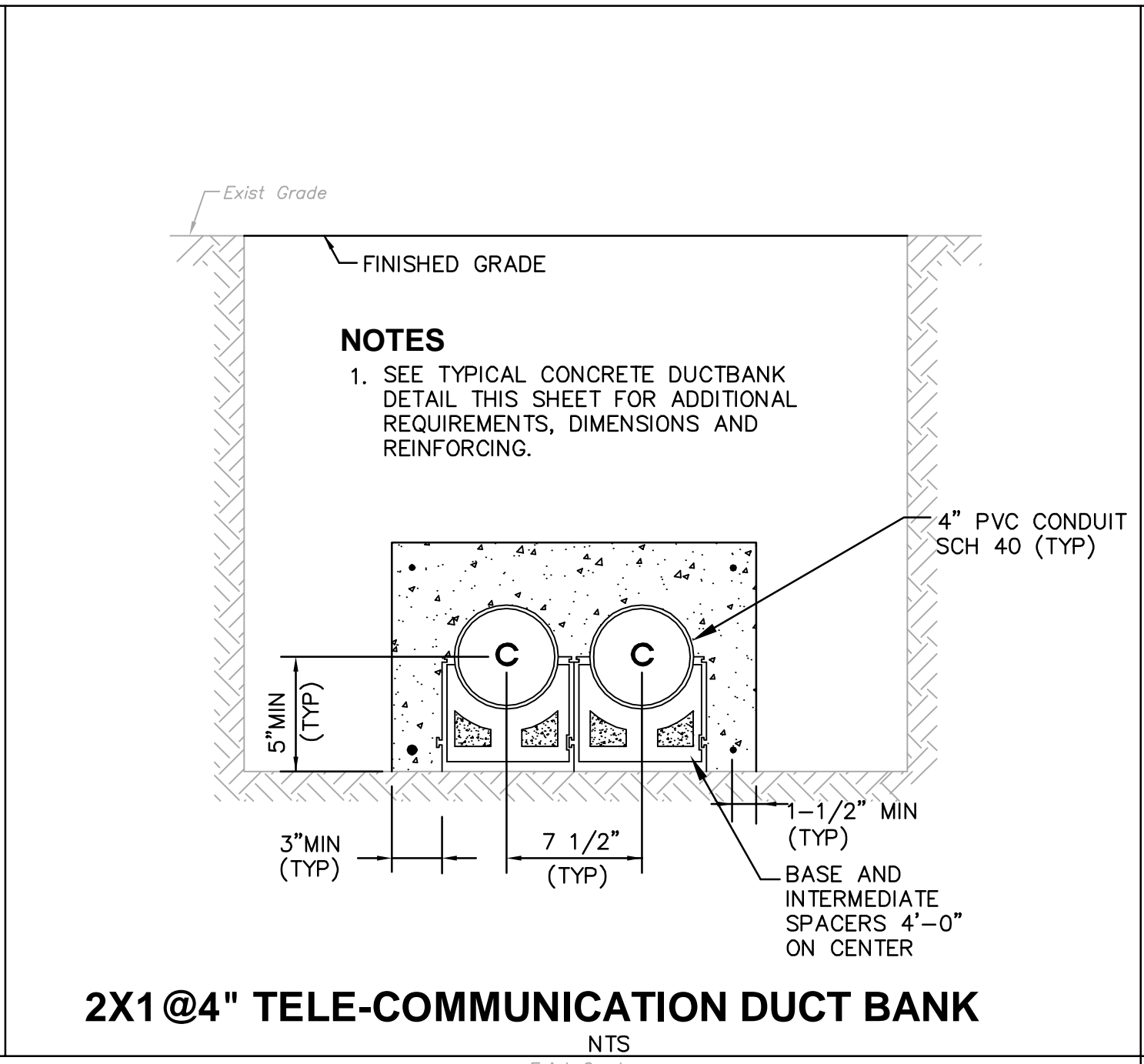
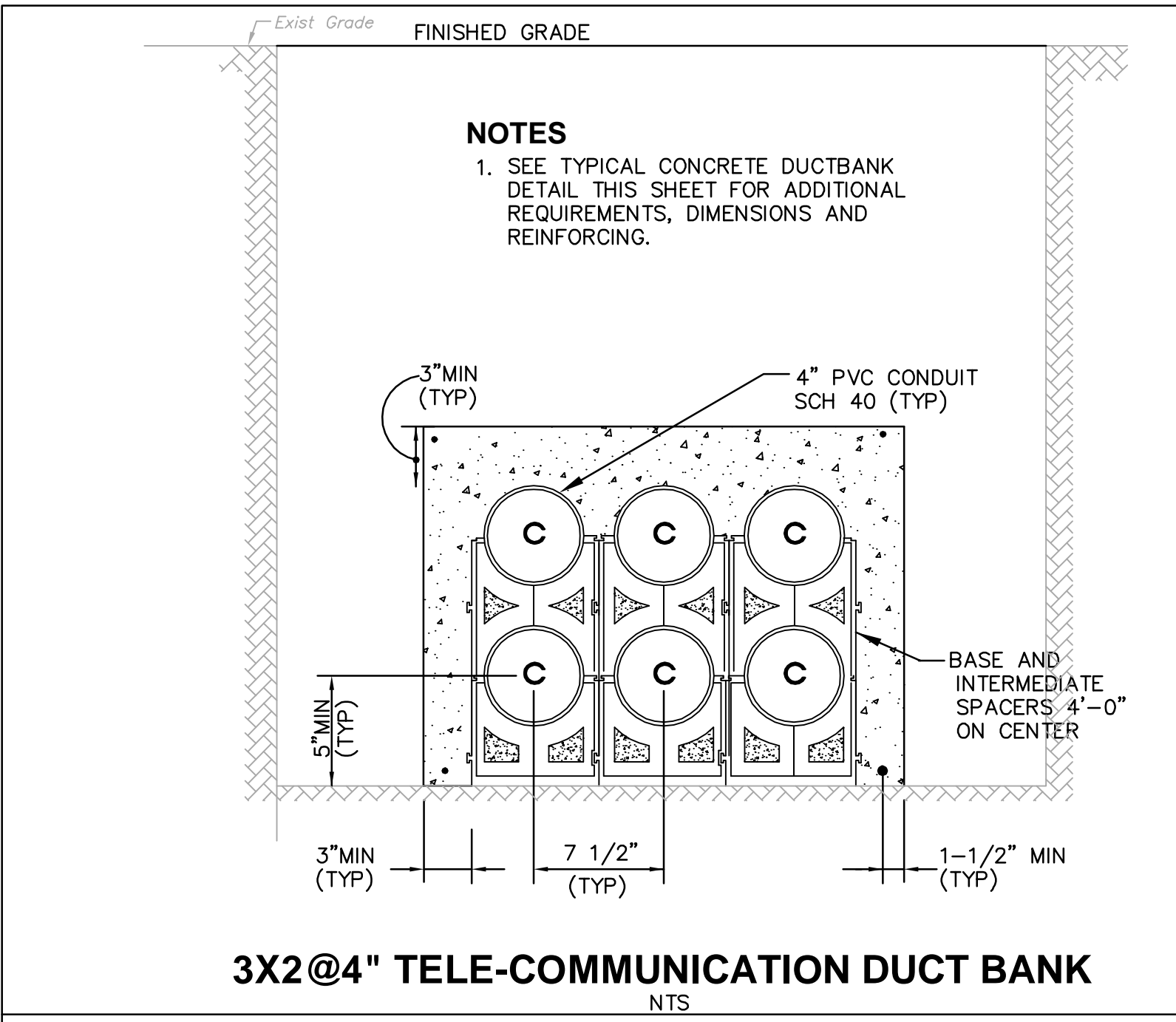
SHEET TITLE:

ELECTRICAL DETAILS

SHEET:

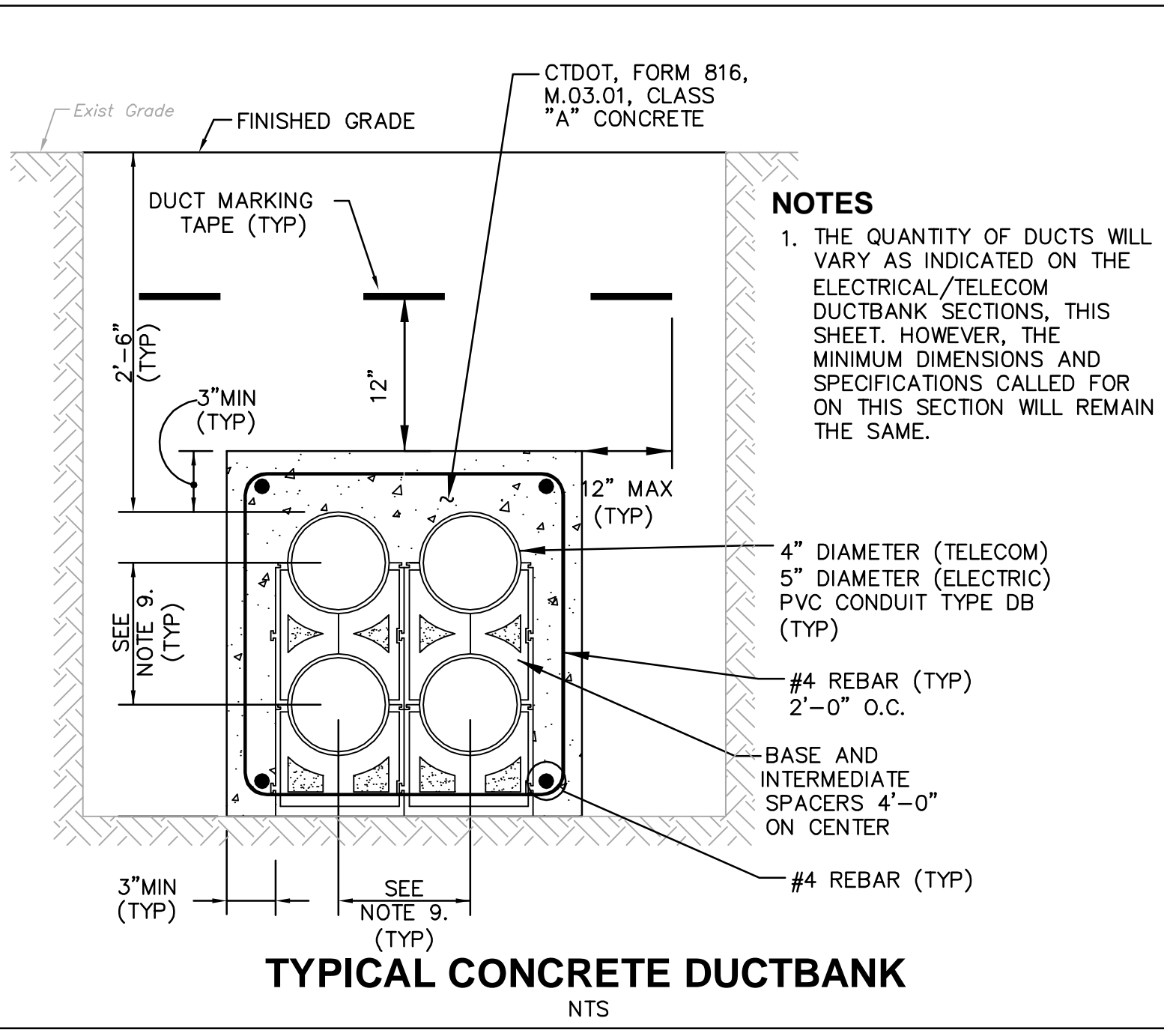
C-24

SHEET: ___ of ___



DUCTBANK GENERAL NOTES

- ALL DUCT BANKS SHALL BE CONCRETE ENCASED.
- ALL DUCT BANKS SHALL BE FORMED ON SIDES.
- DUCT BANKS SHALL BE PITCHED TOWARD MANHOLES, TO THE EXTENT POSSIBLE.
- WHERE EXISTING UTILITIES ARE LIKELY TO BE ENCOUNTERED, CONTRACTOR SHALL HAND DIG AND PROTECT EXISTING UTILITIES.
- FILL UNDER PAVED AREAS, SIDEWALKS, WALLS, ETC. TO BE COMPACTED TO 95% MAXIMUM DENSITY (ASTM D1557).
- ALL CONDUIT IN DUCTBANKS SHALL BE SCHEDULE 40 PVC UNLESS NOTED OTHERWISE.
- ALL SWEEPS AND RISER CONDUITS SHALL BE RIGID GALVANIZED STEEL CONDUIT UNLESS NOTED OTHERWISE.
- ALL CONDUITS, INCLUDING SPARE AND UNUSED CONDUITS, SHALL BE PROVIDED WITH A 3/8" NYLON DRAG LINE.
- DISTANCE BETWEEN CONDUIT CENTERS SHALL BE 7 1/2 INCHES FOR 4 INCH CONDUIT AND 8 1/2 INCH FOR 5 INCH CONDUIT.
- SEE SHEETS C-16 AND C-20 FOR ADDITIONAL GENERAL NOTES AND DETAILS.



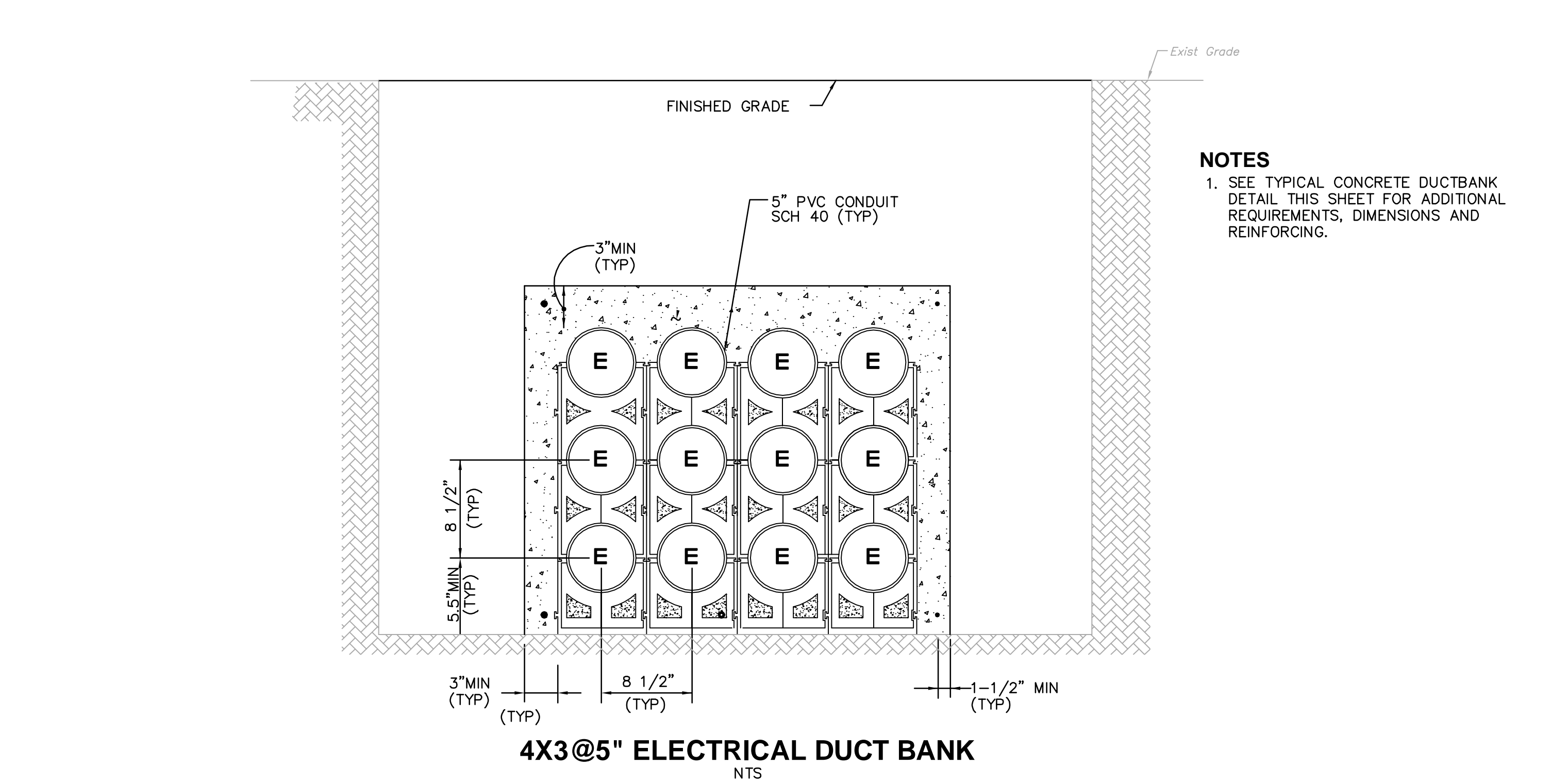
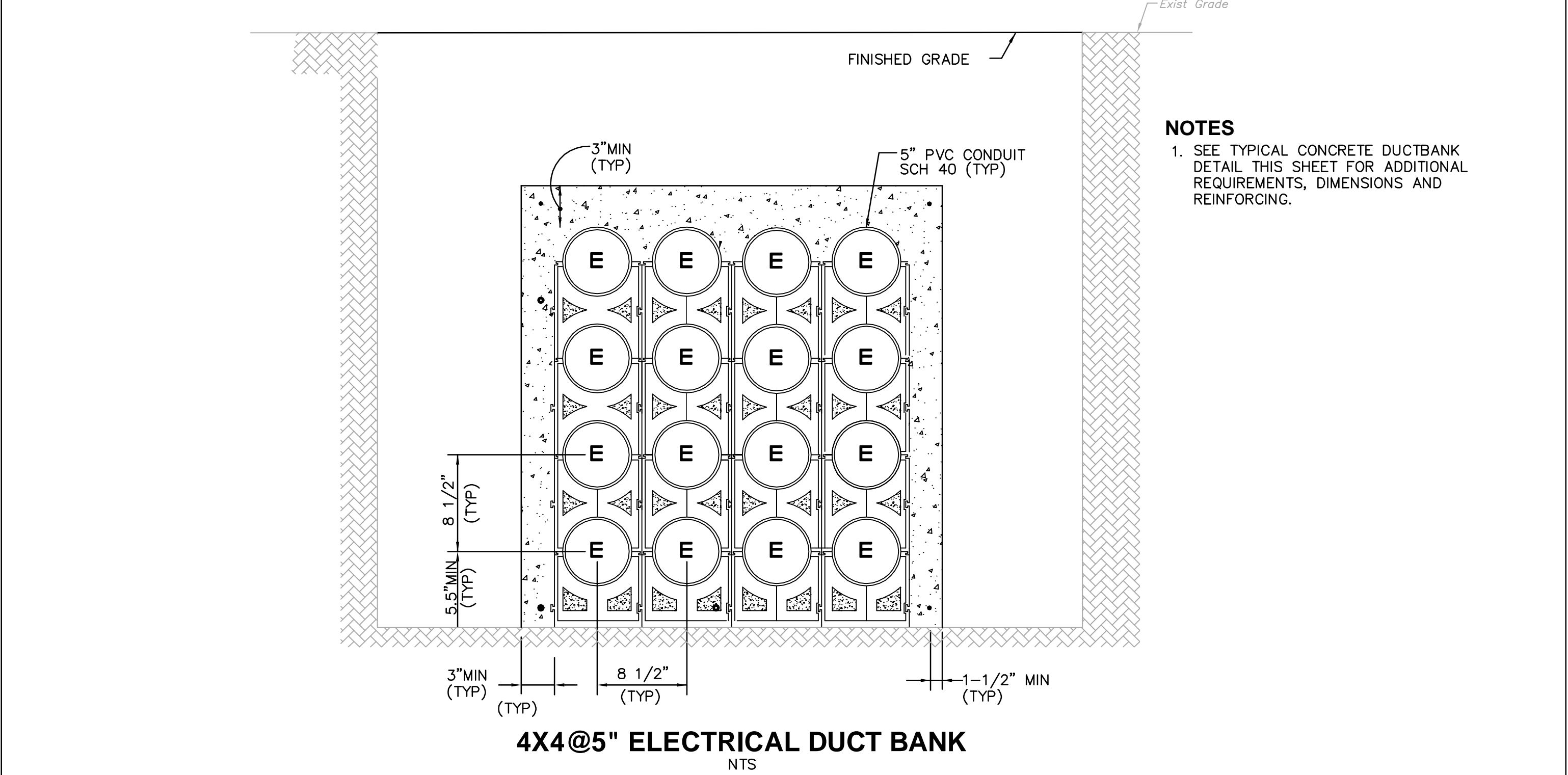
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STATUS:
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CONSULTANT:
AECOM
500 ENTERPRISE DRIVE
ROCKY HILL, CT 06067
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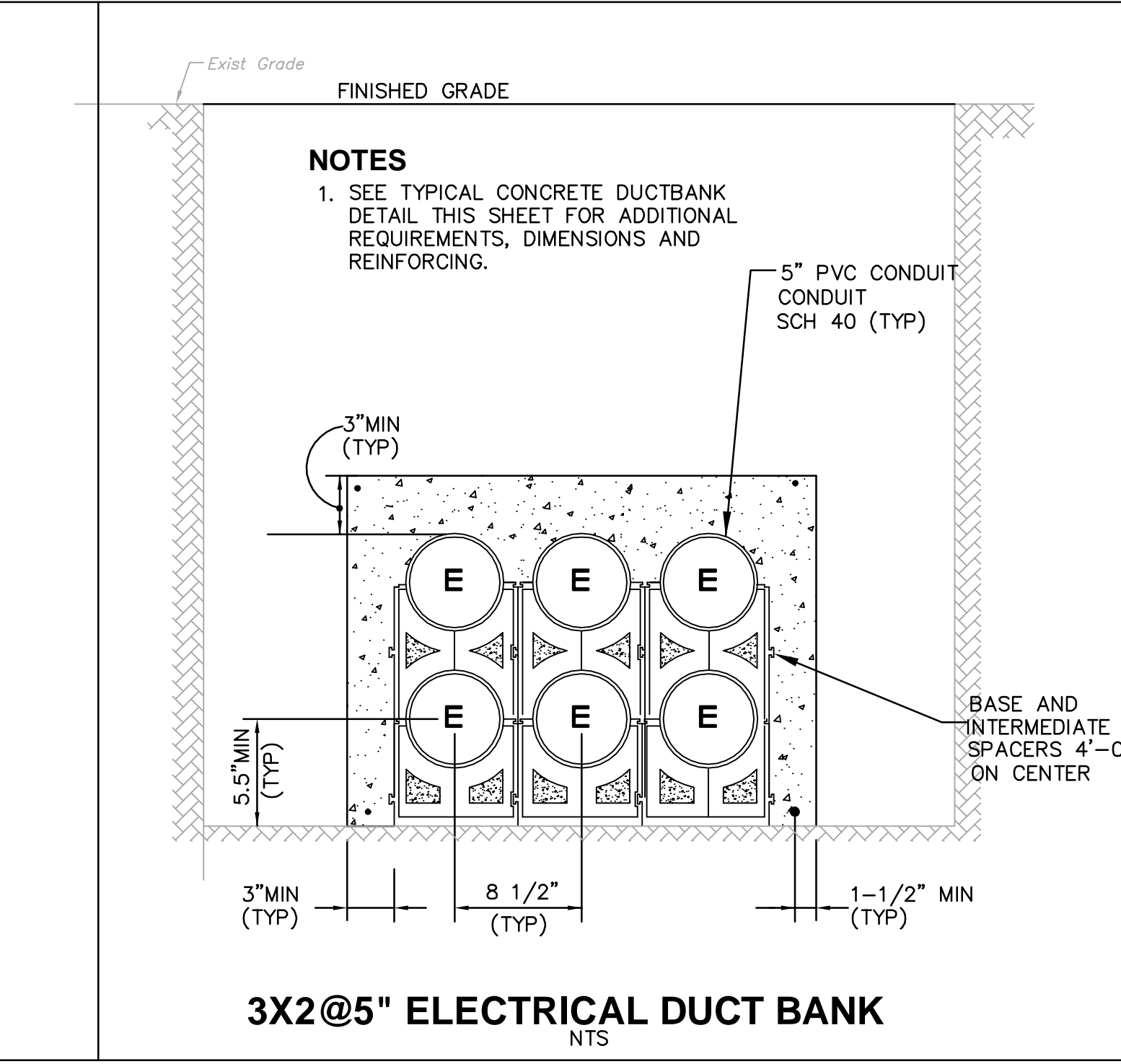
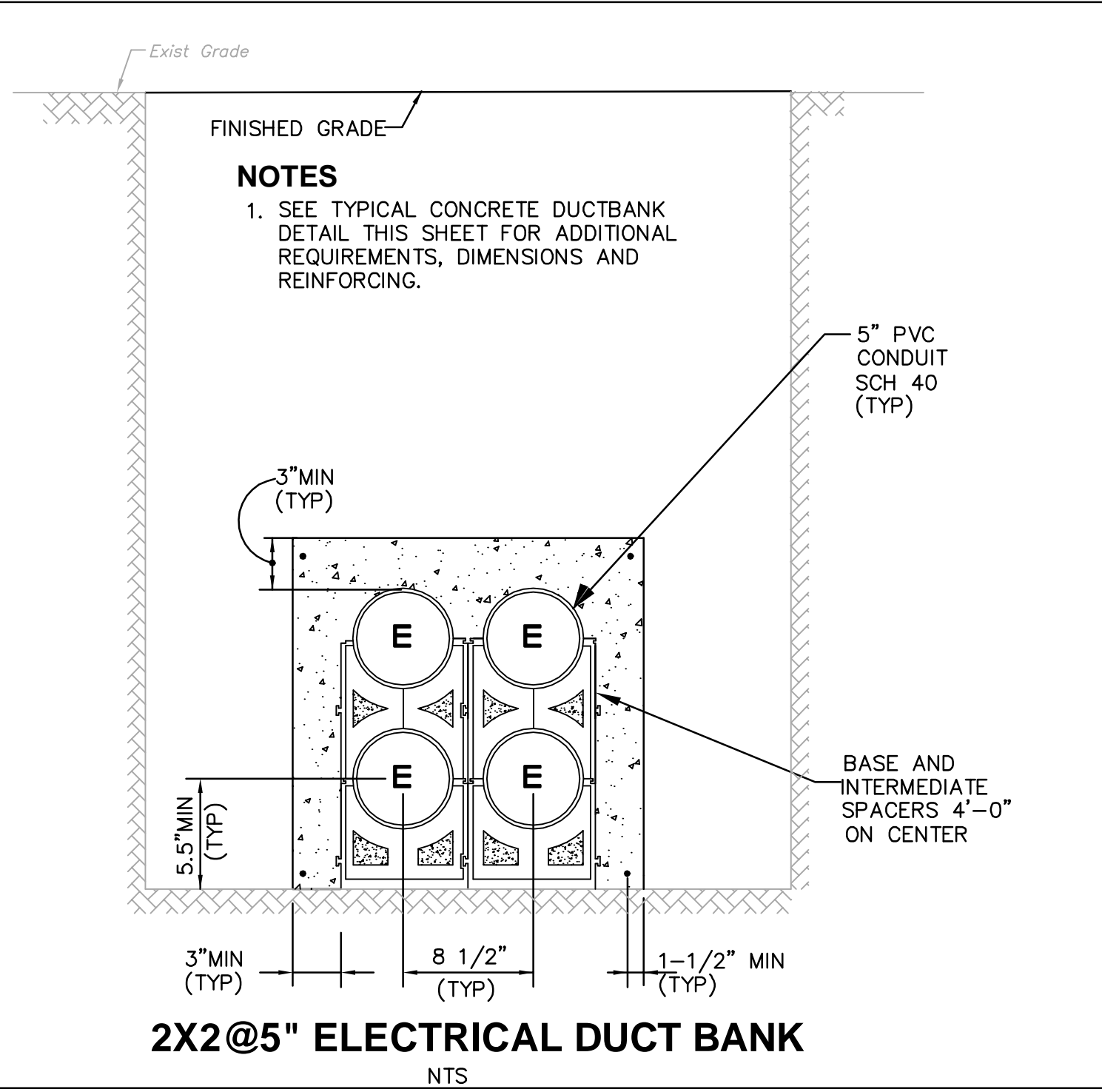
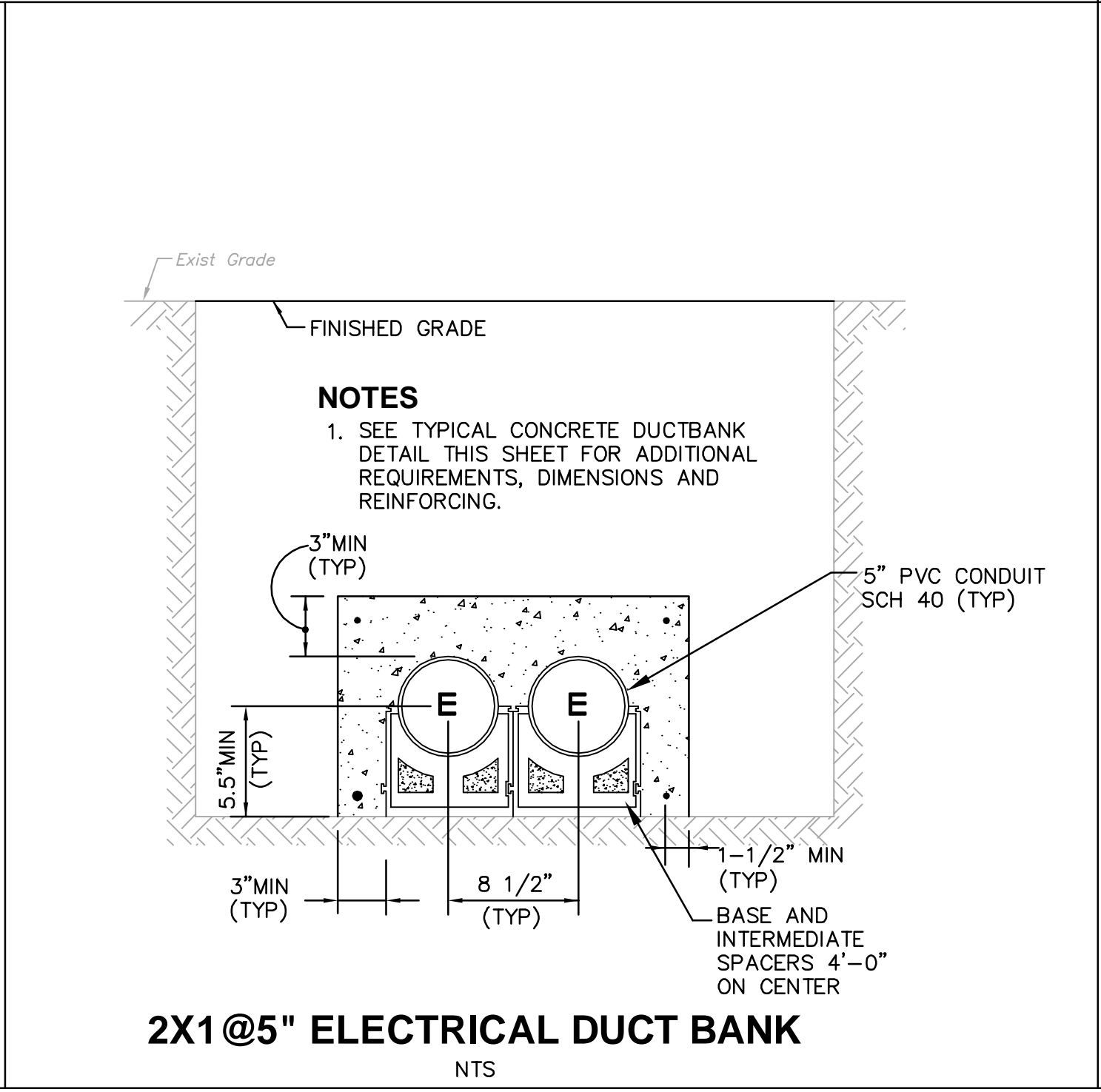
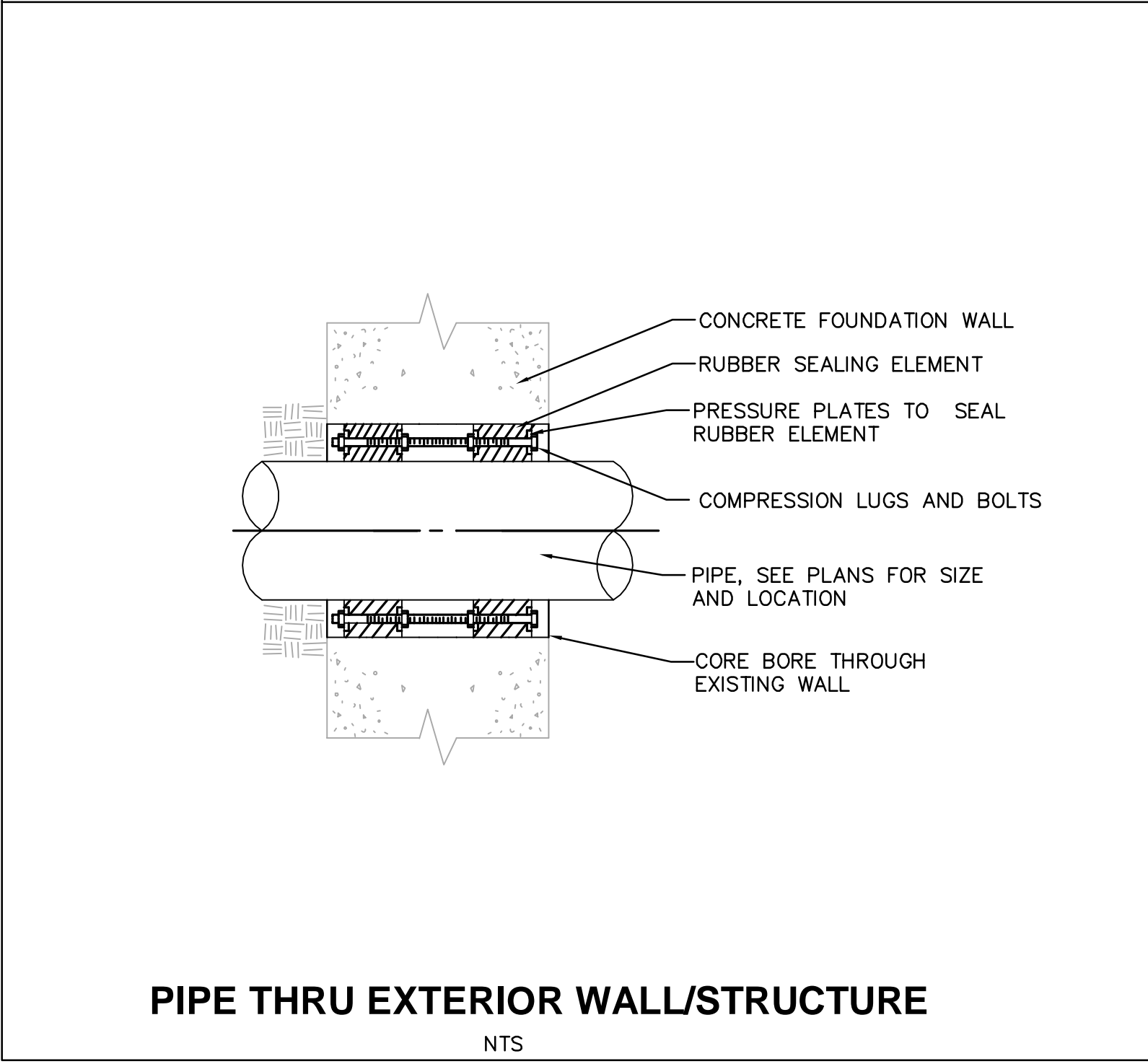
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PLANNING, ARCHITECTURAL & ENGINEERING SERVICES
31 LEDOYT ROAD UNIT 3038
STORRS, CONNECTICUT 06269-3038
TELEPHONE: (860) 486-3127
FACSIMILE: (860) 486-3177

PROJECT:



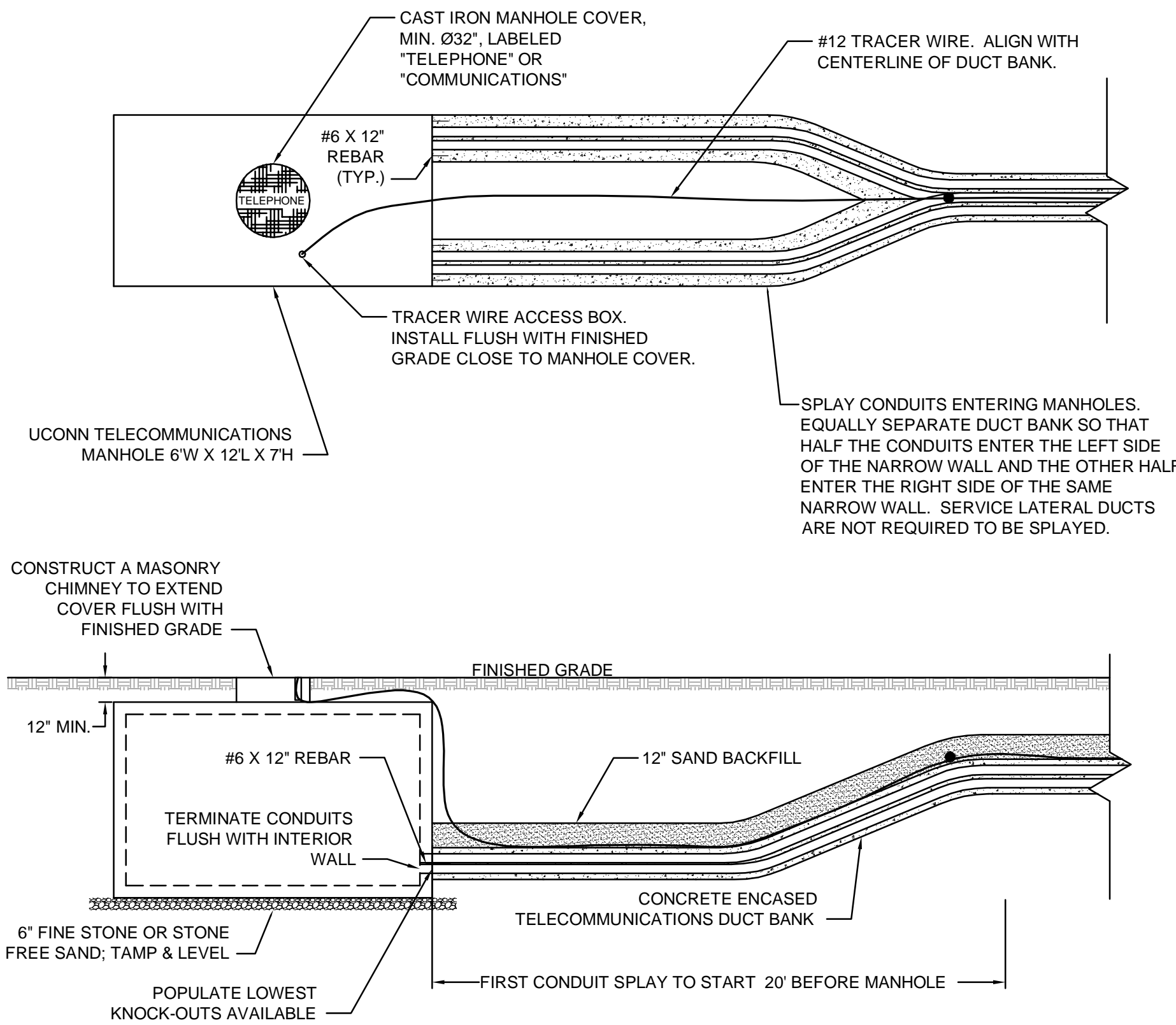
NORTH EAGLEVILLE ROAD AREA
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PHASE II
YOUNG QUAD UTILITIES

PROJECT NO: 901954
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P:\CIVIL\YOUNG QUAD\SHEETS\C-25

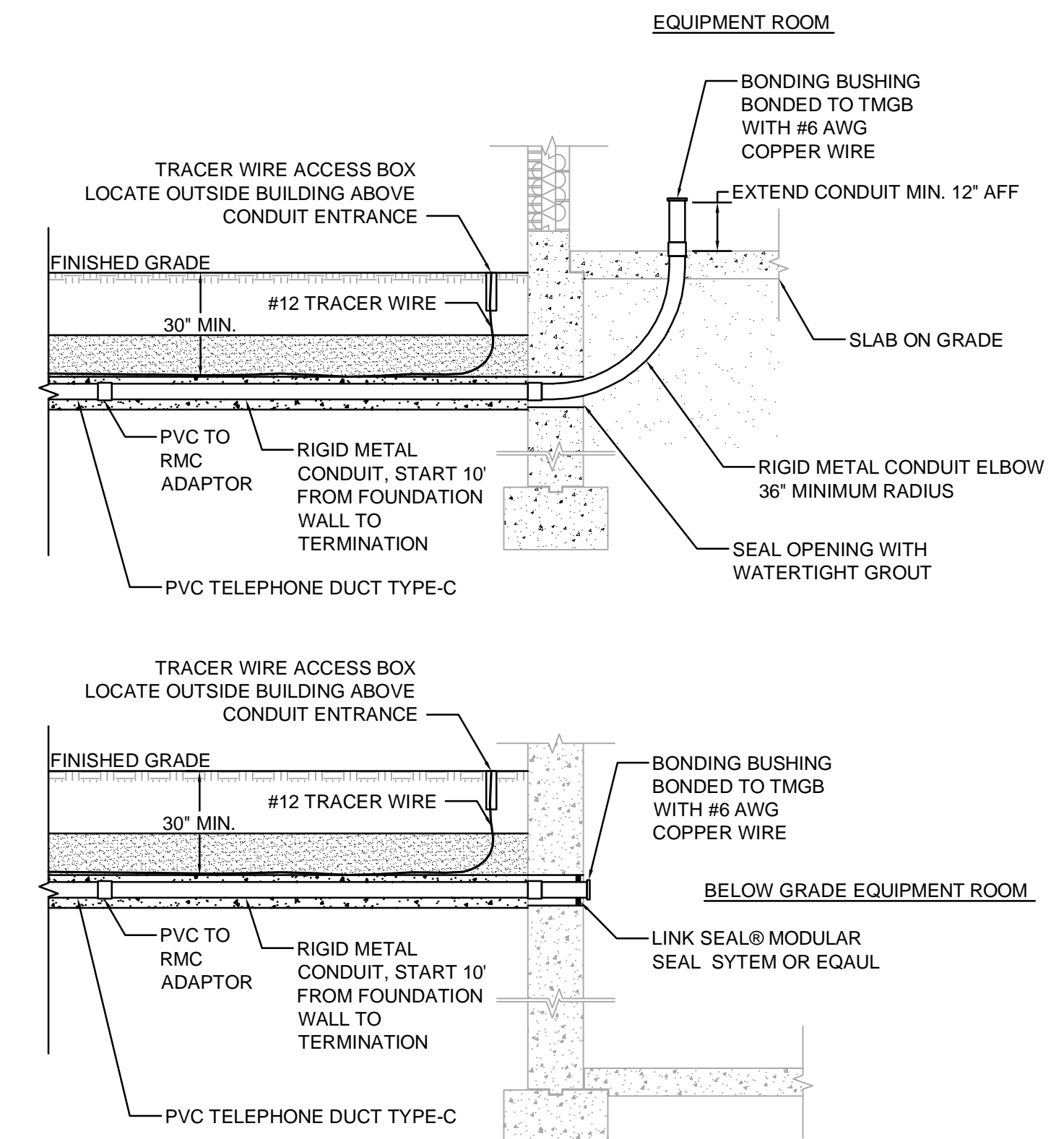
AUTHOR: PETER SAMMIS
DRAFTER: KEVIN MCKENNA
SCALE: AS NOTED
PRINT DATE: APRIL 21, 2015
SHEET TITLE:
ELECTRICAL AND TELECOMMUNICATION DUCTBANK DETAILS

SHEET: **C-25**

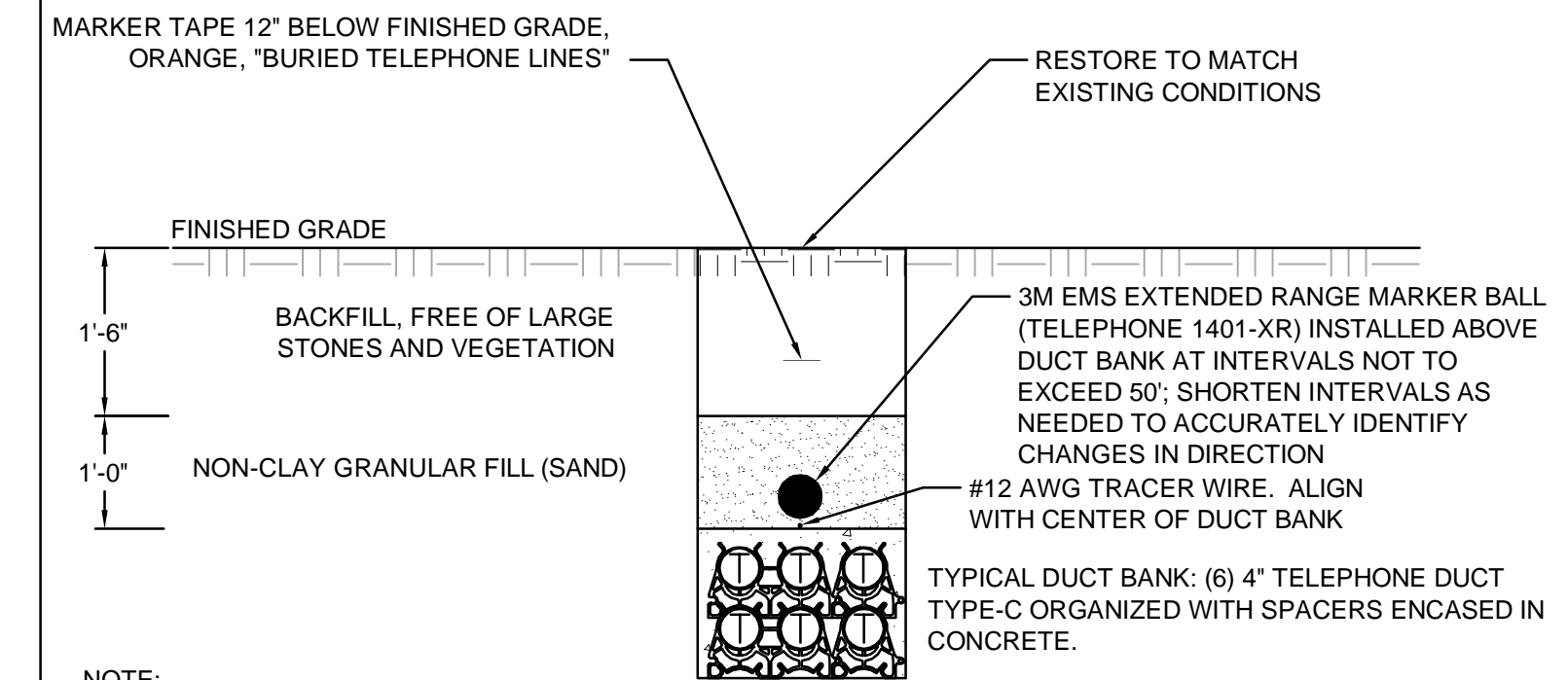
SHEET: ___ of ___



TYPICAL MANHOLE ENTRANCE DETAIL
NTS



TYPICAL BUILDING ENTRANCE DETAIL
NTS



TYPICAL DUCT BANK TRENCH DETAIL
NTS

SPECIFICATIONS:

GENERAL

- VISIT THE PROJECT LOCATION PRIOR TO THE START OF THE PROJECT; EXAMINE AND EVALUATE ALL EXISTING CONDITIONS. INCLUDED IN THIS PROJECT'S SCOPE OF WORK ARE THE PROCESSES, EQUIPMENT, SERVICES, MATERIALS, AND LABOR NECESSARY FOR THE SAFE, TIMELY, ORDERLY, AND PROPER COMPLETION OF THE PROJECT.
- ALL MEASUREMENTS ARE APPROXIMATE. VERIFY ALL DIMENSIONS WITH FIELD CONDITIONS.
- THE LOCATIONS OF ALL UNDERGROUND STRUCTURES SHOWN HERE IN ARE ACCORDING TO THE BEST AVAILABLE INFORMATION. THEY ARE NOT GUARANTEED TO BE CORRECT OR COMPLETE.
- DO NOT DEVIATE FROM THESE PLANS WITHOUT FIRST GAINING APPROVAL OF THE UNIVERSITY INFORMATION TECHNOLOGY SERVICES (UITS) PROJECT MANAGER.
- ARRANGE TO HAVE ALL UTILITIES IDENTIFY THEIR POSITIONS IN THE FIELD BEFORE STARTING EXCAVATION. *CALL-BEFORE-YOU-DIG* (800) 922-4455.
- PROTECT ALL MONUMENTS AND BENCH MARKS.
- PROTECT ALL PLANTS AND TREES AND THEIR ROOT SYSTEMS FROM MECHANICAL AND ENVIRONMENTAL DAMAGE DURING EXCAVATION. BACKFILL ROOT AREA WITH SOIL HAVING TEXTURE AND FERTILITY TO SUSTAIN PLANT LIFE.
- UNLESS OTHERWISE NOTED, MAINTAIN THE FOLLOWING MINIMUM CLEARANCES:

UTILITY	CROSSING	PARALLEL
GAS MAIN	12"	30"
GAS SERVICE	12"	12"
WATER	12"	18"
STEAM	18"	48"
ELECTRIC	12"	12"
STORM & SAN. SEWERS	12"	12"
- UNLESS OTHERWISE NOTED, MAINTAIN THE FOLLOWING MINIMUM BURIED DEPTHS. MEASURE FROM THE TOP OF THE STRUCTURE TO THE NEAREST PORTION OF FINISHED GRADE:

STRUCTURE	DEPTH
DUCT BANK	30"
MANHOLE	12"

CODES AND STANDARDS

- ALL WORK SHALL CONFORM TO THE FOLLOWING CODES AND STANDARDS:
 - CONNECTICUT BUILDING CODES WITH CONNECTICUT 2005 SUPPLEMENTS
 - ANSI/NFPA-70 2005 - NATIONAL ELECTRICAL CODE (NEC)
 - ANSI/IEEE C2 2007 - NATIONAL ELECTRICAL SAFETY CODE (NEC)
 - ANSI/IEEE 1100 2005 - RECOMMENDED PRACTICE FOR POWERING AND GROUNDING ELECTRONIC EQUIPMENT (IEEE EMERALD BOOK)
 - ANSI/TIA/EIA-569-B - COMMERCIAL BUILDING STANDARD FOR TELECOMMUNICATIONS PATHWAYS AND SPACES
 - ANSI/TIA/EIA-606-A - THE ADMINISTRATION STANDARD FOR THE TELECOMMUNICATIONS INFRASTRUCTURE OF COMMERCIAL BUILDINGS
 - ANSI-J-STD-607-A - COMMERCIAL BUILDING GROUNDING AND BONDING REQUIREMENTS FOR TELECOMMUNICATIONS
 - ANSI/TIA/EIA-568-A - CUSTOMER-OWNED OUTSIDE PLANT TELECOMMUNICATIONS CABLING STANDARD
 - TELCORDIA SR1421 - BLUE BOOK, MANUAL OF CONSTRUCTION PROCEDURES
 - ENVIRONMENTAL POLICIES OF THE UNIVERSITY OF CONNECTICUT
 - APPLICABLE FEDERAL, STATE, AND MUNICIPAL CODES AND POLICIES.
- OBTAIN ALL NECESSARY PERMITS PRIOR TO THE START OF CONSTRUCTION

MATERIALS

- MANHOLE: 38Y (SPLAY), "J"-TYPE, MADE OF PRE-CAST CONCRETE WITH THE MINIMUM INTERIOR DIMENSIONS OF 6'W X 12'L X 7'H (OLDCASTLE PRECAST TELEPHONE VAULT 322UT13BY OR EQUAL, SEE DRAWING FOR DETAILS). PROVIDE CAST IRON RINGS AND COVERS; LOAD RATED H-20; MINIMUM DIAMETER OF 32 INCHES. COVERS SHALL BE LABELED "TELEPHONE" OR "COMMUNICATIONS".
- NON-METALLIC CONDUIT: POLYVINYL CHLORIDE CONDUIT (PVC), TELEPHONE DUCT TYPE-"C", DESIGNED FOR DIRECT BURIAL OR CONCRETE ENCASEMENT APPLICATIONS; RUS LISTED, MEETS OR EXCEEDS THE REQUIREMENTS OF NEMA TC-10 AND BELLCORE CAO 8546. FITTINGS SHALL MATCH REQUIREMENTS FOR CONDUITS.
- METALLIC CONDUIT: RIGID METAL CONDUIT, STEEL, ANSI C80.1, HOT DIPPED GALVANIZED INTERIOR AND EXTERIOR, NPT THREADS, ANSI B1.20.1. FITTINGS SHALL MATCH REQUIREMENTS FOR CONDUIT.
- CONCRETE: ENCASE CONDUITS IN CONCRETE HAVING A NOMINAL COMPRESSION STRENGTH OF 2500LBS/SQ.IN. WITH 3/8" MAXIMUM AGGREGATE CRUSH STONE OR WASHED GRAVEL. (CONCRETE SLUMP SIZE: 6" MIN., 8" MAX.)
- TRACER WIRE: MINIMUM - #12AWG SOLID COPPER CONDUCTOR INSULATION TYPE THWN (GAS & OIL RESISTANT).
- TRACER WIRE ACCESS BOX: PROVIDE GRADE LEVEL ACCESS TO EACH END OF THE TRACER WIRE. ABS TUBULAR VALVE BOX WITH CAST IRON COVER, COLOR: ORANGE, ACCESSIBLE VIA STANDARD PENTAGONAL KEY. TRACER WIRE LUG ATTACHED TO UNDERSIDE OF COVER. RATED FOR ROAD SURFACE APPLICATIONS. INSTALL IN CLOSE PROXIMITY TO MANHOLE COVER WITH MAXIMUM SEPARATION OF 500' BETWEEN BOXES (E.I. COPPERHEAD INDUSTRIES, LLC "SNAKE PIT MAGNETIZED TRACER BOX" SERIES OR EQUAL)
- UTILITY MARKER BALL: 3M™ EMS 4" EXTENDED RANGE 5" BALL MARKER - TELEPHONE 1401-XR
- CONDUIT SPACERS: CARLON "SNAP-N-STACK" SP4W20-2 OR EQUAL. SPACERS SHALL MAINTAIN A MINIMUM 2" WALL-TO-WALL SEPARATION OF CONDUITS IN ALL DIRECTIONS AND ELEVATE BOTTOM CONDUITS A MINIMUM 3" ABOVE TRENCH FLOOR. MAXIMUM SPACING BETWEEN SPACERS: 7'-0"
- MULETAPE: FLAT, WOVEN POLYESTER TAPE WITH A PULLING STRENGTH OF 1250LBS. PRE-LUBRICATED FOR EASY PULLING AND DURABLY PRINTED WITH SEQUENTIAL FOOTAGE MARKINGS. (NEPTCO OR EQUAL).
- DUCT PLUGS: BLANK DUCT PLUGS MADE OF CORROSION RESISTANT HIGH-IMPACT PLASTIC. CENTER RUBBER WASHER EXPANDS WHEN TIGHTENED TO PREVENT WATER AND SEDIMENT INFILTRATION; PROVIDED WITH EYELET TO SECURE PULL ROPE. (TYCO ELECTRONICS "JACK MOON" OR EQUAL).

MANHOLES AND CONDUITS

- ALL DUCT BANKS SHALL BE CONSTRUCTED OF CONCRETE ENCASED NON-METALLIC CONDUIT. ALL BENDS SHALL HAVE A MINIMUM RADIUS OF 36 INCHES. UTILIZE MANUFACTURED BENDS WHERE EVER POSSIBLE. WHERE BENDS ARE PERFORMED IN THE FIELD, PROTECT CONDUITS AGAINST KINKS OR DISTORTION OF SHAPE.
- FEEDER AND DISTRIBUTION DUCTS SHALL ENTER ON THE NARROW WALLS OF THE MANHOLES. DUCT PROVIDING SERVICE LATERALS TO BUILDINGS MAY ENTER ON THE LONG WALLS.
- CONDUITS SHALL NOT ENTER THE MANHOLE IN THE COVER CHIMNEY.
- CONDUITS SHALL ENTER MANHOLES PERPENDICULAR TO THE WALL
- UTILIZE INSTALLED TERMADUCTS FOR INSTALLING CONDUITS INTO MANHOLES WHENEVER POSSIBLE. POPULATE THE THE LOWEST KNOCK-OUTS AVAILABLE TO ALLOW FOR EXPANSION. CONDUITS SHALL BE INSTALLED FLUSH WITH THE INTERIOR WALL OF THE MANHOLE AND SHALL NOT PROTRUDE INTO THE INTERIOR SPACE.
- SPLAY CONDUITS ENTERING TELECOMMUNICATION MANHOLES. EQUALLY SEPARATE DUCT BANKS SO THAT HALF THE CONDUITS WILL ENTER NEAR THE LEFT CORNER OF THE NARROW WALL AND THE OTHER HALF WILL ENTER NEAR THE RIGHT CORNER OF THE SAME NARROW WALL. THE SPLAYING OF THE CONDUITS SHOULD START AT LEAST 20" FROM THE MANHOLE. SERVICE LATERAL DUCTS ARE NOT REQUIRED TO BE SPLAYED.
- WHERE POSSIBLE, ORGANIZE CONDUITS IN SUCH A MANNER AS TO PROVIDE "IN-LINE" OR "PULL-THROUGH" CABLE INSTALLATIONS.
- PROVIDE #6 X 12" STEEL REINFORCING BARS INSERTED INTO MANHOLE WALLS PRIOR TO CONCRETE ENCASEMENT OF DUCT BANK.
- AT ALL ROAD AND DRIVEWAY CROSSINGS THE DUCT BANK CONCRETE SHALL BE REINFORCED WITH ENGINEER DESIGNED STEEL REINFORCEMENT.
- PROVIDE RIGID METAL CONDUIT AT THE ENTRANCE TO EACH BUILDING STARTING AT 10' (MIN.) OUTSIDE THE FOUNDATION WALL TO TERMINATION IN THE EQUIPMENT ROOM. BOND CONDUITS TO THE TMGB WITH A #6 AWG COPPER GROUND WIRE AND BONDING BUSHINGS.
- PATCH WALLS AROUND CONDUIT ENTRANCES WITH HYDRAULIC CEMENT OR WATERTIGHT GROUT TO PREVENT WATER INFILTRATION. SEAL ALL CONDUIT ENTRANCES INTO A BELOW GRADE BUILDING SPACE WITH A MECHANICAL MODULAR SEALING SYSTEM (LINK SEAL® OR EQUAL).
- CEMENT ALL PVC CONDUIT JOINTS USING A PVC PRIMER AND SOLVENT CEMENT.
- ALL UNDERGROUND CONDUITS SHALL BE ENCASED IN CONCRETE. WORK CONCRETE TO REMOVE ALL TRAPPED AIR AND INSURE EACH CONDUIT IS COMPLETELY SURROUNDED BY A MINIMUM 2" OF CONCRETE. ALLOW CONCRETE TO CURE FOR AT LEAST ONE HOUR BEFORE BACKFILLING.
- SEAL ALL CONDUIT ENDS WITH BLANK DUCT PLUGS. SECURE MULETAPE TO DUCT PLUG.
- TRAFFIC & SAFETY**
- PROVIDE SIGNS, BARRICADES, DRUMS, TRAFFIC CONES, FENCING, DELINEATORS, AND TRAFFIC CONTROL OFFICERS TO MAINTAIN A SAFE "WORK ZONE", INSURE SAFE TRAFFIC PATTERNS, AND RESTRICT PUBLIC ACCESS TO THE WORK SITE.
- COORDINATE WORK SCHEDULE WITH UITS PROJECT MANAGER TO MAINTAIN BUILDING ACCESS AND MINIMIZE TRAFFIC DISRUPTIONS.
- PROVIDE SHORING AND EXERCISE SAFE TRENCHING PRACTICES AS REQUIRED BY OSHA.
- BACKFILL**
- PLACE TRACER WIRE ON TOP AND ALONG THE CENTERLINE OF DUCT BANK.
- THE FIRST 12" OF FILL SHALL BE SAND OR OTHER GRANULAR MATERIAL TAMPED USING LIGHTWEIGHT EQUIPMENT SUCH AS PNEUMATIC OR VIBRATING TAMPERS.
- INSTALL UTILITY MARKER BALLS ABOVE DUCT BANK AT INTERVALS NOT EXCEED 50' WHEN DUCT BANK IS IN A STRAIGHT LINE. SHORTEN INTERVALS AS APPROPRIATE TO ACCURATELY IDENTIFY CHANGES IN DIRECTION.
- BACKFILL SHALL BE FREE FROM LARGE STONES, FROZEN MATERIALS, WOOD, AND OTHER EXTRANEIOUS MATERIALS.
- PLACE BACKFILL IN LAYERS NOT EXCEED 6". THOROUGHLY COMPACT EACH LAYER.
- PLACE A PLASTIC MARKING TAPE ABOVE THE DUCT BANK AND 12" BELOW FINISHED GRADE. THE PLASTIC TAPE SHALL CLEARLY INDICATE THAT THERE IS A BURIED TELECOMMUNICATIONS UTILITY STRUCTURE BELOW.
- RESTORATION AND EROSION PROTECTION**
- CUT BACK ALL CONCRETE AND BITUMINOUS CONCRETE SURFACES 1'-6"
- RESTORE ALL DISTURBED FOOTPATHS, WALKWAYS, SIDEWALKS, DRIVEWAYS AND ROADWAYS TO MATCH EXISTING MATERIALS AND DEPTHS ("LIKE-FOR-LIKE").
- REFER TO UNIVERSITY DESIGN GUIDE AND STANDARDS, DIV 2, SECT 500.A FOR TYPE AND THICKNESS OF ROADWAY BASE SURFACE COURSES.
- WHERE "LATERALLY" CROSSING UNDER A CONCRETE SIDEWALK WITH A DUCT BANK, REPLACE/RESTORE NO LESS THAN "FULL SQUARE" INCREMENTS OF WALKWAY (E.I. DUMMY JOINT TO DUMMY JOINT OR DUMMY JOINT TO EXPANSION JOINT). PROVIDE A FELT EXPANSION JOINT AT EACH ABUTTING JOINT.
- REFER TO UNIVERSITY DESIGN GUIDE AND STANDARDS, DIV 2, SECT 500.B FOR DETAILS ON CONCRETE PAVING FOR PERMANENT SIDEWALKS.
- PROVIDE EROSION AND SEDIMENT CONTROLS ALONG THE ENTIRE LENGTH OF THE EXCAVATION.
- TESTING AND AS-BUILT DOCUMENTATION**
- ROD AND MANDREL EACH CONDUIT AND PROVIDE A 1250LBS TEST "MULETAPE".
- UTILIZING A 3M "DYNATEL" LOCATING TOOL IDENTIFY THE DUCT BANK'S PATH BY BOTH TRACER WIRE AND MARKER BALLS. THE UITS PROJECT MANAGER MUST BE PRESENT FOR THIS TEST.
- PROVIDE AS-BUILT AUTODESK AUTOCAD DRAWINGS THAT ACCURATELY PROVIDE THE FOLLOWING INFORMATION:
 - THE INSTALLED DUCT BANK'S LOCATION
 - CALLOUTS SHOWING A CROSS-SECTION DETAIL OF EACH DUCT BANK SEGMENT
 - WALL-TO-WALL CONDUIT DISTANCES
 - TRIANGULATION REFERENCES FROM PERMANENT LANDMARKS TO VARIOUS POINTS OF THE DUCT BANK
 - GIS COORDINATES OF EACH MANHOLE COVER AND UTILITY MARKER BALL LOCATION ALONG THE DUCT BANK'S PATH
 - MANHOLE WALL ELEVATION DRAWINGS SHOWING CONDUIT IDENTIFIERS AND LOCATIONS.

CERTIFICATION:

STATUS:

Not for Construction

CONSULTANT:

AECOM
500 ENTERPRISE DRIVE
ROCKY HILL, CT 06067
1-(860)-529-8882

REVISIONS:

MARK	DATE	DESCRIPTION



UNIVERSITY OF CONNECTICUT
PLANNING, ARCHITECTURAL & ENGINEERING SERVICES
31 LEDOYT ROAD UNIT 3038
STORRS, CONNECTICUT 06269-3038
TELEPHONE: (860) 486-3127
FACSIMILE: (860) 486-3177

PROJECT:

NORTH EAGLEVILLE ROAD AREA
INFRASTRUCTURE REPAIR/REPLACEMENT
PHASE II
YOUNG QUAD UTILITIES

PROJECT NO: 901954

WORK ORDER NO:

FILE NAME:

P:\CIVIL\YOUNG QUAD\SHEETS\C-26

AUTHOR: PETER SAMMIS

DRAFTER: KEVIN MCKENNA

SCALE: AS NOTED

PRINT DATE: APRIL 21, 2015

SHEET TITLE:

TELE-COMMUNICATION DETAILS

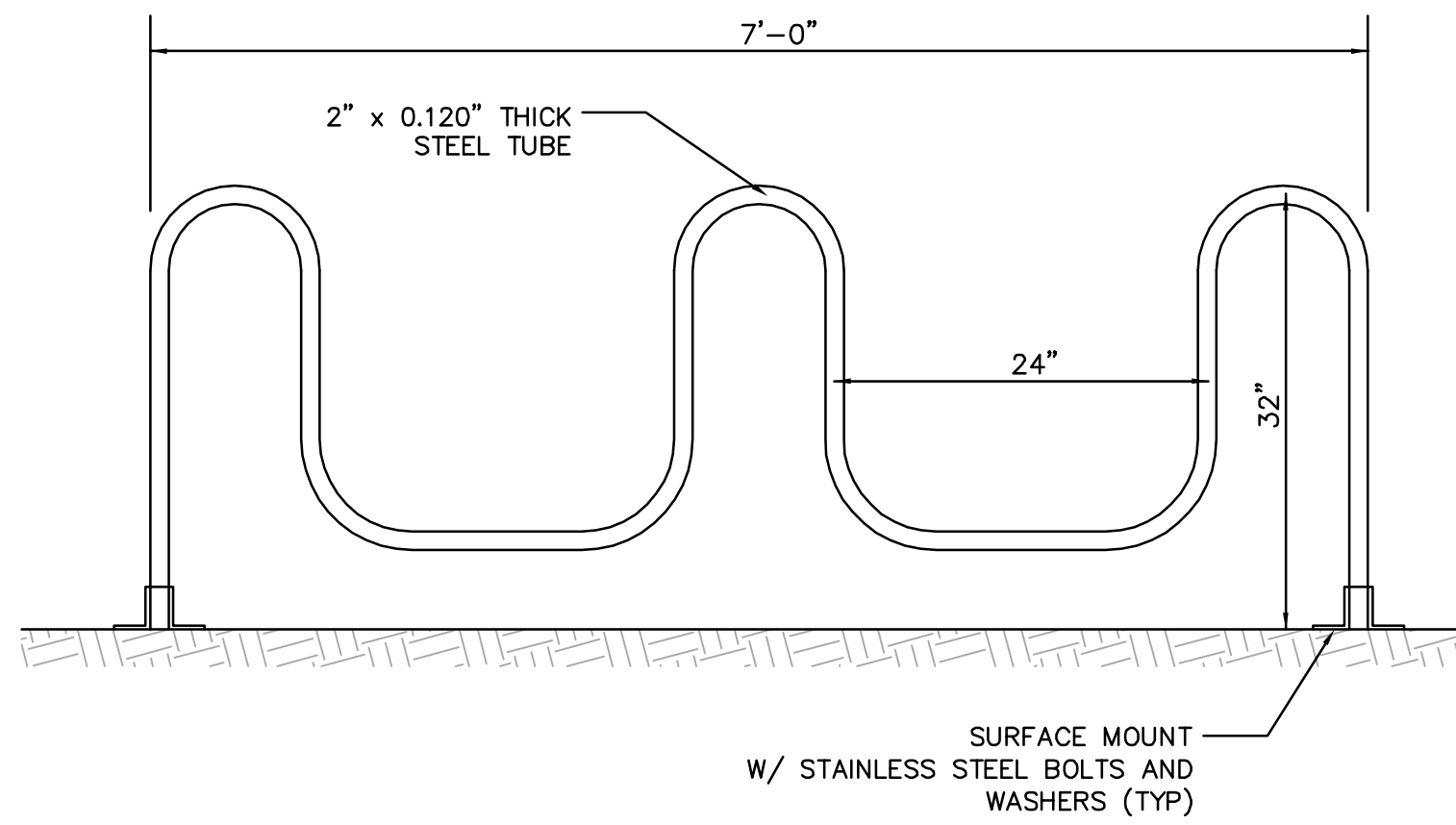
SHEET:

C-26

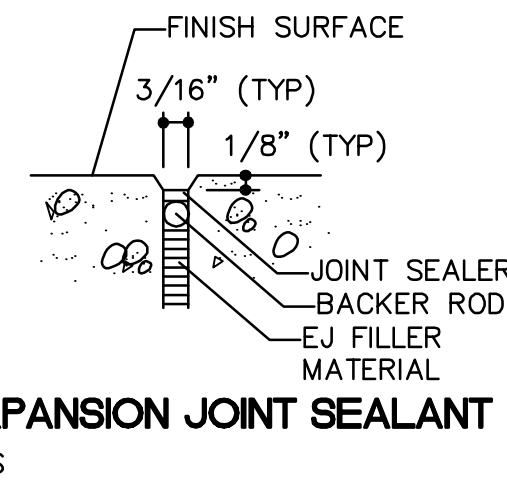
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NOTE

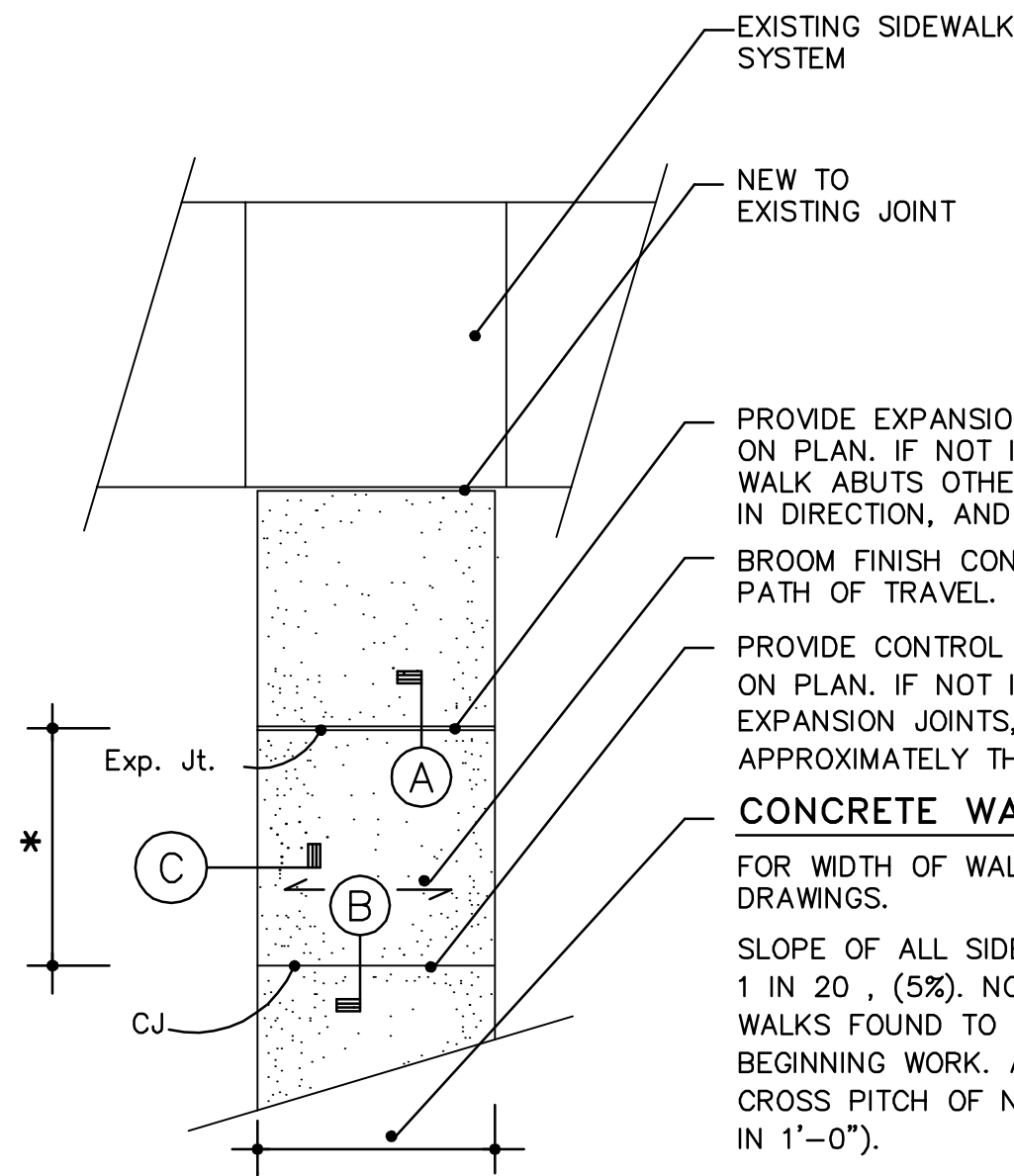
1. LINEAR BIKE RACK MODEL BR6 AS MANUFACTURED BY FUNCTION FIRST DESIGN, LLC.
2. FINISH TO BE POWDER COATED - BLACK.
3. PROVIDE SURFACE MOUNTING PLATES WITH BIKE RACK.



BIKE RACK
NTS



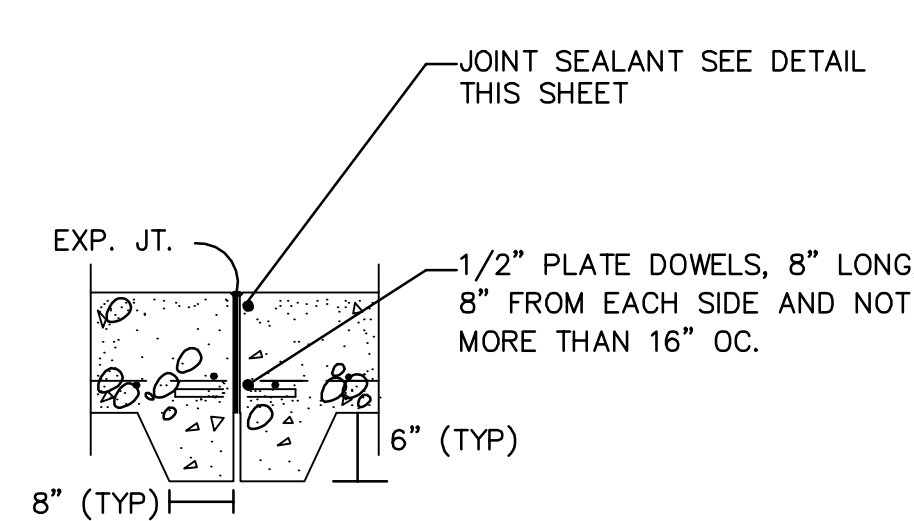
EXPANSION JOINT SEALANT
NTS



PROVIDE EXPANSION JOINTS WHERE SO INDICATED ON PLAN. IF NOT INDICATED, PROVIDE WHERE WALK ABUTS OTHER CONSTRUCTIONS, AT CHANGES IN DIRECTION, AND AT APPROXIMATELY 20' O.C.
BROOM FINISH CONCRETE PERPENDICULAR TO THE PATH OF TRAVEL.
PROVIDE CONTROL JOINTS WHERE SO INDICATED ON PLAN. IF NOT INDICATED, PROVIDE BETWEEN EXPANSION JOINTS, EQUALLY SPACED APPROXIMATELY THE WIDTH OF THE WALK.

CONCRETE WALK SYSTEM

FOR WIDTH OF WALKS OR RAMPS REFER TO DRAWINGS.
SLOPE OF ALL SIDEWALKS SHALL BE LESS THAN 1 IN 20, (5%). NOTIFY THE ARCHITECT OF ALL WALKS FOUND TO BE IN EXCESS OF 5% BEFORE BEGINNING WORK. ALL WALKS SHALL HAVE A CROSS PITCH OF NOT MORE THAN 1% (1/8" IN 1'-0").



EXPANSION JOINT
NTS

FORM CONTROL JOINTS AS INDICATED. TOOL THE JOINT EDGES AND FINISH THE SLAB WITH A BROOM FINISH TEXTURE PERPENDICULAR TO THE DIRECTION OF TRAVEL. THERE SHALL BE NO VARIATIONS BETWEEN THE PLANE OF THE SIDEWALK SURFACE AND THE TOOLED JOINT SURFACE IN EXCESS OF 1/16".

CONTROL JOINT
NTS

CONCRETE SIDEWALK DETAILS
NTS

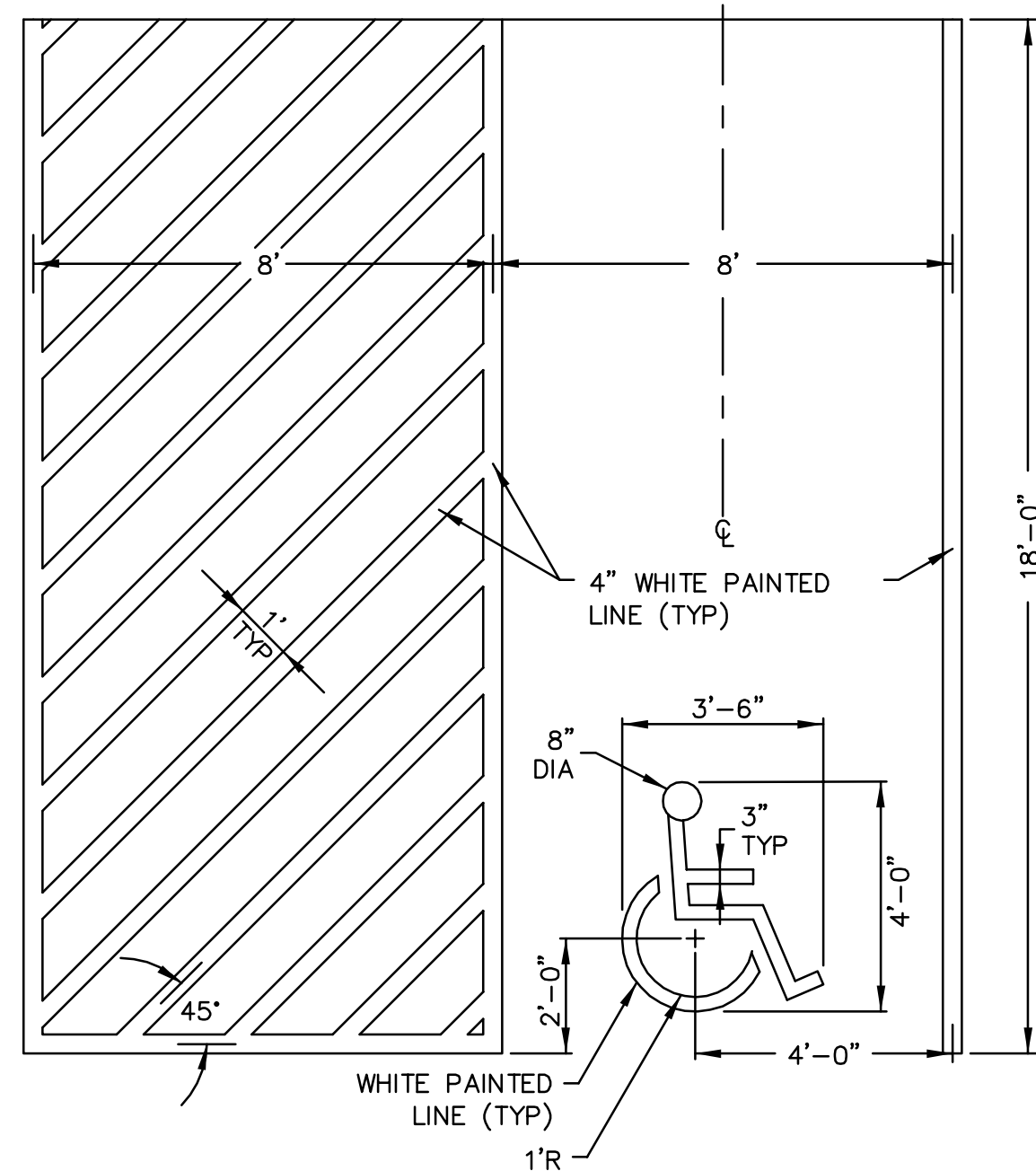
PLACE 8" OF TOPSOIL AT EDGES OF WALK, WHERE REQUIRED. REPAIR EXISTING GRASS AND RESEED AS REQUIRED TO REESTABLISH LAWN AREAS.
CONCRETE WALK OR RAMP. CHAMFER OR TOOL ALL EXTERIOR CORNERS 1/2" - 3/4". PROVIDE 6" THICK WALK, UNLESS INDICATED OTHERWISE.

4X4/4X4 WELDED WIRE FABRIC IN FLAT SHEETS, LAP NOT LESS THAN 12". FABRIC SHALL BE CONT. THROUGH CONTROL JOINTS AND DISCONTINUOUS AT EXPANSION JOINTS. SET FABRIC ON METAL CHAIRS PLACED 1'-4" O.C. EACH WAY. DO NOT DISPLACE REINFORCING. DO NOT WALK ON REINFORCING WHEN PLACING OR FINISHING CONCRETE.
TYPICAL BASE: MINIMUM OF 8" COMPACTED, GRANULAR MATERIAL "CRUSHER-RUN STONE" AGGREGATE BASE, ON COMPACTED SUBSTRATA OR BORROW FILL. MATCH DEPTH OF THE EXISTING BASE IF IN EXCESS OF 8". PROVIDE DOT GRADATION A.

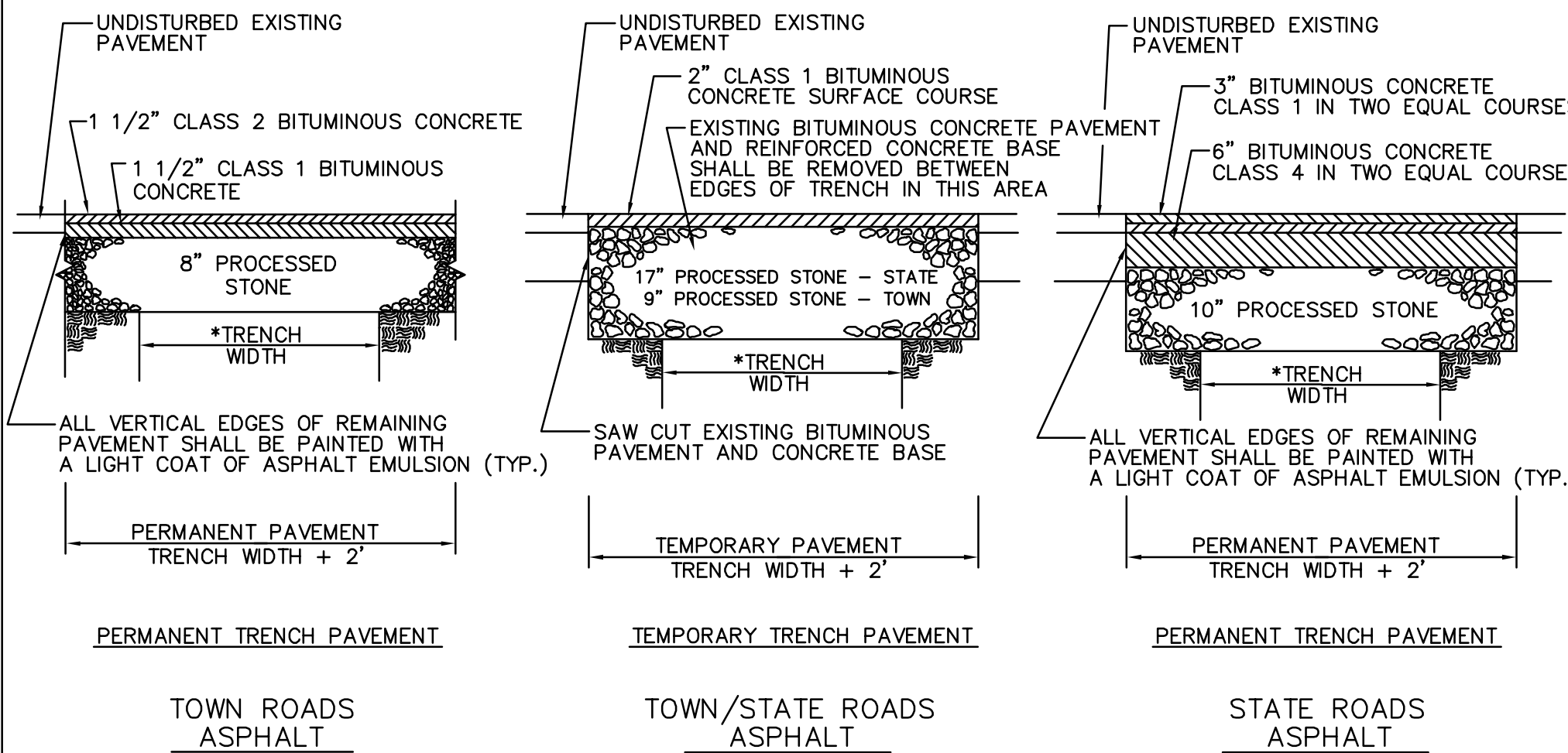
SIDEWALK DETAIL
NTS

NOTE:

1. EACH SPACE TO INCLUDE STATE PERMIT SIGNAGE.(CONN COT# 31-0629)
2. 2% MAXIMUM SLOPE IN ALL DIRECTIONS.

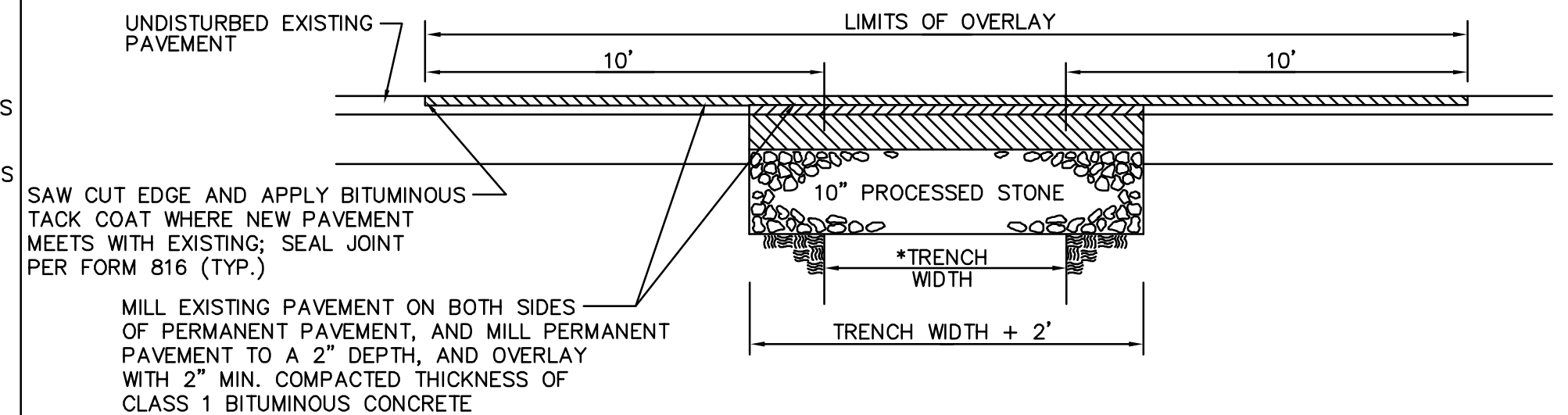


HANDICAPPED VAN PARKING SPACE
NTS

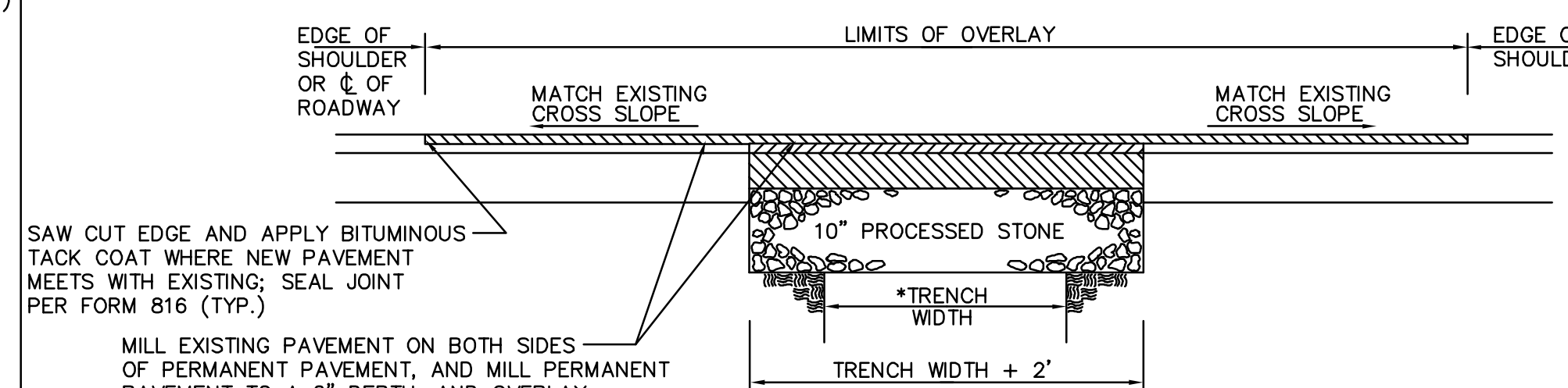


- NOTES:
- 1) PROCESSED STONE TO BE PER CTDOT SPECIFICATIONS 3.04.03 & M.05.01.
 - 2) BITUMINOUS CONCRETE PAVEMENT TO BE PER CTDOT SPECIFICATIONS 4.06 & M.04.
 - 3) SPECIFICATION SECTIONS REFER TO CTDOT STANDARD SPECIFICATION FORM 816.
- * TRENCH WIDTH FOR PURPOSES OF ESTABLISHING PAYMENT LIMIT WIDTH, SHALL BE ID + 2 FEET.

PAVEMENT DETAILS
STATE AND TOWN ROADS
NTS



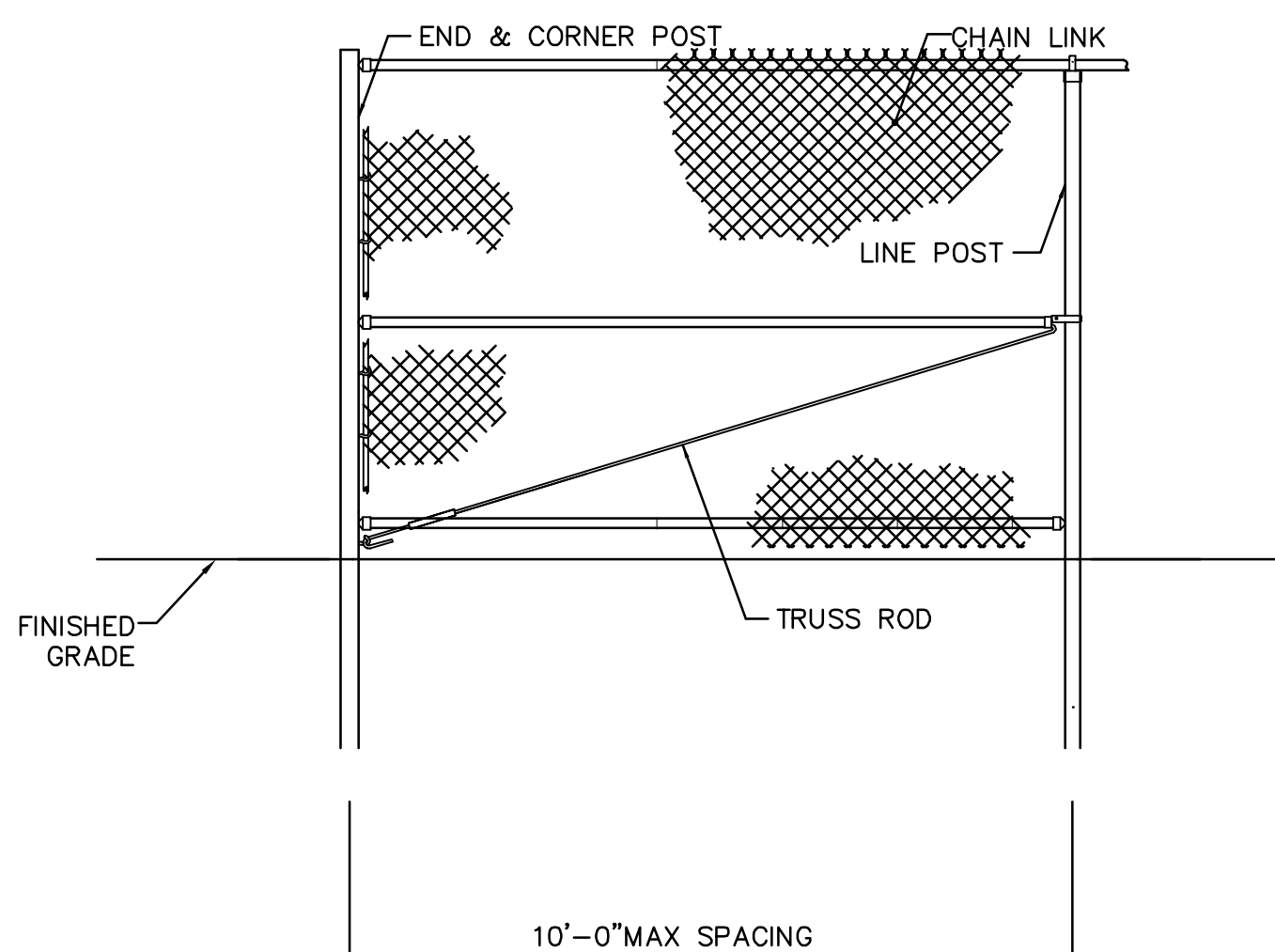
MILLING AND OVERLAY
TRENCHES PERPENDICULAR TO EDGE OF PAVEMENT
NTS



MILLING AND OVERLAY
TRENCHES PARALLEL TO EDGE OF PAVEMENT
NTS

NOTE

1. TEMPORARY CONSTRUCTION CHAIN LINK FENCING SHALL BE IN ACCORDANCE WITH THE REQUIREMENTS OF SECTION 01-5000 2.1B OF THE SPECIFICATIONS.



TEMPORARY CONSTRUCTION CHAIN LINK FENCE
NTS



HANDICAPPED PARKING
STATE PERMIT REQUIRED



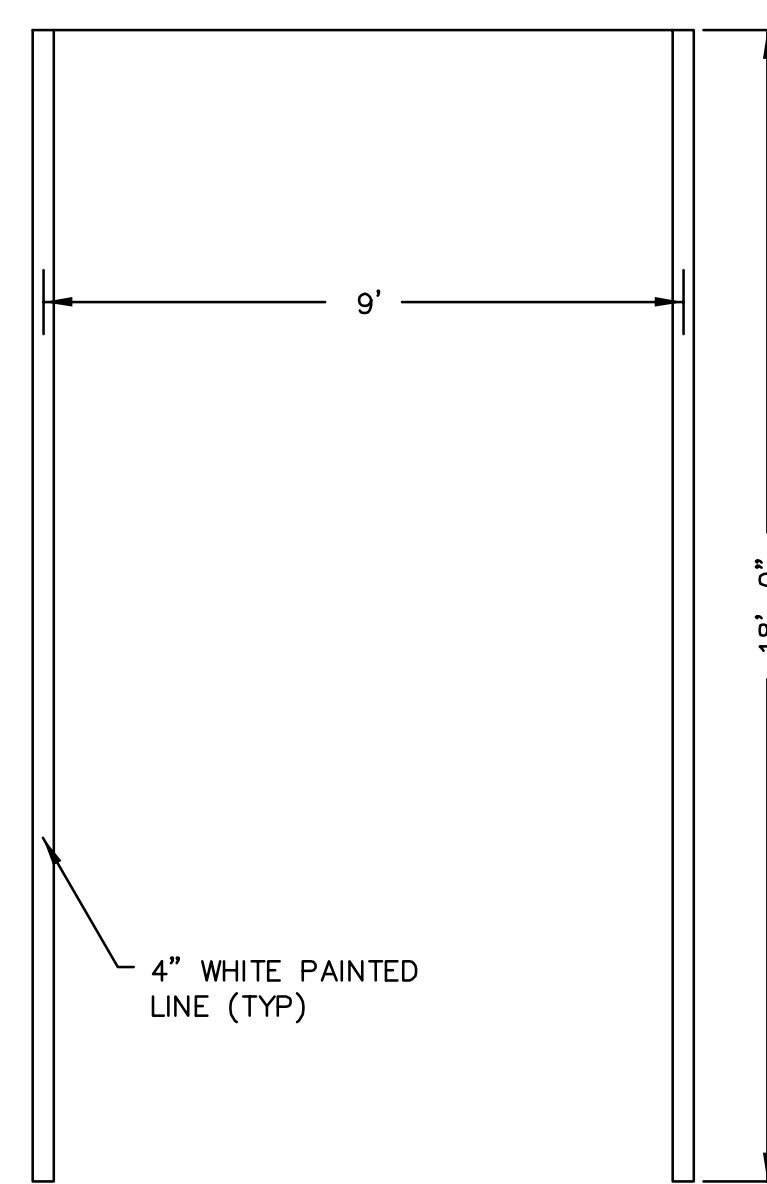
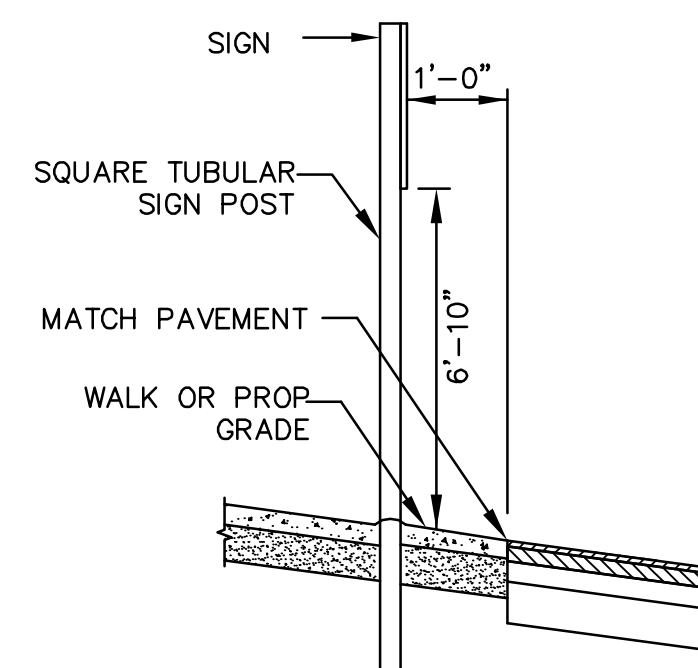
SIZE (IN)	CONN DOT# (#)	POSTS (#)	ALUM THK (IN)
12"x5"	31-0648		.08

COLOR:
BACKGROUND - RED
LEGEND - SILVER

COLOR:
BACKGROUND - BLUE
LEGEND - WHITE
(NO ARROW) (P)

SIZE (IN)	CONN DOT# (#)	POSTS (#)	ALUM THK (IN)
24"x12"	31-0629	1	.08

TYPICAL SECTION SIGN MOUNTING DETAIL
NTS



TYPICAL PARKING SPACE
NTS

SUPPORT OR REMOVE AND RESET EXISTING ROCK WALL AS REQUIRED MATCH EXISTING CONSTRUCTION



ROCK WALL DETAIL
NTS

CERTIFICATION:

STATUS:
Not for Construction

CONSULTANT:

AECOM
500 ENTERPRISE DRIVE
ROCKY HILL, CT 06067
1-(860)-529-8882

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PHASE II
YOUNG QUAD UTILITIES

PROJECT NO: 901954

WORK ORDER NO:

FILE NAME:
P:\CIVIL\YOUNG QUAD\SHEETS\C-27

AUTHOR: PETER SAMMIS
DRAFTER: KEVIN MCKENNA
SCALE: AS NOTED
PRINT DATE: APRIL 21, 2015
SHEET TITLE:

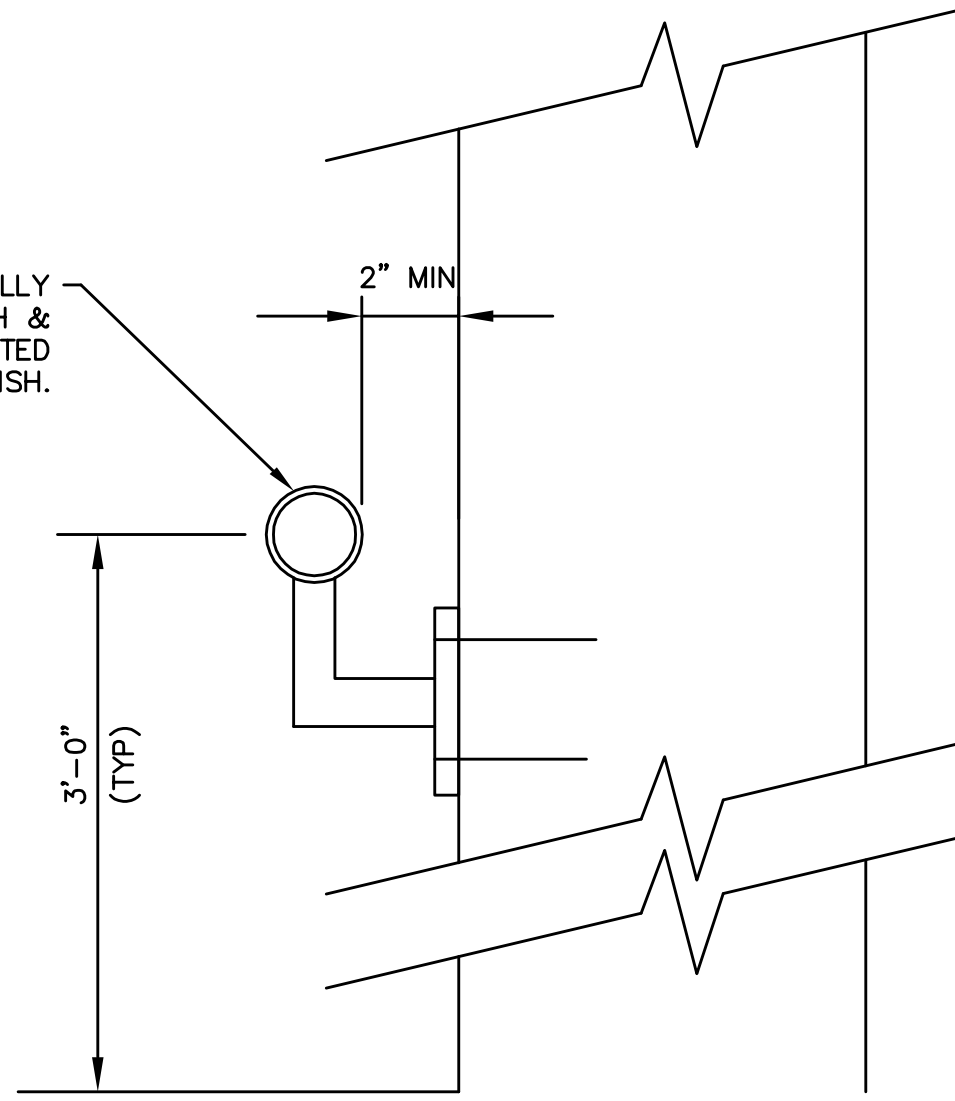
MISCELLANEOUS SITE DETAILS

SHEET:

C-27

SHEET: ___ of ___

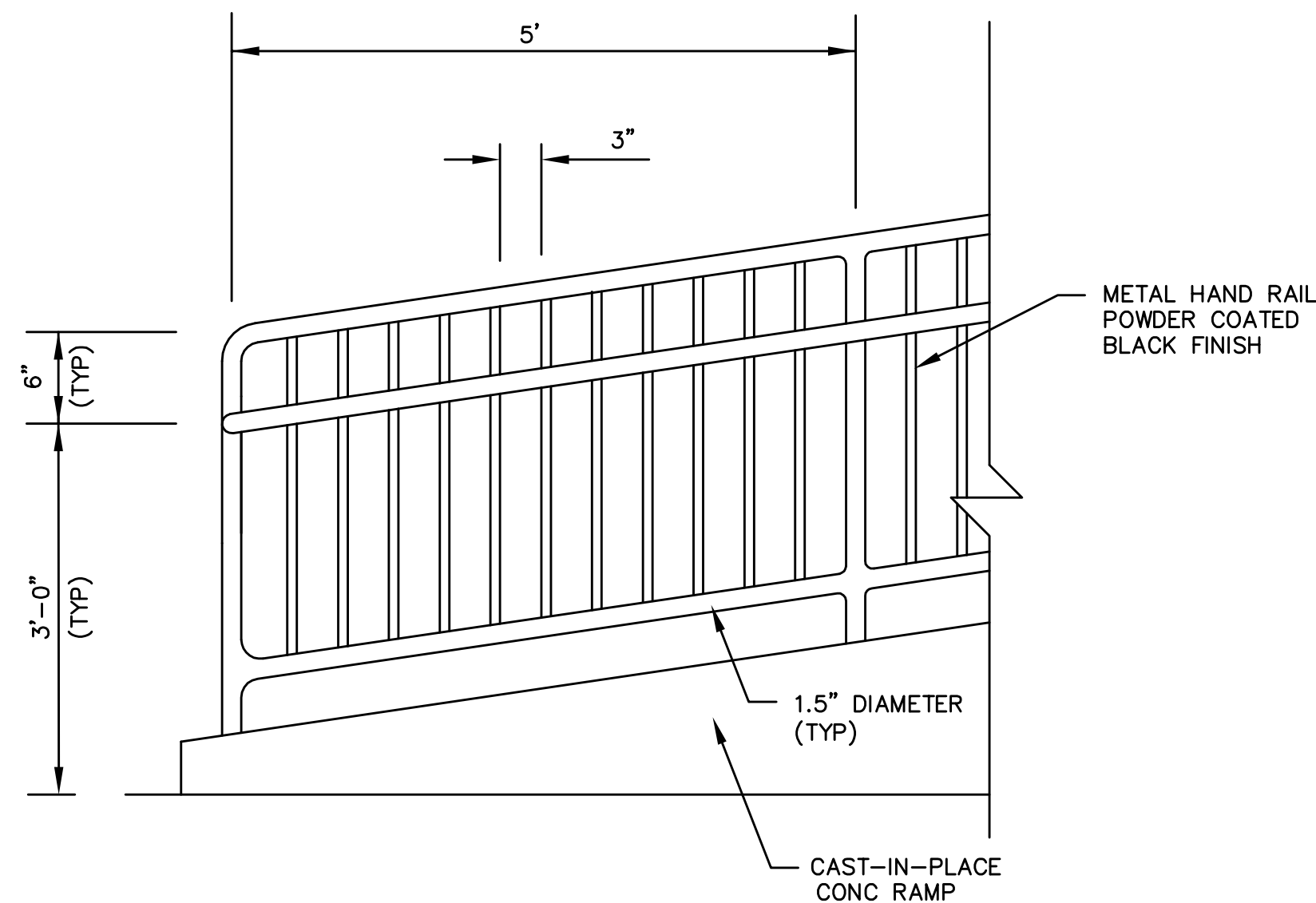
1 1/2" O.D. SCH 40 STEEL PIPE RAIL. FULLY WELD ALL JOINTS. GRIND ALL WELDS SMOOTH & FILL ALL IMPERFECTIONS PRIOR POWDER COATED BLACK FINISH.



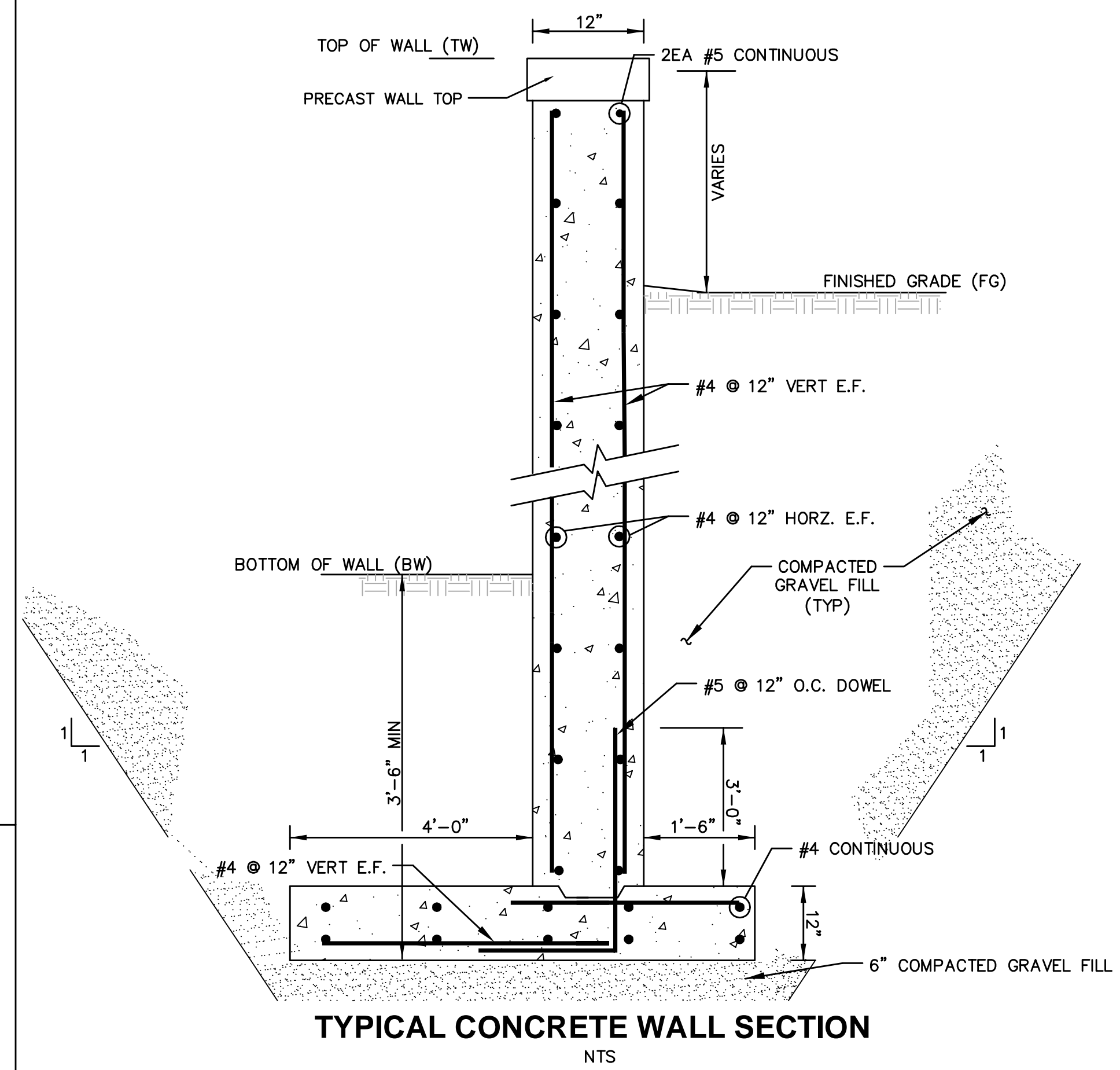
NOTE:

1. PROVIDE HANDRAIL BRACKETS @ 4'-0" O.C. MAX. MOUNTED TO CONCRETE WALL.

TYPICAL WALL MOUNTED HANDRAIL
NTS



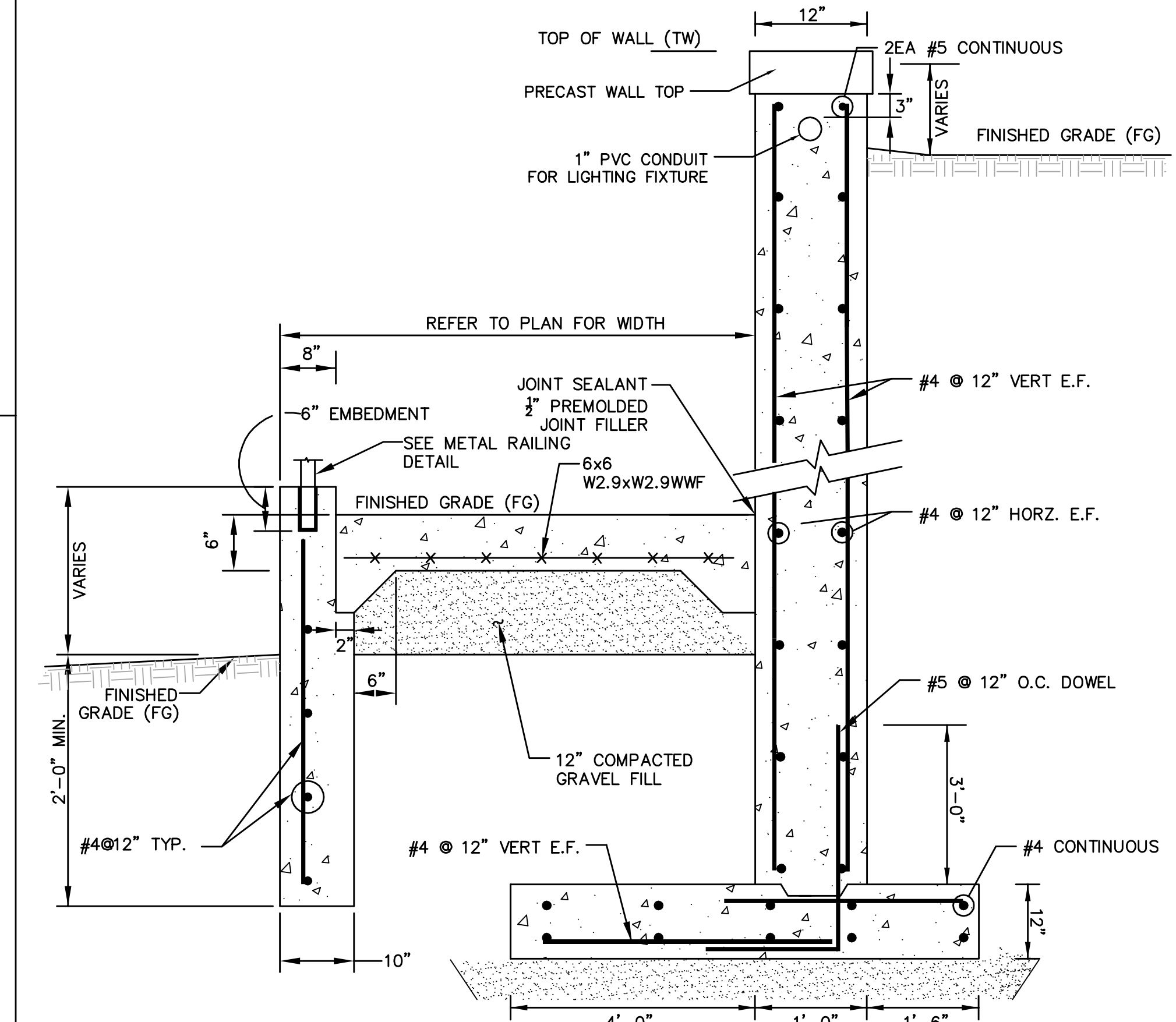
TYPICAL METAL RAIL ELEVATION
NTS



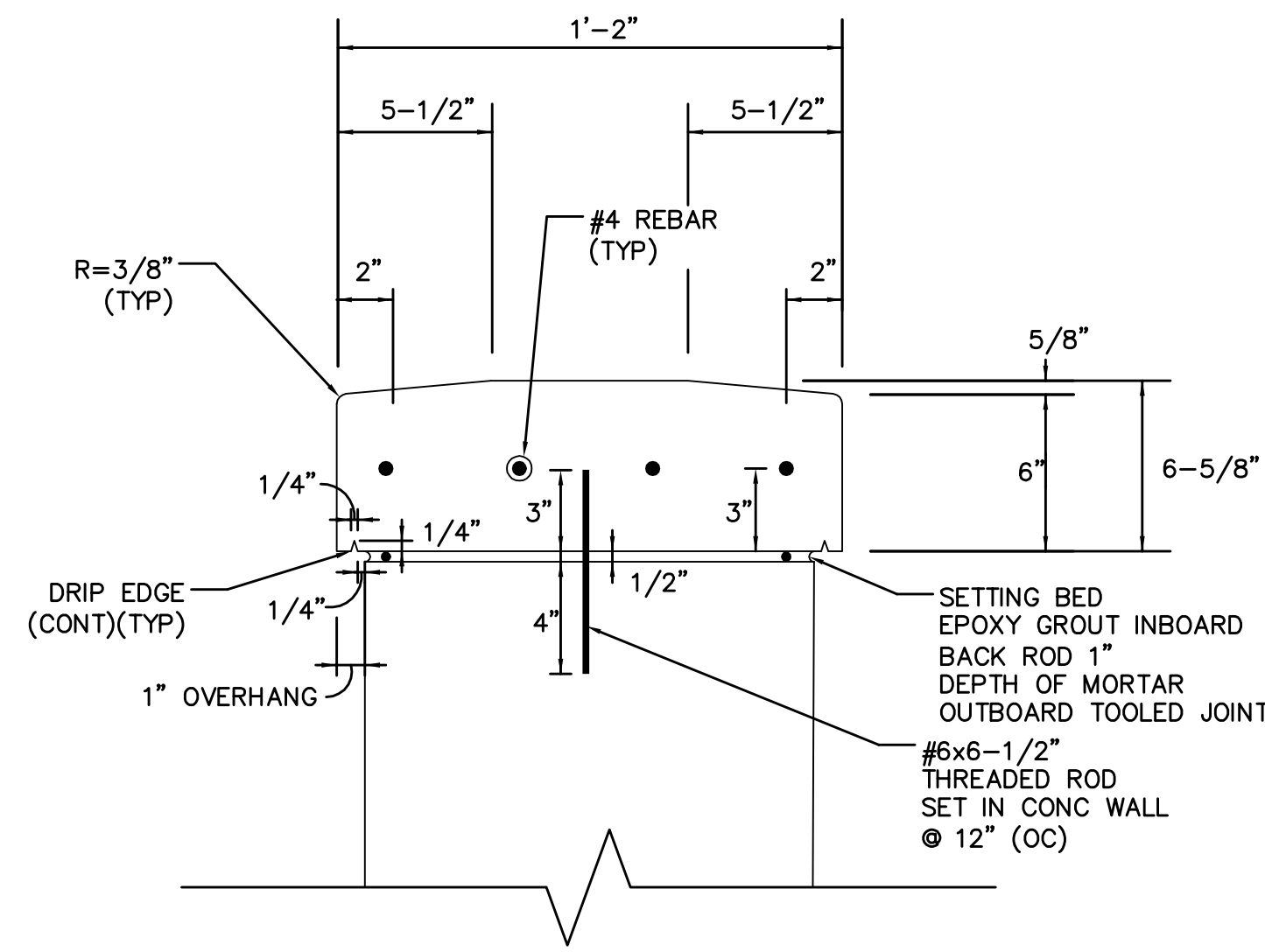
TYPICAL CONCRETE WALL SECTION
NTS

NOTE:

1. COLOR OF THE CONCRETE WALL SHALL MATCH THE COLOR OF THE EXISTING HICKS ARENA FOUNDATION. CUSTOM COLORING MAY BE REQUIRED.



TYPICAL CONCRETE WALL SECTION AT CONCRETE RAMP
NTS



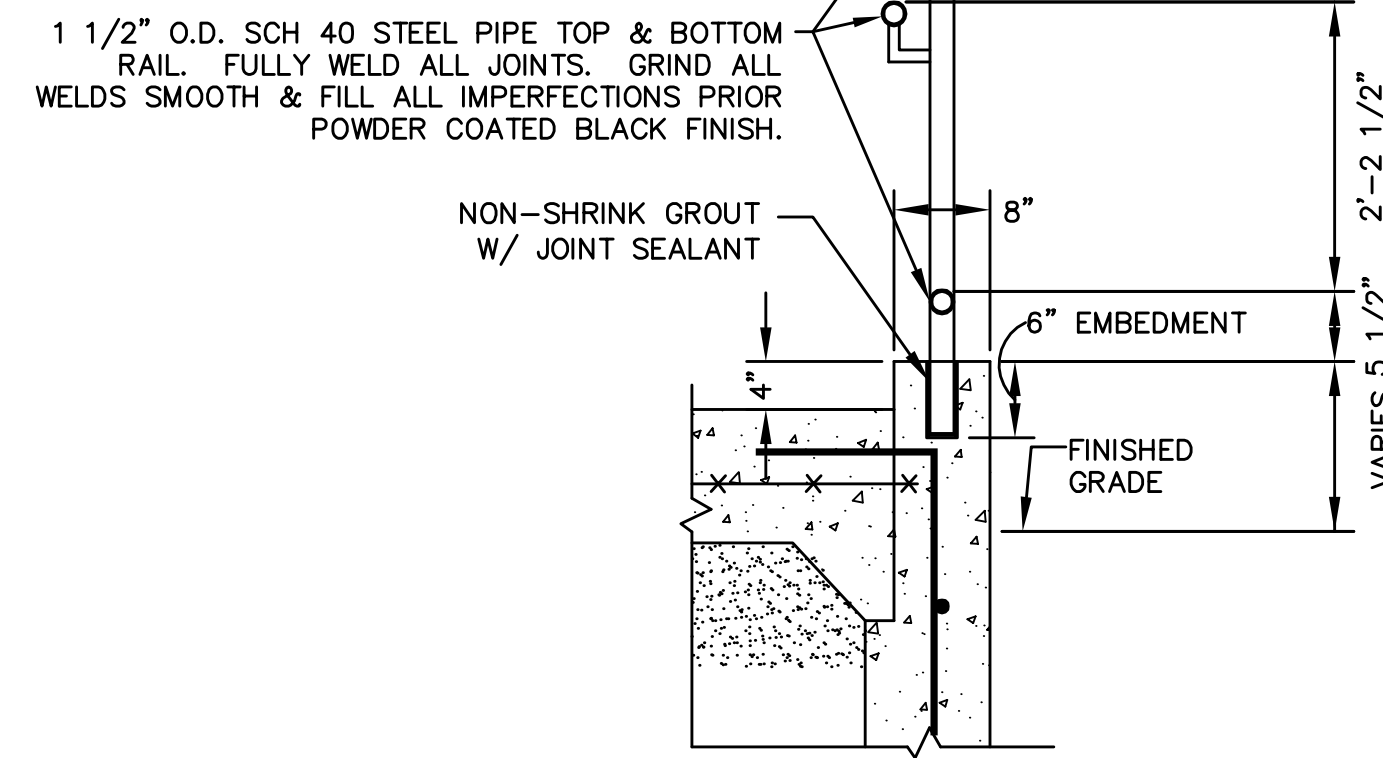
NOTE:

1. DRIP EDGE AND OVERHANG ON ALL EXPOSED SIDES.

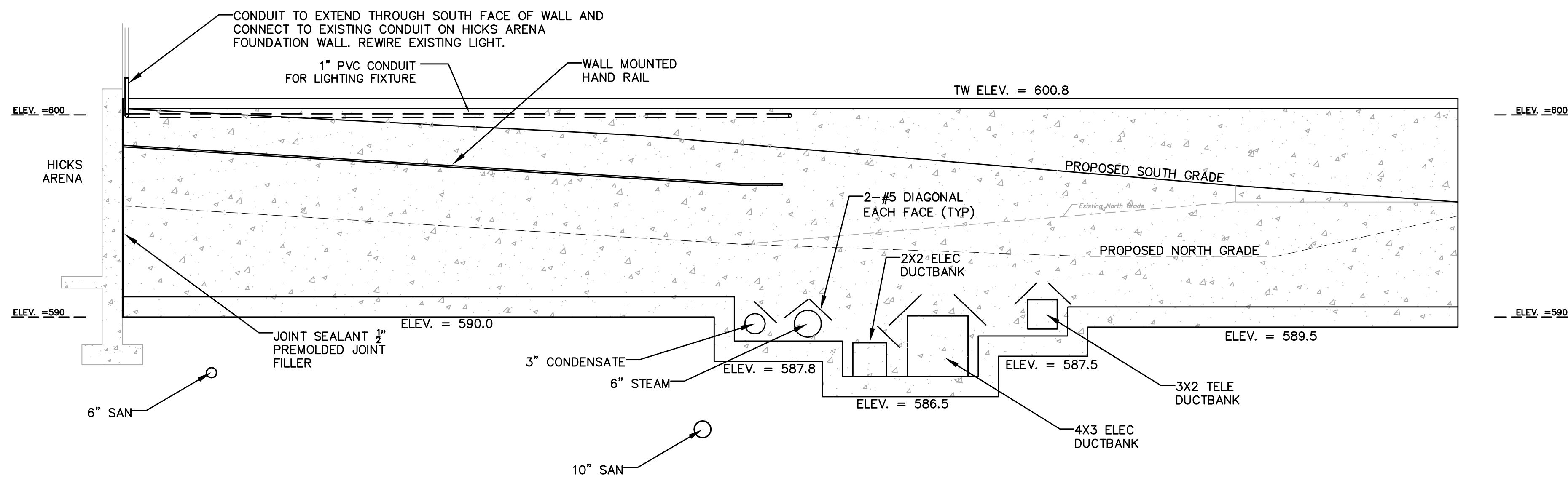
PRECAST WALL TOP
NTS

NOTE:

1. PROVIDE HANDRAIL BRACKETS @ 4'-0" O.C. MAX. WELD TO HANDRAIL & GUARDRAIL.



TYPICAL METAL RAILING SECTION
NTS



CONCRETE RAMP SECTION
SCALE: 1" = 4'

CERTIFICATION:

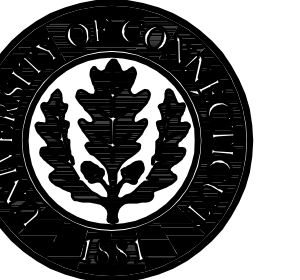
STATUS:
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AECOM
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ROCKY HILL, CT 06067
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NORTH EAGLEVILLE ROAD AREA
INFRASTRUCTURE REPAIR/REPLACEMENT
PHASE II
YOUNG QUAD UTILITIES

PROJECT NO: 901954

WORK ORDER NO:

FILE NAME:
P:\GIVIL\YOUNG QUAD\SHEETS\C-29

AUTHOR: PETER SAMMIS

DRAFTER: KEVIN MCKENNA

SCALE: AS NOTED

PRINT DATE: APRIL 21, 2015

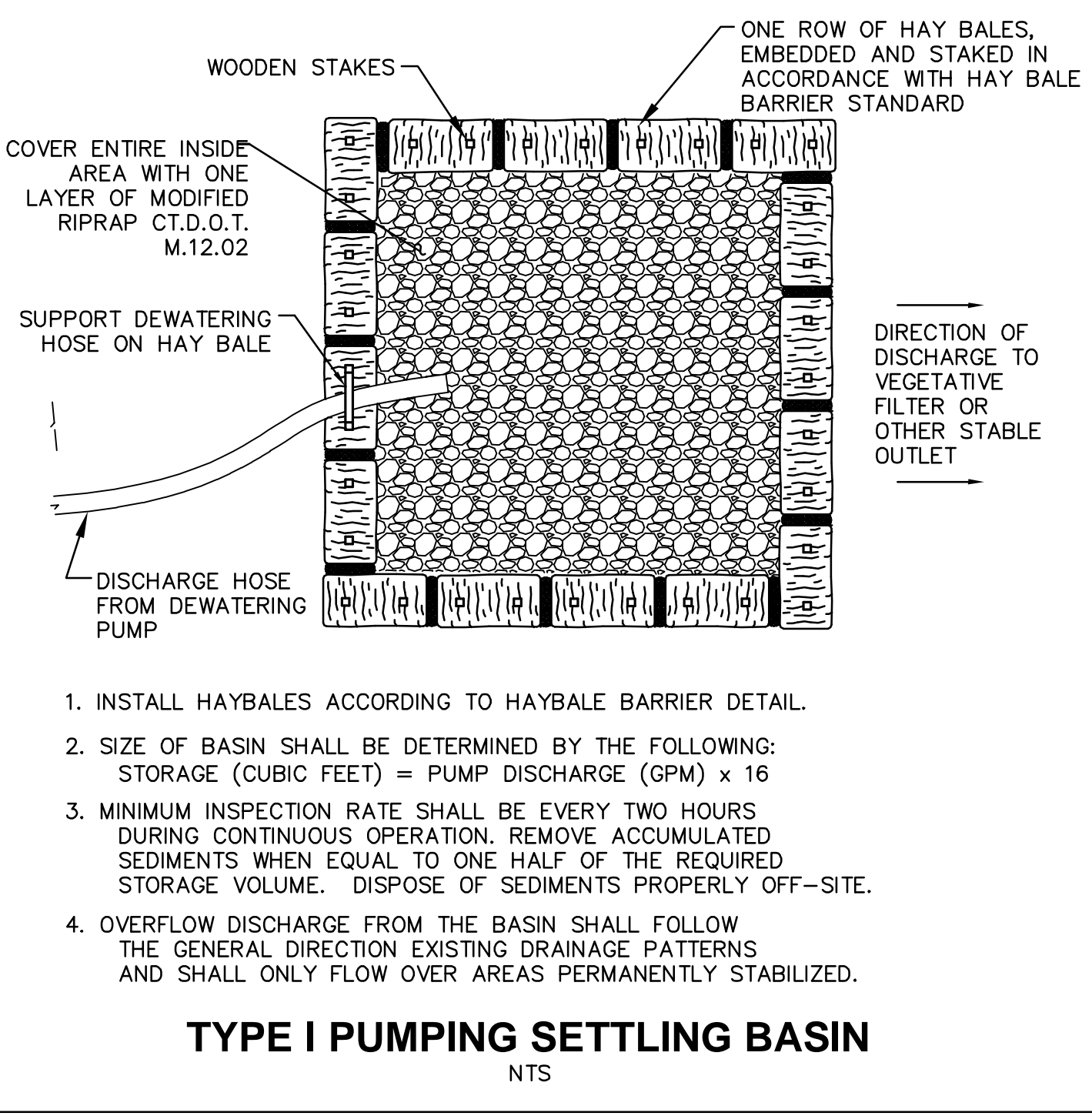
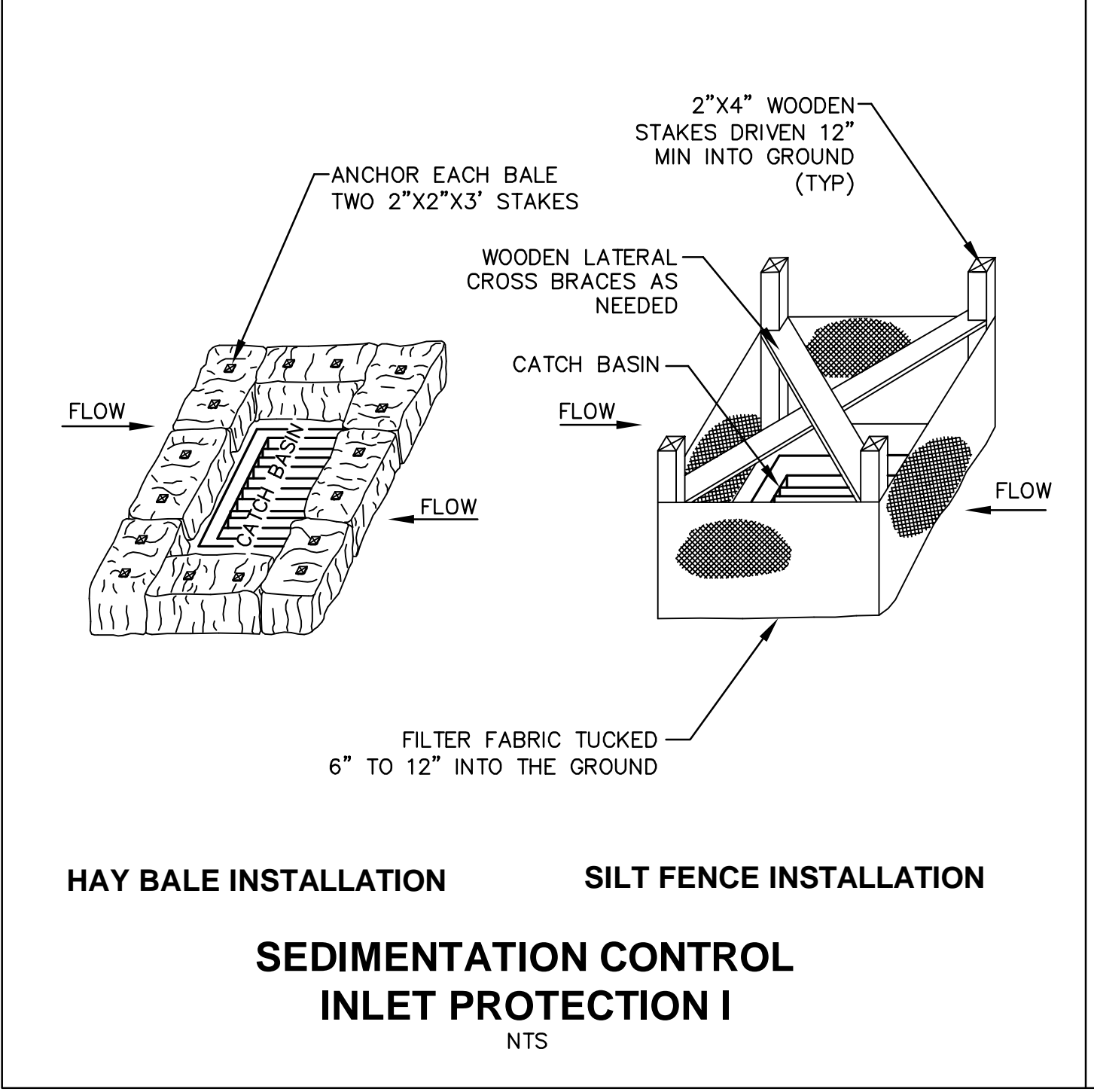
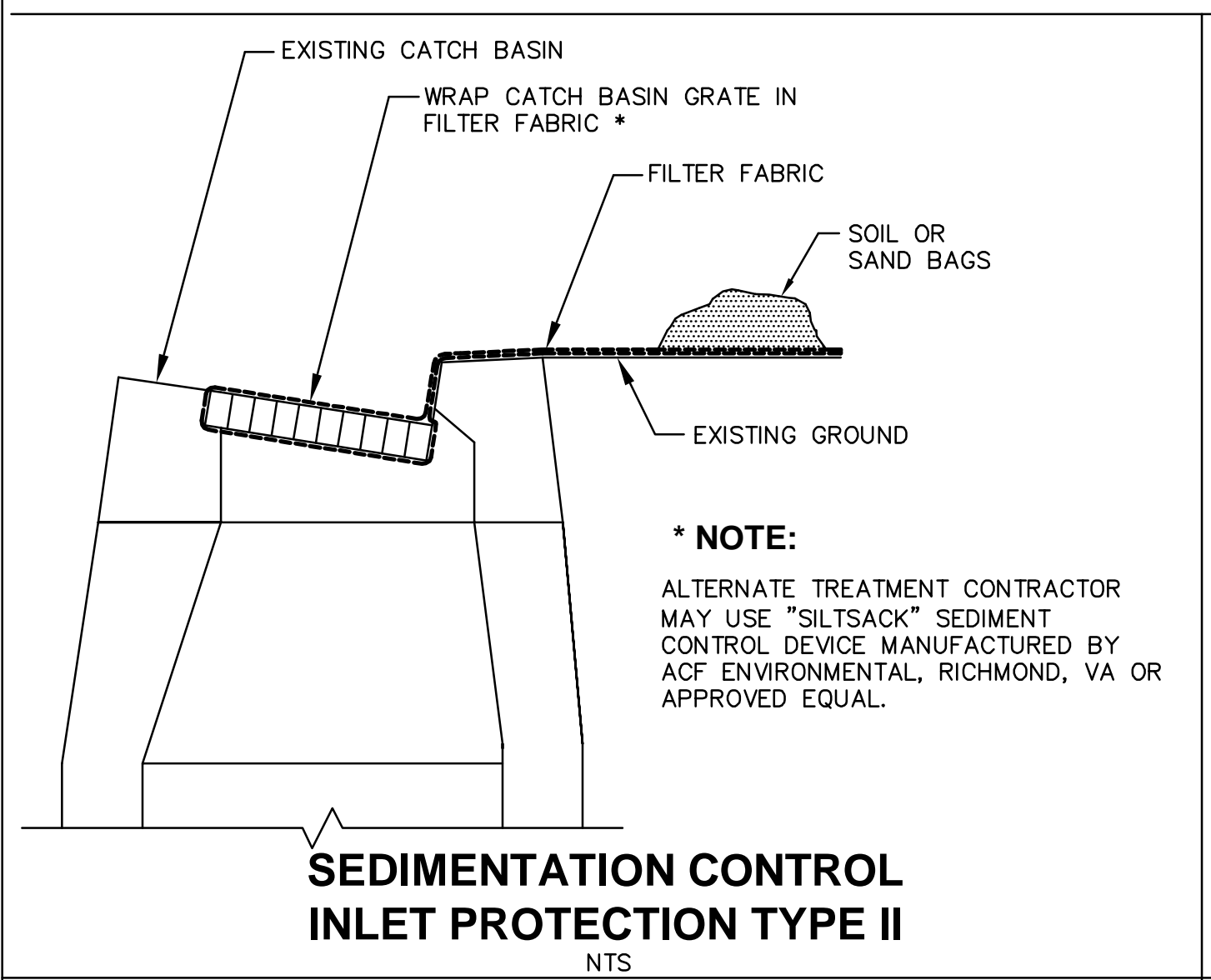
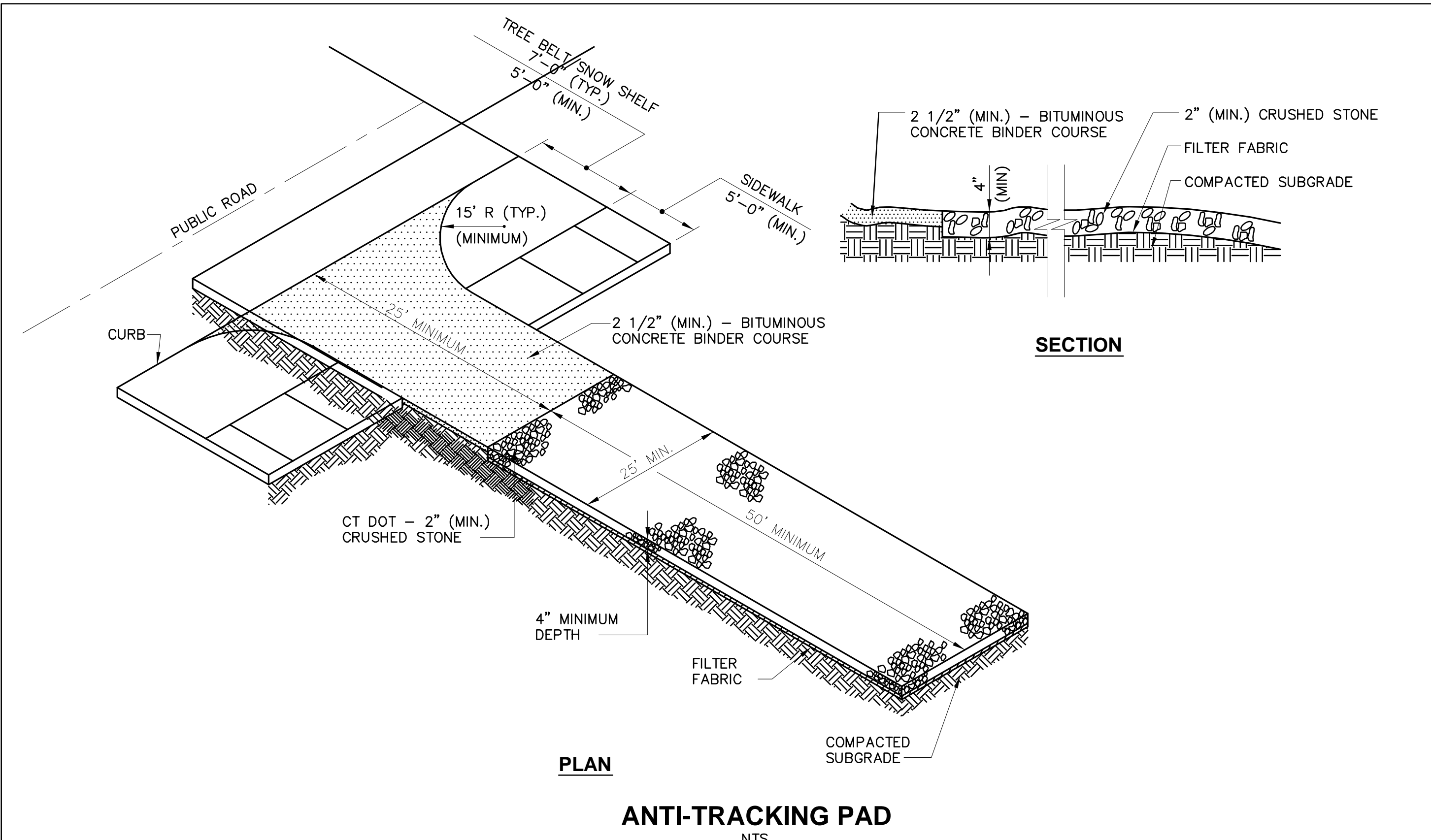
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MISCELLANEOUS SITE DETAILS

SHEET:

C-29

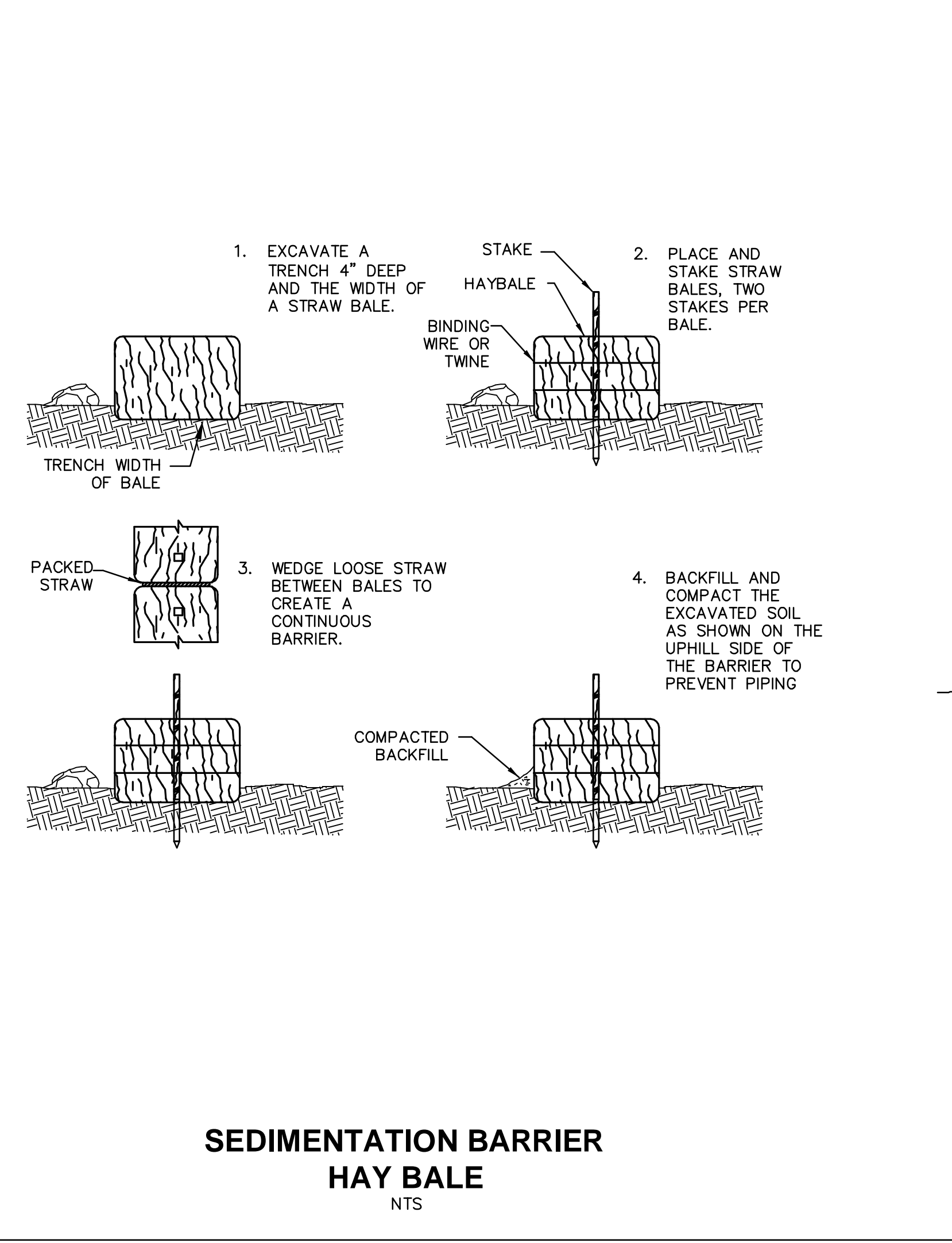
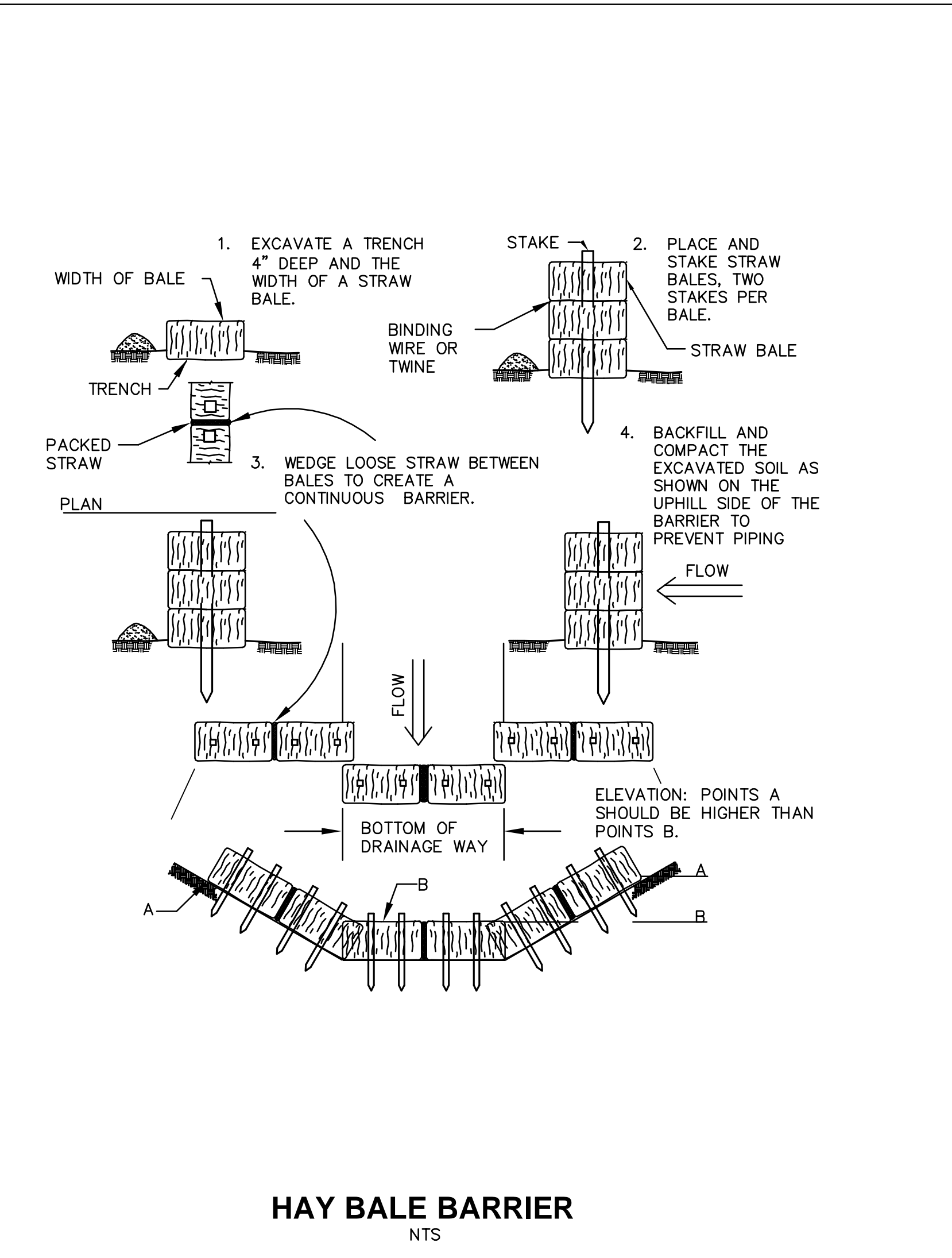
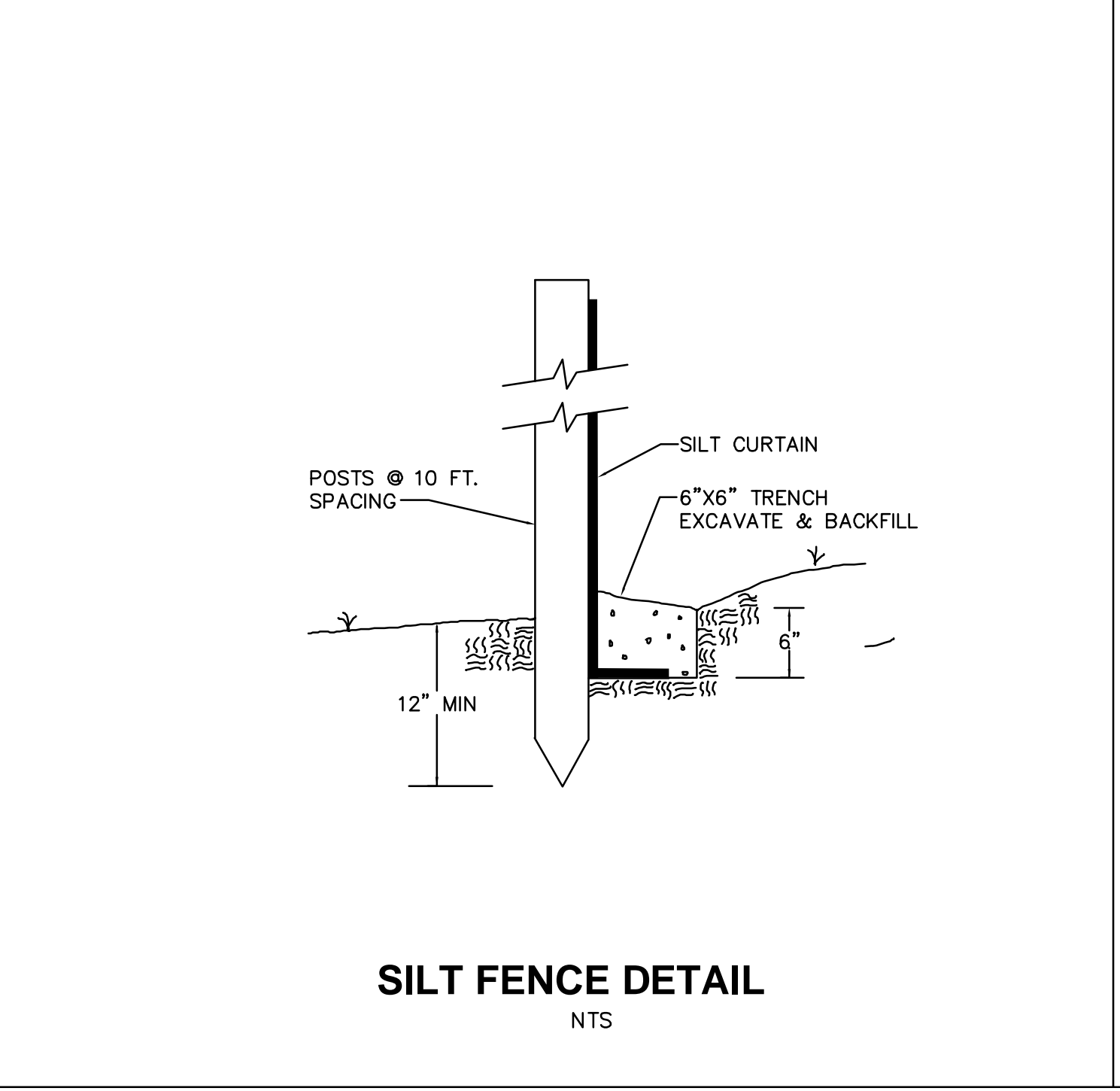
SHEET: ___ of ___



SOIL EROSION AND SEDIMENTATION CONTROL NOTES

- CONTRACTOR SHALL CONTACT "CALL BEFORE YOU DIG" (1-800-922-4455) AND UCONN, OFFICE OF FACILITIES AT LEAST 48 HOURS PRIOR TO ANY FILL OR EXCAVATION OPERATION.
- IMPLEMENTATION OF ALL SEDIMENTATION AND EROSION CONTROL MEASURES SHALL CONFORM TO THE CONTRACT DRAWINGS AND SPECIFICATIONS OR TO THE CTDEP "CONNECTICUT GUIDELINES FOR SOIL EROSION AND SEDIMENT CONTROL," REVISED 2002, WHICHEVER IS MORE STRINGENT.
- CONSTRUCTION ENTRANCES, PERIMETER SEDIMENTATION BARRIERS AND PROTECTION AT EXISTING INLETS SHALL BE INSTALLED PRIOR TO ANY EXCAVATION (INCLUDING THE REMOVAL OF STUMPS).
- IT IS THE INTENT OF THESE PLANS TO SHOW THE INITIAL SOIL EROSION AND SEDIMENTATION CONTROL MEASURES REQUIRED. ACTUAL LOCATIONS OF CONTROLS MAY CHANGE AS CONSTRUCTION PROCEEDS. THE CONTRACTOR SHALL BE RESPONSIBLE FOR PROVIDING ADDITIONAL CONTROL MEASURES AS REQUIRED OR AS DIRECTED BY THE OWNER'S REPRESENTATIVE.
- AREAS DISTURBED BY CONSTRUCTION WHICH WILL NOT BE COVERED BY PAVEMENT, CURBING, OR SIDEWALKS SHALL BE PROVIDED WITH A PERMANENT OR TEMPORARY VEGETATIVE COVER OR MULCHED. THE COVER SHALL BE PROVIDED WITHIN 7 DAYS OF FINAL GRADING.
- IF WORK OF A DISTURBED AREA IS SUSPENDED AND/OR WILL NOT RECEIVE PERMANENT COVER WITHIN 30 DAYS, THEN THE AREAS SHALL BE PROTECTED WITH A MULCH OF HAY, JUTE MESH OR OTHER MATERIALS APPROPRIATE FOR TEMPORARY SOIL PROTECTION WITHIN 7 DAY OF SUSPENSION OF WORK. THESE MEASURES SHALL BE APPLIED IN CONFORMANCE WITH THE AFOREMENTIONED GUIDELINES.
- LONG TERM AND WINTER STABILIZATION WILL CONFORM TO THE PROVISIONS OF THE BEST MANAGEMENT PRACTICE (BMP), CTDOT STANDARD SPECIFICATIONS AND GUIDELINES.
- SEDIMENT AND DEBRIS TRAPPED BY SEDIMENT BARRIERS SHALL BE REMOVED AND DISPOSED OF AS DIRECTED BY THE OWNER'S REPRESENTATIVE OR AT A MINIMUM OF WHEN IT REACHES ONE HALF THE HEIGHT OF THE BARRIER.
- THE CONTRACTOR SHALL BE RESPONSIBLE FOR THE INSTALLATION, INSPECTION, MAINTENANCE AND REMOVAL OF ALL SEDIMENTATION AND EROSION CONTROL MEASURES. ALL MEASURES SHALL BE INSPECTED BY THE CONTRACTOR WEEKLY DURING DRY WEATHER, AFTER EACH RUNOFF PRODUCING STORM, AND AT LEAST ONCE A DAY DURING PERIODS OF PROLONGED RAINFALL. REPAIR OR REPLACEMENT OF DAMAGED SEDIMENTATION OR EROSION CONTROL MEASURES SHALL BE DONE IMMEDIATELY. SEDIMENTATION AND EROSION CONTROL MEASURES SHALL BE REMOVED AFTER UPLAND AREAS BECOME STABLE.
- PROVISIONS SHALL BE MADE TO SAFELY CONDUCT SURFACE RUNOFF TO PROTECTED STORM DRAINS OR PROTECTED OUTLETS TO ENSURE THAT SURFACE RUNOFF WILL NOT DAMAGE SLOPES OR OTHER GRADED AREAS.
- SEDIMENTATION BARRIERS SHALL BE INSTALLED AS CONSTRUCTION PROCEEDS AT THE TOES OF SLOPES, ACROSS SWALES AND ACROSS OPEN GRADED SURFACES. ALL AS NECESSARY TO CONTAIN SEDIMENTATION TRANSPORT.
- SIDE SLOPES OF STOCKPILED MATERIAL SHALL NOT EXCEED TWO HORIZONTAL TO ONE VERTICAL.
- ALL EROSION CONTROLS MUST REMAIN IN PLACE UNTIL AUTHORIZED FOR REMOVAL BY THE OWNER'S REPRESENTATIVE.
- ALL EMBANKMENT SLOPES 3:1 OR GREATER TO BE STABILIZED WITH EROSION CONTROL BLANKET UNLESS OTHERWISE NOTED ON THE DRAWINGS.

NORTH AMERICAN GREEN SC150BN OR ERO MAT V150SC OR LAND LOK



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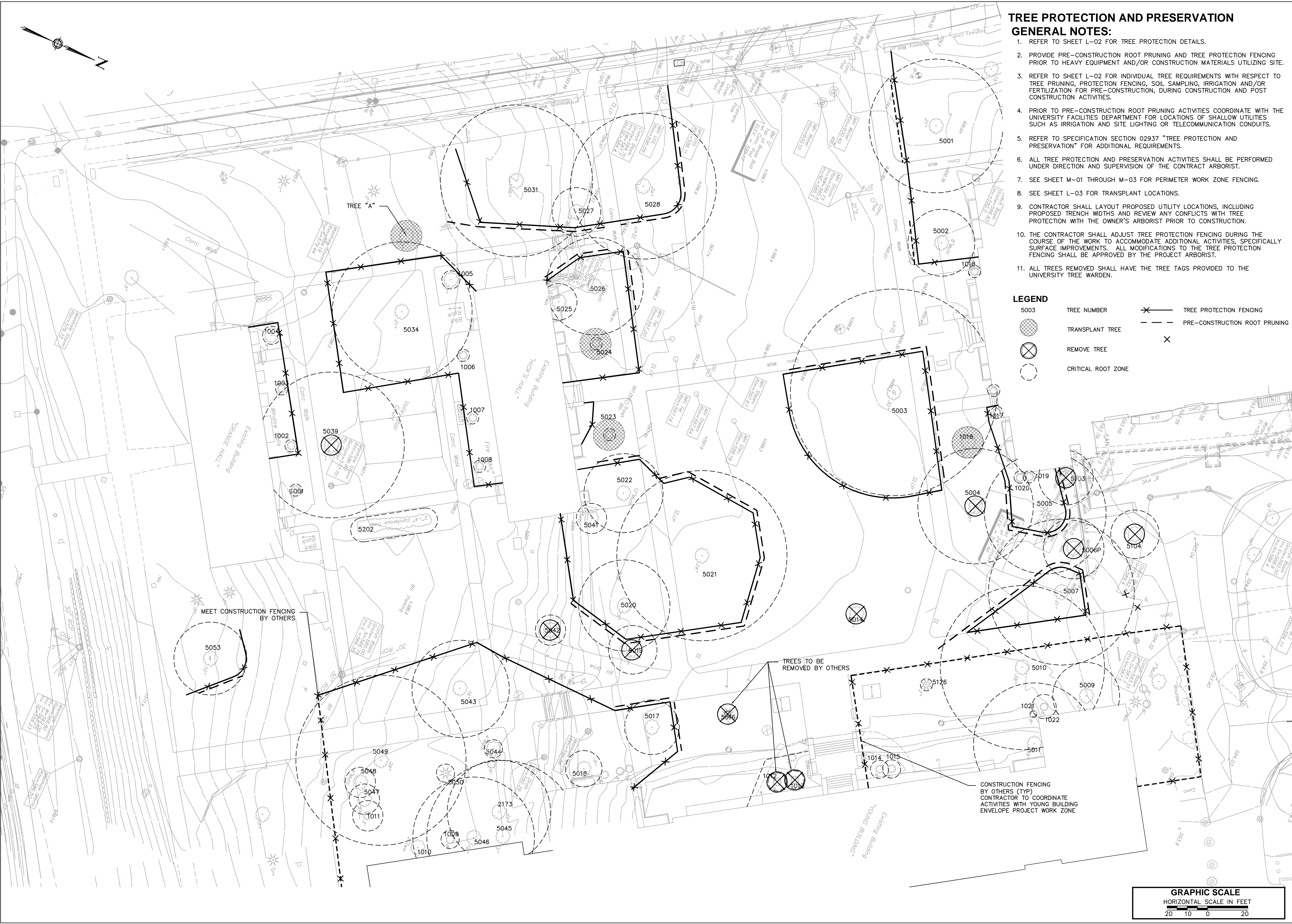
UNIVERSITY OF CONNECTICUT
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31 LEDOYT ROAD UNIT 3038
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PCIVIL\YOUNG QUAD\SHEETS\C-30

AUTHOR: PETER SAMMIS
DRAFTER: KEVIN MCKENNA
SCALE: AS NOTED
PRINT DATE: APRIL 21, 2015
SHEET TITLE:
SOIL EROSION AND SEDIMENTATION CONTROL DETAILS

SHEET:
C-30
SHEET: _ of _

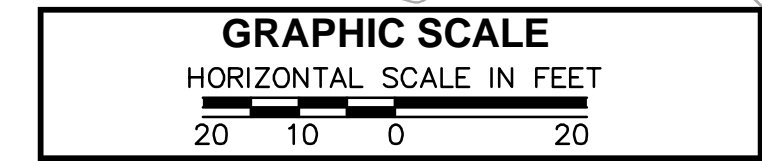


**TREE PROTECTION AND PRESERVATION
GENERAL NOTES:**

1. REFER TO SHEET L-02 FOR TREE PROTECTION DETAILS.
2. PROVIDE PRE-CONSTRUCTION ROOT PRUNING AND TREE PROTECTION FENCING PRIOR TO HEAVY EQUIPMENT AND/OR CONSTRUCTION MATERIALS UTILIZING SITE.
3. REFER TO SHEET L-02 FOR INDIVIDUAL TREE REQUIREMENTS WITH RESPECT TO TREE PRUNING, PROTECTION FENCING, SOIL SAMPLING, IRRIGATION AND/OR FERTILIZATION FOR PRE-CONSTRUCTION, DURING CONSTRUCTION AND POST CONSTRUCTION ACTIVITIES.
4. PRIOR TO PRE-CONSTRUCTION ROOT PRUNING ACTIVITIES COORDINATE WITH THE UNIVERSITY FACILITIES DEPARTMENT FOR LOCATIONS OF SHALLOW UTILITIES SUCH AS IRRIGATION AND SITE LIGHTING OR TELECOMMUNICATION CONDUITS.
5. REFER TO SPECIFICATION SECTION 02937 "TREE PROTECTION AND PRESERVATION" FOR ADDITIONAL REQUIREMENTS.
6. ALL TREE PROTECTION AND PRESERVATION ACTIVITIES SHALL BE PERFORMED UNDER DIRECTION AND SUPERVISION OF THE CONTRACT ARBORIST.
7. SEE SHEET M-01 THROUGH M-03 FOR PERIMETER WORK ZONE FENCING.
8. SEE SHEET L-03 FOR TRANSPLANT LOCATIONS.
9. CONTRACTOR SHALL LAYOUT PROPOSED UTILITY LOCATIONS, INCLUDING PROPOSED TRENCH WIDTHS AND REVIEW ANY CONFLICTS WITH TREE PROTECTION WITH THE OWNER'S ARBORIST PRIOR TO CONSTRUCTION.
10. THE CONTRACTOR SHALL ADJUST TREE PROTECTION FENCING DURING THE COURSE OF THE WORK TO ACCOMMODATE ADDITIONAL ACTIVITIES, SPECIFICALLY SURFACE IMPROVEMENTS. ALL MODIFICATIONS TO THE TREE PROTECTION FENCING SHALL BE APPROVED BY THE PROJECT ARBORIST.
11. ALL TREES REMOVED SHALL HAVE THE TREE TAGS PROVIDED TO THE UNIVERSITY TREE WARDEN.

LEGEND

- | | | | |
|------|--------------------|-------|-------------------------------|
| 5003 | TREE NUMBER | —X— | TREE PROTECTION FENCING |
| ⊗ | TRANSPLANT TREE | - - - | PRE-CONSTRUCTION ROOT PRUNING |
| ⊗ | REMOVE TREE | X | |
| ○ | CRITICAL ROOT ZONE | | |



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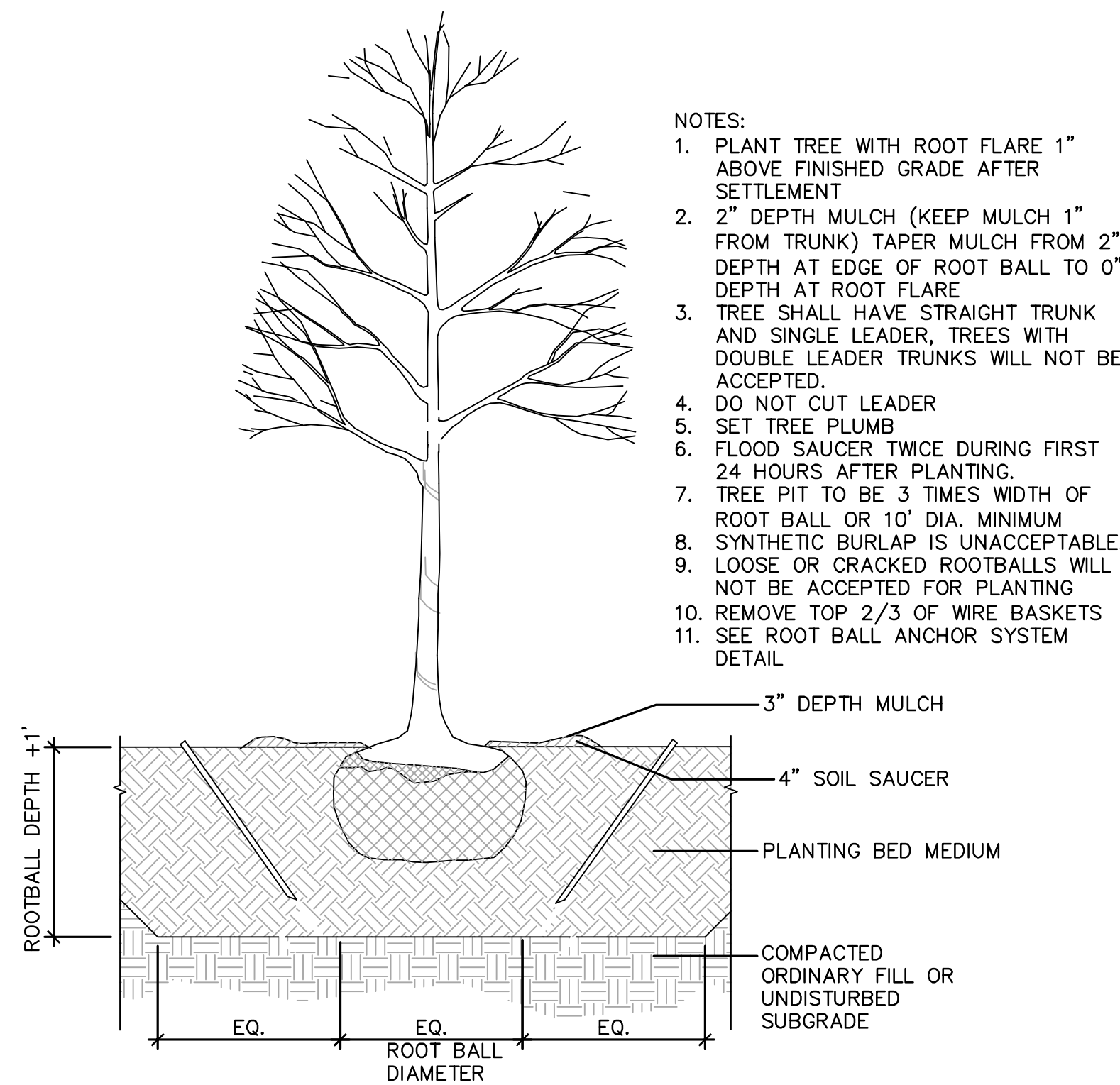
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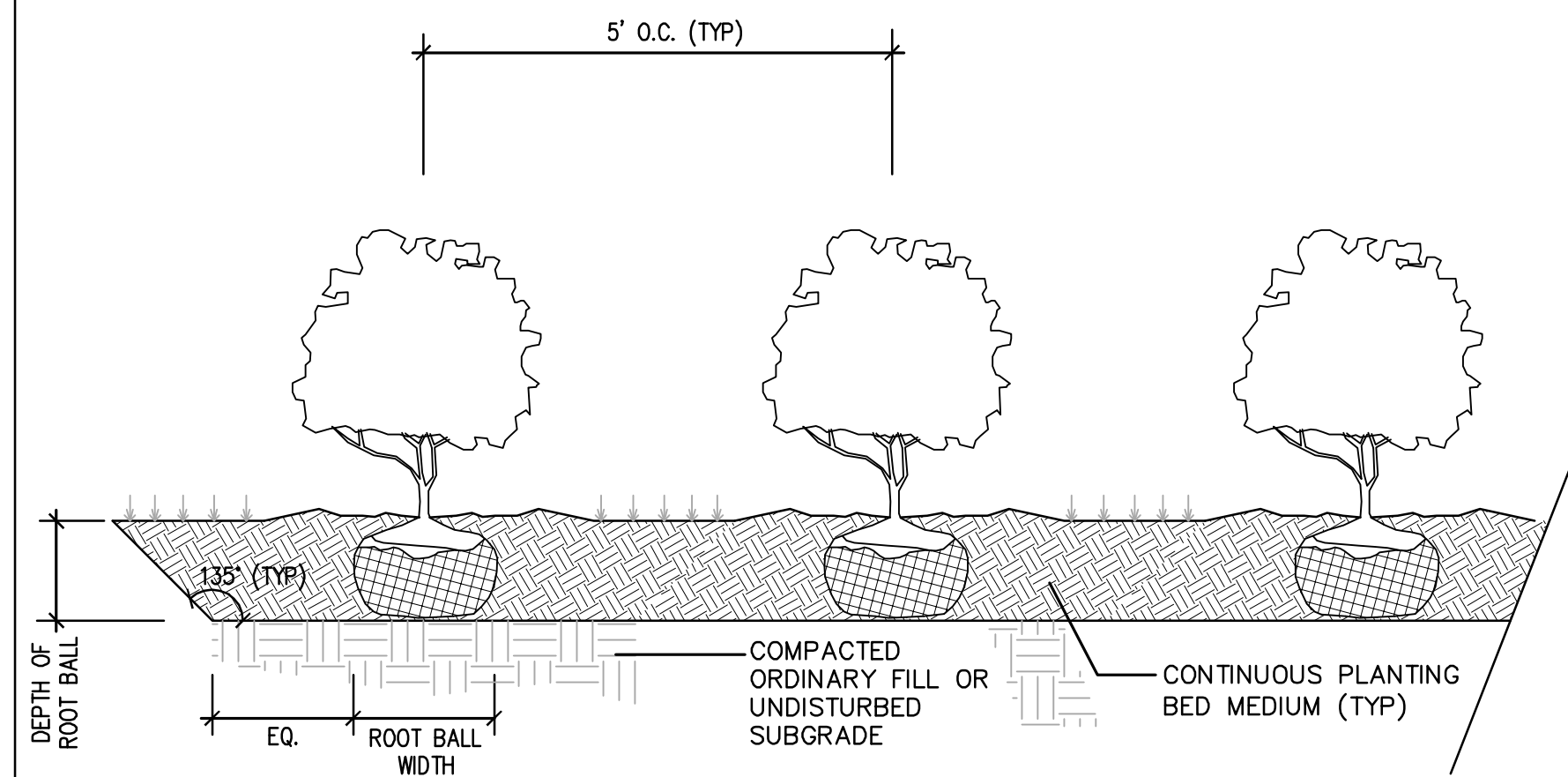
PROJECT:
NORTH EAGLEVILLE ROAD AREA
INFRASTRUCTURE REPAIR/REPLACEMENT
PHASE II
YOUNG QUAD UTILITIES

PROJECT NO: 901954
WORK ORDER NO:
FILE NAME:
P:\CIVIL\YOUNG QUAD\SHEETS\L-01
AUTHOR: PETER SAMMIS
DRAFTER: KEVIN MCKENNA
SCALE: AS NOTED
PRINT DATE: APRIL 21, 2015
SHEET TITLE:

TREE PROTECTION AND PRESERVATION PLAN
SHEET:
L-01
SHEET: _ of _



TREE PLANTING DETAIL
NTS

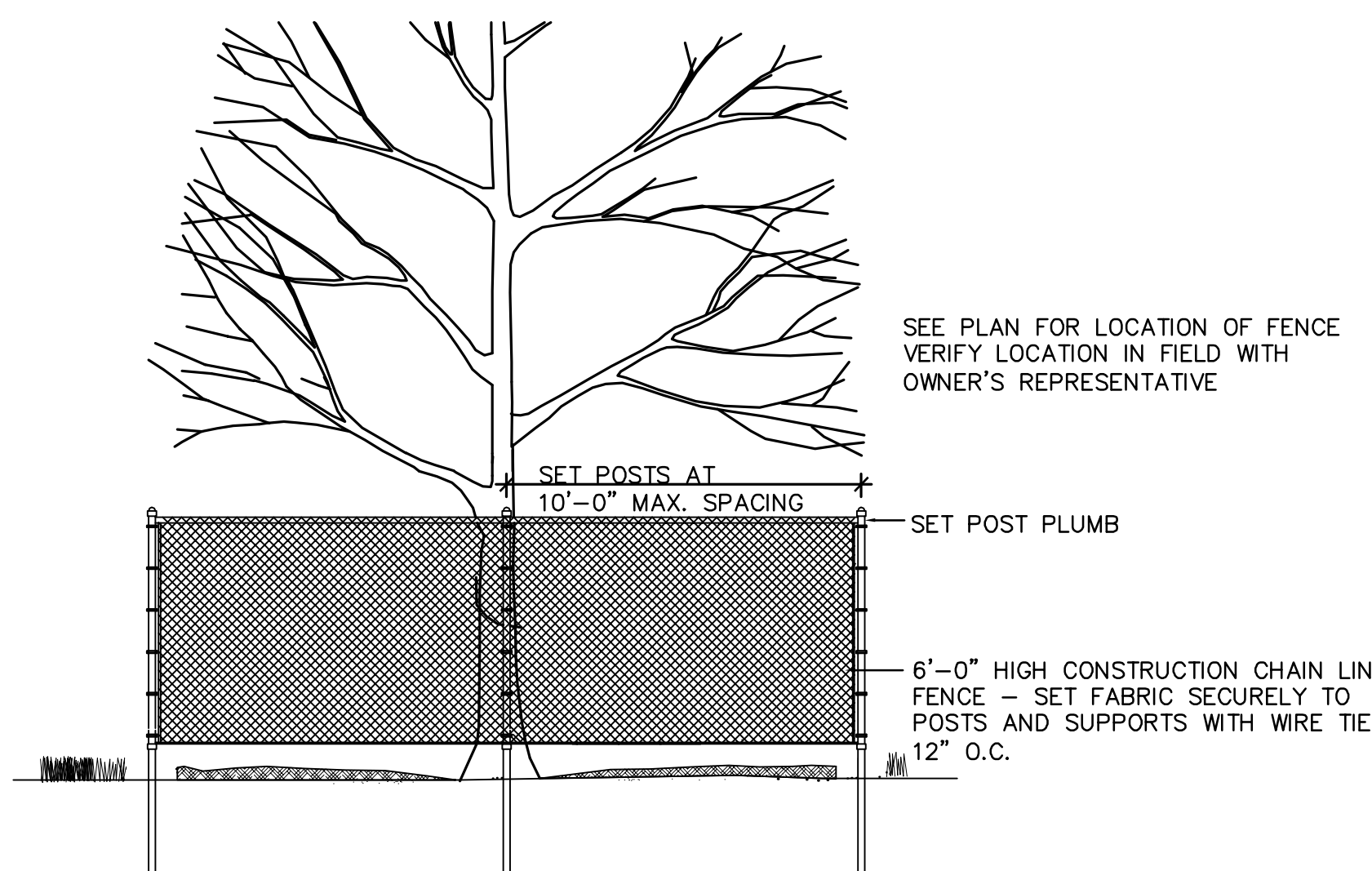


SHRUB PLANTING
NTS

- NOTE:**
1. THE CONTRACTOR SHALL PROVIDE TREE PROTECTION AND STRESS REDUCTION MEASURES AS INDICATED IN THE TREE PROTECTION ACTION KEY AND IN ACCORDANCE WITH SECTION 02937.
 2. ALL TREES WITHIN THE PROJECT AREA SHALL BE PRUNED OF UNHEALTHY BRANCHES, DEAD WOOD AND PROVIDED CROWN PRUNING TO COMPENSATE FOR ROOT LOSS DUE TO ROOT PRUNING OR EXCAVATION ACTIVITIES. CONTRACTORS ARBORIST TO SUBMIT A PLAN FOR CROWN PRUNING TO BE REVIEWED AND APPROVED BY THE PROJECT ARBORIST.
 3. SEE SHEET L-01 FOR SPECIFIC LOCATIONS OF ROOT PRUNING.
 4. ROOT INVIGORATION SHALL INCLUDE SOIL DECOMPACTION AND SOIL AMENDMENTS IN ACCORDANCE WITH SECTION 02937.

TREE PROTECTION ACTION KEY

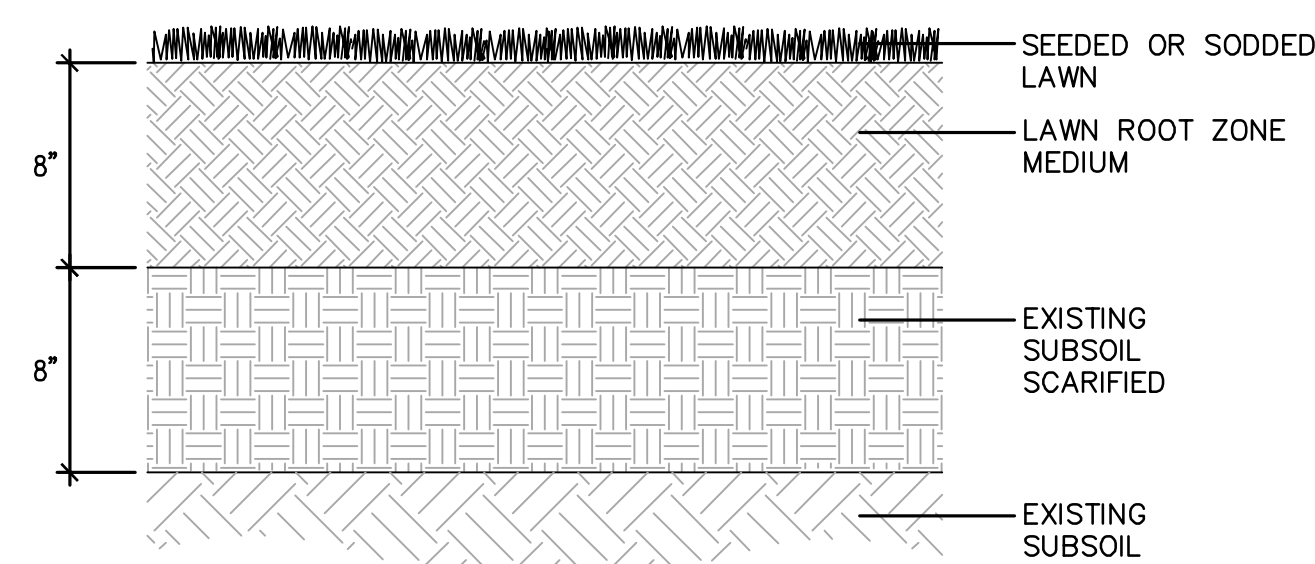
Tree id #	Common Name	Critical root zone Radius in Feet	Pre-Construction				During Construction		Post Construction					
			Fence	Root Pruning	Transplant	Removal	Soil Sample	Irrigation	Monitoring	Root Invigoration	Fertilizer	Irrigation	Monitoring	Mulch Ring
1001	Pekin Lilac	3				Yes								
1002	Pekin Lilac	3	Yes				Yes		Yes		Yes	Yes	Yes	Yes
1003	Pekin Lilac	3	Yes				Yes		Yes		Yes	Yes	Yes	Yes
1004	Tree Lilac	4.5	Yes				Yes		Yes		Yes	Yes	Yes	Yes
1005	Tree Lilac	4.5	Yes				Yes		Yes		Yes	Yes	Yes	Yes
1006	Pekin Lilac	3	Yes				Yes		Yes		Yes	Yes	Yes	Yes
1007	Pekin Lilac	3	Yes				Yes		Yes		Yes	Yes	Yes	Yes
1008	Pekin Lilac	3	Yes				Yes		Yes		Yes	Yes	Yes	Yes
1009	Japanese Holly	4.5	Yes				Yes		Yes		Yes	Yes	Yes	Yes
1010	Viburnum	0	Yes				Yes		Yes		Yes	Yes	Yes	Yes
1011	Taxus	7.5	Yes				Yes		Yes		Yes	Yes	Yes	Yes
1012	Taxus	4.5	Yes			Yes					Yes	Yes	Yes	Yes
1013	Viburnum	4.5	Yes			Yes								
1014	Taxus	4.5	Yes			Yes		Yes			Yes	Yes	Yes	Yes
1015	Viburnum	4.5	Yes			Yes		Yes			Yes	Yes	Yes	Yes
1016	Weeping Cherry	3			Yes		Yes	Yes	Yes		Yes	Yes	Yes	Yes
1017	Lilac	3	Yes				Yes		Yes		Yes	Yes	Yes	Yes
1018	Lilac	3	Yes				Yes		Yes		Yes	Yes	Yes	Yes
1019	Rhododendron	3	Yes				Yes		Yes		Yes	Yes	Yes	Yes
1020	Lilac	3	Yes				Yes		Yes		Yes	Yes	Yes	Yes
1021	Viburnum	1.5	Yes				Yes		Yes		Yes	Yes	Yes	Yes
1022	Taxus	6	Yes				Yes		Yes		Yes	Yes	Yes	Yes
2173	Katsuratree	25.5	Yes				Yes		Yes	Yes	Yes	Yes	Yes	Yes
5001	Horsechestnut	33	Yes	Yes			Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
5002	Saucer Magnolia	16.5	Yes	Yes			Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
5003	Thornless Honeylocust	51	Yes	Yes			Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
5004	Sugar Maple	28.5				Yes								
5005	Lumber Pine	30	Yes	Yes			Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
5006	Kwanzan Oriental Cherry	15				Yes								
5007	Thornless Honeylocust	36	Yes	Yes			Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
5009	European Larch	16.5	Yes				Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
5010	Pin Oak	40.5	Yes				Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
5011	Trident Maple	30	Yes				Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
5014	Camperdown Elm	12				Yes								
5016	Korean Pine	1.5				Yes								
5017	Ginkgo	13.5	Yes	Yes			Yes		Yes	Yes	Yes	Yes	Yes	Yes
5018	Sage Crabapple	9	Yes				Yes		Yes	Yes	Yes	Yes	Yes	Yes
5019	Katsuratree	12				Yes								
5020	Dawn Redwood	22.5	Yes	Yes			Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
5021	Thornless Honeylocust	42	Yes	Yes			Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
5022	Paper Birch	19.5	Yes	Yes			Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
5023	Sweetbay Magnolia	3			Yes		Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
5024	Sweetbay Magnolia	3			Yes		Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
5025	Japanese Tree Lilac	9	Yes				Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
5026	European White Birch	24	Yes	Yes			Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
5027	Saucer Magnolia	12	Yes	Yes			Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
5028	Thornless Honeylocust	36	Yes	Yes			Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
5031	Thornless Honeylocust	37.5	Yes	Yes			Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
5034	Thornless Honeylocust	34.5	Yes	Yes			Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
5039	Sugar Maple	36				Yes								
5041	Carolina Silverbell	7.5	Yes				Yes		Yes	Yes	Yes	Yes	Yes	Yes
5042	Gray Birch	7.5				Yes								
5043	Thornless Honeylocust	24	Yes				Yes		Yes	Yes	Yes	Yes	Yes	Yes
5044	Siebold Viburnum	4.5	Yes				Yes		Yes	Yes	Yes	Yes	Yes	Yes
5045	Katsuratree	37.5	Yes				Yes		Yes	Yes	Yes	Yes	Yes	Yes
5046	Katsuratree	30	Yes				Yes		Yes	Yes	Yes	Yes	Yes	Yes
5047	Kousa Dogwood	7.5	Yes				Yes		Yes	Yes	Yes	Yes	Yes	Yes
5048	Kousa Dogwood	7.5	Yes				Yes		Yes	Yes	Yes	Yes	Yes	Yes
5049	Littleleaf Linden	42	Yes				Yes		Yes	Yes	Yes	Yes	Yes	Yes
5050	Giant Sequoia	4.5	Yes				Yes		Yes	Yes	Yes	Yes	Yes	Yes
5053	Japanese Zelkova	18	Yes	Yes			Yes		Yes	Yes	Yes	Yes	Yes	Yes
5103	Kwanzan Oriental Cherry	13.5				Yes								
5104	Sugar Maple	24				Yes								
5126	Korean Pine	3	Yes				Yes		Yes	Yes	Yes	Yes	Yes	Yes
5202	Eastern Arborvitae Hedge	6	Yes				Yes		Yes	Yes	Yes	Yes	Yes	Yes
7174	Chamaecyparis	4.5	Yes				Yes		Yes	Yes	Yes	Yes	Yes	Yes
A	Shademaster Honeylocust	6			Yes		Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes



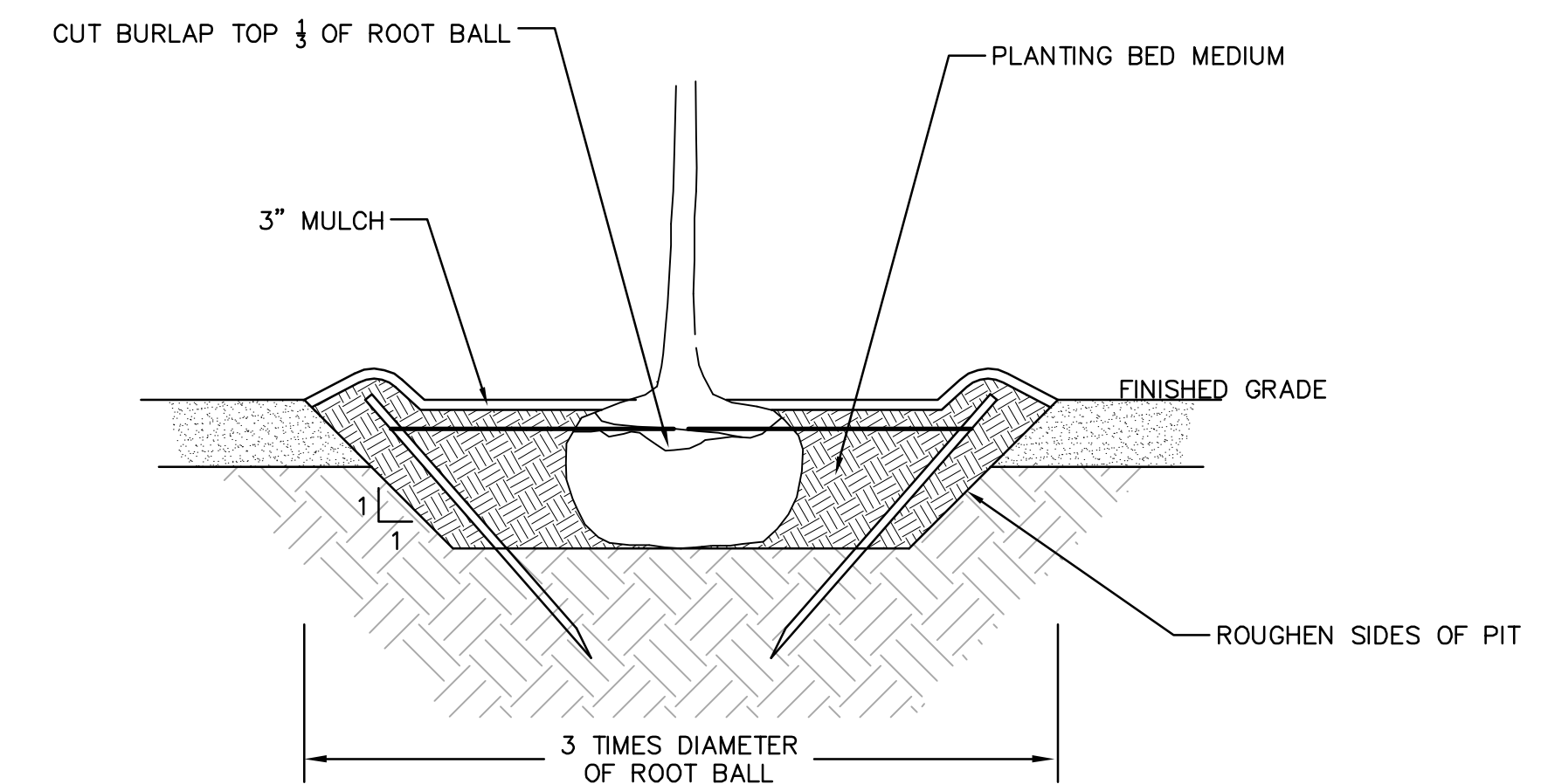
NOTE:
TREE PROTECTION FENCING SHALL BE IN ACCORDANCE WITH THE REQUIREMENTS OF SECTION 01-5639 2.1A OF THE SPECIFICATIONS.

TREE PROTECTION
NTS

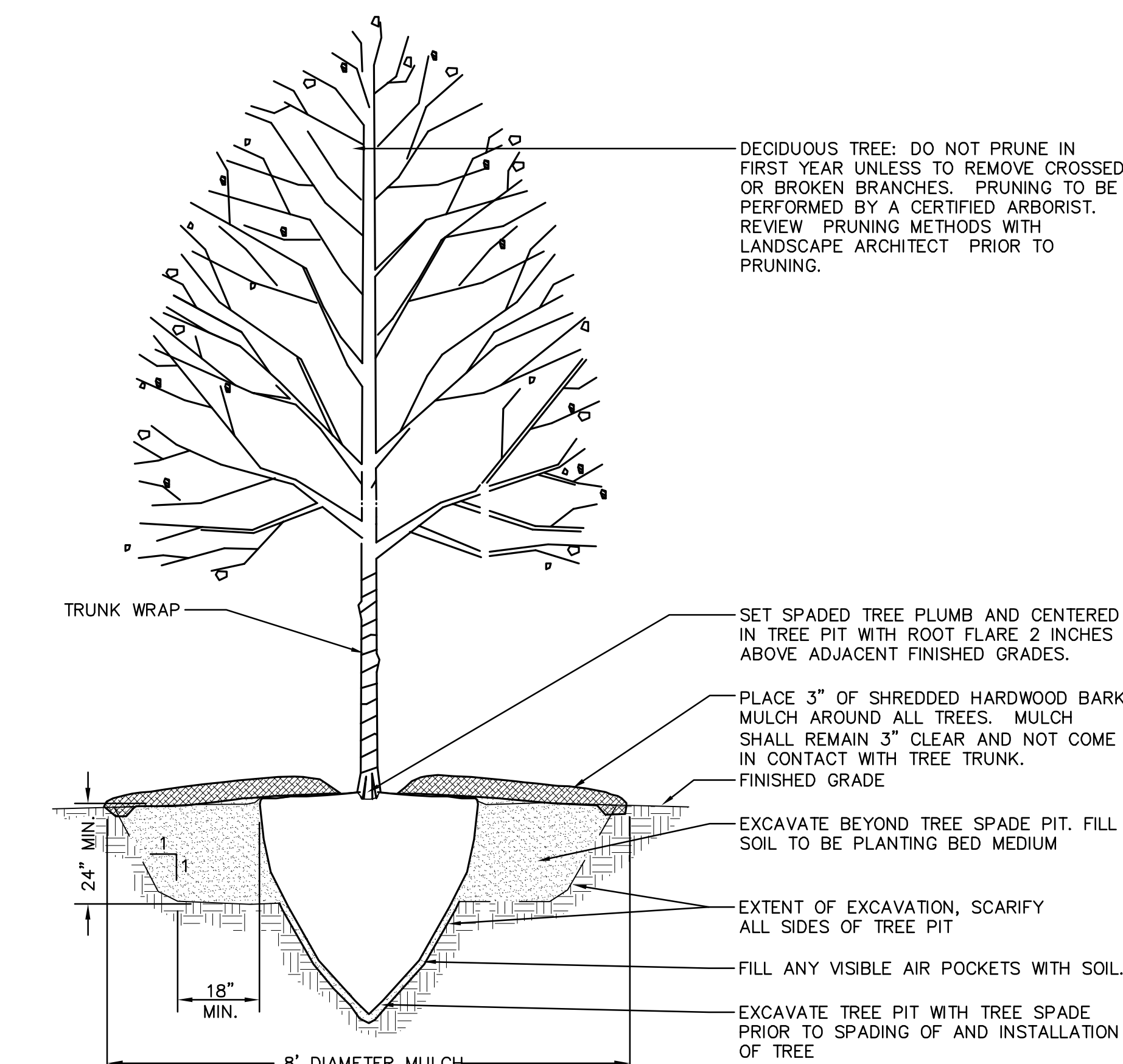
NOTE:
CONTRACTORS ARBORIST TO SUBMIT PLAN FOR SCARIFICATION IN THE VICINITY OF EXISTING TREE ROOTS. PLAN TO BE REVIEWED AND APPROVED BY THE PROJECT ARBORIST PRIOR TO SCARIFICATION.



TURF ESTABLISHMENT
NTS



TREE STAKING, ROOT BALL ANCHOR SYSTEM
NTS



- NOTES:**
1. SCARIFY ALL SIDES OF THE TREE PITS PRIOR TO INSTALLING SPADED ROOT BALL.
 2. GENTLY PLACE THE TREE IN THE TREE PIT AND SET THE TREE PLUMB. KEEP THE ROOT BALL MOIST AT ALL TIMES
 3. THE FILL SOIL SHALL BE FREE OF STONES, LUMPS, ROOTS, OR OTHER DEBRIS GREATER THAN 2". TAMP FILL SOIL FIRMLY HALFWAY UP THE ROOT BALL. TAMP REMAINING FILL SOIL LIGHTLY AND DO NOT COVER THE TOP OF THE ROOT BALL WITH SOIL. WATER GENEROUSLY.
 4. SEE ROOT BALL ANCHOR SYSTEM DETAIL

SPADED EXISTING TREE PLANTING DETAIL
NTS

CERTIFICATION:

STATUS:
Not for Construction

CONSULTANT:

AECOM
500 ENTERPRISE DRIVE
ROCKY HILL, CT 06067
1-(860)-529-8882

REVISIONS:

MARK	DATE	DESCRIPTION



UNIVERSITY OF CONNECTICUT
PLANNING, ARCHITECTURAL & ENGINEERING SERVICES
31 LEDOYT ROAD UNIT 3038
STORRS, CONNECTICUT 06269-3038
TELEPHONE: (860) 486-3127
FACSIMILE: (860) 486-3177

PROJECT:

NORTH EAGLEVILLE ROAD AREA
INFRASTRUCTURE REPAIR/REPLACEMENT
PHASE II
YOUNG QUAD UTILITIES

PROJECT NO: 901954
WORK ORDER NO:
FILE NAME:
P:\CIVIL\YOUNG QUAD\SHEETS\L-02

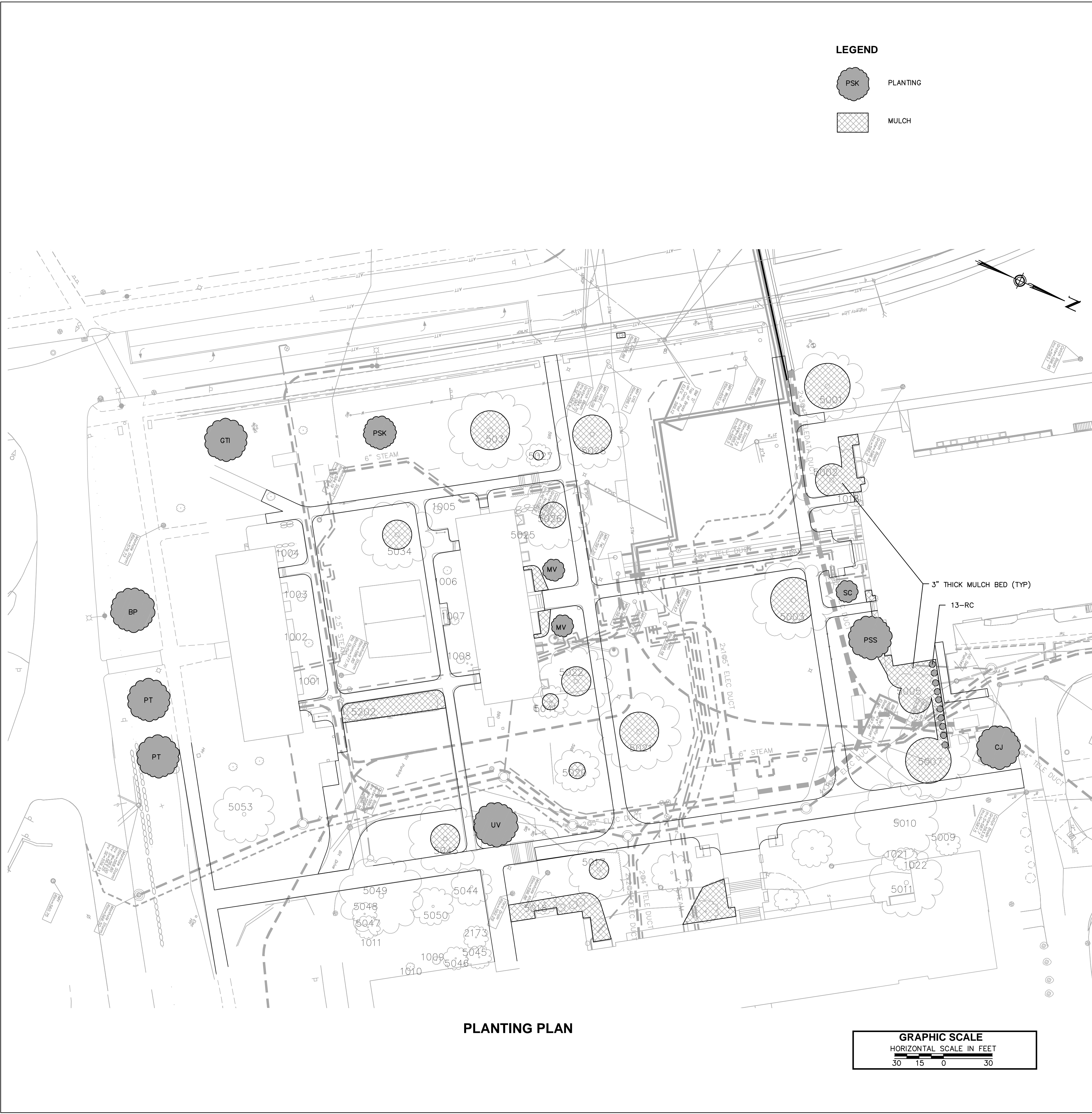
AUTHOR: PETER SAMMIS
DRAFTER: KEVIN MCKENNA
SCALE: AS NOTED
PRINT DATE: APRIL 21, 2015
SHEET TITLE:

TREE PROTECTION DETAILS

SHEET:

L-02

SHEET: ___ of ___



LEGEND

- PLANTING
- MULCH

LANDSCAPE GENERAL NOTES

1. OWNER'S REPRESENTATIVE TO APPROVE PLANT MATERIAL PRIOR TO DELIVERY TO THE SITE AND AGAIN AT SITE PRIOR TO PLANTING.
2. PLANT MATERIAL SHALL CONFORM TO THE "AMERICAN STANDARD FOR NURSERY STOCK", PUBLISHED BY THE AMERICAN ASSOCIATION OF NURSERYMEN, INC.
3. NO SUBSTITUTION OF PLANT SPECIES OR VARIETIES WILL BE ACCEPTABLE WITHOUT THE OWNER'S REPRESENTATIVE'S WRITTEN APPROVAL.
4. LOCATE AND VERIFY ALL UTILITY LINE LOCATIONS PRIOR TO STAKING AND REPORT CONFLICTS TO THE OWNER'S REPRESENTATIVE.
5. STAKE OUT PLANTS IN THEIR APPROXIMATE LOCATION. ADJUST LOCATIONS OF STAKES AS DIRECTED BY OWNER'S REPRESENTATIVE TO ACCOUNT FOR UTILITIES AND OTHER FIELD CONDITIONS. OWNER'S REPRESENTATIVE TO APPROVE FINAL STAKED LOCATIONS PRIOR TO PLANTING.
6. NO PLANTING SHALL BE INSTALLED BEFORE ACCEPTANCE OF FINAL GRADING.
7. COMPLETE QUANTITIES OF PLANTS FOR EACH AREA TO BE AVAILABLE ON SITE AT THE TIME OF PLANTING FOR FIELD LAYOUT BY OWNER'S REPRESENTATIVE. NO PARTIAL LAYOUT AND PLANTING OF AREAS WILL BE ACCEPTABLE.
8. INSTALL PLANTS WITH ROOT FLARES FLUSH WITH GRADE. IMMEDIATELY REPLANT PLANTS WHICH SETTLE OUT OF PLUMB OR BELOW FINISH GRADE.
9. PLANT UNDER FULL SUPERVISION OF CERTIFIED ARBORIST. PROVIDE WRITTEN VERIFICATION OF CERTIFICATION AND/OR LICENSE FOR OWNER'S REPRESENTATIVE'S APPROVAL.
10. LOOSE OR CRACKED ROOT BALLS ARE UNACCEPTABLE.
11. DO NOT USE TREE WRAP.
12. REMOVE TOP 2/3 OF WIRE BASKETS. REMOVE TOP 1/3 OF BURLAP. SYNTHETIC BURLAP WILL NOT BE ACCEPTED. FOR CONTAINER PLANTS, REMOVE CONTAINER AND SCARIFY EDGES OF ROOT BALL 0.5" DEEP IN A MINIMUM OF FOUR LOCATIONS.
13. RAISE AND REPLANT PLANTS THAT SETTLE AFTER PLANTING AND WATERING.
14. WATER PLANTS THOROUGHLY AFTER INSTALLATION, A MINIMUM OF TWICE WITHIN THE FIRST 24 HRS.
15. ALL TREE STAKING OR GUYING SHALL BE DONE IMMEDIATELY AFTER PLANTING, BUT IN NO INSTANCE MORE THAN 24 HOURS AFTER PLANTING. SEE STAKING/GUYING DETAIL. AT COMPLETION OF MAINTENANCE PERIOD REMOVE ALL STAKES, FLAGS, GUYS, TREE WRAP AND ANCHORS.
16. MULCH ALL NEW PLANT PITS TO ACHIEVE A 3" DEPTH (AFTER SETTLEMENT). MULCH FOR SAUCERS TO BE DOUBLE SHREDDED BARK MULCH.
17. ALL EXTERIOR GROUND AREAS DISTURBED BY CONSTRUCTION AND NOT COVERED BY STRUCTURES, PAVING, SIDEWALKS, LANDSCAPING OR OTHER SITE IMPROVEMENTS SHALL BE GRADED, TOPSOILED WITH SOIL PREPARATION TO A DEPTH OF 8" AND TURF ESTABLISHED.
18. ALL LAWN AND PLANTING AREA SOIL PREPARATION SHALL BE FERTILIZED AND AMENDED ACCORDING TO RECOMMENDATIONS OF A SOIL ANALYSIS PROVIDED BY AN APPROVED SOIL TESTING LABORATORY, AND APPROVED BY THE OWNER'S REPRESENTATIVE.
19. FOR TREE PLANTING REQUIREMENTS SEE TREE PLANTING DETAIL THIS SHEET.
20. CONTRACTOR IS RESPONSIBLE FOR SUPPLYING THEIR OWN WATER. WATER WILL NOT BE PROVIDED BY THE UNIVERSITY.
21. UPON COMPLETION OF CONSTRUCTION OPERATIONS ALL LANDSCAPE AREAS IMPACTED BY CONSTRUCTION SHALL BE FULLY RESTORED. RESTORATION SHALL INCLUDE BUT NOT BE LIMITED TO TREE AND PLANT REPLACEMENT, LAWN RESTORATION, AND SOIL COMPACTION REMEDIATION. ALL LANDSCAPE RESTORATION TO BE COORDINATED AND APPROVED BY THE OWNER'S REPRESENTATIVE.
22. SEE SHEET L-02 FOR SHRUB PLANTING DETAILS.
23. MULCH RING SHALL BE PROVIDED FOR ALL EXISTING AND PROPOSED PLANTINGS, INCLUDING TREES.
24. MULCH RING FOR TREES SHALL BE APPROXIMATELY ONE-THIRD THE DRIP LINE DIAMETER.

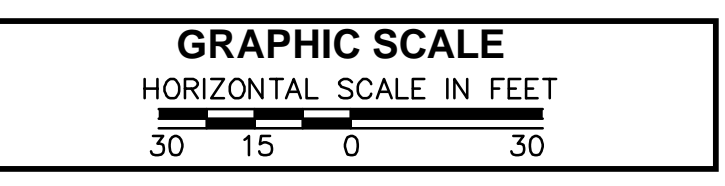
PLANT SCHEDULE

CATEGORY	SYM	BOTANICAL NAME	COMMON NAME	QTY	SIZE	NOTES
TREE	PSK	PRUNUS SERRULATA 'KWANZAN'	KWANZAN ORIENTAL CHERRY	1	3 1/2" CAL	B&B
TREE	PSS	PRUNUS SERRULATA 'SHIROFUGEN'	ORIENTAL CHERRY	1	3 1/2" CAL	B&B
TREE	UV	ULMUS X VEGATA 'CAMPERDOWNII'	CAMPERDOWN ELM	1	3 1/2" CAL	B&B
TREE	CJ	CERCIDIPHYLLUM JAPONICUM	KATSURA TREE	1	3 1/2" CAL	B&B
TREE	BP	BETULA POPULIFOLIA	GRAY BIRCH	1	3 1/2" CAL	B&B
TREE	SC	SALEX CAPREA 'PENDULA'	WEeping PUSSY WILLOW	1	2" CAL	1
TREE	PT	POPULUS TREMULOIDES	WHITE POPLAR	2	1" CAL	1
TREE	MV	MAGNOLIA VIRGINIANA	SWEETBAY MAGNOLIA	2	2" CAL	1
TREE	GTI	GLEDDITISIA TRIACANTHOS INERMIS 'SHADEMASTER'	SHADEMASTER HONEYLOCUST	1	4" CAL	1
SHRUB	RC	RHODODENDRON CAROLINIAUM "CAROLINA GOLD"	CAROLINA GOLD RHODODENDRON	13	24"-36"	B&B

PLANT SCHEDULE NOTES

1. TRANSPLANT FROM EXISTING LOCATION WITHIN WORK AREA.

PLANTING PLAN



CERTIFICATION:

STATUS:
Not for Construction

CONSULTANT:
AECOM
500 ENTERPRISE DRIVE
ROCKY HILL, CT 06067
1-(860)-529-8882

REVISIONS:

MARK	DATE	DESCRIPTION

UNIVERSITY OF CONNECTICUT
PLANNING, ARCHITECTURAL & ENGINEERING SERVICES
31 LEDOYT ROAD UNIT 3038
STORRS, CONNECTICUT 06269-3038
TELEPHONE: (860) 486-3127
FACSIMILE: (860) 486-3177

PROJECT:

NORTH EAGLEVILLE ROAD AREA
INFRASTRUCTURE REPAIR/REPLACEMENT
PHASE II
YOUNG QUAD UTILITIES

PROJECT NO: 901954
WORK ORDER NO:
FILE NAME:
P:\CIVIL\YOUNG QUAD\SHEETS\L-03

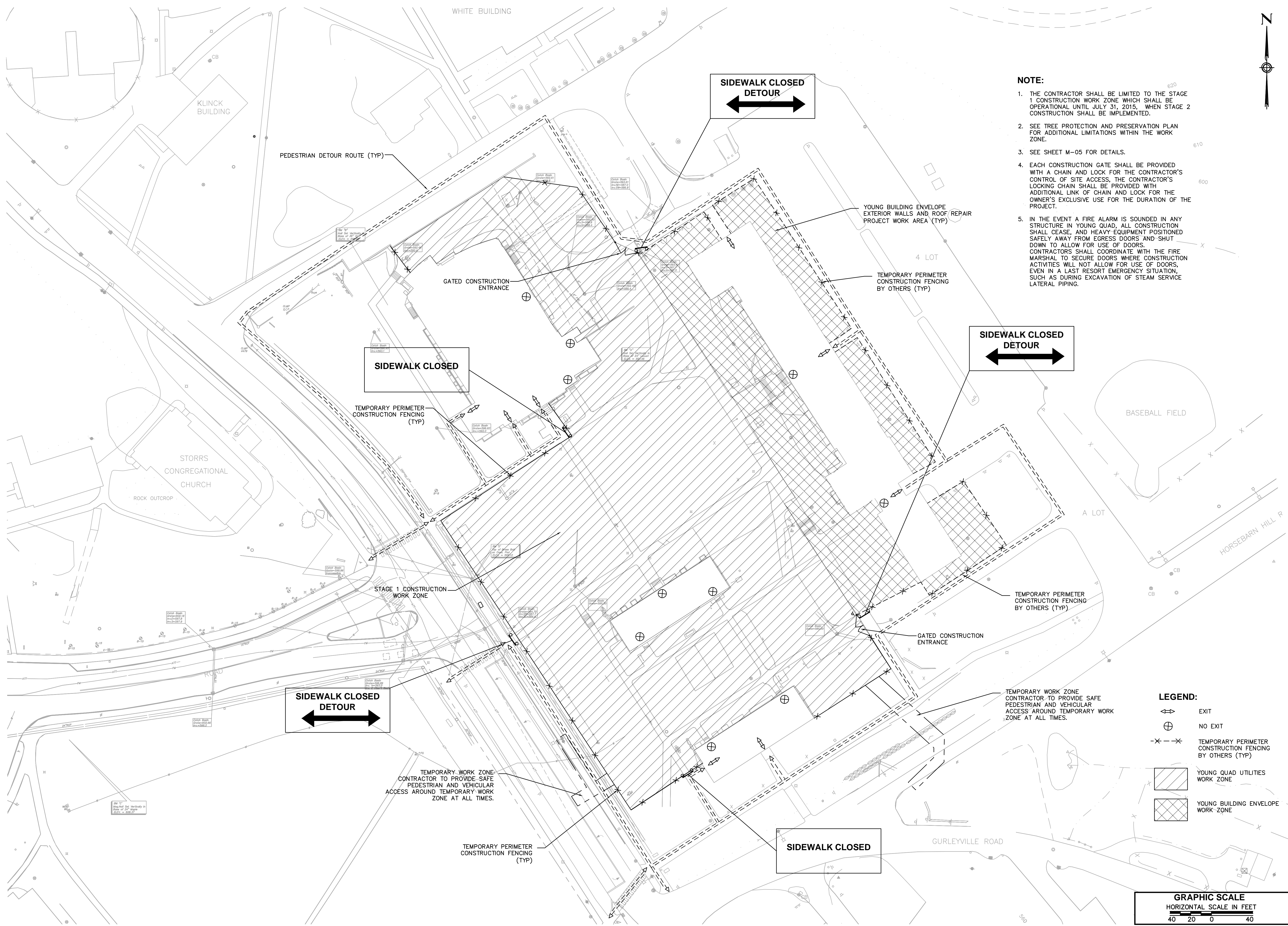
AUTHOR: PETER SAMMIS
DRAFTER: KEVIN MCKENNA
SCALE: AS NOTED
PRINT DATE: APRIL 21, 2015
SHEET TITLE:

LANDSCAPE PLAN AND DETAILS

SHEET:

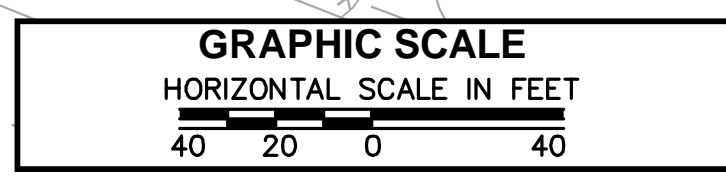
L-03

SHEET: _ of _



- NOTE:**
1. THE CONTRACTOR SHALL BE LIMITED TO THE STAGE 1 CONSTRUCTION WORK ZONE WHICH SHALL BE OPERATIONAL UNTIL JULY 31, 2015. WHEN STAGE 2 CONSTRUCTION SHALL BE IMPLEMENTED.
 2. SEE TREE PROTECTION AND PRESERVATION PLAN FOR ADDITIONAL LIMITATIONS WITHIN THE WORK ZONE.
 3. SEE SHEET M-05 FOR DETAILS.
 4. EACH CONSTRUCTION GATE SHALL BE PROVIDED WITH A CHAIN AND LOCK FOR THE CONTRACTOR'S CONTROL OF SITE ACCESS. THE CONTRACTOR'S LOCKING CHAIN SHALL BE PROVIDED WITH AN ADDITIONAL LINK OF CHAIN AND LOCK FOR THE OWNER'S EXCLUSIVE USE FOR THE DURATION OF THE PROJECT.
 5. IN THE EVENT A FIRE ALARM IS SOUNDED IN ANY STRUCTURE IN YOUNG QUAD, ALL CONSTRUCTION SHALL CEASE AND HEAVY EQUIPMENT POSITIONED SAFELY AWAY FROM EGRESS DOORS AND SHUT DOWN TO ALLOW FOR USE OF DOORS. CONTRACTORS SHALL COORDINATE WITH THE FIRE MARSHAL TO SECURE DOORS WHERE CONSTRUCTION ACTIVITIES WILL NOT ALLOW FOR USE OF DOORS, EVEN IN A LAST RESORT EMERGENCY SITUATION, SUCH AS DURING EXCAVATION OF STEAM SERVICE LATERAL PIPING.

- LEGEND:**
- ⬇ EXIT
 - ⊕ NO EXIT
 - *-*-* TEMPORARY PERIMETER CONSTRUCTION FENCING BY OTHERS (TYP)
 - [Hatched Box] YOUNG QUAD UTILITIES WORK ZONE
 - [Cross-hatched Box] YOUNG BUILDING ENVELOPE WORK ZONE



CERTIFICATION:

STATUS:
Not for Construction

CONSULTANT:
AECOM
500 ENTERPRISE DRIVE
ROCKY HILL, CT 06067
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STORRS, CONNECTICUT 06269-3038
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PROJECT:

NORTH EAGLEVILLE ROAD AREA
INFRASTRUCTURE REPAIR/REPLACEMENT
PHASE II
YOUNG QUAD UTILITIES

PROJECT NO: 901954
WORK ORDER NO:
FILE NAME:
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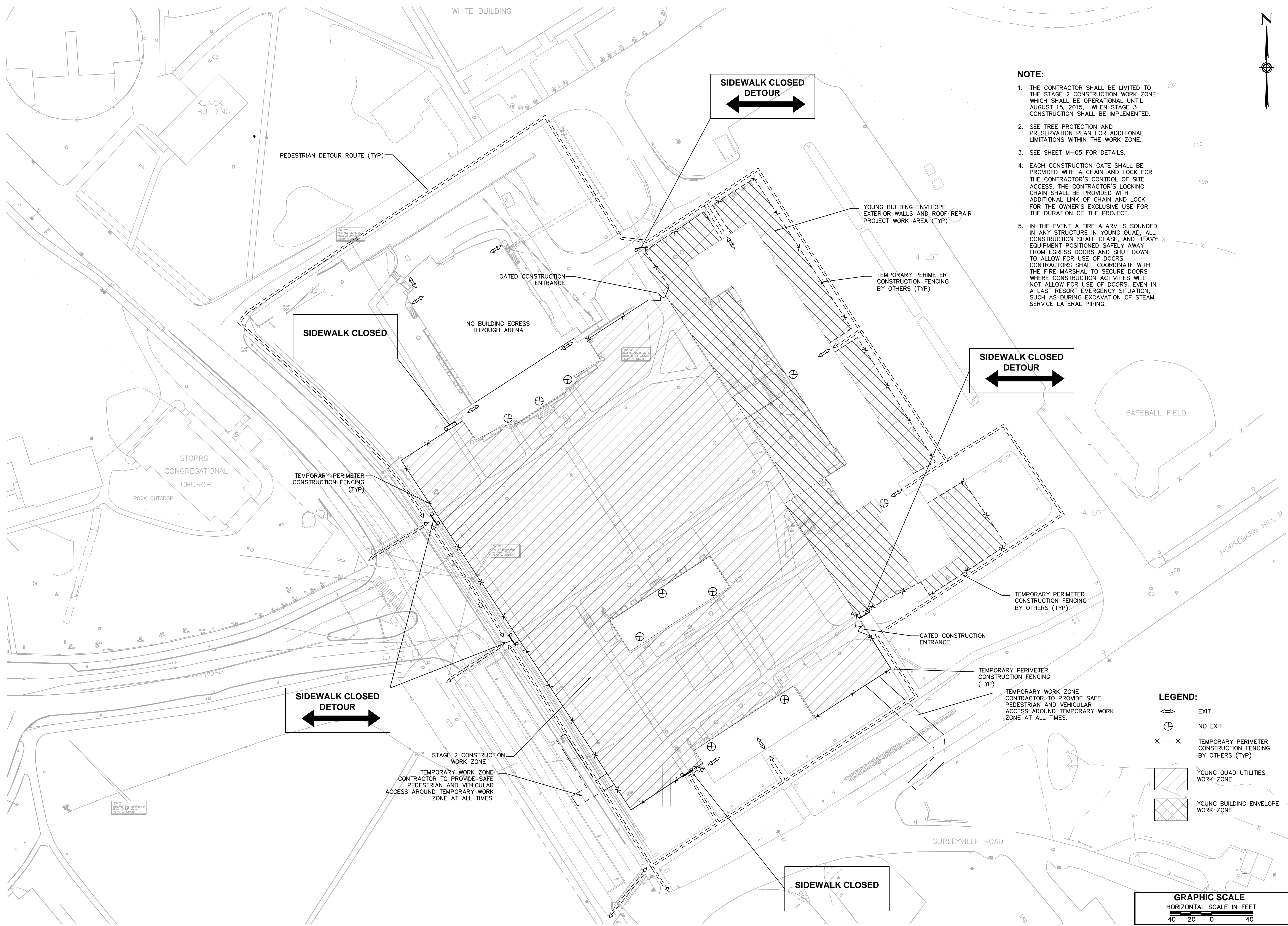
AUTHOR: PETER SAMMIS
DRAFTER: KEVIN MCKENNA
SCALE: AS NOTED
PRINT DATE: APRIL 21, 2015
SHEET TITLE:

**PEDESTRIAN DETOUR PLAN
STAGE 1 CONSTRUCTION**

SHEET:

M-01

SHEET: ___ of ___



NOTE:

1. THE CONTRACTOR SHALL BE LIMITED TO THE STAGE 2 CONSTRUCTION WORK ZONE WHICH SHALL BE OPERATIONAL UNTIL AUGUST 15, 2015. WHEN STAGE 3 CONSTRUCTION SHALL BE IMPLEMENTED.
2. SEE TREE PROTECTION AND PRESERVATION PLAN FOR ADDITIONAL LIMITATIONS WITHIN THE WORK ZONE.
3. SEE SHEET M-05 FOR DETAILS.
4. EACH CONSTRUCTION GATE SHALL BE PROVIDED WITH A CHAIN AND LOCK FOR THE CONTRACTOR'S CONTROL OF SITE ACCESS. THE CONTRACTOR'S LOCKING CHAIN SHALL BE PROVIDED WITH ADDITIONAL LINK OF CHAIN AND LOCK FOR THE OWNER'S EXCLUSIVE USE FOR THE DURATION OF THE PROJECT.
5. IN THE EVENT A FIRE ALARM IS SOUNDED IN ANY STRUCTURE IN YOUNG QUAD, ALL CONSTRUCTION SHALL CEASE, AND HEAVY EQUIPMENT POSITIONED SAFELY AWAY FROM EGRESS DOORS AND SHUT DOWN TO ALLOW FOR USE OF DOORS. CONTRACTORS SHALL COORDINATE WITH THE FIRE MARSHAL TO SECURE DOORS WHERE CONSTRUCTION ACTIVITIES WILL NOT ALLOW FOR USE OF DOORS, EVEN IN A LAST RESORT EMERGENCY SITUATION, SUCH AS DURING EXCAVATION OF STEAM SERVICE LATERAL PIPING.



SIDEWALK CLOSED DETOUR

SIDEWALK CLOSED

SIDEWALK CLOSED DETOUR

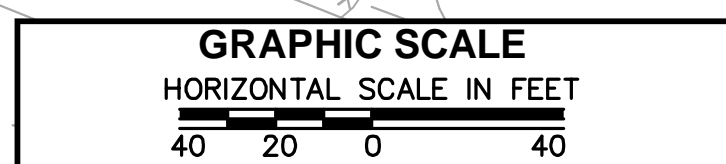
SIDEWALK CLOSED

LEGEND:

- EXIT
- NO EXIT
- TEMPORARY PERIMETER CONSTRUCTION FENCING BY OTHERS (TYP)
- YOUNG QUAD UTILITIES WORK ZONE
- YOUNG BUILDING ENVELOPE WORK ZONE

TEMPORARY WORK ZONE CONTRACTOR TO PROVIDE SAFE PEDESTRIAN AND VEHICULAR ACCESS AROUND TEMPORARY WORK ZONE AT ALL TIMES.

TEMPORARY WORK ZONE CONTRACTOR TO PROVIDE SAFE PEDESTRIAN AND VEHICULAR ACCESS AROUND TEMPORARY WORK ZONE AT ALL TIMES.



CERTIFICATION:

STATUS:
Not for Construction

CONSULTANT:
AECOM
500 ENTERPRISE DRIVE
ROCKY HILL, CT 06067
1-(860)-529-8882

REVISIONS:

MARK	DATE	DESCRIPTION



UNIVERSITY OF CONNECTICUT
PLANNING, ARCHITECTURAL & ENGINEERING SERVICES
31 LEDOYT ROAD UNIT 3038
STORRS, CONNECTICUT 06269-3038
TELEPHONE: (860) 486-3127
FACSIMILE: (860) 486-3177

PROJECT:

**NORTH EAGLEVILLE ROAD AREA
INFRASTRUCTURE REPAIR/REPLACEMENT
PHASE II
YOUNG QUAD UTILITIES**

PROJECT NO: 901954
WORK ORDER NO:
FILE NAME:
P:\CIVIL\YOUNG QUAD\SHEETS\M-02

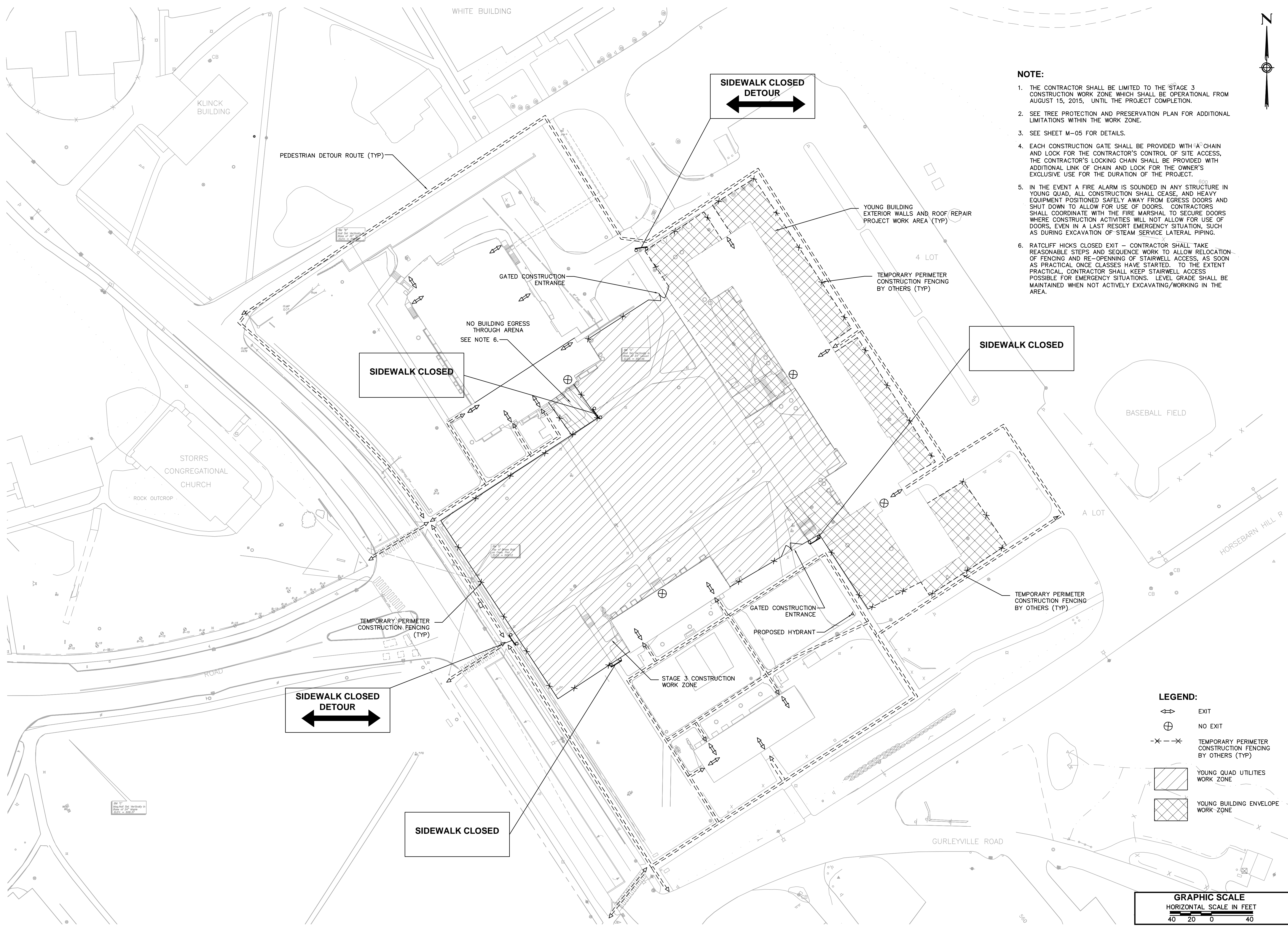
AUTHOR: PETER SAMMIS
DRAFTER: KEVIN MCKENNA
SCALE: AS NOTED
PRINT DATE: APRIL 21, 2015
SHEET TITLE:

**PEDESTRIAN DETOUR PLAN
STAGE 2 CONSTRUCTION**

SHEET:

M-02

SHEET: ___ of ___



NOTE:

1. THE CONTRACTOR SHALL BE LIMITED TO THE 'STAGE 3 CONSTRUCTION WORK ZONE WHICH SHALL BE OPERATIONAL FROM AUGUST 15, 2015, UNTIL THE PROJECT COMPLETION.
2. SEE TREE PROTECTION AND PRESERVATION PLAN FOR ADDITIONAL LIMITATIONS WITHIN THE WORK ZONE.
3. SEE SHEET M-05 FOR DETAILS.
4. EACH CONSTRUCTION GATE SHALL BE PROVIDED WITH A CHAIN AND LOCK FOR THE CONTRACTOR'S CONTROL OF SITE ACCESS. THE CONTRACTOR'S LOCKING CHAIN SHALL BE PROVIDED WITH ADDITIONAL LINK OF CHAIN AND LOCK FOR THE OWNER'S EXCLUSIVE USE FOR THE DURATION OF THE PROJECT.
5. IN THE EVENT A FIRE ALARM IS SOUNDED IN ANY STRUCTURE IN YOUNG QUAD, ALL CONSTRUCTION SHALL CEASE, AND HEAVY EQUIPMENT POSITIONED SAFELY AWAY FROM EGRESS DOORS AND SHUT DOWN TO ALLOW FOR USE OF DOORS. CONTRACTORS SHALL COORDINATE WITH THE FIRE MARSHAL TO SECURE DOORS WHERE CONSTRUCTION ACTIVITIES WILL NOT ALLOW FOR USE OF DOORS, EVEN IN A LAST RESORT EMERGENCY SITUATION, SUCH AS DURING EXCAVATION OF STEAM SERVICE LATERAL PIPING.
6. RATCLIFF HICKS CLOSED EXIT - CONTRACTOR SHALL TAKE REASONABLE STEPS AND SEQUENCE WORK TO ALLOW RELOCATION OF FENCING AND RE-OPENING OF STAIRWELL ACCESS, AS SOON AS PRACTICAL ONCE CLASSES HAVE STARTED. TO THE EXTENT PRACTICAL, CONTRACTOR SHALL KEEP STAIRWELL ACCESS POSSIBLE FOR EMERGENCY SITUATIONS. LEVEL GRADE SHALL BE MAINTAINED WHEN NOT ACTIVELY EXCAVATING/WORKING IN THE AREA.



CERTIFICATION:

STATUS:
Not for Construction

CONSULTANT:
AECOM
500 ENTERPRISE DRIVE
ROCKY HILL, CT 06067
1-(860)-529-8882

REVISIONS:

MARK	DATE	DESCRIPTION



UNIVERSITY OF CONNECTICUT
PLANNING, ARCHITECTURAL & ENGINEERING SERVICES
31 LEDOYT ROAD UNIT 3038
STORRS, CONNECTICUT 06269-3038
TELEPHONE: (860) 486-3127
FACSIMILE: (860) 486-3177

PROJECT:

NORTH EAGLEVILLE ROAD AREA
INFRASTRUCTURE REPAIR/REPLACEMENT
PHASE II
YOUNG QUAD UTILITIES

PROJECT NO: 901954
WORK ORDER NO:
FILE NAME:
P:\CIVIL\YOUNG QUAD\SHEETS\M-03

AUTHOR: PETER SAMMIS
DRAFTER: KEVIN MCKENNA
SCALE: AS NOTED
PRINT DATE: APRIL 21, 2015
SHEET TITLE:

**PEDESTRIAN DETOUR PLAN
STAGE 3 CONSTRUCTION**

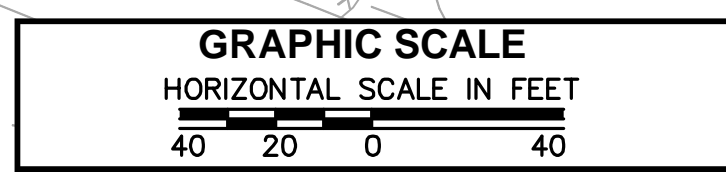
SHEET:

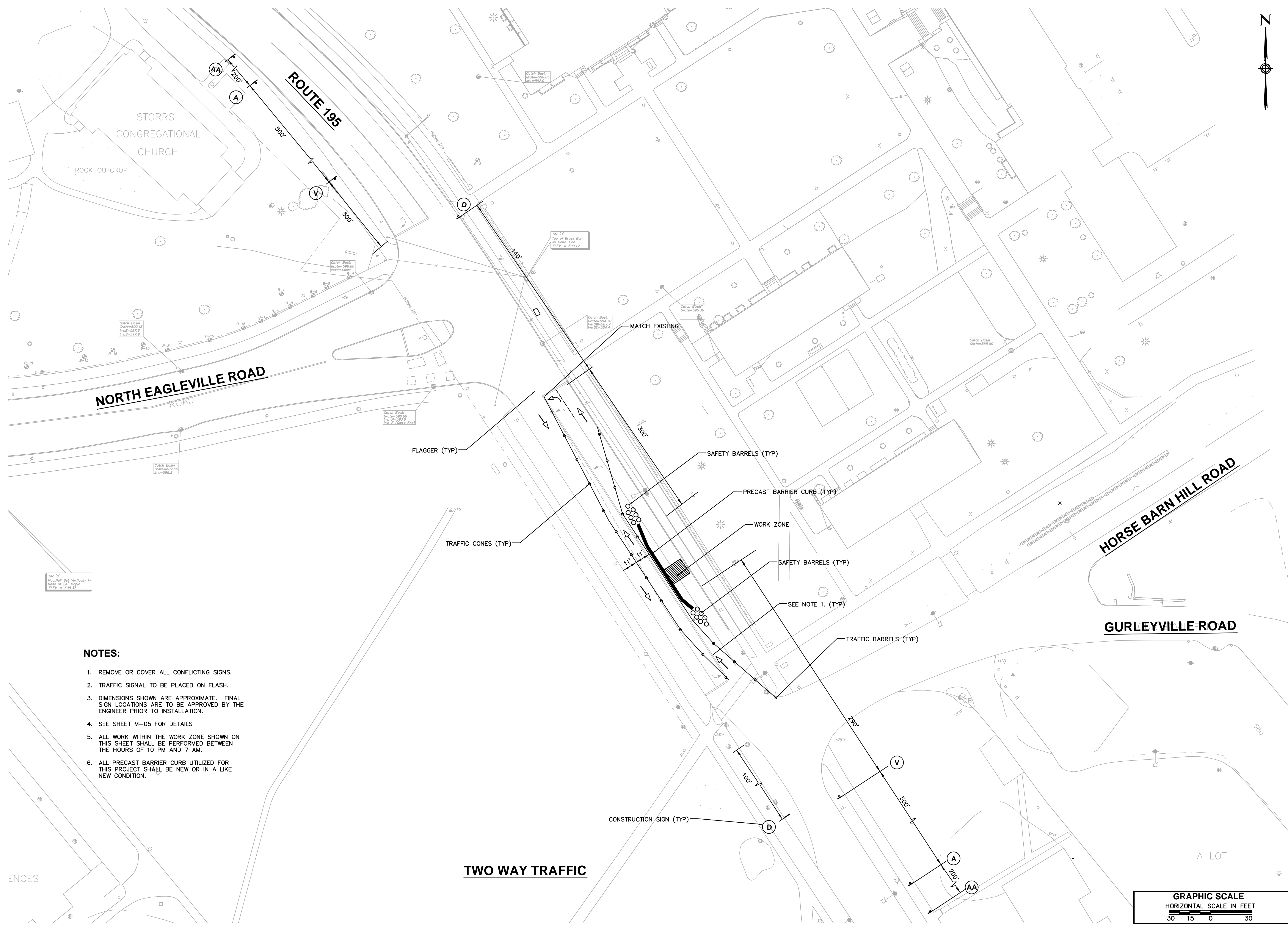
M-03

SHEET: ___ of ___

LEGEND:

- EXIT
- ⊕ NO EXIT
- X-X- TEMPORARY PERIMETER CONSTRUCTION FENCING BY OTHERS (TYP)
- [Hatched Box] YOUNG QUAD UTILITIES WORK ZONE
- [Cross-hatched Box] YOUNG BUILDING ENVELOPE WORK ZONE

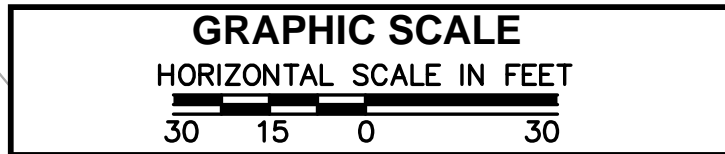




NOTES:

1. REMOVE OR COVER ALL CONFLICTING SIGNS.
2. TRAFFIC SIGNAL TO BE PLACED ON FLASH.
3. DIMENSIONS SHOWN ARE APPROXIMATE. FINAL SIGN LOCATIONS ARE TO BE APPROVED BY THE ENGINEER PRIOR TO INSTALLATION.
4. SEE SHEET M-05 FOR DETAILS
5. ALL WORK WITHIN THE WORK ZONE SHOWN ON THIS SHEET SHALL BE PERFORMED BETWEEN THE HOURS OF 10 PM AND 7 AM.
6. ALL PRECAST BARRIER CURB UTILIZED FOR THIS PROJECT SHALL BE NEW OR IN A LIKE NEW CONDITION.

TWO WAY TRAFFIC



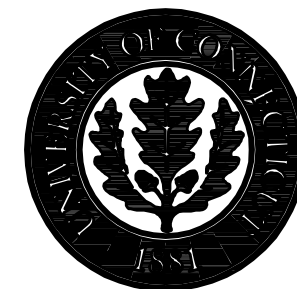
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PROJECT NO: 901954

WORK ORDER NO:

FILE NAME:
P:\CIVIL\YOUNG QUAD\SHEETS\M-04

AUTHOR: PETER SAMMIS

DRAFTER: KEVIN MCKENNA

SCALE: AS NOTED

PRINT DATE: APRIL 21, 2015

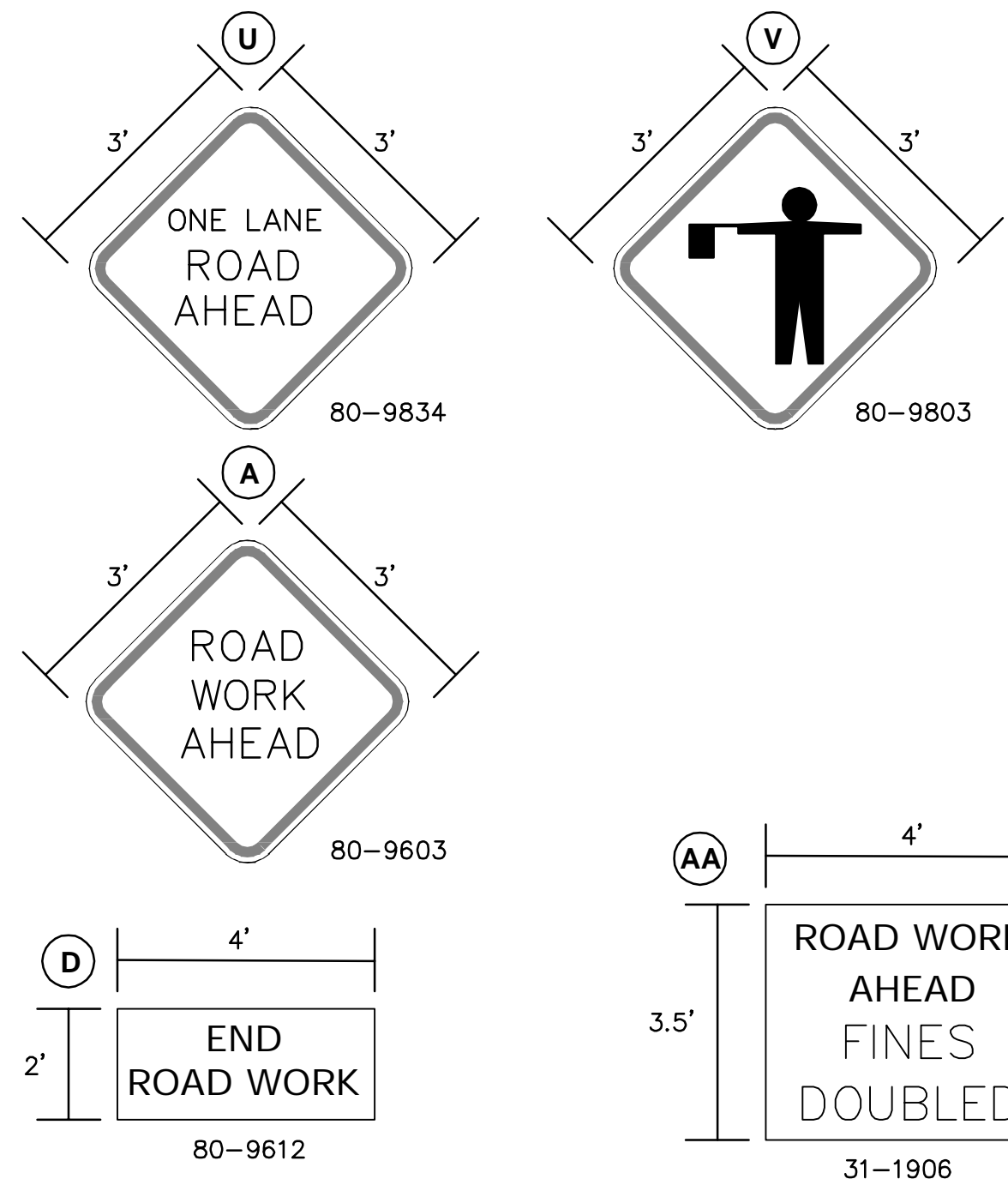
SHEET TITLE:

MAINTENANCE AND PROTECTION OF TRAFFIC ROUTE 195

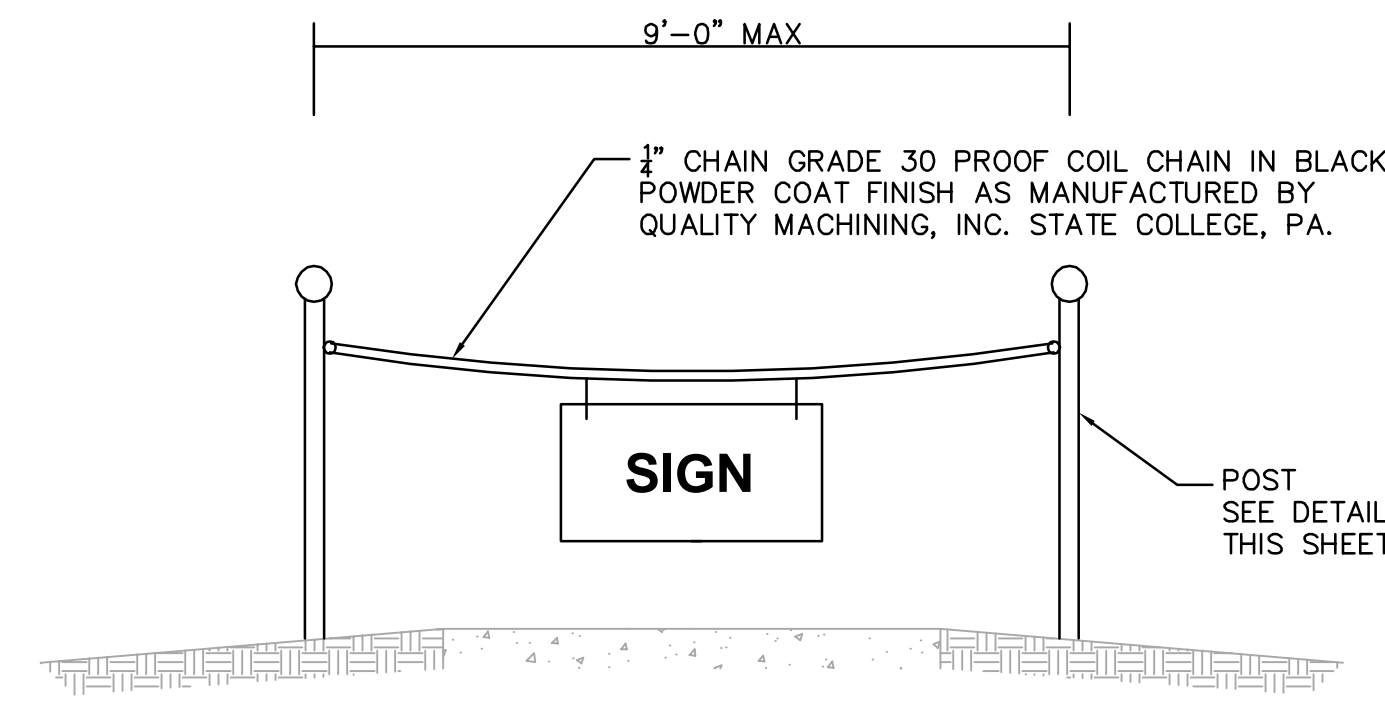
SHEET:

M-04

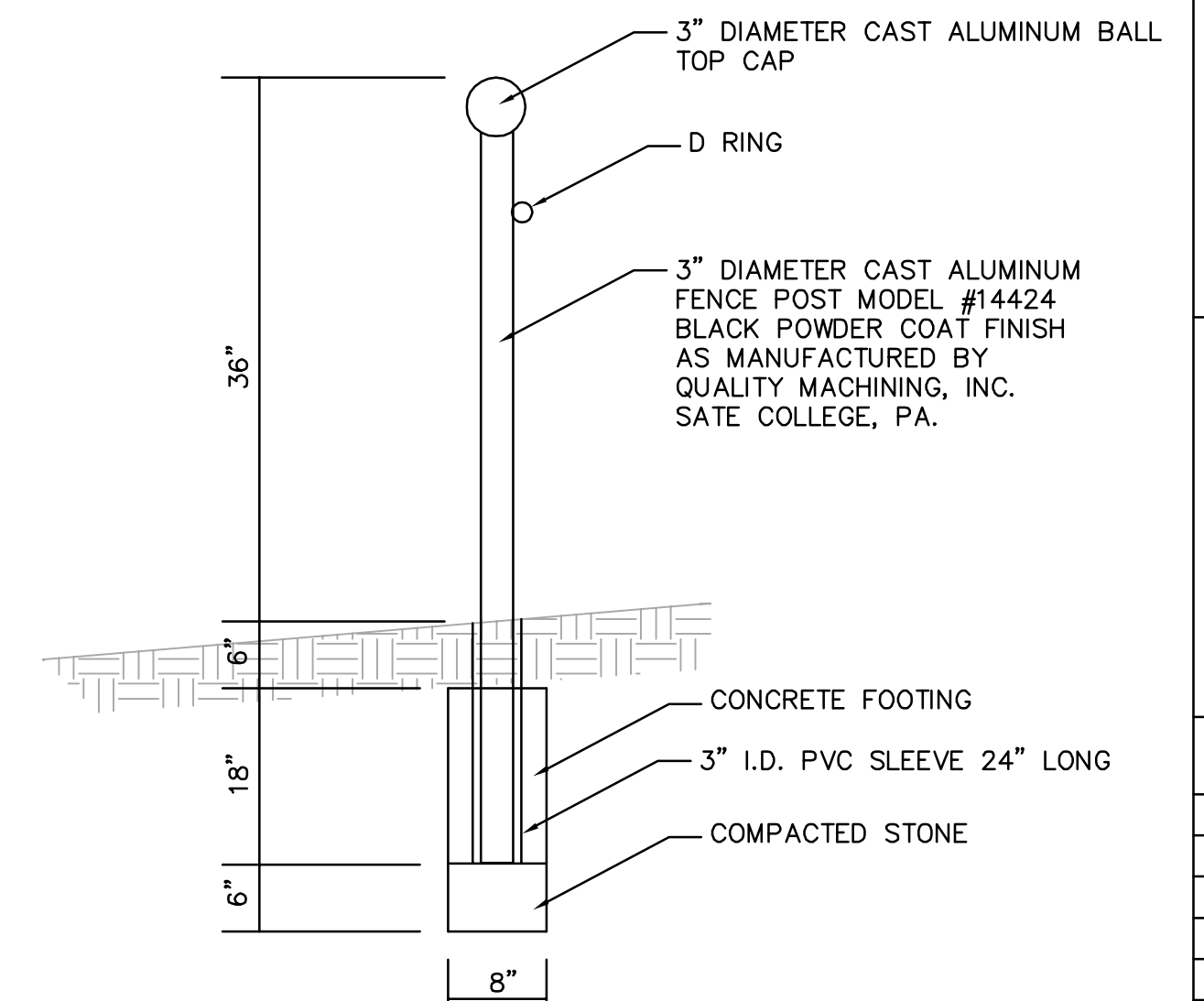
SHEET: ___ of ___



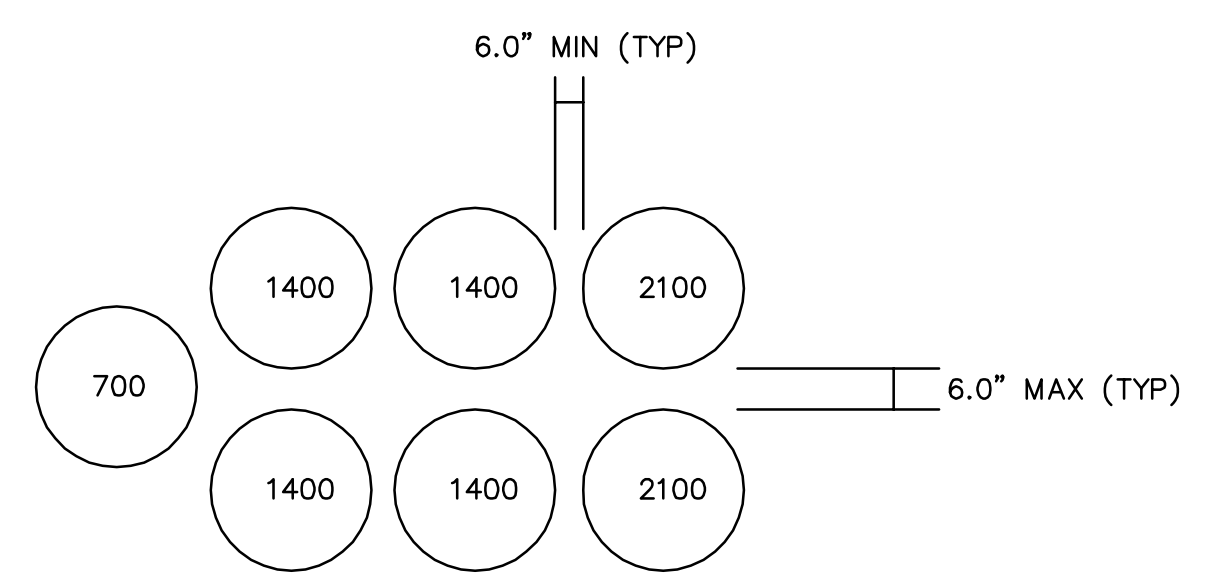
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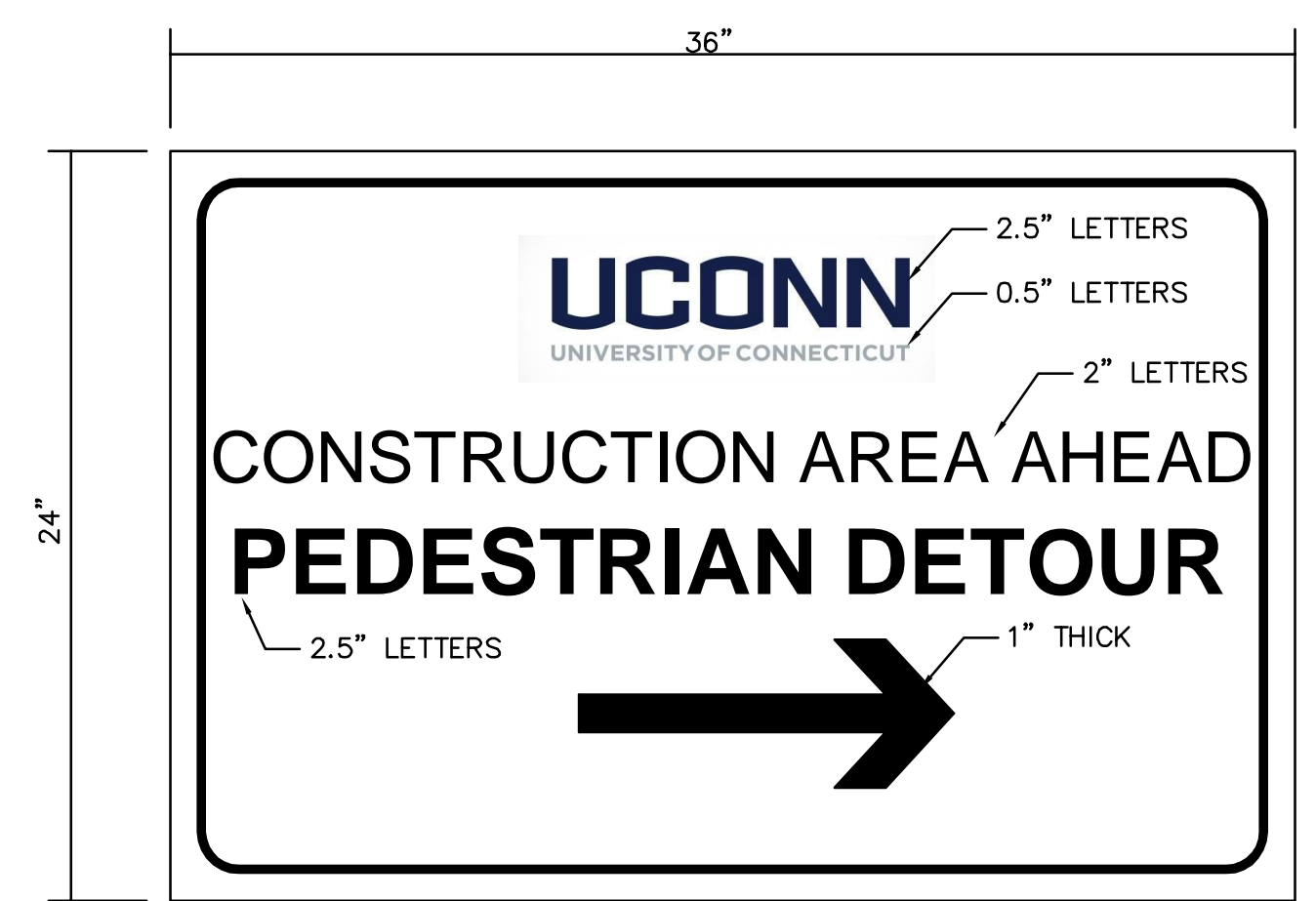
YOUNG QUAD PEDESTRIAN DETOUR SIGNAGE
NTS



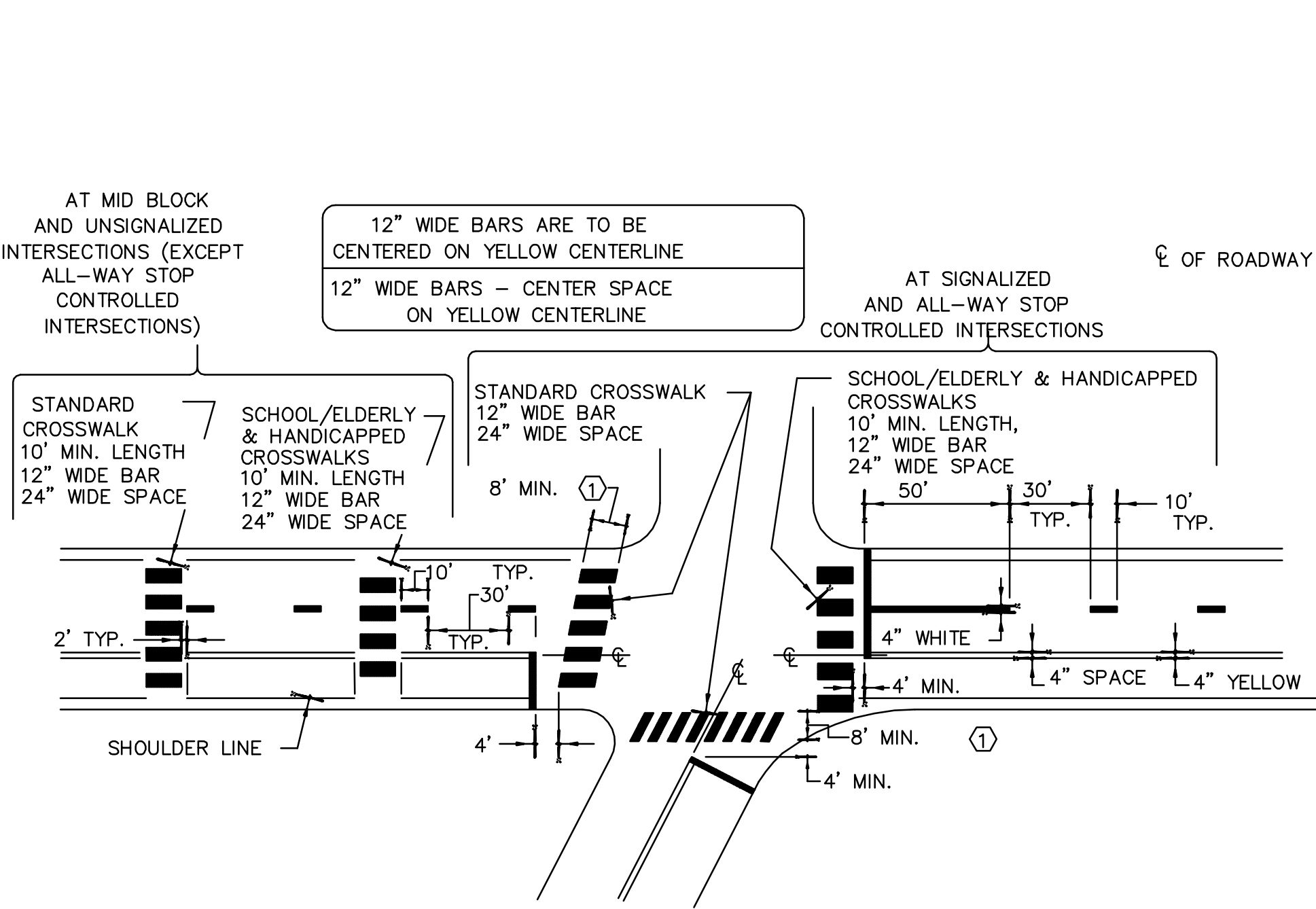
YOUNG QUAD PEDESTRIAN DETOUR SIGN POST DETAIL
NTS



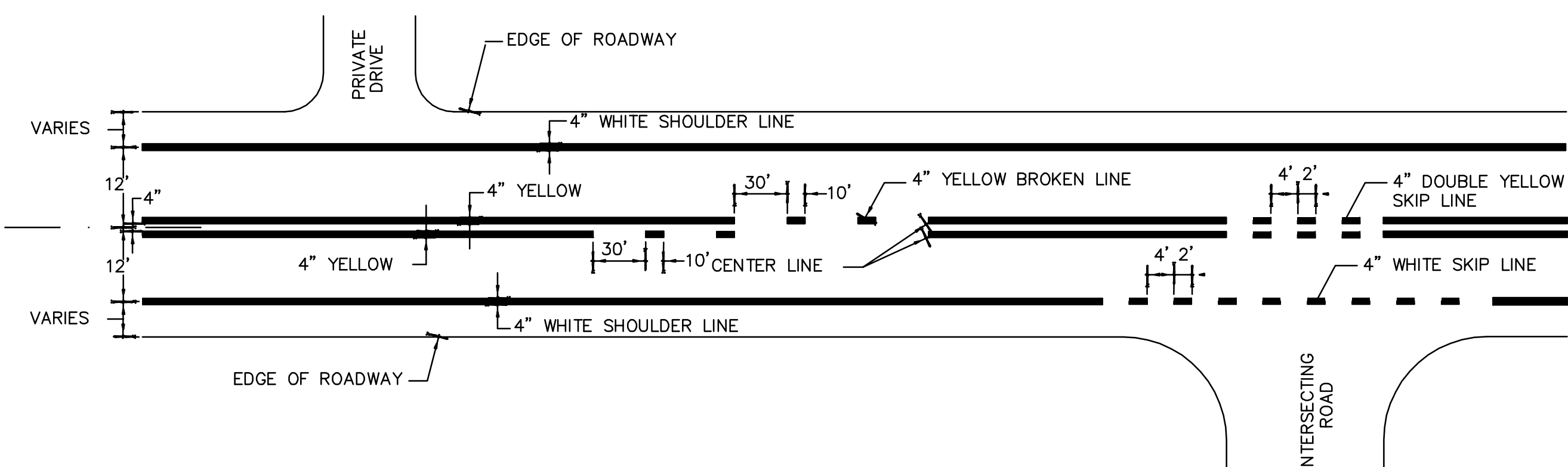
ROUTE 195 SAFETY BARRELS ARRAY DETAIL
NTS



NOTE:
SIGNS SHALL HAVE HUSKY BLUE LETTERS AND GRAPHICS ON REFLECTIVE WHITE METAL.
YOUNG QUAD PEDESTRIAN DETOUR SIGN DETAIL
NTS



PAVEMENT MARKINGS CENTERLINE AND SHOULDER LINE
NTS



- NOTE: (STOP-BARS),**
- STOP BARS TO BE 1 FT MIN. UNLESS OTHERWISE NOTED ON PLANS.
 - STOP BARS TO BE MARKED A MINIMUM OF 4 FT IN ADVANCE OF NEAREST EDGE OF CROSSWALK.
 - IN ABSENCE OF MARKED CROSSWALK THE STOP BAR SHALL BE PLACED AT THE DESIRED STOPPING POINT. IN NO CASE MORE THAN 30 FT OR LESS THAN 5 FT FROM THE NEAREST EDGE OF THE INTERSECTING ROADWAY AND 90° TO THE CENTERLINE OF ROADWAY.
 - THE STOP BAR SHALL ORDINARILY BE PLACED IN LINE WITH THE STOP SIGN. HOWEVER, IF THE STOP SIGN CANNOT BE LOCATED EXACTLY WHERE VEHICLES ARE EXPECTED TO STOP, THE STOP BAR SHOULD BE PLACED AT THE STOPPING POINT.
 - STOP BARS AND CENTERLINE (WHEN SIDE STREET WIDTHS ARE 16 FT OR MORE) ARE TO BE MARKED ON SIDE STREETS WITHIN THE LIMITS OF CONSTRUCTION UNLESS, OTHERWISE INDICATED, OR AS DIRECTED BY THE ENGINEER.
 - STOP BARS SHALL BE WHITE.

- NOTE: (CROSS-WALKS)**
- AT LOCATIONS WHERE THE CROSSWALK IS SKEWED, BARS TO BE PARALLEL TO CURB ENDS OF BARS TO BE PARALLEL. THE LENGTH OF THE BARS WILL VARY DEPENDING ON THE ANGLE OF SKEW.
 - SCRAMBLE WALKS TO BE MARKED WITH ONE 2 FT WIDE LINE ACROSS EACH APPROACH.
 - BARS SHALL NORMALLY BE NO CLOSER THAN 2 FT FROM CURB LINE/EDGE OF ROAD. WHERE EXCESS SPACE MAY DEVELOP THIS DISTANCE MAY BE DECREASED TO 1 FT.
 - ONLY FULL LENGTH BARS ARE TO BE INSTALLED AT CORNER.
 - CROSSWALK MARKINGS SHALL BE WHITE.

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PROJECT NO: 901954
WORK ORDER NO:
FILE NAME:
P:\CIVIL\YOUNG QUAD\SHEETS\M-05
AUTHOR: PETER SAMMIS
DRAFTER: KEVIN MCKENNA
SCALE: AS NOTED
PRINT DATE: APRIL 21, 2015
SHEET TITLE:
MAINTENANCE AND PROTECTION OF TRAFFIC/PEDESTRIAN DETOUR DETAILS

SHEET:
M-05
SHEET: - of -