Dannel P. Malloy
Governor

STATE OF CONNECTICUT
DEPARTMENT OF HOUSING

Evonne M. Klein
Commissioner

Community Development Block Grant Disaster Recovery Program (CDBG-DR)

Owner Occupied Rehabilitation and Rebuilding Program (OORR)

BID PACKAGE

For

Rehabilitation/Reconstruction work to:

3 Marsh Road

Westport, CT 06880

Diversified Technology Consultants

2321 Whitney Avenue, Suite 301

Hamden, CT 06518

203-239-4200

Project #:1846

EQUAL HOUSING OPPORTUNITY

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Section 1 **ADVERTISEMENT FOR BIDS**

Project: Burns Residence

DOH # 1846

The State of Connecticut Department of Housing (DOH) is seeking proposals through a Request for Proposal (RFP) process for the rehabilitation, reconstruction and/or mitigation of residential structures damaged by Superstorm Sandy in compliance with all applicable local, federal, and state statutory requirements with special attention paid to requirements for Community Development Block Grants under the United States Department of Housing and Urban Development ("HUD") Disaster Recovery grant program.

Separated sealed bids for **Rehabilitation/Reconstruction work to Burns Residence, 3 Marsh Road, Westport, CT 06880; Project #1846** will be received by **Diversified Technology Consultants, 2321 Whitney Avenue, Hamden, CT 06518** until **4:00** o'clock PM on **Friday, June 5, 2015**, and then at said office publicly opened and read aloud.

The Information to Bidders, Form of Bid, Form of Contract, Plans, Specifications, and Form of Bid Bond, Performance and Payment Bond, and other contract documents may be examined on the Department of Housing Hurricane Sandy Recover website at www.ct.gov/doh/ and click on the "Hurricane Sandy" link, and Advertisement for Bids.

DOH reserves the right to waive any informalities or to reject any or all bids.

Each bidder must deposit with his bid, security in the amount, form and subject to the conditions provided in the Information to Bidders.

Attention to bidders is particularly called to the requirements as to conditions of employment to be observed and minimum wages rates to be paid under the contract (if applicable), Section 3, Segregated Facilities, Section 109 and E. O. 11246.

No bidder may withdraw his bid within 30 calendar days after the actual date of the bid opening thereof.

INFORMATION FOR BIDDERS

Receipt and Opening of Bids:

The State of Connecticut Department of Housing (herein called the "DOH"), invites bids on the form attached hereto, all blanks of which must be appropriately filled. Bids will be received by DOH at the office of Diversified Technology Consultants, 2321 Whitney Avenue, Hamden, Connecticut 06518 until **4:00** o'clock PM on **Friday, June 5, 2015,** and then at said office publicly opened and read aloud. The envelopes containing the bids must be sealed, addressed to **Diversified Technology Consultants, 2321 Whitney Avenue, Hamden, Connecticut 06518** and designated as **Bid for Burns Residence, 3 Marsh Road, Westport, Connecticut 06880 – Project Number 1846**.

DOH may consider informal any bid not prepared and submitted in accordance with the provisions hereof and may waive any informalities or reject any and all bids. Any bid may be withdrawn prior to the above scheduled time for the opening of bids or authorized postponement there considered. NO bidder may withdraw a bid within 30 days after the actual date of the opening thereof.

Mandatory Walk Through: All bidders must attend a mandatory walk through of the property designated above. The date and time of the walk through is set for **1:00 PM on Tuesday, May 19, 2015**.

Preparation of Bids:

Each bid must be submitted on the prescribed form and accompanied by Certification by Bidder Regarding Equal Employment Opportunity, Form HUD-950.1, and Certification of Bidder Regarding Section 3 and Segregated Facilities. All blank spaces for bid process must be filled in, in ink or typewritten, in both words and figures, and the foregoing Certifications must be fully completed and executed when submitted.

Each bid must be submitted in a sealed envelope bearing on the outside the name of the bidder, his/her address, and the name of the project for which the bid is submitted. If forwarded by mail, the sealed envelope containing the bid must be enclosed in another envelope addressed as specified in the bid form.

Subcontracts: The bidder is specifically advised that any person, for, or other party to whom it is proposed to award a subcontract under this contract:

1. Must be acceptable to the DOH after verification by the State of the current eligibility status; and,
2. Must submit Form HUD-950.2, Certification by Proposed Subcontractor Regarding Equal Employment Opportunity and Certification of Proposed Subcontractor Regarding Section 3 and Segregated Facilities. Approval of the proposed subcontractor award cannot be given by the DOH unless and until the proposed subcontractor has submitted the Certifications and/or other evidence showing that it has fully complied with any reporting requirements to which it is or was subject. Although the bidder is not required to attach

such Certifications by proposed subcontractors to his/her bid, the bidder is here advised of this requirement so that appropriate action can be taken to prevent subsequent delay in subcontract awards.

Method of Bidding: DOH invites the following bid(s):

Qualifications of Bidder: The DOH may make such investigations as he/she deems necessary to determine the ability of the bidder to perform the work, and the bidder shall furnish to the DOH all such information and date for this purpose as the DOH may request. The DOH reserves the right to reject any bid if the evidence submitted by, or investigation of, such bidder fails to satisfy the DOH that such bidder is property qualified to carry out the obligations of the contract and to complete the work contemplated therein. Conditional bids will not be accepted. The State's set Contractor Prequalifications are listed in Exhibit G and also are available at the Department of Housing's Hurricane Sandy Recovers website www.ct.gov/doh/ and click on the "Hurricane Sandy" link.

Bid Security: Each bid must be accompanied by an irrevocable letter of credit from the bank, certified check, or bank cashier's check in the amount not less than five percent (5%) of the bid. Bid bonds may be accepted as bid security. Such checks will be returned to all except the three lowest bidders within three days after the opening of bids, and the remaining cash, or checks will be returned promptly after DOH and the accepted bidder have executed the contract, or opening of bids, upon demand or the bidder at any time thereafter, so long as he/she has been notified of the acceptance of his/her bid.

Conditions of Work: Each bidder must inform him/herself fully of the conditions relating to the construction of the project and the employment of labor thereon. Failure to do so will not relieve a successful bidder of his/her obligation to furnish all material and labor necessary to carry out the provision of his/her contract. Insofar as possible the contractor, in carrying out the work, must employ such methods or means as will not cause any interruption of or interference with the work of any other contractor.

Addenda and Interpretations: No interpretation of the meaning of the plans, specifications or other pre-bid documents will be made to any bidder orally.

Every request for such interpretation should be in writing addressed to: Richard Morse, Project Manager at Diversified Technology Consultants, richard.morse@teamdtc.com and to be given consideration must be received at least seven days prior to the date fixed for the opening of bids. Any and all such interpretations and any supplemental instruction will be in the form of written addenda to the specifications which, if issued, will be forwarded by electronic mail and posted on DOH's Hurricane Sandy website to all prospective bidders (at the respective email addresses furnished for such purposes), not later than three days prior to the date fixed for the opening of bids. Failure of any bidder to receive any such addendum or interpretation shall not relieve such bidder from any obligation under his/her bid as submitted. All addenda so issued shall become part of the contract documents.

Security for Faithful Performance: Simultaneously with his/her delivery of the executed contract, the Contractor shall furnish a surety bond or bonds as security for faithful performance of this contract and for the payment of all persons performing labor on the project under this

contract and furnishing materials in connection with this contract, as specified in the General Conditions included herein. The surety on such bond or bonds shall be a duly authorized surety company satisfactory to the DOH.

Performance and Payment Bonds: A performance and payment bond will be required of the successful bidder (contractor) for 100 percent of the contract price on contracts over $100,000.

Contract Progress Schedule: Each bid shall be accompanied by a Contract Progress Schedule. Such Schedule shall list the bidder's timetable for completion of the contract.

Power of Attorney: Attorneys-in-fact who sign bid bonds or contract bonds must file with each bond a certified and effectively dated copy of their power of attorney.

Notice of Special Conditions: Attention is particularly called to those parts of the contract documents and specifications which deal with the following:

1. Inspection and testing of materials
2. Insurance requirements
3. Wage rates (if applicable)
4. State allowances

Laws and Regulations: The bidder's attention is directed to the fact that all applicable State laws, municipal ordinances, and the rules and regulations of all authorities having jurisdiction over construction of the project shall apply to the contract throughout, and they will be deemed to be included in the contract the same as though herein written out in full.

Method of Award-Lowest Qualified Bidder: If at the time this contract is to be awarded, the lowest base bid submitted by a responsible bidder does not exceed the amount of funds then estimated by the DOH as available to finance the contract; the contract will be awarded on the base bid only. If such bid exceeds such amount, the DOH may reject all bids or may award the contract on the base bid combined with such deductible alternatives applied in numerical order in which they are listed in the Form of Bids, as produces a net amount which is within the available funds.

If the homeowner wishes to select a prequalified bidding contractor other than the lowest and most responsible bidder, said owner is responsible for paying the difference between the lowest bidder and their chosen bidder from their own financing.

Obligation of Bidder: At the time of the opening of bids, each bidder will be presumed to have inspected the site and to have read and to be thoroughly familiar with the plans and contract documents (including all addenda). The failure or omission of any bidder to examine any form, instrument or document shall in no way relieve any bidder from any obligation in respect to his/her bid.

Safety Standards and Accident Prevention: With respect to all work performed under this contract, the contractor shall:

1. Comply with the safety standards provision of applicable laws, building and construction codes and the "Manual of Accident Prevention in Construction" published by the Associated General Contractors of America, the requirements of the Occupational

Safety and Health Act of 1970 (Public Law 91-596), and the requirements of Title 29 of the Code of Federal Regulations, Section 1518 as published in the “Federal Register,” Volume 36, No 75, Saturday, April 17, 1971.

2. Exercise every precaution at all times for the prevention of accidents and the protection of persons (including employees) who may be injured on the job site before the employer has made a standing arrangement for removal of injured persons to a hospital or a doctor’s care.

BID SUBMISSION CHECKLIST

Project # 1846

BID FORM COMPLETE	**( )**
ACKNOWLEDGEMENT of BIDDER COMPLETE	**( )**
BID SECURITY	
N/A	**( )**
Credit Letter	**( )**
Bid Bond	**( )**
AFFIDAVIT of NON-COLLUSION	**( )**
BIDDER'S ELIGIBILITY	**( )**
GENERAL BIDDER CERTIFICATION	**( )**
SUBCONTRACT BIDDER CERTIFICATION	**( )**
SUBCONTRACTOR IDENTITY	**( )**
CONTRACT SCHEDULE	**( )**
SPECIFICATION REQUIRED BID SUBMISSIONS	
N/A	**( )**
ABATEMENT WORK PLANS	**( )**
OTHER	**( )**

Bidder's Name: _____

Authorized Officer: _____

_____

(Signature (Date)

_____

(Print Name) (Title/Position)

BID FORM

The undersigned, being familiarized with the local conditions affecting the cost of the work and with the Drawings, Specifications, Invitation to Bidders, Instructions to Bidders, General Conditions, Bid Form, Form of Contract and Form of Bonds for Project No. __#1846__ and Addenda No. _____ and _____ thereto, as prepared by Diversified Technology Consultants, Hamden, Connecticut, and on file in the office of DOH, hereby proposes to furnish all permits, labor, materials, tools, equipment, and related items required for the rehabilitation and reconstruction including general construction, site improvements, plumbing, heating, electrical, and finish items for said Project No._#1846_____ located at 3 Marsh Road, in Westport, State of Connecticut, all in accordance with the Drawings and Specifications, for the sum of:

_____
WORDS

_____Dollars ($)
WORDS

BREAKDOWN OF BID PRICES	Dollars and Cents
General Construction	$
Asbestos Removal	$
Lead Abatement	$
Mold and Moisture Remediation	$
Structure Demolition	$
Concrete Work	$
Carpentry & Framing	$
Insulation, Barriers, Sealants, Flashing, Gutters, Downspouts	$
Roofing & Siding	$
Doors	$
Windows	$
Drywall, Finishes and Painting	$
Mechanical & Plumbing	$
Electrical	$
Site Work	$
Timber Piles	$
Allowance	$ 10,000.00
Sum: (Being inclusive of all the work and equal to the Sum as stated above)	$

BID FORM
Project #1846
Burns Residence

UNIT PRICE PROPOSALS

The undersigned bidder further proposes and agrees that should any or all of the following UNIT PRICES be accepted and included in the Contract, the amount of the Base Bid, as heretofore stated, shall be adjusted by the amount stated for each UNIT PRICE in accordance with the Sections 012200 UNIT PRICES and 012100 ALLOWANCES. All materials and workmanship shall be in strict accordance with the Drawings and Specifications and shall be in-place prices.

Unit Price

No. 1: _____

_____ $_____
Words Dollars

No. 2: _____

_____ $_____
Words Dollars

No. 3: _____

_____ $_____
Words Dollars

The undersigned agrees to commence the work on a date to be specified in the contract and to complete such work within 150 consecutive calendar days.

The undersigned agrees that if within the period of thirty (30) calendar days after the opening of bids, or when extended to the next work day immediately following said period, notice of the acceptance of this bid shall be mailed, or delivered to him/her at the business address given below, or at any time thereafter before this bid is withdrawn,_____, will within fifteen (15) calendar days thereafter deliver to DOH, where directed, a contract properly executed in such number of counterparts as may be required by said DOH, on the forms annexed, with such changes therein as shall have been made by the DOH, prior to the time named for delivery of this proposal, together with a 100% Performance Bond of a Surety Company, which Surety must be authorized to transact business in the State of Connecticut, and duly qualified therefore, and in the form constituting part of the Specification and a letter indicating those Small/Minority Business Enterprises that will perform work and/or provide materials, equipment or services as part of the contract.

In submitting this bid, it is understood that the right is reserved by the abovementioned DOH to reject any and all bids; and it is agreed that this bid may not be withdrawn for a period of thirty calendar (30) days from the date of bid opening or until the next work day immediately following said period if such period ends on weekend or a State holiday.

Security in the sum of _____ Dollars ($_____)
in the form of _____is submitted herewith in accordance with the Specifications.

BID FORM
Project #1846
Burns Residence

The undersigned bidder agrees to comply with the Section 3 plan included herein and all Federal requirements pertaining to conditions of employment to be observed and minimum wage rates to be paid under the contract, Segregated Facilities, Section 109 and Executive Order 11246.

Attached hereto is an affidavit, in proof that the undersigned has not entered into any collusion with any person in respect to this proposal, or any other proposal, or the submitting of proposals for the above Project. Also attached is a statement of contractor's qualifications, Certification of Bidder Regarding Equal Employment Opportunity, Certification of Bidder Regarding Section 3 and Segregated Facilities.

_____

Date

_____

Firm Name

_____

Address

By: _____

Title: _____

(Bank Letterhead)

BID SECURITY

IRREVOCABLE LETTER OF CREDIT

Dear _____:

We hereby authorize you to draw on us to the aggregate amount of $_____ (five percent of the amount of the bid) in the event _____ withdraws its bid within the bid holding period, or upon being awarded a contract, fails to provide adequate performance and payment security as required by the Contract documents.

Such drafts must be accompanied by the following document:

A written certification by you that the proceeds of any draft drawn on this Letter of Credit will be used solely to indemnify the DOH against loss or damage suffered by it resulting from any act or omission described in the above paragraph.

We warrant to you that all drafts drawn in compliance with the terms of this Letter of Credit will be unconditionally and duly honored upon delivery of the documentation specified and presented to this office.

This Letter of Credit is irrevocable and shall be in full force and effect until notification in writing is received from you that a contract for Project_____ has been awarded and executed, whereupon this Letter of Credit shall automatically be canceled.

This Letter of Credit shall not be modified or amended except upon the written agreement of this Bank and the DOH.

Sincerely yours,

President

FORM OF NON-COLLUSIVE AFFIDAVIT

AFFIDAVIT

State of _____)

County of _____)

_____, being first duly sworn, deposes and says:

That he/she is,_____ the party making the foregoing proposal for bid, that such proposal or bid is genuine and not collusive or sham; that said bidder has not colluded, conspired, connived or agreed, directly or indirectly, with any bidder or person, to put in a sham bid or to refrain from bidding, and has not, in any manner, directly or indirectly, sought by agreement or collusion, or communication or conference, with any person, to fix the bid price of affiant or of any other bidder, or to fix any overhead, profit or cost element of said bid price, or of that of any other bidder, or to secure any advantage against DOH or any person interested in the proposed contract, and that all statements in said proposal for bid are true.

Project No._____

Location _____

_____

Signature

_____

Name and Title

_____

Date

(Signature should be notarized.)

BIDDER'S CERTIFICATION OF ELIGIBILITY

By the submission of this bid, the bidder certifies that to the best of its knowledge and belief, neither it, nor any person or firm which has an interest in the bidder's firm, nor any of the bidder's subcontractors, is ineligible to:

(1) Be awarded contracts by any agency of the United States Government or HUD; or,

(2) Participate in HUD programs pursuant to 24 CFR part 24.

_____

(Name of Bidder)

_____

(Address)

BY: _____

Title: _____

NOTE: This certification is a material representation of fact upon which reliance is placed when making award. If it is later determined that the bidder knowingly rendered an erroneous certification, the contract may be terminated for default, and the bidder may be debarred or suspended from participation in HUD programs and other Federal programs.

CERTIFICATION OF GENERAL BIDDERS ON CDBG-DR CONSTRUCTION PROJECTS

I. CERTIFICATION REGARDING HEALTH AND SAFETY

The undersigned hereby certifies that he/she is able to furnish labor that can work in harmony with all other elements of labor employed or to be employed on the work; that all employees to be employed at the worksite will have successfully completed a course in construction safety and health approved by the United States Occupational Safety and Health Administration that is at least ten hours in duration at the time the employee begins work and who shall furnish documentation of successful completion of said course with the first certified payroll report for each employee.

II. CERTIFICATION REGARDING NON-COLLUSION AND DEBARMENT

The undersigned further certifies under the penalties of perjury that this bid is in all respects bona fide, fair and made without collusion or fraud with any other person. As used in this subsection the word "person" shall mean any natural person, joint venture, partnership, corporation or other business or legal entity. The undersigned further certifies that neither he/she nor any firm, corporation, partnership or association in which he/she has a substantial interest is designated as an ineligible contractor by the Comptroller General of the United States pursuant to Section 5.6 (b) of the Regulations of the Secretary of Labor, Part 5 (29 CFR, Part 5), or pursuant to Section 3 (a) of the Davis-Bacon Act, as amended (40 USC 276a). The undersigned further certifies that said undersigned is not presently debarred from doing public construction work in the State of Connecticut.

Date: _____

_____

Name of General Bidder

By _____

Signature

_____

Print name and Title

_____

Business Address

_____

Street Address City and State

OSHA-10 OSHA-10

CERTIFICATION OF SUB- BIDDERS (IF ANY) ON CDBG-DR CONSTRUCTION PROJECTS

I. CERTIFICATION REGARDING HEALTH AND SAFETY

The undersigned hereby certifies that he is able to furnish labor that can work in harmony with all other elements of labor employed or to be employed on the work; that all employees to be employed at the worksite will have successfully completed a course in construction safety and health approved by the United States Occupation Safety and Health Administration that is at least ten hours in duration at the time the employee begins work and who shall furnish documentation of successful completion of said course with the first certified payroll report for each employee; and that he will comply fully with all laws and regulations applicable to awards of subcontracts subject to section 44F.

II. CERTIFICATION REGARDING NON-COLLUSION AND DEBARMENT

The undersigned further certifies under penalties of perjury that this subbid is in all responses bona fide, fair and made without collusion or fraud with any other person. As used in this subsection the "person" shall mean any natural person, joint venture, partnership, corporation or other business or legal entity. The undersigned further certifies that neither he/she nor any firm, corporation, partnership or association in which he/she has a substantial interest is designated as an ineligible contractor by the Comptroller General of the United States pursuant to Section 5.6 (b) of the Regulations of the Secretary of Labor, Part 5 (29 CFR, Part 5), or pursuant to Section 3 (a) of the Davis-Bacon Act, as amended (40 USC 276a). The undersigned further certifies that said undersigned is not presently debarred from doing public construction work in the State of Connecticut.

Date _____

_____

Name of Sub-bidder

By _____

Signature

_____

Print Name and Title

_____

Business Name

_____

Street Address, City and State

BID BOND

KNOW ALL MEN BY THESE PRESENTS, that we, the undersigned, _____ _____as Principal, and _____Surety, are hereby held and firmly bound unto _____ as DOH in the penal sum of _____ , for the payment of which, well and truly be made, we hereby jointly and severally bind ourselves, our heirs, executors, administrators, successors and assigns. Signed this _____ day of _____, 2015.

THE CONDITION OF THIS OBLIGATION IS SUCH, that whereas the Principal has submitted to _____ a certain Bid, attached hereto and hereby made a part hereof to enter into a contract in writing, for the _____

_____

NOW, THEREFORE,

1. If said Bid shall be rejected, or in the alternate,
2. If said Bid shall be accepted and the Principal shall execute and deliver a contract in the Form of Contract attached hereto (properly completed in accordance with the Bid) and shall furnish a bond for this faithful performance of said contract, and for the payment of all person performing labor or furnishing materials in connection therewith, and shall in all other respects perform the agreement created by the acceptance of said Bid,

Then this obligation shall be void, otherwise the same shall remain in force and effect; it being expressly understood and agreed that the liability of the Surety for any or all claims hereunder shall, in no event, exceed the penal amount of this obligation as herein stated.

The Surety, for value received, hereby stipulates and agrees that the obligations of said Surety and its bond shall be in no way impaired or affected by any extension of the time which the DOH may accept such Bid; and said Surety does hereby waive notice of any such extension.

IN WITNESS WHEREOF, the Principal and Surety have hereunto set their hands and seals, and such of them as are corporations have caused their corporate seals to be hereto affixed and these presents to be signed by their proper officers, the day and year first set forth above.

_____ (L.S)
Principal

_____
Surety

SEAL By: _____

PERFORMANCE AND PAYMENT BOND

KNOW ALL MEN BY THESE PRESENTS: THAT we,
_____, as

PRINCIPAL, and_____ , as SURETY,

are held firmly bound unto_____

_____hereinafter called the DOH, in
the penal sum of_____

_____ ($_____), for the
payment

of which sum we bind ourselves, our heirs, executors, administrators, and successors, jointly and severally.

WHEREAS, Principal has entered into a certain Contract with DOH, dated _____, a copy of which is hereto attached and made a part hereof.

NOW, THEREFORE, the condition of this obligation is such that if the Principal shall in all respects fully perform the Contract and all duly authorized modifications thereof, during its original term and any extensions thereof that may be granted and during any guaranty period for which the Contract provides, and if the Principal shall fully satisfy all claims arising out of the prosecution of the work under the Contract and shall fully indemnify DOH for all expenses which it may incur by reason of such claims, including its attorney's fees and court costs, and if the Principal shall make full payment to all persons supplying labor, services, materials, or equipment in the prosecution of the work under the Contract, in default of which such persons shall have a direct right of action hereupon; and if the Principal shall pay or cause to be paid all sales and use taxes payable as a result of the performance of the Contract as well as payment of gasoline and special motor fuel taxes in the performance of the Contract and all motor vehicle fees required for commercial motor vehicles used in connection with the performance of the Contract, then this obligation shall be void; otherwise, it shall remain in full force and effect. No modification of the Contract or extension of the term thereof, nor any forbearance on the part of DOH shall in any way release the Principal or the Surety from liability hereunder. Notice to the Surety of any such modification, extension, or forbearance is hereby waived.

IN WITNESS WHEREOF, the aforesaid Principal and Surety have executed this instrument and affixed their seals hereto, this _____ day of _____.

_____ _____

Principal Surety

_____ _____

Name and Title

(Signatures must be notarized.)

(Power-of-Attorney for person signing for Surety Company must be attached to bond.)

The rate of premium on this bond is $_____ per thousand.

The total amount of premium charge is $_____.

(The above is to be filled in by Surety Company.)

CERTIFICATE AS TO CORPORATE PRINCIPAL

I, _____, certify that I am the

_____ Secretary of the corporation

named as Principal in the foregoing bond; that _____,

who signed the bond on behalf of the Principal, was then _____

of said corporation; that I know his/her signature thereto is genuine; and that said bond was fully signed, sealed, and attested for and in behalf of said corporation by authority of its governing body.

SUBCONTRACTOR IDENTIFICATION

(Provide additional forms for more subcontractors, as needed prior to execution.)

This form is a part of your bid package and must be submitted along with the itemized and formal bid forms at the time of the bid opening. Failure to submit a completed document could result in the disqualification of your bid.

Name of Subcontractor: _____

Address: _____
Trade: _____
Hourly Wage: _$_____ Full Contract Price: _$_____
Federal Tax# or SSN #: _____
Male Owned Business _____ Female Owned Business_____
Is he/she of Hispanic or Latino ethnicity? Yes_____ No_____
Race: (Please check one)
____White ____American Indian/Alaskan Native
____Black/African American ____Hasidic Jew
____Asian/Pacific American

Name of Subcontractor: _____
Address: _____
Trade: _____
Hourly Wage: _$_____ Full Contract Price: _$_____
Federal Tax# or SSN #: _____
Male Owned Business _____ Female Owned Business_____
Is he/she of Hispanic or Latino ethnicity? Yes_____ No_____
Race: (Please check one)
____White ____American Indian/Alaskan Native
____Black/African American ____Hasidic Jew
____Asian/Pacific American

Name of Subcontractor: _____
Address: _____
Trade: _____
Hourly Wage: _$_____ Full Contract Price: _$_____
Federal Tax# or SSN #: _____
Male Owned Business _____ Female Owned Business_____
Is he/she of Hispanic or Latino ethnicity? Yes_____ No_____
Race: (Please check one)
____White ____American Indian/Alaskan Native
____Black/African American ____Hasidic Jew
____Asian/Pacific American

_____ _____
Contractor's Signature Date

U.S. DEPARTMENT OF HOUSING AND URBAN DEVELOPMENT

CERTIFICATION OF BIDDER REGARDING EQUAL EMPLOYMENT OPPORTUNITY

INSTRUCTIONS

This certification is required pursuant to Executive Order 11246 (30 F R 12319-25). The implementing rules and regulations provide that any bidder or prospective contractor, or any of their proposed subcontractors shall state as an initial part of the bid or negotiations of the contract whether it has participated in any previous contract or subcontract subject to the equal opportunity clause; and, if so, whether it has filed all compliance reports due under applicable instructions.

Where the certification indicates that the bidder has not filed a compliance report due under applicable instructions, such bidder shall be required to submit a compliance report within seven calendar days after bid opening. No contract shall be awarded unless such report is submitted.

CERTIFICATION OF BIDDER

Name and address of Bidder (include zip code)

---

1. Bidder has participated in a previous contract or subcontract subject to the Equal Opportunity Clause.
   ( ) YES ( ) NO
2. Compliance reports were required to be filed in connection with such contract or subcontract.
   ( ) YES ( ) NO
3. Bidder has filed all compliance reports due under applicable instructions, including SF.100.
   ( ) YES ( ) NO ( ) NOT REQUIRED
4. Have you ever seen or are you being considered for sanction due to violation of Executive Order 11246, as amended?
   ( ) YES ( ) NO

NAME AND TITLE OF SIGNER (Please type.)

_____ _____

SIGNATURE DATE

CERTIFICATION OF BIDDERS REGARDING SECTION 3 AND SEGREGATED FACILITIES

Project Name:

Project No:

Name of Prime Contractor:

The undersigned hereby certifies that:

1. Section 3 provisions are included in the Contract
2. A written Section 3 plan was prepared and submitted as part of the bid proceedings (if bid equals or exceeds $100,000.00)
3. No segregated facilities will be maintained.

_____

Name and Title of Signer (Print or Type)

_____ _____

Signature Date

CONTRACTOR

Section 3 Plan Format

_____ agrees to implement the following specific affirmative action steps directed at increasing the utilization of lower income residents and business within the _____.

A. To ascertain from the DOH the exact boundaries of the Section 3 covered project area and where advantageous, seek the assistance of local officials in preparing and implementing the affirmative action plans.
B. To attempt to recruit from within the city the necessary number of lower income residents through: local advertising media, signs placed at the proposed site for the project, and community organizations and public or private institutions operating within or serving the project area such as Service Employment and Redevelopment (SER), Opportunities Industrialization Center (OIC), Urban League, Concentrated Employment Program, Hometown Plan, or the U. S. Employment Service.
C. To maintain a list of all lower income residents who have applied either on their own or on referral from any source, and to employ such persons, if otherwise eligible and if a vacancy exists.
D. To insert this Section 3 plan in all bid documents, and to require all bidders on subcontracts to submit a Section 3 Affirmative Action Plan including utilization goals and the specific steps planned to accomplish these goals.
E. To insure that contracts which are typically let on a negotiated rather than a bid basis in areas other than Section 3 covered project areas, are also let on a negotiated basis, wherever feasible, when let in a Section 3 covered project area.
F. To formally contact unions, subcontractors and trade associations to secure their Burnsation for this program.
G. To insure that all appropriated project area business concerns are notified or pending subcontractural opportunities
H. To maintain records, including copies of correspondence, memoranda, etc., that document all above affirmative action steps have been taken.
I. To appoint or recruit an executive official of the company or agency as Equal Opportunity Officer to coordinate the implementation of the Section 3 plan.
J. To list on Table A, information related to subcontracts to be awarded.
K. To list on Table B, all projected workforce needs for all phases of this project by occupation, trade, skill level and number of positions.

As officers and representatives of _____

We, the undersigned, have read and fully agree to this Affirmative Action Plan, and become a party to the full implementation of this program.

_____	_____	_____
Signature	Title	Date

Loans, grants, contracts and subsidies for less than $100,000.00 will be exempt.

Table A

Proposed Subcontracts Breakdown

For Period Covering _____, 20____ through _____, 20____
(Duration of CDBG-DR OORR Assisted Project)

Column 1	*Column 2*	*Column3*	*Column 4*	*Column 5*
Type of Contract (Business of Profession)	Total Number of Contracts	Total Approximate Dollar Amount	Estimated Number of Contracts to Project Area Businesses*	Estimated Dollar Amount to Project Area Businesses*

*The Project Area is defined as the Town/City boundaries in which the assisted project resides.

_____
Company

_____ _____
Project Name/Residence Project Number

_____ _____
EEO Officer or Designee's Signature Date

Table B

Estimated Project Workforce Breakdown

Column 1	*Column 2*	*Column 3*	*Column 4*	*Column 5*
Job Category	Total Estimated Population	No. Positions Currently Occupied by Permanent Employees	No. Positions Not Currently Occupied	No. Positions to be filled with LIPAR*
Officers/Supervisors				
Professionals				
Technicians				
Housing Sales/Rental Management				
Office Clerical				
Service Workers				
Others				
TRADE:				
Journeymen				
Helpers				
Apprentices				
Maximum No. of Trainees				
Others				
TRADE:				
Journeymen				
Helpers				
Apprentices				
Maximum No. of Trainees				
Others				
TRADE:				
Journeymen				
Helpers				
Apprentices				
Maximum No. of Trainees				
Others				
Total				

**Lower Income Project Area Residents. Individuals residing within the project area whose family income does not exceed 80% of the area median income in the SMSA.*

_____

Company

Green Building Standards Checklist

HUD CPD Green Building Retrofit Checklist

The CPD Green Retrofit Checklist promotes energy efficiency and green building practices for residential retrofit projects. Grantees must follow the checklist in its entirety and apply all measures within the Checklist to the extent applicable to the particular building type being retrofitted. The phrase "when replacing" in the Checklist refers to the mandatory replacement with specified green improvements, products, and fixtures only when replacing those systems during the normal course of the retrofit.

WATER AND ENERGY CONSERVATION MEASURES

☐ **Water-Conserving Fixtures**

Install or retrofit water conserving fixtures in any unit and common facility, use the following specifications: Toilets-- 1.28 gpf; Urinals-- 0.5 gpf; Showerheads-- 2.0 gpm; Kitchen faucets-- 2.0 gpm; and Bathroom faucets-- 1.5gpm. [gpf = gallons per flush; gpm = gallons per minute]

☐ **ENERGY STAR Appliances**

Install ENERGY STAR-labeled clothes washers, dishwashers, and refrigerators, if these appliance categories are provided in units or common areas.

☐ **Air Sealing: Building Envelope**

Seal all accessible gaps and penetrations in the building envelope. If applicable, use low VOC caulk or foam.

☐ **Insulation: Attic** (if applicable to building type)

For attics with closed floor cavities directly above the conditioned space, blow in insulation per manufacturer's specifications to a minimum density of 3.5 Lbs. per cubic foot (CF). For attics with open floor cavities directly above the conditioned space, install insulation to meet or exceed IECC levels.

☐ **Insulation: Flooring** (if applicable to building type)

Install ≥ R-19 insulation in contact with the subfloor in buildings with floor systems over vented crawl spaces. Install a 6-mil vapor barrier in contact with 100% of the floor of the crawl space (the ground), overlapping seams and piers at least 6 inches.

☐ **Duct Sealing** (if applicable to building type)

In buildings with ducted forced-air heating and cooling systems, seal all penetrations of the air distribution system to reduce leakage in order to meet or exceed ENERGY STAR for Homes' duct leakage standard.

☐ **Air Barrier System**

Ensure continuous unbroken air barrier surrounding all conditioned space and dwelling units. Align insulation completely and continuously with the air barrier.

☐ **Radiant Barriers: Roofing**

When replacing or making a substantial repair to the roof, use radiant barrier sheathing or other radiant barrier material; if economically feasible, also use cool roofing materials.

☐ **Windows**

When replacing windows, install geographically appropriate ENERGY STAR rated windows.

☐ **Sizing of Heating and Cooling Equipment**

When replacing, size heating and cooling equipment in accordance with the Air Conditioning Contractors of America (ACCA) Manuals, Parts J and S, or 2012 ASHRAE Handbook--HVAC Systems and Equipment or most recent edition.

☐ **Domestic Hot Water Systems**

When replacing domestic water heating system(s), ensure the system(s) meet or exceed the efficiency requirements of ENERGY STAR for Homes' Reference Design. Insulate pipes by at least R-4.

☐ **Efficient Lighting: Interior Units**

Follow the guidance appropriate for the project type: install the ENERGY STAR Advanced Lighting Package (ALP); ***OR*** follow the ENERGY STAR MFHR program guidelines, which require that 80% of installed lighting fixtures within units must be ENERGY STAR-qualified or have ENERGY STAR-qualified lamps installed; ***OR*** when replacing, new fixtures and ceiling fans must meet or exceed ENERGY STAR efficiency levels.

☐ **Efficient Lighting: Common Areas and Emergency Lighting** (if applicable to building type)

Follow the guidance appropriate for the project type: use ENERGY STAR-labeled fixtures or any equivalent high-performance lighting fixtures and bulbs in all common areas; ***OR*** when replacing, new common space and emergency lighting fixtures must meet or exceed ENERGY STAR efficiency levels. For emergency lighting, if installing new or replacing, all exist signs shall meet or exceed LED efficiency levels and conform to local building codes.

☐ **Efficient Lighting: Exterior**

Follow the guidance appropriate for the project type: install ENERGY STAR-qualified fixtures or LEDs with a minimum efficacy of 45 lumens/watt; ***OR*** follow the ENERGY STAR MFHR program guidelines, which require that 80% of outdoor lighting fixtures must be ENERGY STAR-qualified or have ENERGY STAR-qualified lamps installed; ***OR*** when replacing, install ENERGY STAR compact fluorescents or LEDs with a minimum efficacy of 45 lumens/watt.

INDOOR AIR QUALITY

☐ **Air Ventilation: Single Family and Multifamily** (three stories or fewer)

Install an in-unit ventilation system capable of providing adequate fresh air per ASHRAE 62.2 requirements.

☐ **Air Ventilation: Multifamily** (four stories or more)

Install apartment ventilation systems that satisfy ASHRAE 62.2 for all dwelling units and common area ventilation systems that satisfy ASHRAE 62.1 requirements. If economically feasible, consider heat/energy recovery for 100% of corridor air supply.

☐ **Composite Wood Products that Emit Low/No Formaldehyde**

Composite wood products must be certified compliant with California 93120. If using a composite wood product that does not comply with California 93120, all exposed edges and sides must be sealed with low-VOC sealants.

☐ **Environmentally Preferable Flooring**

When replacing flooring, use environmentally preferable flooring, including the FloorScore certification. Any carpet products used must meet the Carpet and Rug Institute's Green Label or Green Label Plus certification for carpet, pad, and carpet adhesives.

☐ **Low/No VOC Paints and Primers**

All interior paints and primers must be less than or equal to the following VOC levels: Flats--50 g/L; Non-flats--50 g/L; Floor--100 g/L. [g/L = grams per liter; levels are based on a combination of the Master Painters Institute (MPI) and GreenSeal standards.]

☐ **Low/No VOC Adhesives and Sealants**

All adhesives must comply with Rule 1168 of the South Coast Air Quality Management District. All caulks and sealants must comply with regulation 8, rule 51, of the Bay Area Air Quality Management District.

☐ **Clothes Dryer Exhaust**

Vent clothes dryers directly to the outdoors using rigid-type duct work.

☐ **Mold Inspection and Remediation**

Inspect the interior and exterior of the building for evidence of moisture problems. Document the extent and location of the problems, and implement the proposed repairs according to the Moisture section of the EPA Healthy Indoor Environment Protocols for Home Energy Upgrades.

☐ **Combustion Equipment**

When installing new space and water-heating equipment, specify power-vented or direct vent combustion equipment.

☐ **Mold Prevention: Water Heaters**

Provide adequate drainage for water heaters that includes drains or catch pans with drains piped to the exterior of the dwelling.

☐ **Mold Prevention: Surfaces**

When replacing or repairing bathrooms, kitchens, and laundry rooms, use materials that have durable, cleanable surfaces.

☐ **Mold Prevention: Tub and Shower Enclosures**

When replacing or repairing tub and/or shower enclosures, use non-paper-faced backing materials such as cement board, fiber cement board, or equivalent in bathrooms.

☐ **Integrated Pest Management**

Seal all wall, floor, and joint penetrations with low-VOC caulking or other appropriate sealing methods to prevent pest entry. [If applicable, provide training to multifamily buildings staff.]

☐ **Lead-Safe Work Practices**

For properties built before 1978, if the project will involve disturbing painted surfaces or cleaning up lead contaminated dust or soil, use certified renovation or lead abatement contractors and workers using lead-safe work practices and clearance examinations consistent with the more stringent of EPA's Renovation, Repair, and Painting Rule and HUD's Lead Safe Housing Rule.

☐ **Radon Testing and Mitigation** (if applicable based on building location)

For buildings in EPA Radon Zone 1 or 2, test for radon using the current edition of American Association of Radon Scientists and Technologists (AARST)'s Protocols for Radon Measurement in Homes Standard for Single-Family Housing or Duplexes, or AARST's Protocol for Conducting Radon and Radon Decay Product Measurements in Multifamily Buildings. To install radon mitigation systems in buildings with radon level of 4 pCi/L or more, use ASTM E 2121 for single-family housing or duplexes, or AARST's Radon Mitigation Standards for Multifamily Buildings. For new construction, use AARST's Reducing Radon in New Construction of 1 & 2 Family Dwellings and Townhouses, or ASTM E 1465.

Section 2: General Conditions for Construction Contracts

Based on HUD form 5370

Applicability. This form is applicable to any construction/development contract greater than $100,000.

This form includes those clauses required by OMB's common rule on grantee procurement, implemented at HUD in 24 CFR 85.36, and those requirements set forth in Section 3 of the Housing and Urban Development Act of 1968 and its amendment by the Housing and Community Development Act of 1992, implemented by HUD at 24 CFR Part 135.

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1. Definitions

(a) "Architect" means the person or other entity engaged by DOH to perform architectural, engineering, design, and other services related to the work as provided for in the contract. When DOH uses an engineer to act in this capacity, the terms "architect" and "engineer" shall be synonymous. The Architect shall serve as a technical representative of the Contracting Officer. The Architect's authority is as set forth elsewhere in this contract.

(b) "Contract" means the contract entered into between DOH and the Contractor. It includes the forms of Bid, the Bid Bond, the Performance and Payment Bond or Bonds or other assurance of completion, the Certifications, Representations, and Other Statements of Bidders (form HUD-5370), these General Conditions of the Contract for Construction (form HUD-5370), the applicable wage rate determinations from the U.S. Department of Labor (when applicable), any special conditions included elsewhere in the contract, the specifications, and drawings. It includes all formal changes to any of those documents by addendum, change order, or other modification.

(c) "Contracting Officer" means the person delegated the authority by DOH to enter into, administer, and/or terminate this contract and designated as such in writing to the Contractor. The term includes any successor Contracting Officer and any duly authorized representative of the Contracting Officer also designated in writing. The Contracting Officer shall be deemed the authorized agent of DOH in all dealings with the Contractor.

(d) "Contractor" means the person or other entity entering into the contract with DOH to perform all of the work required under the contract.

(e) "Drawings" means the drawings enumerated in the schedule of drawings contained in the Specifications and as described in the contract clause entitled Specifications and Drawings for Construction herein.

(f) "DOH" means the State Department of Housing including the Commissioner, or any other person designated to act on its behalf.

(g) "HUD" means the United States of America acting through the Department of Housing and Urban Development including the Secretary, or any other person designated to act on its behalf. HUD has agreed, subject to the provisions of an Annual Contributions Contract (ACC), to provide financial assistance to DOH, which includes assistance in financing the work to be performed under this contract. As defined elsewhere in these General Conditions or the contract documents, the determination of HUD may be required to authorize changes in the work or for release of funds to DOH for payment to the Contractor. Notwithstanding HUD's role, nothing in this contract shall be construed to create any contractual relationship between the Contractor and HUD.

(h) "Grantee" means the State of Connecticut Department of Housing (DOH).

(i) "Homeowner" means the owner(s) of the real property for which project is taking place and is a party to the contract.

(j) "Project" means the entire project, whether construction or rehabilitation, the work for which is provided for in whole or in part under this contract.

(k) "Specifications" means the written description of the technical requirements for construction and includes the criteria and tests for determining whether the requirements are met.

(l) "Work" means materials, workmanship, and manufacture and fabrication of components.

2. Contractor's Responsibility for Work

(a) The Contractor shall furnish all necessary labor, materials, tools, equipment, and transportation necessary for performance of the work. The Contractor shall also furnish all necessary water, heat, light, and power not made available to the Contractor by the Homeowner pursuant to the clause entitled Access to the Premises Section 5.3 of Homeowner Rehabilitation Agreement herein.

(b) The Contractor shall perform on the site, and with its own organization, work equivalent to at least 15 percent of the total amount of work to be performed under the order. This percentage may be reduced by a supplemental agreement to this order if, during performing the work, the Contractor requests a reduction and the Contracting Officer determines that the reduction would be to the advantage of DOH.

(c) At all times during performance of this contract and until the work is completed and accepted, the Contractor shall directly superintend the work or assign and have on the work site a competent superintendent who is satisfactory to the Contracting Officer and has authority to act for the Contractor.

(d) The Contractor shall be responsible for all damages to persons or property that occur as a result of the Contractor's fault or negligence, and shall take proper safety and health precautions to protect the work, the workers, the public, and the property of others. The Contractor shall hold and save DOH, its officers and agents, free and harmless from liability of any nature occasioned by the Contractor's performance. The Contractor shall also be responsible for all materials delivered and work performed until completion and acceptance of the entire work, except for any completed unit of work which may have been accepted under the contract.

(e) The Contractor shall lay out the work from base lines and bench marks indicated on the drawings and be responsible for all lines, levels, and measurements of all work executed under the contract. The Contractor shall verify the figures before laying out the work and will be held responsible for any error resulting from its failure to do so.

(f) The Contractor shall confine all operations (including storage of materials) on Homeowner premises to areas authorized or approved by the Contracting Officer.

(g) The Contractor shall at all times keep the work area, including storage areas, free from accumulations of waste materials. After completing the work and before final inspection, the Contractor shall (1) remove from the premises all scaffolding, equipment, tools, and materials (including rejected materials) that are not the property of the Homeowner and all rubbish caused by its work; (2) leave the work area in a clean, neat, and orderly condition satisfactory to the Contracting Officer; (3) perform all specified tests; and, (4) deliver the installation in complete and operating condition.

(h) The Contractor's responsibility will terminate when all work has been completed, the final inspection made, and the work accepted by the Contracting Officer. The

Contractor will then be released from further obligation except as required by the warranties specified elsewhere in the contract.

3. Architect's Duties, Responsibilities, and Authority

(a) The Architect for this contract, and any successor, shall be designated in writing by the Contracting Officer.

(b) The Architect shall serve as the Contracting Officer's technical representative with respect to architectural, engineering, and design matters related to the work performed under the contract. The Architect may provide direction on contract performance. Such direction shall be within the scope of the contract and may not be of a nature which: (1) institutes additional work outside the scope of the contract; (2) constitutes a change as defined in the Changes clause herein; (3) causes an increase or decrease in the cost of the contract; (4) alters the Construction Progress Schedule; or (5) changes any of the other express terms or conditions of the contract.

(c) The Architect's duties and responsibilities may include but shall not be limited to:

(1) Making periodic visits to the work site, and on the basis of his/her on-site inspections, issuing written reports to DOH which shall include all observed deficiencies. The Architect shall file a copy of the report with the Contractor's designated representative at the site;

(2) Making modifications in drawings and technical specifications and assisting the Contracting Officer in the preparation of change orders and other contract modifications for issuance by the Contracting Officer;

(3) Reviewing and making recommendations with respect to - (i) the Contractor's construction progress schedules; (ii) the Contractor's shop and detailed drawings; (iii) the machinery, mechanical and other equipment and materials or other articles proposed for use by the Contractor; and, (iv) the Contractor's price breakdown and progress payment estimates; and,

(4) Assisting in inspections, signing Certificates of Completion, and making recommendations with respect to acceptance of work completed under the contract.

4. Other Contracts

DOH may undertake or award other contracts for additional work at or near the site of the work under this contract. The Contractor shall fully Burnsate with the other contractors and with DOH employees and shall carefully adapt scheduling and performing the work under this contract to accommodate the additional work, heeding any direction that may be provided by the Contracting Officer. The Contractor shall not commit or permit any act that will interfere with the performance of work by any other contractor or by DOH employees

Construction Requirements

5. Pre-construction Conference and Notice to Proceed

(a) Upon scheduling of the contract execution, and prior to the commencement of work, the Contractor shall attend a preconstruction conference with representatives of DOH, its Architect, and other interested parties convened by DOH. The conference will serve to acquaint the participants with the general plan of the construction operation and all other requirements of the contract. DOH or its Architect will provide the Contractor with the date, time, and place of the conference.

(b) The contractor shall begin work upon receipt of a written Notice to Proceed from the Contracting Officer or designee. The Contractor shall not begin work prior to receiving such notice. Such notice shall not be prior to the homeowners three (3) day Notice of Cancellation period.

6. Site Investigation and Conditions Affecting the Work

(a) The Contractor acknowledges that it has taken steps reasonably necessary to ascertain the nature and location of the work, and that it has investigated and satisfied itself as to the general and local conditions which can affect the work or its cost, including but not limited to, (1) conditions bearing upon transportation, disposal, handling, and storage of materials; (2) the availability of labor, water, electric power, and roads;(3) uncertainties of weather, river stages, tides, or similar physical conditions at the site; (4) the conformation and conditions of the ground; and (5) the character of equipment and facilities needed preliminary to and during work performance. The Contractor also acknowledges that it has satisfied itself as to the character, quality, and quantity of surface and subsurface materials or obstacles to be encountered insofar as this information is reasonably ascertainable from an inspection of the site, including all exploratory work done by DOH, as well as from the drawings and specifications made a part of this contract. Any failure of the Contractor to take the actions described and acknowledged in this paragraph will not relieve the Contractor from responsibility for estimating properly the difficulty and cost of successfully performing the work, or for proceeding to successfully perform the work without additional expense to DOH.

(b) DOH assumes no responsibility for any conclusions or interpretations made by the Contractor based on the information made available by DOH. Nor does DOH assume responsibility for any understanding reached or representation made concerning conditions which can affect the work by any of its officers or agents before the execution of this contract, unless that understanding or representation is expressly stated in the contract.

7. Differing Site Conditions

(a) The Contractor shall promptly, and before the conditions are disturbed, give a written notice to the Contracting Officer of (1) subsurface or latent physical conditions at the site which differ materially from those indicated in this contract, or (2) unknown physical conditions at the site(s), of an unusual nature, which differ materially from those ordinarily encountered and generally recognized as inhering in work of the character provided for in the contract.

(b) The Contracting Officer shall investigate the site conditions promptly after receiving the notice. Work shall not proceed at the affected site, except at the Contractor's risk, until the Contracting Officer has provided written instructions to the Contractor. If the conditions do materially so differ and cause an increase or decrease in the Contractor's cost of, or the time required for, performing any part of the work under this contract, whether or not changed as a result of the conditions, the Contractor shall file a claim in writing to DOH within ten days after receipt of such instructions and, in any event, before proceeding with the work. An equitable adjustment in the contract price, the delivery schedule, or both shall be made under this clause and the

contract modified in writing accordingly.

(c) No request by the Contractor for an equitable adjustment to the contract under this clause shall be allowed, unless the Contractor has given the written notice required; provided, that the time prescribed in (a) above for giving written notice may be extended by the Contracting Officer.

(d) No request by the Contractor for an equitable adjustment to the contract for differing site conditions shall be allowed if made after final payment under this contract.

8. Specifications and Drawings for Construction

(a) The Contractor shall keep on the work site a copy of the drawings and specifications and shall at all times give the Contracting Officer access thereto. Anything mentioned in the specifications and not shown on the drawings, or shown on the drawings and not mentioned in the specifications, shall be of like effect as if shown or mentioned in both. In case of difference between drawings and specifications, the specifications shall govern. In case of discrepancy in the figures, in the drawings, or in the specifications, the matter shall be promptly submitted to the Contracting Officer, who shall promptly make a determination in writing. Any adjustment by the Contractor without such a determination shall be at its own risk and expense. The Contracting Officer shall furnish from time to time such detailed drawings and other information as considered necessary, unless otherwise provided.

(b) Wherever in the specifications or upon the drawings 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 Contracting Officer 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 Contracting Officer, unless otherwise expressly stated.

(c) 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 drawings 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".

(d) "Shop drawings" means drawings, submitted to DOH by the Contractor, subcontractor, or any lower tier subcontractor, showing in detail (1) the proposed fabrication and assembly of structural elements and (2) the installation (i.e., form, fit, and attachment details) of materials of equipment. It includes drawings, diagrams, layouts, schematics, descriptive literature, illustrations, schedules, performance and test data, and similar materials furnished by the Contractor to explain in detail specific portions of the work required by the contract. DOH may duplicate, use, and disclose in any manner and for any purpose shop drawings delivered under this contract.

(e) If this contract requires shop drawings, the Contractor shall coordinate all such drawings, and review them for accuracy, completeness, and compliance with other contract requirements and shall indicate its approval thereon as evidence of such coordination and review. Shop drawings submitted to the Contracting Officer without evidence of the Contractor's approval may be returned for resubmission. The Contracting Officer will indicate an approval or disapproval of the shop drawings and if not approved as submitted shall indicate DOH's reasons therefore. Any work done before such approval shall be at the Contractor's risk. Approval by the Contracting Officer shall not relieve the Contractor from responsibility for any errors or omissions in such drawings, nor from responsibility for complying with the requirements of this contract, except with respect to variations described and approved in accordance with (f) below.

(f) If shop drawings show variations from the contract requirements, the Contractor shall describe such variations in writing, separate from the drawings, at the time of submission. If the Architect approves any such variation and the Contracting Officer concurs, the Contracting Officer shall issue an appropriate modification to the contract, except that, if the variation is minor or does not involve a change in price or in time of performance, a modification need not be issued.

(g) It shall be the responsibility of the Contractor to make timely requests of DOH for such large scale and full size drawings, color schemes, and other additional information, not already in his possession, which shall be required in the planning and production of the work. Such requests may be submitted as the need arises, but each such request shall be filed in ample time to permit appropriate action to be taken by all parties involved so as to avoid delay.

(h) The Contractor shall submit to the Contracting Officer for approval four copies (unless otherwise indicated) of all shop drawings as called for under the various headings of these specifications. Three sets (unless otherwise indicated) of all shop drawings, will be retained by DOH and one set will be returned to the Contractor. As required by the Contracting Officer, the Contractor, upon completing the work under this contract, shall furnish a complete set of all shop drawings as finally approved. These drawings shall show all changes and revisions made up to the time the work is completed and accepted.

(i) This clause shall be included in all subcontracts at any tier. It shall be the responsibility of the Contractor to ensure that all shop drawings prepared by subcontractors are submitted to the Contracting Officer.

9. Material and Workmanship

(a) All equipment, material, and articles furnished under this contract shall be new and of the most suitable grade for the purpose intended, unless otherwise specifically provided in this contract. References in the contract to equipment, material, articles, or patented processes by trade name, make, or catalog number, shall be regarded as establishing a standard of quality and shall not be construed as limiting competition. The Contractor may, at its option, use any equipment, material, article, or process that, in the judgment of, and as approved by the Contracting Officer, is equal to that named in the specifications, unless otherwise specifically provided in this contract.

(b) Approval of equipment and materials.

(1) The Contractor shall obtain the Contracting Officer's approval of the machinery and mechanical and other equipment to be incorporated into the work. When requesting approval, the Contractor shall furnish to the Contracting Officer the name of the manufacturer, the model number, and other information concerning the performance, capacity, nature, and rating of the machinery and mechanical and other equipment. When required by this contract or by the Contracting Officer, the Contractor shall also obtain the Contracting Officer's approval of the material or articles which the Contractor contemplates incorporating into the work. When requesting approval, the Contractor shall provide full information concerning the material or articles. Machinery, equipment, material, and articles that do not have the required approval shall be installed or used at the risk of subsequent rejection.

(2) When required by the specifications or the Contracting Officer, the Contractor shall submit appropriately marked samples (and certificates related to them) for approval at the Contractor's expense, with all shipping charges prepaid. The Contractor shall label, or otherwise properly mark on the container, the material or product represented, its place of origin, the name of the producer, the Contractor's name, and the identification of the construction project for which the material or product is intended to be used.

(3) Certificates shall be submitted in triplicate, describing each sample submitted for approval and certifying that the material, equipment or accessory complies with contract requirements. The certificates shall include the name and brand of the product, name of manufacturer, and the location where produced.

(4) Approval of a sample shall not constitute a waiver of DOH right to demand full compliance with contract requirements. Materials, equipment and accessories may be rejected for cause even though samples have been approved.

(5) Wherever materials are required to comply with recognized standards or specifications, such specifications shall be accepted as establishing the technical qualities and testing methods, but shall not govern the number of tests required to be made nor modify other contract requirements. The Contracting Officer may require laboratory test reports on items submitted for approval or may approve materials on the basis of data submitted in certificates with samples. Check tests will be made on materials delivered for use only as frequently as the Contracting Officer determines necessary to insure compliance of materials with the specifications. The Contractor will assume all costs of retesting materials which fail to meet contract requirements and/or testing materials offered in substitution for those found deficient.

(6) After approval, samples will be kept in the Project office until completion of work. They may be built into the work after a substantial quantity of the materials they represent has been built in and accepted.

(c) Requirements concerning lead-based paint. The Contractor shall comply with the requirements concerning lead-based paint contained in the Lead-Based Paint Poisoning Prevention Act (42 U.S.C. 4821-4846) as implemented by 24 CFR Part 35, HUD's Lead Safe Housing Rule and EPA's Repair Renovation, and Painting Rule at 40 CFR.80 Subpart E.

10. Permits and Codes

The Contractor shall give all notices and comply with all applicable laws, ordinances, codes, rules and regulations. Notwithstanding the requirement of the Contractor to comply with the drawings and specifications in the contract, all work installed shall comply with all applicable codes and regulations as amended by any waivers. Before installing the work, the Contractor shall examine the drawings and the specifications for compliance with applicable codes and regulations bearing on the work and shall immediately report any discrepancy it may discover to the Contracting Officer. Where the requirements of the drawings and specifications fail to comply with the applicable code or regulation, the Contracting Officer shall modify the contract by change order pursuant to the clause entitled Changes herein to conform to the code or regulation.

(a) The Contractor shall secure and pay for all permits, fees, and licenses necessary for the proper execution and completion of the work. Where DOH can arrange for the issuance of all or part of these permits, fees and licenses, without cost to the Contractor, the contract amount shall be reduced accordingly.

11. Health, Safety, and Accident Prevention

(a) In performing this contract, the Contractor shall:
  (1) Ensure that no laborer or mechanic shall be required to work in surroundings or under working conditions which are unsanitary, hazardous, or dangerous to his/her health and/or safety as determined under construction safety and health standards promulgated by the Secretary of Labor by regulation;
  (2) Protect the lives, health, and safety of other persons;
  (3) Prevent damage to property, materials, supplies, and equipment; and,
  (4) Avoid work interruptions.

(b) For these purposes, the Contractor shall:
  (1) Comply with regulations and standards issued by the Secretary of Labor at 29 CFR Part 1926. Failure to comply may result in imposition of sanctions pursuant to the Contract Work Hours and Safety Standards Act (Public Law 91-54, 83 Stat. 96), 40 U.S.C. 3701 et seq.; and
  (2) Include the terms of this clause in every subcontract so that such terms will be binding on each subcontractor.

(c) The Contractor shall maintain an accurate record of exposure data on all accidents incident to work performed under this contract resulting in death, traumatic injury, occupational disease, or damage to property, materials, supplies, or equipment, and shall report this data in the manner prescribed by 29 CFR Part 1904.

(d) The Contracting Officer shall notify the Contractor of any noncompliance with these requirements and of the corrective action required. This notice, when delivered to the Contractor or the Contractor's representative at the site of the work, shall be deemed sufficient notice of the noncompliance and corrective action required. After receiving the notice, the Contractor shall immediately take corrective action. If the Contractor fails or refuses to take corrective action promptly, the Contracting Officer may issue an order stopping all or part of the work until satisfactory corrective action has been taken. The Contractor shall not base any claim or request for equitable adjustment for additional time or money on any stop order issued under these circumstances.

(e) The Contractor shall be responsible for its subcontractors' compliance with the provisions of this clause. The Contractor shall take such action with respect to any subcontract as DOH, the Secretary of Housing and Urban Development, or the Secretary of Labor shall direct as a means of enforcing such provisions.

12. Temporary Heating

The Contractor shall provide and pay for temporary heating, covering, and enclosures necessary to properly protect all work and materials against damage by dampness and cold, to dry out the work, and to facilitate the completion of the work. Any permanent heating equipment used shall be turned over to the Homeowner in the condition and at the time required by the specifications.

13. Availability and Use of Utility Services

(a) The Homeowner shall make all reasonably required amounts of utilities available to the Contractor from existing outlets and supplies, as specified in the contract. The Contractor shall carefully conserve any utilities furnished without charge.

(b) The Contractor, at its expense and in a manner satisfactory to the Contracting Officer, shall install and maintain all necessary temporary connections and distribution lines. Before final acceptance of the work by DOH, the Contractor shall remove all the temporary connections, distribution lines, meters, and associated paraphernalia.

14. Protection of Existing Vegetation, Structures, Equipment, Utilities, and Improvements

(a) The Contractor shall preserve and protect all structures, equipment, and vegetation (such as trees, shrubs, and grass) on or adjacent to the work site, which are not to be removed under this contract, and which do not unreasonably interfere with the work required under this contract.

(b) The Contractor shall only remove trees when specifically authorized to do so, and shall avoid damaging vegetation that will remain in place. If any limbs or branches of trees are broken during performance of this contract, or by the careless operation of equipment, or by workmen, the Contractor shall trim those limbs or branches with a clean cut and paint the cut with a tree-pruning compound as directed by the Contracting Officer.

(c) The Contractor shall protect from damage all existing improvements and utilities (1) at or near the work site and (2) on adjacent property of a third party, the locations of which are made known to or should be known by the Contractor. Prior to disturbing the ground at the construction site, the Contractor shall ensure that all underground utility lines are clearly marked.

(d) The Contractor shall shore up, brace, underpin, secure, and protect as necessary all foundations and other parts of existing structures adjacent to, adjoining, and in the vicinity of the site, which may be affected by the excavations or other operations connected with the construction of the project.

(e) Any equipment temporarily removed as a result of work under this contract shall be protected, cleaned, and replaced in the same condition as at the time of award of this contract.

(f) New work which connects to existing work shall correspond in all respects with that to which it connects and/or be similar to existing work unless otherwise required by the specifications.

(g) No structural members shall be altered or in any way weakened without the written authorization of the Contracting Officer, unless such work is clearly specified in the plans or specifications.

(h) If the removal of the existing work exposes discolored or unfinished surfaces, or work out of alignment, such surfaces shall be refinished, or the material replaced as necessary to make the continuous work uniform and harmonious. This, however, shall not be construed to require the refinishing or reconstruction of dissimilar finishes previously exposed, or finished surfaces in good condition, but in different planes or on different levels when brought together by the removal of intervening work, unless such refinishing or reconstruction is specified in the plans or specifications.

(i) The Contractor shall give all required notices to any adjoining or adjacent property owner or other party before the commencement of any work.

(j) The Contractor shall indemnify and save harmless DOH from any damages on account of settlement or the loss of lateral support of adjoining property, any damages from changes in topography affecting drainage, and from all loss or expense and all damages for which DOH may become liable in consequence of such injury or damage to adjoining and adjacent structures and their premises.

(k) The Contractor shall repair any damage to vegetation, structures, equipment, utilities, or improvements, including those that are the property of a third party, resulting from failure to comply with the requirements of this contract or failure to exercise reasonable care in performing the work. If the Contractor fails or refuses to repair the damage promptly, the Contracting Officer may have the necessary work performed and charge the cost to the Contractor.

15. Temporary Buildings and Transportation of Materials

(a) Temporary buildings (e.g., storage sheds, shops, offices, sanitary facilities) and utilities may be erected by the Contractor only with the approval of the Contracting Officer and shall be built with labor and materials furnished by the Contractor without expense to DOH. The

temporary buildings and utilities shall remain the property of the Contractor and shall be removed by the Contractor at its expense upon completion of the work. With the written consent of the Contracting Officer, the buildings and utilities may be abandoned and need not be removed.

(b) The Contractor shall, as directed by the Contracting Officer, use only established roadways, or use temporary roadways constructed by the Contractor when and as authorized by the Contracting Officer. 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.

16. Clean Air and Water

The contactor shall comply with the Clean Air Act, as amended, 42 USC 7401 et seq., the Federal Water Pollution Control Water Act, as amended, 33 U.S.C. 1251 et seq., and standards issued pursuant thereto in the facilities in which this contract is to be performed.

17. Energy Efficiency

The Contractor shall comply with mandatory standards and policies relating to energy efficiency which are contained in the energy conservation plan issued in compliance with the Energy Policy and Conservation Act (Pub.L. 94-163) for the State in which the work under the contract is performed.

18. Green Building Standards

DOH will require that all replacement of residential properties, including reconstruction and new construction of substantially damaged properties meet the Enterprise Green Communities Standard.

For those buildings that are non-substantially damaged, DOH will require that they be rehabilitated following the HUD CPD Green Buildings Retrofit Checklist. The requirement for rehabilitation is that to the extent possible strive to meet the checklist standard where there are Energy Star, Water Sense and Federal Management Program-designed products available.

DOH strongly encourages the use of green infrastructure techniques to mitigate against storm water run-off and flooding and incorporate EPA's Green Infrastructure resources to the extent feasible.

19. Inspection and Acceptance of Construction

(a) Definitions. As used in this clause -

(1) "Acceptance" means the act of an authorized representative of DOH by which DOH approves of the work performed under this contract. Acceptance may be partial or complete.

"Inspection" means examining and testing the work performed under the contract (including, when appropriate, raw materials, equipment, components, and intermediate assemblies) to determine whether it conforms to contract requirements.

(1) "Testing" means that element of inspection that determines the properties or elements, including functional operation of materials, equipment, or their components, by the application of established scientific principles and procedures.

(b) The Contractor shall maintain an adequate inspection system and perform such inspections as will ensure that the work performed under the contract conforms to contract requirements. All work is subject to DOH inspection and test at all places and at all reasonable times before acceptance to ensure strict compliance with the terms of the contract.

(c) DOH inspections and tests are for the sole benefit of DOH and do not: (1) relieve the Contractor of responsibility for providing adequate quality control measures; (2) relieve the Contractor of responsibility for loss or damage of the material before acceptance; (3) constitute or imply acceptance; or, (4) affect the continuing rights of DOH after acceptance of the completed work under paragraph (j) below.

(d) The presence or absence of DOH inspector does not relieve the Contractor from any contract requirement, nor is the inspector authorized to change any term or condition of the specifications without the Contracting Officer's written authorization. All instructions and approvals with respect to the work shall be given to the Contractor by the Contracting Officer.

(e) The Contractor shall promptly furnish, without additional charge, all facilities, labor, and material reasonably needed for performing such safe and convenient inspections and tests as may be required by the Contracting Officer. DOH may charge to the Contractor any additional cost of inspection or test when work is not ready at the time specified by the Contractor for inspection or test, or when prior rejection makes reinspection or retest necessary. DOH shall perform all inspections and tests in a manner that will not unnecessarily delay the work. Special, full size, and performance tests shall be performed as described in the contract.

(f) DOH may conduct routine inspections of the construction site on a daily basis.

(g) The Contractor shall, without charge, replace or correct work found by DOH not to conform to contract requirements, unless DOH decides that it is in its interest to accept the work with an appropriate adjustment in contract price. The Contractor shall promptly segregate and remove rejected material from the premises.

(h) If the Contractor does not promptly replace or correct rejected work, DOH may (1) by contract or otherwise, replace or correct the work and charge the cost to the Contractor, or (2) terminate for default the Contractor's right to proceed.

(i) If any work requiring inspection is covered up without approval of DOH, it must, if requested by the Contracting Officer, be uncovered at the expense of the Contractor. If at any time before final acceptance of the entire work, DOH considers it necessary or advisable, to examine work already completed by removing or tearing it out, the Contractor, shall on request, promptly furnish all necessary facilities, labor, and material. If such work is found to be defective or nonconforming in any material respect due to the fault of the Contractor or its

subcontractors, the Contractor shall defray all the expenses of the examination and of satisfactory reconstruction. If, however, such work is found to meet the requirements of the contract, the Contracting Officer shall make an equitable adjustment to cover the cost of the examination and reconstruction, including, if completion of the work was thereby delayed, an extension of time.

(j) The Contractor shall notify the Contracting Officer, in writing, as to the date when in its opinion all or a designated portion of the work will be substantially completed and ready for inspection. If the Architect determines that the state of preparedness is as represented, DOH will promptly arrange for the inspection. Unless otherwise specified in the contract, DOH shall accept, as soon as practicable after completion and inspection, all work required by the contract or that portion of the work the Contracting Officer determines and designates can be accepted separately. Acceptance shall be final and conclusive except for latent defects, fraud, gross mistakes amounting to fraud, or DOH's right under any warranty or guarantee.

20. Use and Possession Prior to Completion

(a) If applicable, the Homeowner may have the right to take possession of or use any completed or partially completed part of the work. Before taking possession of or using any work, the Contracting Officer shall furnish the Contractor a list of items of work remaining to be performed or corrected on those portions of the work that the Homeowner intends to take possession of or use. However, failure of the Contracting Officer to list any item of work shall not relieve the Contractor of responsibility for complying with the terms of the contract. The Homeowner's possession or use shall not be deemed an acceptance of any work under the contract.

(b) While the Homeowner has such possession or use, the Contractor shall be relieved of the responsibility for (1) the loss of or damage to the work resulting from the Homeowner's possession or use, notwithstanding the terms of the clause entitled Permits and Codes herein; (2) all maintenance costs on the areas occupied; and, (3) furnishing heat, light, power, and water used in the areas occupied without proper renuneration therefore. If prior possession or use by the Homeowner delays the progress of the work or causes additional expense to the Contractor, an equitable adjustment shall be made in the contract price or the time of completion, and the contract shall be modified in writing accordingly.

21. Warranty of Title

The Contractor warrants good title to all materials, supplies, and equipment incorporated in the work and agrees to deliver the premises together with all improvements thereon free from any claims, liens or charges, and agrees further that neither it nor any other person, firm or corporation shall have any right to a lien upon the premises or anything appurtenant thereto.

22. Warranty of Construction

(a) In addition to any other warranties in this contract, the Contractor warrants, except as provided in paragraph (j) of this clause, that work performed under this contract conforms to the contract requirements and is free of any defect in equipment, material, or workmanship performed by the Contractor or any subcontractor or supplier at any tier. This warranty shall continue for a period of **one year** from the date of final acceptance of the work. If the Homeowner takes possession of any part of the work before final acceptance, this warranty shall continue for a period of (one year unless otherwise indicated) from the date that the Homeowner takes possession.

(b) The Contractor shall remedy, at the Contractor's expense, any failure to conform, or any defect. In addition, the Contractor shall remedy, at the Contractor's expense, any damage to Homeowner-owned or controlled real or personal property when the damage is the result of—

(1) The Contractor's failure to conform to contract requirements; or

(2) Any defects of equipment, material, workmanship or design furnished by the Contractor.

(c) The Contractor shall restore any work damaged in fulfilling the terms and conditions of this clause. The Contractor's warranty with respect to work repaired or replaced will run for (one year unless otherwise indicated) from the date of repair or replacement.

(d) The Contracting Officer shall notify the Contractor, in writing, within a reasonable time after the discovery of any failure, defect or damage.

(e) If the Contractor fails to remedy any failure, defect, or damage within a reasonable time after receipt of notice, DOH shall have the right to replace, repair or otherwise remedy the failure, defect, or damage at the Contractor's expense.

(f) With respect to all warranties, express or implied, from subcontractors, manufacturers, or suppliers for work performed and materials furnished under this contract, the Contractor shall:

(1) Obtain all warranties that would be given in normal commercial practice;

(2) Require all warranties to be executed in writing, for the benefit of the homeowner; and,

(3) Enforce all warranties for the benefit of the homeowner.

(g) In the event the Contractor's warranty under paragraph(a) of this clause has expired, the homeowner may bring suit at its own expense to enforce a subcontractor's, manufacturer's or supplier's warranty.

(h) Unless a defect is caused by the negligence of the Contractor or subcontractor or supplier at any tier, the Contractor shall not be liable for the repair of any defect of material or design furnished by the homeowner nor for the repair of any damage that results from any defect in DOH furnished material or design.

(i) Notwithstanding any provisions herein to the contrary, the establishment of the time periods in paragraphs (a) and (c) above relate only to the specific obligation of the Contractor to correct the work, and have no relationship to the time within which its obligation to comply with the contract 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 its obligation other than specifically to correct the work.

(j) This warranty shall not limit DOH's/Homeowner's rights under the Inspection and Acceptance of Construction clause of this contract with respect to latent defects, gross mistakes or fraud.

Administrative Requirements

23. Contract Period

The Contractor shall complete all work required under this contract within_____calendar days of the effective date of the contract, or within the time schedule established in the notice to proceed issued by the Contracting Officer.

24. Order of Provisions

In the event of a conflict between these General Conditions and the Specifications, the General Conditions shall prevail. In the event of a conflict between the contract and any applicable state or local law or regulation, the state or local law or regulation shall prevail; provided that such state or local law or regulation does not conflict with, or is less restrictive than applicable federal law, regulation, or Executive Order. In the event of such a conflict, applicable federal law, regulation, and Executive Order shall prevail.

25. Payments

(a) DOH/Homeowner shall pay the Contractor the price as provided in this contract.

(b) DOH shall make progress payments approximately every 30 days as the work proceeds, on estimates of work accomplished which meets the standards of quality established under the contract, as approved by the Contracting Officer. DOH may, subject to written determination and approval of the Contracting Officer, make more frequent payments to contractors which are qualified small businesses.

(c) Before the first progress payment under this contract, the Contractor shall furnish, in such detail as requested by the Contracting Officer, a breakdown of the total contract price showing the amount included therein for each principal category of the work, which shall substantiate the payment amount requested in order to provide a basis for determining progress payments. The breakdown shall be approved by the Contracting Officer and must be acceptable to DOH. The values and quantities employed in making up this breakdown are for determining the amount of progress payments and shall not be construed as a basis for additions to or deductions from the contract price. The Contractor shall prorate its overhead and profit over the construction period of the contract.

(d) The Contractor shall submit, on AIA forms provided by DOH, periodic estimates showing the value of the work performed during each period based upon the approved breakdown of the contract price. Such estimates shall be submitted not later than_14_days in advance of the date set for payment and are subject to correction and revision as required. The estimates must be approved by the Contracting Officer with the concurrence of the Architect prior to payment. If the contract covers more than one project, the Contractor shall furnish a separate progress payment estimate for each.

(e) Along with each request for progress payments and the required estimates, the Contractor shall furnish lien waivers and labor releases as good and sufficient evidence that the premises are free from all liens, damages, and anything chargeable to said contractor.

(f) Except as otherwise provided in State law, DOH shall retain five (5) percent of the amount of progress payments until completion and acceptance of all work under the contract; except, that if upon completion of 50 percent of the work, the Contracting Officer, after consulting with the Architect, determines that the Contractor's performance and progress are satisfactory, DOH may make the remaining payments in full for the work subsequently completed. If the Contracting Officer subsequently determines that the Contractor's performance and progress are unsatisfactory, DOH shall reinstate the five (5) percent retainage until such time as the Contracting Officer determines that performance and progress are satisfactory. Retainage will be released 90 days after project completion.

(g) The Contracting Officer may authorize material delivered on the site and preparatory work done to be taken into consideration when computing progress payments. Material delivered to the Contractor at locations other than the site may also be taken into consideration if the Contractor furnishes satisfactory evidence that (1) it has acquired title to such material; (2) the material is properly stored in a bonded warehouse, storage yard, or similar suitable place as may be approved by the Contracting Officer; (3) the material is insured to cover its full value; and (4) the material will be used to perform this contract. Before any progress payment which includes delivered material is made, the Contractor shall furnish such documentation as the Contracting Officer may require to assure the protection of DOH's/Homeowner's interest in such materials. The Contractor shall remain responsible for such stored material notwithstanding the transfer of title to the Homeowner.

(h) All material and work covered by progress payments made shall, at the time of payment become the sole property of the Homeowner, but this shall not be construed as (1) relieving the Contractor from the sole responsibility for all material and work upon which payments have been made or the restoration of any damaged work; or, (2) waiving the right of DOH/Homeowner to require the fulfillment of all of the terms of the contract. In the event the work of the Contractor has been damaged by other contractors or persons other than employees of DOH in the course of their employment, the Contractor shall restore such damaged work without cost to DOH/Homeowner and to seek redress for its damage only from those who directly caused it.

(i) DOH shall make the final payment due the Contractor under this contract after (1) completion and final acceptance of all work; and (2) presentation of release of all claims against DOH/Homeowner arising by virtue of this contract, other than claims, in stated amounts, that the Contractor has specifically excepted from the operation of the release. Each such exception shall embrace no more than one claim, the basis and scope of which shall be clearly defined. The amounts for such excepted claims shall not be included in the request for final payment. A release may also be required of the assignee if the Contractor's claim to amounts payable under this contract has been assigned.

(j) Prior to making any payment, the Contracting Officer may require the Contractor to furnish receipts or other evidence of payment from all persons performing work and

supplying material to the Contractor, if the Contracting Officer determines such evidence is necessary to substantiate claimed costs.

(k) DOH shall not; (1) determine or adjust any claims for payment or disputes arising there under between the Contractor and its subcontractors or material suppliers; or, (2) withhold any moneys for the protection of the subcontractors or material suppliers. The failure or refusal of DOH to withhold moneys from the Contractor shall in nowise impair the obligations of any surety or sureties under any bonds furnished under this contract.

26. Contract Modifications

(a) Only the Contracting Officer has authority to modify any term or condition of this contract. Any contract modification shall be authorized in writing.

(b) The Contracting Officer may modify the contract unilaterally (1) pursuant to a specific authorization stated in a contract clause (e.g., Changes); or (2) for administrative matters which do not change the rights or responsibilities of the parties (e.g., change in DOH/homeowner's address). All other contract modifications shall be in the form of supplemental agreements signed by the Contractor and the Contracting Officer.

(c) When a proposed modification requires the approval of DOH prior to its issuance (e.g., a change order that exceeds DOH's approved threshold), such modification shall not be effective until the required approval is received by DOH.

27. Changes

(a) The Contracting Officer may, at any time, without notice to the sureties, by written order designated or indicated to be a change order, make changes in the work within the general scope of the contract including changes:
(1) In the specifications (including drawings and designs);
(2) In the method or manner of performance of the work;
(3) Directing the acceleration in the performance of the work.

(b) Any other written order or oral order (which, as used in this paragraph (b), includes direction, instruction, interpretation, or determination) from the Contracting Officer that causes a change shall be treated as a change order under this clause; provided, that the Contractor gives the Contracting Officer written notice stating (1) the date, circumstances and source of the order and (2) that the Contractor regards the order as a change order.

(c) Except as provided in this clause, no order, statement or conduct of the Contracting Officer shall be treated as a change under this clause or entitle the Contractor to an equitable adjustment.

(d) If any change under this clause causes an increase or decrease in the Contractor's cost of, or the time required for the performance of any part of the work under this contract, whether or not changed by any such order, the Contracting Officer shall make an equitable adjustment and modify the contract in writing. However, except for a adjustment based on defective specifications, no proposal for any change under paragraph (b) above shall be allowed for any costs incurred more than 20 days (5 days for oral orders) before the Contractor gives written notice as required. In the case of defective specifications for which DOH is responsible, the equitable adjustment shall include any increased cost reasonably incurred by the Contractor in attempting to comply with the defective specifications.

(e) The Contractor must assert its right to an adjustment under this clause within 30 days after (1) receipt of a written change order under paragraph (a) of this clause, or (2) the furnishing of a written notice under paragraph(b) of this clause, by submitting a written statement describing the general nature and the amount of the proposal. If the facts justify it, the Contracting Officer may extend the period for submission. The proposal may be included in the notice required under paragraph (b) above. No proposal by the Contractor for an equitable adjustment shall be allowed if asserted after final payment under this contract.

(f) The Contractor's written proposal for equitable adjustment shall be submitted in the form of a lump sum proposal supported with an itemized breakdown of all increases and decreases in the contract in at least the following details:

(1) Direct Costs. Materials (list individual items, the quantity and unit cost of each, and the aggregate cost); Transportation and delivery costs associated with materials; Labor breakdowns by hours or unit costs (identified with specific work to be performed); Construction equipment exclusively necessary for the change; Costs of preparation and/ or revision to shop drawings resulting from the change; Worker's Compensation and Public Liability Insurance; Employment taxes under FICA and FUTA; and, Bond Costs when size of change warrants revision.

(2) Indirect Costs. Indirect costs may include overhead, general and administrative expenses, and fringe benefits not normally treated as direct costs.

(3) Profit. The amount of profit shall be negotiated and may vary according to the nature, extent, and complexity of the work required by the change.

The allowability of the direct and indirect costs shall be determined in accordance with the Contract Cost Principles and Procedures for Commercial Firms in Part 31 of the Federal Acquisition Regulation (48 CFR 1-31), as implemented by HUD Handbook 2210.18, in effect on the date of this contract. The Contractor shall not be allowed a profit on the profit received by any subcontractor. Equitable adjustments for deleted work shall include a credit for profit and may include a credit for indirect costs. On proposals covering both increases and decreases in the amount of the contract, the application of indirect costs and profit shall be on the net- change in direct costs for the Contractor or subcontractor performing the work

(g) The Contractor shall include in the proposal its request for time extension (if any), and shall include sufficient information and dates to demonstrate whether and to what extent the change will delay the completion of the contract in its entirety.

(h) The Contracting Officer shall act on proposals within 30 days after their receipt, or notify the Contractor of the date when such action will be taken.

(i) Failure to reach an agreement on any proposal shall be a dispute under the clause entitled Disputes herein. Nothing in this clause, however, shall excuse the Contractor from proceeding with the contract as changed.

(j) Except in an emergency endangering life or property, no

change shall be made by the Contractor without a prior order from the Contracting Officer.

28. Suspension of Work

(a) The Contracting Officer may order the Contractor in writing to suspend, delay, or interrupt all or any part of the work of this contract for the period of time that the Contracting Officer determines appropriate for the convenience of DOH/Homeowner.

If the performance of all or any part of the work is, for an unreasonable period of time, suspended, delayed, or interrupted (1) by an act of the Contracting Officer in the administration of this contract, or (2) by the Contracting Officer's failure to act within the time specified (or within a reasonable time if not specified) in this contract an adjustment may be made for any increase in the cost of performance of the contract (excluding profit) necessarily caused by such unreasonable suspension, delay, or interruption and the contract modified in writing accordingly. However, no adjustment shall be made under this clause for any suspension, delay, or interruption to the extent that performance would have been so suspended, delayed, or interrupted by any other cause, including the fault or negligence of the Contractor or for which any equitable adjustment is provided for or excluded under any other provision of this contract.

(b) A claim under this clause shall not be allowed without prior written approval of the Contracting Officer.

29. Disputes

(a) "Claim," as used in this clause, means a written demand or written assertion by one of the contracting parties seeking, as a matter of right, the payment of money in a sum certain, the adjustment or interpretation of contract terms, or other relief arising under or relating to the contract. A claim arising under the contract, unlike a claim relating to the contract, is a claim that can be resolved under a contract clause that provides for the relief sought by the claimant. A voucher, invoice, or other routine request for payment that is not in dispute when submitted is not a claim. The submission may be converted to a claim by complying with the requirements of this clause, if it is disputed either as to liability or amount or is not acted upon in a reasonable time.

(b) Except for disputes arising under the clauses entitled Labor Standards - Davis Bacon and Related Acts, herein, all disputes arising under or relating to this contract, including any claims for damages for the alleged breach thereof which are not disposed of by agreement, shall be resolved under this clause.

(c) All claims by the Contractor shall be made in writing and submitted to the Contracting Officer for a written decision.

(d) A claim by the Homeowner against the Contractor shall be subject to a written decision by the Contracting Officer.

(e) The Contracting Officer shall, within 60 (unless otherwise indicated) days after receipt of the request, decide the claim or notify the Contractor of the date by which the decision will be made.

(f) The Contracting Officer's decision shall be final unless the Contractor (1) appeals in writing to a higher level in DOH in accordance with DOH's policy and procedures, (2) refers the appeal to an independent mediator or arbitrator, or (3) files suit in a court of competent jurisdiction. Such appeal must be made within (30 unless otherwise indicated) days after receipt of the Contracting Officer's decision.

(g) The Contractor shall proceed diligently with performance of this contract, pending final resolution of any request for relief, claim, appeal, or action arising under or relating to the contract, and comply with any decision of the Contracting Officer.

30. Default

(a) If the Contractor refuses or fails to prosecute the work, or any separable part thereof, with the diligence that will insure its completion within the time specified in this contract, or any extension thereof, or fails to complete said work within this time, the Contracting Officer may, by written notice to the Contractor, terminate the right to proceed with the work (or separable part of the work) that has been delayed. In this event, DOH may take over the work and complete it, by contract or otherwise, and may take possession of and use any materials, equipment, and plant on the work site necessary for completing the work. The Contractor and its sureties shall be liable for any damage to DOH/Homeowner resulting from the Contractor's refusal or failure to complete the work within the specified time, whether or not the Contractor's right to proceed with the work is terminated. This liability includes any increased costs incurred by DOH/Homeowner in completing the work.

(b) The Contractor's right to proceed shall not be terminated or the Contractor charged with damages under this clause if—

(1) The delay in completing the work arises from unforeseeable causes beyond the control and without the fault or negligence of the Contractor. Examples of such causes include (i) acts of God, or of the public enemy, (ii) acts of DOH or other governmental entity in either its sovereign or contractual capacity,
(iii) acts of another contractor in the performance of a contract with DOH, (iv) fires, (v) floods, (vi) epidemics, (vii) quarantine restrictions, (viii) strikes,

(ix) freight embargoes, (x) unusually severe weather, or (xi) delays of subcontractors or suppliers at any tier arising from unforeseeable causes beyond the control and without the fault or negligence of both the Contractor and the subcontractors or suppliers; and

(2) The Contractor, within days (5 days unless otherwise indicated) from the beginning of such delay (unless extended by the Contracting Officer) notifies the Contracting Officer in writing of the causes of delay. The Contracting Officer shall ascertain the facts and the extent of the delay. If, in the judgment of the Contracting Officer, the findings of fact warrant such action, time for completing the work shall be extended by written modification to the contract. The findings of the Contracting Officer shall be reduced to a written decision which shall be subject to the provisions of the Disputes clause of this contract.

(b) If, after termination of the Contractor's right to proceed, it is determined that the Contractor was not in default, or that the delay was excusable, the rights and obligations of the parties will be the same as if the termination had been for convenience of DOH.

31. Liquidated Damages

(a) If the Contractor fails to complete the work within the time specified in the contract, or any extension, as specified in the clause entitled Default of this contract, the Contractor may pay to DOH as liquidated damages, the sum of $100.00 for each day of delay. If different completion dates are specified in the contract for separate parts or stages of the work, the amount of liquidated damages shall be assessed on those parts or stages which are delayed. To the extent that the Contractor's delay or nonperformance is excused under another clause in this contract, liquidated damages shall not be due DOH. The Contractor remains liable for damages caused other than by delay.

(b) If DOH terminates the Contractor's right to proceed, the resulting damage will consist of liquidated damages until such reasonable time as may be required for final completion of the work together with any increased costs occasioned DOH in completing the work.

(c) If DOH does not terminate the Contractor's right to proceed, the resulting damage will consist of liquidated damages until the work is completed or accepted.

32. Termination for Convenience

(a) The Contracting Officer may terminate this contract in whole, or in part, whenever the Contracting Officer determines that such termination is in the best interest of DOH/Homeowner. Any such termination shall be effected by delivery to the Contractor of a Notice of Termination specifying the extent to which the performance of the work under the contract is terminated, and the date upon which such termination becomes effective.

(b) If the performance of the work is terminated, either in whole or in part, DOH/Homeowner shall be liable to the Contractor for reasonable and proper costs resulting from such termination upon the receipt by DOH of a properly presented claim setting out in detail: (1) the total cost of the work performed to date of termination less the total amount of contract payments made to the Contractor; (2) the cost (including reasonable profit) of settling and paying claims under subcontracts and material orders for work performed and materials and supplies delivered to the site, payment for which has not been made by DOH to the Contractor or by the Contractor to the subcontractor or supplier; (3) the cost of preserving and protecting the work already performed until DOH or assignee takes possession thereof or assumes responsibility therefore; (4) the actual or estimated cost of legal and accounting services reasonably necessary to prepare and present the termination claim to DOH/Homeowner; and (5) an amount constituting a reasonable profit on the value of the work performed by the Contractor.

(c) The Contracting Officer will act on the Contractor's claim within days (60 days unless otherwise indicated) of receipt of the Contractor's claim.

(d) Any disputes with regard to this clause are expressly made subject to the provisions of the Disputes clause of this contract.

33. Assignment of Contract

The Contractor shall not assign or transfer any interest in this contract; except that claims for monies due or to become due from DOH/Homeowner under the contract may be assigned to a bank, trust company, or other financial institution. Such assignments of claims shall only be made with the written concurrence of the Contracting Officer. If the Contractor is a partnership, this contract shall inure to the benefit of the surviving or remaining member(s) of such partnership as approved by the Contracting Officer.

34. Insurance

(a) Before commencing work, the Contractor and each subcontractor shall furnish DOH with certificates of insurance listing DOH and the Homeowner as additionally insured A.T.I.M.A. showing the following insurance is in force and will insure all operations under the Contract:

(1) Workers' Compensation, in accordance with state or Territorial Workers' Compensation laws.

(2) Commercial General Liability with a combined single limit for bodily injury and property damage of not less than $1,000,000 per occurrence to protect the Contractor and each subcontractor against claims for bodily injury or death and damage to the property of others. This shall cover the use of all equipment, hoists, and vehicles on the site(s) not covered by Automobile Liability under (3) below. If the Contractor has a "claims- made" policy, then the following additional requirements apply: the policy must provide a "retroactive date" which must be on or before the execution date of the Contract; and the extended reporting period may not be less than five years following the completion date of the Contract.

(3) Automobile Liability on owned and non -owned motor vehicles used on the site(s) or in connection therewith for a combined single limit for bodily injury and property damage of not less than $1,000,000 per occurrence.

(4) Cargo Insurance in the amount of $250,000 is required when the project involves raising the structure above the Base Flood Elevation.

(b) Before commencing work, the Contractor shall furnish DOH with a certificate of insurance evidencing that Builder's Risk (fire and extended coverage) Insurance on all work in place and/or materials stored at the building site(s), including foundations and building equipment, is in force. The Builder's Risk Insurance shall be for the benefit of the Contractor, the Homeowner and DOH as their interests may appear and each shall be named in the policy or policies as an insured. The Contractor in installing equipment supplied by DOH shall carry insurance on such equipment from the time the Contractor takes possession thereof until the Contract work is

accepted by DOH. The Builder's Risk Insurance need not be carried on excavations, piers, footings, or foundations until such time as work on the superstructure is started. It need not be carried on landscape work. Policies shall furnish coverage at all times for the full cash value of all completed construction, as well as materials in place and/or stored at the site(s), whether or not partial payment has been made by DOH. The Contractor may terminate this insurance on buildings as of the date taken over for occupancy by the Homeowner. The Contractor is not required to carry Builder's Risk Insurance for modernization work which does not involve structural alterations or additions and where the Homeowner's existing fire and extended coverage policy can be endorsed to include such work.

(c) All insurance shall be carried with companies which are financially responsible and admitted to do business in the State in which the project is located with a minimum Best rating of A-. If any such insurance is due to expire during the construction period, the Contractor (including subcontractors, as applicable) shall not permit the coverage to lapse and shall furnish evidence of coverage to the Contracting Officer. All certificates of insurance, as evidence of coverage, shall provide that no coverage may be canceled or non- renewed by the insurance company until at least 30 days prior written notice has been given to the Contracting Officer.

35. Subcontracts

(a) Definitions. As used in this contract -

(1) "Subcontract" means any contract, purchase order, or other purchase agreement, including modifications and change orders to the foregoing, entered into by a subcontractor to furnish supplies, materials, equipment, and services for the performance of the prime contract or a subcontract.

(2) "Subcontractor" means any supplier, vendor, or firm that furnishes supplies, materials, equipment, or services to or for the Contractor or another subcontractor.

(b) The Contractor shall not enter into any subcontract with any subcontractor who has been temporarily denied participation in a HUD program or who has been suspended or debarred from participating in contracting programs by any agency of the United States Government or of the state in which the work under this contract is to be performed.

(c) The Contractor shall be as fully responsible for the acts or omissions of its subcontractors, and of persons either directly or indirectly employed by them as for the acts or omissions of persons directly employed by the Contractor.

(d) The Contractor shall insert appropriate clauses in all subcontracts to bind subcontractors to the terms and conditions of this contract insofar as they are applicable to the work of subcontractors.

(e) Nothing contained in this contract shall create any contractual relationship between any subcontractor and DOH or between the subcontractor and HUD.

36. Subcontracting with Small and Minority Firms, Women's Business Enterprise, and Labor Surplus Area Firms

The Contractor shall take the following steps to ensure that, whenever possible, subcontracts are awarded to small business firms, minority firms, women's business enterprises, and labor surplus area firms:

(a) Placing qualified small and minority businesses and women's business enterprises on solicitation lists;

(b) Ensuring that small and minority businesses and women's business enterprises are solicited whenever they are potential sources;

(c) Dividing total requirements, when economically feasible, into smaller tasks or quantities to permit maximum participation by small and minority businesses and women's business enterprises;

(d) Establishing delivery schedules, where the requirements of the contract permit, which encourage participation by small and minority businesses and women's business enterprises; and

(e) Using the services and assistance of the U.S. Small Business Administration, the Minority Business Development Agency of the U.S. Department of Commerce, and State and local governmental small business agencies.

37. Equal Employment Opportunity

During the performance of this contract, the Contractor agrees as follows:

(a) The Contractor shall not discriminate against any employee or applicant for employment because of race, color, religion, sex, national origin, or handicap.

(b) The Contractor shall take affirmative action to ensure that applicants are employed, and that employees are treated during employment without regard to their race, color, religion, sex, national origin, or handicap. Such action shall include, but not be limited to, (1) employment, (2) upgrading, (3) demotion, (4) transfer, (5) recruitment or recruitment advertising, (6) layoff or termination, (7) rates of pay or other forms of compensation, and (8) selection for training, including apprenticeship.

(c) The Contractor shall post in conspicuous places available to employees and applicants for employment the notices to be provided by the Contracting Officer that explain this clause.

(d) The Contractor shall, in all solicitations or advertisements for employees placed by or on behalf of the Contractor, state that all qualified applicants will receive consideration for employment without regard to race, color, religion, sex, national origin, or handicap.

(e) The Contractor shall send, to each labor union or representative of workers with which it has a collective bargaining agreement or other contract or understanding, the notice to be provided by the Contracting Officer advising the labor union or workers' representative of the Contractor's commitments under this clause, and post copies of the notice in conspicuous places available to employees and applicants for employment.

(f) The Contractor shall comply with Executive Order 11246, as amended, and the rules, regulations, and orders of the Secretary of Labor.

(g) The Contractor shall furnish all information and reports required by Executive Order 11246, as amended, Section 503 of the Rehabilitation Act of 1973, as amended, and by rules, regulations, and orders of the Secretary of Labor, or

pursuant thereto. The Contractor shall permit access to its books, records, and accounts by the Secretary of Labor for purposes of investigation to ascertain compliance with such rules, regulations, and orders.

(h) In the event of a determination that the Contractor is not in compliance with this clause or any rule, regulation, or order of the Secretary of Labor, this contract may be canceled, terminated, or suspended in whole or in part, and the Contractor may be declared ineligible for further Government contracts, or Federally assisted construction contracts under the procedures authorized in Executive Order 11246, as amended. In addition, sanctions may be imposed and remedies invoked against the Contractor as provided in Executive Order 11246, as amended, the rules, regulations, and orders of the Secretary of Labor, or as otherwise provided by law.

(i) The Contractor shall include the terms and conditions of this clause in every subcontract or purchase order unless exempted by the rules, regulations, or orders of the Secretary of Labor issued under Executive Order 11246, as amended, so that these terms and conditions will be binding upon each subcontractor or vendor. The Contractor shall take such action with respect to any subcontract or purchase order as the Secretary of Housing and Urban Development or the Secretary of Labor may direct as a means of enforcing such provisions, including sanctions for noncompliance; provided that if the Contractor becomes involved in, or is threatened with, litigation with a subcontractor or vendor as a result of such direction, the Contractor may request the United States to enter into the litigation to protect the interests of the United States.

(j) Compliance with the requirements of this clause shall be to the maximum extent consistent with, but not in derogation of, compliance with section 7(b) of the Indian Self-Determination and Education Assistance Act and the Indian Preference clause of this contract.

38. Employment, Training, and Contracting Opportunities for Low-Income Persons, Section 3 of the Housing and Urban Development Act of 1968.

(a) The work to be performed under this contract is subject to the requirements of Section 3 of the Housing and Urban Development Act of 1968, as amended, 12 U.S.C. 1701u (Section 3). The purpose of Section 3 is to ensure that employment and other economic opportunities generated by HUD assistance or HUD-assisted projects covered by Section 3, shall, to the greatest extent feasible, be directed to low- and very low-income persons, particularly persons who are recipients of HUD assistance for housing.

(b) The parties to this contract agree to comply with HUD's regulations in 24 CFR Part 135, which implement Section 3. As evidenced by their execution of this contract, the parties to this contract certify that they are under no contractual or other impediment that would prevent them from complying with the Part 135 regulations.

(c) The contractor agrees to send to each labor organization or representative of workers with which the contractor has a collective bargaining agreement or other understanding, if any, a notice advising the labor organization or workers' representative of the contractor's commitments under this Section 3 clause, and will post copies of the notice in conspicuous places at the work site where both employees and applicants for training and employment positions can see the notice. The notice shall describe the Section 3 preference, shall set forth minimum number and job titles subject to hire, availability of apprenticeship and training positions, the qualifications for each; and the name and location of the person(s) taking applications for each of the positions; and the anticipated date the work shall begin.

(d) The contractor agrees to include this Section 3 clause in every subcontract subject to compliance with regulations in 24 CFR Part 135, and agrees to take appropriate action, as provided in an applicable provision of the subcontract or in this Section 3 clause, upon a finding that the subcontractor is in violation of the regulations in 24 CFR Part 135. The contractor will not subcontract with any subcontractor where the contractor has notice or knowledge that the subcontractor has been found in violation of the regulations in 24 CFR Part 135.

(e) The contractor will certify that any vacant employment positions, including training positions, that are filled (1) after the contractor is selected but before the contract is executed, and (2) with persons other than those to whom the regulations of 24 CFR Part 135 require employment opportunities to be directed, were not filled to circumvent the contractor's obligations under 24 CFR Part 135.

(f) Noncompliance with HUD's regulations in 24 CFR Part 135 may result in sanctions, termination of this contract for default, and debarment or suspension from future HUD assisted contracts.

(g) With respect to work performed in connection with Section 3 covered Indian housing assistance, section 7(b) of the Indian Self-Determination and Education Assistance Act (25 U.S.C. 450e) also applies to the work to be performed under this contract. Section 7(b) requires that to the greatest extent feasible (i) preference and opportunities for training and employment shall be given to Indians, and (ii) preference in the award of contracts and subcontracts shall be given to Indian organizations and Indian-owned Economic Enterprises. Parties to this contract that are subject to the provisions of Section 3 and Section 7(b)agree to comply with Section 3 to the maximum extent feasible, but not in derogation of compliance with section 7(b).

39. Interest of Members of Congress

No member of or delegate to the Congress of the United States of America shall be admitted to any share or part of this contract or to any benefit that may arise therefrom.

40. Interest of Members, Officers, or Employees and Former Members, Officers, or Employees

No member, officer, or employee of DOH, no member of the governing body of the locality in which the project is situated, no member of the governing body of the locality in which DOH was activated, and no other public official of such locality or localities who exercises any functions or responsibilities with respect to the project, shall, during his or her tenure, or for one year thereafter, have any interest, direct or indirect, in this contract or the proceeds thereof.

41. Limitations on Payments made to Influence Certain Federal Financial Transactions

(a) The Contractor agrees to comply with Section 1352 of Title 31, United States Code which prohibits the use of Federal appropriated funds to pay any person for influencing or attempting to influence an officer or employee of any agency, a Member of Congress, and officer or employee of Congress, or an employee of a Member of Congress in connection with any of the following covered Federal actions: the awarding of any Federal contract; the making of any Federal grant; the making of any Federal loan; the

entering into of any Burnsative agreement; or the modification of any Federal contract, grant, loan, or Burnsative agreement.

(b) The Contractor further agrees to comply with the requirement of the Act to furnish a disclosure (OMB Standard Form LLL, Disclosure of Lobbying Activities) if any funds other than Federal appropriated funds (including profit or fee received under a covered Federal transaction) have been paid, or will be paid, to any person for influencing or attempting to influence an officer or employee of any agency, a Member of Congress, an officer or employee of Congress, or an employee of a Member of Congress in connection with a Federal contract, grant, loan, or Burnsative agreement.

42. Royalties and Patents

The Contractor shall pay all royalties and license fees. It shall defend all suits or claims for infringement of any patent rights and shall save DOH/Homeowner harmless from loss on account thereof; except that DOH shall be responsible for all such loss when a particular design, process or the product of a particular manufacturer or manufacturers is specified and the Contractor has no reason to believe that the specified design, process, or product is an infringement. If, however, the Contractor has reason to believe that any design, process or product specified is an infringement of a patent, the Contractor shall promptly notify the Contracting Officer. Failure to give such notice shall make the Contractor responsible for resultant loss.

43. Examination and Retention of Contractor's Records

(a) DOH, HUD, or Comptroller General of the United States, or any of their duly authorized representatives shall, until 3 years after final payment under this contract, have access to and the right to examine any of the Contractor's directly pertinent books, documents, papers, or other records involving transactions related to this contract for the purpose of making audit, examination, excerpts, and transcriptions.

(b) The Contractor agrees to include in first-tier subcontracts under this contract a clause substantially the same as paragraph (a) above. "Subcontract," as used in this clause, excludes purchase orders not exceeding $10,000.

(c) The periods of access and examination in paragraphs (a) and (b) above for records relating to (1) appeals under the Disputes clause of this contract, (2) litigation or settlement of claims arising from the performance of this contract, or (3) costs and expenses of this contract to which DOH, HUD, or Comptroller General or any of their duly authorized representatives has taken exception shall continue until disposition of such appeals, litigation, claims, or exceptions.

44. Labor Standards - Davis-Bacon and Related Acts

Except for housing rehabilitation/reconstruction projects designed to contain fewer than eight (8) units, if the total amount of this contract exceeds $2,000, the Federal labor standards set forth in the clause below shall apply to the development or construction work to be performed under the contract.

(a) Minimum Wages.

(1) All laborers and mechanics employed under this contract in the development or construction of the project(s) involved will be paid unconditionally and not less often than once a week, and without subsequent deduction or rebate on any account (except such payroll deductions as are permitted by regulations issued by the Secretary of Labor under the Copeland Act (29 CFR Part 3)), the full amount of wages and bona fide fringe benefits (or cash equivalents thereof) due at time of payment computed at rates not less than those contained in the wage determination of the Secretary of Labor which is attached hereto and made a part hereof (if applicable), regardless of any contractual relationship which may be alleged to exist between the Contractor and such laborers and mechanics. Contributions made or costs reasonably anticipated for bona fide fringe benefits under Section 1(b)(2) of the Davis-Bacon Act on behalf of laborers or mechanics are considered wages paid to such laborers or mechanics, subject to the provisions of 29 CFR 5.5(a)(1)(iv); also, regular contributions made or costs incurred for more than a weekly period (but not less often than quarterly) under plans, funds, or programs which cover the regular weekly period, are deemed to be constructively made or incurred during such weekly period. If applicable, such laborers and mechanics shall be paid the appropriate wage rate and fringe benefits in the wage determination for the classification of work actually performed, without regard to skill, except as provided in 29 CFR 5.5(a)(4). Laborers or mechanics performing work in more than one classification may be compensated at the rate specified for each classification for the time actually worked therein; provided, that the employer's payroll records accurately set forth the time spent in each classification in which work is performed. The wage determination (including any additional classification and wage rates conformed under 29 CFR 5.5(a)(1)(ii) and the Davis-Bacon poster (WH-1321) shall be posted at all times by the Contractor and its subcontractors at the site of the work in a prominent and accessible place where it can be easily seen by the workers (if applicable).

(2) (i) Any class of laborers or mechanics, including helpers, which is not listed in the wage determination and which is to be employed under the contract shall be classified in conformance with the wage determination. HUD shall approve an additional classification and wage rate and fringe benefits therefor only when all the following criteria have been met: (A) The work to be performed by the classification requested is not performed by a classification in the wage determination; and (B) The classification is utilized in the area by the construction industry; and (C) The proposed wage rate, including any bona fide fringe benefits, bears a reasonable relationship to the wage rates contained in the wage determination.

(ii) If the Contractor and the laborers and mechanics to be employed in the classification (if known), or their representatives, and HUD or its designee agree on the classification and wage rate (including the amount designated for fringe benefits where appropriate), a report of the action taken shall be sent by HUD or its designee to the Administrator of the Wage and Hour Division, Employee Standards Administration, U.S. Department of Labor, Washington, DC 20210. The Administrator, or an authorized representative, will approve, modify, or disapprove every additional classification action within 30 days of receipt and so advise HUD or its designee or will notify HUD or its designee within the 30-day period that additional time is necessary.

(iii) In the event the Contractor, the laborers or mechanics to be employed in the classification or their representatives, and HUD or its designee do not agree on the proposed classification and wage rate (including the amount designated for fringe benefits, where appropriate), HUD or its designee shall refer the questions, including the views of all interested parties and the recommendation of HUD or its

designee, to the Administrator of the Wage and Hour Division for determination. The Administrator, or an authorized representative, will issue a determination within 30 days of receipt and so advise HUD or its designee or will notify HUD or its designee within the 30-day period that additional time is necessary.

(iv) The wage rate (including fringe benefits where appropriate) determined pursuant to subparagraphs (a)(2)(ii) or (iii) of this clause shall be paid to all workers performing work in the classification under this contract from the first day on which work is performed in classification.

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

(4) If the Contractor does not make payments to a trustee or other third person, the Contractor may consider as part of the wages of any laborer or mechanic the amount of any costs reasonably anticipated in providing bona fide fringe benefits under a plan or program; provided, that the Secretary of Labor has found, upon the written request of the Contractor, that the applicable standards of the Davis-Bacon Act have been met. The Secretary of Labor may require the Contractor to set aside in a separate account assets for the meeting of obligations under the plan or program.

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

(c) Payrolls and basic records.

(1) Payrolls and basic records relating thereto shall be maintained by the Contractor during the course of the work and preserved for a period of three years thereafter for all laborers and mechanics working in the construction or development of the project. Such records shall contain the name, address, and social security number of each such worker, his or her correct classification, hourly rates of wages paid (including rates of contributions or costs anticipated for bona fide fringe benefits or cash equivalents thereof of the types described in section 1(b)(2)(B) of the Davis-Bacon Act), daily and weekly number of hours worked, deductions made, and actual wages paid. Whenever the Secretary of Labor has found, under 29 CFR 5.5(a)(1)(iv), that the wages of any laborer or mechanic include the amount of costs reasonably anticipated in providing benefits under a plan or program described in section 1(b)(2)(B) of the Davis-Bacon Act, the Contractor shall maintain records which show that the commitment to provide such benefits is enforceable, that the plan or program is financially responsible, and that the plan or program has been communicated in writing to the laborers or mechanics affected, and records which show the costs anticipated or the actual cost incurred in providing such benefits. Contractors employing apprentices or trainees under approved programs shall maintain written evidence of the registration of apprenticeship programs and certification of trainee programs, the registration of the apprentices and trainees, and the ratios and wage rates prescribed in the applicable programs.

(2) (i) The Contractor shall submit weekly for each week in which any contract work is performed a copy of all payrolls to the Contracting Officer for transmission to HUD or its designee. The payrolls submitted shall set out accurately and completely all of the information required to be maintained under subparagraph (c)(1) of this clause. This information may be submitted in any form desired. Optional Form WH-347 (Federal Stock Number 029-005-00014-1) is available for this purpose and may be purchased from the Superintendent of Documents, U.S. Government Printing Office, Washington, D.C. 20402. The Contractor is responsible for the submission of copies of payrolls by all subcontractors. (Approved by the Office of Management and Budget under OMB Control Number 1214-0149.)

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

(A) That the payroll for the payroll period contains the information required to be maintained under paragraph (c) (1) of this clause and that such information is correct and complete;

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

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

(iii) The weekly submission of a properly executed certification set forth on the reverse side of Optional Form WH-347 shall satisfy the requirements for submission of the "Statement of Compliance" required by subparagraph (c)(2)(ii) of this clause.

(iv) The falsification of any of the above certifications may subject the Contractor or subcontractor to civil or

criminal prosecution under Section 1001 of Title 18 and Section 3729 of Title 31 of the United States Code.

(3) The Contractor or subcontractor shall make the records required under subparagraph (c)(1) available for inspection, copying, or transcription by authorized representatives of HUD or its designee, the Contracting Officer, or the Department of Labor and shall permit such representatives to interview employees during working hours on the job. If the Contractor or subcontractor fails to submit the required records or to make them available, HUD or its designee may, after written notice to the Contractor, take such action as may be necessary to cause the suspension of any further payment, advance, or guarantee of funds. Furthermore, failure to submit the required records upon request or to make such records available may be grounds for debarment action pursuant to 29 CFR 5.12.

(d) (1) Apprentices. Apprentices will be permitted to work at less than the predetermined rate for the work they performed when they are employed pursuant to and individually registered in a bona fide apprenticeship program registered with the U.S. Department of Labor, Employment and Training Administration, Office of Apprenticeship and Training, Employer and Labor Services (OATELS), or with a State Apprenticeship Agency recognized by OATELS, or if a person is employed in his or her first 90 days of probationary employment as an apprentice in such an apprenticeship program, who is not individually registered in the program, but who has been certified by OATELS or a State Apprenticeship Agency (where appropriate) to be eligible for probationary employment as an apprentice. The allowable ratio of apprentices to journeymen on the job site in any craft classification shall not be greater than the ratio permitted to the Contractor as to the entire work force under the registered program. Any worker listed on a payroll at an apprentice wage rate, who is not registered or otherwise employed as stated in this paragraph, shall be paid not less than the applicable wage rate on the wage determination for the classification of work actually performed. In addition, any apprentice performing work on the job site in excess of the ratio permitted under the registered program shall be paid not less than the applicable wage rate on the wage determination for the work actually performed. Where a contractor is performing construction on a project in a locality other than that in which its program is registered, the ratios and wage rates (expressed in percentages of the journeyman's hourly rate) specified in the Contractor's or subcontractor's registered program shall be observed. Every apprentice must be paid at not less than the rate specified in the registered program for the apprentice's level of progress, expressed as a percentage of the journeyman hourly rate specified in the applicable wage determination. Apprentices shall be paid fringe benefits in accordance with the provisions of the apprenticeship program. If the apprenticeship program does not specify fringe benefits, apprentices must be paid the full amount of fringe benefits listed on the wage determination for the applicable classification. If the Administrator of the Wage and Hour Division determines that a different practice prevails for the applicable apprentice classification, fringes shall be paid in accordance with that determination. In the event OATELS, or a State Apprenticeship Agency recognized by OATELS, withdraws approval of an apprenticeship program, the Contractor will no longer be permitted to utilize apprentices at less than the applicable predetermined rate for the work performed until an acceptable program is approved.

(2) Trainees. Except as provided in 29 CFR 5.16, trainees will not be permitted to work at less than the predetermined rate for the work performed unless they are employed pursuant to and individually registered in a program which has received prior approval, evidenced by formal certification by the U.S. Department of Labor, Employment and Training Administration. The ratio of trainees to journeymen on the job site shall not be greater than permitted underthe plan approved by the Employment and Training Administration. Every trainee must be paid at not less than the rate specified in the approved program for the trainee's level of progress, expressed as a percentage of the journeyman hourly rate specified in the applicable wage determination. Trainees shall be paid fringe benefits in accordance with the provisions of the trainee program. If the trainee program does not mention fringe benefits, trainees shall be paid the full amount of fringe benefits listed in the wage determination unless the Administrator of the Wage and Hour Division determines that there is an apprenticeship program associated with the corresponding journeyman wage rate in the wage determination which provides for less than full fringe benefits for apprentices. Any employee listed on the payroll at a trainee rate who is not registered and participating in a training plan approved by the Employment and Training Administration shall be paid not less than the applicable wage rate in the wage determination for the classification of work actually performed. In addition, any trainee performing work on the job site in excess of the ratio permitted under the registered program shall be paid not less than the applicable wage rate in the wage determination for the work actually performed. In the event the Employment and Training Administration withdraws approval of a training program, the Contractor will no longer be permitted to utilize trainees at less than the applicable predetermined rate for the work performed until an acceptable program is approved.

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

(e) Compliance with Copeland Act requirements. The Contractor shall comply with the requirements of 29 CFR Part 3, which are hereby incorporated by reference in this contract.

(f) Contract termination; debarment. A breach of this contract clause may be grounds for termination of the contract and for debarment as a Contractor and a subcontractor as provided in 29 CFR 5.12.

(g) Compliance with Davis-Bacon and related Act requirements. All rulings and interpretations of the Davis- Bacon and related Acts contained in 29 CFR Parts 1, 3, and 5 are herein incorporated by reference in this contract.

(h) Disputes concerning labor standards. Disputes arising out of

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

Department of Labor, or the employees or their representatives.

(i) Certification of eligibility.

(1) By entering into this contract, the Contractor certifies that neither it (nor he or she) nor any person or firm who has an interest in the Contractor's firm is a person or firm ineligible to be awarded contracts by the United States Government by virtue of section 3(a) of the Davis-Bacon Act or 29 CFR 5.12(a)(1).

(2) No part of this contract shall be subcontracted to any person or firm ineligible for award of a United States Government contract by virtue of section 3(a) of the Davis-Bacon Act or 29 CFR 5.12(a)(1).

(3) The penalty for making false statements is prescribed in the U. S. Criminal Code, 18 U.S.C. 1001.

(j) Contract Work Hours and Safety Standards Act. As used in this paragraph, the terms "laborers" and "mechanics" include watchmen and guards.

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

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

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

(k) Subcontracts. The Contractor or subcontractor shall insert in any subcontracts all the provisions contained in this clause, and such other clauses as HUD or its designee may by appropriate instructions require, and also a clause requiring the subcontractors to include these provisions in any lower tier subcontracts. The prime Contractor shall be responsible for the compliance by any subcontractor or lower tier subcontractor with all these provisions

45. . Non-Federal Prevailing Wage Rates

(a) Any prevailing wage rate (including basic hourly rate and any fringe benefits), determined under State or tribal law to be prevailing, with respect to any employee in any trade or position employed under the contract, is inapplicable to the contract and shall not be enforced against the Contractor or any subcontractor, with respect to employees engaged under the contract whenever such non-Federal prevailing wage rate exceeds:

(1) The applicable wage rate determined by the Secretary of Labor pursuant to the Davis-Bacon Act (40 U.S.C. 3141 et seq.) to be prevailing in the locality with respect to such trade;

(b) An applicable apprentice wage rate based thereon specified in an apprenticeship program registered with the U.S. Department of Labor (DOL) or a DOL- recognized State Apprenticeship Agency; or

(c) An applicable trainee wage rate based thereon specified in a DOL-certified trainee program.

46. Procurement of Recovered Materials.

(a) In accordance with Section 6002 of the Solid Waste Disposal Act, as amended by the Resource Conservation and Recovery Act, the Contractor shall procure items designated in guidelines of the Environmental Protection Agency (EPA) at 40 CFR Part 247 that contains the highest percentage of recovered materials practicable, consistent with maintaining a satisfactory level of competition. The contractor shall procure items designated in the EPA guidelines that contain the highest percentage of recovered materials practicable unless the Contractor determines that such items: (1) are not reasonably available in a reasonable period of time: (2) fail to meet reasonable performance standards, which shall be determined on the basis of the guidelines of the National Institute of Standards and Technology, if applicable to the item; or (3) are only available at an unreasonable price.

(b) Paragraph (a) of this clause shall apply to items purchased under this contract where: (1) the Contractor purchases in excess of $10,000 of the item under this contract; or (2) during the preceding Federal fiscal year, the Contractor: (i) purchased any amount of the items for use under a contract that was funded with Federal appropriations and was within a Federal agency or a State agency of a political subdivision of a State; and (ii) purchased a total of in excess of $10,000 of the item both under and outside that contract.

SECTION 003132 - GEOTECHNICAL DATA

1.1 GEOTECHNICAL DATA

A. This Document with its referenced attachments is part of the Procurement and Contracting Requirements for Project. They provide Owner's information for Bidders' convenience and are intended to supplement rather than serve in lieu of Bidders' own investigations. They are made available for Bidders' convenience and information, but are not a warranty of existing conditions. This Document and its attachments are not part of the Contract Documents.

B. A geotechnical investigation report for Project, prepared by Welti Associates, dated August 13, 2014 is appended to this Document.

END OF SECTION 003132

ATTACHMENT

Geotechnical Study for Proposed New Foundation/Raising of

Burns Residence, 3 Marsh Road, Westport, CT

August 13, 2014

DR. CLARENCE WELTI, P.E., P.C.

GEOTECHNICAL ENGINEERING

227 Williams Street · P.O. Box 397
Glastonbury, CT 06033-0397

(860) 633-4623 / FAX (860) 657-2514

August 13, 2014

Mr. Michael P. Casey, Project Manager
Diversified Technology Consultants
2321 Whitney Avenue, Suite 301
Hamden, CT 06581

Re: Geotechnical Study for Proposed New Foundation/Raising of Burns Residence
3 Marsh Road, Westport, CT

Dear Mr. Casey:

1.0 Herewith are the boring data pertaining to the above. One boring was drilled to a depth of 38 feet below the existing grade. The boring location is shown on the attached sketch. *The boring was drilled by Clarence Welti Associates, Inc. and sampling was conducted by this firm solely to obtain indications of subsurface conditions as part of a geotechnical exploration program. No services were performed to evaluate subsurface environmental conditions.*

2.0 The **Subject Project** will include a renovation or replacement of the existing residence to be compliant with the current FEMA standards and DEEP requirements for construction within a flood zone. The residence is located within a AE flood zone with a base flood elevation (100 year flood) at Elev.13. There is a VE14 flood zone located within 300±feet of the residence. It appears from the available mapping that the existing grades on the lot are below Elev.6. The DEEP (IWRD) recommends that residential structures be designed to the 500 year base flood level and that the 500 year flood level be calculated by multiplying the 100 year flood level by 1.25. It is assumed that the proposed first floor level will 2 feet above the design flood level or at about Elev.18. There is no delineation of the (LIMWA) limits of moderate wave action in the subject area. The ASCE 24-05 defines a "Coastal High Hazard Area" as "where the still water depth of the base flood above the eroded ground elevation is greater than or equal to 3.8 feet, i.e., sufficient to support a wave heights greater than 3 feet and where conditions are conducive to the formation and propagation of such waves". The site conditions would satisfy the water depth criteria. The determination of whether or not the conditions in the area around the subject site area conducive to wave formation is not within the scope of this study. The IRC requires that structures erected in Coastal High Hazard Areas shall be supported on pilings or columns, that the pilings shall have adequate penetration to resist the combined wave and wind load (lateral and uplift), and that the design of piles shall include consideration of the decreased resistance capacity caused by scour of the soil surrounding the piles. ***Apart from the FEMA, ASCE 24-05 and IRC requirements for construction in flood zones, the***

soils cross section at the subject residence will require that it be placed on a pile or helical pier supported foundation.

3.0 The **Soils Cross Section** from the boring is generally as follows:

Crushed Stone to 1.5"

FILL; fine to fine to coarse SAND, little to some Silt, little Gravel to 4.5 feet, medium compact

PEAT to 6 feet

Organic SILT and fine SAND to 8 feet

Fine to coarse SAND, some Gravel, trace Silt 28 feet, medium compact

Fine to medium SAND, little Silt to 41+ feet, loose to medium compact

3.1 The **Water Table** was at 3.5 feet below the existing grades at the completion of the boring.

4.0 The **Criteria for Foundation Type and Loading** are as follows:

1. The maximum total settlement shall not exceed 1" and the maximum differential settlement shall not exceed ½ the maximum settlement.

2. The foundation may be required address seismic requirements of the building code (if required)

3. The Slab on Grade must not settle differentially more than ½" in excess of the structure subsidence.

The above criteria have been assumed by the writer in developing the recommendations, included herein. More stringent criteria than the above may require supplemental geotechnical input.

4.1 Regarding item 2 (above) the IBC site soil profile classification is **"D".** The mapped MCE spectral acceleration values for Westport, CT are $S_s = 0.293$ for a short period and $S_1 = .066$ for a 1 second period.

5.0 Based on the soils cross section, which included organic soils to about 8 feet, and the high water table, the foundation for a new or reconstructed residence should be with driven piles or helical piers. The design should address compression loading, lateral and uplifts loading from wind and moving waters, and the potential loss of lateral support due to the scour of soils around the piles and grade beam. Based on the height of the structure above the existing grades, it is assumed that the design would include a grade beam with concrete columns extending up to the first floor living space.

5.1 The **driven piles** could be concrete filled pipe piles or timber piles. A static pile capacity analysis

was performed for a pipe pile (PP10-3/4 X 0.365 wall with closed end) and a timber pile (14" diameter Class A timber piles with tips at least 9" in diameter). That analyses indicated the pipe piles would achieve an ultimate capacity of 30Tons at about 50 feet below the existing grades and the timber piles would achieve an ultimate capacity of 30 Tons at about 35 feet. The allowable design loading should be no more than ½ the ultimate capacity.

5.1.1 The helical piles could achieve an ultimate compressive capacity of 20 Tons/pile within a length of 40 feet. The actual load would be determined by the installation torque requirements and possible settlements. The helical piles should also be evaluated for buckling and lateral resistance.

5.2 The allowable lateral loading on a vertical driven pile can be 1 kips/pile. Additional lateral resistance could be provided with battered piles. A more detailed analysis of the pile response with lateral loading can be done with the L PILE program when the loads at the pile head have been determined.

5.3 **Summary of Foundation Design Parameters**:

Parameter	Value
Allowable Axial Compression Load PP10-3/4 Concrete filled pipe or Timber Pile (Class A - minimum 14" diameter butt and 9" tip)	15 Tons/pile
Allowable Tension Load	7.5 Tons/pile
Allowable lateral load on PP10 pipe pile with free head	1 kips/pile
Soil Unit Weight (Backfill) *	125 pcf
Internal Friction Angle (Backfill) *	34°
Seismic Soil Profile Site Classification	D
Mapped MCE Spectral Response Acceleration for one second period, S_1	0.062
Mapped MCE Spectral Response Acceleration for short period, S_S	0.253

* Backfill material conforming to section 6.0 below

6.0 Regarding **Backfill of Excavations for Grade Beams and Pile Caps, and Fill Beneath the Slabs on Grade** the material shall conform generally to the following gradation or be 3/8" crushed stone.

Percent Passing	Sieve Size
100	3.5"
50 - 100	3/4"
25 - 80	No.4

The fraction, passing the No.4 sieve shall have less than 15%, passing the No. 200 sieve.

All backfill and fill must be compacted to at least 95% of modified optimum density.

Where filling below water or over a wet sub grade the fill should be with the 3/8" crushed stone. The crushed stone should be carried to at least 6" above the water table. The crushed stone does not require compaction testing.

7.0 Regarding **Earthwork** the soils are in OSHA Class C and all excavations deeper than 5 feet, which are not shored, must be cut back to slopes less than 34°.

8.0 This report has been prepared for specific application to the subject project in accordance with generally accepted soil and foundation engineering practices. No other warranty, express or implied, is made. In the event that any changes in the nature, design and location of structures are planned, the conclusions and recommendations contained in this report should not be considered valid unless the changes are reviewed and conclusions of this report modified or verified in writing.

The analyses and recommendations submitted in this report are based in part upon data obtained from referenced explorations. The extent of variations between explorations may not become evident until construction. If variations then appear evident, it will be necessary to re-evaluate the recommendations of this report.

Dr. Clarence Welti, P.E., P.C., should perform a general review of the final design and specifications in order that geotechnical design recommendations may be properly interpreted and implemented as they were intended.

Based on the deductible for owner occupied residences in our error and omissions policy, our liability for errors and omissions to such owners or their agents would be $10,000. The full policy limits will apply to Diversified Technology Consultants and the State of Connecticut.

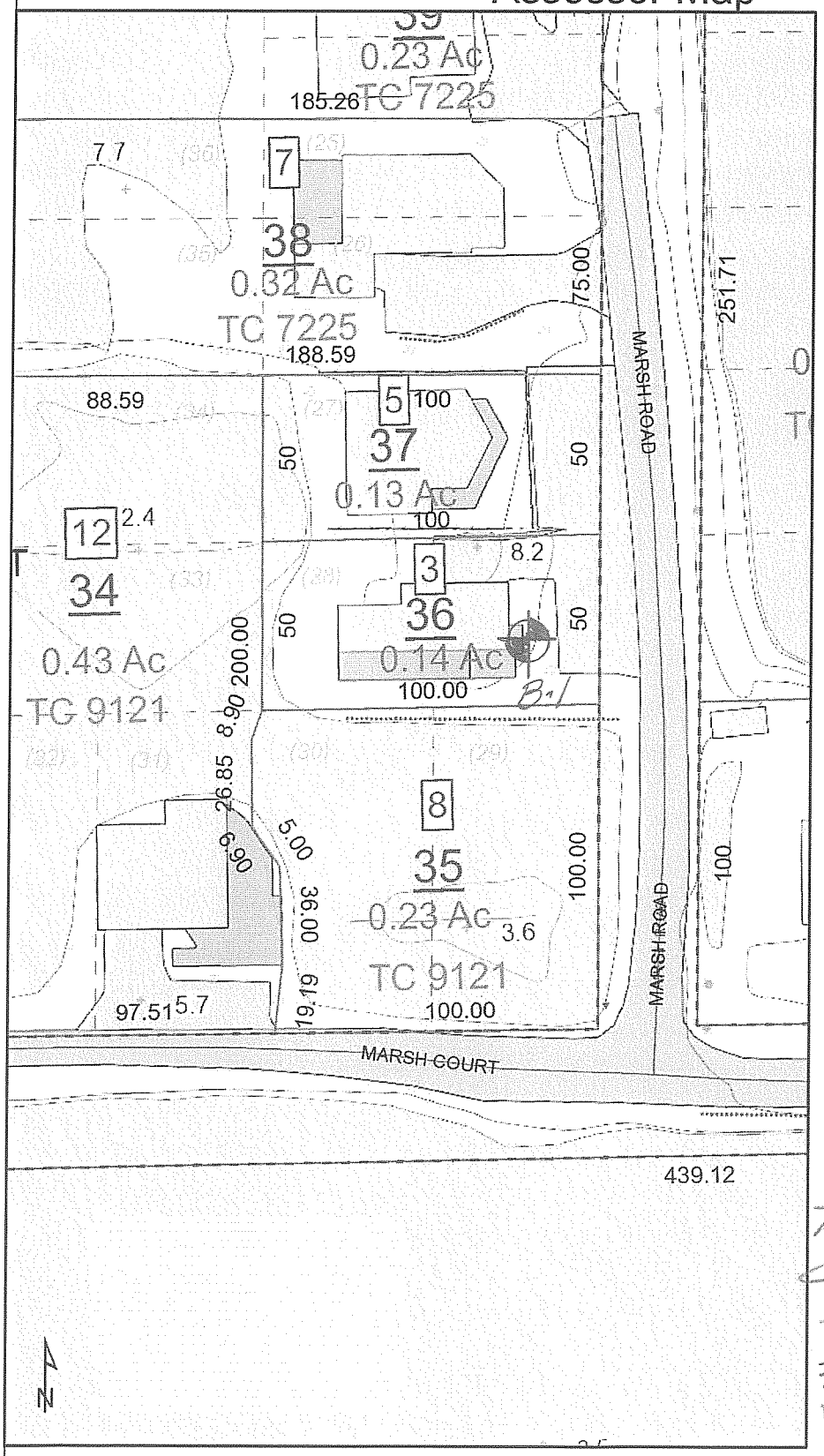
If you have any questions please call me.

Very truly yours,

Max Welti, P.E.

Clarence Welti Ph.D., P. E.
President, Dr. Clarence Welti P.E.; P.C.

Assessor Map



Westport CT Web GIS Map Legend

CAM_line
Deleted_Wetland
Amended_Wetland
del_line
Tidal_Wetland
Waterbody_Watercourse
wet_text_line
Wetland
100 Year Flood Zone
500 Year Flood Zone
Floodway in Zone AE
Basins
Spot Elevation
Water Spot Elevation
bulkhead_polylines
landlock_polylines
original_parcel_polylines
Index
Index Depression
Index Obscured
Index Depression Obscured
Intermediate
Intermediate Depression
Intermediate Obscured
Intermediate Depression (Obs)
Tree
Pipe
Outfall
Catchbasin
Manhole
Electrical Box
Hydrant
Light Pole
Utility Pole
Sign
Unknown
Billboard
Pipeline Above Ground
Tower
towline_polyline
Unknown Lines
Culvert
Dam
Ditch
Rip Rap
Elevation Well
Fence
Guardrail
Hedge
Retaining Wall
Stone Wall
Trees
Abandoned Railroad Tracks
Railroad Tracks
Paved Road Centerline
Unpaved Road Centerline
Stream
Coast Line
Easement
Utility Right of Way
Private Right of Way
Proposed Right of Way
Public Right of Way
Parcel
Fuel Tank
Water Tank
Quarry or Pit
Building
Building Construction
Cement Pad
Deck
Foundation
Greenhouse
Mobile Home
Ruins
Silo
Sombrero
Substation
Bridge
Paved Road
Runway
Unpaved Road
Golf Path
Paved Parking
Unpaved Parking
Paved Driveway
Unpaved Driveway
Public Sidewalk
Treeline
Wet Area
Sound, Lake, Pond, or River
Pool
Golf Green
Golf Bunker
Tennis Court
Golf Tee
Wharf, Dock, or Pier
Park
Athletic Field
Golf Course
index_polygon
HYDRIC SOILS
NON-HYDRIC SOILS
WATER
A
AA
AAA
B
BCD
BPD
CPD
DDD4
GBD
GBDIS
HDD
HSD
MHP
OSRD
PRD
RSD
RORD
RPOD

TEST BORING B-1
C. WELTI ASSOCIATES INC.
7/25/14
3 MARSH ROAD
WESTPORT, CT

1 inch = 50 feet

Westport and its mapping contractors assume no legal responsibility for the information contained herein.

CLARENCE WELTI ASSOC., INC. P.O. BOX 397 GLASTONBURY, CONN 06033	CLIENT DTC	PROJECT NAME BURNS RESIDENCE LOCATION 3 MARSH ROAD, WESTPORT, CT.

	AUGER	CASING	SAMPLER	CORE BAR.
TYPE	HSA		SS	
SIZE I.D.	3.75"		1.375"	
HAMMER WT.			140 lbs	
HAMMER FALL			30"	

OFFSET
LINE & STA.
N. COORDINATE
E. COORDINATE

SURFACE ELEV.
HOLE NO. B-1

GROUND WATER OBSERVATIONS
AT 3.5 FT. AFTER 0 HOURS
AT FT. AFTER HOURS

START DATE 7/25/14
FINISH DATE 7/25/14

DEPTH	SAMPLE NO.	BLOWS/6"	DEPTH	A	STRATUM DESCRIPTION + REMARKS		ELEV.
0	1	5-4-5-13	0.00'-2.00'		STONE SURFACE	0.1	
					BR.FINE-CRS.SAND, LITTLE TO SOME SILT & GRAVEL - FILL		
	2	10-5-5-5	2.00'-4.00'				
5					DARK GREY PEAT	4.5	
	3	0-3-6-11	5.00'-7.00'				
					DARK GREY ORGANIC SILT AND FINE SAND	6.0	
	4	5-5-13-15	7.00'-9.00'				
					GREY FINE-CRS. SAND, SOME GRAVEL, TRACE SILT, FEW COBBLES	8.0	
10	5	8-10-12	10.00'-11.50'				
					GREY/BR. FINE-CRS. SAND, SOME GRAVEL, TRACE SILT	13.5	
15	6	3-3-7	15.00'-16.50'				
20	7	5-6-10	20.00'-21.50'				
25	8	6-5-8	25.00'-26.50'				
					BR. FINE-MED. SAND, LITTLE SILT	28.0	
30	9	2-3-4	30.00'-31.50'				
35							

LEGEND: COL. A:

SAMPLE TYPE: D=DRY A=AUGER C=CORE U=UNDISTURBED PISTON S=SPLIT SPOON

PROPORTIONS USED: TRACE=0-10% LITTLE=10-20% SOME=20-35% AND=35-50%

DRILLER: J. BREWER
INSPECTOR:

SHEET 1 OF 2 HOLE NO. B-1

CLARENCE WELTI ASSOC., INC. P.O. BOX 397 GLASTONBURY, CONN 06033	CLIENT DTC	PROJECT NAME BURNS RESIDENCE LOCATION 3 MARSH ROAD, WESTPORT, CT.

DEPTH	SAMPLE NO.	BLOWS/6"	DEPTH	A	STRATUM DESCRIPTION + REMARKS	ELEV.
	10	2-1-3	35.00'-36.50'			
40	11	5-7-8	40.00'-41.50'			
					BOTTOM OF BORING @ 41.5' 41.5	
45						
50						
55						
60						
65						
70						
75						

LEGEND: COL. A:

SAMPLE TYPE: D=DRY A=AUGER C=CORE U=UNDISTURBED PISTON S=SPLIT SPOON

PROPORTIONS USED: TRACE=0-10% LITTLE=10-20% SOME=20-35% AND=35-50%

DRILLER: J. BREWER

INSPECTOR:

SHEET 2 OF 2 | HOLE NO. B-1

SECTION 011000 - SUMMARY

PART 1 - GENERAL

1.1 SCOPE

A. The scope of the work includes all work demolition and new construction as depicted and described in the plans and the specifications.

1.2 SUMMARY

A. Section Includes:

1. Project information.
2. Work covered by Contract Documents.
3. Access to site.
4. Work restrictions.
5. Specification and drawing conventions.
6. Miscellaneous provisions.

1.3 PROJECT INFORMATION

A. Project Identification: Rehabilitation work to Weady Residence, OORR Project Number 1690.

1. Project Location: 3 Marsh Road, Westport, CT.

B. Owner: Mark & Hillary Burns, 3 Marsh Road, Westport, CT.

C. State of Connecticut Department of Housing Representative
1. Owner's Representative: Lillian Ruiz, State of Ct. DOH Contract Administrator.

D. Architect/Engineer: Diversified Technology Consultants, 2123 Whitney Avenue, Suite 301, Hamden, CT 06518.

E. Design Consultants: The following design professionals have been retained by Diversified Technology Consultants and have prepared designated portions of the Contract Documents:
1. Geotechnical Engineering: Clarence Welti Associates
2. Environmental Consultant: Chemscope

F. The Work of Project is defined by the Contract Documents and consists of the following:

1. This project generally includes demolition and replacement of a residential home damaged by Superstorm Sandy. The work entails the following as shown on the plans and specified herein:
   a. Environmental Abatement; Asbestos
   b. Structure Demolition.
   c. Timber Piles
   d. Concrete
   e. New Construction – Wood Framed Single Family Home.
   f. Site Work; Erosion Control, Excavation, Dewatering, Paving, Utility Work, Grading Loam & Seed

1.4 ACCESS TO SITE

A. General: Contractor shall have access to the Project site during the construction period.

1.5 OWNER ACCESS

A. Owner has the right to access the property at any time during construction. Owner shall coordinate with Contractor and shall be accompanied by contractor to ensure safety during access

1.6 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 regarding work hour restrictions.

B. Coastal Jurisdiction Line: Contractor shall not stockpile soils within the Coastal Jurisdiction Line.

C. On-Site Work Hours: Limit work in the existing building to normal business working hours of 7:00 a.m. to 7:00 p.m., Monday through Friday, unless otherwise approved by the engineer. Comply with local work hour regulations. Comply with local construction work hour restrictions.

D. Controlled Substances: Use of tobacco products and other controlled substances on Project site is not permitted.

1.7 SPECIFICATION AND DRAWING CONVENTIONS

A. Specification Content: The Specifications use certain conventions for the style of language and the intended meaning of certain terms, words, and phrases when used in particular situations. These conventions are as follows:

1. Imperative mood and streamlined language are generally used in the Specifications. The words "shall," "shall be," or "shall comply with," depending on the context, are implied where a colon (:) is used within a sentence or phrase.

2. Specification requirements are to be performed by Contractor unless specifically stated otherwise.

B. Provisions of the Contract and Division 01 General Requirements apply to the Work of all Sections in the Specifications and govern all work for the project.

PART 2 - PRODUCTS (Not Used)

PART 3 - EXECUTION (Not Used)

END OF SECTION 011000

SECTION 012100 - ALLOWANCES

PART 1 - GENERAL

1.1 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.
4. Contingency allowances.

1.2 SELECTION AND PURCHASE

A. At the earliest practical date after award of the Contract, advise Engineer 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 Engineer'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 Engineer from the designated supplier.

1.3 ACTION SUBMITTALS

A. Submit proposals for purchase of products or systems included in allowances, in the form specified for Change Orders.

1.4 INFORMATIONAL SUBMITTALS

A. Submit invoices or delivery slips to show actual quantities of materials delivered to the site for use in fulfillment of each allowance.

B. 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.

C. Coordinate and process submittals for allowance items in same manner as for other portions of the Work.

1.5 COORDINATION

A. Coordinate allowance items with other portions of the Work. Furnish templates as required to coordinate installation.

1.6 LUMP-SUM, UNIT-COST, AND QUANTITY ALLOWANCES

A. Allowance shall include cost to Contractor of specific products and materials ordered by Owner or selected by Engineer under allowance and shall include taxes, 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 selected by Engineer under allowance shall be included as part of the Contract Sum and not part of the allowance.

C. Unused Materials: Return unused materials purchased under an allowance to manufacturer or supplier for credit to Owner, after installation has been completed and accepted.

1. If requested by Engineer, retain and prepare unused material for storage by Owner. Deliver unused material to Owner's storage space as directed.

1.7 CONTINGENCY ALLOWANCES

A. Use the contingency allowance only as directed by Engineer for Owner's purposes and only by Change Orders that indicate amounts to be charged to the allowance.

B. Contractor's overhead, profit, and related costs for products and equipment ordered by Owner under the contingency allowance are included in the allowance and are not part of the Contract Sum. These costs include delivery, installation, taxes, insurance, equipment rental, and similar costs.

C. Change Orders authorizing use of funds from the contingency allowance will include Contractor's related costs and reasonable overhead and profit margins.

D. At Project closeout, credit unused amounts remaining in the contingency allowance to Owner by Change Order.

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.

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.

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: Contingency Allowance: Include the sum of $ 10,000 for Unforeseen Conditions

1. This allowance is a contingent allowance and shall be used for unforeseen conditions as may be encountered during the construction and determined necessary by the engineer to complete the work. This allowance shall only be used upon execution of approved change order.
   a. If Unforeseen Conditions are not encountered the allowance value shall be returned to the owner by way of executing a credit change order to the owner for the entire value of the allowance at the conclusion of the project.

END OF SECTION 012100

SECTION 012200 - UNIT PRICES

PART 1 - GENERAL

1.1 SUMMARY

A. Section includes administrative and procedural requirements for unit prices.

1.2 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.

1.3 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.

PART 2 - PRODUCTS (Not Used)

PART 3 - EXECUTION

3.1 SCHEDULE OF UNIT PRICES

A. Unit Price 1:

1. Description:
2. Unit of Measurement:

B. Unit Price No. 2:

1. Description:

2. Unit of Measurement:

C. Unit Price No. 3:

1. Description:
2. Unit of Measure:

END OF SECTION 012200

SECTION 012500 - SUBSTITUTION PROCEDURES

PART 1 - GENERAL

1.1 SUMMARY

A. Section includes administrative and procedural requirements for substitutions.

1.2 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 will offer advantage to Contractor and Owner.

1.3 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 or facsimile of form acceptable to the Engineer.
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 Engineers and owners.
h. Material test reports from a qualified testing agency indicating and interpreting test results for compliance with requirements indicated.

i. Research reports evidencing compliance with building code in effect for Project, from ICC-ES or other recognized agency.
j. 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.
k. Cost information, including a proposal of change, if any, in the Contract Sum.
l. 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.
m. 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. Engineer's Action: If necessary, Engineer will request additional information or documentation for evaluation within seven 7 days of receipt of a request for substitution. Engineer will notify Contractor of acceptance or rejection of proposed substitution within **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 Engineer's Supplemental Instructions for minor changes in the Work.
b. Use product specified if Engineer does not issue a decision on use of a proposed substitution within time allocated.

1.4 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.

1.5 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 **15** days prior to time required for preparation and review of related submittals.

1. Conditions: Engineer will consider Contractor's request for substitution when the following conditions are satisfied. If the following conditions are not satisfied, Engineer 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. Substitution request is fully documented and properly submitted.
c. Requested substitution will not adversely affect Contractor's construction schedule.
d. Requested substitution has received necessary approvals of authorities having jurisdiction.
e. Requested substitution is compatible with other portions of the Work.
f. Requested substitution has been coordinated with other portions of the Work.
g. Requested substitution provides specified warranty.
h. 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.

B. Substitutions for Convenience: Not allowed.

PART 3 - EXECUTION (Not Used)

END OF SECTION 012500

SECTION 012900 - PAYMENT PROCEDURES

PART 1 - GENERAL

1.1 SUMMARY

A. Section includes administrative and procedural requirements necessary to prepare and process Applications for Payment.

1.2 DEFINITIONS

A. Schedule of Values: A statement furnished by Contractor allocating portions of the Contract Sum to various portions of the Work and used as the basis for reviewing Contractor's Applications for Payment.

1.3 SUBMITTAL

A. Schedule of Value: Contractor shall submit a schedule of values for approval of the Engineer within 14 days of notice to proceed.

1.4 SCHEDULE OF VALUE

A. Coordination: Coordinate preparation of the schedule of values with preparation of Contractor's construction schedule.

1. Coordinate line items in the schedule of values with other required administrative forms and schedules, including the following:

    a. Application for Payment forms with continuation sheets.
    b. Submittal schedule.
    c. Items required to be indicated as separate activities in Contractor's construction schedule.

2. Submit the schedule of values to Engineer no later than seven 7 days before the date scheduled for submittal of initial Applications for Payment.

B. Format and Content: Use Project Manual table of contents as a guide to establish line items for the schedule of values. Provide at least one line item for each Specification Section.

1. Identification: Include the following Project identification on the schedule of values:

    a. Project name and location.
    b. Name of Engineer.
    c. Engineer's project number
    d. Contract Number.
    e. Contractor's name and address.
    f. Date of submittal.

2. Arrange schedule of values consistent with format of AIA Document G703, EJCDC Document C-620 or similar form as approved by the Engineer.

3. Provide a breakdown of the Contract Sum in enough detail to facilitate continued evaluation of Applications for Payment and progress reports. Coordinate with Project Manual table of contents. Provide multiple line items for principal subcontract amounts in excess of five(5) percent of the Contract Sum.

    a. Include separate line items under Contractor and principal subcontracts for Project closeout requirements in an amount totaling five percent of the Contract Sum and subcontract amount.

4. Round amounts to nearest whole dollar; total shall equal the Contract Sum.

5. Provide separate line items in the schedule of values for initial cost of materials, for each subsequent stage of completion, and for total installed value of that part of the Work.
6. Allowances: Provide a separate line item in the schedule of values for each allowance. Show line-item value of unit-cost allowances, as a product of the unit cost, multiplied by measured quantity. Use information indicated in the Contract Documents to determine quantities.
7. Each item in the schedule of values and Applications for Payment shall be complete. Include total cost and proportionate share of general overhead and profit for each item.

    a. Temporary facilities and other major cost items that are not direct cost of actual work-in-place shall be shown as a separate line item in the schedule of values.

8. Schedule Updating: Update and resubmit the schedule of values before the next Applications for Payment when Change Orders or Construction Change Directives result in a change in the Contract Sum.

1.5 APPLICATIONS FOR PAYMENT

A. Each Application for Payment following the initial Application for Payment shall be consistent with previous applications and payments as certified by Architect and paid.

B. Payment Application Times: Submit Application for Payment to Architect by the last day of the month. The period covered by each Application for Payment is one month, ending on the last day of the month.

    1. Submit draft copy of Application for Payment seven days prior to due date for review by Architect.

C. Application for Payment Forms: Use AIA Document G702 and AIA Document G703 or EJCDC Document C-620 form or facsimile thereof as may be acceptable to the Engineer for Applications for Payment.

D. Application Preparation: Complete every entry on form. Notarize and execute by a person authorized to sign legal documents on behalf of Contractor. Incomplete applications will be returned without action.

E. Waivers of Mechanic's Lien: With each Application for Payment, submit waivers of mechanic's lien from entities lawfully entitled to file a mechanic's lien arising out of the Contract and related to the Work covered by the payment.

1. Submit partial waivers on each item for amount requested in previous application, after deduction for retainage, on each item.
2. When an application shows completion of an item, submit conditional final or full waivers.
3. Owner reserves the right to designate which entities involved in the Work must submit waivers.
4. Waiver Forms: Submit executed waivers of lien on forms acceptable to Owner.
5. Submit final Application for Payment with or preceded by conditional final waivers from every entity involved with performance of the Work covered by the application who is lawfully entitled to a lien.

F. Initial Application for Payment: Administrative actions and submittals that must precede or coincide with submittal of first Application for Payment include the following:

1. List of subcontractors.
2. Schedule of values.
3. Contractor's construction schedule (preliminary if not final).
4. Products list (preliminary if not final).
5. Schedule of unit prices.
6. Submittal schedule (preliminary if not final).
7. List of Contractor's staff assignments.
8. List of Contractor's principal consultants.
9. Copies of building permits.
10. Copies of authorizations and licenses from authorities having jurisdiction for performance of the Work.
11. Initial progress report.
12. Certificates of insurance and insurance policies.
13. Performance and payment bonds.
14. Data needed to acquire Owner's insurance.

G. Application for Payment at Substantial Completion: After Architect issues the Certificate of Substantial Completion, submit an Application for Payment showing 100 percent completion for portion of the Work claimed as substantially complete.

1. Include documentation supporting claim that the Work is substantially complete and a statement showing an accounting of changes to the Contract Sum.
2. This application shall reflect Certificate(s) of Substantial Completion issued previously for Owner occupancy of designated portions of the Work.

H. Final Payment Application: After completing Project closeout requirements, submit final Application for Payment with releases and supporting documentation not previously submitted and accepted, including, but not limited, to the following:

1. Evidence of completion of Project closeout requirements.
2. Insurance certificates for products and completed operations where required and proof that taxes, fees, and similar obligations were paid.
3. Updated final statement, accounting for final changes to the Contract Sum.
4. AIA Document G706, "Contractor's Affidavit of Payment of Debts and Claims."
5. AIA Document G706A, "Contractor's Affidavit of Release of Liens."
6. AIA Document G707, "Consent of Surety to Final Payment."
7. Evidence that claims have been settled.

8. Final meter readings for utilities, a measured record of stored fuel, and similar data as of date of Substantial Completion or when Owner took possession of and assumed responsibility for corresponding elements of the Work.

PART 2 - PRODUCTS (Not Used)

PART 3 - EXECUTION (Not Used)

END OF SECTION 012900

SECTION 013100 - PROJECT MANAGEMENT AND COORDINATION

PART 1 - GENERAL

1.1 SUMMARY

A. Section includes administrative provisions for coordinating construction operations on Project including, but not limited to, the following:

1. General coordination procedures.
2. Requests for Information (RFIs).
3. Project Web site.
4. Project meetings.

B. Each contractor shall participate in coordination requirements. Certain areas of responsibility are assigned to a specific contractor.

C. Related Requirements:
1. Section 017300 "Execution" for procedures for coordinating general installation and field-engineering services, including establishment of benchmarks and control points.
2. Section 017700 "Closeout Procedures" for coordinating closeout of the Contract.

1.2 DEFINITIONS

A. RFI: Request from Owner, Engineer, or Contractor seeking information required by or clarifications of the Contract Documents.

1.3 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 CSI Form 1.5A. or other form approved by the Engineer. 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.
4. Subcontract Value

B. Key Personnel Names: Within **15** days of starting construction operations, submit a list of key personnel assignments, including superintendent 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.

1.4 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. Coordinate installation of different components to ensure maximum performance and accessibility for required maintenance, service, and repair.
3. Make adequate provisions to accommodate items scheduled for later installation.

B. 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. Pre-installation conferences.
7. Project closeout activities.

C. 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.

1.5 COORDINATION DRAWINGS

A. Coordination Drawings, General: 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.

1.6 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 in a prompt manner to avoid delays in Contractor’s work or work of subcontractors.

1. Engineer will return RFIs submitted to Engineer by other entities controlled by Contractor with no response.

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 Engineer
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 or Software-generated form with substantially the same content as indicated above, acceptable to Engineer submitted with attachments in Adobe Acrobat PDF format.

D. Engineer's Action: Engineer will review each RFI, determine action required, and respond. Allow **seven** working days for Engineer's response for each RFI. RFIs received by Engineer after 1:00 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 Engineer's actions on submittals.
    g. Incomplete RFIs or inaccurately prepared RFIs.

2. Engineer's action may include a request for additional information, in which case Engineer's time for response will date from time of receipt of additional information.
3. Engineer'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.

    a. If Contractor believes the RFI response warrants change in the Contract Time or the Contract Sum, notify Engineer in writing within [**10**] 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 weekly. Use CSI Log Form 13.2B. Include the following:

1. Project name.
2. Name and address of Contractor.

3. Name and address of Engineer.
4. RFI number including RFIs that were returned without action or withdrawn.
5. RFI description.
6. Date the RFI was submitted.
7. Date Engineer's response was received.

F. On receipt of Engineer's action, update the RFI log and immediately distribute the RFI response to affected parties. Review response and notify Engineer within seven days if Contractor disagrees with response.

1.7 PROJECT MEETINGS

A. General: Schedule meetings and conferences at Project site with the Engineer 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 Engineer of scheduled meeting dates and times.
2. Minutes: Engineer will record significant discussions and agreements achieved and distribute to the Owner, DOH, and Contractor. Contractor shall distribute to subcontractors.

B. Preconstruction & Pre-installation Conferences: Schedule a preconstruction conference before starting construction, at a time convenient to Owner and Engineer, but no later than **15** days after execution of the Agreement. Schedule pre-installation conferences prior to the start of work requiring the conference and after submittals have been approved and materials obtained and ready for inspection.
1. Attendees: Authorized representatives of Owner, Engineer, 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.
2. Pre-Construction Conference 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. Designation of key personnel and their duties.
e. Lines of communications.
f. Procedures for processing field decisions and Change Orders.
g. Procedures for RFIs.
h. Procedures for testing and inspecting.
i. Procedures for processing Applications for Payment.
j. Distribution of the Contract Documents.
k. Submittal procedures.
l. Sustainable design requirements.
m. Preparation of record documents.
n. Use of the premises and existing building.
o. Work restrictions.
p. Working hours.
q. Owner's occupancy requirements.
r. Responsibility for temporary facilities and controls.
s. Procedures for moisture and mold control.

t. Procedures for disruptions and shutdowns.
u. Construction waste management and recycling.
v. Parking availability.
w. Office, work, and storage areas.
x. Equipment deliveries and priorities.
y. First aid.
z. Security.
aa. Progress cleaning.

3. 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.

C. Project Closeout Conference: Schedule a project closeout conference, at a time convenient to Owner and Engineer, but no later than 30 days prior to the scheduled date of Substantial Completion.

1. Attendees: Authorized representatives of Owner, Engineer, and their consultants; Contractor and its superintendent; major subcontractors; suppliers; and other concerned parties shall attend the meeting. Participants at the meeting shall be familiar with Project and authorized to conclude matters relating to the Work.
2. Agenda: Discuss items of significance that could affect or delay Project closeout, including the following:

a. Preparation of record documents.
b. Procedures required prior to inspection for Substantial Completion and for final inspection for acceptance.
c. Submittal of written warranties.
d. Requirements for preparing operations and maintenance data.
e. Requirements for delivery of material samples, attic stock, and spare parts.
f. Preparation of Contractor's punch list.
g. Procedures for processing Applications for Payment at Substantial Completion and for final payment.
h. Coordination of separate contracts.
i. Installation of Owner's furniture, fixtures, and equipment.
j. Responsibility for removing temporary facilities and controls.

D. Progress Meetings: Progress meetings will be held biweekly or at other regular intervals as the Engineer determines necessary for the work.

1. Coordinate dates of meetings with preparation of payment requests.
2. Attendees: In addition to representatives of Owner and Engineer, each contractor, subcontractor, supplier, and other concerned entities.
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. Review present and future needs of each entity present, including the following:
1) Schedule
2) Safety
3) Sequence of operations.
4) Status of submittals.
5) Progress cleaning.
6) Quality and work standards.
7) Status of correction of deficient items.
8) Field observations.

9) Status of RFIs.
10) Issues related to progress of the work.
11) Pending changes.
12) Status of Change Orders.
13) Documentation of information for payment requests.

PART 2 - PRODUCTS (Not Used)

PART 3 - EXECUTION (Not Used)

END OF SECTION 013100

SECTION 013300 - 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.

B. Related Requirements:

1. Section 012900 "Payment Procedures" for submitting Applications for Payment and the schedule of values.
2. Section 017839 "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 Engineer'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 Engineer’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. File Transfer Protocol (FTP): Communications protocol that enables transfer of files to and from another computer over a network and that serves as the basis for standard Internet protocols. An FTP site is a portion of a network located outside of network firewalls within which internal and external users are able to access files.

D. 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 Engineer] 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. Description of the Work covered.
    f. Scheduled date for Engineer's final release or approval.
    g. Scheduled date of fabrication.
    h. Scheduled dates for purchasing.
    i. Scheduled dates for installation.
    j. Activity or event number.

1.5 SUBMITTAL ADMINISTRATIVE REQUIREMENTS

A. Preparation: Contractor shall prepare, review, and approve all submittals indicating that the submittal is in conformance with the plans and specifications. Deviations shall be noted on the transmittal as well as clearly identified on the shop drawing document. ALL SELECTIONS SHALL BE CLEARLY MARKED BY THE CONTRACTOR and EACH PRODUCT MUST BE CLEARLY IDENTIFIED FOR ITS INTENDED USE ON THE PROJECT.

B. 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.
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. Engineer reserves the right to withhold action on a submittal requiring coordination with other submittals until related submittals are received.

C. Processing Time: Allow time for submittal review, including time for resubmittals, as follows. Time for review shall commence on Engineer'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 **15** days for initial review of each submittal. Allow additional time if coordination with subsequent submittals is required. Engineer will advise Contractor when a submittal being processed must be delayed for coordination.
2. Resubmittal Review: Allow **15** days for review of each resubmittal.
3. Sequential Review: Where sequential review of submittals by Engineer's consultants, Owner, or other parties is indicated, allow **21** days for initial review of each submittal.

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 Engineer.
4. Transmittal Form for Electronic Submittals: Use electronic form acceptable to Engineer**,** containing the following information:

    a. Project name.
    b. Date.
    c. Name and address of Engineer.
    d. Name of Construction Manager.
    e. Name of Contractor.
    f. Name of firm or entity that prepared submittal.
    g. Names of subcontractor, manufacturer, and supplier.
    h. Category and type of submittal.
    i. Submittal purpose and description.
    j. Specification Section number and title.
    k. Specification paragraph number or drawing designation and generic name for each of multiple items.
    l. Drawing number and detail references, as appropriate.
    m. Location(s) where product is to be installed, as appropriate.
    n. Related physical samples submitted directly.
    o. Indication of full or partial submittal.
    p. Transmittal number**,** numbered consecutively.
    q. Submittal and transmittal distribution record.
    r. Other necessary identification.
    s. Remarks.

E. Options: Identify options requiring selection by Engineer.

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 Engineer 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 Engineer's 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 Engineer'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.

1. Submit electronic submittals via email as PDF electronic files.

   a. Engineer will return annotated file. Annotate and retain one copy of file as an electronic Project record document file.
2. 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. Testing by recognized testing agency.
   f. Application of testing agency labels and seals.
   g. Notation of coordination requirements.
   h. Availability and delivery time information.

4. For equipment, include the following in addition to the above, as applicable:

    a. Wiring diagrams showing factory-installed wiring.
    b. Printed performance curves.
    c. Operational range diagrams.
    d. 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. PDF electronic file.

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 the project plan dimensions.
3. Submit Shop Drawings in the following format:

    a. PDF electronic file.

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.
    e. Specification paragraph number and generic name of each item.

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 **three** full set(s) of available choices where color, pattern, texture, or similar characteristics are required to be selected from manufacturer's product line. Engineer 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** sets of Samples. Engineer 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** sets of paired units that show approximate limits of variations.

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 Engineer.

B. Delegated-Design Services Certification: In addition to Shop Drawings, Product Data, and other required submittals, submit digitally signed PDF electronic file and three 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, 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 Engineer.

B. Project Closeout and Maintenance Material Submittals: See requirements in Section 017700 "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 ENGINEER'S ACTION

A. Submittals: Engineer will review each submittal, make marks to indicate corrections or revisions required, and return it. Engineer will stamp each submittal with an action stamp and will mark stamp appropriately to indicate **action.**

B. Incomplete submittals are unacceptable, will be considered nonresponsive, and will be returned for resubmittal without review.

C. Submittals not required by the Contract Documents may be returned by the Engineer without action.

END OF SECTION 013300

SECTION 014000 - QUALITY REQUIREMENTS

PART 1 - GENERAL

1.1 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 Engineer, Owner, or authorities having jurisdiction are not limited by provisions of this Section.
4. Specific test and inspection requirements are not specified in this Section.

1.2 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 Engineer.

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. Field Quality-Control Testing: Tests and inspections that are performed on-site for installation of the Work and for completed Work.

G. Testing Agency: An entity engaged to perform specific tests, inspections, or both. Testing laboratory shall mean the same as testing agency.

H. 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).

I. 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.

1.3 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 Engineer 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 Engineer for a decision before proceeding.

1.4 INFORMATIONAL SUBMITTALS

A. Permits, Licenses, and Certificates: For Owner's records, submit copies of permits, licenses, certifications, inspection reports, releases, jurisdictional settlements, notices, receipts for fee payments, judgments, correspondence, records, and similar documents, established for compliance with standards and regulations bearing on performance of the Work.

1.5 QUALITY ASSURANCE

A. 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.

B. 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.

C. 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.

D. 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 as directed by Engineer.
2. Notify Engineer **seven** days in advance of dates and times when mockups will be constructed.
3. Obtain Engineer's approval of mockups before starting work, fabrication, or construction. Make formal shop drawing submittal transmittal requesting mock-up inspection. Allow seven days for initial review and each re-review of each mockup
4. Maintain mockups during construction in an undisturbed condition as a standard for judging the completed Work.
5. Demolish and remove mockups when directed unless otherwise indicated.

1.6 QUALITY CONTROL

A. Coordination: Coordinate sequence of activities to accommodate quality-assurance and -control services with to avoid necessity of removing and replacing construction to accommodate testing and inspecting.

1. Schedule times for tests, inspections, obtaining samples, and similar activities.

B. 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 Owner, Engineer, testing agencies, and each party involved in performance of portions of the Work where tests and inspections are required.

1.7 SPECIAL TESTS AND INSPECTIONS

A. Special Tests and Inspections: Owner will engage a qualified testing agency to conduct the following special tests and inspections:
1. Concrete Testing and Inspection
2. Reinforcing Inspection
3. Welding Inspections
4. Compaction Testing
5. Hot Mix Asphalt Pavement Inspection

B. Re-Testing due to Failure to Coordinate the Work or Failed Test shall be paid for by the Contractor.

PART 2 - PRODUCTS (Not Used)

PART 3 - EXECUTION

3.1 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 Section 017300 "Execution."

B. Repair and protection are Contractor's responsibility, regardless of the assignment of responsibility for quality-control services.

END OF SECTION 014000

SECTION 015000 - TEMPORARY FACILITIES AND CONTROLS

PART 1 - GENERAL

1.1 SUMMARY

A. Section includes requirements for temporary utilities, support facilities, and security and protection facilities.

B. Related Requirements:

1. Section 011000 "Summary" for work restrictions and limitations on utility interruptions.
2. Section 312319 "Dewatering" for disposal of ground water at Project site.

1.2 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 Engineer, testing agencies, and authorities having jurisdiction.

B. Water and Sewer Service from Existing System: Contractor shall provide his own water. Contractor shall pay utility bills for water usage while the building is under contractor’s control.

C. Electric Power Service from Existing System: Contractor shall provide his own electricity. Contractor shall pay utility bills while the building is under contractor’s control. Where permanent service has been disconnected, provide and pay for temporary power required for the work.

1.3 INFORMATIONAL SUBMITTALS

A. Moisture-Protection Plan
B. Dust and HVAC Control Plan

1.4 QUALITY ASSURANCE

A. Electric Service: Comply with NECA, NEMA, and UL standards and regulations for temporary electric service. Install service to comply with NFPA 70.

B. Tests and Inspections: Arrange for authorities having jurisdiction to test and inspect each temporary utility before use. Obtain required certifications and permits.

1.5 PROJECT CONDITIONS

A. Temporary Use of Permanent Facilities: Engage Installer of each permanent service to assume responsibility for operation, maintenance, and protection of each permanent service during its use as a construction facility before Owner's acceptance, regardless of previously assigned responsibilities.

B. LIMITED ACCESS TO HOME: Contractor shall install protection to flooring and carpeting and provide at the entry to the home clean “booties” to cover boots prior to entry.

PART 2 - PRODUCTS

2.1 MATERIALS

A. Polyethylene Sheet: Reinforced, fire-resistive sheet, 10-mil (0.25-mm) minimum thickness, with flame-spread rating of 15 or less per ASTM E 84 and passing NFPA 701 Test Method 2.

B. Dust-Control Adhesive-Surface Walk-off Mats: Provide mats minimum 36 by 60 inches (914 by 1624 mm).

C. 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.

2.2 TEMPORARY FACILITIES

A. 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; with class and extinguishing agent as required by locations and classes of fire exposures.

B. HVAC Equipment: 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 and clean HVAC system as required in Section 017700 "Closeout Procedures".

PART 3 - EXECUTION

3.1 INSTALLATION, GENERAL

A. 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.

B. Provide each facility ready for use when needed to avoid delay. Do not remove until facilities are no longer needed or are replaced by authorized use of completed permanent facilities.

3.2 TEMPORARY UTILITY INSTALLATION

A. Water Service: 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.

B. 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. Toilets: Use of Owner's existing toilet facilities will not be permitted.

C. 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. Provide temporary heat to existing home or weatherproof home during unheated periods. This shall include providing environmentally safe antifreeze for all traps that may be subject to damage by freezing. Make any repairs necessary that may occur as a result of failure to protect the existing home.

D. Isolation of Work Areas: Prevent dust, fumes, and odors from entering areas with limited or no construction activities.

1. Prior to commencing work, isolate the HVAC system in area where work is to be performed.
   a. 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.

E. 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.

F. Electric Power Service: Provide electric power service and distribution system of sufficient size, capacity, and power characteristics required for construction operations.

1. Install electric power service overhead unless otherwise indicated.
2. Connect temporary service to Owner's existing power source, as directed by Owner.

G. Lighting: Provide temporary lighting with local switching that provides adequate illumination for construction operations, observations, inspections, and traffic conditions.

1. Install and operate temporary lighting that fulfills security and protection requirements without operating entire system.

3.3 SUPPORT FACILITIES INSTALLATION

A. 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.

B. Waste Disposal Facilities: Provide waste-collection containers in sizes adequate to handle waste from construction operations. Comply with requirements of authorities having jurisdiction. Comply with progress cleaning requirements in Section 017300 "Execution."

C. 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.

D. Temporary Stairs: Until permanent stairs are available, provide temporary stairs where ladders are not adequate.

E. Existing Stair Usage: Use of Owner's existing stairs will be permitted only when work is required related to the stairway. Protect finished material from damage and utilize “booties” to prevent finish material from becoming stained. Clean 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.

F. 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 Section 011000 "Summary."

C. Temporary Erosion and Sedimentation Control: Comply with authorities having jurisdiction, and requirements specified in Section 312000 "Earth Moving."

D. 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.

E. Temporary Partitions: Provide floor-to-ceiling dustproof partitions to limit dust and dirt migration and to separate areas non-construction areas from fumes and dust.

F. Temporary Floor Covering: Provide Temporary Floor Covering over existing flooring where work is to be performed. Protect Existing Flooring from worker traffic, dust, and debris.

1. Provide Boot Covers for Workers if necessary to walk on owners finished floors.

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.

3.6 OPERATION, TERMINATION, AND REMOVAL

A. 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.

B. Termination and Removal: 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. At Substantial Completion, repair, renovate, and clean permanent facilities used during construction period. Comply with final cleaning requirements specified in Section 017700 "Closeout Procedures."

END OF SECTION 015000

SECTION 017300 - EXECUTION

PART 1 - GENERAL

1.1 SUMMARY

A. Section includes general administrative and procedural requirements governing execution of the Work including, but not limited to, the following:

1. Construction layout.
2. Field engineering and surveying.
3. Installation of the Work.
4. Cutting and patching.
5. Coordination of Owner-installed products.
6. Progress cleaning.
7. Starting and adjusting.
8. Protection of installed construction.
9. Flood Contingency Plan

B. Related Requirements:

1. Section 011000 "Summary" for limits on use of Project site.
2. Section 013300 "Submittal Procedures" for submitting surveys.
3. Section 017700 "Closeout Procedures" for submitting final property survey with Project Record Documents, recording of Owner-accepted deviations from indicated lines and levels, and final cleaning.
4. Section 024119 "Selective Demolition" for demolition and removal of selected portions of the building.
5. Section 078400 "Firestopping" for patching penetrations in fire-rated construction.

1.2 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.

1.3 INFORMATIONAL SUBMITTALS

A. Qualification Data: For land surveyor.

B. Certificates: Submit certificate signed by land surveyor certifying that location and elevation of improvements comply with requirements.

C. Flood Contingency Plan: Prior to Commencement of any construction, the contractor will submit to the Project Engineer a written Flood Contingency Plan. The plan will include the following:

1. A description of the means by which the Contractor will remove from within the flood plain, all materials, equipment and personnel prior to a predicted major storm. The contractor is responsible for monitoring local weather conditions and will secure the work site before predicted major storms. A major storm shall be defined as a storm predicted by the N.O.A.A. weather service with warning of flooding, severe thunderstorms, or similarly severe weather conditions or effects.
2. Provisions for notifying workers engaged in work of an impending storm.
3. Provisions for securing work in progress prior to a major storm.
4. No buoyant, hazardous, flammable, explosive, soluble, expansive, or any other materials which could be injurious to human, animal, or plant life in the event of a flood will be stored below the elevation of the 500-year flood at any time. No storage of construction equipment and/or material will occur within the floodplain unless such equipment and/or material is not subject to major flood damage, or is anchored, restrained, or enclosed to prevent it from floating away or is removed prior to flooding. The material storage areas must be identified on the construction plans.

D. Certified Surveys: Submit **two** copies signed by **land surveyor.**

E. Final Property Survey: Submit **2** copies showing the Work performed and record survey data.

1.4 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

   a. Water, moisture, or vapor barriers.
   b. Membranes and flashings.
   c. Exterior curtain-wall construction.
   d. Sprayed fire-resistive material.
   e. Equipment supports.
   f. Piping, ductwork, vessels, and equipment.
   g. Noise- and vibration-control elements and systems.

3. 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.

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 sustainable design requirements.

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 local utility 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. 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 Section 013100 "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. Engage a land surveyor to assist with the lay out the Work using accepted surveying practices to assure Zoning Setback and Variance lines are adhered to and elevation requirements for finished construction is as required by the contract.

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.

3.4 FIELD ENGINEERING

A. 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.

B. Certified Survey: On completion of foundation walls, peirs, major site improvements, and other work requiring field-engineering services, prepare a certified survey showing dimensions, locations, angles, and elevations of construction and sitework. Submit certified as-built conditions of foundation and piers prior to additional work being performed.

C. Final Property Survey: Engage a **land surveyor** to prepare a final property survey showing significant features (real property) for Project. Include on the survey a certification, signed by land surveyor that principal metes, bounds, lines, and levels of Project are accurately positioned as shown on the survey.

1. Show boundary lines Zoning Setback lines, monuments, streets, site improvements and utilities, existing improvements and significant vegetation, adjoining properties, acreage, grade contours, and the distance and bearing from a site corner to a legal point.
2. Recording: At Substantial Completion, have the final property survey recorded by or with authorities having jurisdiction as the official "property survey."
3. Provide Elevation Certificate Signed and Sealed by Surveyor.

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.
4. Maintain minimum headroom clearance of 96 inches in occupied spaces and 90 inches in unoccupied spaces.

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. 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. Excavating and Backfilling: Comply with requirements in applicable Sections where required by cutting and patching operations.
4. 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.
5. Proceed with patching after construction operations requiring cutting are complete.

F. 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.

G. 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 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. 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.

3. 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 Section 015000 "Temporary Facilities and Controls." Section 017419 "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.

3.8 STARTING AND ADJUSTING

A. Start equipment and operating components to confirm proper operation. Remove malfunctioning units, replace with new units, and retest. Adjust equipment for proper operation. Adjust operating components for proper operation without binding. Coordinate Manufacturer's Field Services where specified in equipment specifications.

B. Test each piece of equipment to verify proper operation. Test and adjust controls and safeties. Replace damaged and malfunctioning controls and equipment.

3.9 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 017300

SECTION 017419 - CONSTRUCTION WASTE MANAGEMENT AND DISPOSAL

PART 1 - GENERAL

1.1 PERFORMANCE REQUIREMENTS

A. General: Practice efficient waste management in the use of materials in the course of the Work. Use all reasonable means to divert construction and demolition waste from landfills and incinerators. Facilitate recycling and salvage of materials. Provide separate containers for waste to be landfilled, recycled, or reused.

1.2 INFORMATIONAL SUBMITTALS

A. Waste Management Plan: Submit plan within 30 days of Agreement.

B. Records of Donations & Sales: Indicate receipt and acceptance of salvageable waste donated to individuals and organizations. Indicate whether organization is tax exempt.

C. Recycling and Processing Facility Records: Indicate receipt and acceptance of recyclable waste by recycling and processing facilities licensed to accept them. Include manifests, weight tickets, receipts, and invoices.

1.3 WASTE MANAGEMENT PLAN

A. General: Develop a waste management plan. List each type of waste and indicate waste disposal sites, resource recovery agencies, salvage and donation waste items. Include the following:

1. Waste Identification: Indicate anticipated types of waste.
2. Salvaged Materials for Reuse
3. Salvaged Materials for Sale or Donation. If applicable, list local charitable organizations (such as the Habitat for Humanity) in "Salvaged Materials for Donation" Subparagraph below.
4. Recycled Materials
5. Disposed Materials: Indicate how and where materials will be disposed of. Include name, address, and telephone number of each landfill and incinerator facility.
6. Handling and Transportation Procedures: Include method that will be used for separating recyclable waste including sizes of containers, container labeling, and designated location where materials separation will be performed.

PART 2 - PRODUCTS (Not Used)

PART 3 - EXECUTION

3.1 PLAN IMPLEMENTATION

A. General: Implement approved waste management plan. Provide handling, containers, storage, signage, transportation, and other items as required to implement waste management plan during the entire duration of the Contract.

1. Comply with operation, termination, and removal requirements in Section 015000 "Temporary Facilities and Controls."

3.2 SALVAGING DEMOLITION WASTE

A. Salvaged Items for Reuse in the Work: Salvage items for reuse and handle as follows:

1. Clean salvaged items.
2. Store items in a secure area until installation.
3. Protect items from damage during transport and storage.
4. Install salvaged items to comply with installation requirements for new materials and equipment. Provide connections, supports, and miscellaneous materials necessary to make items functional for use indicated.

3.3 RECYCLING DEMOLITION AND CONSTRUCTION WASTE, GENERAL

A. General: Recycle waste in accordance with local municipality requirements. Incorporate recycling efforts into the waste management plan where possible.

3.4 DISPOSAL OF WASTE

A. General: Except for items or materials to be salvaged, recycled, or otherwise reused, remove waste materials from Project site and legally dispose of them in a landfill or incinerator acceptable to authorities having jurisdiction.

1. Except as otherwise specified, do not allow waste materials that are to be disposed of accumulate on-site.
2. Remove and transport debris in a manner that will prevent spillage on adjacent surfaces and areas.

B. Burning: Do not burn waste materials.

C. Disposal: Remove waste materials from Owner's property and legally dispose of them.

END OF SECTION 017419

SECTION 017700 - CLOSEOUT PROCEDURES

1.1 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. Warranties.
4. Final cleaning.
5. Repair of the Work.

B. Related Requirements:
1. Section 017300 "Execution" for progress cleaning of Project site.
2. Section 017839 "Project Closeout Record Documents" for submitting record Drawings, record Specifications, and record Product Data.

1.2 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.

1.3 CLOSEOUT SUBMITTALS

A. Certificates of Release/ Certificate of Occupancy: From authorities having jurisdiction.
B. Certificate of Insurance: For continuing coverage.
C. Field Report: For pest control inspection.
D. Schedule of Maintenance Material Items: For maintenance material submittal items specified in other Sections.

1.4 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, Certificate of Occupancy: 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 and Individual Technical Specification Sections, including project record documents, operation and maintenance manuals, final completion construction photographic documentation, damage or settlement surveys, property and as-built surveys, elevation certificate, and similar final

record information. Warranties, workmanship bonds, maintenance service agreements, final certifications, and similar documents.

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 Architect's signature for receipt of submittals.

3. Submit test/adjust/balance records.
4. 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. Advise Owner of changeover in heat and other utilities.
6. Terminate and remove temporary facilities from Project site, along with mockups, construction tools, and similar elements.
7. Complete final cleaning requirements, including touchup painting.
8. 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.

1.5 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 according to Section 012900 "Payment Procedures."
2. 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.
3. Certificate of Insurance: Submit evidence of final, continuing insurance coverage complying with insurance requirements.

4. Submit pest-control final inspection report.

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.

1.6 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. Use CSI Form 14.1A.

1.7 SUBMITTAL OF PROJECT WARRANTIES

A. Time of Submittal: Submit written warranties 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. 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 (215-by-280-mm) paper.
2. Identify each binder on the front and spine with the typed or printed title "WARRANTIES," Project name, and name of Contractor.
3. 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.

C. Provide additional copies of each warranty to include in operation and maintenance manuals.

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. 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. Sweep paved areas broom clean. Remove petrochemical spills, stains, and other foreign deposits.
c. Rake grounds that are neither planted nor paved to a smooth, even-textured surface.
d. Remove tools, construction equipment, machinery, and surplus material from Project site.
e. Remove snow and ice to provide safe access to building.
f. 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.
g. Remove debris and surface dust from limited access spaces, including roofs, plenums, shafts, trenches, equipment vaults, manholes, attics, and similar spaces.
h. Sweep concrete floors broom clean in unoccupied spaces.
i. Vacuum carpet and similar soft surfaces, removing debris and excess nap; clean according to manufacturer's recommendations if visible soil or stains remain.
j. 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.
k. Remove labels that are not permanent.
l. Wipe surfaces of mechanical and electrical equipment**,** and similar equipment. Remove excess lubrication, paint and mortar droppings, and other foreign substances.
m. Clean plumbing fixtures to a sanitary condition, free of stains, including stains resulting from water exposure.
n. Replace disposable air filters and clean permanent air filters. Clean exposed surfaces of diffusers, registers, and grills.
o. Clean ducts, blowers, and coils if units were operated without filters during construction or that display contamination with particulate matter on inspection.

1) Clean HVAC system in compliance with NADCA Standard 1992-01. Provide written report on completion of cleaning.

p. Clean light fixtures, lamps, globes, and reflectors to function with full efficiency.
q. Leave Project clean and ready for occupancy.

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 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.

END OF SECTION 017700

SECTION 017839 - PROJECT RECORD DOCUMENTS

PART 1 - GENERAL

1.1 SUMMARY

A. Section includes administrative and procedural requirements for project record documents, including the following:

1. Record Drawings.
2. Record Product Data.
3. Miscellaneous record submittals.

B. Related Requirements:
1. Section 017300 "Execution" for final property survey.
2. Section 017700 "Closeout Procedures" for general closeout procedures.

1.2 CLOSEOUT SUBMITTALS

A. Record Drawings: Comply with the following:

1. Number of Copies: Submit one set of marked-up record prints and an annotated pdf copy for review and approval

B. Record Product Data: Submit one paper copy and an annotated PDF electronic files and directories 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.

C. Miscellaneous Record Submittals: See other Specification Sections for miscellaneous record-keeping requirements and submittals in connection with various construction activities. Submit annotated PDF electronic files and directories of each submittal.

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 to the work.
k. Details not on the original Contract Drawings.
l. Field records for variable and concealed conditions.
m. 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.

2.2 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.

B. Format: Submit record Product Data as annotated PDF electronic file.

1. Include record Product Data directory organized by Specification Section number and title, electronically linked to each item of record Product Data.

2.3 MISCELLANEOUS RECORD SUBMITTALS

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

PART 3 - EXECUTION

3.1 RECORDING AND MAINTENANCE

A. Recording: Maintain one copy of each submittal during the construction period for project record document purposes. Post changes and 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 reference during normal working hours.

END OF SECTION 017839

ASBESTOS ABATEMENT TECHNICAL SPECIFICATIONS

BURNS RESIDENCE

SITE 026 – 3 MARSH ROAD, WESTPORT, CT

APPLICATION #1846

FEBRUARY 2015

Prepared by

Daniel P. Sullivan

Accredited Asbestos Abatement Project Designer,
State of Connecticut, USEPA

Certificate # PD-001-362 Chem Scope Training Division

Licensed Asbestos Consultant, State of Connecticut DPH,
Project Designer License # 000096, Validation # 03-790804

Chem Scope, Inc.
15 Moulthrop St
North Haven CT 06473
(203) 865-5605

STATE OF CONNECTICUT

DEPARTMENT OF PUBLIC HEALTH

PURSUANT TO THE PROVISIONS OF THE GENERAL STATUTES OF CONNECTICUT

THE INDIVIDUAL NAMED BELOW IS CERTIFIED
BY THIS DEPARTMENT AS A

ASBESTOS CONSULTANT-PROJECT DESIGNER

CERTIFICATION NO.
000096

CURRENT THROUGH
04/30/15

VALIDATION NO.
03-790804

DANIEL P. SULLIVAN

SIGNATURE

COMMISSIONER

CERT# PD-001 - 382

CHEMSCOPE TRAINING DIVISION

ASBESTOS PROJECT DESIGNER REFRESHER

8HOUR TRAINING CERTIFICATE

Daniel P. Sullivan

15 Moulthrop Street , North Haven CT

Has attended an 8 hour course on the subject discipline on

02/27/2014 and has passed a written examination.

"The person receiving this certificate has completed the requisite training required for asbestos accreditation as a project designer under TSCA Title II"

Course topics include Background Information on Asbestos, Abatement Construction Projects, Safety System Design Specifications, Personal Protective Equipment, Additional Safety Hazards, Fiber Aerodynamics and Control, Designing Abatement Solutions, Cost Estimating, Specifications, Abatement Drawings, Contract Preparation and Administration, Legal issues, Replacement substitutes, Role of Other Consultants, Occupied Building and Regulations.

Examination Date: 02/27/2014

Expiration Date: 02/27/2015

This training course has been accredited by the State of Connecticut.

Ronald D. Arena or Brian Santos
Training Director Training Manager

Chem Scope, Inc.
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Section 020800 Asbestos Abatement

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PART 1 - BACKGROUND INFORMATION

1.1 REASON FOR THE WORK:

A. The asbestos abatement at this facility is being done to accommodate the planned demolition of the subject structure. The house is scheduled for demolition because of the extent of the storm damage.

1.2 BUILDING DESCRIPTION:

A. The subject building is a single-family, two-story contemporary-style house totaling approximately 1500 sq ft, which was built in 1978 of wood-frame construction. Heat is supplied from a furnace in the mechanical closet off the kitchen. There is a crawlspace under the house. The heat, water and electricity were all on at the time of our inspection.

PART 2 - ASBESTOS SCOPE OF WORK

2.1 BASIC SERVICES:

A. Asbestos work areas are listed in Schedule A.

B. Examine all conditions, as they exist at the work site prior to submitting a bid for the work of this Section. Where amounts or quantities are given these amounts or quantities have been estimated. Contractor shall have no claim as to added work as the result of accepting said estimates. Contractor is required to verify quantities on site and report any discrepancies no later than seven (7) calendar days before the bid due date or to accept the amounts or quantities to be correct as herein stated.

C. Furnish all labor, materials, and services for the removal and disposal of all specified asbestos-containing material (ACM) located at the subject site. The asbestos abatement to be performed will be as needed to support the demolition activities. All work shall be coordinated by the Contractor. If the drawings or specifications should provide a contradiction, the most stringent information or requirement shall apply, as determined by the Engineer. All ACM detected in the path of the demolition must be removed prior to the demolition of the subject building. Except where noted, perform incidental demolition to access materials to be removed where removal is indicated.

D. Contractor shall retain a State of Connecticut licensed Asbestos Abatement Contractor (AAC) to perform the asbestos abatement work of this Section.

E. Engineer shall retain an Industrial Hygiene firm, with a State of Connecticut Licensed Project Monitor (PM) that shall be designated as the authorized representative of the Owner for purposes of monitoring the asbestos abatement work. The level of monitoring shall be at the discretion of the Engineer. The Contractor will regard the PM's direction as authoritative and binding as provided herein, in matters particularly but not limited to approval of work areas, pre-abatement inspections and final completion of the abatement. Final visual inspection will be conducted by a CT DPH Licensed Project Monitor for all abatement work completed. Where needed, air clearance testing and monitoring shall be performed by a CT DPH Licensed Project Monitor. Cooperate with the client and testing laboratory in scheduling and obtaining samples.

F. Any deviation from these specifications requires the written approval and authorization from the Owner and the Engineer.

G. Contractor is responsible for proper disposal of all ACM wastes.

H. Quantities given either in this specification are estimated; The Asbestos Abatement Contractor is responsible for accepting the quantities or measuring them to his satisfaction. The Asbestos Abatement Contractor shall have no claim as to added work as the result of accepting said measurements or other stated conditions. The Asbestos Abatement Contractor shall report any discrepancies to the Owner and to the Engineer or accept the amounts or quantities to be correct as herein stated.

2.1 BASIC SERVICES (cont):

I. Refer to drawings appended where work locations are shown schematically.

J. In the event of disagreement between drawings and the specification, the specification shall take precedence.

K. The Work of this Project Design is to be done in accordance with applicable regulations and these specifications. Where this design and regulations disagree, the strictest requirements shall be observed.

2.2 DETAILED SCOPE OF WORK:

A. The AAC shall refer to the Asbestos Pre-Demolition Inspection Report in Appendix A of these Specifications and the instructions to follow.

B. This Section specifies the requirements for the removal of ACM at the Work Site. The Work includes, but may not be limited to, removal and disposal of the following ACM from the subject site, including all selective demolition and dismantling needed to perform the work, as delineated in Schedule A. The quantities of ACM in Schedule A are approximate.

C. Remove Asbestos Containing Materials (ACM) as delineated in Schedule A. The quantities (if given) of ACM in Schedule A are approximate. In all cases before abatement, review the General Contractor's latest plans before doing any demolition to insure that materials to remain are not demolished.

D. Remove all interior and exterior ACM prior to demolition

1. Interior:
   a. Remove all (approximately 320 square feet) ACM linoleum flooring with gray fibrous backing and adhesive down to bare wood floor or wood sub-floor. All abatement work must pass CT DPH "no visible residue" criteria. The Work is shown in Schedule A. The area is shown schematically in the attached drawings.

E. **For removal of the exterior ACM transite panels:** If the contractor is able to remove the ACM transite panels (by removing the entire panel intact) then the removal does not constitute asbestos abatement as defined by Section 19a-332 of the Connecticut General Statutes. In this case, the ACM must be undamaged and non-friable and remain undamaged and non-friable during the removal. (See enclosed CT-DPH Circular Letter #2003-10). If it is determined that the ACM transite panel will not be removed intact, then the abatement work must be done by a licensed asbestos abatement contractor using proper procedures and practices. In either case, the ACM must be disposed of in an EPA Approved Landfill for asbestos.

F. Remove all ACM flashing as delineated in Schedule A.

2.3 SCHEDULE A:

MATERIAL	*LOCATION*	*~FOOTAGE*
INTERIOR:		
Brown hard linoleum flooring with black sticky mastic (under blue fibrous wood and linoleum flooring with brown fibrous backing, on wood*)	1-4 Kitchen+Closets	190 sq ft
	1-5 Back Hall+2Closets	40 sq ft
	Total	230 sq ft
EXTERIOR:		
Hard gray fibrous ACM "transite" siding shingles (walls to crawlspace, nailed to wood)	Sides A, B,C and D	450 sq ft
Black sticky ACM roof flashing tar (at Chimney Penetration)	Porch Roof	< 3 sq ft

END 2.3 SCHEDULE A

PART 3 - ADDITIONAL DETAILS OF EXECUTION OF WORK

3.1 GENERAL INSTRUCTIONS:

Work will be executed according to the preceding instructions in the general section of this Specification except as modified by instructions under this section as follows:

A. The use of combustion engine driven equipment inside the building is prohibited, unless used with additional engineering controls such as a catalytic converter and carbon monoxide monitoring. Any needed carbon monoxide monitoring shall be provided by the Asbestos Abatement Contractor.

B. The subject house's supply water at taps may be turned off prior to the work, if so the General Contractor will provide an adequate water supply for the work.

C. The General Contractor will be responsible for providing temporary power as needed at reasonable locations.

D. Any temporary lighting will be supplied by the Asbestos Abatement Contractor. Fixtures should be floor-mounted or otherwise strategically located so that they are out of the way of the work and provide adequate lighting in accordance with OSHA requirements.

E. Movable objects including furniture (tables, chairs, oven and refrigerator) and stored material will be removed from the work areas by others before the work.

F. See schematic drawings appended. In the event of disagreement between drawings and the specification, the specification shall take precedence.

G. Exhaust all negative air units to the outside via the windows or doors. Install all negative air inlets at the furthest points from the doorway in the work area to provide maximum cross airflow. Details will be coordinated with the PM on site.

H. Perform related work to access the asbestos materials to be removed including any necessary demolition.

I. Asbestos Abatement Contractor is responsible for proper disposal of all wastes.

J. **Final re-occupancy testing is required, if the building is going to be reoccupied after the asbestos removal and strongly recommended by CT-DPH even if the building is not going to be re-occupied such as in the case of building demolition, for removal of greater than three (3) sq. ft or linear ft of ACM. Based on this PCM final air clearances will be run for all interior areas by a CT DPH Licensed Project Monitor.**

PART 4- DIVISION 1 – ASBESTOS ABATEMENT

4.1 REGULATIONS:

A. The Asbestos Abatement Contractor will conform to all applicable Federal State and Local Regulations, including, but not limited to the following principal regulations:
   1. OSHA 29 CFR 1926.1101 (Asbestos);
   2. NESHAP (National Emissions Standards for Hazardous Air Pollutants) 40 CFR 61 Subpart M. (40 CFR 61.145 and 61.150)
   3. Regulation of Connecticut State of Agencies Sections 19a-332-1 through 19a-332-16 inclusive. (Standards for Asbestos Abatement)
   4. Regulation of Connecticut State of Agencies Sections 20-440-1 through 20-440-9 inclusive. (Licensure and Training Requirements for Asbestos Abatement).
   5. Connecticut DEP Regulations (Section 22a-208(x) and Section 22a-252 of the Connecticut General Statutes). (DEP Applies to Waste Disposal in CT)
   6. Principal related OSHA regulations in 29 CFR:
      a. 1910.134 (Respirators)
      b. 1910.38, 1926.24 and 1926.150-155 (Fire safety and emergency response)
      c. 1926.450 et seq (Ladder and Scaffold safety)
      d. 1926.500 (Fall Protection)
      d. 1926.402 and .416-.417 (Electrical safety)
      e. Additional Regulations re: Protective Clothing and Equipment:
         - 1910.132-3 Protective Clothing
         - 1910.136 Foot protection
         - 1910.137 Electrical protective devices
         - 1910.94 ventilation
         - 1910.119 process safety
         - 1910.134 respirators
         - 1910.preface 179.220-227 PPE program
         - 1910.146 permit required spaces
         - 1910.156 fire brigades
         - 1910.160 fire extinguishers
         - 1910.335 energized plugs and receptacles
         - 1910.1000 air contaminants
         - 1926.28 PPE
         - 1926.501 (Duty to have Fall Protection)
         - 1926.502 (Fall Protection Systems and Practices
         - 1926.503 (Fall Protection Training Requirements)
      f. 1926.22 (Recording and Reporting of Injuries)
      g. 1926.23 (First Aid and Medical Attention)
      h. 1910.141 (Shower and Sanitation requirements)
      i. 1926.59 (Hazard Communication)
   7. CFR 49 parts 171-173 US Dept of Transportation.
   8. U.S. Department of Transportation, Title 49, Parts 172 and 173.
   9. All State, County, Department, Municipal codes and ordinances as applicable.

B. Where applicable State, Federal and Local Regulations differ, the more stringent regulation applies. In the event of disagreement between these specifications and the regulations, the stricter provision shall apply.

4.2 AIR MONITORING

A. General

1. The Engineer will provide a DPH Licensed Project Monitor, (PM) to carry out the Industrial Hygiene and Air Monitoring services, which will include the required post abatement visual inspection and final clearance testing, and may include pre-abatement inspections and during work monitoring.

2. Coordination between the Asbestos Abatement Contractor and PM.
   a. The Asbestos Abatement Contractor will provide the Engineer and the PM with a schedule of work indicating the planned dates and hours of the Asbestos Abatement Contractor's work at the site.
   b. The PM must have Reasonable Notice of any changes in this schedule.
   c. In no case may the Asbestos Abatement Contractor be working at the site at times unknown to the PM.
   d. Reasonable Notice shall be given by the Asbestos Abatement Contractor to the PM indicating when a work area will be ready for final air clearance testing.

B. Post Abatement Testing:

1. After completion of Removal in a Work Area, the Asbestos Abatement Contractor will make the first visual inspection. Following satisfactory completion of the Asbestos Abatement Contractor's visual inspection, the PM will perform a visual inspection to ensure that no visible residue remains.

2. The final air samples will be collected aggressively and analysis conducted by Phase Contrast Microscopy (PCM) as specified in the regulations.

C. Lab Qualifications:

1. Analysis of the air samples by NIOSH 7400 will be made by a AIHA- Laboratory Accreditation Program, LLC, Accredited and a board certified analyst in the AIHA Registry Programs, LLC. The Laboratory must be a State Approved Environmental Laboratory (approved by Connecticut Department of Public Health Laboratory Division) for Asbestos analysis in air and must participate in and be proficient in the NIOSH PAT Program for Asbestos.

2. Air sample analysis by PCM (NIOSH 7400) must be conducted by individuals trained in the National Institute for Occupational Health (NIOSH) course # 582, Sampling and Analysis of Airborne Asbestos Fibers and/or equivalent course.

D. Asbestos Abatement Contractor's Personal Air Samples: Personal air sampling shall be conducted by the Asbestos Abatement Contractor according to 1926.1101. Provide a State of Connecticut DPH (Department of Public Health) licensed Project Monitor for this purpose. Samples will include daily 30-minute excursion limit samples and 8 hour time-weighted average concentration samples. Personal air sampling results must be recorded at the work site within 24 hours and be available for review until the job is complete. Air Monitoring must be supervised by a Licensed Project Monitor.

4.3 NOTIFICATIONS

A. Send written notification as required by state and local regulations prior to beginning any Work on asbestos-containing materials.

1. Connecticut DPH: Contractor will prepare and submit 10-day notification forms required by the State of Connecticut Department of Public Health. Notification 10 calendar days before the project will be sent to:

   Connecticut Dept of Public Health (DPH)
   410 Capitol Ave - MS # 51AIR,
   P.O. Box 340308
   Hartford, CT 06134
   (860) 509-7367

2. Local Fire Department. Send written notification 10 days prior to the start of Work.

4.4 ASBESTOS ABATEMENT CONTRACTOR QUALIFICATIONS AND TECHNICAL SUBMITTALS, PRE-ABATEMENT MEETING

A. The Asbestos Abatement Contractor Shall Submit to the Engineer before Work begins:

1. Copy of Asbestos Abatement license.

2. Copies of supervisor and worker certificates for each employee, to be used for the project including DPH certifications and required training in a State of Connecticut Approved training center: 5 days for supervisors and 4 days for workers. This documentation shall include copies of initial and refresher training to date. For each worker proof of up to date fit testing and medical surveillance required by CFR 29 1926.1101 and 1910.134.

3. Documentation, when rental equipment is to be used, that the owner of the equipment is aware of the intended use of the rented equipment for Asbestos Work.

4. Copies of DPH Notifications including any revised notifications.

5. Copies of any alternate work practice (AWP) requests and DPH replies.

6. Independent third party certification that HEPA vacuums, and Negative Air units conform to ANSI Z9.2-1979 and that they are in reliable working order.

7. Certification that Fire safety requirements have been or will be met.

8. MSDS's: Required OSHA Hazard Communication information and training for any hazardous chemicals at this site according to CFR 29.1926.59. Include a list of all the hazardous chemicals to be brought to the site including amounts to be brought in, the intended use, and Material Safety Data Sheets (MSDS's) for each chemical. This includes all replacement materials to be used which must be certified asbestos- free.

9. Site specific Fall Protection Plan for roof work. Plan must state at least full compliance with OSHA 1926.501, 1926.502 and 1926.503.

C. The Asbestos Abatement Contractor Shall Submit at the conclusion of the job:

1. Daily Employee sign in lists which must have printed and signed names.

2. Log of access to the work area (dive sheets)

3. Daily narrative of the job

4. Personal air sampling records for this job.

5. Submit within at least 30 days of the waste being received at the disposal facility and within at least 40 days of the waste being accepted by the transporter:Waste manifests, original to the Owner and a copy to the Project Monitor. The Waste Shipment Record shall specify the designated number of bags or cubic yards of asbestos waste.

4.5 SITE CONDITION

A. Prior to the Work, contractor shall visit the site and be fully acquainted with present and expected conditions affecting the Work, including but not limited to:

1. Physical condition of the site.

2. Handling and storage of tools, equipment and materials.

3. Access to water, electric power, and other variables.

4. The character and quantity of all surface and subsurface obstacles to be encountered.

4.6 SAFETY AND SECURITY

A. Asbestos Abatement Contractor has responsibility to establish and maintain workplace safety and security in the areas of His Work. The work areas will be locked, on off-hours, when work is not being done.

B. Asbestos Abatement Contractor will maintain at the work site daily logs of activities and the names of all persons entering the site and include with required submittals at the end of the project. The Asbestos Abatement Contractor will allow only authorized personnel into the work area.

4.7 WORKER PROTECTION TO BE PROVIDED

A. Asbestos Abatement Contractor's workers shall be instructed on fire, electrical, and other hazards specific to this job site. Instructions will include spill response, power failure and emergency evacuation procedures. The workers will receive the required OSHA Hazard Communication information and training for any hazardous chemicals brought to this site.

B. All persons entering the Work Area shall wear prescribed protective clothing and respirators until the Final Clearance Tests are successfully completed for the Work Area. Respiratory protection shall meet the requirements of OSHA as described in 29CFR 1910.134 and 1926.1101 for Asbestos.

C. The Asbestos Abatement Contractor will provide appropriate respirators, disposable suits, and other safety equipment at no cost to his employees, for Asbestos and as needed for other physical and health hazards at the work site.

D. Any feasible combination of engineering controls, work practices, and personal protective equipment may be used to reduce personnel exposure to Asbestos and other hazards.

E. The Asbestos Abatement Contractor has responsibility to maintain His Supervisor on site at all times. Duties of the Supervisor shall include:

1. Assessments required by OSHA 1926.1101.
2. Maintaining copies of Regulations including 1926.1101 and 40CFR 61 Subpart M, all records specified in the regulations and a copy of these Specifications on site.
3. Posting signs and guarding the Work Area against unauthorized intrusion and ensuring all persons entering the Work Area are properly certified, trained, and equipped and that each entry is recorded in the site log.
4. Providing workers with safety equipment, except any person will have his own personal, fitted respirator.
5. Ensuring proper decontamination procedures such as proper use of suits and shower are followed without exception and that the shower and other safety equipment are properly functioning.
6. Performing the required Exposure Assessment as delineated herein.

F. Before leaving the Work Area each person shall: vacuum gross contamination from protective clothing, proceed to the Equipment Room and remove all clothing except respirator, and still wearing the respirator proceed naked to the shower and clean the respirator and self using soap and water and rinse self in the shower. Dispose of the wet respirator cartridges in a receptacle for Asbestos waste.

4.7 WORKER PROTECTION TO BE PROVIDED (CONT)

G. Following showering and drying off, each person shall proceed directly to the Clean (change) Room and dress in street clothes at the end of each day's work or before eating or taking a break. Otherwise one may don disposable clothing of a different color or otherwise distinctively different, for use outside the Work Area, than suits used inside the Work Area.

H. Require that workers NOT eat, drink, smoke, chew gum or tobacco or use toilet facilities (either existing or temporary) in the Work Area.

I. The prescribed protective clothing, respirator use and decontamination measures in the Work Area, including all those described in this Specification and prescribed in the Regulations will remain in effect from the moment Asbestos disturbance begins until Final Clearance of the Area.

J. Employers shall make available to employees information on programs to aid workers in cessation of smoking.

K. Employees working in contiguous areas to the Work Area must understand warning signs. Bilingual signs, pictographs or graphics may be required.

4.8 WORK SCHEDULING, SEQUENCE AND AREA RESTORATION

A. The following sequence shall be observed for each work area:

1. Establish the Decon.
2. Establish Critical Barriers and Negative Airflow at the earliest possible time to protect against fiber release during setup.
3. Perform pre-cleaning and containment construction.
4. Perform removal and cleanup.
5. Perform initial visual inspection and notify the PM.
6. Final visual inspection will then be done by the PM.
7. Only after satisfactory final visual inspection from the PM: Shut down Negative Air Units, remove Critical Barriers and Negative Air Units and restore the area to a satisfactory condition.

4.8 WORK SCHEDULING, SEQUENCE AND AREA RESTORATION (CONT)

B. Restoring the work areas

1. Immediately following successful final clearance in each area, the Asbestos Abatement Contractor shall remove his equipment and materials from the completed section.

2. Restore the areas to a clean and orderly condition and where applicable.

3. Clean duct tape and adhesive from surfaces where used to construct containment.

4. A post abatement walkthrough will be conducted by the PM and the Asbestos Abatement Contractor after the above steps to make sure that the area is clean and in good condition.

4.9 FIRE PROTECTION AND FIRE PREVENTION

A. Notify the local Fire Department in advance of any work performed. Notifications shall be prior to storage or installation of the Asbestos Abatement Contractor's materials on the Owner's property.

B. Fire Protection:

1. Adequate temporary fire protection shall be provided. Fire fighting equipment shall be conspicuously located and readily accessible at all times, and be maintained in operating condition.

2. Smoking
   a. Smoking shall be prohibited in work areas and in the vicinity of hazardous operations or materials.
   b. Where smoking is allowed, it shall be so noted, and safe receptacles shall be provided for smoking materials.

4.10 NEIGHBORHOOD CONSIDERATIONS

A. Work will be conducted so as to avoid disturbing the neighborhood. Asbestos Abatement Contractor will coordinate with the PM suitable locations for Negative Air and Decons, egresses, and waste storage facilities.

B. After the Asbestos waste container is deployed, it will remain locked unless in immediate use. The Supervisor will maintain control of the key.

C. Littering of the area is prohibited. Asbestos Abatement Contractor will provide suitable receptacles for beverage and food containers and all other such litter and ensure that no litter is generated on the premises.

4.11 MATERIALS

A. Deliver all materials in the original container, packages with original manufacturer's labels.

B. Damaged or deteriorated materials shall not be used and shall be removed from the premises. Material that becomes contaminated with Asbestos shall be decontaminated or disposed of as Asbestos waste.

C. Use plastic sheet of 6-mil thickness for walls and for floors. Use sizes to minimize the number of seams.

D. Polyethylene bags shall be 6-mil and of sufficient size for the application.

E. When tie wraps of plastic are used to secure waste bags, they must be at least five inches long, pointed, and looped.

F. Tape will be used that is capable of sealing joints in adjacent plastic sheets and for attachment of plastic sheet to finished or unfinished surfaces of dissimilar materials and capable of adhering under the anticipated load and amended water usage.

G. Surfactant (wetting agent) shall consist of 50% polyoxethylene ether and 50% polyoxyethylene ester at a concentration of one ounce to 5 gal of water or as directed by manufacturer.

H. Use only Asbestos-free replacement materials and according to applicable fire or building codes. Replacement materials must provide equivalent or better performance than the original Asbestos materials.

I. Signs to be posted at the Work Area shall be in sufficient quantity to post at all entries to Work Areas. Signs will comply with OSHA 1926.1101.

4.12 TOOLS AND EQUIPMENT

A. The Asbestos Abatement Contractor will have available spray equipment capable of mixing wetting agent with water and generating sufficient pressure and volume and having sufficient hose length to reach all areas with Asbestos.

B. Impermeable containers are to be used to receive and retain any Asbestos-containing or contaminated materials until disposal at an acceptable disposal site. Containers shall be labeled in accordance with OSHA 1926.1101 and shall be both water and airtight.

C. The Asbestos Abatement Contractor shall have sufficient personal Air Monitoring equipment to monitor each type of activity in each Work Area.

D. The Asbestos Abatement Contractor shall provide suitable tools for Asbestos Removal.

E. Asbestos Abatement Contractor shall have sufficient quantity of equipment and materials necessary for the job including protective clothing, filter cartridges, spare fitted masks for each worker, plastic sheeting, duct tape, air filters, air sample cassettes, signs, grounded power cables, GFCI units, HEPA vacuums, Negative Air Units and spare filters, ladders, sufficient Negative Air Exhaust duct to discharge filtered air outside, shower units, Decontamination Enclosures, water filtration units and all other equipment required by Regulations and by this Specification.

F. Negative Air Units shall be provided by the Asbestos Abatement Contractor to meet HEPA requirement and be of sufficient capacity to maintain a Negative Air pressure of at least 0.02 inches of water in the Enclosure. Airflow shall be sufficient through the Decon areas so any fibers are not able to escape outside the containment. Unit intakes shall be located to draw contaminated air away from the breathing zone of employees in the regulated area and through the HEPA filter. Units shall be equipped with warning lights, alarms, or other devices to sense pressure drop variation to prevent operation when filters are overloaded or ruptured.

4.13 PREPARATION OF THE INTERIOR WORK AREAS

A. Where necessary, shut down the electric power including equipment, receptacles and lighting fixtures. Coordinate any special safety requirements with the Owner, PM and GC, including lock-out/tag-out and isolation of electrical equipment.

B. Provide temporary power, circuits and lighting and ensure safe installation of temporary power sources and equipment per applicable code requirements, regulations and as specified in Section 01500. Provide safety lighting and ground fault interrupter circuits (GFCI) for all power cords and electrical equipment. Only 3 prong grounded cords will be permitted.

C. Asbestos Abatement Contractor will coordinate locations of Decons and Negative Air Unit locations with the PM.

D. **Shut down and isolate any heating, cooling and ventilating air systems to prevent contamination and fiber dispersal to other areas of the house.** Seal any vents within the Work Area. Isolation will be accomplished by sealing airtight using plastic, tape and other means.

4.13 PREPARATION OF THE WORK AREAS (CONT)

E. Except as per a DPH approved alternate work practice (AWP): Establish Critical Barriers: Seal off all openings and any penetrations into the Work Area with plastic sheeting at least 6-mil thick. Do not seal off sprinkler heads, smoke/heat detectors or other such safety equipment. Consult the Owner for advice or instructions on such items. Doorways and corridors, which will not be used for passage during the Work, must be sealed with barriers. Barriers will be constructed with floor and wall plastic overlapping so that no water will escape from the Work Area to the contiguous area.

F. Establish Negative Air HEPA filtered air flow at the first opportunity to produce a minimum of 0.02 inches of water negative pressure in the work area relative to the non-work area and at least 4 air changes/hour unless more stringent requirements are specified in the scope of work. These values must be verified initially and daily and recorded by the Asbestos Abatement Contractor. Use additional air flow where specified herein.

G. Pre-clean movable objects within the proposed Work Area using HEPA vacuums and/or wet cleaning methods as appropriate and remove such objects from Work Areas to a temporary location.

H. Pre-clean fixed objects within the Work Areas using HEPA vacuums and/or Wet Cleaning methods as appropriate and enclose with a minimum of 4-mil plastic sheeting and tape.

I. Clean the Work Area surfaces using HEPA vacuums and/or Wet Cleaning methods.

J. Containment construction- Except as per a DPH approved alternate work practice (AWP): Cover all floors surfaces not included in the asbestos abatement work with two layers of 6-mil fire retardant polyethylene sheeting. Cover all walls and other fixed items not included in the asbestos-abatement work with two layers of 4-mil fire retardant polyethylene sheeting. Poly sheeting must conform to the requirements of the National Fire Protection Association Standard 701. Cover floors first so that polyethylene extends at least twelve inches up on walls, then cover walls with polyethylene sheeting to the floor thus overlapping the first layer by at least 12 inches. Stagger seams of the polyethylene. The containment must be air and watertight. Provide Airlocks at entrances to and exits from the Work Areas.

K. Maintain emergency exits including fire exits satisfactory to fire officials.

L. Any ceiling protrusions, ceiling panels, porous surfaces, or irregularities which may become contaminated, interfere with the Work or permit contamination beyond the confines of the Work Area must be managed to prevent contamination or release of fibers.

M. Any barriers constructed and structural members of Decon units using framing must conform to applicable building codes. This construction must be sufficiently sturdy to resist breaching or collapsing under active work conditions. Portable or prefabricated structures with comparable strength and effectiveness may be used.

N. In all cases, access between contaminated and uncontaminated areas must be through an Airlock. In all cases, access between any 2 rooms within the Enclosure System shall be through a Curtained Doorway.

4.14 PREPARATION OF THE DECONTAMINATION ENCLOSURE SYSTEM (DECON)

A. In general, the Decon unit will conform to drawings appended, and consist of 3 totally enclosed chambers contiguous to the Work Area plus a provision for managing dirty equipment as delineated below and in Section 19a-332a-6:

1. An Equipment Room with two (2) curtained doorways; one to the Work Area and one to the Airlock.

2. A Shower Room with two curtained doorways; one to each Airlock. Plastic on Shower Room and adjoining Equipment and Clean Rooms shall be non-transparent. Showers with hot and cold water shall be provided and used at all Asbestos Removal operations. Careful attention shall be paid to the shower construction to prevent leakage of any kind. The shower will be supplied with soap, water and towels at all times. Wastes from the shower shall be filtered using best available technology prior to disposal in the drain.

3. A Clean Room with one Curtained Doorway into the Airlock and one entrance or exit to non-contaminated areas of the building. The Clean Room shall have sufficient lockers for storage of the workers street clothes, towels and other non-contaminated items. Joint use of this space for other functions such as offices, extraneous equipment, materials or tools shall be prohibited.

4. Equipment Decontamination Enclosure: Provide or construct an Equipment Decontamination enclosure consisting of two (2) totally enclosed chambers including: a) a Washroom consisting of an Airlock with a Curtained Doorway to a designated staging area of the Work Area and a Curtained Doorway to the Holding Area. b) A Holding Area constituting an Airlock with a Curtained Doorway to the Washroom and a Curtained Doorway to a designated uncontaminated area.

4.15 SEPARATION OF WORK AREAS FROM OCCUPIED AREAS

A. Work areas shall be separated by means of airtight barriers.

1. Where doors are at the boundary, cover both sides of the door with a double layer of plastic sheet with joints staggered and sealed with tape.

2. Where corridors or other open spaces are to be the boundary, build suitable building code conforming framing and apply 3/8-inch minimum thickness sheathing on work side only unless noted otherwise. Cover both sides of partition with double layer of plastic sheet with joints staggered and sealed with tape. Edges of partition at floor, walls and ceiling shall be caulked airtight.

4.16 MAINTENANCE OF ENCLOSURE SYSTEMS

A. The Asbestos Abatement Contractor is responsible for maintaining the Enclosure in proper condition to serve the intended purpose and meeting the requirements of the Regulations and these Specifications. The Competent Person will inspect the Enclosure initially and daily:

1. Visual inspection for conformity.

2. Chemical smoke tests and air pressure/ flow measurements. Must have manometric readings of negative pressure of 0.02 inches of water or greater.

4.17 FINAL CHECK LIST BEFORE COMMENCEMENT OF ASBESTOS REMOVAL WORK

A. Arrangements made for disposal of waste at an EPA approved landfill.

B. Work areas and Decon units conform to requirements specified above.

C. Materials, tools and equipment specified including waste receptors are on hand.

D. All worker training has been completed.

E. All submittals have been received and are in proper order.

4.18 ASBESTOS REMOVAL AND CLEANUP

A. Spray Asbestos materials with Amended Water using the airless sprayer to produce a fine spray. Wet Asbestos material freshly before Removal Work in manageably sized sections. Do not let Asbestos materials dry out once disturbed during the Work.

B. Bag the wet Asbestos waste immediately to prevent drying and to prevent possible tracking of Asbestos wastes.

C. Seal filled containers with the wet Asbestos waste in the Work Area. Wet clean the outside of the sealed bag and move to the Holding Area (bagout) for double bagging by workers who have entered from uncontaminated areas dressed in clean disposable suits. Only the double sealed bags and other cleaned materials will exit via the bagout. Persons will leave only via the Decon-shower route.

D. The Asbestos materials must be packaged in impermeable dust tight containers (i.e., heavy-duty six-mil plastic bags or sealed fiber pack drums).

E. All containers must be labeled in large legible letter:

DANGER
CONTAINS ASBESTOS FIBERS
AVOID CREATING DUST
CANCER AND LUNG DISEASE HAZARD

F. Waste shall be tagged or labeled clearly with the name of the generator i.e. the Asbestos Abatement Contractor and the name of the work site in accordance with NESHAP (40 CFR Part 61).

G. After completion of Stripping Work, all surfaces from which Asbestos has been removed shall be wet brushed using a nylon brush, wet wiped and sponged or cleaned by an equivalent method to remove all visible material. During this Work the surfaces shall be kept wet. Wire brushes are not permitted.

H. Remove visible accumulations of Asbestos material and debris. Wet clean all surfaces within the Work Area.

I. Subsequent to the completion of all Asbestos Removal Work, clean all dried surfaces with a HEPA filtered vacuum.

J. Apply a thin coat of Encapsulant to plastic barriers after cleaning.

K. At appropriate times in the cleaning sequence, remove the first layer of plastic facing the Work Area, walls first and then floors. Clean and remove sealed containers and equipment; Change HEPA filters.

4.19 EQUIPMENT REMOVAL PROCEDURES

A. Clean surfaces of contaminated containers and equipment by HEPA vacuuming and wet sponging or wiping before moving them into the Decon for final cleaning.

B. Seal all HEPA vacuums and negative air units with poly and duct tape.

4.20 DISPOSAL

A. The Asbestos Abatement Contractor will dispose of Asbestos wastes according to Applicable Regulations.

B. The Asbestos Abatement Contractor will forward Asbestos Disposal Documentation: the original to the Owner.

C. Impermeable double containers are to be used to receive and retain any Asbestos-containing or contaminated materials until disposal at an acceptable disposal site. Materials shall be adequately wet. Containers shall be labeled in accordance with OSHA 1926.1101 and shall be both water and airtight. All containers must be labeled in large legible letters:

DANGER
CONTAINS ASBESTOS FIBERS
AVOID CREATING DUST
CANCER AND LUNG DISEASE HAZARD

D. After the Asbestos waste container is deployed, it will remain locked unless in immediate use. The job Foreman or designated person will maintain control of the key.

E. All vehicles transporting ACM waste shall be labeled during loading and unloading of the waste as per NESHAP regulations 40 CFR 61.25.

F. All waste will be properly transported off-site at the end of each workday, for the duration of the abatement.

F. Each waste container shall be tagged or labeled clearly with the name of the generator i.e. the Asbestos Abatement Contractor and the name of the work site in accordance with the NESHAP regulations (40 CFR Part 61, subpart M).

G. Each Asbestos waste pickup will be signed for using chain of custody forms provided in the EPA regulations CFR 40 Part 61.

4.21 INITIAL CLEARANCE INSPECTION

A. After cleaning the Work Area, the Asbestos Abatement Contractor will make an initial visual inspection and issue notice to the PM that Work is complete. An inspection by the PM shall then be conducted. If this Inspection finds that the Work is incomplete or that there are visible accumulations of residue, the Asbestos Abatement Contractor shall repeat the cleaning at His expense until the Work Area is in compliance.

B. After successful completion of the above visual inspection, the Asbestos Abatement Contractor shall apply Encapsulant (lockdown) i.e., apply a thin coat of Encapsulant to shall be applied to all surfaces that have been stripped of ACM and to polyethylene barriers.

C. Allow the Work Area to dry at least overnight.

4.22 FINAL CLEARANCE TESTING

A. After surfaces have dried, a final visual inspection by the PM is performed. If this inspection reveals no visible residue, Final Air Sampling shall be carried out.

B. Aggressive air sampling and analysis shall be undertaken by the PM who will select locations of the samples in the Work Area. At least 5 samples shall be taken in each Work Area. Sampling and analysis shall be carried out according to 40 CFR Part 763.

   1. For PCM, NIOSH Method 7400, Air Monitoring volumes shall be sufficient to provide a detection limit of 0.010 fibers/cc. (and preferably 1200 liters). Each of 5 aggressive air samples in the Work Area must have a concentration of 0.010 fibers/cc or less.

C. Work Areas, which fail the visual inspection or Final Air Clearance concentrations specified, shall continue to be cleaned at the Asbestos Abatement Contractor's expense until the specif1ied criteria are achieved. The Asbestos Abatement Contractor will be responsible for the cost of re-testing failed areas and for delays to the project resulting from failure to comply with the Final Air Clearance and inspection criteria.

D. Upon successful Final Air Clearance, mandatory respiratory protection in the Work Area may be waived, the Critical Barriers removed, and the Negative Air and Decontamination Units shut down and removed.

4.23 MULTI-EMPLOYER WORKSITES

A. All employers working on the site must receive the information delineated below. To a large extent, this is accomplished by giving each employer a copy of this specification.

B. Each employer at the site is responsible for ensuring that his employees on site receives this information and makes provisions to protect his employees from asbestos exposure.

C. In addition, following are specific OSHA requirements for certain parties:

1. General Contractor: Responsible for overall supervision. All parties must comply with the supervision of the general contractor on the site. The general contractor must make determinations of whether the Asbestos Abatement Contractor is in compliance with the OSHA asbestos standard cited herein.

2. Asbestos Abatement Contractor:
   a. Must inform other employers at the site of the nature of the work with asbestos, the existence of and the requirements of regulated areas, the measures to be taken to protect employees of the other employers from exposure, any breaches in the containment or enclosure, that these employers must ascertain on a daily basis that the containment or enclosure is secure.
   b. Must inform all the other employers on the site of the location and quantity of ACM and the measures to be taken to protect them from exposure.
   c. Within 10 days of completion of asbestos removal work, the Asbestos Abatement Contractor shall inform the owner and employers who will be working in the area of the quantity and PACM or ACM remaining in the former regulated area and the final visual inspection results.

3. All employers at the site:
   a. Move their employees away from the regulated area until any breaches are corrected or
   b. Provide the same protective equipment as specified herein for the Asbestos Abatement Contractor.
   c. Regardless of who creates any asbestos hazard, the employer of exposed employees is required to comply with applicable protective provisions of 1926.1101 to protect his employees.
   d. Employers who discover the presence of ACM or suspected ACM on the worksite must notify the project or building owner and the other employers.
   e. For inadvertently discovered ACM or PACM there is a 24-hour notification requirement to the owner and all employers at the site.

4. Building and or project owners:
   a. Before asbestos removal or repair work (class I, II or III work) is initiated, must notify their own employees and employers who are bidding on such work, of the quantity and location of ACM or PACM (presumed asbestos containing material) present in such areas.
   b. Owners must also notify their own employees who work in or adjacent to such jobs.
   c. The building owner must keep records of all information received which relates to the presence, location and quantity of ACM and PACM in the owner's building, project or vessel and transfer all such information to successive owners.

(Note: OSHA has defined 'building owner' to include those lessees who control the management and record keeping functions of a building/facility.)

4.24 EXPOSURE ASSESSMENT

A Each employer, who has a workplace where asbestos abatement is conducted, must ensure that a competent person conducts an exposure assessment in accordance with 1926.1101 immediately before or at the initiation of the abatement to ascertain expected exposures.

B. Each Initial Exposure assessment by the Competent Person shall include:

1. Air monitoring historical data
2. Degree and quality of supervision
3. Employee training and experience
4. Techniques used for wetting the ACM or PACM in the various circumstances encountered
5. Placing and repositioning the ventilation equipment, and
6. Impacts due to weather conditions

4.25 PROHIBITIONS

A. High-speed abrasive disc saws to cut ACM or PACM shall not be used unless inside the containment with HEPA filtered negative exhausts as herein specified or unless equipped with local HEPA filtered ventilation to collect contamination from cutting.

B. Compressed air use for cleaning ACM or PACM contaminated surfaces is prohibited unless conducted inside the containment with HEPA filtered negative exhausts as herein specified.

C. Dry shoveling or sweeping or other dry clean-up of dust and debris containing ACM or PACM is prohibited.

D. Employee rotation as a means of reducing employee exposure is prohibited.

E. Sanding ACM or PACM flooring, backing or mastic is prohibited.

4.26 ADDITIONAL INSTRUCTIONS FOR EXTERIOR REMOVAL

A. Air Samples

1. Personal air sampling shall be conducted by the AAC according to CFR 29 1926.1101 to ensure workers are using proper respiratory protection. This monitoring shall be conducted on each shift including 8 hour and excursion sampling as herein specified.

B. Pre-abatement Inspection:

1. Before exterior work may commence, the Work Area functions are checked for conformity with these specifications and the regulations by the Competent Person.

C. Post Abatement Testing

1. Final Air Clearance is not required for exterior removal, visual inspection only.

2. After completion of Removal, the AAC will make the first visual inspection. Following completion of the AAC's visual inspection, the PM will perform a visual inspection to ensure that the work is complete and that no visible residue remains.

D. Personnel Protection

1. AAC's workers shall be instructed and equipped to for protection from fire, electrical, and other hazards peculiar to exterior abatement. The AAC will take appropriate precautions for other non-Asbestos hazards at the site including:

   a) Fall hazards including the roof structural conditions
   b) Electrical and fire safety
   c) Fire prevention and escape
   d) Excessive cold or heat stress for workers
   e) Wind hazards
   f) Proper traction on icy or other slippery surfaces.
   g) Eye and head protection

2. Any feasible combination of engineering controls, work practices, and personal protective equipment may be used to reduce personnel exposure to Asbestos and other hazards.

3. All persons entering the Work Area shall wear prescribed protective clothing and respirators until the Asbestos related work is successfully completed in the Area.

E. Preparation of the Work Areas

1. Establish the area of exterior abatement as a regulated Work Area by means of signs posted at the Work Area perimeter.

4.26 ADDITIONAL INSTRUCTIONS FOR EXTERIOR REMOVAL (CONT)

3. Provide a clean change area equipped so workers can decontaminate their suits and change into street clothes without passing back through the Work area. The location will be coordinated by the Engineer or PM on site. In general, the Clean Change unit will consist of 2 enclosed chambers:

   a) A clean area with one Curtained Doorway into the dirty room and one entrance or exit to non-controlled areas of the roof or building. The clean room shall have sufficient space for storage of the workers street clothes, towels and other non-contaminated items.

   b) A dirty area. Provide or construct an enclosure consisting of a space for HEPA vacuuming and removing contaminated clothing with a Curtained Doorway to a designated staging area of the controlled area.

4. Any equipment constructed including the worker clean change area must be sufficiently sturdy to resist dislodging, breaching or collapsing under wind and active work conditions.

F. Work Practices:

1. AAC shall observe the following work practices as required by OSHA:
   a. Continually mist any cutting blades used.

   b. Keep material intact during removal

   c. Use wet methods. Except if the competent person determines that the specific conditions of a exterior job (eg a steeply sloping roof, or below freezing temperatures combined with the water resulting from any misting, would create a slipping hazard, misting may be omitted, if other precautions are followed, such as equipping the power tool with a HEPA vacuum system, or using hand methods.

   d. Immediately lower unbagged material to a covered receptacle using a dust tight chute, crane or hoist; or immediately wrap material in plastic sheeting and lower it to ground by end of shift.

   e. Loose dust left by sawing is to be HEPA vacuumed immediately.

   f. The entire area below the work will be a regulated area.

   g. If it is a non-friable roofing material, power cutting with misting is allowed if cuts are made to obtain largest feasible pieces.

   h. Only necessary work shall be done below the roof while asbestos materials are being removed and the locations of the work shall be selected to minimize exposure, such as upwind of the asbestos work.

   i. AAC must maintain full personal protection including maintaining the area below the work as a regulated area, clean change areas and appropriate respirators as delineated in this specification.

G. Asbestos Removal and Cleanup

1. Establish a material egress location nearest the Asbestos waste receptacle, which shall be at a location agreed at the pre construction meeting. If Asbestos waste is not packaged at the site of the work, an air tight chute or crane or hoist must be used to transfer the wet material immediately to the lined dumpster or other properly prepared container. The base of any chute used must be enclosed air tight to prevent spillage. If asbestos waste is packaged on the roof, it must be in sealed packages conforming to these specifications and lowered ground and placed in a secure location no later than the end of the work shift.
2. No Asbestos or other litter will be permitted as for example in the vicinity of the waste receptacle.
3. A knife cut and lift followed by cutting should dislodge the ACM without rendering it friable. If power-cutting tools are used, wet misting, HEPA filtered devices or equivalent controls must be used in conjunction with the power cutting tools to prevent any visible emissions.
4. ACM material shall be removed in an intact state to the extent feasible.
5. Use Amended Water to wet Asbestos material freshly before Abatement Work and to maintain wet for disposal.
6. Cutting machines, when used, shall be misted continuously during use unless a competent person determines that misting substantially decreases worker safety.
7. All loose dust left by sawing operations must be HEPA vacuumed immediately.
8. After completion of Stripping Work, all surfaces from which Asbestos has been removed shall be HEPA vacuumed and wet wiped and sponged or cleaned by an equivalent method to remove all visible dust and debris particles.
9. Remove visible accumulations of Asbestos material and debris.
10. Subsequent to the completion of all Asbestos Removal Work, clean all surfaces with a HEPA filtered vacuum.
11. The combination of control measures used must produce no visible dust nor leave visible residue.

H. Final Inspection

1. After cleaning the Work Area, the AAC will make an initial visual inspection and notify the PM that Work is complete. An inspection by the PM shall then be conducted. If the PM finds that the Work is incomplete or that there are visible accumulations of residue, the AAC shall repeat the cleaning at His expense until the Work Area is in compliance.

I. Disposal

1. The AAC will dispose of Asbestos wastes in accordance to procedures delineated above except: Non-friable materials meeting the EPA definition of Category 1 materials which are removed intact may be placed in a bulk Asbestos waste container meeting the following requirements:
   a. The container is labeled and constructed in compliance with applicable OSHA, EPA and DOT regulations and state and local regulations of the States through which the materials is to be transported and/or disposed of and meets the requirements of the EPA approved landfill, which is intended to receive the material.
   b. The container contents are adequately wet.

PART 5 DEFINITIONS:

A. *Abatement:* Procedures to control fiber release from Asbestos-containing materials; includes Removal, Encapsulation, and Enclosure.

B. *Airlock:* A system for permitting ingress and egress while assuring air movement to a contaminated area from an uncontaminated area.

C. *Air Monitoring:* The process of measuring the fiber content of a specific volume of air in a stated period of time.

D. *Licensed Project Monitor (PM):* A DPH Licensed professional capable of conducting air monitoring and analysis schemes. This individual is responsible for recognition of technical deficiencies in worker protection equipment and procedures during both planning and on-site phases of an Abatement project. Monitoring and worker protection. Air sampling shall be in accordance with NIOSH Method 7400 and as described in OSHA standards 29 CFR 1926.1101, or (as applicable for TEM) according to 40 CFR Part 763 Subpart E.

E. *Amended Water:* Water to which a surfactant has been added.

F. *Asbestos:* Asbestos is a name given to a number of naturally occurring fibrous silicates. There are two varieties of Asbestos; the serpentine form (Chrysotile) characterized by long, soft, flexible, and wavy fibers, and the amphiboles which occur as straight, needle-like fibers, and consist of crocidolite, amosite, anthophyllite, tremolite and actinolite.

G. *ACM / Asbestos Containing Material:* A material which contains more than 1% Asbestos per EPA test Method 600/R-93/116.

H. *Category 1 and 2 Asbestos materials:* Non-friable materials as defined in the amended NESHAP regulation 40 CFR 61, 11/20/90.

I. *Class I Asbestos Abatement Work:* Removal of Thermal System Insulation and surfacing removal of ACM or PACM (TSI and Surfacing have the same meaning as in EPA AHERA except drywall is not classed as surfacing but plaster is.

J. *Class II Asbestos Abatement Work:* Removal of ACM or PACM other than TSI and surfacing.

K. *Class III work:* Repair involving disturbance of ACM or PACM.

L. *Class IV work:* Maintenance and custodial work in areas with ACM or PACM such as dusting surfaces, vacuuming carpets, sweeping or mopping asbestos containing floors or floors in areas where ACM or PACM is present; cleaning up ACM or PACM, changing a light bulb or battery in a smoke detector on a surfaced ceiling, polishing floor tile.

M. *Clean Change Area:* An area equipped as specified herein so that workers can decontaminate their suits and change into street clothes without passing back through the regulated area.

N. *Clean Room:* An uncontaminated area or room, which is a part of the Worker Decontamination Enclosure with provisions for storage of worker's street clothes and protective equipment.

O. *Competent Person:* A person experienced in Asbestos Abatement with a current Asbestos Abatement Supervisor's Certificate from an EPA Approved Training Center. In addition, a person meeting the following requirements in 1926.32: "one who is capable of identifying existing and predictable hazards in the surroundings or working conditions which are unsanitary, hazardous, or dangerous to employees, and who has authorization to take prompt corrective measures to eliminate them."

P. *Critical Barrier:* The last layer of plastic sheeting separating Work Areas from non-Work Areas

Q. *Curtained Doorway:* A device to allow passage from one room to another while permitting minimal air movement between the rooms, typically constructed by placing two overlapping sheets of plastic over an existing or temporarily framed doorway, securing each along the top of the doorway, securing the vertical edge of one sheet along one vertical side of the doorway, and securing the vertical edge of the other sheet along the opposite vertical side of the doorway. Two curtained doorways spaced a minimum of six feet apart from an Airlock.

R. *Decontamination Enclosure System (Decon.):* A series of connected rooms, with Curtained Doorways between any two (2) adjacent rooms, for the decontamination of workers and of materials and equipment which is connected to and adjacent to the regulated area. A Decontamination Enclosure System always contains at least one (1) Airlock.

S. *DPH:* Connecticut Department of Public Health

T. *Encapsulant (sealant):* a liquid material which can be applied to Asbestos-Containing Material and which controls the possible release of Asbestos fibers from the material either by creating a membrane over the surface (bridging Encapsulant) or be penetrating into the material and binding its components together (penetrating Encapsulant). Any such Encapsulants shall be in conformance with Building and/or Fire Safety Code requirements.

U. *Engineer:* Diversified Technology Consultants (DTC)

W. *Equipment Decontamination Enclosure:* That portion of a Decontamination Enclosure System (Decon) designed for controlled transfer of materials and equipment, typically consisting of a Washroom and a Holding area.

X. *Encase:* To directly cover pipe insulation with an airtight impermeable cover such as re-moistenable cloth or conduit.

Y. *Equipment Room:* A contaminated area or room, which is part of the Worker Decontamination Enclosure with provisions for storage of contaminated clothing and equipment.

Z. *Fixed Object:* A unit of equipment or furniture in the Work Areas, which cannot be removed from the Work Area.

AA. *Friable Asbestos Material:* An Asbestos material that can be crumbled, pulverized or reduced to powder when dry by hand pressure and which releases Asbestos fibers into the environment.

BB. *HEPA Filter:* A high efficiency particulate air (HEPA) filter in compliance with ANSI Z9.2-1979.

CC. *HEPA Vacuum Equipment:* Vacuum equipment with a HEPA filter system for filtering the air effluent from the unit.

DD. *Holding Area:* A chamber in the Equipment Decontamination Enclosure located between the Washroom and an uncontaminated area. The Holding area comprises an Airlock.

EE. *Mini-Containment:* A fully contained small work area with decontamination unit, negative air that differs only in size from the containments herein specified.

FF. *Movable Object:* A unit of equipment or furniture in the Work Area, which can be removed from the Work Area.

GG. *Negative Air Units or Negative Air Pressure Equipment:* A portable local exhaust system equipped with HEPA filtration used to create negative pressure in a contaminated area (negative with respect to adjacent uncontaminated areas) and capable of maintaining a constant discharge of filtered air outside and creating suction so that air flow direction moves from uncontaminated areas into the Work Areas.

HH. *NESHAP:* National Emission Standards for Hazardous Air Pollutants, including Asbestos, administered by the EPA.

II. *NIOSH:* National Institute for Occupational Safety and Health.

JJ. *Owner:* Burns

KK. *PACM: Presumed Asbestos Containing Material. OSHA definition:* TSI or Surfacing. Note: OSHA also assumes roofing and resilient flooring to contain asbestos but the work practices differ. EPA assumed ACM covers a much broader range of building materials.

LL. *Permissible Exposure Limit (PEL):* OSHA Standard. Eight (8) hour time weighted average (TWA) of 0.1 fibers per cubic centimeter of airborne Asbestos, tremolite, anthophyllite, actinolite, or a combination of these materials as determined by the method prescribed in appendix A to OSHA Regulations 29 CFR 1926.1101, or by an equivalent method.

MM. *Plasticize:* To cover floors and walls with plastic sheeting as herein specified.

NN. *Removal:* All herein specified procedures necessary to remove Asbestos Containing Materials from the designated areas and to transport and dispose of these materials at an acceptable site.

OO. *Shower Room:* A room between the Clean Room and the Equipment Room in the Worker Decontamination Enclosure with hot and cold or warm running water and suitably arranged for complete showering during decontamination. The Shower Room comprises an Airlock between contaminated and clean areas.

PP. *Stripping:* Taking of Asbestos materials from any surface.

QQ. *Surfactant:* A chemical wetting agent added to water to improve penetration.

RR. *Surfacing Material*: Material that is spray applied or troweled on or otherwise applied to surfaces.

SS. *Thermal System Insulation (TSI):* Material applied to pipes, fittings, boilers, breeching, tanks, ducts or other components to prevent heat loss or gain.

TT. *Washroom:* A room between the Work Area and the Holding Area in the Equipment Decontamination Enclosure with provisions for storage of contaminated clothing and equipment.

UU. *Wet Cleaning:* The process of eliminating Asbestos contamination from building surfaces and objects by using cloths, mops, or other cleaning tools which have been dampened with water, and by afterwards disposing of these cleaning items as Asbestos contaminated waste.

VV. *Work Area:* An area where Asbestos Abatement operations are performed, which is isolated by physical boundaries to prevent the spread of Asbestos dust, fibers, or debris; Designated rooms, spaces or areas of the project in which Asbestos Abatement actions are to be undertaken or which may become contaminated as a result of such Abatement actions. A contained Work Area is an area, which has been sealed, plasticized and equipped with a Decontamination Enclosure System.

WW. *Worker Decontamination Enclosure System*: That portion of a Decontamination Enclosure System designated for controlled passage workers and other personnel and authorized persons typically consisting of a Clean Room, a Shower Room and an Equipment Room.

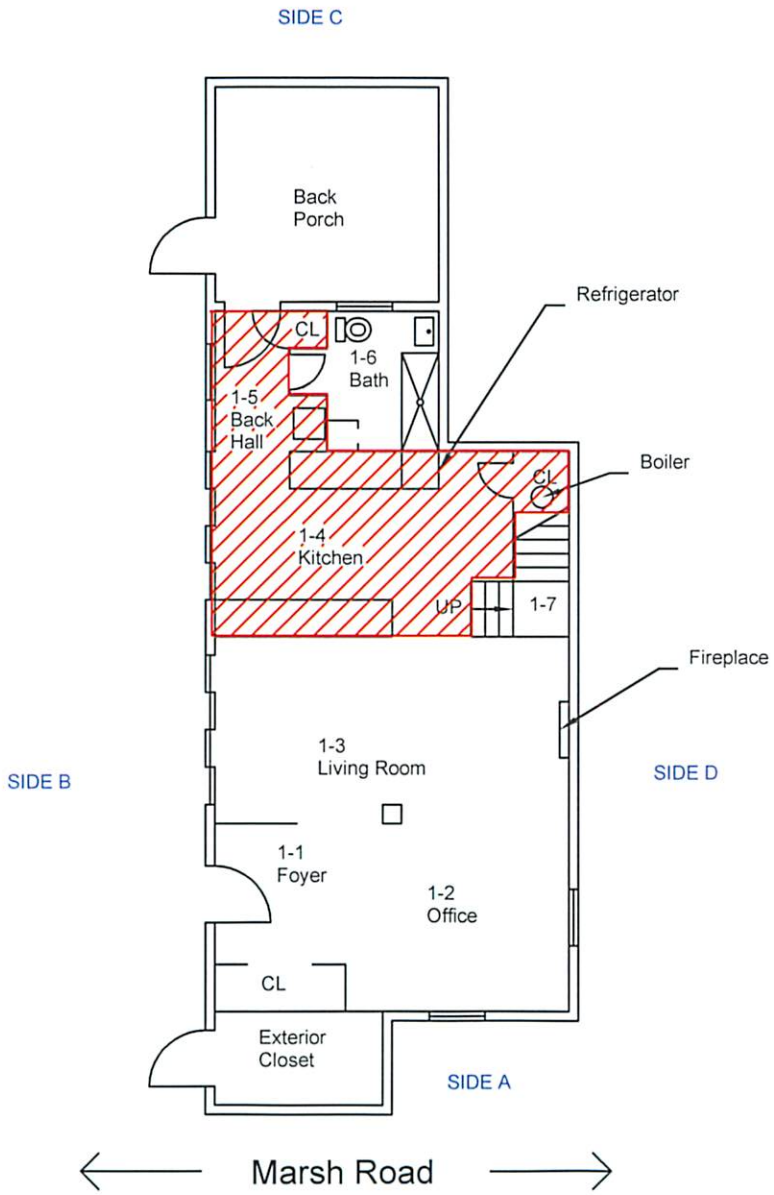
PART 6 - LIST OF DRAWINGS

6.1	DRAWING NUMBER	DESCRIPTION
A.	1ACM	LOCATION OF ACM FLOORING – FIRST FLOOR
	3ACM	LOCATION OF EXTERIOR ACM TRANSITE PANELS
	3RF	LOCATION OF EXTERIOR ACM ROOF FLASHING

B. FOUR (4) DECONTAMINATION SYSTEM CONSTRUCTION.

ChemScope Inc.

Site 026 - Main Level
3 Marsh Road, Westport, CT
CS# 183-481, 7/1/14



LEGEND OF SYMBOLS

Location of ACM flooring in Scope of Inspection

NOTATIONS

See Report for Details

DRAWN BY: LEIGH HONOROF

ChemScope Inc.

SHEET TITLE

ASBESTOS, LEAD & MOLD INSPECTION

3 MARSH RD
WESPORT, CT

MAIN LEVEL

CHEMSCOPE NUMBER: CS# 183-481

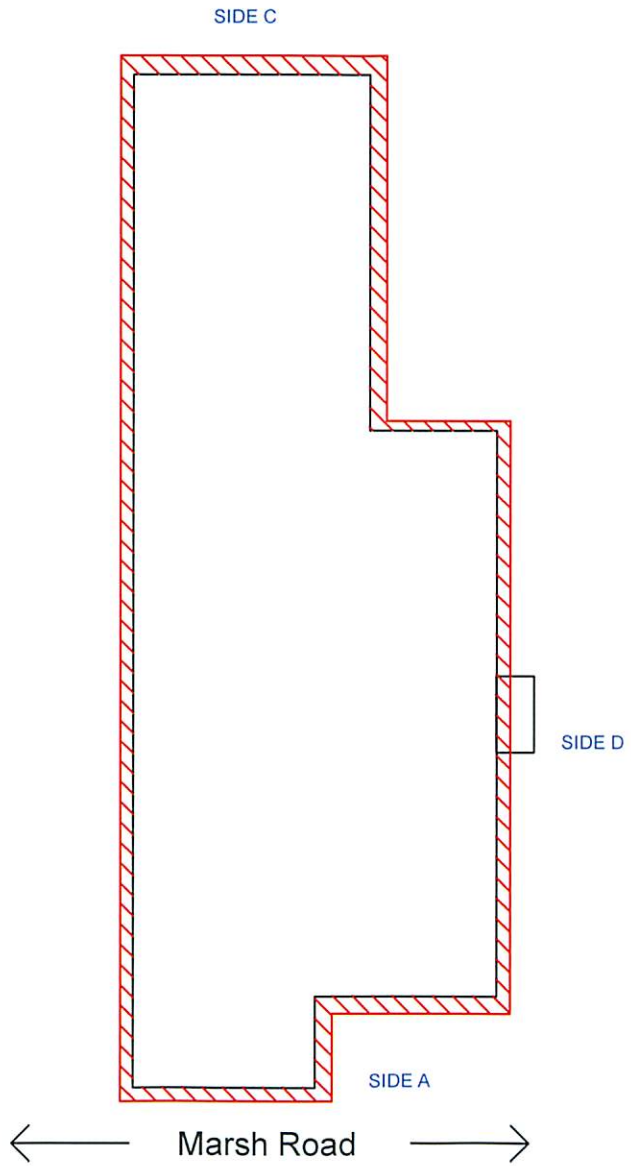
SCALE: NOT TO SCALE

DATE: 07/01/2014

DRAWING NUMBER: 1ACM

ChemScope Inc.

Site 026 - Roof & Exterior
3 Marsh Road, Westport, CT
CS# 183-481, 7/1/14



LEGEND OF SYMBOLS

Location of ACM Transite Panels in Scope of Inspection

NOTATIONS

DRAWN BY: LEIGH HONOROF

ChemScope Inc.

SHEET TITLE

ASBESTOS, LEAD & MOLD INSPECTION

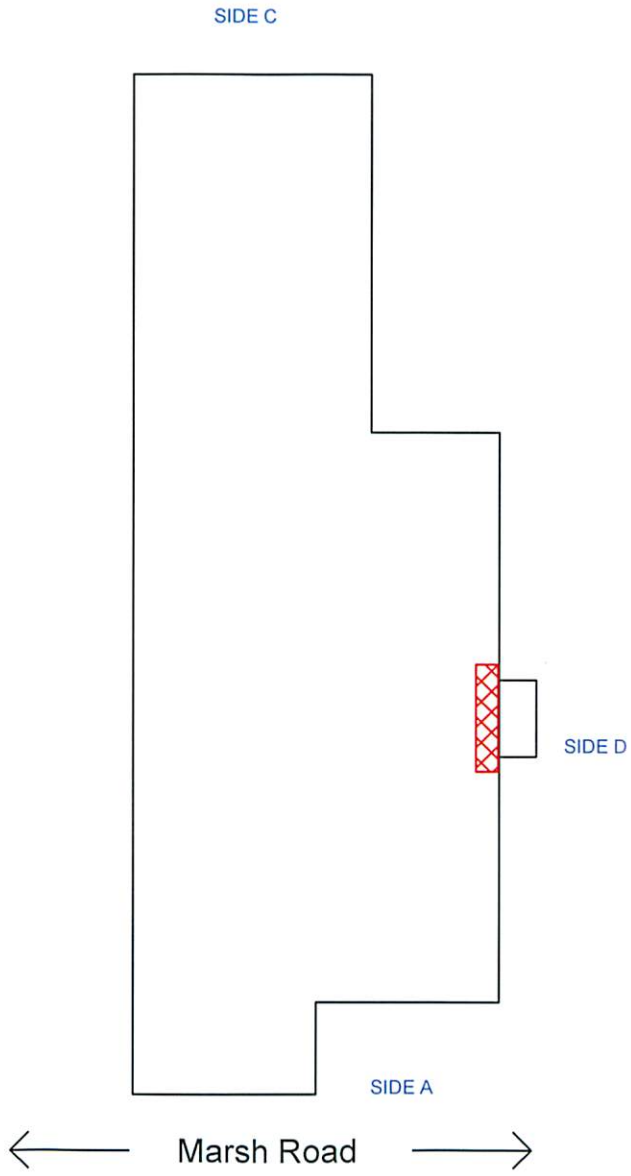
3 MARSH RD
WESPORT, CT

ROOF
& EXTERIOR

CHEMSCOPE NUMBER	DRAWING NUMBER
CS# 183-481	3ACM
SCALE: NOT TO SCALE	
DATE: 07/01/2014	

ChemScope Inc.

Site 026 - Roof & Exterior
3 Marsh Road, Westport, CT
CS# 183-481, 7/1/14



LEGEND OF SYMBOLS

	Location of ACM Roof Flashing In Scope oF Inspection

NOTATIONS

DRAWN BY: LEIGH HONOROF

ChemScope Inc.

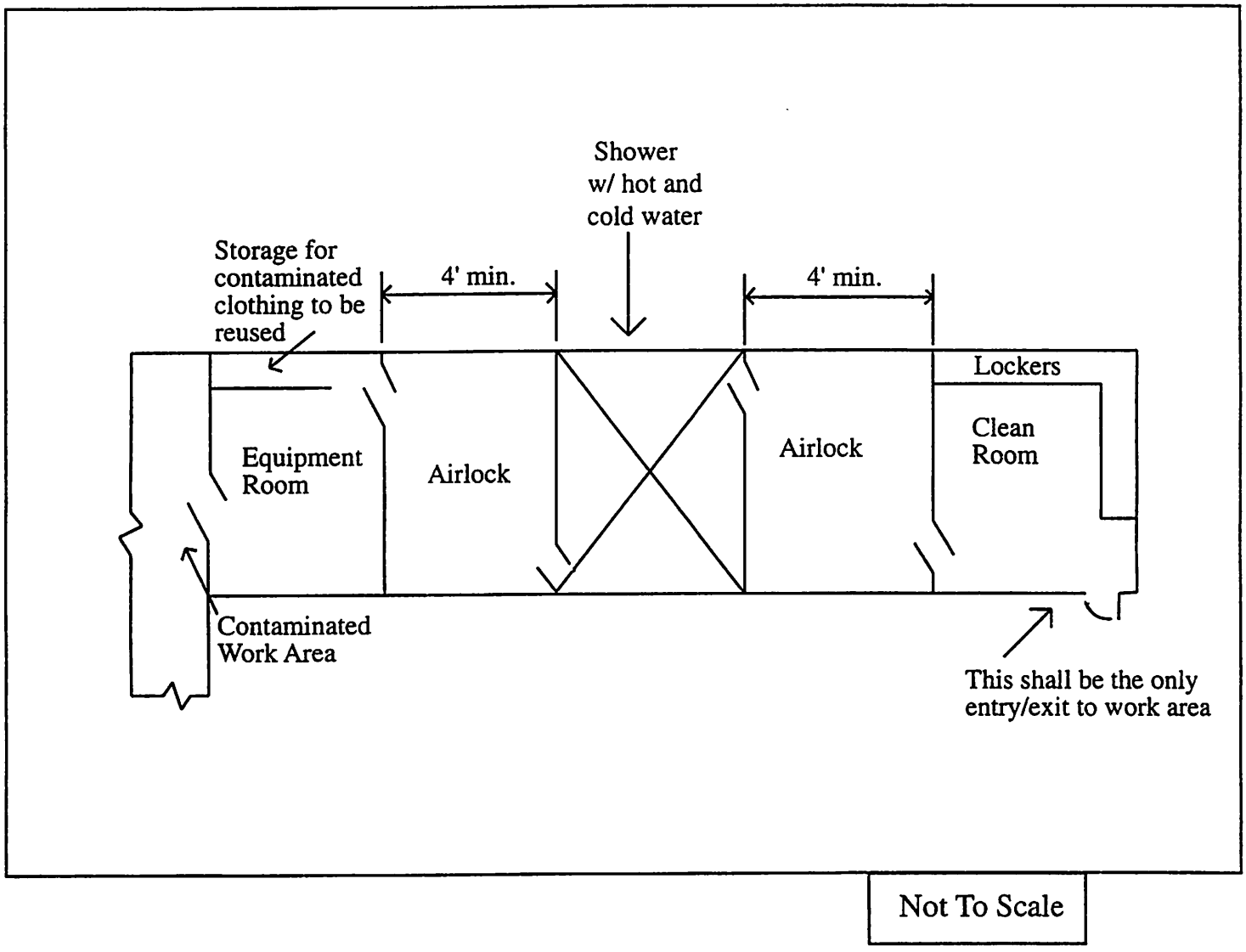
SHEET TITLE

ASBESTOS, LEAD & MOLD INSPECTION

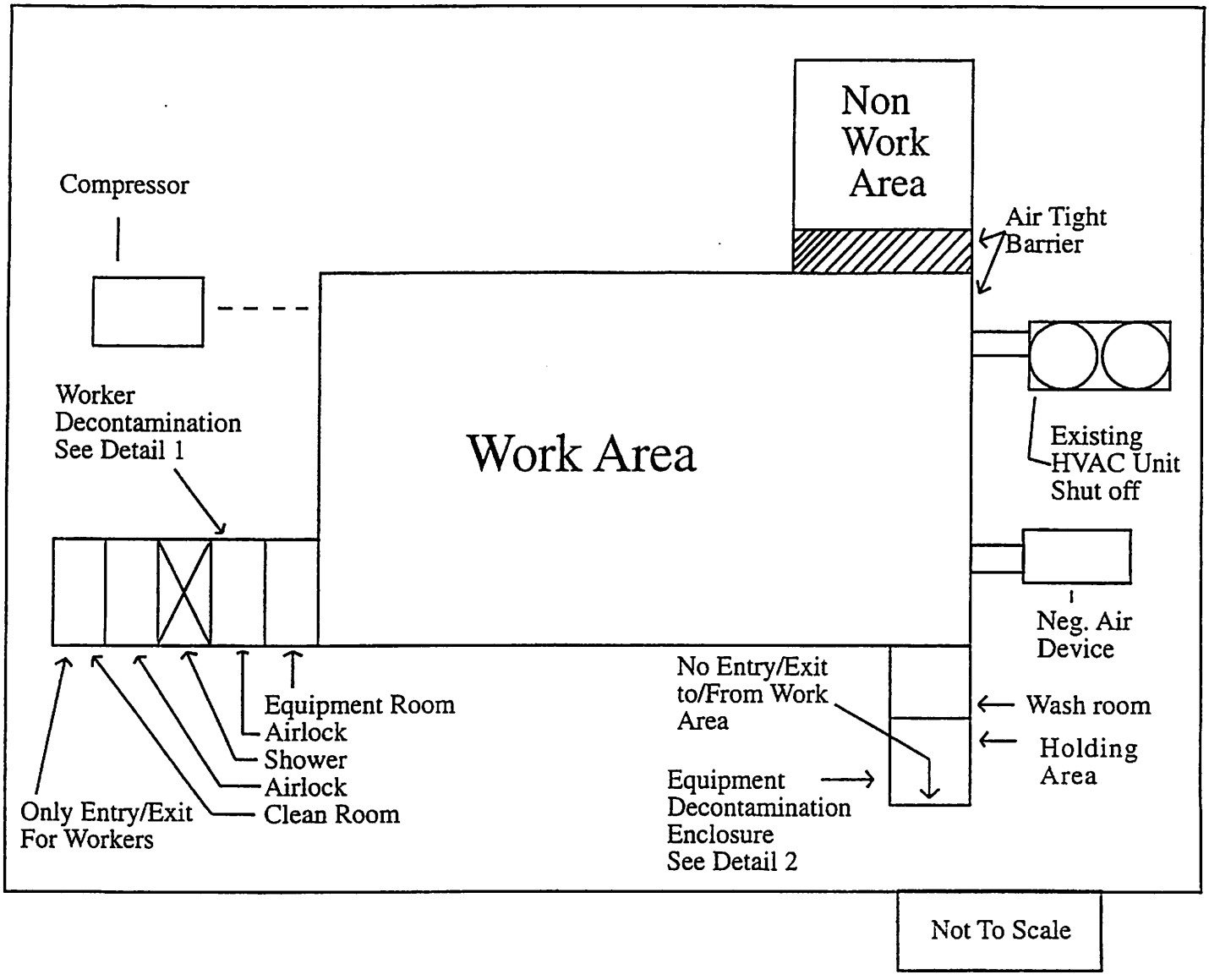
3 MARSH RD
WESPORT, CT

ROOF
& EXTERIOR

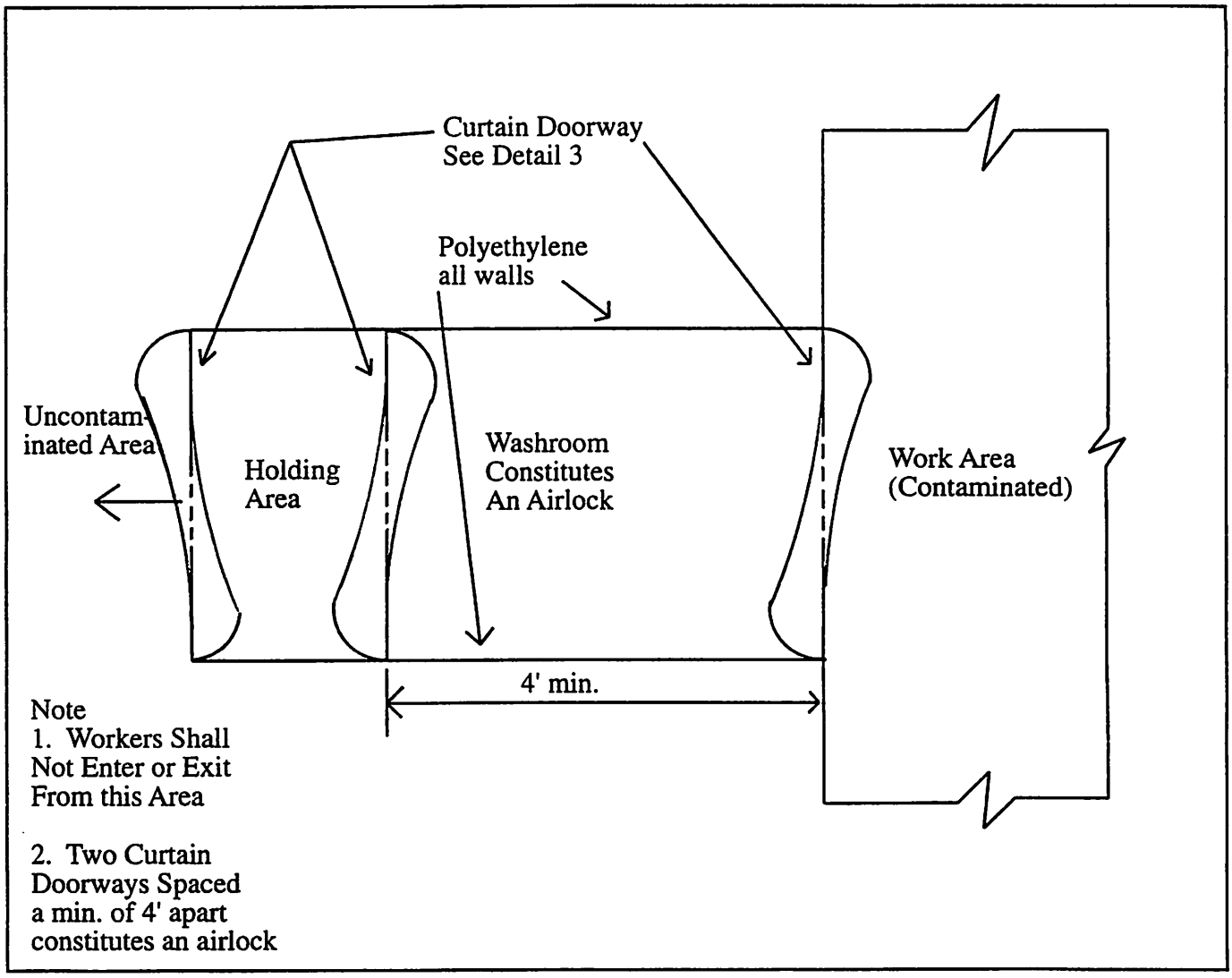
CHEMSCOPE NUMBER: CS# 183-481	DRAWING NUMBER: 3 RF
SCALE: NOT TO SCALE	
DATE: 07/01/2014	



Schematic of Worker Decontamination Enclosure Detail 1



Schematic Building Plan



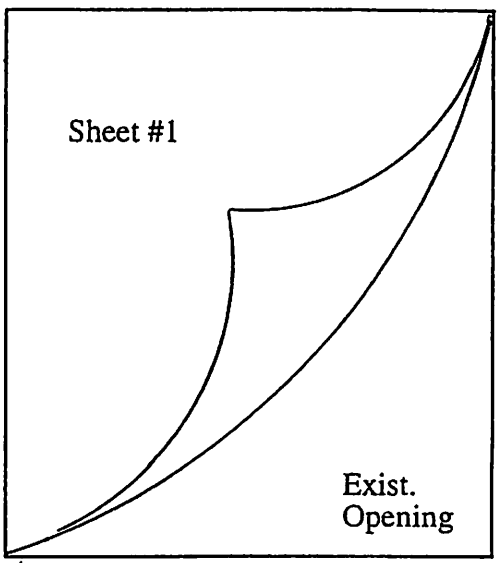
Not To Scale

Plan of Equip. Decontamination Enclosure Detail 2

END OF SECTION

1. Secure top Edge of Sheet #1 Along Top Edge of Opening

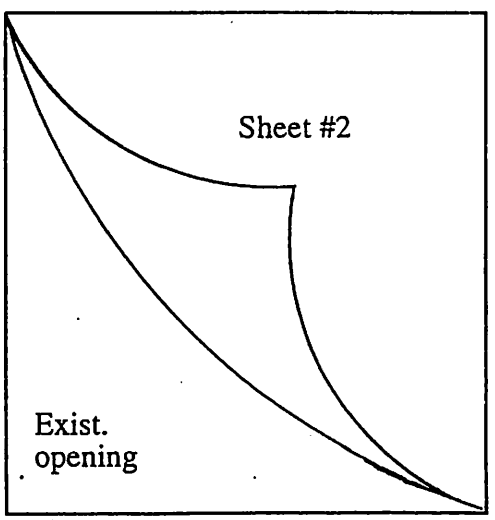
2. Secure Sheet #1 Along one vertical side of opening



A

3. Secure Polyethylene Sheet#2 Along Top edge of opening

4. Secure Polyethylene sheet #2 along opposite side of opening as sheet#1 was secured



B

Curtains Doorway
Detail 3

APPENDIX A

ChemScope INDUSTRIAL HYGIENE • ENVIRONMENTAL CHEMISTRY
15 Moulthrop Street, North Haven, CT 06473-3686 • Phone (203) 865-5605 • Fax (203) 498-1610 • www.chem-scope.com

Scott Feulner
Diversified Technology Consultants (DTC)
2321 Whitney Avenue, Suite 301
Hamden, CT 06518

2/13/2015

ASBESTOS PRE-DEMOLITION INSPECTION
SITE 026 (BURNS) – 3 MARSH ROAD, WESTPORT, CT
APPLICATION #1846
CS#183-481, 7/1/2014 & 2/5/2015, PAGE 1 OF 7

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Inspection Report Synopsis	3-5
Limitations of the Inspection	6
Recommendations	6-7

Attachments:

- Scope of inspection drawings – 4 pages
- ACM location drawing(s) - 3 page(s)
- PLM Certificate of Analysis report with chain of custody - 17 page(s)
- Sample location drawing(s) - 5 page(s)
- CT-DPH Circular Letter #2003-10, 2 page(s)

Report Distribution:

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Michael Casey, DTC michael.casey@teamdtc.com

File Location:

NAS AAUM-Reports\AsbInsp\LH\LH-PREDEMO2015.doc

INTRODUCTION

EXECUTIVE SUMMARY: Asbestos containing materials (ACM) were detected within the scope of this inspection and will need to be properly removed and disposed of prior to demolition that would disturb these materials. Abatement work must be done by a licensed asbestos abatement contractor using proper procedures and practices with licensed and trained individuals. **This asbestos pre-demolition report supersedes the previous asbestos pre-renovation report CS#183-481 on 3 Marsh Road, Westport, CT.** All asbestos testing data from ChemScope Inc.'s previous pre-renovation report is included in this report and its attachments.

BUILDING DESCRIPTION: The subject building is a single-family, two-story contemporary-style house totaling approximately 1500 sq ft, which was built in 1978 of wood-frame construction. Heat is supplied from a furnace in the mechanical closet off the kitchen. There is a crawlspace under the house. The heat, water and electricity were all on. The house was occupied during our inspection.

BACKGROUND: We understand the subject house suffered damage as a result of hurricane Sandy on October 29-30, 2012. After an expansion of the scope of work from renovation, the house is scheduled for demolition.

SCOPE OF INSPECTION: Asbestos Pre-Demolition Inspection of the subject house, as directed by our client. The scope of inspection has expanded from pre-renovation to pre-demolition.

Our work included the following:

- Collection and analysis of building materials within the scope of demolition for asbestos, as required by the regulations.
- A list with quantity, type and location of asbestos containing materials (ACM) in the scope.
- Report of the findings including ACM location drawings.

This investigation and information provided in this report depends partly on background information provided by the client. This report is intended for the use of the client. The scope of services performed may not be appropriate for other users and any use of this report by third parties is at their sole risk. This report is intended to be used in its entirety. No excerpts may be taken to be representative of this report.

TEST PARAMETERS: This is an Asbestos Pre-Demolition Inspection intended to identify the presence, location, and quantity of any asbestos containing building materials which are part of the demolition for compliance with OSHA 1926.1101 (k)(2)(i) and CT DPH 19a-332a-1 through 16.

For sampling, EPA Wet Methods are used to prevent fiber release. Building materials sampled are analyzed at our laboratory by EPA method 600/R-93/116. This is currently the approved EPA Test method, which uses Polarized Light Microscopy with Dispersion Staining. The laboratory is accredited by NIST/NVLAP and AIHA Laboratory Accreditation program, LLC, and is a Connecticut Approved Environmental Laboratory for Asbestos Analysis.

INSPECTION REPORT SYNOPSIS

LOCATION NAME AND ADDRESS: Site 026 (Burns), Application #1846
3 Marsh Road, Westport, CT

INSPECTION DATE(S): 7/1/2014 & 2/5/2015

QUALIFICATIONS: The Inspection was conducted by Daniel P. Sullivan and Leigh H. Elijah:

Daniel P. Sullivan is certified as follows:
- EPA & State of Connecticut Accredited Asbestos Inspector, Project Monitor & Project Designer
- State of Connecticut Licensed Asbestos Inspector/Management Planner (#000019)
- State of Connecticut Licensed Asbestos Project Monitor (#000036)
- State of Connecticut Licensed Asbestos Project Designer (#000096)

Leigh H. Elijah is certified as follows:
- EPA & State of Connecticut Accredited Asbestos Inspector & Project Monitor
- State of Connecticut Licensed Asbestos Inspector (#000874)
- State of Connecticut Licensed Project Monitor (#000756)

For information about Chem Scope, Inc., log onto http://www.chem-scope.com.

SITE OBSERVATIONS ON 2/5/2015:

- Most windows and doors were either vinyl or bare wood and had neither exterior nor interior caulking or glazing. Windows with caulking and glazing were as follows:
  - Two four section windows on the A wall of the first and second floor had interior clear pliable caulking mixed with white pliable caulking, and white hard glazing from between glass and wood. Mixed yellow and white pliable window caulking from between wood and glass, was present at the 5'x6' exterior upper section of these windows. Reddish brown hard glazing from between wood and glass, from under white crumbly caulking was present at the exterior 2' x 1.5' lower center section of these windows. Bluish clear pliable caulking from between glass and wood was present at the exterior 6" x 1.5' lower right and left sections of these windows.
  - Three 4' x 1.5' windows (Main floor C2, and second floor C1 and C3)* had both interior and exterior white pliable caulking from between glass and wood.
  - The C1 window on the first floor, which was 1.5'x2', had mixed white and black exterior caulking from between glass and wood.
  - The 2' x 5.5' window on the door to the back porch had clear pliable caulking on the interior and exterior, between glass and wood.
- Grey hard grout and grey hard cinderblock were present throughout the base and structure of the building. In some places, it was crumbling or chipped, with debris.
- A chimney on the D wall had grey hard grout/mortar on red hard brick. In some places, it was crumbling or chipped, with debris.

*The ChemScope Inc. naming system for windows is a clockwise numbering system, relative to the wall, either A, B, C, or D, on which the windows are located. See attached drawings for detail.

INSPECTION REPORT SYNOPSIS (Continued)

FINDINGS: The following asbestos containing materials (ACM) were detected in the Scope of the Inspection:

MATERIAL	***LOCATION***	***~FOOTAGE***
INTERIOR:		
Brown hard linoleum flooring with black sticky mastic (under blue fibrous wood and linoleum flooring with brown fibrous backing, on wood*)	1-4 Kitchen+CL 1-5 Back Hall+2CL **Total**	190 sq ft 40 sq ft **230 sq ft**
EXTERIOR:		
Hard gray fibrous ACM "transite" panels (walls to crawlspace, nailed to wood)	**Sides A, B,C and D**	**450 sq ft**
Black sticky ACM roof flashing tar (along wall adjacent 2nd Floor)	**Porch Roof**	**< 3 sq ft**

The following is a summary table of the materials that tested as non-Asbestos Containing Material (ACM) (<1%) within the Scope of Work (not already summarized above):

Material	Location	Sample #'s	Findings
Orange hard mortar with white hard grout, (under 4" white ceramic floor tile)	1-6 Bath	183-481-5,6	No Asbestos Detected
White hard grout (between 4" white ceramic floor tile)	1-6 Bath	183-481-7,8	No Asbestos Detected
White and off-white crumbly sheetrock taping compound	Throughout	183-481-9,10, 11,26,27,28	<1%Chrysotile Asbestos*
Grey crumbly sheetrock and brown fibrous paper backing	Throughout	183-481-12,13, 14,29,30,31	No Asbestos Detected
White crumbly textured ceiling coat with white facecoat (on sheetrock)	1-3 Living Rm	183-481-15,16, 17	No Asbestos Detected
Grey hard grout White hard grout and white hard mortar, (from beneath white hard geometric ceramic floor tile)	2-4 Bath	183-481-(18-25)	No Asbestos Detected
Brown fibrous particle board (from above sheetrock ceiling)	Second Floor	183-481-32,33	No Asbestos Detected
Brown & red fibrous paper on black sticky glue (on pink fibrous fiberglass)	Attic	183-481-34,35	No Asbestos Detected
Silver& red fibrous paper on black sticky glue (on pink fibrous fiberglass)	Attic	183-481-36,37	No Asbestos Detected

INSPECTION SYNOPSIS REPORT (Continued)

Summary table of the materials that tested as non-Asbestos Containing Material (ACM) (<1%) within the Scope of Work (continued):

Material	Location	Sample #'s	Findings
Black fibrous tar paper (from under side shingles)	Exterior Siding	183-481-38,39	No Asbestos Detected
Black fibrous shingles with grey, black, white and green granules and Black fibrous shingles with white and black granules	Roofs	183-481-40,41, 43	No Asbestos Detected
Grey hard grout (from grey hard cinderblock foundation debris)	Exterior Crawlspace	183-481-45,46	No Asbestos Detected
Grey hard cinderblock (from sample #45/46)	Exterior Crawlspace	183-481-47, 48	No Asbestos Detected
Grey hard grout/mortar (from red hard brick chimney)	Exterior Crawlspace	183-481-49, 50	No Asbestos Detected
Red hard brick (from sample #49/50)	Exterior Crawlspace	183-481-51, 52	No Asbestos Detected
Mixed yellow and white pliable window caulking (from between wood and glass, 5'x6' A Window)	Exterior, First Floor, 1-2 Office	183-481-53, 54	No Asbestos Detected
Reddish brown hard glazing (from between wood and glass, from under white crumbly caulking, 2'x1.5' lower center A window)	Exterior, First Floor, 1-2 Office	183-481-55, 56	No Asbestos Detected
White crumbly caulking (from sample #55/56)	Exterior, First Floor, 1-2 Office	183-481-57, 58	No Asbestos Detected
Bluish clear pliable caulking (from between glass and wood, at 6" x 1.5' window (1 of 2) on A wall)	Exterior, First Floor, 1-2 Office	183-481-59, 60	No Asbestos Detected
Mixed white and black pliable caulking (from between glass and wood, at 1.5'x2' C1 Window)	Exterior, First Floor, 1-8 Bath	183-481-61, 62	No Asbestos Detected
Clear pliable caulking (from between glass and wood, at interior 2'x5.5' window on door to porch/white white pliable caulking, from between glass and wood, at interior 5'x6' A wall window)	Interior, First Floor, 1-5 Back Hall/1-2 Office	183-481-63, 64	No Asbestos Detected
White pliable caulking (from sample #64/with clear pliable caulking, form between glass and wood, at interior 5'x6' A wall window)	Interior, First Floor, 1-2 Office	183-481-65, 66	No Asbestos Detected
White hard glazing (with clear pliable caulking, from between glass and wood, at interior 6'x1.5' A wall window (1 of 2)	Interior, First Floor, 1-2 Office	183-481-67, 68	No Asbestos Detected

* Materials with <1% asbestos (sheetrock taping compound) are not defined as asbestos containing materials in DPH and EPA regulations. However, OSHA regulations require proper procedures be used to prevent exposure to workers performing the related disturbance. This includes training and protection for employees who may be exposed above the OSHA PEL.

LIMITATIONS OF INSPECTION

It is important to note that every effort is made to detect asbestos (ACM) in the path of the demolition by our inspectors. It is not practical or prudent to demolish the work area during an inspection. The owner should be aware of this in case suspect materials or concealed suspect materials are uncovered during the actual renovation.

If suspect materials that were previously not accessible or not sampled during this inspection are discovered during the demolition, or if the scope of the demolition changes to include disturbance of new materials not inspected, then demolition must stop and the materials must be sampled by a CT DPH licensed asbestos inspector prior to disturbance of these materials.

RECOMMENDATIONS

All Asbestos Containing Materials (ACM) detected in the path of the demolition must be removed prior to the disturbance of these materials.

Asbestos removal is regulated by federal and state agencies. Abatement work must be done by a licensed asbestos abatement contractor using proper procedures and practices, including containment, decontamination facilities, negative air units and trained and CT DPH licensed workers. Final re-occupancy testing is also required, if the building is going to be reoccupied after the asbestos removal and strongly recommended even if the building is not going to be re-occupied such as in the case of building demolition, for removal of greater than three (3) sq. ft or linear ft of ACM. A CT DPH Licensed Project Monitor is always required for final visual inspections after asbestos removal. Please see attached CT DPH Circular Letter #2010-48.

Please also keep in mind that notification to the DPH is required for asbestos abatement involving greater than 10 linear feet or 25 square feet of or for any demolition. Disposal of all ACM is regulated by EPA and the Connecticut DEEP; an EPA approved landfill must be used.

For removal of the ACM transite panels: If the contractor is able to remove the ACM transite panels (by removing the entire panel intact) then the removal does not constitute asbestos abatement as defined by Section 19a-332 of the Connecticut General Statutes. In this case, the ACM must be undamaged and non-friable and remain undamaged and non-friable during the removal. (See enclosed CT-DPH Circular Letter #2003-10). If it is determined that the ACM transite panel will not be removed intact, then the abatement work must be done by a licensed asbestos abatement contractor using proper procedures and practices. In either case, the ACM must be disposed of in an EPA Approved Landfill for asbestos.

RECOMMENDATIONS (Continued)

OSHA regulations 1926.1101 requires that before asbestos removal or repair work (class I, II or III work) is initiated, building owners/facility owners must notify their own employees and employers who are bidding on such work, of the quantity and location of ACM or PACM (presumed asbestos containing material) present in such areas. Also for inadvertently discovered ACM or PACM there is a 24-hour notification requirement to the owner and all employers at the site.

Materials with <1% asbestos (such as the sheetrock taping compound) are not defined as asbestos containing materials in DPH and EPA regulations. However, OSHA regulations require proper procedures be used to prevent exposure to workers performing the related disturbance. This includes training and protection for employees who may be exposed above the OSHA PEL.

If you have any questions or need more information please call me. Thank you for calling on us.

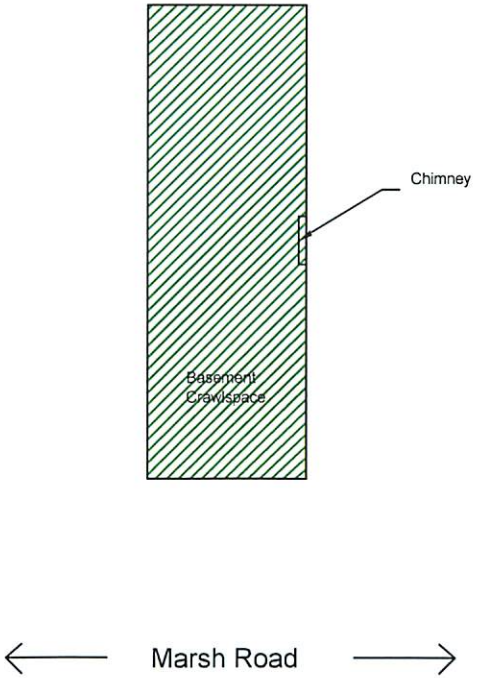
Sincerely,

Leigh H. Elijah
Asbestos Inspector

ChemScope Inc.

Site 026 - Exterior Basement Crawlspace
3 Marsh Road, Westport, CT
CS# 183-481, 02/05/2015

SCOPE OF INSPECTION DRAWING



LEGEND OF SYMBOLS

NOTATIONS

LEIGH ELIJAH

ChemScope Inc.

ASBESTOS, LEAD &
MOLD INSPECTION

3 MARSH RD
WESPORT, CT

BASEMENT CRAWLSPACE

CS# 183-481

NOT TO SCALE

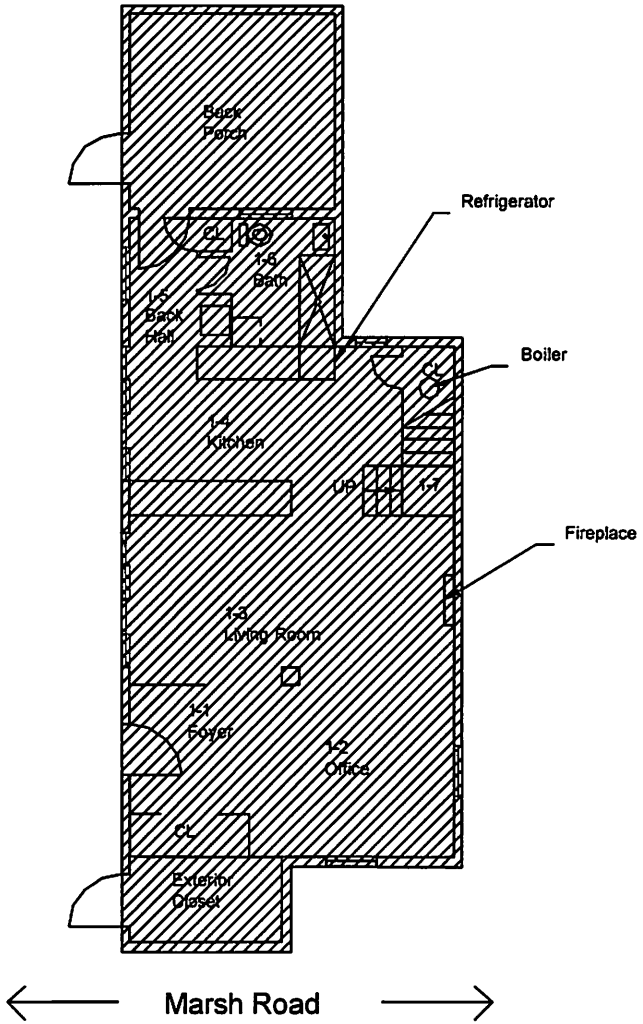
02/05/2015

B

ChemScope Inc.

Site 026 - Main Level
3 Marsh Road, Westport, CT
CS# 183-481, 02/05/2015

SCOPE OF INSPECTION DRAWING



LEGEND OF SYMBOLS

SCOPE OF INSPECTION

NOTATIONS

LEIGH ELIJAH

ChemScope Inc.

ASBESTOS, LEAD & MOLD INSPECTION

3 MARSH RD
WESPORT, CT

MAIN LEVEL

CS# 183-481

NOT TO SCALE

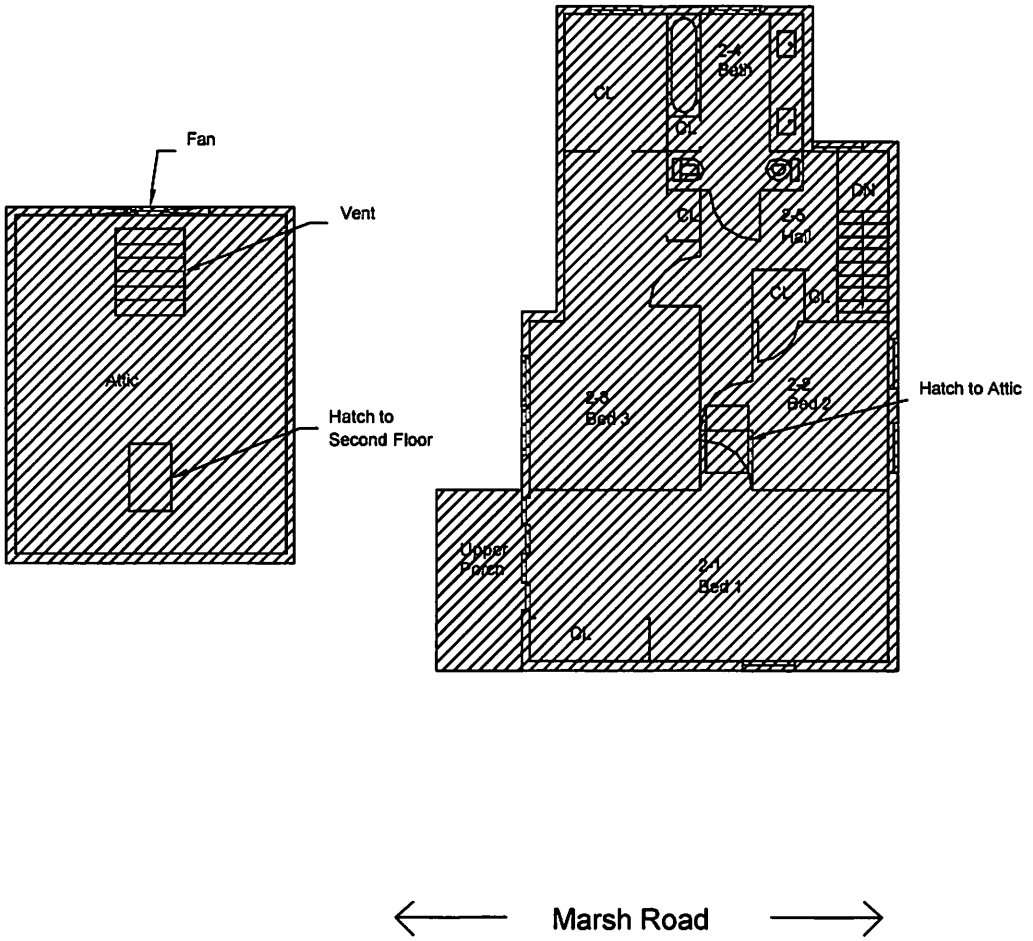
02/05/2015

1

ChemScope Inc.

Site 026 - Second Floor & Attic
3 Marsh Road, Westport, CT
CS# 183-481, 02/05/2015

SCOPE OF INSPECTION DRAWING



LEGEND OF SYMBOLS

SCOPE OF INSPECTION

NOTATIONS

LEIGH ELIJAH

ChemScope Inc.

ASBESTOS, LEAD &
MOLD INSPECTION

3 MARSH RD
WESPORT, CT

SECOND FLOOR
& ATTIC

CS# 183-481

NOT TO SCALE

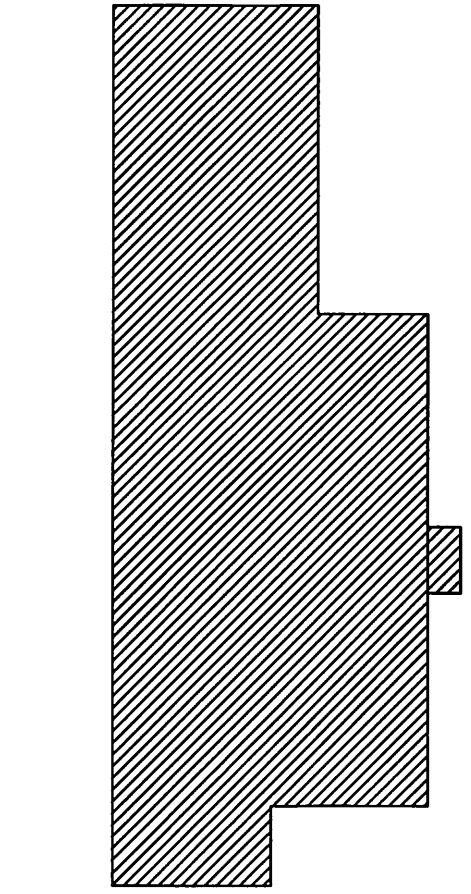
02/05/2015

2

ChemScope Inc.

Site 026 - Roof & Exterior
3 Marsh Road, Westport, CT
CS# 183-481, 02/05/2015

SCOPE OF INSPECTION DRAWING



Marsh Road

LEGEND OF SYMBOLS

[redacted]

NOTATIONS

[redacted]
LEIGH ELIJAH

ChemScope Inc.

[redacted]

ASBESTOS, LEAD &
MOLD INSPECTION

3 MARSH RD
WESPORT, CT

ROOF
& EXTERIOR

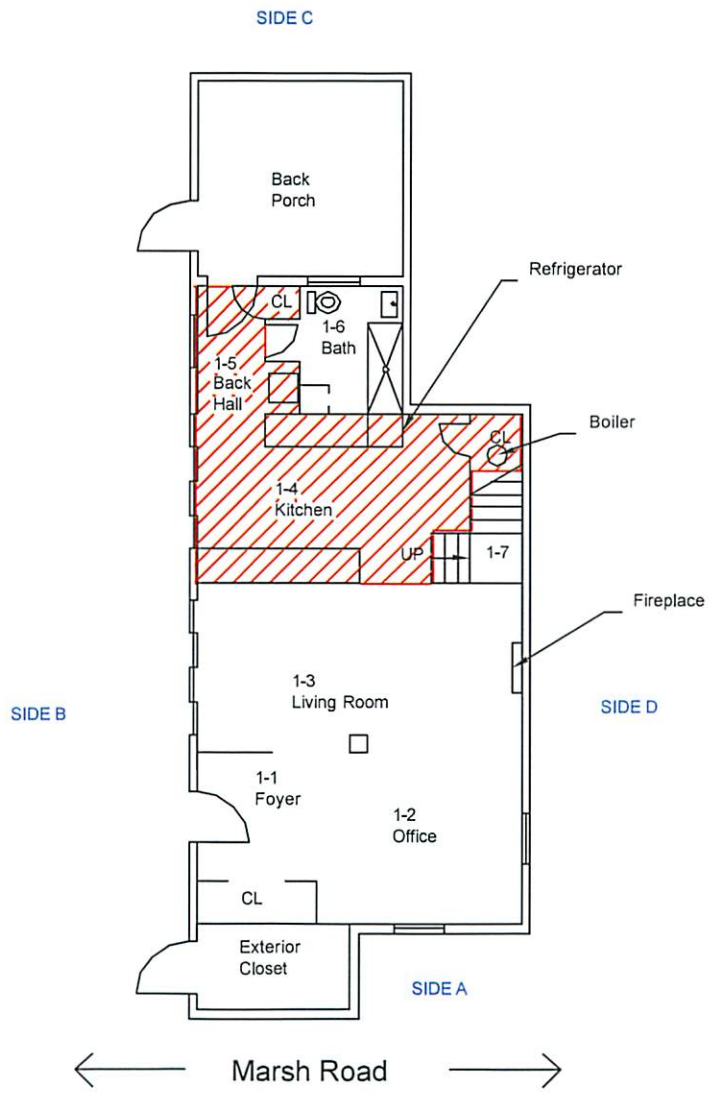
[redacted]
CS# 183-481
[redacted]
NOT TO SCALE
[redacted]
02/05/2015

3

ChemScope Inc.

Site 026 - Main Level
3 Marsh Road, Westport, CT
CS# 183-481, 7/1/14

ACM FLOORING LOCATION DRAWING
See Report for Details



LEGEND OF SYMBOLS

Location of ACM flooring in Scope of Inspection

NOTATIONS

See Report for Details

LEIGH HONOROF

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ASBESTOS, LEAD & MOLD INSPECTION

3 MARSH RD
WESTPORT, CT

MAIN LEVEL

CS# 183-481

NOT TO SCALE

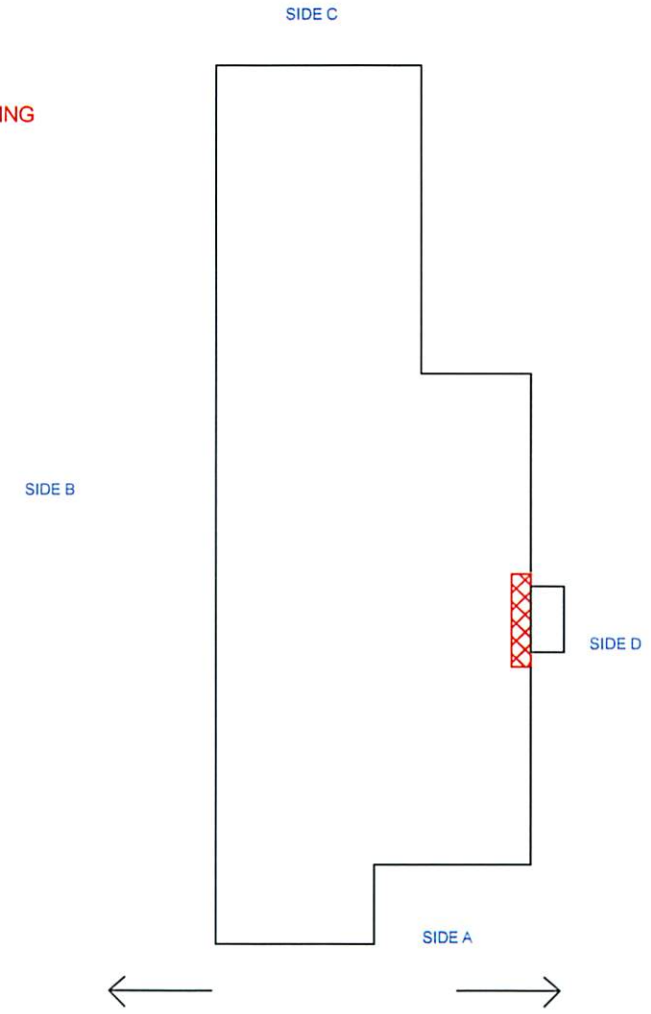
07/01/2014

1 ACM

ChemScope Inc.

Site 026 - Roof & Exterior
3 Marsh Road, Westport, CT
CS# 183-481, 7/1/14

ACM LOCATION DRAWING: ROOF FLASHING
See Report for Details



LEGEND OF SYMBOLS

Location of ACM Roof Flashing In Scope of Inspection

NOTATIONS

LEIGH HONOROF

ChemScope Inc.

ASBESTOS, LEAD & MOLD INSPECTION

3 MARSH RD
WESTPORT, CT

ROOF
& EXTERIOR

CS# 183-481

NOT TO SCALE

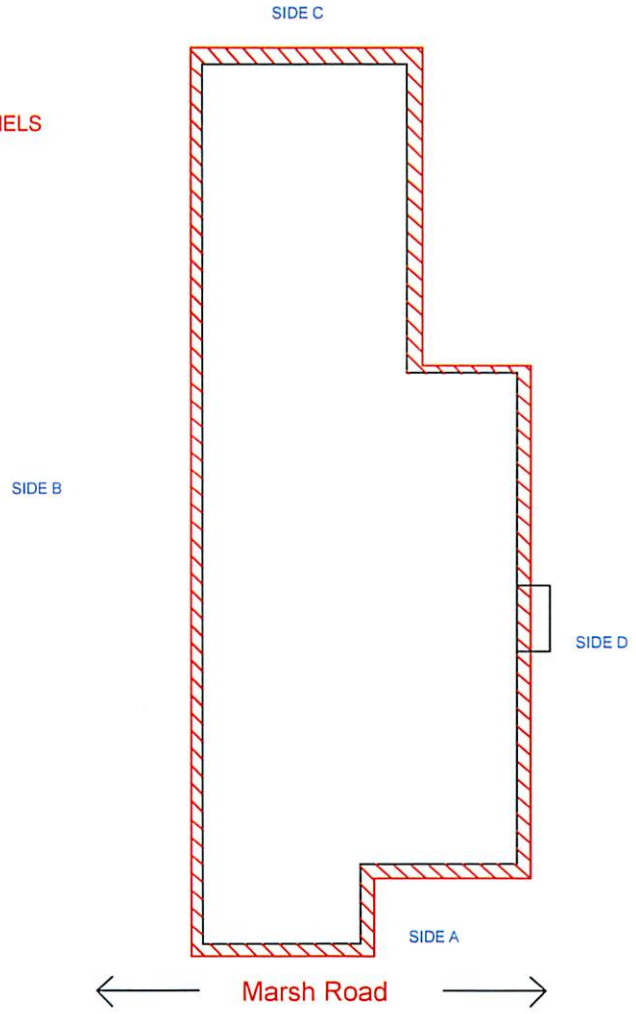
07/01/2014

3 RF

ChemScope Inc.

Site 026 - Roof & Exterior
3 Marsh Road, Westport, CT
CS# 183-481, 7/1/14

ACM LOCATION DRAWING: TRANSITE PANELS
See Report for Details



LEGEND OF SYMBOLS

Location of ACM Transite Panels In Scope of Inspection

NOTATIONS

LEIGH HONOROF

ChemScope Inc.

ASBESTOS, LEAD & MOLD INSPECTION

3 MARSH RD
WESTPORT, CT

ROOF
& EXTERIOR

CS# 183-481

NOT TO SCALE

07/01/2014

3ACM

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Certificate Of Analysis

Diversified Technology Consultants (DTC) - Scott Feulner
2321 Whitney Avenue
Suite 301
Hamden CT 06518

7/9/2014
CS# 183-481

Bulk sample(s) from Site 026 (Burns) - Application #1846, 3 Marsh Road, Westport, CT collected by Leigh Honorof on 7/1/2014

Asbestos Identification in the samples. Examination made by Polarized Light Microscopy (PLM) per EPA Test Method 600/R-93/116

Sample Identification	Findings (Analyzed 7/9/14)
183-481-1 Blue fibrous wood and linoleum floor covering with brown fibrous paper backing (on styrofoam sheeting on plastic sheeting on wood on brown hard linoleum on black sticky mastic on wood) / 1-4 Kitchen	*Not Analyzed*
183-481-2 Blue fibrous wood and linoleum floor covering with brown fibrous paper backing (on styrofoam sheeting on plastic sheeting on wood on brown hard linoleum on black sticky mastic on wood) / 1-4 Kitchen	*Not Analyzed*
183-481-3 Brown hard linoleum flooring on black sticky mastic (under wood, on wood) / 1-4 Kitchen	*5% Chrysotile Asbestos (point counted)* *87% Non- Fibrous Particles* *8% Volatile on Ignition*
183-481-4 Brown hard linoleum flooring on black sticky mastic (under wood, on wood) / 1-4 Kitchen	*Not Analyzed*
183-481-5 Orange hard mortar (with white hard grout, under 4" white ceramic floor tile) / 1-6 Bath	*<1% Chrysotile Asbestos (point counted)* *49% Non- Fibrous Particles* *51% Volatile on Ignition*

Bulk sample(s) from Site 026 (Burns) - Application #1846, 3 Marsh Road, Westport, CT collected by Leigh Honorof on 7/1/2014

Asbestos Identification in the samples. Examination made by Polarized Light Microscopy (PLM) per EPA Test Method 600/R-93/116

Sample Identification	**Findings (Analyzed 7/9/14)**
183-481-6 Orange hard mortar (with white hard grout, under 3.5" white ceramic covebase tile) / 1-6 Bath	*No Asbestos Detected* *12% Non- Fibrous Particles* *88% Volatile on Ignition*
183-481-7 White hard grout (from sample #5, between 4" white ceramic floor tile) / 1-6 Bath	*No Asbestos Detected* *96% Non- Fibrous Particles* *4% Volatile on Ignition*
183-481-8 White hard grout (from sample #6, between 3.6" white ceramic covebase tile) / 1-6 Bath	*No Asbestos Detected* *92% Non- Fibrous Particles* *8% Volatile on Ignition*
183-481-9 White crumbly sheetrock taping compound (from sample #6, behind 3.6" white ceramic covebase tile) / 1-6 Bath	*No Asbestos Detected* *93% Non- Fibrous Particles* *7% Volatile on Ignition*
183-481-10 White crumbly sheetrock taping compound (with grey crumbly sheetrock and brown fibrous paper backing, from ceiling) / 1-4 Kitchen	*No Asbestos Detected* *95% Non- Fibrous Particles* *5% Volatile on Ignition*
183-481-11 Off white crumbly sheetrock taping compound (with grey crumbly sheetrock and brown fibrous paper backing, from wall) / 1-1 Foyer	*<1% Chrysotile Asbestos (point counted)* *79% Non- Fibrous Particles* *21% Volatile on Ignition*
183-481-12 Grey crumbly sheetrock and brown fibrous paper backing (from wall) / 1-5 Back Hall	*No Asbestos Detected* *83% Non- Fibrous Particles* *17% Volatile on Ignition*

Bulk sample(s) from Site 026 (Burns) - Application #1846, 3 Marsh Road, Westport, CT collected by Leigh Honorof on 7/1/2014

Asbestos Identification in the samples. Examination made by Polarized Light Microscopy (PLM) per EPA Test Method 600/R-93/116

Sample Identification	**Findings (Analyzed 7/9/14)**
183-481-13 Grey crumbly sheetrock and brown fibrous paper backing (from sample #10) / 1-4 Kitchen	*No Asbestos Detected* *59% Non- Fibrous Particles* *15% Fiberglass* *26% Volatile on Ignition*
183-481-14 Grey crumbly sheetrock and brown fibrous paper backing (from sample #11) / 1-1 Foyer	*No Asbestos Detected* *79% Non- Fibrous Particles* *21% Volatile on Ignition*
183-481-15 White crumbly textured ceiling coat with white facecoat (on sheetrock) / 1-3 Living room	*No Asbestos Detected* *80% Non- Fibrous Particles* *20% Volatile on Ignition*
183-481-16 White crumbly textured ceiling coat with white facecoat (on sheetrock) / 1-3 Living Room	*No Asbestos Detected* *80% Non- Fibrous Particles* *20% Volatile on Ignition*
183-481-17 White crumbly textured ceiling coat with white facecoat (on sheetrock) / 2-5 Hall	*No Asbestos Detected* *86% Non- Fibrous Particles* *14% Volatile on Ignition*
183-481-18 Grey hard grout (with white hard mortar, from beneath white hard geometric ceramic floor tile) / 2-4 Bath	*No Asbestos Detected* *96% Non- Fibrous Particles* *4% Volatile on Ignition*
183-481-19 Grey hard grout (with white hard mortar, from beneath white hard geometric ceramic floor tile) / 2-4 Bath	*No Asbestos Detected* *96% Non- Fibrous Particles* *4% Volatile on Ignition*

Bulk sample(s) from Site 026 (Burns) - Application #1846, 3 Marsh Road, Westport, CT collected by Leigh Honorof on 7/1/2014

Asbestos Identification in the samples. Examination made by Polarized Light Microscopy (PLM) per EPA Test Method 600/R-93/116

Sample Identification	**Findings (Analyzed 7/9/14)**
183-481-20 White hard mortar (from sample #18, from between white hard geometric ceramic floor tiles) / 2-4 Bath	*No Asbestos Detected* *93% Non- Fibrous Particles* *7% Volatile on Ignition*
183-481-21 White hard mortar (from sample #19, from between white hard geometric ceramic floor tiles) / 2-4 Bath	*No Asbestos Detected* *92% Non- Fibrous Particles* *8% Volatile on Ignition*
183-481-22 White hard grout (with white hard mortar from between white hard 4" ceramic shower tiles) / 2-4 Bath	*No Asbestos Detected* *53% Non- Fibrous Particles* *47% Volatile on Ignition*
183-481-23 White hard grout (from between white hard 4" ceramic shower tiles) / 2-4 Bath	*No Asbestos Detected* *54% Non- Fibrous Particles* *46% Volatile on Ignition*
183-481-24 White hard mortar (from sample #22, from beneath white hard 4" ceramic shower tiles) / 2-4 Bath	*No Asbestos Detected* *52% Non- Fibrous Particles* *48% Volatile on Ignition*
183-481-25 White hard mortar (from beneath white hard 4" ceramic shower tiles) / 2-4 Bath	*No Asbestos Detected* *86% Non- Fibrous Particles* *14% Volatile on Ignition*
183-481-26 Off white crumbly sheetrock taping compound (with grey crumbly sheetrock and brown fibrous paper backing, from wall) / 2-3 Bed 3	*<1% Chrysotile Asbestos (point counted)* *81% Non- Fibrous Particles* *19% Volatile on Ignition*

Bulk sample(s) from Site 026 (Burns) - Application #1846, 3 Marsh Road, Westport, CT collected by Leigh Honorof on 7/1/2014

Asbestos Identification in the samples. Examination made by Polarized Light Microscopy (PLM) per EPA Test Method 600/R-93/116

Sample Identification	**Findings (Analyzed 7/9/14)**
183-481-27 White crumbly sheetrock taping compound (with grey crumbly sheetrock and brown fibrous paper backing, from wall) / 2-4 Bath	*No Asbestos Detected* *95% Non- Fibrous Particles* *5% Volatile on Ignition*
183-481-28 White crumbly sheetrock taping compound (with grey crumbly sheetrock and brown fibrous paper backing, from ceiling) / 2-5 Hall	*No Asbestos Detected* *77% Non- Fibrous Particles* *23% Volatile on Ignition*
183-481-29 Grey crumbly sheetrock and brown fibrous paper backing (from sample #26) / 2-3 Bed 3	*No Asbestos Detected* *76% Non- Fibrous Particles* *24% Volatile on Ignition*
183-481-30 Grey crumbly sheetrock and brown fibrous paper backing (from sample #27) / 2-4 Bath	*No Asbestos Detected* *77% Non- Fibrous Particles* *23% Volatile on Ignition*
183-481-31 Grey crumbly sheetrock and brown fibrous paper backing (from sample #28) / 2-5 Hall	*No Asbestos Detected* *79% Non- Fibrous Particles* *21% Volatile on Ignition*
183-481-32 Brown fibrous particle board (from above sheetrock ceiling) / 2-5 Hall	*No Asbestos Detected* *2% Non- Fibrous Particles* *98% Volatile on Ignition*
183-481-33 Brown fibrous particle board (from above sheetrock ceiling) / 2-5 Hall	*No Asbestos Detected* *6% Non- Fibrous Particles* *94% Volatile on Ignition*

Bulk sample(s) from Site 026 (Burns) - Application #1846, 3 Marsh Road, Westport, CT collected by Leigh Honorof on 7/1/2014

Asbestos Identification in the samples. Examination made by Polarized Light Microscopy (PLM) per EPA Test Method 600/R-93/116

Sample Identification	**Findings (Analyzed 7/9/14)**
183-481-34 Brown & red fibrous paper on black sticky glue (on pink fibrous fiberglass) / Attic	*No Asbestos Detected* *18% Non- Fibrous Particles* *4% Fiberglass* *78% Volatile on Ignition*
183-481-35 Brown & red fibrous paper on black sticky glue (on pink fibrous fiberglass) / Attic	*No Asbestos Detected* *2% Non- Fibrous Particles* *7% Fiberglass* *91% Volatile on Ignition*
183-481-36 Silver& red fibrous paper on black sticky glue (on pink fibrous fiberglass) / Attic	*No Asbestos Detected* *18% Non- Fibrous Particles* *5% Fiberglass* *77% Volatile on Ignition*
183-481-37 Silver& red fibrous paper on black sticky glue (on pink fibrous fiberglass) / Attic	*No Asbestos Detected* *17% Non- Fibrous Particles* *4% Fiberglass* *79% Volatile on Ignition*
183-481-38 Black fibrous tar paper (from under side shingles) / Exterior side C, near garbage cans	*No Asbestos Detected* *14% Non- Fibrous Particles* *86% Volatile on Ignition*
183-481-39 Black fibrous tar paper (from under side shingles) / Exterior side A	*No Asbestos Detected* *20% Non- Fibrous Particles* *80% Volatile on Ignition*
183-481-40 Black fibrous shingles with grey, black, white and green granules (over exterior closet, 2 layers of shingle) / Roof	*No Asbestos Detected* *62% Non- Fibrous Particles* *38% Volatile on Ignition*

Bulk sample(s) from Site 026 (Burns) - Application #1846, 3 Marsh Road, Westport, CT collected by Leigh Honorof on 7/1/2014

Asbestos Identification in the samples. Examination made by Polarized Light Microscopy (PLM) per EPA Test Method 600/R-93/116

Sample Identification	**Findings (Analyzed 7/9/14)**
183-481-41 Black fibrous shingles with white and black granules (over 2-3) / Roof	*No Asbestos Detected* *66% Non- Fibrous Particles* *17% Fiberglass* *17% Volatile on Ignition*
183-481-42 Black fibrous flashing tar () / Chimney	*15% Chrysotile Asbestos* *46% Non- Fibrous Particles* *39% Volatile on Ignition*
183-481-43 Black fibrous shingles with white facecoat (on wood) / Front fascia	*No Asbestos Detected* *64% Non- Fibrous Particles* *36% Volatile on Ignition*
183-481-44 Grey hard/fibrous paneling (on foundation, nailed to wood) / Exterior crawlspace	*15% Chrysotile Asbestos* *82% Non- Fibrous Particles* *3% Volatile on Ignition*

PARAMETERS
ASBESTOS PLM ANALYSIS
(Revised 3/22/13)

1. *Materials which contain >1% asbestos (greater than 1%) by PLM (polarizing light microscopy) analysis are considered to be asbestos containing materials under EPA and the State of Connecticut Regulations. OSHA still regulates material with <1%. (Contact laboratory for information.) {Note: A more sensitive method is available called TEM (transmission electron microscopy). TEM may detect asbestos fibers that PLM cannot see, but the above agencies' enforcement is based on PLM analysis. Rules may differ for states other than Connecticut. It is best to check with the individual state. For example, New York State requires TEM confirmation of negative PLM results on floor tile}.*

2. *If no asbestos is detected in a sample, or if the asbestos content is less than 1% by PLM, additional samples of the same material should be submitted for confirmation. Please check with the laboratory for guidance on the number of samples needed. Sample collection in Connecticut must be by a DPH Licensed Asbestos Inspector. Many other states also require licensing.*

3. *Floor Tile Mastic: Mastic under floor tile should be separately sampled by scraping some of the mastic from the floor to avoid contamination from the floor tile.*

4. *Although Chem Scope, Inc. takes great effort to insure accuracy in the estimation of asbestos in the materials analyzed, no quantitation method is without some uncertainty. Based on independent calibration studies and comparison of Chem Scope's quantitative results with NVLAP and AIHA round robin programs we estimate our uncertainty in quantitation to be relatively small. The average relative uncertainty of the estimate is calculated to be 35% for samples that contain less than 10% asbestos. This means a estimate of 10% asbestos in a sample has a probable range of 6.5% to 13.5% while an estimate of 1% has a range of 0.65% to 1.35%.*

5. *The presence of non-asbestos components, which are recognized by the PLM analyst, is reported with the estimated amounts. This is not an exhaustive analysis for the non-asbestos materials since the primary purpose is to determine if asbestos is present and, if so, how much is present of each type of asbestos.*

6. *Results reported apply only to the sample(s) analyzed.*

7. *Special treatment of samples: Chem Scope, Inc. routinely uses gravimetric sample reduction techniques such as low temperature ashing or acid dissolution on samples like floor tile, roofing materials, glue dots, or high cellulose content samples prior to PLM analysis. These methods are used to aid in the PLM analysis and to provide better quantitative data. Layered samples, if possible, are analyzed separately as individual layers. However, in accordance with the method, if any layer contains >1% asbestos (greater than 1%) it is to be considered an asbestos containing material. All results are reported to the original sample basis.*

8. *Sample results are not corrected for blanks. Analytical blanks are run daily and if contamination is suspected the samples are rerun.*

9. *Chem Scope, Inc. performs "400 point" point counting when the asbestos content is visually estimated to be less than 10%. There is no additional charge for this analysis.*

The Scope of Accreditation referenced in this report applies to bulk asbestos fiber analysis by PLM (Polarized Light Microscopy).
Accreditation does not imply endorsement by NVLAP, NIST or any Federal or State Agency.
This report pertains only to the samples tested and may not be reproduced in part.
Condition of the samples at the time of receipt was acceptable unless otherwise noted on the Certificate of Analysis.
See test parameters above and attached chain of custody form.
We would love to hear from you. Comments? Questions? Please call or email us at chem.scope@snet.net.

ChemScope, Inc. is accredited by AIHA LAP, LLC LAB #100134
NVLAP Lab Code 101061-0.
Connecticut Department of Public Health (DPH) Approved Environmental Lab PH 0581

Signature	Signature (if applicable)	Authorized Signature or	Authorized Signature or	Authorized Signature
Analyst	Inspector	Suzanne Cristante Laboratory Director	Izabela Kremens Quality Manager	Ronald Arena President

Chem Scope, Inc.
15 Moulthrop Street, North Haven CT 06473
203-865-5605

Form FL-4A Rev 11/12/13
(Issued By SC)

CHAIN OF CUSTODY

Emailed____
Faxed_____
Called _____
Logged_____

Site 026 (Burns) - Application #1846

Sample Source: 3 Marsh Road, Westport, CT CS Job CS# 183-481

Sampled by: Leigh Hassel & Dan Sullivan Date Sampled: 7/1/2014 Customer Name: Diversified Technology Consultants (DTC) -

CS Sample#	Client Sample#	Sample Description	Comments
183-481-1644		See Attached	

Sample Turnaround: 1-week 7/9/14

Analysis Requested(if variable, use comment column) PLM

Check if you want sample returned ____ (sampled will be disposed of after 30 days).

Relinquished by [signature] Date 7/1/14 Time 3:30 pm Received by In Lab Box
Relinquished by_____ Date _____ Time _____ Received by _____

Other Special Instructions: _____

Result Transmittal Instructions (for Chem Scope to transmit): Tell Dan

FOR CHEM SCOPE, INC. TO FILL OUT IF SAMPLES ARE GOING TO OUTSIDE LAB:

Name of Laboratory: _____ Method of Transportation to Laboratory: _____

Result Transmittal Instructions (for outside Lab to Chem Scope, Inc): ***PLEASE FAX RESULTS***

The person submitting samples is responsible for obtaining true and representative samples, for complying with applicable regulations and for the use of the data obtained from the analysis. For example, many states have licensing and laboratory approval requirements. Please contact the individual states if you have any questions regarding specific sampling or approval requirements. For Connecticut sites, we have licensed inspectors available to collect client samples and to perform building inspections.

Dear Laboratory Customer or Potential Customer,

New laboratory accreditation standards require us to provide our clients information about our services to make sure that your requirements for testing are adequately defined, documented and understood. The following is for your information. Please call us if you have any questions or comments.

Type of Samples:
/_/ PCM cassettes are routinely run by NIOSH Method 7400.
/ / Bulk materials are run by EPA Method: #600/R-93/116.

Air Samples: NIOSH 7400 Method counts all fibers. This method may be used for personal air samples and for finals. Two field blanks must be submitted for each set of samples. In the unlikely event that there is to be any deviation from the standard test, you will be consulted by phone before the work begins. Those clients who have not had NIOSH 582 or AHERA asbestos training courses (either supervisor or project monitor) should consult with the lab director for more information. The test parameters are further explained in the analytical report.

Bulk materials: sampled are analyzed by the latest EPA Method: (#600/R-93/116) which uses polarized light microscopy (PLM). When asbestos is detected and the amount is estimated to be <10%, we automatically point count the samples. When there are interfering substances present, we may use ashing, acid washing or other procedures described in the method to handle the interference. Those clients who have not had AHERA asbestos training courses (either inspector, supervisor or project designer) should consult with the lab director for more information. The test parameters are further explained in the analytical report.

All Samples must be clearly labeled with source name and identification number or sufficient information from the client to make this sample uniquely identified. (We will then add our notebook #, page # (batch) and unique number within the batch.) Samples must be in a clean, air tight package such as a zip loc bag. Appropriate completed paperwork must accompany the sample. Bulk and air samples may not be submitted in the same package.

As soon as available bench top results will be faxed to you and reports will then be mailed. We will retain air samples for at least three months and bulk samples for 6 months unless you advise us otherwise.

You are welcome to visit the laboratory at any time to discuss the work, monitor the work or verify our testing services. We appreciate your business and encourage any feedback regarding improving our services or our quality system. Please take a minute to complete the following survey and mail/fax it to ChemScope, Inc.

Customer Service Survey

To help us improve our services give your opinions to the following:

1- The printed laboratory report was complete and easy to understand. ☐ YES ☐ NO
If no, please explain _____.

2- The turn around time for results met your expectations/needs. ☐ YES ☐ NO
If no, please explain _____.

3- How likely are you to recommend ChemScope Inc. to someone?
☐ Excellent ☐ Very Good ☐ Good ☐ Fair ☐ Poor

4- How likely are you to return to ChemScope in the future if the need arises?
☐ Excellent ☐ Very Good ☐ Good ☐ Fair ☐ Poor

5. On a scale of 1 to 5 where 1 represents "Satisfied" and 5 represents "Dissatisfied", how would you rate your level of overall satisfaction.
☐ 1 ☐ 2 ☐ 3 ☐ 4 ☐ 5

6- Please add any additional comments or suggestions that would be helpful when you use our services:
_____

Name _____ Company_____

Address_____ Telephone/e-mail_____

Can we contact you regarding this survey? ☐ YES ☐ NO

ChemScope INDUSTRIAL HYGIENE • ENVIRONMENTAL CHEMISTRY
15 Moulthrop Street, North Haven, CT 06473-3686 • Phone (203) 865-5605 • Fax (203) 498-1610

Certificate Of Analysis

Diversified Technology Consultants (DTC) - Scott Feulner
2321 Whitney Avenue
Suite 301
Hamden CT 06518

02/12/2015
CS#: 183-481

Bulk sample(s) from Site 026 (Burns) - Application #1846, 3 Marsh Road, Westport, CT collected by Leigh Elijah on 02/05/2015

Asbestos Identification in the samples. Examination made by Polarized Light Microscopy (PLM) per EPA Test Method 600/R-93/116

Sample Identification	Findings (Analyzed 02/12/2015)
183-481-45 Grey hard grout (from grey hard cinderblock foundation debris)/Exterior Crawlspace, B wall	*No Asbestos Detected* *93% Non Fibrous Particles* *7% Volatile on Ignition*
183-481-46 Grey hard grout (from grey hard cinderblock foundation debris)/Exterior Crawlspace, B wall	*No Asbestos Detected* *91% Non Fibrous Particles* *9% Volatile on Ignition*
183-481-47 Grey hard cinderblock (from sample #45)/Exterior Crawlspace, B wall	*No Asbestos Detected* *92% Non Fibrous Particles* *8% Volatile on Ignition*
183-481-48 Grey hard cinderblock (from sample #46)/Exterior Crawlspace, B wall	*No Asbestos Detected* *91% Non Fibrous Particles* *9% Volatile on Ignition*
183-481-49 Grey hard grout/mortar (from red hard brick chimney)/Exterior Crawlspace, D wall	*No Asbestos Detected* *93% Non Fibrous Particles* *7% Volatile on Ignition*

Bulk sample(s) from Site 026 (Burns) - Application #1846, 3 Marsh Road, Westport, CT collected by Leigh Elijah on 02/05/2015

Asbestos Identification in the samples. Examination made by Polarized Light Microscopy (PLM) per EPA Test Method 600/R-93/116

Sample Identification	**Findings (Analyzed 02/12/2015)**
183-481-50 Grey hard grout/mortar (from red hard brick chimney)/Exterior Crawlspace, D wall	*No Asbestos Detected* *94% Non Fibrous Particles* *6% Volatile on Ignition*
183-481-51 Red hard brick (from sample #49)/Exterior Crawlspace, D wall	*No Asbestos Detected* *91% Non Fibrous Particles* *9% Volatile on Ignition*
183-481-52 Red hard brick (from sample #50)/Exterior Crawlspace, D wall	*No Asbestos Detected* *88% Non Fibrous Particles* *12% Volatile on Ignition*
183-481-53 Mixed yellow and white pliable window caulking (from between wood and glass, 5'x6' A Window)/Exterior, First Floor, 1-2 Office	*No Asbestos Detected* *20% Non Fibrous Particles* *80% Volatile on Ignition*
183-481-54 Mixed yellow and white pliable window caulking (from between wood and glass, 5'x6' A Window)/Exterior, First Floor, 1-2 Office	*No Asbestos Detected* *20% Non Fibrous Particles* *80% Volatile on Ignition*
183-481-55 Reddish brown hard glazing (from between wood and glass, from under white crumbly caulking, 2'x1.5' lower center A Window)/Exterior, First Floor, 1-2 Office	*No Asbestos Detected* *67% Non Fibrous Particles* *33% Volatile on Ignition*
183-481-56 Reddish brown hard glazing (from between wood and glass, from under white crumbly caulking, 2'x1.5' lower center A Window)/Exterior, First Floor, 1-2 Office	*No Asbestos Detected* *66% Non Fibrous Particles* *34% Volatile on Ignition*

Bulk sample(s) from Site 026 (Burns) - Application #1846, 3 Marsh Road, Westport, CT collected by Leigh Elijah on 02/05/2015

Asbestos Identification in the samples. Examination made by Polarized Light Microscopy (PLM) per EPA Test Method 600/R-93/116

Sample Identification	**Findings (Analyzed 02/12/2015)**
183-481-57 White crumbly caulking (from sample #55)/Exterior, First Floor,1-2 Office	*No Asbestos Detected* *68% Non Fibrous Particles* *32% Volatile on Ignition*
183-481-58 White crumbly caulking (from sample #56)/Exterior, First Floor, 1-2 Office	*No Asbestos Detected* *66% Non Fibrous Particles* *34% Volatile on Ignition*
183-481-59 Bluish clear pliable caulking (from between glass and wood, at 6" x 1.5' window (1 of 2) on A wall)/Exterior, First Floor, 1-2 Office	*No Asbestos Detected* *6% Non Fibrous Particles* *94% Volatile on Ignition*
183-481-60 Bluish clear pliable caulking (from between glass and wood, at 6" x 1.5' window (1 of 2) on A wall)/Exterior, First Floor, 1-2 Office	*No Asbestos Detected* *9% Non Fibrous Particles* *91% Volatile on Ignition*
183-481-61 Mixed white and black pliable caulking (from between glass and wood, at 1.5'x2' C1 Window)/Exterior, First Floor, 1-8 Bath	*No Asbestos Detected* *56% Non Fibrous Particles* *3% Wollastonite* *41% Volatile on Ignition*
183-481-62 Mixed white and black pliable caulking (from between glass and wood, at 1.5'x2' C1 Window)/Exterior, First Floor,1-8 Bath	*No Asbestos Detected* *55% Non Fibrous Particles* *45% Volatile on Ignition*
183-481-63 Clear pliable caulking (from between glass and wood, at interior 2 'x 5.5' window on door to porch)/Interior, First Floor, 1-5 Back Hall	*No Asbestos Detected* *45% Non Fibrous Particles* *55% Volatile on Ignition*

Bulk sample(s) from Site 026 (Burns) - Application #1846, 3 Marsh Road, Westport, CT collected by Leigh Elijah on 02/05/2015

Asbestos Identification in the samples. Examination made by Polarized Light Microscopy (PLM) per EPA Test Method 600/R-93/116

Sample Identification	**Findings (Analyzed 02/12/2015)**
183-481-64 Clear pliable caulking (with white pliable caulking, from between glass and wood, at interior 5'x6' A wall window)/Interior, First Floor,1-2 Office	*No Asbestos Detected* *45% Non Fibrous Particles* *55% Volatile on Ignition*
183-481-65 White pliable caulking (from sample #64)/Interior, First Floor, 1-2 Office	*No Asbestos Detected* *47% Non Fibrous Particles* *53% Volatile on Ignition*
183-481-66 White pliable caulking (with clear pliable caulking, from between glass and wood, at interior 5'x6' A wall window)/Interior, First Floor, 1-2 Office	*No Asbestos Detected* *69% Non Fibrous Particles* *31% Volatile on Drying*
183-481-67 White hard glazing (with clear pliable caulking, from between glass and wood, at interior 6"x1.5' A wall window (1 of 2))/Interior, First Floor,1-2 Office	*No Asbestos Detected* *93% Non Fibrous Particles* *7% Volatile on Drying*
183-481-68 White hard glazing (with clear pliable caulking, from between glass and wood, at interior 6"x1.5' A wall window (1 of 2))/Interior, First Floor, 1-2 Office	*No Asbestos Detected* *91% Non Fibrous Particles* *9% Volatile on Drying*

PARAMETERS
ASBESTOS PLM ANALYSIS
(Revised 3/22/13)

1. *Materials which contain >1% asbestos (greater than 1%) by PLM (polarizing light microscopy) analysis are considered to be asbestos containing materials under EPA and the State of Connecticut Regulations. OSHA still regulates material with <1%. (Contact laboratory for information.) {Note: A more sensitive method is available called TEM (transmission electron microscopy). TEM may detect asbestos fibers that PLM cannot see, but the above agencies' enforcement is based on PLM analysis. Rules may differ for states other than Connecticut. It is best to check with the individual state. For example, New York State requires TEM confirmation of negative PLM results on floor tile}.*

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3. *Floor Tile Mastic: Mastic under floor tile should be separately sampled by scraping some of the mastic from the floor to avoid contamination from the floor tile.*

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6. *Results reported apply only to the sample(s) analyzed.*

7. *Special treatment of samples: Chem Scope, Inc. routinely uses gravimetric sample reduction techniques such as low temperature ashing or acid dissolution on samples like floor tile, roofing materials, glue dots, or high cellulose content samples prior to PLM analysis. These methods are used to aid in the PLM analysis and to provide better quantitative data. Layered samples, if possible, are analyzed separately as individual layers. However, in accordance with the method, if any layer contains >1% asbestos (greater than 1%) it is to be considered an asbestos containing material. All results are reported to the original sample basis.*

8. *Sample results are not corrected for blanks. Analytical blanks are run daily and if contamination is suspected the samples are rerun.*

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This report pertains only to the samples tested and may not be reproduced in part.
Condition of the samples at the time of receipt was acceptable unless otherwise noted on the Certificate of Analysis.
See test parameters above and attached chain of custody form.
We would love to hear from you. Comments? Questions? Please call or email us at chem.scope@snet.net

ChemScope, Inc. is accredited by AIHA LAP, LLC LAB #100134
NVLAB Lab Code 101061-0.
Connecticut Department of Public Health (DPH) Approved Environmental Lab PH 0581

Signature	Signature (if applicable)	Authorized Signature or	Authorized Signature	or Authorized Signature
Analyst	Inspector	Suzanne Cristante Laboratory Director	Izabela Kremens Quality Manager	Ronald D. Arena President

Form FL-4 Rev 11/12/13
(Issued By SC)

ChemScope *INDUSTRIAL HYGIENE • ENVIRONMENTAL CHEMISTRY*

15 Moulthrop Street, North Haven, CT 06473-3686 • Phone (203) 865-5605 • Fax (203) 498-1610

Emailed_____
Faxed_____
Called_____
Logged_____

Chain of Custody

Site 026 (Burns) - Application #1846

Sample Source: 3 Marsh Road, Westport, CT CS Job #183-481

Sampled By: Leigh Sligh Date Sampled: 2/5/15 Customer Name: Diversified Technology Consultants (DTC) - Scott Feulner

CS Sample#	Client Sample#	Sample Description	Comments
183-481(15-68)		see attached	

Sample Turnaround: 1 week (Thu)

Analysis Requested (if variable, use comment column): PLM

Check if you want sample returned _____(sample will be disposed of after 30days).

Relinquished by LH Date 2/5/15 Time 3:20pm Received By Lab Inbox

Relinquished by_____ Date _____ Time _____ Received By_____

Other Special Instructions:_____

Result Transmittal Instructions (for Chem Scope to transmit): Tell LH/DS

FOR CHEM SCOPE, INC. TO FILL OUT IF SAMPLES ARE GOING TO OUTSIDE LABORATORY:

Name of Laboratory:_____

Method of Transportation to Laboratory: _____

Result Transmittal Instructions (for outside Laboratory to Chem Scope, Inc):

The person submitting samples is responsible for obtaining true and representative samples, for complying with applicable regulations and for the use of the data obtained from the analysis. For example, many states have licensing and laboratory approval requirements. Please contract the individual states if you have any questions regarding specific sampling or approval requirements. For Connecticut, sites we have licensed inspectors available to collect client samples and to perform building inspections.

Dear Laboratory Customer or Potential Customer,

New laboratory accreditation standards require us to provide our clients information about our services to make sure that your requirements for testing are adequately defined, documented and understood. The following is for your information. Please call us if you have any questions or comments.

Type of Samples
/_/ PCM cassettes are routinely run by NIOSH Method 7400.
/ / Bulk materials are run by EPA Method: #600/R-93/116.

Air Samples: NIOSH 7400 Method counts all fibers. This method may be used for personal air samples and for finals. Two field blanks must be submitted for each set of samples. In the unlikely event that there is to be any deviation from the standard test, you will be consulted by phone before the work begins. Those clients who have not had NIOSH 582 or AHERA asbestos training courses (either supervisor or project monitor) should consult with the lab director for more information. The test parameters are further explained in the analytical report.

Bulk materials: sampled are analyzed by the latest EPA Method: (#600/R-93/116) which uses polarized light microscopy (PLM). When asbestos is detected and the amount is estimated to be less than 10%, we automatically point count the samples. When there are interfering substances present, we may use ashing, acid washing or other procedures described in the method to handle the interference. Those clients who have not had AHERA asbestos training courses (either inspector, supervisor or project designer) should consult with the lab director for more information. The test parameters are further explained in the analytical report.

All Samples must be clearly labeled with source name and identification number or sufficient information from the client to make this sample uniquely identified. (We will then add our notebook #, page # (batch) and unique number within the batch.) Samples must be in a clean, air tight package such as a zip loc bag. Appropriate completed paperwork must accompany the sample. Bulk and air samples may not be submitted in the same package.

As soon as available bench top results will be faxed to you and reports will then be mailed. We will retain air samples for at least three months and bulk samples for 6 months unless you advise us otherwise.

You are welcome to visit the laboratory at any time to discuss the work, monitor the work or verify our testing services. We appreciate your business and encourage any feedback regarding improving our services or our quality system. Please take a minute to complete the following survey and mail/fax it to ChemScope, Inc.

Customer Service Survey

To help us improve our services give your opinions to the following:

1- The printed laboratory report was complete and easy to understand. YES__ NO__
If no, please explain _____.

2- The turn around time for results met your expectations/needs. YES__ NO__
If no, please explain _____.

3- How likely are you to recommend ChemScope Inc. to someone?
Excellent__ Very Good__ Good__ Fair__ Poor__

4- How likely are you to return to ChemScope in the future if the need arises?
Excellent__ Very Good__ Good__ Fair__ Poor__

5. On a scale of 1 to 5 where 1 represents "Satisfied" and 5 represents "Dissatisfied", how would you rate your level of overall satisfaction.
1__ 2__ 3__ 4__ 5__

6- Please add any additional comments or suggestions that would be helpful when you use our services:
_____

Name _____ Company_____

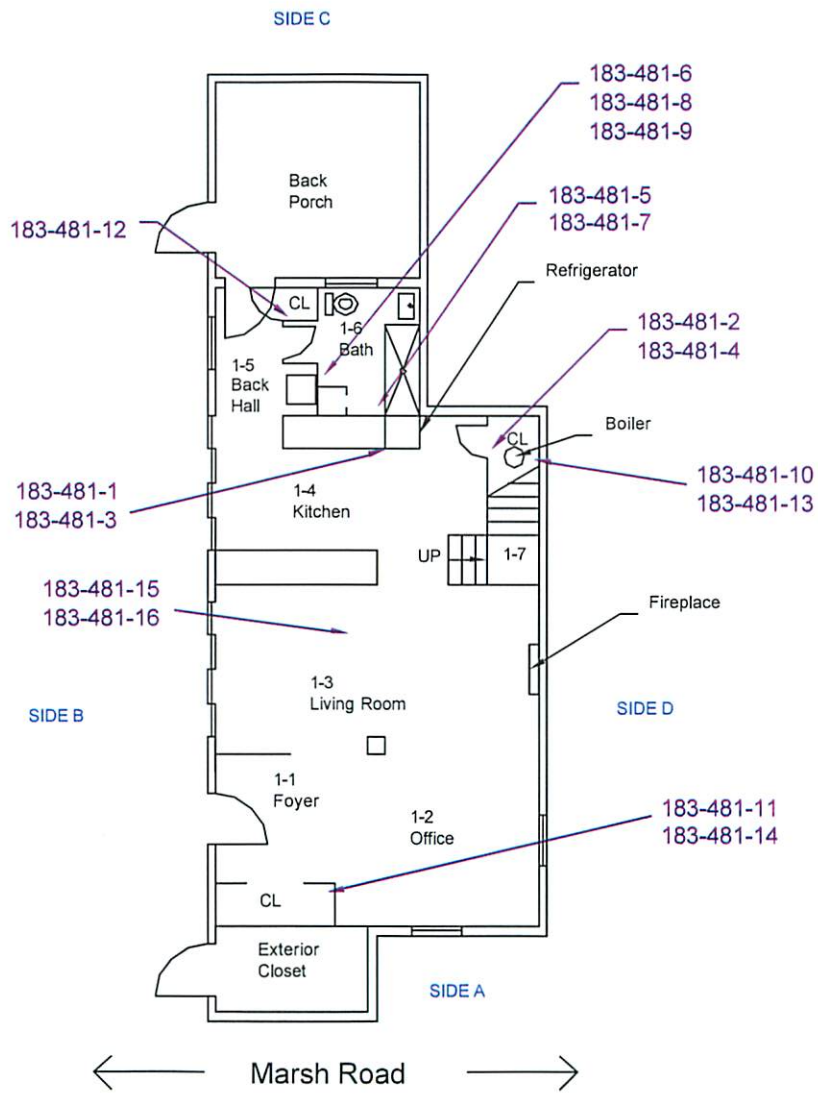
Address_____ Telephone/e-mail_____

Can we contact you regarding this survey? YES__ NO__

ChemScope Inc.

Site 026 - Main Level
3 Marsh Road, Westport, CT
CS# 183-481, 7/1/14

BULK SAMPLE LOCATION DRAWING



LEGEND OF SYMBOLS

1	BULK SAMPLE LOCATIONS

NOTATIONS

LEIGH HONOROF

ChemScope Inc.

ASBESTOS, LEAD & MOLD INSPECTION

3 MARSH RD
WESTPORT, CT

MAIN LEVEL

CS# 183-481

NOT TO SCALE

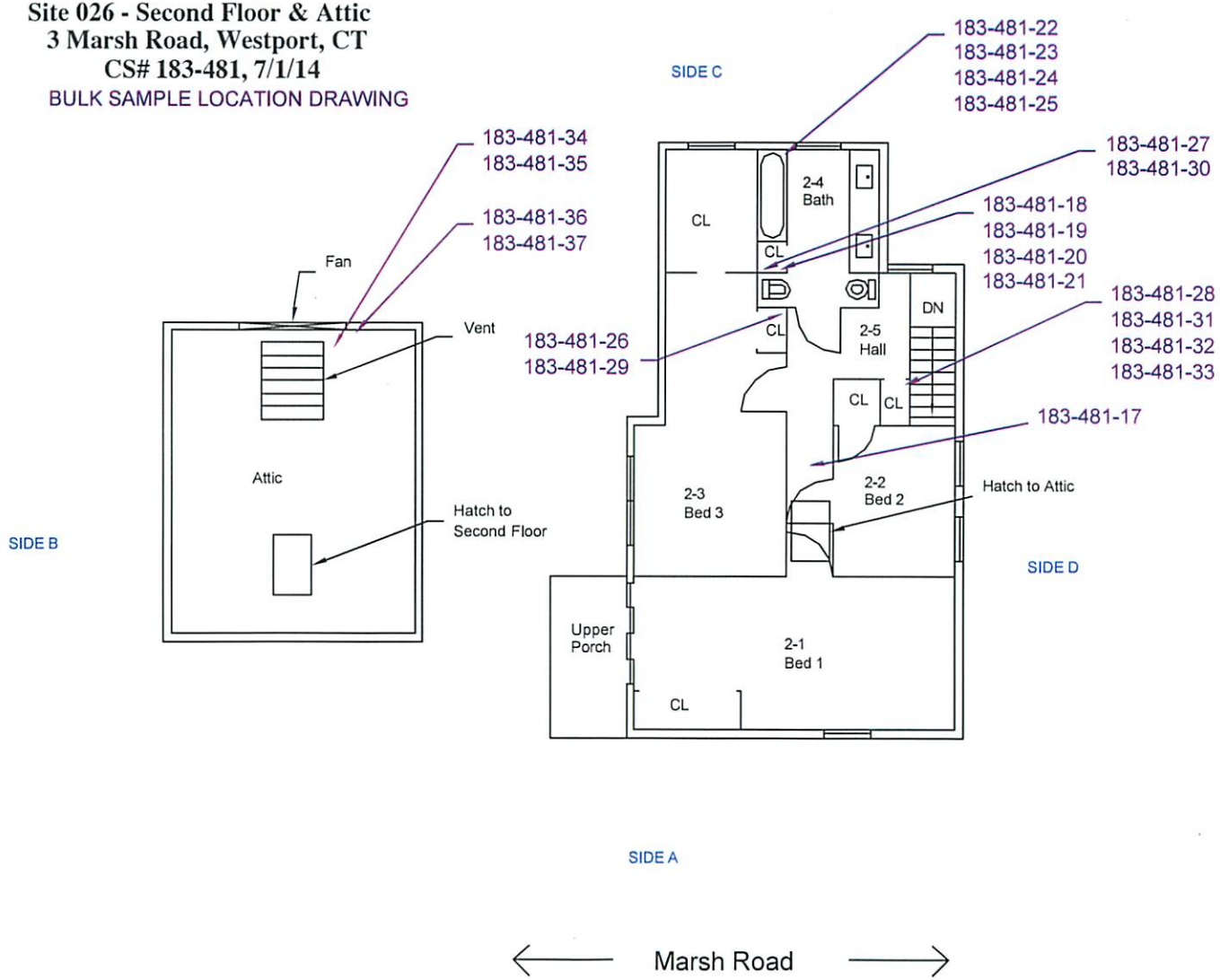
07/01/2014

1 B

ChemScope Inc.

Site 026 - Second Floor & Attic
3 Marsh Road, Westport, CT
CS# 183-481, 7/1/14

BULK SAMPLE LOCATION DRAWING



LEGEND OF SYMBOLS

1	BULK SAMPLE LOCATIONS

NOTATIONS

LEIGH HONOROF

ChemScope Inc.

ASBESTOS, LEAD & MOLD INSPECTION

3 MARSH RD
WESTPORT, CT

SECOND FLOOR & ATTIC

CS# 183-481

NOT TO SCALE

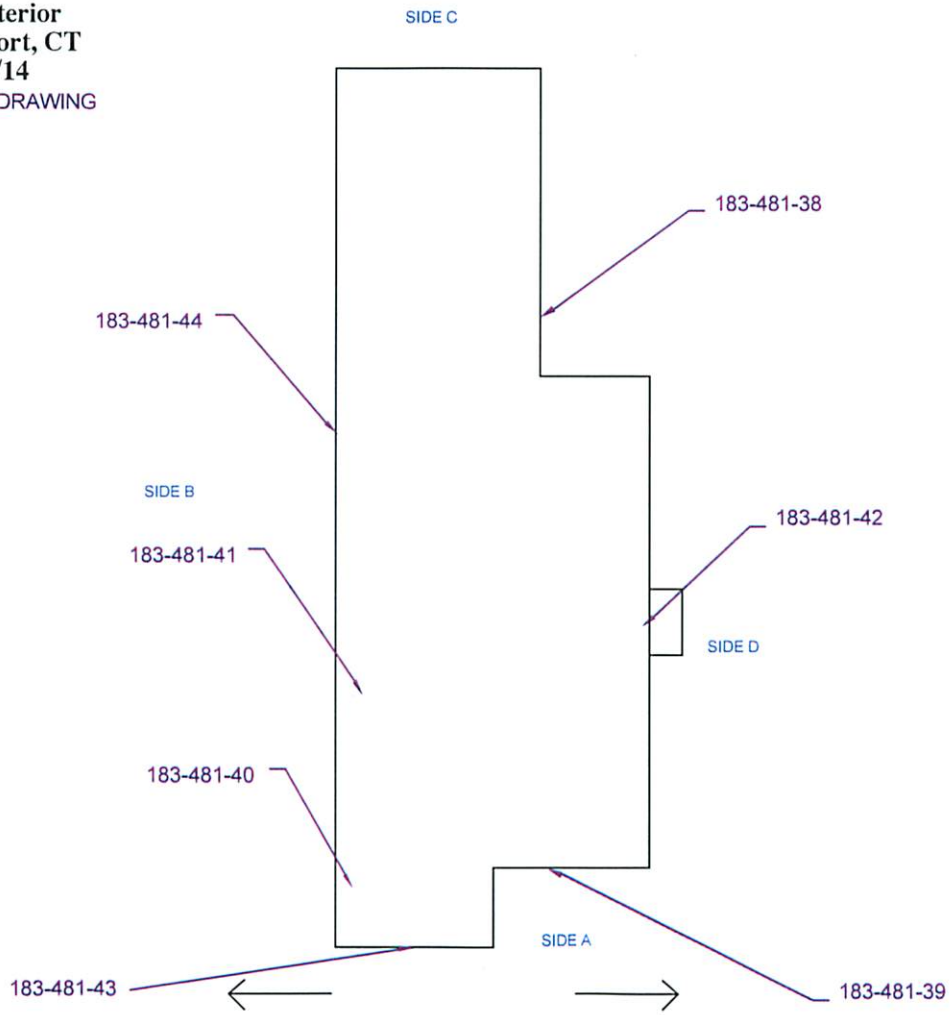
07/01/2014

2 B

ChemScope Inc.

Site 026 - Roof & Exterior
3 Marsh Road, Westport, CT
CS# 183-481, 7/1/14

BULK SAMPLE LOCATION DRAWING



LEGEND OF SYMBOLS

1 [redacted]

NOTATIONS

[redacted] LEIGH HONOROF

ChemScope Inc.

[redacted]

ASBESTOS, LEAD & MOLD INSPECTION

3 MARSH RD
WESTPORT, CT

ROOF
& EXTERIOR

CS# 183-481

NOT TO SCALE

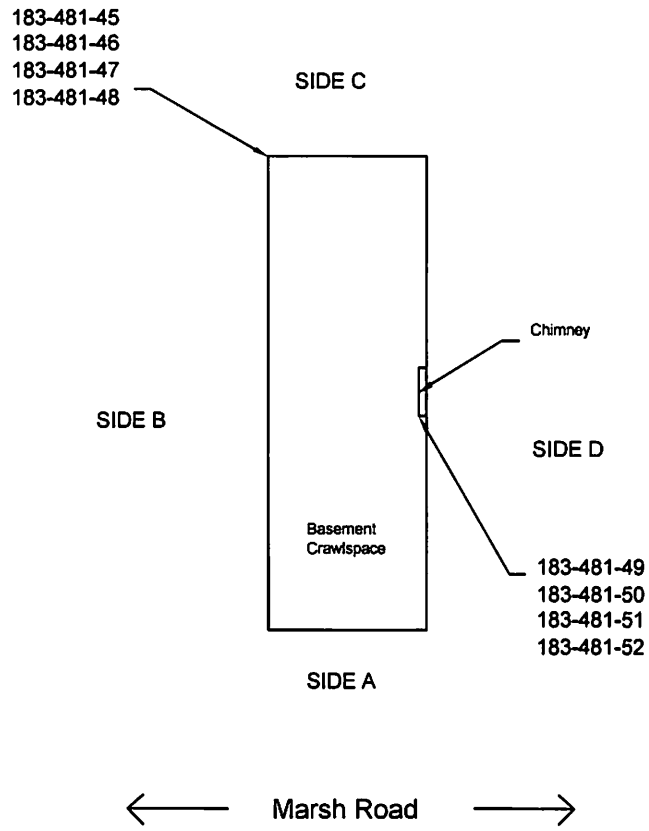
07/01/2014

3 B

ChemScope Inc.

Site 026 - Exterior Basement Crawlspace
3 Marsh Road, Westport, CT
CS# 183-481, 02/05/2015

BULK SAMPLE LOCATION DRAWING



LEGEND OF SYMBOLS

1	[redacted]

NOTATIONS

[redacted]
LEIGH ELIJAH

ChemScope Inc.

[redacted]
ASBESTOS, LEAD & MOLD INSPECTION

3 MARSH RD
WESPORT, CT

BASEMENT CRAWLSPACE

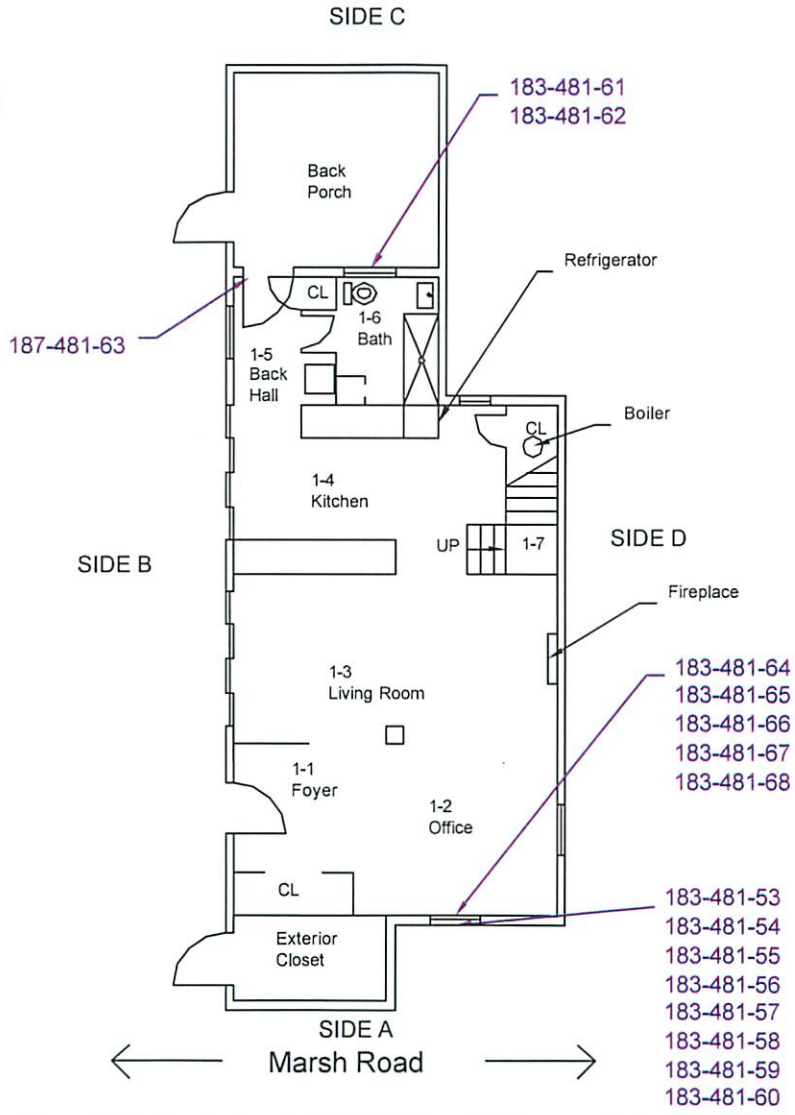
[redacted]
CS# 183-481
[redacted]
NOT TO SCALE
[redacted]
02/05/2015

B B

ChemScope Inc.

Site 026 - Main Level
3 Marsh Road, Westport, CT
CS# 183-481, 02/05/2015

BULK SAMPLE LOCATION DRAWING



LEGEND OF SYMBOLS

1	BULK SAMPLE LOCATIONS

NOTATIONS

LEIGH ELIJAH

ChemScope Inc.

ASBESTOS, LEAD & MOLD INSPECTION

3 MARSH RD
WESPORT, CT

MAIN LEVEL

CS# 183-481

NOT TO SCALE

02/05/2015

1 B

STATE OF CONNECTICUT

DEPARTMENT OF PUBLIC HEALTH

Division of Environmental Health Circular Letter #2003-10

To: **Licensed Project Designers, Licensed Asbestos Abatement Contractors and Connecticut Approved Asbestos Training Providers**

From: **Ronald Skomro, Supervising Environmental Sanitarian**
Asbestos Program

Date: **April 7, 2003**

Subject: **Regulatory Interpretation Regarding Intact Removal of Non-Friable Asbestos-Containing Materials**

A request for regulatory interpretation was made by a licensed asbestos consultant to the Department of Public Health (DPH) concerning the applicability of the DPH regulations to activities involving intact non-friable asbestos-containing materials within a facility. This memorandum addresses the DPH response to the scenarios presented. The following is a list of those activities detailed by the consultant:

- Removal of transite panels by unbolting or unscrewing and removing the panels intact;
- Removal of transite lab-type desk tops by either unbolting or unscrewing and removing the desk top intact, or complete component removal of the entire desk;
- Removal of flexible duct connectors by either unbolting or unscrewing and removing the connector intact, or complete component removal of the entire connector and small portions of the surrounding ductwork;
- Removal of countertops, backsplashes, etc., with linoleum, panel glue, or similar materials by completely removing the entire unit intact;
- Removal of sinks with pan sealant by removing the sink intact;
- Removal of window sashes with window glazing (interior or exterior) by removing the window stops and removing the entire window sash unit intact;
- Picking up loose floor tiles that have become completely disassociated with the floor and are either whole or are slightly broken but are still not considered to be Regulated Asbestos-Containing Material (RACM);
- Picking up loose miscellaneous non-friable items such as rolls of linoleum, loose gaskets, loose shingles, etc.;
- Removal of fire doors containing insulation from their hinges intact for complete component disposal;
- Attaching framing, brackets, etc., to structures by using power actuated tools to shoot/screw/bolt fasteners through the framing, brackets, etc., and through category I non-friable ACM (e.g., floor tile or mastic, cove base, waterproofing tar-like coating, asphalt roofing, gasketing, etc.). (The use of drills or similar tools to drill pilot holes or holes through the materials is not allowed.)

Phone: (860) 509-7367, Fax: (860) 509-7367
Telephone Device for the Deaf (860) 509-7191
410 Capitol Avenue - MS #51AIR
PO Box 340308 Hartford CT 06134
Affirmative Action /An Equal Opportunity Employer

It is the interpretation of the DPH that the activities that are detailed above do not constitute asbestos abatement as defined by Section 19a-332 of the Connecticut General Statutes. Given this interpretation, such activities are not subject to DPH regulation. This interpretation is provided based upon the following understandings:

1. The asbestos-containing material is undamaged and non-friable and remains undamaged and non-friable during the removal or collection of the material. In the case of floor tile characterized as "slightly broken", a case-by-case assessment should be made to determine whether the removal of the tile constitutes asbestos abatement. The DPH shall be contacted directly when such activities are contemplated.
2. The asbestos-containing material is removed intact and without breakage or other disturbance of the material. The material is removed without the creation of a visible residue.
3. The asbestos-containing material is not subject to sanding, cutting, grinding, or abrading during the removal or collection process.
4. The asbestos-containing material does not become a RACM as defined by the asbestos National Emission Standards for Hazardous Air Pollutants (40 CFR Part 61, Subpart M).

It should be noted that asbestos-containing waste generated as a result of these activities must be disposed of as asbestos waste at an authorized waste disposal facility. Questions regarding the disposal of asbestos-containing material within the State of Connecticut should be directed to the Connecticut Department of Environmental Protections at (860) 424-3366.

This interpretation does not relieve the owner of the facility in which these activities are performed, or the operator of these activities from complying with the provisions of all other applicable federal, state, or local regulations.

SECTION 024116 - STRUCTURE DEMOLITION

PART 1 - GENERAL

1.1 SUMMARY

A. Section Includes:
1. Demolition and removal of buildings and site improvements.
2. Removing below-grade construction.
3. Disconnecting, capping or sealing, and removing site utilities.
4. Salvaging items for reuse by Owner.

B. Related Requirements:
1. Section 003126 – Existing Hazardous Material Information
2. Section 011000 "Summary" for use of the premises and phasing requirements.
3. Section 020800 Asbestos Removal
4. Section 312000 "Earth Moving" for site clearing and removal of above- and below-grade site improvements not part of building demolition.

1.2 MATERIALS OWNERSHIP

A. Unless otherwise indicated, demolition waste becomes property of Contractor.

B. Salvage Items are identified in these specifications and on the plans. They shall become part of the project or turned over to the owner as indicated.

1.3 INFORMATIONAL SUBMITTALS

A. Pre-demolition Photographs: Show existing conditions of adjoining construction and site improvements, including finish surfaces that might be misconstrued as damage caused by demolition operations. Submit formally to Engineer for Record prior to start of work.

1.4 FIELD CONDITIONS

A. Buildings to be demolished will be vacated and their use discontinued before start of the Work.

B. Buildings immediately adjacent to demolition area will be occupied. Conduct building demolition so operations of occupied buildings will not be disrupted.
1. Provide not less than 72 hours' notice of activities that will affect operations of adjacent occupied buildings.
2. Maintain access to existing walkways, exits, and other facilities used by occupants of adjacent buildings. Do not close or obstruct walkways, exits, or other facilities used by occupants of adjacent buildings without written permission from authorities having jurisdiction.

C. Hazardous Materials: Present in buildings and structures to be demolished. A report on the presence of hazardous materials is on file for review and use. Examine report to become aware of locations where hazardous materials are present.
1. Asbestos Containing material remediation is specified elsewhere in the Contract Documents.
2. Do not disturb asbestos containing building materials or items suspected of containing hazardous materials except under procedures specified elsewhere in the Contract Documents.
3. Lead Materials: See Lead Inspection Report Included as part of these contract documents. Lead is present at the building. See attached report including XRF lead sreening and Hazardous Waste Evaluation with determination that the waste is not likely

to be a lead hazardous waste in accordance with DEEP guidance documents. Follow all recommendations regarding handling of waste.

a. Lead (as defined by OSHA regulations 29 CFR 1926.62) and Lead Based Paint (as defined by USC Title 15 – Chapter 53- Toxic Substance Control) and also above state DPH standards was detected on surfaces and/or components. This will require workers disturbing Lead to be properly protected and trained including personal air sampling on the workers. The concentrations determined by the personal samples will determine the level of protection required by OSHA

D. On-site storage or sale of demolished items or materials is not permitted.

1.5 COORDINATION

A. Arrange demolition schedule to coordinate with the work of other onsite activity. Coordinate demolition activities with hazardous material removal activities.

B. Coordinate with Utilities for Utility Shutdown and service relocations.

C. Coordinate disciplines for removal of salvage items to be turned over to owner or installed as part of the work.

PART 2 - PRODUCTS

2.1 PERFORMANCE REQUIREMENTS

A. Regulatory Requirements: Comply with governing EPA notification regulations before beginning demolition. Comply with hauling and disposal regulations of authorities having jurisdiction.

B. Standards: Comply with ASSE A10.6 and NFPA 241.

2.2 SOIL MATERIALS

A. Satisfactory Soils: Comply with requirements in Section 312000 "Earth Moving."

PART 3 - EXECUTION

3.1 EXAMINATION

A. Verify that utilities have been disconnected and capped before starting demolition operations.

B. Review Project Record Documents of existing construction or other existing condition and hazardous material information provided by Owner. Owner does not guarantee that existing conditions are same as those indicated in Project Record Documents.

C. Verify that hazardous materials have been remediated before proceeding with building demolition operations.

D. Inventory and record the condition of items to be removed and salvaged. Provide photographs or video of conditions that might be misconstrued as damage caused by salvage operations.

3.2 UTILITY SERVICES AND MECHANICAL/ELECTRICAL SYSTEMS

A. Existing Utilities to be Disconnected: Locate, identify, disconnect, and seal or cap off utilities serving buildings and structures to be demolished.

1. Arrange to shut off utilities with utility companies.
2. If removal, relocation, or abandonment of utility services will affect adjacent occupied buildings, then provide temporary utilities that bypass buildings and structures to be demolished and that maintain continuity of service to other buildings and structures.
3. Cut off pipe or conduit at locations and depths required for new construction activities and a minimum of 24 inches below grade. Cap, valve, or plug and seal remaining portion of pipe or conduit after bypassing according to requirements of authorities having jurisdiction.
4. Do not start demolition work until utility disconnecting and sealing have been completed and verified in writing.

3.3 PROTECTION

A. Existing Facilities: Protect adjacent walkways, properties, and facilities during demolition operations.

B. Temporary Shoring: Provide and maintain interior and exterior shoring, bracing, or structural support to preserve stability and prevent unexpected movement or collapse of construction being demolished.

C. Temporary Protection: Erect temporary protection, such as walks, fences, railings, canopies, and covered passageways, where required by authorities having jurisdiction and as indicated. Comply with requirements in Section 015000 "Temporary Facilities and Controls."
   1. Protect adjacent buildings and facilities from damage due to demolition activities.
   2. Protect existing site improvements, appurtenances, and landscaping to remain.
   3. Erect a plainly visible fence around drip line of individual trees or around perimeter drip line of groups of trees to remain.
   4. Provide temporary barricades and other protection required to prevent injury to people and damage to adjacent buildings and facilities to remain.
   5. Provide protection to ensure safe passage of people around building demolition area and to and from occupied portions of adjacent buildings and structures.
   6. Protect walls, windows, roofs, and other adjacent exterior construction that are to remain and that are exposed to building demolition operations.
   7. Erect and maintain dustproof partitions and temporary enclosures to limit dust, noise, and dirt migration to occupied portions of adjacent buildings.

3.4 DEMOLITION, GENERAL

A. General: Demolish the house completely. Protect Garage to remain during demolition and construction activities. Use methods required to complete the Work within limitations of governing regulations.

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

   1. Use water mist and other suitable methods to limit spread of dust and dirt. Comply with governing environmental-protection regulations. Do not use water when it may damage adjacent construction or create hazardous or objectionable conditions, such as ice, flooding, and pollution.

C. Explosives: Use of explosives is not permitted.

3.5 DEMOLITION BY MECHANICAL MEANS

A. Proceed with demolition of structural framing members systematically, from higher to lower level. Complete building demolition operations above each floor or tier before disturbing supporting members on the next lower level.

B. Remove debris from elevated portions of the building by chute, hoist, or other device that will convey debris to grade level in a controlled descent.

   1. Remove structural framing members and lower to ground by method suitable to minimize ground impact and dust generation.

C. Salvage:
   1. Clean salvaged items of dirt and demolition debris.
   2. Pack or crate items after cleaning. Identify contents of containers.
   3. Store items in a secure area.

4. Protect items from damage during transport and storage.
5. Items to be removed and salvaged are indicated on Drawings or below.

D. Below-Grade Construction: Demolish foundation walls and other below-grade construction. Remove below-grade construction, including basements, foundation walls, and footings, completely.

1. Completely fill below-grade areas and voids resulting from building demolition operations with structural fill according to backfill requirements in Section 312000 "Earth Moving

E. Existing Utilities: Demolish existing utilities and below-grade utility structures unless being re-used. Fill abandoned utility structures with lean concrete or satisfactory soil materials in accordance with Section 312000 "Earth Moving."

3.6 REPAIRS

A. Promptly repair damage to adjacent buildings caused by demolition operations.

3.7 DISPOSAL OF DEMOLISHED MATERIALS

A. Remove demolition waste materials from Project site. Do not allow demolished materials to accumulate on-site. Remove and transport debris in a manner that will prevent spillage on adjacent surfaces and areas.

B. Do not burn demolished materials.

3.8 CLEANING

A. Clean adjacent structures and improvements of dust, dirt, and debris caused by building demolition operations. Clean roadways of debris caused by debris transport.

3.9 SCHEDULE OF SALVAGE ITEMS:

A. Refrigerator: To be stored during construction and installed at completion of construction.

B. Tub: To be stored during construction and remain on site.

C. Windows: As directed by the owner.

D. Sink: Large old washsink not installed shall remain on-site.

END OF SECTION 024116

SECTION 033000 - CONCRETE WORK

1.0 GENERAL

A. Related Sections:
   a. Quality Requirements: Section 014000
   b. Rough Carpentry: Section 061000
   c. Helical Piles: Section 316320

1.1 SCOPE

A. Extent of concrete:
   a. Slab on Grade Concrete
   b. Exterior Concrete
   c. Formed Cast-in-Place Concrete
   d. Concrete Reinforcing
   e. Misc. Concrete items.

1.2 SUBMITTALS

A. Refer to Section 01300.

B. Shop Drawings; Reinforcement: Submit original shop drawings for fabrication, bending, and placement of concrete reinforcement. Comply with ACI 315 "Manual of Standard Practice for Detailing Reinforced Concrete Structures" showing bar schedules, stirrup spacing, diagrams of bent bars, and arrangement of concrete reinforcement. Include special reinforcement required for openings through concrete structures.

C. Submit the following:

   1. Shop drawings and bending schedules of reinforcing.

   2. Procedures for hot weather and cold weather concreting. Include requirements for placing, protection, curing, and adjusting concrete mixes.

D. Mix designs:

   Submit data confirming concrete mix proportions. Submit one form for each class of concrete specified at least 15 days prior to start of work. Do not begin production until mixes have been reviewed by the Architect/Engineer.

E. Production facility standard deviation records:

   Only required if excess concrete strength requirement for trial mixes is less than 1,200 psi.

F. Cylinder test reports.

1.3 QUALITY ASSURANCE

A. Codes and Standards: Comply with provisions of following codes, specifications, and standards, except where more stringent requirements are shown or specified:

ACI 301 "Specifications for Structural Concrete for Buildings".
ACI 318 "Building Code Requirements for Reinforced Concrete".
Concrete Reinforcing Steel Institute (CRSI), "Manual of Standard Practice".
ACI 304 "Recommended Practice for Measuring, Mixing Transporting, and Placing Concrete".
ACI 305 "Hot Weather Concreting".
ACI 306 "Cold Weather Concreting".
ACI 315 "Details and Detailing of Concrete Reinforcement".
ACI 347 "Recommended Practice for Concrete Formwork".
ACI 211 "Recommended Practice for Selecting Proportions for Normal and Heavyweight Concrete".
ACI 214 "Recommended Practice for Evaluation of Compressive Test Results of Concrete".
ACI 302 "Guide for Concrete Floor and Slab Construction".
ACI 201 "Guide to Durable Concrete".

1.4 PROJECT CONDITIONS

A. Protection of Footings against Freezing: Cover completed work at footing level with sufficient temporary or permanent cover as required to protect footings and adjacent sub-grade against possibility of freezing; maintain cover for time period as necessary.

B. Protection of Cast-In-Place Concrete: Follow ACI Recommendations for weather protection. Provide complete cover of concrete to protect against the adverse effects of cold, heat, wind, rain, and flood. Protection shall be secured as to maintain proper curing conditions for the full 2 week cure period. Provide temporary heat or heated blankets to maintain 40degree temperatures required for concrete curing.

C. Dewatering: Reference dewatering specification. Protect concrete from flooding by excessive rain, high tides, or high water tables during initial set.

1.5 FIELD QUALITY CONTROL

A. The testing laboratory will analyze the proposed concrete design mix and sample and test aggregate and concrete as follows:

Fine aggregate tests: organic content, sieve analysis, fineness modulus.

Coarse aggregate tests: sieve analysis

Mix design: refer to Section 03310 for requirements and submittal format.

B. The Testing Laboratory will perform the following field tests:

1. Secure samples in accordance with ASTM C 172, except modified for slump to comply with ASTM C94.

2. Slump: ASTM C 143; one test for each 100 cubic yards, or fraction thereof, at point of discharge for each day's pour of each type of concrete; additional tests when concrete consistency seems to have changed.

3. Air Content: ASTM C 173, volumetric method for lightweight or normal weight concrete; ASTM C 231 pressure method for normal weight concrete; one for each day's pour of each type of air-entrained concrete.

4. Concrete Temperature: Test hourly when air temperature is 40 deg. F (4 deg C) and below, and when 80 deg F (27 deg C) and above; and each time a set of compression test specimens is made.

5. Compression Test Specimen: ASTM C 31; one set of 4 standard cylinders for each compressive strength test, unless otherwise directed. Mold and store cylinders for laboratory cured test specimens except when field-cure test specimens are required.

6. Compressive Strength Tests: ASTM C 31; one set for each day's pour exceeding 5 cu. yds. Plus additional sets for each 50 cu. yds. Over and above the first 25 cu. yds. Of each concrete class placed in any one day' one specimen tested at 7 days, two specimens tested at 28 days, and one specimen retained in reserve for alter testing if required.

7. When frequency of testing will provide less than 5 strength tests for a given class of concrete, conduct testing from at least 5 randomly selected batches or from each batch if fewer than 5 are used.

8. Strength level of concrete will be considered satisfactory if averages of sets of three consecutive strength test results equal or exceed specified compressive strength, and no individual strength test result falls below specified compressive strength by more than 500 psi.

9. Test results will be reported in writing to Structural engineer and Contractor within 24 hours after tests. Reports of compressive strength tests shall contain the project identification name and number, date of concrete placement, name of concrete testing service, concrete type and class, location of concrete batch in structure, design compressive strength at 28 days, concrete mix proportions and materials; compressive breaking strength and type of break for both 7-day tests and 28-day tests.

10. Reinforcing: The testing service will inspect the location and installation details of reinforcing steel for compliance with the approved drawings, specifications and AC1 318.

2.0 PRODUCTS

2.1 FORM MATERIALS

A. Forms for Concrete: Plywood, metal, metal-framed plywood faced, or other acceptable panel-type materials, to provide continuous, straight, smooth, exposed surfaces. Furnish in largest practicable sizes to minimize number of joints and to conform to joint system shown on drawings.

B. Form Coatings: Provide commercial formulation form-coating compounds that will not bond with, stain nor adversely affect concrete surfaces, and will not impair subsequent treatments of concrete surfaces, such as sealants or dampproofing. Provide such as “Crete-Lease 880 VOC” by Cresset Chemical Company, a non-staining liquid chemical release agent which will not leave any kerosene, oil or wax residue to interfere with bonding of sealants and dampproofing material.

Form ties: Steel wire snap ties with positive breakbacks which will leave no metal closer than 1-1/2” from formed surface of concrete, leaving a cone-shaped recess 1” in diameter and 1-1/2” deep.

2.2 REINFORCING MATERIALS

A. Reinforcing Bars: ASTM A 615, Grade 60, deformed.

B. Welded Wire Fabric: ASTM A 185, welded steel wire fabric. All mesh reinforcement shall be furnished in flat sheets.

C. Supports for Reinforcement: Bolsters, chairs, spacers, and other devices for spacing, supporting, and fastening reinforcing bars and welded wire fabric in place. Use wire bar type supports complying with CRSI specifications.

For slabs-on-grade, use supports with horizontal runners.

2.3 CONCRETE MATERIALS

A. Portland Cement: ASTM C 150, Type I, American made. For Architectural Concrete use White Cement conforming to ASTM C 150, Type I American made.

Use one brand of cement throughout project, unless otherwise acceptable to Architect/Engineer.

B. Aggregates: ASTM C 33, ASTM C330 for lightweight aggregates and as herein specified.

Provide aggregates from a single source for exposed concrete.

Fine Aggregate: clean, washed sharp sand, uniformly graded fine to coarse as approved with no more than 5% passing 100 sieve when sand is thoroughly dry.

Coarse Aggregate: clean washed gravel or crushed trap rock, or combination thereof, graded in accordance with ASTM C 33 size number 67 (3/4" aggregate).

Sand (for bonding grout): ASTM C 144.

C. Water: Clean, free from deleterious amounts of acid, alkalis, and organic materials.

D. Air-Entraining Admixture: ASTM C 260, certified by manufacturer to be compatible with other required admixtures.

Products: Provide one of the following:

"Air-Mix"; Euclid Chemical Co.
"MB-VR"; Master Builders.
"Darex"; W.R. Grace.

E. Water-Reducing Admixture: ASTM C 494, Type A, and containing not more than 0.1 percent chloride ions by weight of cement.

Products: Provide one of the following:

"WRDA Hycol"; W.R. Grace.
"Eucon WR-75"; Euclid Chemical Co.
"Pozzolith 122N"; Master Builders.

F. High-Range Water-Reducing Admixture (Superplasticizer): ASTM C 494, Type F or Type G and containing not more than 0.1 percent chloride ions by weight of cement.

Products: Provide one of the following:

"Daracem"; W.R. Grace.
"Eucon 37"; Euclid Chemical Co.
"Rheobuild"; Master Builders.

G. Water-Reducing, Non-Chloride Accelerator Admixture: ASTM C 494, Type C or E, and containing not more than 0.1 percent chloride ions by weight of cement.

Products: Provide one of the following:

"Accelguard 80"; Euclid Chemical Co.
"Pozzotec 20"; Master Builders.
"Daraset Accelerator": W. R. Grace

H. Water-Reducing, Retarding Admixture: ASTM C 494, Type D, and containing not more than 0.1 percent chloride ions by weight of cement.

Products: Provide one of the following:

"Pozzolith 122R"; Master Builders.
"Eucon Retarder 75"; Euclid Chemical Co.
"Daratard"; W.R. Grace.

I. Prohibited Admixtures: Calcium chloride thyocyanates or admixtures containing more than 0.1 percent chloride ions are not permitted.

2.4 RELATED MATERIALS

A. Bonding Compound: Acrylic or Styrene Butadiene:

Products: Provide one of the following:

"J-40 Bonding Agent"; Dayton Superior Corp.
"Everbond"; L & M Construction Chemicals.
"SBR Latex"; Euclid Chemical Company.

"Daraweld C"; W. R. Grace Company.

B. Absorptive Cover: Burlap cloth made from jute or kenaf, weighing approximately 9 oz. per sq. yd., complying with AASHTO M 182, Class 2.

C. Moisture-Retaining Cover: One of the following, complying with ASTM C 171:

Waterproof paper.
Polyethylene film.
Polyethylene-coated burlap.

D. Liquid Membrane-Forming Curing Compound: Liquid type membrane curing compound complying with Federal Specification TT-C-800A(1). Liquid type membrane curing compound shall be a film-type high solids (30% solids minimum) curing and sealing compound.

Products: Provide one of the following:

"Masterkure"; Master Builders.
"Super Pliocure"; Euclid Chemical Co.
"Proseal 30"; Prokrete Industries
"Day-Chem Cure & Seal"; Dayton Superior

E. Premoulded Joint Filler: Homex 300 expansion joint filler, ¼" thick by full depth of slab as manufactured by Homasote Company. Equivalent non-bituminous material may be used if approved by the Architect/Engineer.

2.5 PROPORTIONING AND DESIGN OF MIXES

A. Contractor shall be solely responsible for providing concrete to meet strength requirements.

B. Composition:

The concrete shall be composed of Portland Cement, fine aggregate, coarse aggregate, water reducing admixture, water, and air entraining admixture where required.

Materials shall conform to Article MATERIALS above and to applicable sections of referenced standards.

C. Density:

The unit weight (air dry) of normal weight concrete at 28 days shall be between 140 and 150 lbs. per cu. ft.

E. Selection of Concrete Proportions by Performance Data:

The concrete shall be proportioned to produce an average strength level exceeding the required strength. Adequacy of concrete strength shall be confirmed by records of 30 consecutive strength tests representing concrete having identical materials, proportions, air content and slump to that

specified for each class of concrete specified. The 30 consecutive strength test records must have been obtained within the year preceding submission.

2.6 CONCRETE PROPERTIES

A. Use compressive strengths of concrete as shown on the drawings and classes of concrete generally as tabulated below:

Class I: All exterior concrete, including, but not limited to, walls, foundations and slabs.

Class	Strength @	Maximum		
	28 Days	Water/Cement	Slump	Special
Requirements				
I	4000 PSI	0.54	4”	Note (1), Note (2) +3

Slump values are those which will be measured at the point of discharge and prior to the addition of superplasticizer

Note (1) Use water reducing admixture.

Note (2) Use air-entraining admixture.

Note (3) High range water reducing admixture (super-plasticizer) may be used to increase slump to a maximum value of 8".

B. Evaluation and acceptance of Concrete:

The evaluation and acceptance of concrete shall be governed by "Building Code Requirements for Reinforced Concrete" (ACI 318).

In general, the strength level of the concrete will be considered satisfactory if the averages of all sets of three consecutively tested concrete specimens equal or exceed the required strength and no individual strength test result falls below the required strength by more than 500 PSI.

If the above requirements are not met, and if the likelihood of low strength concrete is confirmed, additional tests shall be performed at the contractor's expense as outlined in Chapter 4 of the ACI 318 Code or other action appropriate to the circumstances and as determined by the Architect/Engineer shall be taken to assure the load-carrying capacity of the structure under design loads.

C. Admixtures:

Use water-reducing admixture in concrete as required for placement and workability.

Use non-chloride accelerating admixture in concrete slabs placed at ambient temperatures below 50 degrees F (10 deg C).

High-range water-reducing admixture may be used in concrete for interior slabs on grade, pumped concrete, slabs on metal deck, architectural concrete, concrete required to be watertight, and concrete with water/cement ratios below 0.50.

Use air-entraining admixture in exterior exposed concrete, unless otherwise indicated. Add air-entraining admixture at manufacturer's prescribed rate to result in concrete at point of placement having total air content of 6% plus-or-minus 1-1/2 percent.

2.7 CONCRETE MIXING

A. Ready-Mix Concrete: Comply with requirements of ASTM C 94, and as herein specified.

B. During hot weather, or under conditions contributing to rapid setting of concrete, a shorter mixing time than specified in ASTM C 94 may be required.

3.0 EXECUTION

3.1 FORMS

A. Design, erect, support, brace, and maintain formwork to support vertical and lateral, static, and dynamic loads that might be applied until such loads can be supported by concrete structure.

B. Maintain formwork construction tolerances complying with ACI 347.

C. Formwork shall be readily removable without impact, shock, or damage to cast-in-place concrete surfaces and adjacent materials.

D. Construct forms to sizes, shapes, lines, and dimensions shown, and to obtain accurate alignment, location, grades, level and plumb work in finished structures. Provide for openings, offsets, sinkages, keyways, recesses, moldings, rustications, reglets, chamfers, blocking, screeds, bulkheads, anchorages and inserts, and other features required in work. Use selected materials to obtain required finishes. Solidly butt joints and provide back-up at joints to prevent leakage of cement paste.

E. Provisions for Other Trades: Provide openings in concrete formwork to accommodate work of other trades. Determine size and location of openings, recesses, and chases from trades providing such items. Accurately place and securely support items built into forms.

F. Cleaning and Tightening: Thoroughly clean forms and adjacent surfaces to receive concrete. Remove chips, wood, sawdust, dirt, or other debris just before concrete is placed. Retightening forms and bracing after concrete placement is required to eliminate leaks and maintain proper alignment.

G. Form Ties: Factory-fabricated, adjustable-length, removable or snapoff metal form ties, designed to prevent from deflection, and to prevent spalling concrete surfaces upon removal.

3.2 PLACING REINFORCEMENT

A. Comply with Concrete Reinforcing Steel Institute's recommended practice for "Placing Reinforcing Bars" for details and methods of reinforcement placement and supports, and as herein specified.

B. Clean reinforcement of loose rust and mill scale, earth, ice, and other materials which reduce or destroy bond with concrete.

C. Accurately position, support, and secure reinforcement against displacement by formwork, construction, or concrete placement operations. Locate and support reinforcing by metal chairs, runners, bolsters, spacers, and hangers, as required.

D. Place reinforcement to obtain at least minimum coverage for concrete protection. Arrange, space, and securely tie bars and bar supports to hold reinforcement in position during concrete placement operations. Set wire ties so ends are directed into concrete, not toward exposed concrete surfaces.

3.3 JOINTS

A. Construction Joints: Locate and install construction joints as indicated or, if not indicated, locate joints a max of 60 feet on center and so as not to impair strength and appearance of the structure, as acceptable to Architect/Engineer.

B. Provide keyways at least 1-1/2" deep in construction joints in walls, slabs, and between walls and footings; accepted bulkheads designed for this purpose may be used for slabs.

C. Place construction joints perpendicular to main reinforcement. Continue reinforcement across construction joints, except as otherwise indicated.

D. Isolation Joints in Slabs-on-Ground: Construct isolation joints in slabs-on-ground at points of contact between slabs-on-ground and vertical surfaces, such as column pedestals, foundation walls, grade beams, and elsewhere as indicated, using ¼" thick premoulded joint filler through full thickness of slab.

E. Contraction (Control) Joints in Slabs-on-Ground: Construct contraction joints in slabs-on-ground to form panels of patterns as shown. Use saw cuts 1/8" x 1/4 slab depth, unless otherwise indicated.

   Contraction joints in exposed floor slabs shall be formed by saw cuts as soon as possible after slab finishing as may be safely done without dislodging aggregate.

F. If joint pattern not shown, provide joints not exceeding 20 feet in either direction and located to conform to bay spacing wherever possible (at column centerlines, half bays, third-bays), with equal or close to equal spacings in each direction.

3.4 INSTALLATION OF EMBEDDED ITEMS

A. General: Set and build into work anchorage devices and other embedded items required for other work that is attached to, or supported by, cast-in-place concrete. Use setting drawings, diagrams, instructions, and directions provided by suppliers of items to be attached thereto.

B. Set anchors required to secure materials of other trades against concrete.

3.5 PREPARATION OF FORM SURFACES

A. Coat contact surfaces of forms with a form-coating compound before reinforcement is placed.

B. Thin form-coating compounds only with thinning agent of type, and in amount, and under conditions of form-coating compound manufacturer's directions. Do not allow excess form-coating material to accumulate in forms or to come into contact with concrete surfaces against which fresh concrete will be placed. Apply in compliance with manufacturer's instructions.

C. Forms to be thoroughly cleaned of all debris and free of all water, snow, or ice.

D. Coat steel forms with a non-staining, rust-preventative from oil or otherwise protect against rusting. Rust-stained steel formwork is not acceptable.

3.6 CONCRETE PLACEMENT

A. Convey concrete from mixer or truck to forms as rapidly as possible by methods which will prevent segregation or loss of ingredients. Place in forms as nearly as practicable to its final position. Thoroughly spade or tamp around reinforcing.

B. Preplacement Inspection: Before placing concrete, inspect and complete formwork installation, reinforcing steel, and items to be embedded or cast-in. Notify other crafts to permit installation of their work; cooperate with other trades in setting such work. Moisten wood forms immediately before placing concrete where form coatings are not used.

C. General: Comply with ACI 304 "Recommended Practice for Measuring, Mixing, Transporting, and Placing Concrete", and as herein specified.

D. Deposit concrete continuously or in layers of such thickness that no concrete will be placed on concrete which has hardened sufficiently to cause the formation of seams or planes of weakness. If a section cannot be placed continuously, provide construction joints as herein specified. Deposit concrete as nearly as practicable to its final location to avoid segregation.

E. Placing Concrete in Forms: Deposit concrete in forms in horizontal layers not deeper than 24" and in a manner to avoid inclined construction joints. Where placement consists of several layers, place each layer while preceding layer is still plastic to avoid cold joints. When concrete is started, carry on as continuous operation until placing of section is completed. Cold joints will not be permitted.

F. If concreting must be stopped before completing any particular section, build a keyed bulkhead in forms. Before continuing thoroughly dampen and apply the bonding compound. New concrete shall be placed only after the bonding compound has dried.

G. Consolidate placed concrete by mechanical vibrating equipment supplemented by hand-spading, rodding, or tamping. Use equipment and procedures for consolidation of concrete in accordance with ACI 309.

H. Do not use vibrators to transport concrete inside forms. Insert and withdraw vibrators vertically at uniformly spaced locations not farther than visible effectiveness of machine. Place vibrators to rapidly penetrate placed layer and at least 6" into preceding layer. Do not insert vibrators into lower layers of concrete that have begun to set. At each insertion limit duration of vibration to time necessary to consolidate concrete and complete embedment of reinforcement and other embedded items without causing segregation of mix.

I. Placing Concrete Slabs: Deposit and consolidate concrete slabs in a continuous operation, within limits of construction joints, until the placing of a panel or section is completed.

J. Consolidate concrete during placing operations so that concrete is thoroughly worked around reinforcement and other embedded items and into corners.

K. Bring slab surfaces to correct level with straightedge and strikeoff. Use bull floats or darbies to smooth surface, free of humps or hollows. Do not disturb slab surfaces prior to beginning finishing operations.

L. Maintain reinforcing in proper position during concrete placement operations.

M. Cold Weather Placing:
1. Protect concrete work from physical damage or reduced strength which could be caused by frost, freezing actions, or low temperatures, in compliance with ACI 306 and as herein specified.

2. When air temperature has fallen to or is expected to fall below 40 deg F (4 deg C), uniformly heat water and aggregates before mixing to obtain a concrete mixture temperature of not less than 50 deg F (10 deg C), and not more than 80 deg F (27 deg C) at point of placement.

3. Do not use frozen materials or materials containing ice or snow. Do not place concrete on frozen subgrade or on subgrade containing frozen materials.

4. Do not use calcium chloride, salt, and other materials containing antifreeze agents or chemical accelerators, unless otherwise accepted in mix designs.

5. Submit procedure for cold weather concreting for approval.

N. Hot Weather Placing:
1. When hot weather conditions exist that would seriously impair quality and strength of concrete, place concrete in compliance with ACI 305 and as herein specified.

2. Cool ingredients before mixing to maintain concrete temperature at time of placement below 90 deg F (32 deg C). Mixing water may be chilled, or chopped ice may be used to control temperature provided water equivalent of ice is calculated to total amount of mixing water.

3. Cover reinforcing steel with water-soaked burlap if it becomes too hot, so that steel temperature will not exceed the ambient air temperature immediately before embedment in concrete.

4. Fog spray forms, reinforcing steel, and subgrade just before concrete is placed.

5. Use water-reducing retarding admixture (Type D) when required by high temperatures, low humidity, or other adverse placing conditions.

6. Submit hot weather concreting procedures for approval.

3.7 FINISH OF FORMED SURFACES

A. Rough Form Finish: For formed concrete surfaces not exposed to view in the finished work and not to receive any applied materials. Patch and repair tie holes and defective areas. Rub down or chip off fins and other projections exceeding 1/4" in height.

B. Exposed to View Concrete shall be installed for a smooth uniform concrete surface free of blemishes, discoloration, voids or marks.

3.8 SLAB FINISHES

A. Float Finish: Apply float finish to slab surfaces to receive a trowel finish.

B. Trowel Finish: Apply trowel finish to slab surfaces to be exposed-to-view, and slab surfaces to be covered with resilient flooring, carpet, ceramic or quarry tile, paint, or other thin film finish coating, system. After floating, begin first trowel finish operation using a power- driven trowel. Begin final troweling when surface produces a ringing sound as trowel is moved over surface. Consolidate concrete surface by final hand-troweling operation, free of trowel marks, uniform in texture and appearance, and with surface leveled to tolerances of F_F 20 - F_L 17. Grind smooth surface defects which would telegraph through applied floor covering system.

C. Exterior Slab-On-Grade Finish shall be a light broom finish.

3.9 CONCRETE CURING AND PROTECTION

A. General: Protect freshly placed concrete from premature drying and excessive cold or hot temperatures.

B. Start initial curing as soon as free water has disappeared from concrete surface after placing and finishing. Weather permitting, keep continuously moist for not less than 7 days.

C. Begin final curing procedures immediately following initial curing and before concrete has dried. Continue final curing for at least 7 days in accordance with ACI 301 procedures. Avoid rapid drying at end of final curing period.

D. Curing Methods: Perform curing of concrete by curing and sealing compound, by moist curing, by moisture-retaining cover curing, and by combinations thereof, as herein specified.

E. Provide moisture curing by following methods.

Keep concrete surface continuously wet by covering with water.

Continuous water-fog spray.

Covering concrete surface with absorptive cover, thoroughly saturating cover with water and keeping continuously wet. Place absorptive cover to provide coverage of concrete surfaces and edges, with 4" lap over adjacent absorptive covers.

F. Provide moisture-cover curing as follows:

Cover concrete surfaces with moisture-retaining cover for curing concrete, placed in widest practicable width with sides and ends lapped at least 3" and sealed by waterproof tape of adhesive. Immediately repair any holes or tears during curing period using cover material and waterproof tape.

G. Provide curing and sealing compound to exposed interior slabs and to exterior slabs, walks, and curbs, as follows:

Apply specified curing and sealing compound to concrete slabs as soon as final finishing operations are complete (within 2 hours). Apply uniformly in continuous operation by power-spray or roller in accordance with manufacturer's directions. Recoat areas subjected to heavy rainfall within 3 hours after initial application. Maintain continuity of coating and repair damage during curing period.

H. Do not use membrane curing compounds on surfaces which are to be covered with coating material applied directly to concrete; waterproofing, dampproofing, membrane roofing, flooring (such as ceramic or quarry tile, glue-down carpet), painting, and other coatings and finish materials, unless otherwise acceptable to Architect/Engineer.

3.10 REMOVAL OF FORMS

A. Formwork not supporting weight of concrete, such as sides of beams, walls, columns, and similar parts of the work, may be removed after cumulatively curing at not less than 50 deg F (10 deg C) for 24 hours after placing concrete, provided concrete is sufficiently hard to not be damaged by form removal operations, and provided curing and protection operations are maintained. Formwork supporting weight of concrete may be removed after the concrete has reached 70% of its required compressive strength.

3.11 RE-USE OF FORMS

A. Clean and repair surfaces of forms to be re-used in work. Split, frayed, delaminated or otherwise damaged form facing material will not be acceptable for exposed surfaces. Apply new form coating compound as specified for new formwork.

B. When forms are extended for successive concrete placement, thoroughly clean surfaces, remove fins and laitance, and tighten forms to close joints. Align and secure joint to avoid offsets. Do not use “patched” forms for exposed concrete surfaces, except as acceptable to Architect.

END OF SECTION 033000

SECTION 05 52 14 - ALUMINUM RAILING SYSTEM

PART 1 - GENERAL

1.1 SUMMARY

A. Section Includes: Extruded aluminum railing system with cable infill.

B. Related Sections:
   1. 061000– ROUGH CARPENTRY.

1.2 SUBMITTAL PROCEDURES

A. Reference Section 013300–Submittal Procedures; submit following items:
   1. Product Data including color chart for initial color selection.
   2. Shop Drawings: Indicate materials, sizes, styles, fabrication, anchorage and installation details for railing system and infill.
   3. Samples:
      a. Post and rail sections– minimum 4 inch (100 mm) long piece of each type specified herein.
      b. Infill:
         1) Cable – minimum 8 inch long piece with end fittings.
         2) Picket – minimum 4 inch long piece.
         3) Aluminum chip with selected paint color for final color verification.
   4. Quality Assurance/Control Submittals:
      a. Qualifications: Proof of manufacturer's qualifications.
      b. Manufacturer's Installation Instructions.

B. Closeout Procedures: Reference Section 017700–Closeout Procedures ; submit following items:
   1. Maintenance Instructions.
      a. Manufacturer's recommendation for periodic checking and adjustment of cables to maintain uniform cable tension.
      b. Manufacturer's recommendation for periodic cleaning of cables, glass panels, railing frames and related components to remove accumulated dirt, debris and stains.

   2. Manufacture standard warranty.

1.3 QUALITY REQUIREMENTS

A. Qualifications:
   1. Manufacturer Qualifications: Minimum five years experience in producing aluminum railing systems.

B. Field Samples:
   1. Reference Section 014000– Quality Requirements.
   2. Install one complete railing including infill panel at location selected by Architect.
   3. Obtain Architect's approval prior to installing additional railings.
   4. Approved sample may remain as part of completed work.

1.4 WARRANTY

A. 10 year limited warranty against defects in materials and workmanship.

1.5 MAINTENANCE

A. Extra Materials: Provide one, approximately 0.6 fluid ounce (18 ml) bottle, of touch-up paint per 100 feet (30 m) of each color railing.

PART 2 - PRODUCTS

2.1 MANUFACTURER

A. Feeney, Inc.
2603 Union St
Oakland, CA 94607

Toll Free: (800) 888-2418
Tel: (510) 893-9473
Fax: (510) 893-9484
E-mail: sales@feeneyinc.com
Website: http://www.designrail.com

B. ClearVue Railing a division of

Hansen architectural systems, Inc.

5500 SE Alexander street

Hillsboro, OR. 97123

Toll Free: (800) 599-2965

Fax: (503)356-8478

Website: www.aluminumrailing.com

C. Substitutions Procedures: Reference Section 012500–Substitution Procedures.

2.2 MATERIALS

A. Extruded Aluminum Rails, Tubes, Profiles, Pipes, Plate & Sheet: 6000-series aluminum.

B. Cables: 1/8 inch (3.2 mm) diameter, 1 by 19 construction, Type 316 stainless steel, polished finish, commercial, dry grade cable with fittings specified below.
   1. Fittings:
      a. Horizontal Cables: Provide a 4-1/4 inch (108mm) long stainless steel Threaded Terminal factory attached to one end of each cable and a stainless steel Quick-Connect®SS fitting for field attachment on the other end.
      b. Include washers, nuts, end caps and any accessory items as recommended by manufacturer for installation conditions or as shown on Drawings.

2.3 COMPONENTS

A. Posts: Types(s) specified below.
   1. Square Post: 2-3/8 inch (61mm) square with 3/32 inch (2.4 mm) thick extruded aluminum tube. fascia mount as shown on Drawings.

B. Cap Rail: Type(s) specified below.
   1. Series 200: 3-1/2 inch by 1-1/4 inch (89 by 32 mm) by 3/32 inch (2.4 mm) thick extruded aluminum rectangular profile.

C. Cap Infill Channel: Extruded aluminum profile configured to secure specified infill.

D. Foot Rail: Extruded aluminum profile configured to secure specified infill.

E. Infill:
   1. Pickets: 3/4 inch (19 mm) square extruded aluminum tubes.
   2. Cables: Horizontal placement.

F. Fasteners for Interconnecting Railing Components: Stainless steel screws of type and size recommended by railing manufacturer.

G. Fasteners for Connecting Components to Other Construction: Type and size as shown on Drawings.

H. Aluminum end caps for exposed open ends of rails, tubes, and profiles.

2.4 FINISH

A. Shop Finish: Powder coat aluminum components in compliance with AAMA 2604.

B. Color: Standard color as selected by Architect from manufactures full range.

PART 3 - EXECUTION

3.1 EXAMINATION

A. Examine work upon which railings will be installed.

B. Coordinate with responsible entity to correct unsatisfactory conditions.

C. Commencement of work by installer is acceptance of substrate conditions.

3.2 INSTALLATION

A. Follow manufacturer's installation instructions.

B. Isolate dissimilar metals where indicated on the Drawings with grommets, bushings, or coatings as appropriate.

C. Touch-up damaged paint surfaces with touch-up paint provided.

3.3 CLEANING

A. Reference Section 01 74 00–Cleaning and Waste Management.

B. Clean soiled surfaces and cables using a mild detergent and warm water solution with soft clean cloths.

C. Clean cables thoroughly using synthetic scotch type pads and hot soapy water (or denatured alcohol) to remove residual lubricants; rinse thoroughly with clear water and wipe dry.

END OF SECTION

SECTION 061000 - ROUGH CARPENTRY

PART 1 - GENERAL

1.1 SUMMARY

A. This Section includes the following:

1. Framing with dimension lumber.
2. Framing with engineered wood products.
3. Wood blocking and nailers.
4. Wood furring.
5. Sheathing.
6. Subflooring and underlayment.
7. Building wrap.

1.2 DEFINITIONS

A. Rough Carpentry: Carpentry work not specified in other Sections and not exposed, unless otherwise indicated.

B. Exposed Framing: Dimension lumber not concealed by other construction.

C. Lumber grading agencies, and the abbreviations used to reference them, include the following:

1. SPIB - Southern Pine Inspection Bureau.
2. WCLIB - West Coast Lumber Inspection Bureau.
3. WWPA - Western Wood Products Association.

1.3 RELATED SECTIONS

A. 061533 Wood Patio Decking

1.4 SUBMITTALS

A. Product Data: For each type of process and factory-fabricated product. Indicate component materials and dimensions and include construction and application details.

1. Include data for wood-preservative treatment from chemical treatment manufacturer and certification by treating plant that treated materials comply with requirements. Indicate type of preservative used, net amount of preservative retained, and chemical treatment manufacturer's written instructions for handling, storing, installing, and finishing treated material.
2. For products receiving a waterborne treatment, include statement that moisture content of treated materials was reduced to levels specified before shipment to

Project site.

3. Include copies of warranties from chemical treatment manufacturers for each type of treatment.

PART 2 - PRODUCTS

2.1 MANUFACTURERS

A. Research/Evaluation Reports: For the following, showing compliance with IRC 2009 including 2013 Connecticut Supplements.

1. Preservative-treated wood.
2. Engineered wood products.
3. Expansion anchors.
4. Metal framing hardware.
5. Adhesive anchoring systems for concrete.
6. Building wrap.

2.2 QUALITY ASSURANCE

A. Source Limitations for Engineered Wood Products: Obtain each type of engineered wood product through one source from a single manufacturer.

2.3 DELIVERY, STORAGE, AND HANDLING

A. Protect materials from exposure to weather and contact with Stack lumber, plywood, and other panels; place spacers between each bundle to provide air circulation. Provide for air circulation around stacks and under coverings.

2.4 MANUFACTURERS

A. Available Manufacturers: Subject to compliance with requirements, manufacturers offering products that may be incorporated into the Work include, but are not limited to, the following:

B. Manufacturers: Subject to compliance with requirements, provide products by one of the following:

1. Laminated-Veneer Lumber:

a. Boise Cascade Corporation.
b. Georgia-Pacific Corporation.
c. Louisiana-Pacific Corporation.
d. Pacific Woodtech Corp.
e. Trus Joist.
f. Union Camp Corp.; Building Products Division.
g. Willamette Industries, Inc.

2. Building Wrap:

   a. DuPont (E. I. du Pont de Nemours and Company).
   b. Celotex Corporation (The); Building Products Division.
   c. Parsec, Inc.
   d. Raven Industries, Inc.
   e. Reemay, Inc.
   f. Simplex Products.
   g. Sto-Cote Products, Inc.
   h. Tenneco Building Products.

3. Metal Framing Hardware:

   a. Simpson Strong-Tie Company, Inc.
   b. Alpine Engineered Products, Inc.
   c. Cleveland Steel Specialty Co.
   d. Harlen Metal Products, Inc.
   e. KC Metals Products, Inc.
   f. Silver Metal Products, Inc.
   g. Southeastern Metals Manufacturing Co., Inc.
   h. United Steel Products Company, Inc.

4. Adhesive Anchoring System for Concrete Anchors

   a. Simpson Strong-Tie Company, Inc.- SET

5. Barrier Membranes:

   a. Grace Construction Products: Vycor Deck Protector.

2.5 WOOD PRODUCTS, GENERAL

A. Lumber: DOC PS 20-99 and applicable rules of lumber grading agencies certified by the American Lumber Standards Committee Board of Review.

   1. Factory mark each piece of lumber with grade stamp of grading agency.
   2. Where nominal sizes are indicated, provide actual sizes required by DOC PS 20 for moisture content specified. Where actual sizes are indicated, they are minimum dressed sizes for dry lumber.
   3. Provide dressed lumber, S4S, unless otherwise indicated.
   4. Provide dry lumber with 19 percent maximum moisture content at time of dressing for 2-inch nominal thickness or less, unless otherwise indicated.

B. Engineered Wood Products: Provide engineered wood products acceptable to authorities having jurisdiction and for which current model code research or evaluation reports exist that show compliance with building code in effect for Project.

   1. Allowable Design Stresses: Provide engineered wood products with allowable

design stresses, as published by manufacturer that meet or exceed those indicated. Manufacturer's published values shall be determined from empirical data or by rational engineering analysis and demonstrated by comprehensive testing performed by a qualified independent testing agency.

C. Wood Structural Panels:

1. Oriented Strand Board: DOC PS 2-95.
2. Factory mark panels according to indicated standard.

2.6 WOOD-PRESERVATIVE-TREATED MATERIALS

A. Preservative Treatment by Pressure Process: AWPA C2-02 (lumber) and AWPA C9-03 (plywood), except that lumber that is not in contact with the ground and is continuously protected from liquid water may be treated according to AWPA C31 with inorganic boron (SBX).

1. Preservative Chemicals: Acceptable to authorities having jurisdiction and one of the following:
   a. Ammoniacal, or amine, copper quat (ACQ).
   b. Copper bis (dimethyldithiocarbamate) (CDDC).
   c. Ammoniacal copper citrate (CC).
   d. Copper azole, Type A (CBA-A).
   e. Oxine copper (copper-8-quinolinolate) in a light petroleum solvent.

2. For exposed items indicated to receive a stained or natural finish, use chemical formulations that do not require incising, contain colorants, bleed through, or otherwise adversely affect finishes.

B. Kiln-dry material after treatment to a maximum moisture content of 19 percent for lumber and 15 percent for plywood. Do not use material that is warped or does not comply with requirements for untreated material.

C. Mark each treated item with the treatment quality mark of an inspection agency approved by the American Lumber Standards Committee Board of Review.

D. Application: Treat items indicated on Drawings, and the following:

1. Wood cants, nailers, curbs, equipment support bases, blocking, stripping, and similar members in connection with roofing, flashing, vapor barriers, and waterproofing.
2. Wood sills, sleepers, blocking, furring, stripping, and similar concealed members in contact with masonry or concrete.
3. Wood framing members less than 8 inches above grade at exterior foundation walls.
4. Wood framing members less than 18 inches above exposed ground in crawl spaces.
5. Exterior wood decking and framing member.

2.7 DIMENSION LUMBER

A. General: Provide dimension lumber of grades and species indicated on the drawings according to the American Lumber Standards Committee National Grading Rule provisions of the grading agency indicated.

2.8 MISCELLANEOUS LUMBER

A. General: Provide lumber for support or attachment of other construction, including the following:

1. Blocking.
2. Cants.
3. Nailers.
4. Furring.

B. For items of dimension lumber size, provide No. 2 grade lumber with 19 percent maximum moisture content and of the following species:

1. Douglas Fir Larch with the following properties:

Fb=900 PSI	Fc(PAR) = 1350 PSI
Fc (PERP) = 625 PSI	Fv = 125 PSI
	E = 1,600,000 PSI

C. For concealed boards, provide lumber with 19 percent maximum moisture content and any of the following species and grades:

1. Mixed southern pine, No. 2 grade; SPIB.
2. Eastern softwoods, No. 3 Common grade; NELMA.
3. Northern species, No. 3 Common grade; NLGA.
4. Western woods, Standard or No. 3 Common grade; WCLIB or WWPA.

D. For furring strips for installing plywood or hardboard paneling, select boards with no knots capable of producing bent-over nails and damage to paneling.

2.9 ENGINEERED WOOD PRODUCTS

A. Laminated-Veneer Lumber: A composite of wood veneers with grain primarily parallel to member lengths, manufactured with an exterior-type adhesive complying with ASTM D 2559. Product conforms to minimum basic design properties indicated on drawings as determined according to ASTM D 5456:

2.10 SHEATHING

A. Oriented-Strand-Board Wall Sheathing: DOC PS 2-92 Exposure 1 sheathing.

1. Span Rating: Not less than 24/16.
2. Thickness: Not less than 7/16 inch.

B. Oriented-Strand-Board Roof Sheathing: Exposure 1 sheathing.

1. Span Rating: Not less than 40/20.
2. Thickness: Not less than 5/8 inch.

2.11 SUBFLOORING AND UNDERLAYMENT

A. Oriented-Stand-Board, Combination Subfloor-Underlayment: DOC PS 2-92 Exposure 1 single-floor panels.

1. Span Rating: Not less than 24 inches, Building 7 not less than 48 inches.
2. Thickness: Not less than 23/32 inches, Building 7 not less than 1 1/8inches.
3. Edge Detail: Tongue and groove.
4. Surface Finish: Fully sanded face.

B. Underlayment, General: Provide underlayment in nominal thicknesses indicated or, if not indicated, not less than 1/4 inch over smooth subfloors and not less than 3/8 inch over board or uneven subfloors.

C. Plywood Underlayment for Resilient Flooring: DOC PS 1-95, Exposure 1 Underlayment with fully sanded face.

2.12 FASTENERS

A. General: Provide fasteners of size and type indicated that comply with requirements specified in this Article for material and manufacture.

1. Where rough carpentry is exposed to weather, in ground contact, or in area of high relative humidity, provide fasteners with hot-dip zinc coating complying with ASTM A 153/A 153M.

B. Nails, Brads, and Staples: ASTM F 1667.

C. Wood Screws: ASME B18.6.1.

D. Lag Bolts:ASME B18.2.1.

E. Bolts: Steel bolts complying with ASTM A 307, Grade A with ASTM A 563 hex nuts and flat washers.

F. Expansion Anchors: Anchor bolt and sleeve assembly of material indicated below with capability to sustain, without failure, a load equal to 6 times the load imposed when installed in unit masonry assemblies and equal to 4 times the load imposed when installed in concrete as determined by testing per ASTM E 488 conducted by a qualified independent testing and inspecting agency.

1. Material: Carbon-steel components, zinc plated to comply with ASTM B 633, Type III Fe/Zn 5.
2. Material: Stainless steel with bolts and nuts complying with ASTM F 593 and ASTM F 594, Alloy Group 1 or 2.

2.13 METAL CONNECTION HARDWARE

A. General: Provide framing anchors made from metal indicated, of structural capacity, type, and size indicated, and as follows:

1. Research/Evaluation Reports: Provide products acceptable to authorities having jurisdiction and for which model code research/evaluation reports exist that show compliance of metal framing anchors, for application indicated, with building code in effect for Project.
2. Allowable Design Loads: Provide products with allowable design loads, as published by manufacturer that meet or exceed those indicated. Manufacturer's published values shall be determined from empirical data or by rational engineering analysis and demonstrated by comprehensive testing performed by a qualified independent testing agency.

B. Galvanized Steel Sheet: Hot-dip, zinc-coated steel sheet complying with ASTM A 653/A 653M, G185 coating designation.

C. Stainless-Steel Sheet: ASTM A 666, Type 316.

1. Use for exterior locations and where indicated.

D. Joist and Rafter Hangers, Post Base and Caps, Holdown Anchors, Straps, Hurricane Ties, Framing Clips, and wall bracing as indicated on the drawings.

2.14 MISCELLANEOUS MATERIALS

A. Building Paper: Asphalt-saturated organic felt complying with ASTM D 226, Type I (No. 15 asphalt felt), unperforated.

B. Building Wrap: Air-retarder sheeting made from polyolefins; cross-laminated films, woven strands, or spun-bonded fibers; coated or uncoated; with or without perforations; and complying with ASTM E 1677, Type I.

1. Thickness: Not less than 3 mils.
2. Permeance: Not less than 10 perms.
3. Flame-Spread Index: 25 or less per ASTM E 84.
4. Allowable Exposure Time: Not less than three months.

C. Building Wrap Tape: Pressure-sensitive plastic tape recommended by building wrap manufacturer for sealing joints and penetrations in building wrap.

D. Sheathing Tape: Pressure-sensitive plastic tape for sealing joints and penetrations in sheathing and recommended by sheathing manufacturer for use with type of sheathing required.

E. Adhesives for Field Gluing Structural Panels to Framing: Formulation complying with APA AFG-01 or ASTM D 3498 that is approved for use with type of construction panel indicated by both adhesive and panel manufacturers.

F. Water-Repellent Preservative: NWWDA-tested and -accepted formulation containing 3-iodo-2-propynyl butyl carbamate, combined with an insecticide containing chloropyrifos as its active ingredient.

G. Barrier Membranes for providing corrosion protection of galvanized metal connection hardware in contact with pressure treated lumber.

PART 3 - EXECUTION

3.1 INSTALLATION, GENERAL

A. Set rough carpentry to required levels and lines, with members plumb, true to line, cut, and fitted. Fit rough carpentry to other construction; scribe and cope as needed for accurate fit. Locate furring, nailers, blocking, grounds, and similar supports to comply with requirements for attaching other construction.

B. Do not use materials with defects that impair quality of rough carpentry or pieces that are too small to use with minimum number of joints or optimum joint arrangement.

C. Apply field treatment complying with AWPA M4-95 to cut surfaces of preservative-treated lumber and plywood.

D. Securely attach rough carpentry work to substrate by anchoring and fastening as indicated, complying with the following:

1. NER-272 for power-driven fasteners.
2. Published requirements of metal framing hardware manufacturer.
3. Table 2304.9.1, "Fastening Schedule," in IRC International Residential Code.

E. Use common wire nails, unless otherwise indicated. Select fasteners of size that will not fully penetrate members where opposite side will be exposed to view or will receive finish materials. Make tight connections between members. Install fasteners without splitting wood; predrill as required.

F. Use finishing nails for exposed work, unless otherwise indicated. Countersink nail heads and fill holes with wood filler.

3.2 WOOD BLOCKING, AND NAILER INSTALLATION

A. Install where indicated and where required for attaching other work. Form to shapes indicated and cut as required for true line and level of attached work. Coordinate

locations with other work involved.

B. Attach items to substrates to support applied loading. Recess bolts and nuts flush with surfaces, unless otherwise indicated. Build anchor bolts into masonry during installation of masonry work. Where possible, secure anchor bolts to formwork before concrete placement.

3.3 WOOD FURRING INSTALLATION

A. Install level and plumb with closure strips at edges and openings. Shim with wood as required for tolerance of finish work.

1. Fire block furred spaces of walls, at each floor level and at ceiling, with wood blocking or noncombustible materials accurately fitted to close furred spaces.

B. Furring to Receive Plywood or Hardboard Paneling: Install 1-by-3-inch nominal size furring vertically at 16 inches o.c.

C. Furring to Receive Gypsum Board: Install 1-by-3-inch nominal size furring vertically at 24 inches o.c.

3.4 WOOD FRAMING INSTALLATION, GENERAL

A. Framing Standard: Comply with AFPA's "Manual for Wood Frame Construction," unless otherwise indicated.

B. Framing with Engineered Wood Products: Install engineered wood products to comply with manufacturer's written instructions.

C. Do not splice structural members between supports.

3.5 WALL AND PARTITION FRAMING INSTALLATION

A. General: Arrange studs so wide face of stud is perpendicular to direction of wall or partition and narrow face is parallel. Provide single bottom plate and double top plates using members of 2-inch nominal thickness whose widths equal that of studs, except single top plate may be used for non-load-bearing partitions. Anchor or nail plates to supporting construction, unless otherwise indicated.

1. For exterior walls, provide 2 by 4 inch nominal size wood stud spacing at 16 inches otherwise indicated, or match existing spacing.
2. For interior bearing walls, provide 2-by-4-inch nominal size at 16 inches, unless otherwise indicated.
3. For interior partitions and walls, provide 2-by-4-inch nominal- size wood studs spaced 16 inches, unless otherwise indicated.

B. Construct corners and intersections with three or more studs. Provide blocking and

framing as indicated and as required to support facing materials, fixtures, specialty items, and trim.

1. Provide continuous horizontal blocking at all exterior walls. Locate blocking at all horizontal panel edges in sheathing using members of 2-inch nominal thickness.

C. Erection Tolerances: Install framing level, plumb, and true to line to a maximum allowable tolerance variation of 1/4 inch in 10 feet and as follows:

1. Space individual framing members no more than plus or minus 1/8 inch from plan location. Cumulative error shall not exceed minimum fastening requirements of sheathing or other finishing materials.

D. Fire block concealed spaces of wood-framed walls and partitions at each floor level and at ceiling line of top story. Where fire blocking is not inherent in framing system used, provide closely fitted wood blocks of 2-inch nominal- thick lumber of same width as framing members.

E. Frame openings with multiple studs and headers. Provide nailed header members of thickness equal to width of studs. Set headers on edge and support on jamb studs.
1. For load-bearing walls, provide minimum header sizes as indicated on drawings

3.6 FLOOR JOIST FRAMING INSTALLATION

A. General: Install wood joists in accordance with support ends of each member with not less than 1-3/4 inches of bearing on wood or 3 inches on concrete or masonry. Align joists with wall studs below at bearing walls. Attach floor joists as follows:

1. Where supported on wood members, by toe nailing or by using metal framing anchors.
2. Where framed into wood supporting members, by using by using metal joist hangers.

B. Frame openings with headers and trimmers supported by metal joist hangers; double headers and trimmers.

C. Do not notch joist.

D. Provide solid LVL blocking at ends of joists unless nailed to header, band, or rim joist.

E. Lap members framing from opposite sides of beams, girders, or partitions not less than 4 inches or securely tie opposing members together. Provide solid blocking by depth of joist over supports.

F. Provide solid blocking between joists under jamb studs for openings.

G. Under non-load-bearing partitions, provide double joists separated by solid blocking equal to depth of studs above.

3.7 CEILING JOIST AND RAFTER FRAMING INSTALLATION

A. Ceiling Joists: Install ceiling joists with crown edge up and complying with requirements specified above for floor joists. Face nail to ends of parallel rafters.

1. Where ceiling joists are at right angles to rafters, provide additional short joists parallel to rafters from wall plate to first joist; nail to ends of rafters and to top plate and nail to first joist or anchor with framing anchors or metal straps. Provide 2-by-4-inch nominal- size stringers spaced 48 inches o.c. crosswise over main ceiling joists.

B. Rafters: Notch to fit exterior wall plates and use metal framing anchors. Double rafters to form headers and trimmers at openings in roof framing, if any, and support with metal hangers. Where rafters abut at ridge, place directly opposite each other and nail to ridge member or use metal ridge hangers. Align rafters with wall studs below at bearing walls.

1. At valleys, provide double-valley rafters of size indicated or, if not indicated, of same thickness as regular rafters and 2 inches deeper. Bevel ends of jack rafters for full bearing against valley rafters.
2. At hips, provide double hip rafters of size indicated or, if not indicated, of same thickness as regular rafters and 2 inches deeper. Bevel ends of jack rafters for full bearing against hip rafter.

C. Provide special framing as indicated for eaves, overhangs, dormers, and similar conditions, if any.

D. Install wood posts using metal anchors indicated.

E. Treat ends of timber beams and posts exposed to weather by dipping in water-repellent preservative for 15 minutes.

3.8 STAIR FRAMING INSTALLATION

A. Provide stair framing members of size, space, and configuration indicated or, if not indicated, to comply with the following requirements:

1. Stringer Size: 1 ¾" by 14 actual size minimum.
2. Stringer Material: Parallam plus PSL.
3. Notching: Notch stringers to receive treads, risers, and supports.
4. Stringer Spacing: At least 1 stringers for each 36-inch clear width of stair.

B. Provide stair framing with no more than 3/16-inch variation between adjacent treads and risers and no more than 3/8-inch variation between largest and smallest treads and risers within each flight.

3.9 WOOD STRUCTURAL PANEL INSTALLATION

A. General: Comply with applicable recommendations contained in APA Form No. E30K, "APA Design/Construction Guide: Residential & Commercial," for types of structural- use panels and applications indicated. Glue all panels to framing.

1. Combination Subfloor-Underlayment:

   a. Glue and nail to wood framing.
   b. Space panels 1/8 inch apart at edges and ends.

2. Sheathing:

   a. Glue and Nail to wood framing.
   b. Space panels 1/8 inch apart at edges and ends.

3. Roof Sheathing:

   a. Glue and Nail to wood framing.
   b. Space panels 1/8 inch apart at edges and ends
   c. Install panel clips or solid blocking at panel edges perpendicular to framing members spaced 20” o.c. or greater

4. Underlayment:

   a. Glue and Nail or staple to subflooring.
   b. Space panels 1/32 inch apart at edges and ends.
   c. Fill and sand edge joints of underlayment receiving resilient flooring just before installing flooring.

5. Plywood Backing Panels: Nail or screw to supports.

3.10 BUILDING PAPER APPLICATION

A. Apply building paper horizontally with 2-inch overlap and 6-inch) end lap; fasten to sheathing with galvanized staples or roofing nails. Cover upstanding flashing with 4-inch overlap.

3.11 BUILDING WRAP APPLICATION

A. Cover wall sheathing with building wrap as indicated.

1. Comply with manufacturer's written instructions.
2. Cover upstanding flashing with 4-inch overlap.
3. Seal seams, edges, and penetrations with tape.
4. Extend into jambs of openings and seal corners with tape.

3.12 SHEATHING TAPE APPLICATION

A. Apply sheathing tape to joints between sheathing panels and at items penetrating sheathing. Apply at upstanding flashing to overlap both flashing and sheathing.

END OF SECTION 061000

SECTION 061533 – WOOD PATIO DECKING AND STAIRS

1.0 SCOPE

A. Provide New Wood Decks and Stair, Railings, Posts, Fastener and miscellaneous materials to complete the work.
B. Provide New Supports and Repairs to Existing Deck to remain.
C. All work shall be done in accordance with the Connecticut State Building Code.

1.1 SUBMITTALS

A. Wood, fasteners and railings – Product Data
B. Deck Protector – Product Data.
C. Handrail Support – Product Data

2.0 PRODUCTS

2.1 DECKING AND STAIR TREADS:

A. Provide hand selected pressure treated lumber for freedom from characteristics, on exposed surfaces and edges that would impair finish appearance, including decay, honeycomb, knot holes, shake, splits, torn grain, and wane.

B. Provide pressure treated dimension lumber decking and stair treads: construction or no. 2 grade any of the following species:
    1. Hem-fir or hem-fir (north); NLGA, WCLIB, or WWPA.
    2. Douglas fir-larch, Douglas fir-larch (north), or Douglas fir-south; NLGA, WCLIB, or WWPA.
    3. Mixed southern pine; SPIB.
    4. Redwood; RIS.

2.2 RAILINGS:

A. Provide hand selected pressure treated lumber for freedom from characteristics, on exposed surfaces and edges that would impair finish appearance, including decay, honeycomb, knot holes, shake, splits, torn grain, and wane.

B. Provide pressure treated dimension lumber railing members: construction or no. 2 grade any of the following species:
    1. Hem-fir or hem-fir (north); NLGA, WCLIB, or WWPA.
    2. Douglas fir-larch, Douglas fir-larch (north), or Douglas fir-south; NLGA, WCLIB, or WWPA.
    3. Mixed southern pine; SPIB.
    4. Redwood; RIS.

C. Provide pressure treated Railing Boards:
    1. Douglas fir, C & Btr finish or C Select; NLGA, WCLIB, or WWPA.
    2. Hem-fir, C & Btr finish or C Select; NLGA, WCLIB, or WWPA.
    3. Redwood; RIS.

D. Railing Boards: Radius-edged S4S boards, same grade as decking.

2.3 POSTS:

A. Dimension lumber posts: construction or no. 2 or construction, stud, or no. 3 grade pressure treated lumber for any of the following species:
    1. Hem-fir or hem-fir (north); NLGA, WCLIB, or WWPA.
    2. Douglas fir-larch, Douglas fir-larch (north), or Douglas fir-south; NLGA, WCLIB, or WWPA.
    3. Mixed southern pine; SPIB.
    4. Spruce-pine-fir or spruce-pine-fir (south); NELMA, NLGA, WCLIB, or WWPA.
    5. Northern species; NLGA.
    6. Eastern softwoods; NELMA.
    7. Western woods; WCLIB or WWPA

2.4 HANDRAILS:

A. Type: Type I or Type II
B. Material: PT Wood Rail
C. Support: Stainless Steel or Solid Brass suitable for exterior marine environment.
D. Fasteners: Stainless Steel or Solid brass compatible with materials being fastened.

2.5 FASTENERS:

A. Provide fasteners of size and type indicated, acceptable to authorities having jurisdiction, and that comply with requirements specified for material and manufacture. Provide nails or screws, in sufficient length, to penetrate not less than 1-1/2 inches (38 mm) into wood substrate. Provide Lag or Through-Bolts with nuts and washers.
    1. For pressure-preservative-treated wood, use stainless-steel fasteners.

2.6 MOISTURE BARRIERS:

A. Vycor Deck Protector

3.0 EXECUTION

3.1 PREPARATION

A. Clean substrates of projections and substances detrimental to application.
B. Stain wood, including both faces and edges. Cut to required lengths and stain ends. Comply with requirements in section 099300 "Staining and Transparent Finishing."

3.2 DECK & STAIR FRAMING INSTALLATION

1. Decks shall be constructed in accordance with section R311 and R312 of the building code.
2. Install joists with crown edge up and support ends of each member with not less than 1-1/2 inches (38 mm) of bearing on wood. Attach floor joists where framed into wood supporting members by using wood ledgers as indicated or, if not indicated, by using metal joist hangers. Do not notch joists.
3. Lap members framing from opposite sides of beams or girders not less than 4 inches (102 mm,) or securely tie opposing members together. Provide solid blocking of 2-inch nominal (38-mm actual) thickness by depth of joist over supports.

4. Provide solid blocking of 2-inch nominal (38-mm actual) thickness by depth of joist at intervals of 96 inches (2438 mm) O.C., between joists.
5. Make tight connections between members. Install fasteners without splitting wood; do not countersink nail heads unless otherwise indicated
6. Install Vycor Deck Protection over joists, ledgers, and beams.
7. Fasten with lag or through bolts to house box framing members-min. one per joist bay and as required by authority having jurisdiction.
8. Construct guardrails in accordance with R312 of the Building Code.
9. Install handrails pursuant to section R311.7 of the Building Code

END OF SECTION 061633

SECTION 062000 – CARPENTRY

1.0 SCOPE

A. General Carpentry and Finish Construction.
B. Exterior Trim
C. Blocking
D. Install Fiber-cement Exterior Siding below first floor and at chases.
E. Misc. Materials – flashings etc.

1.1 SUBMITTALS

A. Product Data: For each type of product indicated.
B. Provide Finish Samples

2.0 PRODUCTS

2.1 General Materials:

A. General: Provide materials that comply with requirements of AWI's quality standard for each type of woodwork and quality grade specified, unless otherwise indicated.
B. Thermoset Decorative Panels: Particleboard or medium-density fiberboard finished with thermally fused, melamine-impregnated decorative paper complying with LMA SAT-1.
C. Provide PVC or polyester edge banding complying with LMA EDG-1 on components with exposed or semi-exposed edges.
D. Wood Products: Comply with the following:
    1. Hardboard: AHA A135.4.
    2. Medium-Density Fiberboard: ANSI A208.2, Grade MD, made with phenol-formaldehyde resins.
    3. Particleboard: ANSI A208.1, Grade M-2.
    4. Veneer-Faced Panel Products (Hardwood Plywood): HPVA HP-1, made with adhesive containing no urea formaldehyde.

2.2 MISCELLANEOUS MATERIALS

A. Furring, Blocking, Shims, and Hanging Strips: Softwood or hardwood lumber, kiln dried to less than 15 percent moisture content.
B. Furring, Blocking, Shims, and Hanging Strips: Fire-retardant-treated softwood lumber, kiln dried to less than 15 percent moisture content.
C. Screws: Select material, type, size, and finish required for each use. Comply with ASME B18.6.1 for applicable requirements.
D. Nails: Select material, type, size, and finish required for each use. Comply with FS FF-N-105 for applicable requirements.
E. Anchors: Select material, type, size, and finish required for each substrate for secure anchorage. Provide nonferrous-metal or hot-dip galvanized anchors and inserts on inside face of exterior walls and elsewhere as required for corrosion resistance. Provide toothed-steel or lead expansion sleeves for drilled-in-place anchors.
F. Adhesives, General: Do not use adhesives that contain urea formaldehyde.

3.0 EXECUTION

Finished carpentry shall be installed without blemishes from nailing mis-strikes (moons, halfmoons).

Fill holes, gaps and/or sand in preparation for painting. Nails shall be set 1/16". Nails shall not be overdriven through the trim.

A. Install interior finish carpentry level, plumb, true, and aligned with adjacent materials. Use concealed shims where necessary for alignment.

   1. Scribe and cut interior finish carpentry to fit adjoining work. Refinish and seal cuts as recommended by manufacturer.
   2. Where face fastening is unavoidable, countersink fasteners, fill surface flush, and sand unless otherwise indicated.
   3. Install to tolerance of 1/8 inch in 96 inches (3 mm in 2438 mm) for level and plumb. Install adjoining interior finish carpentry with 1/32-inch (0.8-mm) maximum offset for flush installation and 1/16-inch (1.5-mm) maximum offset for reveal installation.
   4. Coordinate interior finish carpentry with materials and systems in or adjacent to it. Provide cutouts for mechanical and electrical items that penetrate interior finish carpentry.

B. Standing and running trim installation
   1. Install with minimum number of joints practical, using full-length pieces from maximum lengths of lumber available. Do not use pieces less than 24 inches (610 mm) long, except where necessary. Stagger joints in adjacent and related standing and running trim. Miter at returns, miter at outside corners, and cope at inside corners to produce tight-fitting joints with full-surface contact throughout length of joint. Use scarf joints for end-to-end joints. Plane backs of casings to provide uniform thickness across joints where necessary for alignment.

3.1 ADJUSTING AND CLEANING

A. Repair damaged and defective woodwork, where possible, to eliminate functional and visual defects; where not possible to repair, replace woodwork. Adjust joinery for uniform appearance.
B. Clean, lubricate, and adjust hardware.
C. Clean woodwork on exposed and semi-exposed surfaces. Touch up shop-applied finishes to restore damaged or soiled areas.

END OF SECTION 062000

SECTION 06 60 00 PLASTIC FABRICATIONS

PART 1 GENERAL

1.1 SECTION INCLUDES

A. Cellular pvc trim boards for corner boards, soffits, fascias, battens, door pilasters, frieze boards, rake boards, architectural millwork and door/window trim.

1.2 RELATED SECTIONS

A. Section 07457 – Cementitous Siding.

1.3 REFERENCES

A. ASTM D792 - Density and Specific Gravity of Plastics by Displacement.

B. ASTM D570 - Water Absorption of Plastics.

C. ASTM D638 - Tensile Properties of Plastics.

D. ASTM D790 - Flexural Properties of Unreinforced and Reinforced Plastics and Electrical Insulating Materials.

E. ASTM D1761 - Mechanical Fasteners in Wood.

F. ASTM D5420 - Standard Test Method for Impact Resistance of Flat, Rigid Plastic Specimen by means of a Striker Impacted by a Falling Weight.

G. ASTM D256 - Determining the Pendulum Impact Resistance of Plastics.

H. ASTM D696 - Coefficient of Linear Thermal Expansion of Plastics Between -30˚C and 30˚C with a Vitreous silica Dilatometer.

I. ASTM D635 - Rate of Burning and/or Extent and Time of Burning of Plastics in a Horizontal Position.

J. ASTM E84 - Surface Burning Characteristics of Building Materials.

K. ASTM D648 - Deflection Temperature of Plastics Under Flexural Load in the Edgewise Position.

L. ASTM D3679 - Standard Specification for Rigid Poly Vinyl Chloride (PVC) Siding.

1.4 SUBMITTALS

A. General: Submit listed submittals in accordance with Conditions of the Contract and Division 1 Submittal Procedures Section.

B. Product Data: Submit product data, manufacturer's catalogs, SPEC-DATA® product sheet, for specified products.

1.4 SUBMITTALS (continued)

C. Samples: Submit three material samples representative of the texture, thickness and widths shown and specified herein.

1.5 05 QUALITY ASSURANCE

A. Regulatory Requirements: Check with Local Building Code for installation requirements.

B. Allowable Tolerances:

1. Variation in component length: -0.00 / +1.00”
2. Variation in component width: ± 1/16”
3. Variation in component thickness: ± 1/16”
4. Variation in component edge cut: ± 2˚
5. Variation in Density -0% + 10%

C. Workmanship, Finish, and Appearance:

1. Free foam cellular pvc that is homogeneous and free of voids, holes, cracks, and foreign inclu sions and other defects. Edges must be square, and top and bottom surfaces shall be flat with no convex or concave deviation.

2. Uniform surface free from cupping, warping, and twisting.

1.6 06 DELIVERY, STORAGE AND HANDLING

A. Trim materials should be stored on a flat and level surface on a full shipping pallet. Handle materials to prevent damage to product edges and corners. Store materials under a protective covering to prevent jobsite dirt and residue from collecting on the boards.

1.7 07 WARRANTY

A. Provide manufacturer’s 25 year warranty against defects in manufacturing that cause the products to rot, corrode, delaminate, or excessively swell from moisture.

PART II PRODUCTS 2.

01 MATERIALS

A. Acceptable products: AZEK® Trimboards manufactured by Vycom Corporation, 801 Corey Street, Moosic, PA 18507.

B. Material: Free foam cellular pvc material with a small-cell microstructure and density of .55 grams/cm^3.

1. Material shall have a minimum physical and performance properties specified in

Section C on the following page.

C. Performance and physical characteristic requirements:

PROPERTY	UNITS	VALUE	ASTM METHOD
PHYSICAL			
Density	g/cm^3	0.55	D 792
Water Absorption	%	0.15	D 570
MECHANICAL			
Tensile Strength	psi	2256	D 638
Tensile Modulus	psi	144,000	D 638
Flexural Strength	psi	3329	D 790
Flexural Modulus	psi	144,219	D 790
Nail Hold	Lbf/in of penetration	35	D 1761
Screw Hold	Lbf/in of penetration	680	D 1761
Staple Hold	Lbf/in of penetration	180	D 1761
Gardner Impact	in-lbs	103	D 5420
Charpy Impact (@23˚C)	ft-lbs	4.5	D 256
THERMAL			
Coefficient of Linear Expansion	in/in/˚F	3.2 x 10-5	D 696
Burning Rate	in/min	No burn when flame removed	D 635
Flame Spread Index	--	25	E 84
Heat Deflection Temp 264 psi	˚F	150	D 648
Oil Canning (@140˚F)	˚F	Passed	D 648

2.2 ACCESSORY PRODUCTS

A. Fasteners:

- Use fasteners designed for wood trim and wood siding (thinner shank, blunt point, full round head) with AZEK®.
- Use a highly durable fastener such as stainless steel or hot-dipped galvanized.
- Staples, small brads and wire nails must not be used as fastening members.
- The fasteners should be long enough to penetrate the solid wood substrate a minimum of 1 1/2".
- Standard nail guns work well with AZEK trim products.
- Use 2 fasteners per every framing member for trimboards applications. Trimboards 12" or wider, as well as sheets, will require additional fasteners.
- Fasteners must be installed no more than 2" from the end of each board.
- AZEK should be fastened into a flat, solid substrate. Fastening AZEK into hollow or uneven areas must be avoided.
- Pre-drilling is typically not required unless a large fastener is used or product is installed in low temperatures.
- 3/8" and 1/2" sheet product is not intended to be ripped into trim pieces. These profiles must be glued to a substrate and mechanically fastened.

B. Adhesives:

- Glue all AZEK to AZEK joints such as window surrounds, long fascia runs, etc. with AZEK Adhesive, a cellular pvc cement, to prevent joint separation.
- The glue joint should be secured with a fastener and/or fastened on each side of the joint to allow adequate bonding time.
- AZEK Adhesive has a working time of 10 minutes and will be fully cured in 24 hours.
- If standard pvc cements are used, keep in mind these products typically cure quickly which will result in limited working time and may reduce adhesive strength.
- Surfaces to be glued should be smooth, clean and in complete contact with each other.
- To bond AZEK to other substrates, various adhesives may be used. Consult adhesive manufacturer to determine suitability.

C. Sealants:
- Use urethane, polyurethane or acrylic based sealants without silicone.

2.3 03 FINISHES

A. AZEK products do not require paint for protection, but may be painted to achieve a custom color.

B. Preparation:

- No special surface preparations are required prior to painting - sanding is not necessary for paint adhesion.
- Surface must be clean and dry.
- If desired, nail holes may be filled with polyurethane or acrylic based caulk.
- Use a 100% acrylic latex paint with a Light Reflective Value (LRV) of 55 or higher.
- Follow the paint manufacturer's recommendations to apply.

PART III EXECUTION 3.

01 INSTALLATION

A. Manufacturers instructions:

- Comply with manufacturer's product catalog installation instructions and product technical bulletin instructions.

B. Cutting:

- AZEK products can be cut using the same tools used to cut lumber.
- Carbide tipped blades designed to cut wood work well. Avoid fine tooth metal cutting blades.
- Rough edges from cutting may be caused by excessive friction, poor board support, or worn or improper tooling.

C. Drilling

- AZEK products can be drilled using the same tools used to drill lumber.
- Drilling AZEK products is similar to drilling a hardwood. Care should be taken to avoid frictional heat buildup.
- Use standard woodworking drills. Do not use drills made for normal rigid pvc.
- Periodic removal of AZEK shavings from the drill hole may be necessary.

D. Milling

- AZEK products can be milled using standard milling machines used to mill lumber.
- Relief Angle 20˚ to 30˚
- Cutting speed to be optimized with the number of knives and feed rate.

E. Routing

- AZEK products can be routed using standard router bits and the same tools used to rout lumber.
- Carbide tipped router bits are recommended.

F. Edge Finishing

- Edges can be finished by sanding, grinding or filing with traditional woodworking tools.

G. Nail Location

- Use 2 fasteners per every framing member for trimboard applications.
- Trimboards over 12" or wider, as well as sheets, will require additional fasteners.
- Fasteners must be installed no more than 2" from the end of each board.

H. Thermal Expansion and Contraction

- AZEK products expand and contract with changes in temperature.
- Properly fastening AZEK material along its entire length will minimize expansion and contraction.
- When properly fastened, allow for 1/8" per 18 foot of AZEK product for expansion and contraction.
- Joints between pieces of AZEK should be glued to eliminate joint separation. When gaps are glued on a long run of AZEK, allow expansion and contraction at ends of the run.

END OF SECTION

SECTION 072119 FOAMED-IN-PLACE INSULATION

1.0 SCOPE

A. Provide Closed-cell Spray Foam Insulation under first floor.
B. Provide Closed-cell Spray Foam at Misc. Voids to complete air barrier.

1.1 SUBMITTALS

A. Provide product data and Installation Instructions for closed-cell spray foam insulation.

2.0 PRODUCTS

A. Provide Closed-cell Spray Foam Insulation

B. Closed-Cell Polyurethane Foam Insulation: ASTM C 1029, Type II, with maximum flame-spread and smoke-developed indexes of 75 and 450, respectively, per ASTM E 84.

1. AVAILABLE MANUFACTURERS:
   a. Icynene Inc.
   b. Dow chemical company.
   c. CertainTeed
   d. BASF

2. Minimum density of 1.5 lb/cu. Ft. (24 kg/cu. M), thermal resistivity of 6.2 deg f x h x sq. Ft./btu x in. At 75 deg f (43 k x m/w at 24 deg c).

3. Fire propagation characteristics: passes NFPA 285 testing as part of an approved assembly.

3.0 EXECUTION

3.1 INSTALLATION GENERAL:

A. Comply with insulation manufacturer's written instructions applicable to products and applications indicated.

3.2 INSTALLATION FOR CLOSED-CELL SPRAY FOAM INSULATION:

A. Apply spray-applied insulation according to manufacturer's written instructions. Do not apply insulation until installation of pipes, ducts, conduits, wiring, and electrical outlets in walls is completed and windows, electrical boxes, and other items not indicated to receive insulation are masked. After insulation is applied, make flush with face of studs by using method recommended by insulation manufacturer.

B. Miscellaneous Voids: Install insulation in miscellaneous voids and cavity spaces where required to prevent gaps in insulation.

3.3 PROTECTION:

A. Protect installed insulation from damage due to harmful weather exposures, physical abuse, and other causes. Provide temporary coverings or enclosures where insulation is subject to abuse and cannot be concealed and protected by permanent construction immediately after installation.

END OF SECTION 072119

SECTION 072216.13 RIGID THERMAL INSULATION

1.0 SCOPE

A. Provide Extruded Polystyrene Insulation board

1.1 SUBMITTALS

A. Provide product data and Installation Instructions for insulation board and fasteners.

2.0 PRODUCTS

A. Provide Expanded Polystyrene Insulation Board.
   1. Manufacturer: Owens Corning
   2. Type: X
   3. Product: Foamular 150
   4. Thickness: As indicated on drawings.
   5. Compressive Strength: 15 psi
   6. Permeability: 1 Perm per inch
   7. Edge Profile: Tongue & Groove.
   8. Flame Spread Index: Less than 75 per ASTM E84.
   9. Smoke Developed Index: Less than 450 per ASTM E 84.

B. Fasteners:
   1. Hot dipped galvanized roofing nails.
   2. Length as required to provide ¾” depth penetration to the attaching material.

3.0 EXECUTION

INSTALLATION:

A. Comply with insulation manufacturer's written instructions applicable to products and applications indicated.

B. Install insulation that is undamaged, dry, and unsoiled and that has not been left exposed to ice, rain, or snow at any time.

C. Install perpendicular to joist direction. Nail off at 12” o.c. at the edge and 16 o.c. in the field.

   1. Install in a manner that provides a snug fit to structural members, cope in where necessary
   2. Seal gaps with compatible sealant.

END OF SECTION

SECTION 072500 - WEATHER BARRIER

PART 1 – GENERAL

1.1 SECTION INCLUDES

A. Weather barrier and Air barrier membrane (DuPont™ Tyvek® HomeWrap®)
B. Seam Tape (DuPont™ Tyvek® Tape)
C. Fasteners (DuPont™ Tyvek® Wrap Caps)

1.2 REFERENCES

A. ASTM International
   1. ASTM C920; Standard Specification for Elastomeric Joint Sealants
   2. ASTM C1193; Standard Guide for Use of Joint Sealants
   3. ASTM D882; Test Method for Tensile Properties of Thin Plastic Sheeting
   4. ASTM D1117; Standard Guide for Evaluating Non-woven Fabrics
   5. ASTM E84; Test Method for Surface Burning Characteristics of Building Materials
   6. ASTM E96; Test Method for Water Vapor Transmission of Materials
   7. ASTM E1677; Specification for Air Retarder Material or System for Framed Building Walls
   8. ASTM E2178; Test Method for Air Permeance of Building Materials
B. AATCC – American Association of Textile Chemists and Colorists
   1. Test Method 127 Water Resistance: Hydrostatic Pressure Test
C. TAPPI
   1. Test Method T-410; Grams of Paper and Paperboard (Weight per Unit Area)
   2. Test Method T-460; Air Resistance (Gurley Hill Method)

1.3 SUBMITTALS

A. Product Data: Submit manufacturer current technical literature for each component.
B. Samples: Weather Barrier membrane, minimum 8-1/2 inches by 11 inch.
C. Quality Assurance Submittals
   1. Manufacturer Instructions: Provide manufacturer's written installation instructions.

1.4 QUALITY ASSURANCE

A. Qualifications
   1. Installer shall have experience with installation of similar weather barrier assemblies under similar conditions.
   2. Installation shall be in accordance with manufacturer's installation guidelines and recommendations.
   3. Source Limitations: Provide weather barrier and accessory materials produced by single manufacturer.

1.5 DELIVERY, STORAGE AND HANDLING

A. Deliver weather barrier materials and components in manufacturer's original, unopened, undamaged containers with identification labels intact.
B. Store weather barrier materials as recommended by system manufacturer.

1.6 SCHEDULING

A. Review requirements for sequencing of installation of weather barrier assembly with installation of windows, doors, louvers and flashings to provide a weather-tight barrier assembly.

PART 2 – PRODUCTS

2.1 MANUFACTURER

A. DuPont; 4417 Lancaster Pike, Chestnut Run Plaza 728, Wilmington, DE 19805; 1-800-44-TYVEK (8-9835); http://www.construction.tyvek.com

2.2 MATERIALS

A. Basis of Design: spunbonded polyolefin, non-woven, non-perforated, weather barrier is based upon DuPont™ Tyvek® HomeWrap® and related assembly components.

B. Performance Characteristics:
   1. Air Penetration: <.004 cfm/ft^2 at 1.57 psf, when tested in accordance with ASTM E2178. Type I per ASTM E1677.
   2. Water Vapor Transmission: 56 perms, when tested in accordance with ASTM E96-05, Method A.
   3. Water Penetration Resistance: 250 cm when tested in accordance with AATCC Test Method 127.
   4. Basis Weight: 1.8 oz/yd^2, when tested in accordance with TAPPI Test Method T-410.
   5. Air Resistance: 1200 seconds, when tested in accordance with TAPPI Test Method T-460.
   6. Tensile Strength: 30/30 lbs/in., when tested in accordance with ASTM D882.
   7. Tear Resistance: 8/6 lbs, when tested in accordance with ASTM D1117.
   8. Surface Burning Characteristics: Class A, when tested in accordance with ASTM E84. Flame Spread: 15, Smoke Developed: 15

2.3 ACCESSORIES

A. Seam Tape: 3 inch wide, DuPont™ Tyvek® Tape as distributed by DuPont Building Innovations.

B. Fasteners:
   1. DuPont™ Tyvek® Wrap Caps, as distributed by DuPont: #4 nails with large 1-inch plastic cap fasteners, or 1-inch plastic cap staples with leg length sufficient to achieve a minimum penetration of 5/8-inch into the wood stud.

C. Sealants
   1. Provide sealants that comply with ASTM C 920, elastomeric polymer sealant to maintain watertight conditions.
   2. Products:
      a. DuPont™ Residential Sealant
      b. Sealants recommended by the weather barrier manufacturer.

D. Adhesive:
   1. Provide adhesive recommended by weather barrier manufacturer.

2. Products:
   a. Liquid Nails® LN-109
   b. Denso Butyl Liquid
   c. 3M High Strength 90
   d. SIA 655
   e. Adhesives recommend by the weather barrier manufacturer.

PART 3 - EXECUTION

3.1 EXAMINATION

A. Verify substrate and surface conditions are in accordance with weather barrier manufacturer recommended tolerances prior to installation of weather barrier and accessories.

3.2 INSTALLATION – WEATHER BARRIER

A. Install weather barrier over exterior face of exterior wall substrate in accordance with manufacturer recommendations.
B. Start weather barrier installation at a building corner, leaving 6-12 inches of weather barrier extended beyond corner to overlap.
C. Install weather barrier in a horizontal manner starting at the lower portion of the wall surface. Maintain weather barrier plumb and level.
D. Extend bottom roll edge over sill plate interface 2” to 3” minimum. Seal weather barrier with sealant or tape. Shingle weather barrier over back edge of thru-wall flashings and seal weather barrier with sealant or tape. Ensure weeps are not blocked.
E. Subsequent layers shall overlap lower layers a minimum of 6 inches horizontally in a shingling manner.
F. Window and Door Openings: Extend weather barrier completely over openings.
G. Weather Barrier Attachment:
   1. Attach weather barrier to studs through exterior sheathing. Secure using weather barrier manufacturer recommended fasteners, spaced 12 -18 inches vertically on center along stud line, and 24 inch on center, maximum horizontally.

3.3 SEAMING

A. Seal seams of weather barrier with seam tape at all vertical and horizontal overlapping seams.
B. Seal any tears or cuts as recommended by weather barrier manufacturer.

3.4 OPENING PREPARATION (for use with flanged windows)

A. Cut weather barrier in an “I-cut” pattern. A modified I-cut is also acceptable.
   1. Cut weather barrier horizontally along the bottom and top of the window opening.
   2. From the top center of the window opening, cut weather barrier vertically down to the sill
   3. Fold side and bottom weather barrier flaps into window opening and fasten.
B. Cut a head flap at 45-degree angle in the weather barrier membrane at window head to expose 8 inches of sheathing. Temporarily secure weather barrier membrane flap away from sheathing with tape.

3.5 THRU-WALL FLASHING / WEATHER BARRIER INTERFACE AT BASE OF WALL

A. Overlap thru-wall flashing with weather barrier by 6-inches.

B. Mechanically fasten bottom of weather barrier through top of thru-wall flashing.
C. Seal vertical and horizontal seams with tape or sealing membrane.

3.6 THRU-WALL FLASHING / WEATHER BARRIER INTERFACE AT WINDOW HEAD

A. Cut flap in weather barrier at window head.
B. Prime exposed sheathing.
C. Install lintel as required. Verify end dams extend 4 inches minimum beyond opening.
D. Install end dams bedded in sealant.
E. Adhere 2 inches minimum thru-wall flashing to wall sheathing. Overlap lintel with thru-wall flashing and extend ¼ inch minimum beyond outside edge of lintel to form drip edge.
F. Apply sealant along thru-wall flashing edges.
G. Fold weather barrier flap back into place and tape bottom edge to thru-wall flashing.
H. Tape diagonal cuts of weather barrier.
I. Secure weather barrier flap with fasteners.

3.7 PROTECTION

A. Protect installed weather barrier from damage.

END OF SECTION 072500

SECTION 07457 - CEMENTITIOUS SIDING

PART 1 GENERAL

1.1 SECTION INCLUDES

A. Cementitious express/reveal jointed panel with accessories. James Hardie HardiePanel Vertical Siding.

1.2 RELATED SECTIONS

1. Division 01: Administrative, procedural, and temporary work requirements.
2. Section 06 1000 - Rough Carpentry: Wood furring.
3. Section 07 2800 - Moisture Barriers: Exterior wall moisture barrier.
4. Section 07 9200 - Joint Sealers: Joint sealers and accessories.
5. Section 09 9100 - Painting: Field-applied paint finish.

1.3 REFERENCES

A. ASTM International (ASTM):
1. ASTM C834 - Standard Specification for Latex Sealants.
2. ASTM C920 - Standard Specification for Elastomeric Joint Sealants.
3. ASTM C1186 - Standard Specification for Flat Non-Asbestos Fiber-Cement Sheets.
4. ASTM D1117 - Standard Guide for Evaluating Nonwoven Fabrics.
5. ASTM E84 - Standard Test Method for Surface Burning Characteristics of Building Materials.
6. ASTM E96 - Test Methods for Water Vapor Transmission of Materials.
7. ASTM E119 - Standard Test Methods for Fire Tests of Building Construction and Materials.
8. ASTM E136 - Standard Test Method for Behavior of Materials in a Vertical Tube Furnace at 750 degrees C.

B. AATCC127 - Water Resistance: Hydrostatic Pressure Test.

C. TAPPI - T460 - Air Resistance of Paper (Gurley Method).

1.4 SUBMITTALS

A. Submit under provisions of Section 01300.

B. Product Data: Manufacturer's data sheets on each product to be used, including:
1. Installation instructions and recommendations.
2. Storage and handling requirements and recommendations.
3. Manufacturer's best practice guide.
4. Technical data sheet.

C. Selection Samples: For each finish product specified, two complete sets of color chips representing manufacturer's full range of available colors and patterns.

D. Verification Samples: For each finish product specified, two samples, minimum size 4 by 6 inches (100 by 150 mm), representing actual product, color, and patterns.

1.5 QUALITY ASSURANCE

A. Mock-Up: Provide a mock-up for evaluation of surface preparation techniques

1. Finish areas designated by Architect.
2. Do not proceed with remaining work until workmanship, color, and sheen are approved by Architect.
3. Refinish mock-up area as required to produce acceptable work.

1.6 DELIVERY, STORAGE, AND HANDLING

A. Store products in manufacturer's unopened packaging until ready for installation.

B. Store siding flat on a smooth level surface. Protect edges and corners from chipping. Store sheets under cover and keep dry prior to installing.

C. Store and dispose of solvent-based materials, and materials used with solvent-based materials, in accordance with requirements of local authorities having jurisdiction.

1.7 PROJECT CONDITIONS

A. Maintain environmental conditions (temperature, humidity, and ventilation) within limits recommended by manufacturer for optimum results. Do not install products under environmental conditions outside manufacturer's absolute limits.

1.8 WARRANTY

A. Manufacturer's Warranty: Provide James Hardie HardiePanel Vertical Siding Limited Product Warranty, with 30-year limited product warranty against manufacturing defects.
1. Application Warranty: Application limited warranty for 2 years.

PART 2 PRODUCTS

2.1 MANUFACTURERS

A. Acceptable Manufacturer: James Hardie Building Products, Inc.,

B. Requests for approval of equal substitutions will be considered in accordance with provisions of Section 01600.

2.2 CLADDING

A. Cement Cladding Panels: HardiePanel Vertical Siding as manufactured by James Hardie Building Products, Inc. 5/16 inches thick, 3 feet 11.5 inches wide by 7 feet 11.5 inches long. Product shall be engineered for climate conditions.
1. Manufacturer's Climate Zone Product: HZ5 for freezing wet climates with a green tint primer.

B. Code Compliance Requirement for Siding Materials:
1. Fiber-cement siding, complies with ÅSTM C 1186 Type A Grade II.
2. Fiber-cement siding, complies with ASTM E 136 as a noncombustible material.
3. Fiber-cement siding, complies with ASTM E 84 Flame Spread Index = 0, Smoke Developed Index = 5.
4. Fiber-cement siding, complies with ÅSTM E 119 1 hour and 2 hour fire resistive assemblies listed with Warnock Hersey.
5. Fiber-cement siding, tested to ASTM E330 for Transverse Loads.

6. Intertek Warnock Hersey Product Listing.
7. Manufacturer's Technical Data Sheet.

2.3 FURRING (STRAPPING)

A. Rainscreen Cavity: Install Hardie Reveal Panels on a drained and vented rainscreen cavity, with a minimum 3/8 inch air cavity. Selection of cavity vent materials shall be incorporated into the design to prevent insect and pest entry.

2.4 ACCESSORIES

A. Battens: HardiePanel Vertical Siding batten strips

B. Trims: Reveal™ Trims in the following profiles supplied by James Hardie. Reveal Trims confirm to a 6063 alloy in T-5 temper with a minimum thickness of 0.050 inch. All reveal trims are 12 feet in length.
1. Horizontal trim.
2. Vertical trim.
3. Outside corner trim.
4. Inside corner trim.
5. J channel trim.
6. Drip cap trim.

C. Finishes of Reveal Trims:
1. Chem Film for field painting of Reveal Trims; Chem Film Coating shall conform to ASTM N D1730

2.5 FASTENERS

A. Fasteners: For attaching Hardie Reveal Panel to a rain screen provide the following:
1. Steel Framing: 10-12 1-1/2 inch long x 0.47 inch HD low profile Torx (T20W) (TW-S-D12-4.8x38).
2. Fasteners shall be of high quality stainless steel to ensure resistance to corrosion. For field painting, fasteners should be treated to accept paint adhesion.
a. Alternatives must be approved by the architect. e.g. decorative screws, nails, bugle head screws, etc.

2.6 FINISHES

A. Factory Primer: Provide factory applied universal primer.
1. Primer: Factory applied sealer/primer by James Hardie. Apply two coats flat sheen finishes to panels.
2. Topcoat: Refer to Section 09900 and Exterior Finish Schedule.

B. Factory Finish for Trim:
1. Trim for Factory-Applied Coating and Field-Applied Finish: Chem Film.
2. Trim for Factory-Applied Finish and No Field-Applied Finish: Clear anodized.

PART 3 EXECUTION

3.1 EXAMINATION

A. Do not begin installation until substrates have been properly prepared.

B. If framing preparation is the responsibility of another installer, notify Architect of unsatisfactory preparation before proceeding.

3.2 PREPARATION

A. Clean surfaces thoroughly prior to installation.

B. Prepare surfaces using the methods recommended by the manufacturer for achieving the best result for the substrate under the project conditions.

C. Ensure that drainage plane in intact and all penetrations are sealed.

3.3 INSTALLATION

A. Metal Framing: Minimum 20 gauge 3-5/8 inch (92 mm) C-Stud 16 inches maximum metal framing complying with local building codes, including the use of water-resistive barriers and/or vapor barriers where required. Minimum 1-1/2 inches (38 mm) face and straight, true, of uniform dimensions and properly aligned.
   1. Install water-resistive barriers and claddings to dry surfaces.
   2. Repair any punctures or tears in the water-resistive barrier prior to the installation of the siding.
   3. Protect siding from other trades.

B. Furring: Install furring on a minimum 3/8 inch rainscreen cavity, or in accordance with local building code for rainscreen requirements.

C. Panel Installation: Install materials in strict accordance with manufacturer's installation instructions.
   1. Place fasteners no closer than 3/4 inch (9.5 mm) from panel edges and 2 inches (51 mm) from panel corners.
   2. Use fasteners as specified in the James Hardie Tech Data sheet and in the Hardie Reveal Panel Installation Instruction.
   3. Install panel using 1/2 inch (13 mm) spacers at horizontal joints. Leave bottom edge of panel above all horizontal trims exposed, no caulking shall be placed at this overlap of Horizontal Reveal Trim. Factory primed edge shall always be used.
   4. Allow minimum vertical clearance between the bottom edge of siding and any other material in strict accordance with the manufacturer's installation instructions and as determined by James Hardie Zone.
   5. Maintain clearance between siding and adjacent finished grade.
   6. Specific framing and fastener requirements - refer to the applicable building code compliance reports.

3.4 FINISHING

A. Finish factory primed siding with a minimum of two coats of high quality 100 percent acrylic exterior flat grade paint with flat finish within 180 days of installation. Follow paint manufacturer's written product recommendation and written application instructions.

B. Field cut edges shall be coated during the installation process using an exterior grade primer/sealer that is compatible with the type of paint to used on project.

3.5 PROTECTION

A. Protect installed products until completion of project.

B. Touch-up, repair or replace damaged products before Substantial Completion.

END OF SECTION 07457

SECTION 076200 SHEET METAL FLASHING & TRIM

PART 1 GENERAL

1.1 SUMMARY

A. Section Includes:
1. Metal flashings and trim.

B. Related Sections:
1. Division 01: Administrative, procedural, and temporary work requirements.
2. Section 079200 - Joint Sealers.

1.2 REFERENCES

A. American National Standards Institute/Single Ply Roofing Institute (ANSI/SPRI) ES-1 - Wind Design Standard for Edge Systems Used with Low Slope Roofing Systems.

B. ASTM International (ASTM):
1. B32 - Standard Specification for Solder Metal.
2. B209 - Standard Specification for Aluminum and Aluminum-Alloy Sheet and Plate.

C. Sheet Metal and Air Conditioning Manufacturer's Association International (SMACNA) - Architectural Sheet Metal Manual.

1.3 QUALITY ASSURANCE

A. Design, fabricate, and install metal flashings in accordance with ANSI/SPRI ES-1.

PART 2 PRODUCTS

2.1 MATERIALS

A. Aluminum Sheet:
1. ASTM B209, alloy 3003, temper H14, 0.032 inch thick.
2. Finish: Natural.

2.2 ACCESSORIES

A. Solder: ASTM B32.

B. Fasteners: Same material and finish as sheet metal, with neoprene gasketed washers where exposed.

C. Joint Sealers: Specified in Section 079200.

2.3 FABRICATION

A. Fabricate components in accordance with SMACNA Manual.

B. Solder shop formed joints [except pop rivet and seal joints at prefinished metal]. After soldering, remove flux and wash clean.

C. Fabricate corners in single units with minimum 18 inch long legs.

D. Fabricate vertical faces with bottom edge formed outward 1/4 inch and hemmed to form drip.

E. Form sections accurate to size and shape, square and free from distortion and defects.

F. Provide for thermal expansion and contraction in sheet metal:
   1. Other sheet metal:
      a. Provide expansion joints in sheet metal exceeding 15 feet in running length.
      b. Place expansion joints at 10 feet on center maximum and maximum 2 feet from corners and intersections.
   2. Joint width: Consistent with types and sizes of materials, minimum width 1/4 inch.

G. Unless otherwise indicated, provide minimum 3/4 inch wide flat lock seams; lap in direction of water flow.

H. Fabricate cleats and starter strips of same material as sheet metal.

PART 3 EXECUTION

3.1 INSTALLATION

A. Install flashing and sheet metal as indicated and in accordance with SMACNA Manual.

B. Install cleats and starter strips before starting installation of sheet metal. Fasten at 6 inches on center maximum.

C. Secure flashings with concealed fasteners where possible.

D. Apply plastic cement between metal and bituminous flashings.

E. Fit flashings tight, with square corners and surfaces true and straight.

F. Seam and seal field joints.

G. Separate dissimilar metals with bituminous coating or non-absorptive gaskets.

H. Apply joint sealers as specified in Section 079200.

3.2 CLEANING

A. Clean sheet metal; remove slag, flux, stains, spots, and minor abrasions without etching surfaces.

END OF SECTION 076200

SECTION 077120 - GUTTERS & DOWNSPOUTS

PART 1 GENERAL

1.1 SUMMARY

A. Section Includes:
1. Gutters and Downspouts
2. Related accessories

B. Related Sections:
1. Section 07 6200 Sheet Metal Flashing and Trim
2. Section 07 9200 - Joint Sealers

1.2 REFERENCES

A. ASTM International (ASTM):
1. B209 - Standard Specification for Aluminum and Aluminum-Alloy Sheet and Plate.

B. Sheet Metal and Air Conditioning Manufacturer's Association International (SMACNA) - Architectural Sheet Metal Manual.

1.3 SUBMITTALS

A. Submittals for Review:
1. Shop Drawings: Show locations, types and thicknesses of metal, profiles, dimensions, fastening methods, provisions for expansion and contraction, and joint details.
2. Samples:
a. Gutter profile, minimum 12 inches long.
b. Downspout section, minimum 12 inches long.
c. 3 x 3 inch prefinished metal samples showing full range of available colors.

1.4 QUALITY ASSURANCE

A. Fabricator and Installer Qualifications: Minimum 5 years documented experience in work of this Section.

B. Design, fabricate, and install in accordance with SMACNA Manual.

PART 2 PRODUCTS

2.1 MANUFACTURERS

A. Acceptable Manufacturers:
1. Alcoa
2. Englert, Inc.
3. USA Aluminum
4. Site fabricated seamless gutters per Section 07 7120

B. Substitutions: Under provisions of Division 01.

2.2 COMPONENTS

A. Gutters: Aluminum sheet, ASTM B 209, Alloy 3105-H24. Minimum tensile strength 26,000 psi, minimum yield strength 25,000 psi or equivalent. Continuous and seamless sheet aluminum, roll formed.
   1. Thickness: 0.027 inches minimum
   2. Profile: K style

B. Downspouts: Aluminum sheet, ASTM B 209, Alloy 3105-H24. Minimum tensile strength 26,000 psi, minimum yield strength 25,000 psi or equivalent.
   1. Thickness: 0.019 inch.
   2. Size: 3 inches by 4 inches.

C. Endcaps: Aluminum sheet, ASTM B 209, Alloy 3105-H24, thickness 0.027 inch.

D. Inside and Outside Mitres: Aluminum sheet, ASTM B 209, Alloy 3105-H24, thickness 0.027 inch.

E. Gutter Hangers and Anchors: Aluminum sheet, ASTM B 209, Alloy 3105-H24, thickness 0.063 inch. Provide types required to suit project requirements.

F. Downspout Anchors: Aluminum. Provide types required to suit project requirements.

G. Elbows: Aluminum sheet, ASTM B 209, Alloy 3105-H24. Minimum tensile strength 26,000 psi, minimum yield strength 25,000 psi or equivalent.
   1. Thickness: 0.019 inch.
   2. Size: To match downspouts.

H. Aluminum Finish: two-coat system applied in a continuous baked-on process in a single operation, comprising of an acid-based primer and baked-on high performance linear polyester topcoat on exposed surfaces.

   1. Color: As selected by Architect from manufacturer's full range

2.3 FABRICATION

A. Continuously form seamless gutters to the profiles and sizes specified.
B. Form downspouts of profiles and sizes specified.
C. Hem exposed edges of metal.

PART 3 EXECUTION

3.1 EXAMINATION

A. Do not begin installation until substrates have been properly prepared.
B. Verify governing dimensions at building.
C. Verify surfaces are ready to receive gutters and downspouts.
D. If substrate preparation is the responsibility of another installer, notify Architect of unsatisfactory preparation before proceeding.

3.2 PREPARATION

A. Clean surfaces thoroughly prior to installation.

B. Clean and repair if necessary any adjoining work on which this work is in any way dependent for its proper installation.

C. Prepare surfaces using the methods recommended by the manufacturer for achieving the best result for the substrate under the project conditions.

3.3 INSTALLATION

A. Install in accordance with manufacturer's instructions.

B. Install gutters using appropriate hangers to allow normal expansion and contraction.

C. Install gutter hangers using two 1-1/4 inch screw shank nails and fastened into solid lumber.

D. All gutters shall be in continuous length for each elevation (run). No end laps are allowed.

E. Exercise care in placing aluminum in contact with other dissimilar metals or materials that are not compatible with aluminum.

F. Providing adequate insulation/separation where ever necessary, such as by painting or otherwise protecting when they are in contact with aluminum or when drainage from them passes over aluminum surfaces.

G. Install sealants where indicated to clean dry surfaces only without skips or voids.

3.4 PROTECTION

A. Protect installed products until completion of project.

B. Touch-up, repair or replace damaged products before Substantial Completion.

3.1 CLEANING

A. Clean gutters and downspouts after installation; dust, dirt, stains, spots, and minor abrasions without etching surfaces.

END OF SECTION - 077120

SECTION 078400 FIRESTOPPING

1.0 SCOPE

A. Provide firestopping products to limit the spread of fire, heat, smoke, and gasses through otherwise unprotected openings in rated assemblies, including walls, partitions, floors, roof/ceilings, and similar locations, restoring the integrity of the fire rated construction to its original fire rating.

1.1 SUBMITTALS

A. Product Data: Furnish manufacturer's product data sheets on each material to be used in firestop systems. Information on manufacturer's product data sheet should include:
   1. Product characteristics including compliance with appropriate ASTM/UL/ANSI test standards.
   2. Storage and handling requirements and recommendations.

B. Installation Instruction: Furnish manufacturer's installation instructions.

2.0 PRODUCTS

A. General: Use only firestopping products that have been tested for specific fire-resistance-rated construction conditions conforming to construction assembly type, penetrating item type or joint opening width and movement capabilities, annular space requirements, and fire-rating involved for each separate instance.

   1. Compatibility: Provide firestopping composed of components that are compatible with each other, the substrates forming openings, and the items, if any, penetrating the firestopping under conditions of service and application, as demonstrated by firestopping manufacturer based on testing and field experience.

B. Intumescent Sealants: Single component intumescent latex formulations containing no water soluble intumescent ingredients capable of expanding a minimum 3 times

C. Endothermic Sealants: Single component latex formulations that upon cure do not re-emulsify during exposure to moisture.

D. Elastomeric Sealants: Single component latex formulations that upon cure do not re-emulsify during exposure to moisture and accommodate minimum ±25 percent movement.

E. Firestop Devices: Factory-assembled steel collars lined with intumescent material capable of expanding a minimum 30 times sized to fit specific outside diameter of penetrating item.

F. Fire Rated Cable Pathways: Gangable device modules capable of being retrofitted around existing cables and comprised of steel raceway with intumescent foam pads allowing 0 to 100 percent cable fill and requiring no additional action in the form of plugs, twisting closure, putty, pillow, or sealant to achieve fire and leakage ratings.

G. Wall Opening Protective Materials: Intumescent, non-curing pads or inserts for protection of electrical switch and receptacle boxes to reduce horizontal separation to less than 24” (610 mm)

H. Firestop Putty: Intumescent, 100% solids, non-hardening, water resistant, butyl rubber based putties containing no solvents or silicone compounds

I. Silicone Sealants: Moisture curing, single component, silicone elastomeric sealant for horizontal surfaces (pourable or nonsag) or vertical surface (nonsag).

J. All-Weather Coatings: Moisture curing, single component silicone copolymer elastomeric spray coatings for horizontal surfaces where greater water resistance is required or inclement weather is anticipated.

K. Silicone Foam: Multicomponent, silicone-based liquid elastomers, that when mixed, expand and cure in place to produce a flexible, non-shrinking foam.

3.0 EXECUTION

3.1 PREPARATION

A. Examination of Conditions: Examine areas and conditions under which work is to be performed and identify conditions detrimental to proper or timely completion.
B. Surfaces to which firestop materials will be applied shall be free of dirt, grease, oil, scale, laitance, rust, release agents, water repellents, and any other substances that may inhibit optimum adhesion.
C. Provide masking and temporary covering to prevent soiling of adjacent surfaces by firestopping materials.
D. Do not proceed until unsatisfactory conditions have been corrected.

3.2 FIRESTOPPING INSTALLATION

A. General Requirements: Install through-penetration firestop systems and fire-resistive joint systems in accordance with “Performance Criteria” Article and in accordance with the conditions of testing and classification as specified in the published design.
B. Manufacturer’s Instructions: Comply with manufacturer’s instructions for installation of firestopping products.
    1. Seal all openings or voids made by penetrations to ensure an air and water resistant seal.
    2. Consult with mechanical engineer, project manager, and damper manufacturer prior to installation of through-penetration firestop systems that might hamper the performance of fire dampers as it pertains to duct work.
    3. Protect materials from damage on surfaces subjected to traffic.
    4. Apply a suitable bond-breaker to prevent three-sided adhesion in applications where this condition might occur such as the intersection of a gypsum wallboard/steel stud wall to floor or roof assembly where the joint is backed by a steel ceiling runner or track.
    5. Where joint application is exposed to the elements, fire-resistive joint sealant must be approved by manufacturer for use in exterior applications and shall comply with ASTM C-920, “Specification for Elastomeric Joint Sealants”.

3.3 FIELD QUALITY CONTROL

A. Keep areas of work accessible until inspection by authorities having jurisdiction.
B. Where deficiencies are found, repair or firestopping products so they comply with requirements.

3.4 ADJUSTING AND CLEANING

A. Remove equipment, materials and debris, leaving area in undamaged, clean condition.
B. Clean all surfaces adjacent to sealed openings to be free of excess firestopping materials and soiling as work progresses.

END OF SECTION 078400

SECTION 079200 JOINT SEALANTS

1.0 SCOPE

A. Provide joint sealant for the execution and completion of the work as required by installation instructions, code, or other sections of the specifications and contract documents.

1.1 SUBMITTALS

A. Provide product data: for each joint-sealant product indicated.

B. Provide samples for initial selection: manufacturer's color charts consisting of strips of cured sealants showing the full range of colors available for each product exposed to view.

2.0 PRODUCTS

A. Low VOC/no VOC: sealants used on this project shall be low voc/no voc sealants containing a minimum of volatile organic compounds.

B. Sealants shall comply with **regulation 8, rule 51 of the bay area quality management district.**

C. Sealants shall be selected suitable for their application. Sealants installed related to finished applications to receive paint shall be paintable sealant.

3.0 EXECUTION

A. INSTALLATION OF JOINT SEALANTS

1. General: comply with joint-sealant manufacturer's written installation instructions for products and applications indicated, unless more stringent requirements apply. Area to receive sealants shall be cleaned and free of loose dust or debris that may compromise the purpose of the sealant or provide an inadequate finish.

2. Sealant installation standard: comply with recommendations in ASTM C 1193 for use of joint sealants as applicable to materials, applications, and conditions indicated.

3. Install sealant backings of kind indicated to support sealants during application and at position required to produce cross-sectional shapes and depths of installed sealants relative to joint widths that allow optimum sealant movement capability.
   a. Do not leave gaps between ends of sealant backings.
   b. Do not stretch, twist, puncture, or tear sealant backings.
   c. Remove absorbent sealant backings that have become wet before sealant application and replace them with dry materials.

4. Install bond-breaker tape behind sealants where sealant backings are not used between sealants and backs of joints.
5. Install sealants using proven techniques that comply with the following and at the same time backings are installed:

a. Place sealants so they directly contact and fully wet joint substrates.
b. Completely fill recesses in each joint configuration.
c. Produce uniform, cross-sectional shapes and depths relative to joint widths that allow optimum sealant movement capability.

6. Tooling of nonsag sealants: immediately after sealant application and before skinning or curing begins, tool sealants according to requirements specified in subparagraphs below to form smooth, uniform beads of configuration indicated; to eliminate air pockets; and to ensure contact and adhesion of sealant with sides of joint.
   a. Remove excess sealant from surfaces adjacent to joints.
   b. Use tooling agents that are approved in writing by sealant manufacturer and that do not discolor sealants or adjacent surfaces.
   c. Provide concave joint profile per figure 8A in ASTM C 1193, unless otherwise indicated.

B. CLEANING
1. Clean off excess sealant or sealant smears adjacent to joints as the work progresses by methods and with cleaning materials approved in writing by manufacturers of joint sealants and of products in which joints occur.

C. PROTECTION
1. Protect joint sealants during and after curing period from contact with contaminating substances and from damage resulting from construction operations or other causes so sealants are without deterioration or damage at time of substantial completion. If, despite such protection, damage or deterioration occurs, cut out and remove damaged or deteriorated joint sealants immediately so installations with repaired areas are indistinguishable from original work.

END OF SECTION 079200

SECTION 08 16 00 - COMPOSITE DOORS

PART 1 - GENERAL

1.1 SECTION INCLUDES

A. Bifold Doors

B. Passage Doors

1.2 REFERENCES

A. American National Standards Institute (ANSI)

1. ANSI Z97.1: Safety Glazing Materials Used in Buildings – Safety Performance Specifications and Methods of Test

B. National Fire Protection Association (NFPA)

1. NFPA 252: Standard Methods of Fire Tests of Door Assemblies.

C. Underwriters Laboratories, Inc. (UL)

1. UL10B: Standard for Fire Tests of Door Assemblies (Note: Neutral pressure testing standard)
2. UL 10C: Standard for Positive Pressure Fire Tests of Door Assemblies.

D. Underwriters' Laboratories of Canada (ULC)

1. CAN4-S104: Standard Method for Fire Tests of Door Assemblies.

F Uniform Building Code Standard 7-2 (UBC)

1. UBC 7-2 (1994): Fire Tests of Door Assemblies. (Note: Neutral pressure testing standard).

2. UBC 7-2 (1997): Fire Test of Door Assemblies. (Note: Positive pressure testing standard).

1.3 DESIGN REQUIREMENTS

A. Fire-Rated Door Assemblies: Fire door assemblies shall meet or exceed fire-protection ratings indicated when tested in accordance with [NFPA 252] [UL 10[B][C]] [CAN-4S104] [and] [UBC 7-2].

B. Mirrored Door: Comply with ANSI Z97.1 safety requirements.

1.4 SUBMITTALS

A. Refer to Section 01 33 00 Submittal Procedures.

B. Product Data: Submit door manufacturer current product literature, including installation instruction.

C. Samples: Provide finish samples for all products.

D. Quality Assurance Submittals

1. Manufacturer Instructions: Provide manufacturer's written installation instructions.

E. Closeout Submittals

1. Refer to Section 01 77 00 Closeout Procedures.

1.5 DELIVERY, STORAGE AND HANDLING

A. Deliver doors, materials and components in manufacturer's original, unopened, undamaged containers with identification labels intact.

B. Store doors as recommended by manufacturer.

1.6 WARRANTY

A. Manufacturer standard warranty indicating that the door will be free from material and workmanship defects from the date of substantial completion for the time periods indicated below:

1. Door Unit: 5 years

PART 2 - PRODUCTS

2.1 MANUFACTURER

A. JELD-WEN® , Brosco, Simpson.

B. Basis of Design: Doors are based on JELD-WEN®'s Molded Interior Door: model C 3000 3 panel door.

2.2 BIFOLD DOORS

A. Door Design

1. Surface Finish: Smooth
2. Panels and Sticking Profile:
   a. Three panels, with beaded sticking

B. Core

1. Hollow core.

   a. Thickness: 1-3/4 inch.

C. Hardware

1. Finish: Brushed Chrome

D. Finish: Preprimed

1. Color: White

2.3 PASSAGE DOORS

A. Door Design

1. Surface Finish: Smooth
2. Panels and Sticking Profile:
   a. Three panels, with beaded sticking.

B. Core and Frame

1. Solid core with combination wood/MDF frame.

   a. Thickness: 1-3/4 inch .

2. Jambs

   a. Jamb Width: 4-3/4 inch.
   b. Jamb Type: Flat.
   c. Jamb Species: Pine.

C. Hardware

1. Finish: Brushed Chrome.

D. Finish: Preprimed.

1. Color: White.

PART 3 - EXECUTION

3.1 GENERAL

A. Install doors in accordance with manufacturer's installation guidelines and recommendations.

3.2 EXAMINATION

A. Inspect door prior to installation.

B. Inspect rough opening for compliance with door manufacturer recommendations. Verify rough opening conditions are within recommended tolerances.

3.3 PREPARATION

A. Prepare door for installation in accordance with manufacturer's recommendations.

B. Trim bottom of jamb sides to achieve desired distance between door bottom and finished floor height.

3.4 PASSAGE DOOR INSTALLATION

A. Place door unit into opening and level hinge side of jamb. Use shims fastened through jamb and stop to level and temporarily secure in place.

B. Level latch side of jamb. Use shims fastened through jamb and stop to level and temporarily secure in place.

C. Verify spacing between jamb and door is uniform on all sides. Adjust as necessary.

D. Shim top of jamb in center of opening and fasten with nail.

E. Re-check for square, level and even spacing around door. Nail securely in place through stop, jamb, shims and into studs every 12 inches.

F. Set nails.

G. Install trim on both sides using nails every 12 to 16 inches.

3.5 BIFOLD DOOR INSTALLATION

A. Attach door hardware to door.

B. Attach jamb hardware.

1. Fasten overhead track in center of finished opening by inserting screws through pre-drilled holes.
2. Attach jamb brackets flush to finished floor in line with overhead track.

C. Install door assemblies.

1. Place pivot pin in hole at top corner bracket and place guide wheel in track.
2. Lift door assembly and drop bottom pin into bottom bracket hole.

D. Check positioning and operation. Adjust hardware if necessary.

END OF SECTION

SECTION 081614 - FIBERGLASS EXTERIOR DOORS

PART 1 GENERAL

1.1 SECTION INCLUDES

A. Fiberglass Entry Doors
B. Fire Rated Fiberglass Entry Doors

1.2 RELATED SECTIONS

A. 062000 - Carpentry
B. 072500 – Weather Barriers
C. 072600 – Vapor Retarders
D. 079200 – Joint Sealants: Sealants and caulking
E. 099100 - Painting

1.3 REFERENCES

A. American Society for Testing and Materials (ASTM):
   1. ASTM E 90 – Standard Test Method for Laboratory Measurement of Airborne Sound Transmission Loss of Building Partitions.
   2. ASTM E 283 – Rate of Air Leakage Through Exterior Windows, Curtain Walls and Doors Under Specified Pressure Difference Across the Specimen.
   3. ASTM E 330 – Structural Performance of Exterior Windows, Doors, Skylights and Curtain Walls by Uniform Static Air Pressure Difference.
   4. ASTM E 331 – Water Penetration of Exterior Windows, Skylights, Doors, and Curtain Walls by Uniform Static Air Pressure Difference.
   6. ASTM E 547 – Standard Test Method for Water Penetration of Exterior Windows, Skylights, Doors, and Curtain Walls by Cyclic Static Air Pressure Difference.
   7. ASTM E 1300 – Standard Practice for Determining Load Resistance of Glass in Buildings.
   8. ASTM E 1332 – Standard Classification for Determination of Outdoor-Indoor Transmission Class.
   9. ASTM E 1886 – Standard Test Method for Performance of Exterior Windows, Curtain Walls, Doors, and Impact Protective Systems Impacted by Missiles and Exposed to Cyclic Pressure Differentials.
   10. ASTM E 1996 – Standard Specification for Performance of Exterior Windows, Curtain Walls, Doors, and Impact Protective Systems Impacted by Windborne Debris in Hurricanes.

B. Environmental Protection Agency and Department of Energy:
   1. Energy Star Program Requirements Product Specification for Residential Windows, Doors, and Skylights.

C. Code of Federal Regulations:
   1. CFR 1201 Part 2 – Safety Standard for Architectural Glazing Materials.

D. National Fenestration Rating Council
   1. NFRC 100 – Procedure for Determining Fenestration Product U-Factors.
   2. NFRC 200 – Procedure for Determining Fenestration Product Solar Heat Gain Coefficient and Visible Transmittance (VT) at Normal Incidence.
   3. NFRC 400 – Procedure for Determining Fenestration Product Air Leakage.

E. National Fire Protection Association
   1. NFPA 252 – Standard Methods of Fire Tests of Door Assemblies

F. Underwriters Laboratory
   1. UL 10B – Standard for Fire Testing Door Assemblies.
   2. UL 10C – Standard for Positive Pressure Fire Tests of Door Assemblies.

1.4 PERFORMANCE REQUIREMENTS

A. Doors shall have a structural design pressure rating of DP 30.

B. Door Unit Air Leakage, NFRC 400, 1.57 psf (25 mph): 0.50 cfm per square foot of frame or less.

C. Door Unit Water Penetration: No water penetration through door unit when tested in accordance with ASTM E 331or ASTM E 547 with water applied at rate of 5 gallons per hour per square foot at 0 psf.

D. Doors shall have a positive pressure certified fire door rating of 20 minutes.

E. Doors shall have a minimum/maximum U-Value of .27 and a minimum/maximum SHGC of .18

F. Doors shall qualify for Energy Star Rating.

1.5 SUBMITTALS

A. Product Data: Submit door manufacturer current product literature, including installation instructions.

B. Shop Drawings: Submit manufacturer's shop drawings, indicating dimensions, construction, component connections, anchorage methods and locations, accessories, hardware locations, and installation details.

1.6 QUALITY ASSURANCE

A. Mockup:
   1. Provide sample unit of representative product size and using manufacturer approved installation methods to determine acceptability of door installation methods.
   2. Approved mockup shall represent minimum quality required for the Work.
   3. Approved mockup shall remain in place within the Work.

B. Quality Assurance Submittals:
   1. Provide documentation for specified performance as required.
   2. Manufacturers' installation instructions.

C. Installer Qualifications: Minimum 5 years documented experience in work of this Section.

1.7 DELIVERY, STORAGE, AND HANDLING

A. Delivery: Deliver materials to site undamaged with labels clearly identifying manufacturer, product name, and installation instructions

B. Storage: Store materials in an upright position, off ground, under cover, and protected from weather, direct sunlight, and construction activities.

C. Handling: protect materials and finish during handling and installation to prevent damage.

1.8 WARRANTY

A. Manufacturer's Warranty: 3 years.

PART 2 PRODUCTS

2.1 MANUFACTURER

A. Basis of design: Therma-Tru Corp.

B. Acceptable Manufacturers:
1.) Therma-Tru Corp. (http://www.thermatru.com)
2.) Pella; (http://www.pella.com)
3.) Jeld-Wen. (http://www.jeld-wen.com)

C. Substitutions: Under provisions of Division 01.

2.2 HARDWARE

A. To be determined by owner.

B. Provide required hardware at Rated Doors.

2.3 GLAZING
1. Factory glazed with double-pane construction.
2. Privacy glass: Chord

2.4 INSTALLATION ACCESSORIES

A. Sill pan
B. Corner seal pad
C. Rain deflector
D. Rain Guard
E. Weather Barrier & Tape
F. Misc. as required by manufacturer for proper installation.

PART 3 EXECUTION

3.1 EXAMINATION

A. Examine areas to receive doors. Notify Architect in writing any unacceptable conditions that would adversely affect installation or subsequent performance of the product. Do not proceed with installation until unsatisfactory conditions are corrected.

3.2 INSTALLATION

A. Install fiberglass doors in full compliance with manufacturer's instructions and approved shop drawings.

B. Install 20 minute doors with permanent fire door certification label in compliance with the requirements of the labeling agency and NFPA.

C. Maintain alignment and compatibility with adjacent work.

3.3 FINISHING

A. Finish in compliance with manufacturer's recommendations.

3.3 Protection

A. Protect installed products until completion of project.

B. Touch-up, repair or replace damaged products prior to Substantial Completion, following manufacturer's instructions.

END OF SECTION

SECTION 089543 - FLOOD VENTS

PART 1 GENERAL

1.1 SECTION INCLUDES

A. Flood vents.

1.2 RELATED SECTIONS

A. Section 06 10 00 - Rough Carpentry.

B. Section 07 92 00 - Joint Protection.

1.3 REFERENCES

A. ASCE/SEI 24-98, Flood Resistant Design and Construction.

B. ASCE/SEI 24-05, Flood Resistant Design and Construction.

C. ASCE/SEI 24-14, Flood Resistant Design and Construction.

D. FEMA, 44-CFR, Part 59-60 and 60.3 National Flood Insurance Program (NFIP).

E. FEMA/FIA-TB 1-2008, Openings in Foundation Walls and Walls of Enclosures for Buildings Located in Special Flood Hazard Areas.

F. NER-624, National Evaluation Report No. NER-624. July 2007.

G. International Code Council ICC-ES Acceptance Criteria for Automatic Foundation Flood Vents (AC-364). October 2007

H. International Code Council ICC-ES Acceptance Criteria for Mechanically Operated Flood Vents (AC-364). October 2013.

I. Federal Emergency Management Association's MEMO W-08086, October 2008

J. UL - Test for Fire Dampers in conjunction with flood vents.

1.4 DESIGN / PERFORMANCE REQUIREMENTS

A. SMART VENT Products Flood Vents are Engineered Openings comply with the following:
   1. Certifications:
      a. International Code Council - Evaluation Service Report (ESR-2074) including Florida Building Code Supplement.
      b. Florida Building Product Approval (FL5822) approved for use in High Velocity Hurricane Zones (HVHZ).
   2. Compliance:
      a. FEMA Technical Bulletin 1: Openings in Foundation Walls and Walls of Enclosures (TB-1).
      b. NFIP Bulletin W-08086.

c. NFIP Flood Insurance Manual.
d. American Society of Civil Engineers: Flood Resistant Design and Construction (ASCE 24-14).
e. International Residential Codes (IRC)
f. International Building Codes (IBC)

1.5 SUBMITTALS

A. Submit under provisions of Section 01 33 00 – Submittal Procedures.

B. Product Data: Manufacturer's data sheets on each product to be used, including:
1. Preparation instructions and recommendations.
2. Storage and handling requirements and recommendations.
3. Installation methods.

C. Manufacturer's Certificates: Certify products meet or exceed specified requirements.

1.6 QUALITY ASSURANCE

A. Manufacturer Qualifications: Company specializing in manufacturing products specified in this section with minimum 5 years documented experience.

B. Installer Qualifications: Installer with experience on projects of a similar size and scope with similar installation conditions.

1.7 DELIVERY, STORAGE, AND HANDLING

A. Deliver and store materials to site in manufacturer's original, unopened containers and packaging, with labels clearly identifying product name and manufacturer.

B. Store products in clean, dry area indoors until ready for installation. Store materials in accordance with manufacturer's instructions.

C. Protect materials and finish from damage during handling and installation.

1.8 SEQUENCING

A. Ensure that locating templates and other information required for installation of products of this section are furnished to affected trades in time to prevent interruption of construction progress.

B. Ensure that products of this section are supplied to affected trades in time to prevent interruption of construction progress.

1.9 WARRANTY

A. Provide the manufacturer's standard limited warranty.

PART 2 PRODUCTS

2.1 MANUFACTURERS

A. Acceptable Manufacturer: Smart Vent Products, Inc.

B. Requests for substitutions will be considered in accordance with provisions of Section 012500 – Substitutions Procedures.

2.2 FLOOD VENTS

A. General: Vents are constructed of Marine Grade 316 Stainless Steel formed and smooth-welded with a rigid construction. Frames are designed for installation in masonry, concrete, or framed walls, stud walls, garage doors and metal panels. Vents have a pivoting door assembly that is fitted with two patented sealed floats that provide vermin protection and immediately and automatically release the door upon contact with rising water to relieve unbalanced lateral forces on foundation walls.

B. Insulated Series: Provide flood protection only. Styrofoam insulation with perimeter weatherstripping.

1. FLOOD VENT Products #1540-570 Wood Stud Wall Model: Flush or Solid Insulated Doors.
   a. Flood Coverage: 200 sq.ft.
   b. Styrofoam core R-Value: 8.34
   c. Size: 14-1/2 inches W by 8-3/4 inches H.
   d. Rough Opening: 14-1/2 inches W by 8-3/4 inches H.

C. Accessories:
1. Stainless Steel straps, four for each vent, and masonry or concrete.

2. Adjustable wrench for thru-bolted models and screwdriver for stud wall models.
3. Trim and Sleeves: Sleeves for use in ' un-filled' masonry and for, Fire Walls where ' air-space' is required on Exterior Walls and to finish off the inside of openings:

   a. Wood Wall Model 1540-570 Interior Trim Flange #1540-573, 4 inch

D. Color: As selected by architect from manufacturer's full range.

E. Sealant: Provide joint sealers as specified in Section 07 92 00 - Joint Sealants. Only Fire-Rated sealant shall be used on Fire-Rated walls or openings.

PART 3 EXECUTION

3.1 EXAMINATION

A. Do not begin installation until substrates have been properly prepared.

B. Verify vent locations are ready to receive work, and dimensions are as indicated on shop drawings or as instructed by manufacturers.

C. If substrate preparation is the responsibility of another installer, notify Architect of unsatisfactory preparation before proceeding.

3.2 PREPARATION

A. Clean surfaces thoroughly prior to installation.

B. Verify that no obstructions exist that will interfere with the proper operation of the vents.

C. Prepare surfaces using the methods recommended by the manufacturer for achieving the best result for the substrate under the project conditions.

3.3 INSTALLATION

A. Install in accordance with manufacturer's instructions.

B. Install vents in at least two different walls spaced evenly around foundation perimeter, and located a maximum of 12 inches above grade to bottom of vent.

C. Install vents plumb, level, square, true to line, and rigid.

D. Attach vents securely in place using fasteners supplied or approved by manufacturer.

E. Separate incompatible materials to prevent galvanic corrosion.

F. Install one single height flood vent for every 200 sq.ft. of enclosed space below floodplain.

G. Adjust flood vents for proper operation.

3.4 PROTECTION

A. Protect installed products until completion of project.

B. Touch-up, repair or replace damaged products before Substantial Completion.

END OF SECTION

SECTION 092900 GYPSUM BOARD

1.0 SCOPE

A. Gypsum Board and Gypsum Board Assemblies
B. Interior ceilings and walls.
C. Exterior grade gypsum board at ceiling at carport, entire underside of First Floor.

1.1 SUBMITTALS

A. Provide Product Data and Samples for the following:
    a. Gypsum Board Products
    b. Taping Compounds and Joint Fillers
    c. Joint Tape
    d. Edge trim, corner bead, etc.
    e. Fasteners

2.0 PRODUCTS

A. Provide gypsum board as called for on the drawings and as recommended by the manufacturer suitable for the application.
    1. Provide gypsum board complying with ASTM C 36/C 36m or ASTM C 1396/C 1396m, as applicable to type of gypsum board indicated and whichever is more stringent.
    2. Ceiling type gypsum-interior: thickness, shown on drawings, long edges shall be tapered
        A. Manufactured to have more sag resistance
    3. Glass-Mat Ceiling,Soffit Applications-5/8" Type X, Water Resistant and Moisture Resistant similar to USG SECUREROCK Bran Glass-Mat Sheathing complying with ASTM C1177 and ASTM C1396.
    4. Water-resistant gypsum backing board complying with ASTM C 630/C 630m or ASTM C 1396/C 1396m
B. Edge Trim & Corner Beads: Galvanized steel
C. Fasteners: Stainless steel roofing nails, (1-3/4" min) 11 guage, 7/16th diameter head (minimum), or stainless steel bugle head fasteners as recommended by the manufacturer for coastal environments.
D. Compounds:
    a. Interior Applications – As recommended by gypsum board manufacturer.
    b. Exterior Applications - Similar to Sheetrock Brand Durabond Setting –Type Joint Compound suitable for exterior gysum ceiling boards.

3.0 EXECUTION

3.1 GENERAL:
A. Comply with ASTM C 840.
B. Install gypsum board in thickness to match existing gypsum wallboard at matching locations.
C. Inspect framing to assure adequate location of blocking and nailers.
D. Install ceiling panels across framing to minimize the number of abutting end joints and to avoid abutting end joints in central area of each ceiling. Stagger abutting end joints of adjacent panels not less than one framing member.
E. Install panels with face side out. Butt panels together for a light contact at edges. Do not force into place.
F. Locate edge and end joints over supports, except in ceiling applications where intermediate supports or gypsum board back-blocking is provided behind end joints. Do not place tapered edges against cut edges or ends. Stagger vertical joints on opposite sides of partitions. Do not make joints other than control joints at corners of framed openings.
G. Form control and expansion joints with space between edges of adjoining gypsum panels.
H. Cover both faces of support framing with gypsum panels in concealed spaces (above ceilings, etc.), except in chases braced internally.
    1. Fit gypsum panels around ducts, pipes, and conduits.

3.2 INSTALLATION:

A. On ceilings, apply gypsum panels before wall/partition board application to greatest extent possible and at right angles to framing, unless otherwise indicated.
B. On partitions/walls, apply gypsum panels horizontally (perpendicular to framing), unless otherwise indicated or required by fire-resistance-rated assembly, and minimize end joints.
C. Install Water Resistant gypsum board in kitchen and mechanical closet.
D. Install gypsum boards on exterior ceiling surface perpendicular to the joists. Select fastener length for minimum of ¾" penetration to structure. Fasten 8" oc or as required by code and manufacturer's instructions. Use setting type compound that is resistant to humidity. Provide a Level 5 taping finish including skim coat to prepare the surface for painting. Install trim where necessary to complete the application.

3.3 FINISHING GYPSUM BOARD:

A. Treat gypsum board joints, interior angles, edge trim, control joints, penetrations, fastener heads, surface defects, and elsewhere as required to prepare gypsum board surfaces for decoration. Promptly remove residual joint compound from adjacent surfaces.
B. Prefill open joints, rounded or beveled edges, and damaged surface areas.
C. Apply joint tape over gypsum board joints, except those with trim having flanges not intended for tape.
D. Gypsum Board Finish Levels: Finish panels to levels indicated below and according to ASTM C 840:

1. Level 1: Ceiling plenum areas, concealed areas, and where indicated.
2. Level 2: Panels that are substrate for tile.
3. Level 3 is suitable for surfaces receiving medium- or heavy-textured finishes before painting or heavy wallcoverings where lighting conditions are not critical.
4. Level 4: At panel surfaces that will be exposed to view, unless otherwise indicated.
5. Level 5: At panel surfaces that will be exposed to exterior and require a painted finish

3.4 PROTECTION:

E. Protect installed products from damage from weather, condensation, direct sunlight, construction, and other causes during remainder of the construction period.
F. Remove and replace panels that are wet, moisture damaged, and mold damaged.
    1. Indications that panels are wet or moisture damaged include, but are not limited to, discoloration, sagging, or irregular shape.
    2. Indications that panels are mold damaged include, but are not limited to, fuzzy or splotchy surface contamination and discoloration.

END OF SECTION 092900

SECTION 096520 - LAMINATE FLOORING

PART 1 GENERAL

1.1 SUMMARY

A. Section Includes:
1. Laminate Plank flooring.
2. Reducers.
3. Thresholds
4. Base
5. Underlayments

1.2 REFERENCES

A. ASTM International (ASTM):
1. D2047 - Standard Test Method for Static Coefficient of Friction of Polish-Coated Flooring Surfaces as Measured by the James Machine.
2. E648 - Standard Test Method for Flooring Radiant Panel Test.
3. F970 - Standard Test Method for Static Load Limit.
4. F1066 - Standard Specification for Vinyl Composition Tile.

B. Resilient Floor Covering Institute (RFCI) - FloorScore Certification Program.

1.3 SUBMITTALS

A. Submittals for Review:
1. Product Data: Provide data on specified products, describing physical and performance characteristics.
2. Samples:
a. Flooring: 12 inch long samples in each color and pattern.
b. Reducers, thresholds, transitions and moldings: 4 inch long samples in each color.

B. Quality Control Submittals:
1. Certificates of Compliance: Certification from an independent testing laboratory that flooring meets fire hazard classification requirements.

1.4 QUALITY ASSURANCE

A. Installer Qualifications: Minimum 5 years documented experience in work of this Section.

B. Fire Hazard Classification: Class I rated, tested to ASTM E648.

C. Static Coefficient of Friction: Minimum 0.5, tested to ASTM D2047.

1.5 PROJECT CONDITIONS

A. Maintain temperature in spaces to receive flooring between 70 and 90 degrees F for 24 hours before, during, and for minimum 48 hours after installation.

B. Maintain minimum temperature of 55 degrees F after flooring is installed, except as otherwise specified.

1.6 WARRANTY

A. Provide manufacturer 25 year limited residential warranty. The warranty shall warrant against the following defects:
1) The laminate surface will not wear through

2) The floor will not fade due to sun or electrical light
3) The floor will not stain.
4) The floor will resist damage from moisture due to damp mopping and everyday spills when removed promptly
5) MAINTENANCE The joint will remain secure under normal use conditions.

1.7

A. Extra Materials: One unopened carton of each color and pattern.

PART 2 PRODUCTS

2.1 MANUFACTURERS

A. Acceptable Manufacturers - Vinyl Plank:
1. Innovations
2. USFloors. (www.usfloorsllc.com)
3. Armstrong. (www.armstrong.com)
4. Mannington. (www.mannington.com)

B. Substitutions: Under provisions of Division 01.

2.2 MATERIALS

A. Laminate Flooring Tile:
1. Product: Match Existing Laminate Flooring.
2. Size: As selected by homeowner.
3. Color: As selected by homeowner from manufacturer's selection.
4. Greenguard Certified Low/Voc, or FloorScore Certified

2.3 ACCESSORIES

A. Leveling Compound: White, premixed, latex based.

B. Foam underlayment – 2.0 lb polyethylene foam (1.9-2 lb density, CFC free, 1.8mm to 2.1mm thickness.

C. Thresholds, Transition Strips & misc.: Provide thresholds, transitions strips, and misc. moldings to match the new flooring material as approved by the owner to complete the work.

PART 3 EXECUTION

3.1 EXAMINATION

A. Verify that wood subflooring is properly installed. Correct any deficiencies to existing subflooring that may result in a substandard installation.

3.2 PREPARATION

A. Clean substrate; remove loose and foreign matter that could impede performance of flooring.

B. Replace any water damaged underlayment & subflooring.

C. Fill cracks, voids, and depressions in substrate with leveling compound.

D. Grind off high spots and projections in substrate; leave smooth and level to 1/4 inch in 10 feet.

3.3 INSTALLATION OF PLANK

A. Install in accordance with manufacturer's instructions.

B. Mix materials from multiple containers to ensure shade variations are consistent when flooring is placed.

C. Lay flooring with joints parallel to building lines to produce symmetrical pattern.

D. Install flooring to pattern directed by owner. Allow minimum half-size units at room or area perimeter.

E. Scribe flooring to walls, columns, cabinets, and other appurtenances. Ensure that base, trim, plates, or escutcheons will completely cover cut edges. Allow 3/8” expansion space for expansion and contraction as recommended by the manufacturer.

F. Extend flooring into recesses, alcoves, closets and under equipment.

G. Terminate flooring at centerline of door openings where adjacent floor finish is dissimilar.

3.4 INSTALLATION OF REDUCER STRIPS

A. Center strips under doors where flooring terminates at door openings.

B. Install in longest practical lengths; butt ends tight.

C. Scribe to abutting surfaces.

3.5 ADJUSTING

A. Correct flooring that is not seated; replace damaged flooring.

3.6 CLEANING

A. Clean flooring, wax, and machine buff in accordance with manufacturer's instructions.

3.7 PROTECTION

A. Do not allow traffic on flooring in accordance with manufacturer’s installation instructions.

B. Cover areas subject to traffic with protective covering.

END OF SECTION - 096520

SECTION 099100 - PAINTING

PART 1 GENERAL

1.1 SUMMARY

A. Section Includes:

1. Surface preparation and field application of paints.
2. Provide paint in color and finish as selected by the owner

B. Related Sections:
1. Division 01: Administrative, procedural, and temporary work requirements.
2. Division 02: Lead Abatement

1.2 REFERENCES

A. ASTM International (ASTM):
1. D4442 - Standard Test Method for Direct Moisture Content Measurement of Wood and Wood-Base Materials.
2. D6886 - Standard Test Method for Speciation of the Volatile Organic Compounds (VOCs) in Low VOC Content Waterborne Air-Dry Coatings by Gas Chromatograpy.

B. Master Painters Institute (MPI) - Architectural Painting Specification Manual.

1.3 SUBMITTALS

A. Submittals for Review:
1. Product Data: Manufacturer's data on materials proposed for use including:
   a. Product designation and grade.
   b. Product analysis and performance characteristics.
   c. Standards compliance.
   d. Material content.
   e. Mixing and application procedures.
2. Samples:
   a. 3 x 6 inch samples of each coating system on representative substrate. Step back successive coats so that all coats remain exposed. Indicate type of material used for each coat.
3. Paint Schedule: Indicate types and locations of each surface, paint materials, and number of coats to be applied.

1.4 QUALITY ASSURANCE

A. Applicator Qualifications: Minimum 5 years documented experience in work of this Section.

B. Materials, Preparation, and Workmanship: Conform to MPI Painting Manual.

C. Mockup:
1. Construct mockup panels for interior wall finishes, 4 feet wide x full height.
2. Show: Each color and texture.
3. Locate where directed.
4. Approved mockup may remain as part of the Work.

1.5 DELIVERY, STORAGE AND HANDLING

A. Container Labels: Include manufacturer's name, type of paint, brand name, lot number, brand code, coverage rates, surface preparation, drying time, cleanup requirements, color designation, and instructions for mixing and reducing.

B. Paint Materials: Store at ambient temperature from 45 to 90 degrees F in ventilated area, or as required by manufacturer's instructions.

1.6 PROJECT CONDITIONS

A. Do not apply materials when surface and ambient temperatures or relative humidity are outside ranges required by paint manufacturer.

B. Maintain ambient and substrate temperatures above manufacturer’s minimum requirements for 24 hours before, during. and after paint application.

C. Do not apply materials when relative humidity is above 85 percent or when dew point is less than 5 degrees F different than ambient or surface temperature.

D. Provide lighting level of 30 footcandles at substrate surface.

PART 2 PRODUCTS

2.1 MANUFACTURERS

A. Acceptable Manufacturers:
1. Benjamin Moore and Co. (www.benjaminmoore.com)
2. Devoe Paint Co. (www.devoepaint.com)
3. Glidden. (www.gliddenprofessional.com)
4. PPG Architectural Finishes, Inc. (www.pittsburghpaints.com)
5. Pratt and Lambert Paints. (www.prattandlambert.com)
6. Sherwin Williams. (www.sherwin-williams.com)

2.2 MATERIALS

Provide complete painting system to include compatible primers, base coat, and surface coats per manufacturer’s recommended application for each substrate to be painted.

All interior paints and primers must be less than or equal to the following VOC levels: Flats--50 g/L; Non-flats--50 g/L; Floor--100 g/L. [g/L = grams per liter; levels are based on a combination of the Master Painters Institute (MPI) and GreenSeal standards.]

A. Paints:
1. As selected by Owner or approved substitute.
2. Free from all forms of lead and mercury.

B. Gloss Ratings:

Gloss Designation	Units at 60 Degrees	Units at 85 Degrees

Flat	0 to 5	Maximum 10
Eggshell	10 to 25	10 to 35
Satin	20 to 35	Minimum 35
Semigloss	35 to 70	
Gloss	70 to 85	
High Gloss	Minimum 85	

2.3 ACCESSORIES

A. Accessory Materials: Paint thinners and other materials required to achieve specified finishes; commercial quality.

B. Patching Materials: Latex filler.

C. Fastener Head Cover Materials: Latex filler.

2.4 MIXES

A. Deliver paints pre-mixed and pre-tinted.

B. Uniformly mix to thoroughly disperse pigments.

C. Do not thin in excess of manufacturer's recommendations.

D. Re-mix paint during application; ensure complete dispersion of settled pigment and uniformity of color and gloss.

PART 3 EXECUTION

3.1 EXAMINATION

A. Test shop applied primer for compatibility with subsequent coatings.

B. Measure moisture content of surfaces using electronic moisture meter. Do not apply coatings unless moisture content of surfaces are below following maximums:
   1. Gypsum board: 12 percent.
   2. Concrete: 12 percent.
   3. Wood: 15 percent, measured to ASTM D4442.
   4. Concrete floors: 8 percent.

3.2 PREPARATION

A. General:
   1. Protect adjacent and underlying surfaces.
   2. Remove electrical plates, hardware, light fixture trim, escutcheons, and fittings prior to preparing surfaces or finishing.
   3. Correct defects and clean surfaces capable of affecting work of this section.

4. Seal marks that may bleed through surface finishes with shellac.

B. Impervious Surfaces: Remove mildew by scrubbing with solution of trisodium phosphate and bleach. Rinse with clean water and allow to dry.

C. Gypsum Board:
1. Fill minor defects with filler compound. Spot prime defects after repair.

D. Concrete:
1. Remove dirt, loose mortar, scale, salt and alkali powder, and other foreign matter.
2. Remove oil and grease with solution of trisodium phosphate; rinse and allow to dry.
3. Remove stains caused by weathering of corroding metals with solution of sodium metasilicate after thoroughly wetting with water. Allow to dry.

E. Concrete Floors:
1. Remove contamination, acid etch, and rinse floors with clear water. Allow to dry.
2. Verify that required acid-alkali balance has been achieved.

F. Galvanized Steel: SSPC Method SP1 - Solvent Cleaning.

G. Aluminum: SSPC Method SP1 - Solvent Cleaning.

H. Uncoated Ferrous Metals: SSPC Method SP2 - Hand Tool Cleaning or Method SP3 - Power Tool Cleaning.

I. Shop Primed Ferrous Metals:
1. SSPC Method SP2 - Hand Tool Cleaning or Method SP3 - Power Tool Cleaning.
2. Feather edges to make patches inconspicuous.
3. Prime bare steel surfaces.

J. Interior Wood:
1. Wipe off dust and grit.
2. Seal knots, pitch streaks, and sappy sections with sealer.
3. Fill nail holes and cracks after primer has dried; sand between coats.

K. Exterior Wood:
1. Remove dust, grit, and foreign matter.
2. Seal knots, pitch streaks, and sappy sections.

L. Existing Surfaces:
1. Remove loose, flaking, powdery, and peeling paints.
2. Lightly sand glossy painted surfaces.
3. Fill holes, cracks, depressions and other imperfections with patching compound; sand flush with surface.
4. Remove oil, grease, and wax by scraping; solvent wash and thoroughly rinse.
5. Remove rust by wire brushing to expose base metal.

3.3 APPLICATION

A. Apply paints in accordance with manufacturer’s instructions and MPI Painting Manual.

B. Apply primer or first coat closely following surface preparation to prevent recontamination.

C. Do not apply finishes to surfaces that are not dry.

D. Apply coatings to minimum dry film thickness recommended by manufacturer.

E. Apply each coat of paint slightly darker than preceding coat unless specified otherwise.

F. Apply coatings to uniform appearance without laps, sags, curtains, holidays, and brush marks.

G. Allow applied coats to dry before next coat is applied.

H. When required on deep and bright colors apply an additional finish coat to ensure color consistency.

I. Continue paint finishes behind wall-mounted accessories.

J. Sand between coats on interior wood surfaces.

K. Match final coat to approved color samples.

L. Where clear finishes are specified, tint fillers to match wood. Work fillers into grain before set. Wipe excess from surface.

M. Prime concealed surfaces of exterior wood and interior wood in contact with masonry or cementitious materials with one coat primer paint.

N. Mechanical and Electrical Components:
   1. Paint factory primed equipment.
   2. Remove unfinished and primed louvers, grilles, covers, and access panels; paint separately.
   3. Paint exposed and insulated pipes, conduit, boxes, ducts, hangers, brackets, collars, and supports unless factory finished.
   4. Do not paint name tags or identifying markings.
   5. Paint exposed conduit and electrical equipment in finished areas.
   6. Paint duct work behind louvers, grills, and diffusers flat black to minimum of 18 inches or beyond sight line.

O. Do not Paint:
   1. Surfaces indicated on Drawings or specified to be unpainted or unfinished.
   2. Surfaces with factory applied finish coat or integral finish.
   3. Architectural metals, including brass, bronze, stainless steel, and chrome plating.

3.4 ADJUSTING

A. Touch up or refinish disfigured surfaces.

3.5 CLEANING

A. Remove paint from adjacent surfaces. Remove all masking and waste products.

END OF SECTION 099100

SECTION 099123 EXTERIOR PAINTING

1.0 SCOPE

A. Paint underside of first floor, ground floor ceiling.
B. Paint trim boards.
C. Paint misc. unfinished products requiring painted finish for weather protection or as called for on the plans or specifications.
D. Staining and Transparent Finishing

1.1 SUBMITTALS

A. Provide Product Data: For each type of product. Include preparation requirements and application instructions.

B. Provide Samples for Initial Selection: For each type of paint product.

2.0 PRODUCTS

A. Provide Benjamin Moore, Sherwin Williams paint or approved equal.

B. VOC content: provide materials that comply with VOC limits of authorities having jurisdiction.

C. Colors: to be selected by the owner from manufacturer’s standard colors or mixing charts.

3.0 EXECUTION

3.1 PREPARATION

A. Comply with manufacturer's written instructions and recommendations in "MPI manual" applicable to substrates and paint systems indicated.
B. Clean substrates of substances that could impair bond of paints, including dust, dirt, oil, grease, and incompatible paints and encapsulants.
C. Coordination of shop-applied prime coats with topcoats is critical.

3.2 APPLICATION

A. Apply paints according to manufacturer's written instructions and recommendations in "MPI manual.”
   1. Use applicators and techniques suited for paint and substrate indicated.
   2. Paint surfaces behind movable items same as similar exposed surfaces. Before final installation, paint surfaces behind permanently fixed items with prime coat only.
   3. Do not paint over labels of independent testing agencies or equipment name, identification, performance rating, or nomenclature plates.

B. Apply paints to produce surface films without cloudiness, spotting, holidays, laps, brush marks, roller tracking, runs, sags, ropiness, or other surface imperfections. Cut in sharp lines and color breaks.

3.3 CLEANING AND PROTECTION

A. At end of each workday, remove rubbish, empty cans, rags, and other discarded materials from Project site.
B. After completing paint application, clean spattered surfaces. Remove spattered paints by washing, scraping, or other methods. Do not scratch or damage adjacent finished surfaces.
C. Protect work of other trades against damage from paint application. Correct damage to work of other trades by cleaning, repairing, replacing, and refinishing, as approved by architect, and leave in an undamaged condition.
D. At completion of construction activities of other trades, touch up and restore damaged or defaced painted surfaces.

END OF SECTION 099113

SECTION 220000 - PLUMBING WORK

1.0 GENERAL:

A. All applicable codes, laws and regulations governing or relating to any portion of this work are hereby incorporated into and made a part of these specifications, and their provisions shall be carried out by the Contractor who shall inform the Owner, prior to submitting a Proposal, of any work or material which violates any of the above laws and regulations. Any work done by the Contractor causing such violation shall be corrected by the Contractor.

B. Investigate each space through which equipment must be moved. Where necessary, equipment shall be shipped from manufacturer in sections of size suitable for moving through available restrictive spaces. Ascertain from building Owner and Tenant at what times of day equipment may be moved through all areas.

C. Drawings are diagrammatic and indicate general arrangement of systems and work. Pipe routing is shown diagrammatically and does not show all offsets, drops and rises of runs. The Contractor shall allow in his price for routing of pipe to avoid obstructions. Coordination with the existing services, including those of other trades is required. Maintain headroom and space conditions.

D. Install work so as to be readily accessible for operation, maintenance and repair. Minor deviations from drawings may be made to accomplish this, but changes which involve extra cost shall not be made without approval.

E. Alternation of Existing Systems: The work includes alterations and extensions of existing facilities. The contractor shall survey the site and determine alterations required for the new work. Contractor shall size piping for proper system operation at completion of work, but in no case shall reduce piping sizes from existing. All existing conditions cannot be completely detailed on the drawings. Install new work and connect to existing work with minimum interference to existing facilities. Connect new work to existing work in neat and acceptable matter. Restore existing disturbed work to original condition.

F. Disconnect, remove and/or relocate existing material, equipment and other work as noted or required for proper installation of new work.

G. The Contractor shall keep all equipment and materials, and all parts of the building, exterior spaces and adjacent streets, sidewalks and pavements, free from material and debris resulting from the execution of this work. Excess materials will not be permitted to accumulate either on the interior or the exterior.

H. The locations of the existing services are believed to be as indicated on the drawings. The contractor shall verify the actual location of these services and notify the engineer of any discrepancies prior to commencing any work.

I. Seal openings through partitions, walls and floors with non-shrinking fire proof caulking or other noncombustible material.

J. Provide all necessary flashing and counterflashing to maintain the waterproofing integrity of this building as required by the installation or removal of piping and equipment. Provide equipment curbs as required.

K. All present material, equipment and construction debris to be removed under this contract shall become the property of the Contractor with the exception of specific equipment and apparatus requested by the building representative, Architect or as noted to be relocated on the drawings. Removed equipment shall be properly disposed of by this Contractor.

L. Materials and workmanship, unless otherwise noted, shall be in accordance with building standards.

M. The work in the building shall be done when and as directed, and in a manner satisfactory to the Owner. The work shall be performed so as to cause the least possible inconvenience and disturbance to the present occupants.

N. All material and equipment to be new unless otherwise noted and shall be in accordance with building standards.

O. A careful examination of the portions of the existing building, equipment, etc., which affect this work, and the access to such spaces, has been made and that the Contractor is familiar with existing conditions and difficulties that will affect the execution of the work. Later claims shall not be made for labor, equipment or materials required because of difficulties encountered which could have been foreseen during such an examination. The on-site inspection shall verify existing pipe sizes, clearances, etc. and conditions.

P. Insurance: In accordance with building requirements and shall include a Hold Harmless clause for Owner and Engineer.

Q. The final acceptance will be made after the Contractor has adjusted his equipment, tested the various systems, demonstrated that it fulfills the requirements of the drawings and specifications and has furnished all the required certificates of inspection and approval.

2.0 SCOPE OF WORK:

A. Scope of Work shall consist of providing labor, materials, equipment, services and fees necessary for complete and safe installation in conformity with the Plumbing Code and all other applicable industry, national and local codes and authorities having jurisdiction.

B. The base building drawings, plans, details, specifications and specification addenda are made part of this Contract and shall apply to all work under the Contract unless otherwise amended, modified, supplemented or specified herein.

C. The Contractor shall furnish a written guarantee to replace or repair promptly and assume responsibility for all expenses incurred for any workmanship and equipment in which defects develop within one year from the date of final certificate for payment and/or from date or actual use of equipment or occupancy of spaces by Owner included under the various parts of the work, whichever date is earlier. This work shall be done as directed by the Owner. This guarantee shall also provide that where defects occur, the Contractor will assume responsibility for all expenses incurred in repairing and replacing work of other

trades affected by defects, repairs or replacements in equipment supplied by the Contractor.

D. The Contractor shall give necessary notice, file drawings and specifications with the department having jurisdiction, obtain permits or licenses necessary to carry out this work and pay all fees therefore. The Contractor shall arrange for inspection and tests of any or all parts of the work if so required by authorities and pay all charges for same. The Contractor shall pay all costs for, and furnish to the Owner before final billing, all certificates necessary as evidence that the work installed conforms with all regulations where they apply to this work.

3.0 SHOP DRAWINGS

A. Prior to the installation of any work and procurement of equipment provide complete set of coordinated shop drawings of all new and existing equipment, indicating capacity dimensions and sequence of operation for written approval by the Architect and Engineer.

B. Indicate on each shop drawings submitted:

1. Project name, location, and project number.
2. Name of Architect and Engineer
3. Item identification and specification section.
4. Approval stamp of prime contractor

C. Submissions:

1. Submissions 11 in. x 17 in. or smaller: If the submission is a catalog cut, then the Contractor shall submit two copies, one to the Architect and one to the Engineer. All catalog cuts shall be complete.

2. Submissions larger than 11 in. x 17 in.: Submit one print to the Architect and one print to the Engineer.

D. Submit shop drawings for the following:

1. Pipe and Fittings
2. Valves
3. Plumbing Fixtures and Trim
4. Piping Layouts
5. Supports, Hangers and Guides
6. Insulation

4.0 AS-BUILT DRAWINGS AND EQUIPMENT OPERATIONAL INSTRUCTIONS

A. Upon completion and acceptance of work, Contractor shall furnish written instructions and equipment manuals and demonstrate to the Owner the proper operation and maintenance of all equipment and apparatus furnished under this contract.

B. These instructions shall be typed on 8-1/2 in. x 11 in. paper and bound in three ring binders with clear acetate covers. Contractor shall give one copy of the instructions to the Owner and one copy to the Engineer.

C. The instruction booklet shall bear the name, address and telephone number of the project, Architect and Engineer.

D. Reproducible "As-Built" drawings shall be provided indicating the as installed conditions of the work. "As-Built" drawings shall be provided to the Engineer after completion of the installation.

5.0 GENERAL PROVISIONS FOR PLUMBING WORK:

A. Specifications are of simplified form and include incomplete sentences. Words or phrases such as "the Contractor shall," "shall be," "furnish," "provide," "a," "the," and "all" have been omitted for brevity.

B. Definitions:

1. "Provide": To supply, install and connect up complete and ready for safe and regular operation the particular work referred to unless specifically otherwise noted.
2. "Install": To erect, mount and connect complete with related accessories.
3. "Furnish" or "Supply: To purchase, procure, acquire and deliver complete with related accessories.
4. "Work": Labor, materials, equipment, apparatus, controls, accessories and other items required for proper and complete installation.
5. "Wiring": Raceway, fittings, wire, boxes and related items.
6. "Concealed": Embedded in masonry or other construction, installed in furred spaces, within double partitions or hung ceilings, in trenches, in crawl spaces, or in enclosures.
7. "Exposed": Not installed underground or "concealed" as defined above.
8. "Similar" or "Equal": Equal in materials, weight, size, design and efficiency of specified product.

C. Quality assurance

1. Quality and gauge of materials: new, best of their respective kinds, free from defects and listed by Underwriters Laboratories, Inc., or bearing their label. Materials and equipment of similar application shall be of same manufacturer, except as noted.

2. Guarantee: All materials and workmanship shall be guaranteed for a period of one year from date of acceptance of work.

D. Product delivery, storage and handling

1. Moving of equipment: Where necessary, ship in carted sections of size to permit passing through available spaces.

2. Accessibility: For operation, maintenance and repair. Minor deviations shall be permitted. Changes of magnitude or involving extra cost are not permissible without review. Group concealed electrical equipment requiring access with equipment freely accessible through access doors.

E. Paint shall be the best grade for its purpose. Deliver in original sealed containers and apply in accordance with manufacturer's instructions. Colors shall be as selected. Utilize galvanized iron primer on panel and pull boxes, after fabrication. Utilize hot dipped galvanized or dipped in zinc chromate for: outlet boxes, junction boxes, conduit hangers, rods, inserts and supports. Red lead or zinc chromate with finish to match surroundings shall be used for marred surfaces of steel equipment and raceways. A field-applied zinc chromate prime coat shall be utilized for steel or iron work.

F. Brush and clean work prior to concealing, painting and acceptance. Painted exposed work soiled or damaged. Clean and repair to match adjoining work before final acceptance. Remove debris from inside and outside of material and equipment.

G. Final locations and mounting orientations of all plumbing fixtures shall be verified by Architect.

H. All access door locations shall be reviewed by Architect prior to installation.

6.0 PIPE AND FITTINGS:

A. Sanitary Drainage, Condensate and Vent

1. Solid wall PVC pipe with socket fittings.
2. Solvent Cements:
   a. ASTM D 2564. Include primer according to ASTM F 656.
   b. PVC solvent cement shall have a VOC content of 510 g/L or less when calculated according to 40 CFR 59, Subpart D (EPA Method 24).
4. Adhesive primer shall have a VOC content of 550 g/L or less when calculated according to 40 CFR 59, Subpart D (EPA Method 24).
5. Solvent cement and adhesive primer shall comply with the testing and product requirements of the California Department of Health Services' "Standard Practice for the Testing of Volatile Organic Emissions from Various Sources Using Small-Scale Environmental Chambers."

B. Domestic Water

1. Type L copper tubing with cast bronze or ASME B16.22 wrought-copper solder fittings.
2. Bronze Fittings for Grooved-End, Copper Tubing: ASTM B 75 (ASTM B 75M) copper tube or ASTM B 584 bronze castings.
3. Solder Filler Metals: ASTM B 32, lead-free alloys.
4. Copper Unions:
   a. MSS SP-123.
   b. Cast-copper-alloy, hexagonal-stock body.
   c. Ball-and-socket, metal-to-metal seating surfaces.
   d. Solder-joint or threaded ends.

C. Hose Bibb Branch Piping

1. PEX SDR 9 tubing with metal-insert type fittings or stainless steel crimp rings and a multiple outlet, plastic or corrosion resistant metal manifold with a plastic or corrosion resistant metal valve for each outlet.

D. All exposed piping passing through walls, floors, ceilings, and partitions shall be provided with chrome plated cast brass escutcheons held in place with set screws.

7.0 VALVES:

A. Ball valves:

1. Two-piece, full-port, brass, end entry; similar to Milwaukee BA-100

B. Check valves:

1. Bronze, threaded cap, Teflon disc; similar to Milwaukee 1509

D. Plug valves:

1. Class 125 cylindrical lubricated plug valves with threaded ends, 200 psi CWP, bronze plug with sealant groove; similar to Milwaukee 611.

8.0 DIELECTRIC COUPLINGS:

A. General Requirements: Assembly of copper alloy and ferrous materials with separating nonconductive insulating material. Include end connections compatible with pipes to be joined.

B. Dielectric Unions:

1. Standard: ASSE 1079.

1. Pressure Rating: 150 psig at 180 deg F.

3. End Connections: Solder-joint copper alloy and threaded ferrous.

C. Dielectric Flanges:

2. Standard: ASSE 1079.

3. Factory-fabricated, bolted, companion-flange assembly.

4. Pressure Rating: 150 psig at 180 deg F.

4. End Connections: Solder-joint copper alloy and threaded ferrous; threaded solder-joint copper alloy and threaded ferrous.

D. Dielectric-Flange Insulating Kits:

1. Nonconducting materials for field assembly of companion flanges.

2. Pressure Rating: 150 psig.

3. Gasket: Neoprene or phenolic.

4. Bolt Sleeves: Phenolic or polyethylene.

5. Washers: Phenolic with steel backing washers.

E. Dielectric Nipples:

1. Standard: IAPMO PS 66.

2. Electroplated steel nipple complying with ASTM F 1545.

3. Pressure Rating and Temperature: 300 psig at 225 deg F.

4. End Connections: Male threaded or grooved.

5. Lining: Inert and noncorrosive, propylene.

9.0 INSULATION:

A. All insulation (including jacket, facing and adhesive) shall have composite fire and smoke hazard ratings as tested by procedures listed in ASTM E-84, NFPA 255 and UL 273; not exceeding a flame spread of 25 and a smoke developed of 50.

B. On valves and fittings provide premolded closed cell insulation fittings. Vapor seal insulation on "CW".

C. "CW" piping: Provide 1/2 in. closed cell insulation pipe covering with vapor barrier jacket.

D. "HW" piping: Provide 1-1/2 in. thick closed cell insulation pipe covering for pipe diameters 1-1/2 in. and less, all other pipe sizes provide 2 in. thick closed cell insulation pipe covering.

E. Heat Traced piping: Provide 1-1/2 in. thick closed cell insulation pipe covering for pipe diameters 1-1/2 in. and less, all other pipe sizes provide 2 in. thick closed cell insulation pipe covering.

10.0 HEAT TRACE

A. Use a pair of parallel No. 16 AWG, nickel-coated, stranded copper bus wires embedded in cross-linked conductive polymer core, which varies heat ouput in response to temperature along it’s length. Terminate with waterproof, factory-assembled, non-heating leads with connectors at one end, and seal the opposite end watertight. Cable shall be capable of crossing over itself once without overheating.

B. Maximum operating temperature (Power on): 150 deg F

C. Maximum exposure temperature (power off): 185 deg F

D. Maximum heat output: 8W/ft

E. Electrical components, devices and accessories shall be listed and labeled as defined in NFPA 70 and marked for intended location and application.

F. Install Raychem AT-180 aluminum tape over heat trace on all PEX piping.

11.0 PLUMBING FIXTURES:

A. Provide all fixtures with stop valves and supplies and fixture traps as required.

B. All fixtures shall be as indicated on the design documents.

12.0 PIPING SUPPORTS:

A Support all piping from building construction by providing inserts, beam clamps, and acceptable brackets. Submit all methods for review.

B. Provide trapeze hangers of bolted angles or channels for grouped lines and services.

C. Provide additional framing where building construction is inadequate. Submit for review.

D. Suspended horizontal piping:

1. Support all piping independently from structure using heavy iron-hinged type hangers, similar to Grinnell Clevis No. 260.

2. Provide electroplated solid-band hangers similar to auto-grip, for two-inch and smaller pipe.

3. Provide wall brackets for wall-supported piping, and provide pipe saddles for floor-mounted piping.

4. Provide supports with copper lining for uninsulated copper piping.

5. Suspend piping from inserts, using beam clamps with retaining clamp or locknut, steel fish plates, cantilever brackets or other accepted means. Beam clamps shall be similar to Grinnell Figures 61, 87, 131, or 225.

6. Suspend piping by rods with double nuts.

7. Provide additional steel framing as required and accepted where overhead construction does not permit fastening hanger rods in required locations.

8. Support branch fixture water piping in chases with copper-plated metal brackets, secured to studs, similar to Holdrite Nos. 102-18, 107-18, 102-26, or 101-26.

E. Provide 180 degree arc galvanized metal covering shields on hangers for insulated piping without incompressible insulating block in insulation at hangers.

F. Maximum hanger spacing as indicated.

Piping Material	Max. Horizontal Spacing (ft)	Max. Vertical Spacing (ft)
Copper or Copper Alloy	12	10
PEX	2.67	10
PVC	4	10

G. Vertical piping:

1. Provide extension pipe clamps bolted to bare pipe on each side and bearing equally on structure or welded to beam.

2. Provide spacing as indicated:

a. Threaded piping shall be every floor level, at a maximum of 10 feet on centers.

b. Tubing shall be every floor level maximum 10 feet on centers.

H. Expansion anchors:

1. Provide smooth wall, non-self-drilling internal plug expansion type anchors constructed of AISC 12l14 steel and zinc plated in accordance with fed. Spec. Qq-a-325 type 1, class 3.

2. Do not exceed 1/4 of average valves for a specific anchor size using 2000 psig (13,800 kpa) concrete only, for maximum working loads.

3. Provide spacing and install anchors in accordance with the manufacturer's recommendations.

4. Expansion anchors shall be U.L. Listed and similar to Hilti HDI.

12.0 TESTS:

A. Domestic water piping:

5. Test piping hydrostatically at a minimum pressure of 125 psi or 1.5 times the service pressure, whichever is greater.

6. Duration of test shall be 2 hours without a loss in pressure.

B. Drainage and vent piping:

7. Cap all outlets and fill piping system to overflowing from a point at least 10 feet above the floor.

8. The water level shall remain constant throughout the test duration of 2 hours.

C. Arrange and coordinate tests with owner 48 hours in advance. Notify engineer and architect of test date and time.

D. Defects disclosed by the tests shall be repaired or replaced. Tests shall be repeated as directed until all work is proven satisfactory.

E. Take all precautions necessary to prevent damage to the building and its contents as a result of such tests. Repair any damage caused.

3.11 CLEANING

A. Clean and disinfect potable domestic water piping as follows:
   1. Purge new piping and parts of existing piping that have been altered, extended, or repaired before using.
   2. Use purging and disinfecting procedures prescribed by authorities having jurisdiction; if methods are not prescribed, use procedures described in either AWWA C651 or AWWA C652 or follow procedures described below:
      a. Flush piping system with clean, potable water until dirty water does not appear at outlets.
      b. Fill and isolate system according to either of the following:
         1) Fill system or part thereof with water/chlorine solution with at least 50 ppm (50 mg/L) of chlorine. Isolate with valves and allow to stand for 24 hours.
         2) Fill system or part thereof with water/chlorine solution with at least 200 ppm (200 mg/L) of chlorine. Isolate and allow to stand for three hours.
      c. Flush system with clean, potable water until no chlorine is in water coming from system after the standing time.
      d. Repeat procedures if biological examination shows contamination.
      e. Submit water samples in sterile bottles to authorities having jurisdiction.

B. Clean non-potable domestic water piping as follows:
   1. Purge new piping and parts of existing piping that have been altered, extended, or repaired before using.
   2. Use purging procedures prescribed by authorities having jurisdiction or; if methods are not prescribed, follow procedures described below:
      a. Flush piping system with clean, potable water until dirty water does not appear at outlets.
      b. Submit water samples in sterile bottles to authorities having jurisdiction. Repeat procedures if biological examination shows contamination.

C. Prepare and submit reports of purging and disinfecting activities. Include copies of water-sample approvals from authorities having jurisdiction.

D. Clean interior of domestic water piping system. Remove dirt and debris as work progresses.

END OF SECTION 220000

SECTION 230000 - MECHANICAL WORK

1.0 GENERAL

A. These specifications call out certain duties of the contractor and his subcontractor. They are not intended as subcontract documents, nor are they intended as a material list of items required by the contract.

B. Provide all items and work called for in this division of specifications in accordance with the contract documents. This includes all incidentals, equipment, appliances, services, hoisting, scaffolding, supports, tools, supervision labor, consumable items, fees, licenses, etc., necessary to provide complete systems. Perform start up and check out each item and system to provide fully operable systems.

C. The work to be done under this division of the specifications include the furnishing of but necessary to complete the work as equipment, labor, supplies, supervision and materials not specifically mentioned ready for use, mechanical systems. It is the intention of the specifications and drawings to call for furnished work, tested and ready for operation.

D. It is the intent that all mechanical work and materials necessary to complete the entire project in accordance with the contract plans and specifications, where specifically mentioned here or not, shall be furnished. All work and materials necessary to fulfill this intent shall be supplied under the mechanical specifications without additional cost to the owner.

E. CODES AND STANDARDS:

1. Current International Building Code and Current Connecticut Supplement.
2. Comply with requirements of local utility company.
3. Comply with requirements of local authority having jurisdiction.
4. Comply with all applicable governmental regulations. Comply with all federal, state, city, insurance underwriters and other applicable codes and ordinances. If any conflict arises between these specifications, codes and ordinances, immediately notify the engineer. Do not deviate from the specifications nor install any work which may be in conflict with codes and ordinances until the conflict is resolved and the solution is approved by the engineer.

F. REGULATIONS:

1. All work shall be done in strict accordance with the current Connecticut state building code, including the latest Connecticut Supplement with all amendments included, the State Fire Safety Code, International Building Code, NFPA, ADA, UL, NEMA, OSHA, with all requirements of all governmental departments having jurisdiction. Requirements of the above take precedence over plans and specifications.

G. RULES, PERMITS AND FEES:

1. This contractor shall give all necessary notices, obtain all permits and pay all state and local taxes, fees and other costs in connections with their work, file all necessary plans, prepare all documents and obtain all necessary approvals of all state and local departments having jurisdiction. Obtain all required certificates of inspection for their

work and delivery of the same to the owner before request for acceptance and final payment for the work.

2. This contractor shall include in the work, at no extra expense to the owner, any material, labor, apparatus, services, drawings (in addition to contract drawings and documents), in order to comply with all applicable laws, ordinances, rules and regulations whether or not shown on the drawings and/or specified.

3. This contractor shall perform and file all tests in accordance with the current regulations of State of Connecticut and local authorities. The contractor shall furnish and install signs required by the state and local authorities.

H. GUARANTEE AND SERVICE:
   1. The contractor shall guarantee all workmanship and materials for a period of one year from the date of acceptance of the installation. In addition, the contractor shall provide, free of charge, one year's maintenance guarantee on maintained service and adjustment of all equipment in this contract.

I. REFERENCE PUBLICATIONS:
   1. American Society for Testing and Materials (ASTM) and American National Standards Institute (ANSI) Publications are referred to herein, refer to latest edition only.

J. SUMMITTALS:
   1. Prior to delivery to the work area, but well in advance of requirements necessary to allow engineer ample time for review, contractor shall submit for approval, seven (7) copies of each shop drawing.

   2. Product data: Submit manufacturer's technical product data, including rated capacities of selected model clearly indicated, and furnished specialties and accessories, and installation instructions.

   3. Shop drawings: Submit manufacturer's assembly type shop drawings indicating dimensions, rough-in requirements, required clearances, and methods of assembly of components and anchorages.

   4. Maintenance data: Submit maintenance data and parts list for each type of plumbing fixture and accessory: including "trouble shooting" maintenance guide. Include this data, product data and shop drawings in maintenance manual.

   5. INDICATE ON EACH SUBMISSION:

      i. Project Name, Location, and Number
      ii. Owner and Engineers Names
      iii. Item Identification/Description
      iv. Approval Stamp of Prime Contractor

K. RECORD DRAWINGS:

1. Contractor shall keep accurate record of all deviations in work as actually installed.

2. DEFINITIONS:

   i. 'Furnish' or 'Provide' - to furnish, install and connect up complete and ready for operation particular work referred to, unless specifically indicated on drawings.
   ii. 'Work' - labor, materials, equipment, apparatus, controls, accessories and all other items customarily furnished and/or required for proper and complete installation of work.
   iii. 'Concealed' - embedded in masonry or other constructions, installed behind wall furring, within double partitions or hung ceilings.
   iv. 'Exposed' - exposed to view.
   v. 'Indicate' or 'Shown' - as indicated or shown on drawings or specified in specifications.
   vi. 'Piping' - pipe, fittings, flanges, valves, controls, hangers, traps, drains, insulation and items customarily or required in connections with or related to such piping.
   vii. 'Supply' - to purchase, produce, acquire and deliver complete with all related items.
   viii. 'Install' - to mount and connect up complete with all related accessories.
   ix. 'Noted' - as indicated on drawings and/or specified.

L. DRAWINGS AND INTENT:

1. Drawings are intended as working drawings for general layout of the various items of equipment. However, layout of accessories, specialties, equipment and piping systems are diagrammatic unless specifically dimensioned, and do not necessarily indicate every required valve, fittings, elbow, pipe, transitions, trap, junction or pullbox, offsets or similar items required for the installation to be complete. Contractor is responsible for the complete and functional installation.

M. MEASUREMENTS:

1. All measurements taken at the building shall take precedence over scale dimensions. Every part of the plans shall be fitted to the actual conditions at the building. If there is a conflict with the scale dimensions, contact architect and/or engineer for direction/clarification.

N. PROTECTION OF EQUIPMENT, MATERIALS AND FIXTURES:

1. Close pipe and duct openings with caps or plugs during installation. Tightly cover and protect fixtures and equipment against dirt, water and chemical or mechanical injury. At completion of all work, fixtures, exposed materials and equipment shall be thoroughly cleaned.

O. HOUSEKEEPING:

1. This contractor shall be responsible for keeping stock of materials and equipment stored on premises in a tidy and orderly manner and, at all times, keep the premises free from accumulation of waste material or rubbish caused by their employees at work. He shall remove his rubbish and surplus materials from the job site and shall leave the premises and their work in a clean and well maintained condition

P. ACCESSIBILITY:
   1. Place duct, valves, unions, drains, and items requiring maintenance, adjustment, or repair, in accessible locations. Coordinate final location of access panels with owner.

Q. ADJUSTMENTS:
   1. Upon completion of work, perform the following adjustment procedures:

      i. Adjust systems components for proper performance.
      ii. Open and close valves, dampers, set proper operating position.

R. COORDINATION OF WORK:

   1. Transmit to other trades all information required for work to be provided under their respective sections in sufficient time for installation.

   2. Wherever work interconnects with the work of other trades, coordinate with other trades to insure that all trades have the information necessary so they may properly install all necessary connections to equipment. Identify all work items (valves, drains, etc.) In an approved manner in order that the ceiling subcontractor will know where to install access doors and panels.

   3. Consult with other trades regarding equipment thus, if possible, the motors and controls are by the same manufacturer. All equipment must be submitted as a shop drawing and approved by engineer.

   4. Furnish and set all sleeves for passage of pipes and conduits through walls and ceiling, and elsewhere as will be required for the protection of each pipe passing throughout building surfaces.

   5. Provide required supports and hangers for piping, fixtures and equipment, thus loading will not exceed allowable loadings for structure.

   6. Conform the work to the requirements in these contract documents. Provide offsets, fittings, drains, and accessories which may be required. Investigate the structural and finish conditions affecting the work, and arrange the work accordingly. Provide such piping, fittings, valves and accessories as required to meet such conditions.

S. ELECTRICAL CONNECTIONS:

1. Power supply and alarm wiring shall be provided including but not limited to connections made to any new equipment, pumps, valves, fixtures, and other items receiving electrical connection.

2. To facilitate electrical connections provide electrical items with NEMA enclosures having sufficient knockouts, connectors, terminal blocks and/or contacts.

2.0 PRODUCTS

A. MECHANICAL MATERIALS
   a. Refrigerant Piping- ASTM B 88 Type L or ASTM B 280, Type ACR with wrought copper fittings and 95-5 in antimony or alloy HB solder to join copper fittings on copper pipe.

B. DISSIMILAR METALS:

   a. Where copper or brass alloy is connected to galvanized metal, the two shall be separated with an insulation connection fitting.

C. VALVES:
   a. GATE VALVES
      i. 2 inch and smaller, MSS SP 25, MSS SP-70 Type 1, Class 125 psi steam, 200 psi cold working pressure (CWP), ASTM126 class b cast-iron body and bonnet, bolted bonnet, outside screw & yoke, rising stem, solid bronze disc, bronze stem, renewable bronze seat rings, threaded end connection, non-asbestos packing and gaskets, aluminum or malleable-iron handwheel.
      ii. Manufacturers - Iron gate valves, Crane Co.; Crane Valve Group; Crane Valves, Stockham Division, Nibco Inc.

   b. GLOBE VALVES
      i. 2 Inches And Smaller, Bronze Globe Valves MSS Sp-80 Type 3, Class 150 Psi Steam, 300 Psi Cold Working Pressure (CWP), ASTM B 62 Cast-Bronze Body And Bonnet, Union Bonnet, Stainless Steel Disc, Stainless Steel Seat, Copper-Silicon Alloy Rising Stem, Teflon-Impregnated Packing with bronze packing nut, threaded end connection, aluminum or malleable-iron handwheel
      ii. Manufacturers - Bronze Globe Valves, Crane Co; Crane Valve Group; Jenkins Valves, Crane Valves, Stockham Division, Grinnell Corporation, Walworth Company, Nibco Inc

   c. SWING CHECK VALVES
      i. 2 Inches And Smaller, Bronze Check Valves MSS SP-80, Class 150 Psi Steam, Bronze Check Valves 300 Psi Cold Working Pressure (CWP), ASTM B 62 Cast-Bronze Body And Cap, “Y” Pattern, Stainless Steel Free Floating Hinge Pin, Threaded Cap, Regrinding Seat, Bronze Disc, Threaded (Steel Piping) End Connection
      ii. Manufacturers - Bronze Check Valves, Horizontal And Vertical, Horizontal, Crane Co.; Crane Valve Group; Jenkins Valves, Stockham Division, Grinnell Corporation, Walworth Company, Nibco Inc., Vertical, Cincinnati Valve Co.

d. CONTROL VALVES
   i. ½" to 1-1/4", 570 series heat motor zone valves, 2-way style, 24 VAC, manual bypass lever, bronze body with brass/engineered polymer seat, 125 psi max working pressure
   ii. Manufacturers – Taco

D. SLEEVES:
   a. Provide No. 22 USSG galvanized iron sleeves extend through construction in ceilings, walls and partitions. For insulated piping sized to allow insulation to pass through the sleeve, provide 1/2" space between pipe and/or insulation and sleeve. Seal all sleeves in accordance with building code and fire department requirements.

2.0 EXECUTION

A. All products equipment & miscellaneous products used shall be installed in accordance with the manufacturer's written instructions.

B. PIPE SLEEVE INSTALLATION:
   a. Provide for piping passing through walls, partitions and slab, sleeves sized at least 1" larger than outside diameter of pipe.
   b. Sleeves are required for piping passing through fired-rated walls constructed of metal studs and gypsum wallboard.
   c. Terminate sleeves through walls, partitions and ceilings flush with finished surfaces: through slabs 1/2" above finished floor in habitable spaces and 2" above rough finish in pipe spaces and other unfinished areas.
   d. Set sleeves in place before placing concrete, or securely and fasten and grout in place with concrete. Exercise care in locating and setting of sleeves to assure accurate alignment. In absence of sleeves, use core drilled holes and provide curbs to prevent the passage of water.
   e. Fill void spaces between piping and pipe sleeves with approved elastomeric caulking materials.

C. ESCUTCHEON INSTALLATION:
   a. Provide escutcheon on pipe protrusions at walls, partitions, ceiling and floors. Escutcheon shall fit snugly around piping and cover surface openings.

D. EXAMINATION:
   a. Verify that all piping, and equipment are tested and approved prior to insulation installation.

   b. Verify that all surfaces are clean, dry and without foreign material before applying insulation materials.

E. HANGER SPACING
   a. Install hangers at the following intervals:
      i. NPS 1/2: Maximum span, 60 inches; minimum rod size, 1/4 inch.
      ii. NPS 3/4: Maximum span, 60 inches; minimum rod size, 1/4 inch.
      iii. NPS 1: Maximum span, 72 inches; minimum rod size, 1/4 inch.
      iv. NPS 1-1/4: Maximum span, 96 inches; minimum rod size, 3/8 inch.

v. NPS 1-1/2 (DN 40): Maximum span, 96 inches; minimum rod size, 3/8 inch.

b. Use thermal-hanger shield inserts for insulated piping and tubing.

F. VERTICAL PIPING

a. Install supports for vertical piping at the following intervals:

vi. PVC piping every 48 inches.

vii. Cast-iron piping every 15 feet.

b. Support vertical piing and tubing at base and at each floor. Install extension pipe or riser clamps MSS Type 8.

G. PIPE INSTALLATION - GENERAL:

a. Preparation: Cut pipe and tubing ends square, remove burrs and ream to original bore. Clean joint surfaces prior to assembly. Wipe off excess joining compounds and flux residue.

b. Screwed: Use American Standard taper pipe threads cut sharp and true and suitable for normal engagement. Screw threaded items up close to shoulders with not more than three complete threads shown. Do not use lamp wick, cord, wool or other wicking materials. Repair leaks with new materials, do not peen or caulk. Teflon pipe joint tape or joint compounds composed of red lead and graphite ground in linseed oil will be permitted, applied to male threads only.

c. Solder: Make up joints with 95-5 tin-antimony wire solder and non-corrosive flux. Do not use 50-50 or other tin lead solders.

H. MECHANICAL COUPLINGS: Use manufacturer's materials and methods

I. MATERIALS

a. Hangers: Provide hangers with galvanized coating or nonmetallic coating for copper pipe and thermal shield inserts for insulated pipe.

b. Pipe: Drain- PVC pipe and fittings, ASTM D2665

J. MULTI-ZONE HVAC SYSTEM

a. The heat pump system shall be an air cooled system consisting of a single outdoor unit connected to multiple indoor units. All indoor units connected to a single compressor shall run in either cooling mode or heating mode.

b. Certification requirements

a. Units must have ratings certified by AHRI.

b. ISO 9001 Quality Management System, ISO 14001 Environmental Management System

c. Comply with UL 1995 Heating and Cooling Equipment Standard and bear the ETL label.

d. All wiring is to be installed per National Electrical Code (NEC).

e. The outdoor unit shall have sound levels not exceeding 56 dB(A) tested in an anechoic chamber under ISO1996 standard.

f.

c. Outdoor Unit

a. Unit shall be capable of operating at the following ambient range: Cooling (-4F DB to 118F DB) and Heating (-4F WB to 64F WB).
b. The factory assembled system shall have the outdoor unit fitted with refrigerant strainer, check valves, oil separator, accumulator, 4-way reversing valve, electronic expansion valves, hot gas bypass valve, high side and low side refrigerant charging ports, and a service port.
c. The outdoor unit shall be capable of auto defrost operation to melt accumulated ice off the outdoor unit heat exchanger. The defrost cycle control shall be based on outdoor ambient temperatures and outdoor unit heat exchanger temperatures.
d. The outdoor unit shall have an oil injection mechanism to ensure a consistent film of oil on all moving compressor parts at low speed. The outdoor unit shall have an oil separator to separate oil mixed with the refrigerant gas during compression and return oil to the compressor.
e. The outdoor units shall be equipped with direct drive variable speed fans, and shall have permanently lubricated bearings and a raised guard to help prevent contact with moving parts.
f. Outdoor unit coils shall be factory tested to 600 psig and be a factory built coil with a coil guard.
g. The outdoor unit shall be equipped with one hermetically sealed, digitally controlled, inverter driven twin-rotary compressor and be capable of operating in a frequency range from 20 Hz to 100 Hz with control in 1 Hz increments. The compressor shall be mounted on vibration attenuating rubber grommets and be equipped with over-current protection.
h. The outdoor unit shall have high and low pressure sensors, outdoor temperature sensor, discharge temperature sensor and suction temperature sensor.

d. Indoor unit
   a. The system shall be capable of performing continuous operation even when power is turned off to an individual indoor unit.
e. Branch box
   a. Branch box shall not require a condensate drain and be designed for indoor installation. Each port shall connect to a single indoor unit. Provide access at each branch box.
f. Refrigerant Piping
   a. Refrigerant shall be R410A.
   b. The refrigerant circuit shall be field piped with manufacturer supplied Branch Distribution units and Y-branches (if applicable) to multiple (non-ducted) indoor units.

K. INSULATION: Manville, Knauf, Owens Corning
   a. All insulation (including jacket, facing and adhesive) shall have composite fire and smoke hazard ratings as tested by procedures listed in ASTM E-84, NFPA 255 and UL 273; not exceeding a flame spread of 25 and a smoke developed of 50.
   b. On valves and fittings provide premolded closed cell insulation fittings.
   c. Refrigerant piping: Provide 1-1/2 in. thick closed cell insulation pipe covering for all pipe diameters.

L. CLEANING:
   a. Clean pipe prior to painting.
   b. Upon completion of work, perform the following cleaning procedures:

viii. Remove protective covers after painting
ix. Clean piping and equipment
x. Remove surplus materials and rubbish
xi. Restore damaged surface finishes

M. TESTING:

a. General: Test HVAC systems to satisfaction of building official and the engineer. Do not close in, conceal, or cover up any work until it has been tested, inspected, and approved by engineer and local officials.

b. Flush piping, prior to testing, to remove foreign material which may have entered during course of installation. Clean filters and strainers after flushing.

c. The contractor shall, at his own expense, during the progress of the work or upon its completion as ordered, make such tests of their work as herein specified or as are required by and in the presence of the plumbing inspector. If so directed, tests shall be made of sections for the work so as not to delay the work of other trades.

d. The contractor shall provide all apparatus, temporary work or any other requirements necessary for such tests. The contractor shall take all due precautions to prevent damage to the building or its contents that may be incurred by such tests as they will be required to repair and make good, at their own expense, any damaged caused.

e. Any defects or deficiencies discovered as a result of test shall be immediately repaired and tests shall be repeated until the test requirements are fully complied with.

f. No caulking or pipe joints to remedy leaks will be permitted.

g. The contractor shall notify the owner two days in advance of running tests to allow their representative to be present to witness tests. Notification to be in writing.

h. Test piping to 1.5X system pressure or a minimum of 150 psi.

N. GUARANTEE:

a. Supply two copies, inserted into maintenance manual, of a warranty countersigned and guaranteed by contractor, stating that imperfect system operation and all defects in labor and materials of plumbing work will be repaired without cost to the owner for a period of one year from date of substantial completion, and stating that all plumbing equipment has been fully serviced and left in proper operating condition.

END OF SECTION 230000

SECTION 260000 – GENERAL PROVISIONS FOR ELECTRICAL WORK

1.0 GENERAL

A. References

1. This section covers the general requirements for electrical work; examine all contract drawings and all other sections of the specifications for additional work related to the work of this division.

B. Definitions

1. 'Provide' - to furnish, install and connect up complete and ready for safe and regular operation of particular work referred to unless, specifically otherwise noted.

2. 'Install' - to erect, mount and connect complete with related accessories.

3. 'Work' - labor, materials, equipment, apparatus, controls, accessories and other items required for proper and complete installation.

4. 'Wiring' - raceway, fittings, wire, boxes, mounting hardware and related items.

5. 'Concealed' - embedded in masonry or other construction cavity, installed in furred spaces, within double partitions or hung ceilings.

6. 'Similar' or 'equal' - equal materials, weight, size, design and efficiency of specified product.

7. 'Contractor' - the electrical contractor.

8. 'Noted' - as indicated on the drawings and/or specifications.

2.0 SCOPE

A. This work shall consist of the furnishings of all labor, materials and services required complete, ready for correct operation for all electrical work call for by the accompanying drawings and specifications. All electrical work shall be performed in accordance with the national electrical code, state and local codes.

B. The data indicated in these drawings and specifications are as exact as could be secured. But their absolute accuracy is not guaranteed. Do not scale drawings. Exact locations, distances, levels and other conditions will be governed by the building. Use the drawings and specifications for guidance and secure the engineer's approval of changes in locations. Circuits, where shown on an electrical drawings, are so indicated primarily for the purpose of indicating the general circuit plan and do not necessarily indicate the exact location of routing of the raceways unless specifically indicated. Circuits shall be run in suitable conditions considering structural features, other trades, construction methods and good installation practice.

C. Before submitting a bid, the contractor shall visit the site and become thoroughly familiar with all existing conditions under which the work and work of other trades will be installed. This contract includes all necessary offsets, transitions, modifications and relocation required to install all new equipment in new or existing spaces. Contractor shall include any modifications required in existing electrical equipment

for installation of new electrical equipment and new equipment of other trades. (Lighting fixtures, devices, conduit wiring, etc.) All new and existing equipment and systems shall be fully operational under this contract before the project is considered complete. The contractor shall be held responsible for any assumptions that are made, any omissions or errors made as a result of failure to visit the site and become thoroughly familiar with the existing conditions and the contract documents of all trades.

D. Codes, regulations and standards

1. All electrical work shall be performed in accordance with the following approved codes:

   a. STATE DEMOLITION CODE
   b. STATE BUILDING CODE
   c. STATE FIRE SAFETY CODE
   d. LOCAL BUILDING CODE
   e. IBC - INTERNATIONAL BUILDING CODE
   f. ANSI - AMERICAN NATIONAL STANDARDS INSTITUTE
   g. ASTM - AMERICAN SOCIETY FOR TESTING AND MATERIALS
   h. OSHA - OCCUPATIONAL SAFETY AND HEALTH ADMINISTRATION
   i. U.L. - UNDERWRITERS LABORATORIES
   j. NFPA 70 - NATIONAL ELECTRICAL CODE, 2011 EDITION
   k. IEEE - INSTITUTE OF ELECTRICAL AND ELECTRONIC ENGINEERS
   l. NEMA - NATIONAL ELECTRICAL MANUFACTURERS ASSOCIATION

E. Permits, fees and inspections

1. The contractor shall give all necessary notices, obtain all permits, pay for all government, state sales taxes and applicable fees. The contractor shall file all drawings, complete all documents and obtain all necessary approvals from the proper authority or agency having jurisdiction. Obtain all required certificates of inspection covering work. The contractor shall see that all required inspections and tests are made and shall cooperate to make these tests as thorough and as readily made as possible.

F. Materials and workmanship

1. All materials and apparatus required for the work, except as otherwise specified, shall be new and of first-class quality. It shall be furnished, delivered, erected, connected, finished in every detail and so selected and arranged as to fit properly into the building spaces. Where no specific kind or quality material is given, a first-class standard article as accepted by the engineer shall be furnished.

2. All equipment and materials shall be specification grade and bear the underwriter's label. No substitute or alternate equipment, material, etc. Will be considered for this project.

3. All work shall be of a quality consistent with good trade practice and shall be installed in a neat, workmanlike manner. The engineer/owner reserves the right to reject any work which, in his opinion, has been installed in a substandard, dangerous or in an unserviceable manner. The contractor shall replace rejected work in a satisfactory manner at no extra cost to the owner.

G. Guarantees

1. All workmanship and materials shall be fully guaranteed for a period of one year after acceptance of the entire installation covered by this contract. Should any defects occur during the guaranteed period, the contractor shall repair and/or replace all defective equipment, material and/or work at no extra charge to the Owner.

H. Coordination

1. All work shall be carried out in conjunction with other trades and full cooperation shall be given in order that all work may proceed with a minimum of delay and interference.

I. Shop drawings

1. Submit one digital copy for review, detailed shop drawings of all equipment and material specified. The contractor shall review all shop drawings prior to submission to the engineer for review. No material or equipment may be delivered to the job site or installed until contractor has in their possession, approved shop drawings for the particular material or equipment. Shop drawings shall be specific with items submitted for approval clearly identified.

J. The following is a list of electrical items that must be submitted for review:

1. Panelboards
2. Circuit breakers
3. Lighting
4. Conduit, wire and cable
5. Devices (receptacles, toggle switches, detectors, etc)
6. Manual motor starter
7. Detector – smoke, heat and combination smoke/carbon monoxide (multi-station)

K. Equipment protection

1. Properly and completely protect against all damage, all apparatus, equipment, etc., included in this contract. The contractor will be held responsible for any damage to furnished apparatus, equipment, etc., until final acceptance.

L. Property protection

1. The contractor shall take whatever means necessary and/or required to protect owner's property within the working areas from dust, debris and other matter generated by the work. No work shall commence in areas where protection is required until approval has been given to the contractor by the owner.

M. Manufacturer's instruction

1. Install all equipment in accordance with manufacturer's instructions or requirements for proper operation and maintenance.

N. Equipment painting and cleaning

1. Thoroughly clean all electrical equipment devices and enclosures upon completion of all work. Repaint any equipment whose finish is damaged or rusted. Match manufacturer's original finish.

O. Penetration sealant

1. All penetrations shall be sealed with 3M intumescent fire barrier penetration sealant, applied per manufacturer's and U.L. guidelines. Fire rating to match architectural drawings.

P. Cutting, patching, repairing and painting

1. The general contractor shall perform all cutting, patching, repairing and painting for all electrical items and equipment called for under this contract.

2.1 PRODUCTS

A. Description

1. All materials and equipment provided under this section shall be new, first grade, best of their respective kinds and in no way shall they be less than the quality and intent set forth under this section. They shall meet the requirements of all standards set up to govern the manufacturer of electrical materials and comply with all applicable codes and standards.

B. Wire

1. Conductors shall be U.L. listed, 600 volts, 90 deg. C., single conductor type THWN/THHN. 98% conductivity, annealed uncoated copper with PVC insulation covered with nylon sheath jacket. Tested in accordance with the requirements of underwriters' laboratories standard 83. Wire shall be identified by surface marking indicating manufacturer's identification conductor size and metal, voltage rating, U.L. symbol and type designation. Conductors shall be stranded. Minimum size shall be #12 AWG unless otherwise indicated. Manufactured by Rome Cable, Triangle Wire & Cable, General Cable or Essex Wire & Cable. Nonmetallic sheathed cable (Romex) may be utilized where permitted by the National Electrical Code.

C. Rigid galvanized steel conduit (RGS)

1. Rigid steel conduit shall be full weight, heavy wall steel pipe with galvanized protective coating. Manufacutured by Triangle Wire and Cable, Allied Tube and Conduit, Republic or Steelduct. Conduit fittings shall be malleable iron, cadmium plated with full threaded hubs.

D. Rigid Polyvinyl chloride conduit (PVC)

1. Rigid polyvinyl chloride conduit shall be type DB, schedule 40, sunlight resistant, rated or used with 90 degrees C. Conductors, U.L. rated. All PVC conduit and fittings shall be solvent welded. Manufactured by Carlon, Electri-Flex or Plastiline.

E. Liquid-Tight Flexible Metal Conduit (LFMC)

1. Liquid-Tight flexible conduit shall be constructed of heavy galvanized sheet metal strip, spirally-wound interlock construction with and extruded polyvinyl gray jacket. Conduit shall be U.L. labeled and conformed to the application and environment in which it will be used. All connections, couplings and fittings shall be of high quality steel-zinc rated type specifically designed for this purpose. Manufactured by O/Z or Electric-Flex.

F. Fittings

1. Metal clad cable connectors shall be malleable iron-zinc plated, male hub threads with locknut.

2. Conduit fittings shall be manufactured by O/Z Gedney, Crouse-Hinds or Appleton.

G. Cable Ties

1. Cable ties shall be fabricated of one-piece with no metal parts. Manufactured by Burndy, T&B, Panduit or Blackburn.

H. Outlet boxes

1. Outlet boxes shall be galvanized steel in areas where there is exposed conduits and plastic where nonmetallic sheath cabling is used. Boxes shall be flush or surface mounted and of proper type and size as required for the particular application. Size and type dictated by the number of devices (2 gang minimum with single gang plaster ring for single device locations), number of conductors and wiring method utilized. Boxes shall be adequate size for the installation of conductors without excessive bending or crimping of the conductors and damaging of conductor insulation. Manufactured by Steel City or Raco.

2. Outlet boxes shall be secured firmly in place to the building structure and set true and square. Provide suitable means to support outlet box to take the weight of the lighting fixture or device. Outlet boxed or box extension rings shall be set flush to the finished wall or ceiling. Boxes must be attached that they will not 'rock', 'shift' or 'move in and out' when devices are used. In no case shall boxes be installed back-to-back in a common wall dividing two spaces.

3. Where more than one outlet is shown or specified to be the same elevation or one above the other, align them exactly on center lines horizontally or vertically.

4. Multiple switches shown at one location shall be installed ganged together under one wall plate. Switches shall be arranged in an order appropriate to the locations of lighting fixture being controlled.

I. Panelboards

1. Panelboards shall be the combination thermal/magnetic circuit breaker type, 1 phase, 3 wire, 240/120V, 42 positons and shall be provided with 100A main circuit breaker. Provide with fully rated hard-drawn copper, 98 percent conductive phase and ground bus. Lugs sized to accommodate wire quality and sizes. Panel shall be U.L. listed. Door-in-door design and flush mounted. Boxes shall be corrosion resistant, and zinc finish galvanized. Fronts shall be reinforced steel powder finish painted light gray (ANSI-61) and shall be equipped with concealed hinges and concealed trim adjusting screws. Directory card holders shall be corrosion-proof valox with retractable latch, keyed alike. Phase bus shall be sequenced and fully insulated ratings shall be displayed on the dead front shield and totally visible with the door open. Panelboards shall be manufactured by Square D, Siemens, General Electric, or Cutler Hammer.

J. Circuit breakers

1. Branch circuit breakers shall be compatible with panel installed within home. Refer to schedule on drawings for circuit breaker quantity and size.

K. Phase sequence and balancing

1. Maintain correct phase sequence of all feeders and circuits with phase identification throughout the entire system. Balance all feeders and circuits to within 10%.

L. Manual motor starters

1. Furnish and install fractional horsepower manual motor starters with on-off control, thermal overload relay and pilot lights. Manufactured by General Electric, Siemens, Square D, or Allen Bradley

M. Junction boxes, pullboxes and wireways

1. Junction boxes, pullboxes and wireways shall be of proper type and sizes as required. Furnish with knockouts and flanges to receive the covers. Covers shall be flat, of the same material as the box and fastened to the box with machine screws. Manufactured by Hoffman, Square D or Lee Products.

N. Wiring devices

1. All devices shall be residential grade, U.L. listed, self-grounding, ground lug, side/back wired. Color shall be selected by owner unless otherwise indicated. All devices shall be energy star rated.

2. Receptacles shall be 125V and 20A. Receptacles that are located in areas subject to weather conditions, shall be wet location listed, energy star rated, and resistant to salt spray.

3. 125V 20A receptacles located in kitchen, basement, storage area and outdoors shall be GFCI type.

4. All 125V 15 and 20A receptacles located at 5-1/2' above finish floor or below shall be tamper resistant type.

5. Receptacles that have a power feed thru (feed in - feed out) arrangement shall be pigtailed. Feed thru feature on duplex receptacles use is not acceptable.

6. Switches shall be 120V and 20A. Switches that are located in areas subject to weather conditions, shall be wet location listed, energy star rated, and resistant to salt spray.

7. The enclosure for receptacles and switches located in wet locations shall be installed so that there is a gasket between the cover and the base to assure a proper seal. The enclosure must employ stainless steel mounting hardware and be constructed of impact resistant polycarbonate. The outlet enclosure shall be U.L. listed. Manufactured by Taymac, Carlon, or approved equal.

8. Wall plates for switches and receptacles shall be smooth thermoplastic or nylon in finished areas. Color by owner. Manufactured by Hubbell, Pass & Seymour, Leviton, or Mulberry.

9. Wall plates for switches and receptacles shall be stamped steel for unfinished areas. Manufactured by Hubbell, Pass & Seymour, Leviton, or Mulberry.

O. Lighting fixtures

1. Furnish and install lighting fixtures as specified on the lighting schedule, or approved equal, complete with all accessories, louvers, lamps and mounting hardware. The fixtures shall be marked 'A', 'B' 'C'. Provide lamps for all fixtures of wattages and types indicated. Fluorescent ballast shall be high power factor, low harmonic, and rapid start electronic. Manufactured by Advance 'MARKV'. Fluorescent lamps shall be rapid start with minimum temperature rating of 3500K, U.O.N. Manufactured by General Electric or Sylvania.

2. Exterior wall mounted fixtures shall be wet location listed.

3. Interior surface mounted lighting fixtures shall be wet location listed.

4. Interior recessed downlights shall be energy star rated.

5. Furnish and install new lamps during the course of construction up to and including the date of final completion of the project.

6. Clean and remove all paint, stickers, dirt, smudges and fingerprints from lighting fixtures after final building clean-up.

P. Power and control wiring

1. Furnish and install all power wiring, control wiring (120VAC), conduit and fittings for all plumbing, heating, ventilation and air conditioning equipment and final connections.

Manual motor starters shall be provided with running overload protection. Upon completion of work, check out each item. Items to be checked are voltage, rotation and overload protection.

Q. Detectors (multi-station)

1. Smoke, heat and combination smoke/carbon monoxide detectors shall be hardwired type with battery backup, UL listed and manufactured by Kidde or approved equal.

3.0 EXECUTION

A. Installation

1. All work, materials and manner of installing same shall be in strict accordance with the latest requirements of the national electric code.

2. All conduit and wiring shall be installed concealed unless otherwise noted.

B. Raceways

1. Raceways, enclosures and boxes shall be mechanically joined to form a continuous electrical path.

2. Furnish locknuts and bushings for all conduit terminations in all outlet boxes, panels, pull boxes, conduit stubs, etc.

C.

3. Rigid galvanized steel conduit (RGS) shall be used for wiring buried under grade service entrance conductors and exterior installations.

4. Rigid polyvinyl chloride (PVC) shall be used for service entrance conductors, lighting and power branch circuits buried under grade and installed in basement.

D. Wiring

1. Provide wiring to all outlets, equipment, apparatus and other specialties under this division that which furnished or provided under other divisions.

2. The term 'wiring' shall be considered to be comprised of the conduit, conductors, connections, etc.

3. All wiring on drawings is sized for type THWN/THHN copper conductors.

4. Minimum size wire shall be #12 unless otherwise indicated. All wiring shall be color coded.

5. Exercise caution in pulling conductors into raceways so as not to damage the insulation. Cable pulling lubricant shall be used to assist in pulling.

6. Conductor within panelboards, junction boxes and other equipment where concentration of equipment are enclosed, shall be neatly arranged and tied with cable ties.

7. Circuits shall be so connected to the panelboards that the total load is distributed as neatly as possible, equally between each line and neutral. 10% will be considered a reasonable and allowable unbalance.

8. Branch circuit wiring for switches, receptacles, devices and lighting in drywall construction may be installed with nonmetallic sheathed (Romex) type cable where approved by NEC and the authority having jurisdiction.

9. Common neutral for multiple branch circuits is not acceptable. Provide separate neutral for each branch circuit.

10. Wiring in outlet boxes, junction boxes, cabinet panelboards or equipment shall have a minimum of eight (8") inches length leads for connecting wiring devices to make up circuit splices.

11. Install copper green insulated grounding conductor in all conduits and raceways.

E. Splicing

1. Splicing shall be done with insulated or non-insulated connectors of appropriate types and current-carrying capacity. Non-insualted connectors shall be wrapped with insulating tape to the thickness of the insulation of the conductors being spliced. Electrical tape shall be 3M or Super 88 scotch vinyl flame-retardant, cold and weather resistant.

2. Splices for conductors, sizes #10 AWG or smaller shall be made with U.L. listed spring-type connectors or appropriate current carrying capacity.

3. Splices, taps and terminals for conductors #8 AWG or larger shall be made with U.L. listed bolted pressure connectors of bronze or copper construction, of appropriate current carrying capacity. Equal to O/Z Gedeny, Burndy or Blackburn.

F. Identification

1. Furnish and install nameplates for all electrical equipment, identifying name, function and/or control.

G. Grounding

1. All electrical work shall be grounded and bonded in full conformance with the latest approved edition of the national electrical code and local requirements.

2. All electrical equipment shall be made to form a continuous conducting, ground path of low impedance for ground fault circuits and operation of the circuit protective devices within each circuit.

3. Provide grounding conductor in all raceways.

4. Ground connections with the grounding conductors shall be made at each outlet box, lighting fixture components by means of a positively secured grounding clamp, screw or clip.

5. Bonding shall be provided to assure electrical continuity and the capacity to safely conduct any fault current likely to be imposed.

6. All devices (switches, receptacles, etc.), shall be grounded to conduit system with a minimum of #14 AWG and to match circuit breaker ratings in accordance with NEC table 250.122. Ground wire shall be connected to ground screw in device and fastened to backbox with 10-32x3/8" slotted hexagon head washer face ground with green dye finish.

END OF SECTION 260000

SECTION 312000 - EARTH MOVING

PART 1 - GENERAL

1.1 RELATED DOCUMENTS

A. The Standard Specifications for this section shall be the State of Connecticut Department of Transportation Standard Specifications for Roads, Bridges and Incidental Construction Form 816 supplemented and amended through the date of this project bid.

1.2 SUMMARY

A. Section Includes:

1. Removing existing vegetation.
2. Stripping and stockpiling topsoil.
3. Removing above- and below-grade site improvements.
4. Temporary erosion and sedimentation control.
5. Excavating and filling for rough grading the Site.
6. Preparing subgrades for slabs-on-grade, walks, pavements and turf and grasses.
7. Excavating and backfilling for buildings and structures.
8. Drainage course for concrete slabs-on-grade.
9. Subsurface drainage backfill for walls and trenches.
10. Excavating and backfilling trenches for utilities and pits for buried utility structures.

B. Related Requirements:
1. Section 033000 "Concrete Work" for granular course if placed over vapor retarder and beneath the slab-on-grade.
2. Section 312319 "Dewatering" for lowering and disposing of ground water during construction.
3. Section 316219 "Timber Piles" for excavation of shafts and disposal of surplus excavated material.
4. Section 329200 "Turf and Grasses" for finish grading in turf and grass areas, including preparing and placing planting soil for turf areas.

1.3 MATERIAL OWNERSHIP

A. Except for materials indicated to remain Owner's property, cleared materials shall become Contractor's property and shall be removed from Project site.

1.4 ACTION SUBMITTALS

A. Product Data: For each type of the following manufactured products required:

1. Geotextiles.
2. Warning tapes.

B. Samples for Verification: For the following products, in sizes indicated below:

1. Geotextile: 12 by 12 inches.
2. Warning Tape: 12 inches long; of each color.

3. Soil Materials

1.5 INFORMATIONAL SUBMITTALS

A. Material Test Reports: For each on-site and borrow soil material proposed for fill and backfill as follows:

1. Classification according to ASTM D 2487.
2. Laboratory compaction curve according to ASTM D 698 ASTM D 1557.

B. Preexcavation Photographs or Videotape: Show existing conditions of adjoining construction and site improvements, including finish surfaces that might be misconstrued as damage caused by earth-moving operations. Submit before earth moving begins.

1.6 FIELD CONDITIONS

A. Traffic: Minimize interference with adjoining roads, streets, walks, and other adjacent occupied or used facilities during earth-moving operations.

1. Do not close or obstruct streets, walks, or other adjacent occupied or used facilities without permission from Owner and authorities having jurisdiction.

B. Salvageable Improvements: Carefully remove items indicated to be salvaged and store on Owner's premises.

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

D. Soil Stripping, Handling, and Stockpiling: Perform only when the soil is dry or slightly moist. Refer to Lead Abatement specifications for handling of soils containing lead. No soil shall be taken off-site. Do not stockpile on site within Coastal Jurisdiction area.

PART 2 - PRODUCTS

2.1 SOIL MATERIALS

A. General: Provide borrow soil materials when sufficient satisfactory soil materials are not available from excavations.

B. Satisfactory Soils: Soil Classification Groups GW, GP, GM, SW, SP, and SM according to ASTM D 2487 Groups A-1, A-2-4, A-2-5, and A-3 according to AASHTO M 145, or a combination of these groups; free of rock or gravel larger than 3 inches in any dimension, debris, waste, frozen materials, vegetation, and other deleterious matter.

C. Unsatisfactory Soils: Soil Classification Groups GC, SC, CL, ML, OL, CH, MH, OH, and PT according to ASTM D 2487 Groups A-2-6, A-2-7, A-4, A-5, A-6, and A-7 according to AASHTO M 145, or a combination of these groups.

1. Unsatisfactory soils also include satisfactory soils not maintained within 2 percent of optimum moisture content at time of compaction.

D. Fill Materials: Fill materials under structures shall be either Granular Fill or Compacted Granular Fill as called for in the plans and details. Granular Fill or Compacted Granular Fill shall be per sections 2.13 or 2.14, respectively, of the Standard Specifications Form 816. Compacted Granular Fill shall be compacted to 95% of the material dry density.

E. Subbase Material: Naturally or artificially graded mixture of natural or crushed gravel, crushed stone, and natural or crushed sand; ASTM D 2940/D 2940M; with at least 90 percent passing a 1-1/2-inch sieve and not more than 12 percent passing a No. 200 sieve.

F. Bedding Course: Naturally or artificially graded mixture of natural or crushed gravel, crushed stone, and natural or crushed sand; ASTM D 2940/D 2940M; except with 100 percent passing a 1-inch sieve and not more than 8 percent passing a No. 200 sieve.

G. Drainage Course: Narrowly graded mixture of washed crushed stone, or crushed or uncrushed gravel; ASTM D 448; coarse-aggregate grading Size 57; with 100 percent passing a 1-1/2-inch sieve and zero to 5 percent passing a No. 8 sieve.

H. Sand: ASTM C 33/C 33M; fine aggregate.

2.2 GEOTEXTILES

A. Subsurface Drainage Geotextile: Nonwoven needle-punched geotextile, manufactured for subsurface drainage applications, made from polyolefins or polyesters; with elongation greater than 50 percent; complying with AASHTO M 288 and the following, measured per test methods referenced:

1. Survivability: Class 2; AASHTO M 288.
2. Apparent Opening Size: No. 40 No. 60 No. 70 sieve, maximum; ASTM D 4751.
3. Permittivity: 0.2 per second, minimum; ASTM D 4491.
4. UV Stability: 50 percent after 500 hours' exposure; ASTM D 4355.

B. Separation Geotextile: Woven geotextile fabric, manufactured for separation applications, made from polyolefins or polyesters; with elongation less than 50 percent; complying with AASHTO M 288 and the following, measured per test methods referenced:

1. Survivability: Class 2; AASHTO M 288.
2. Apparent Opening Size: No. 60 sieve, maximum; ASTM D 4751.
3. Permittivity: 0.02 per second, minimum; ASTM D 4491.
4. UV Stability: 50 percent after 500 hours' exposure; ASTM D 4355.

2.3 ACCESSORIES

A. Detectable Warning Tape: Acid- and alkali-resistant, polyethylene film warning tape manufactured for marking and identifying underground utilities, a minimum of 6 inches wide and 4 mils thick, continuously inscribed with a description of the utility, with metallic core encased in a protective jacket for corrosion protection, detectable by metal detector when tape is buried up to 30 inches deep; colored as follows:

1. Red: Electric.
2. Yellow: Gas, oil, steam, and dangerous materials.
3. Orange: Telephone and other communications.
4. Blue: Water systems.

5. Green: Sewer systems.

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 earth-moving operations.

B. Protect and maintain benchmarks and survey control points from disturbance during construction.

C. Protect and maintain erosion and sedimentation controls during earth-moving operations.

D. Protect subgrades and foundation soils from freezing temperatures and frost. Remove temporary protection before placing subsequent materials.

E. Protect existing site improvements to remain from damage during construction.

1. Restore damaged improvements to their original condition, as acceptable to Owner.

F. Remove erosion and sedimentation controls, and restore and stabilize areas disturbed during removal.

3.2 CLEARING AND GRUBBING

A. Remove obstructions, trees, shrubs, and other vegetation to permit installation of new construction.

1. Grind down stumps and remove roots larger than 3 inches in diameter, obstructions, and debris to a depth of 18 inches below exposed subgrade.
2. Chip removed tree branches and dispose of off-site.

B. Fill depressions caused by clearing and grubbing operations with satisfactory soil material unless further excavation or earthwork is indicated.

1. Place fill material in horizontal layers not exceeding a loose depth of 8 inches, and compact each layer to a density equal to adjacent original ground.

3.3 TOPSOIL STRIPPING

A. Remove sod and grass before stripping topsoil.

B. Strip topsoil to depth of 6 inches in a manner to prevent intermingling with underlying subsoil or other waste materials.

1. Remove subsoil and nonsoil materials from topsoil, including clay lumps, gravel, and other objects larger than 2 inches in diameter; trash, debris, weeds, roots, and other waste materials.

C. Stockpile topsoil away from edge of excavations without intermixing with subsoil or other materials. Grade and shape stockpiles to drain surface water. Cover to prevent windblown dust and erosion by water.

1. Limit height of topsoil stockpiles to 72 inches.
2. Stockpile surplus topsoil to allow for respreading deeper topsoil.
3. See plans for special conditions for handling soils related to stockpiling.

3.4 SITE IMPROVEMENTS

A. Remove existing above- and below-grade improvements as indicated and necessary to facilitate new construction.

B. Remove slabs, paving, curbs, gutters, and aggregate base as indicated.

1. Unless existing full-depth joints coincide with line of demolition, neatly saw-cut along line of existing pavement to remain before removing adjacent existing pavement. Saw-cut faces vertically.

3.5 DISPOSAL WASTE MATERIALS

A. Remove demolished materials, and waste materials including trash and debris, and legally dispose of them off Owner's property.

3.6 EXPLOSIVES

A. Explosives: Do not use explosives.

3.7 EXCAVATION, GENERAL

A. Unclassified Excavation: Excavate to subgrade elevations regardless of the character of surface and subsurface conditions encountered. Unclassified excavated materials may include rock, soil materials, and obstructions. No changes in the Contract Sum or the Contract Time will be authorized for rock excavation or removal of obstructions.

1. If excavated materials intended for fill and backfill include unsatisfactory soil materials and rock, replace with satisfactory soil materials.

3.8 EXCAVATION FOR STRUCTURES

A. Excavate to indicated elevations and dimensions within a tolerance of plus or minus 1 inch. If applicable, extend excavations a sufficient distance from structures for placing and removing concrete formwork, for installing services and other construction, and for inspections.

1. Excavations for Footings and Foundations: Do not disturb bottom of excavation. Excavate to depths as required to accommodate bedding, stone, or drainage layers. Excavate by hand to final grade just before placing concrete reinforcement. Trim bottoms to required lines and grades to leave solid base to receive other work.
2. Pile Foundations: Stop excavations 6 to 12 inches above bottom of pile cap before piles are placed. After piles have been driven, remove loose and displaced material. Excavate to final grade, leaving solid base to receive concrete pile caps.

3. Excavation for Underground Mechanical or Electrical Utility Structures: Excavate to elevations and dimensions indicated within a tolerance of plus or minus 1 inch. Do not disturb bottom of excavations intended as bearing surfaces.

3.9 EXCAVATION FOR WALKS AND PAVEMENTS

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

3.10 EXCAVATION FOR UTILITY TRENCHES

A. Trench Bottoms: Excavate trenches 4 inches deeper than bottom of pipe and conduit elevations to allow for bedding course. Hand-excavate deeper for bells of pipe.

1. Excavate trenches 6 inches deeper than elevation required in rock or other unyielding bearing material to allow for bedding course.

2. Excavate trenches to allow installation of top of pipe below frost line.

3. Bank and bench excavation sides 34° minimum. Provide trench boxes or soil support to stabilize soil and provide safety for workers.

3.11 SUBGRADE INSPECTION

A. Notify Engineer when excavations have reached required subgrade.

B. If Engineer determines that unsatisfactory soil is present, continue excavation and replace with compacted backfill or fill material as directed.

C. Proof-roll subgrade with five passes of a 10 ton static weight compactor to identify soft pockets and areas of excess yielding. Do not proof-roll wet or saturated subgrades. Static mode is recommended for proofrolling subgrade areas

1. Completely proof-roll subgrade in one direction, repeating proof-rolling in direction perpendicular to first direction. Limit vehicle speed to 3 mph. A minimum of five overlapping passes shall be performed
2. Excavate soft spots, unsatisfactory soils, and areas of excessive pumping or rutting, as determined by Engineer, and replace with compacted backfill or fill as directed.

D. Reconstruct subgrades damaged by freezing temperatures, frost, rain, accumulated water, or construction activities, as directed by Engineer, without additional compensation.

3.12 UNAUTHORIZED EXCAVATION

A. Fill unauthorized excavation under foundations or wall footings by extending bottom elevation of concrete foundation or footing to excavation bottom, without altering top elevation. Lean concrete fill, with 28-day compressive strength of 2500 psi, may be used when approved by Engineer.

1. Fill unauthorized excavations under other construction, pipe, or conduit using 3/8” broken stone.

3.13 STORAGE OF SOIL MATERIALS

A. Stockpile borrow soil materials and excavated satisfactory soil materials without intermixing. Place, grade, and shape stockpiles to drain surface water. Cover to prevent windblown dust or erosion. Stockpile soil materials away from edge of excavations. Do not stockpile soils within Coastal Jurisdiction areas.

3.14 BACKFILL

A. Place and compact backfill in excavations promptly, but not before completing the following:

1. Construction below finish grade including, where applicable, subdrainage, dampproofing, waterproofing, and perimeter insulation.
2. Surveying locations of underground utilities for Record Documents.
3. Testing and inspecting underground utilities.
4. Removing concrete formwork.
5. Removing trash and debris.
6. Removing temporary shoring, bracing, and sheeting.
7. Installing permanent or temporary horizontal bracing on horizontally supported walls.

B. Place backfill on subgrades free of mud, frost, snow, or ice.

3.15 UTILITY TRENCH BACKFILL

A. Place backfill on subgrades free of mud, frost, snow, or ice.

B. Place and compact bedding course on trench bottoms and where indicated. Shape bedding course to provide continuous support for bells, joints, and barrels of pipes and for joints, fittings, and bodies of conduits.

C. Backfill voids with satisfactory soil while removing shoring and bracing.

1. Soil Backfill: Place and compact initial backfill of subbase material, free of particles larger than 1 inch in any dimension, to a height of 12 inches over the pipe or conduit.

a. Carefully compact initial backfill under pipe haunches and compact evenly up on both sides and along the full length of piping or conduit to avoid damage or displacement of piping or conduit. Coordinate backfilling with utilities testing.

D. Final Backfill:

1. Soil Backfill: Place and compact final backfill of satisfactory soil to final subgrade

E. Warning Tape: Install warning tape directly above utilities, 12 inches below finished grade, except 6 inches below subgrade under pavements and slabs.

3.16 SOIL MOISTURE CONTROL

A. Uniformly moisten or aerate subgrade and each subsequent fill or backfill soil layer before compaction to within 2 percent of optimum moisture content.

1. Do not place backfill or fill soil material on surfaces that are muddy, frozen, or contain frost or ice.
2. Remove and replace, or scarify and air dry, otherwise satisfactory soil material that exceeds optimum moisture content by 2 percent and is too wet to compact to specified dry unit weight.

3.17 COMPACTION OF SOIL BACKFILLS AND FILLS

A. Place backfill and fill soil materials in layers not more than 8 inches in loose depth for material compacted by heavy compaction equipment and not more than 4 inches in loose depth for material compacted by hand-operated tampers.

B. Place backfill and fill soil materials evenly on all sides of structures to required elevations and uniformly along the full length of each structure.

C. Compact soil materials to not less than the following percentages of maximum dry unit weight according to ASTM D 1557:

1. Under structures, building slabs, steps, and pavements, scarify and recompact top 12 inches of existing subgrade and each layer of backfill or fill soil material at 95 percent.
2. Under walkways, scarify and recompact top 6 inches below subgrade and compact each layer of backfill or fill soil material at 92 percent.
3. Under turf or unpaved areas, scarify and recompact top 6 inches below subgrade and compact each layer of backfill or fill soil material at 85 percent.
4. For utility trenches, compact each layer of initial and final backfill soil material at 85 percent.

3.18 GRADING

A. General: Uniformly grade areas to a smooth surface, free of irregular surface changes. Comply with compaction requirements and grade to cross sections, lines, and elevations indicated.

1. Provide a smooth transition between adjacent existing grades and new grades.
2. Cut out soft spots, fill low spots, and trim high spots to comply with required surface tolerances.

B. Site Rough Grading: Slope grades to direct water away from buildings and to prevent ponding. Finish subgrades to elevations required to achieve indicated finish elevations, within the following subgrade tolerances:

1. Turf or Unpaved Areas: Plus or minus 1 inch.
2. Walks: Plus or minus 1 inch.
3. Pavements: Plus or minus 1/2 inch.

C. Grading inside Building Lines: Finish subgrade to a tolerance of 1/2 inch when tested with a 10-foot straightedge.

3.19 SUBBASE AND BASE COURSES UNDER PAVEMENTS

A. Place subbase course on subgrades free of mud, frost, snow, or ice.

B. On prepared subgrade, place subbase course under pavements and walks as follows:

1. Install separation geotextile on prepared subgrade according to manufacturer's written instructions, overlapping sides and ends.
2. Shape subbase course to required crown elevations and cross-slope grades.
3. Place subbase course 6 inches or less in compacted thickness in a single layer.
4. Place subbase course that exceeds 6 inches in compacted thickness in layers of equal thickness, with no compacted layer more than 6 inches thick or less than 3 inches thick.
5. Compact subbase course at optimum moisture content to required grades, lines, cross sections, and thickness to not less than 95 percent of maximum dry unit weight according to ASTM D 1557.

C. Pavement Shoulders: Place shoulders along edges of subbase course to prevent lateral movement. Construct shoulders, at least 12 inches wide, of satisfactory soil materials and compact simultaneously with each subbase layer to not less than 95 percent of maximum dry unit weight according to ASTM D 1557.

3.20 DRAINAGE COURSE UNDER CONCRETE SLABS-ON-GRADE

A. Place drainage course on subgrades free of mud, frost, snow, or ice.

B. On prepared subgrade, place and compact drainage course under cast-in-place concrete slabs-on-grade as follows:

1. Install subdrainage geotextile on prepared subgrade according to manufacturer's written instructions, overlapping sides and ends.
2. Place drainage course 6 inches or less in compacted thickness in a single layer.
3. Place drainage course that exceeds 6 inches in compacted thickness in layers of equal thickness, with no compacted layer more than 6 inches thick or less than 3 inches thick.
4. Compact each layer of drainage course to required cross sections and thicknesses to not less than 95 percent of maximum dry unit weight according to ASTM D 698.

3.21 FIELD QUALITY CONTROL

A. Special Inspections: Owner will engage a qualified special inspector to perform the following special inspections:

1. Determine prior to placement of fill that site has been prepared in compliance with requirements.
2. Determine that fill material classification and maximum lift thickness comply with requirements.
3. Determine, during placement and compaction that in-place density of compacted fill complies with requirements.

B. Testing Agency: Owner will engage a qualified geotechnical engineering testing agency to perform tests and inspections.

C. Allow testing agency to inspect and test subgrades and each fill or backfill layer. Proceed with subsequent earth moving only after test results for previously completed work comply with requirements.

D. Footing Subgrade: At footing subgrades, at least one test of each soil stratum will be performed to verify design bearing capacities. Subsequent verification and approval of other footing subgrades may be based on a visual comparison of subgrade with tested subgrade when approved by Engineer.

E. Testing agency will test compaction of soils in place according to ASTM D 1556, ASTM D 2167, ASTM D 2937, and ASTM D 6938, as applicable. Tests will be performed at the following locations and frequencies:

1. Paved and Building Slab Areas: At subgrade and at each compacted fill and backfill layer, at least one test for every 2000 sq. ft. or less of paved area or building slab but in no case fewer than three tests.
2. Foundation Wall Backfill: At each compacted backfill layer, at least one test for every 100 feet or less of wall length but no fewer than two tests.
3. Trench Backfill: At each compacted initial and final backfill layer, at least one test for every 150 feet or less of trench length but no fewer than two tests.

F. When testing agency reports that subgrades, fills, or backfills have not achieved degree of compaction specified, scarify and moisten or aerate, or remove and replace soil materials to depth required; recompact and retest until specified compaction is obtained.

3.22 PROTECTION

A. Protecting Graded Areas: Protect newly graded areas from traffic, freezing, and erosion. Keep free of trash and debris.

B. Repair and reestablish grades to specified tolerances where completed or partially completed surfaces become eroded, rutted, settled, or where they lose compaction due to subsequent construction operations or weather conditions.

1. Scarify or remove and replace soil material to depth as directed by Engineer; reshape and recompact.

C. Where settling occurs before Project correction period elapses, remove finished surfacing, backfill with additional soil material, compact, and reconstruct surfacing.

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

3.23 DISPOSAL OF SURPLUS AND WASTE MATERIALS

A. Remove surplus satisfactory soil and waste materials, including unsatisfactory soil, trash, and debris, and legally dispose of them off Owner's property.

END OF SECTION 312000

SECTION 312319 - DEWATERING

PART 1 - GENERAL

1.1 RELATED DOCUMENTS

A. The Standard Specifications for this section shall be the State of Connecticut Department of Transportation Standard Specifications for Roads, Bridges and Incidental Construction Form 816 supplemented and amended through the date of this project bid.

1.2 SUMMARY

A. Section includes construction dewatering.

B. Related Requirements:

1. Section 312000 "Earth Moving" for excavating, backfilling, site grading, and controlling surface-water runoff and ponding.

1.3 INFORMATIONAL SUBMITTALS

A. Existing Conditions: Using photographs or video recordings, show existing conditions of adjacent construction and site improvements that might be misconstrued as damage caused by dewatering operations. Submit before Work begins.

PART 2 - PRODUCTS

2.1 PERFORMANCE REQUIREMENTS

A. Dewatering Performance: Furnish, install, test, operate, monitor, and maintain dewatering system of sufficient scope, size, and capacity to control hydrostatic pressures and to lower, control, remove, and dispose of ground water and permit excavation and construction to proceed on dry, stable subgrades.

1. Continuously monitor and maintain dewatering operations to ensure erosion control, stability of excavations and constructed slopes, prevention of flooding in excavation, and prevention of damage to subgrades and permanent structures.
2. Prevent surface water from entering excavations by grading, dikes, or other means.
3. Accomplish dewatering without damaging existing buildings, structures, and site improvements adjacent to excavation.
4. Remove dewatering system when no longer required for construction.

B. Regulatory Requirements: Comply with governing EPA notification regulations before beginning dewatering. Comply with water- and debris-disposal regulations of authorities having jurisdiction.

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 dewatering operations.

B. Install dewatering system to ensure minimum interference with roads, streets, walks, and other adjacent occupied and used facilities.

C. Provide temporary grading to facilitate dewatering and control of surface water.

D. Protect and maintain temporary erosion and sedimentation controls.

3.2 INSTALLATION

A. Place dewatering system into operation to lower water to specified levels before excavating below ground-water level.

B. Provide sumps, sedimentation tanks, and other flow-control devices as required by authorities having jurisdiction.

3.3 OPERATION

A. Operate system to lower and control ground water to permit excavation, construction of structures, and placement of fill materials on dry subgrades. Drain water-bearing strata above and below bottom of foundations, drains, sewers, and other excavations.

1. Do not permit open-sump pumping that leads to loss of fines, soil piping, subgrade softening, and slope instability.

B. Dispose of water removed by dewatering in a manner that avoids endangering public health, property, and portions of work under construction or completed. Dispose of water and sediment in a manner that avoids inconvenience to others.

C. Survey-Work Benchmarks: Resurvey benchmarks regularly during dewatering and maintain 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.

D. Provide continual observation to ensure that subsurface soils are not being removed by the dewatering operation.

E. Prepare reports of observations.

3.4 PROTECTION

A. Protect and maintain dewatering system during dewatering operations.

B. Promptly repair damages to adjacent facilities caused by dewatering.

END OF SECTION 312319

SECTION 315000 - EXCAVATION SUPPORT AND PROTECTION

PART 1 - GENERAL

1.1 RELATED DOCUMENTS

A. The Standard Specifications for this section shall be the State of Connecticut Department of Transportation Standard Specifications for Roads, Bridges and Incidental Construction Form 816 supplemented and amended through the date of this project bid.

1.2 SUMMARY

A. Section includes temporary excavation support and protection systems.

B. Related Requirements:

1. Section 312000 "Earth Moving" for excavating and backfilling and for controlling surface-water runoff and ponding.
2. Section 312319 "Dewatering" for dewatering excavations.

1.3 FIELD CONDITIONS

A. Interruption of Existing Utilities: Do not interrupt any utility serving facilities or others unless permitted under the following conditions and then only after arranging to provide temporary utility according to requirements indicated:

1. Notify Engineer no fewer than two days in advance of proposed interruption of utility.
2. Do not proceed with interruption of utility without Engineer's written permission.

PART 2 - PRODUCTS

2.1 PERFORMANCE REQUIREMENTS

A. Provide, design, monitor, and maintain excavation support and protection system capable of supporting excavation sidewalls and of resisting earth and hydrostatic pressures and superimposed and construction loads.

1. Install excavation support and protection systems without damaging existing buildings, structures, and site improvements adjacent to excavation.
2. Continuously monitor vibrations, settlements, and movements to ensure stability of excavations and constructed slopes and to ensure that damage to permanent structures is prevented.

2.2 MATERIALS

A. Structural Steel: ASTM A 36/A 36M, ASTM A 690/A 690M, or ASTM A 992/A 992M.

B. Wood Lagging: Lumber, mixed hardwood, nominal rough thickness of size and strength required for application.

C. Cast-in-Place Concrete: ACI 301, of compressive strength required for application.

D. Reinforcing Bars: ASTM A 615/A 615M, Grade 60, deformed.

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 that could develop during excavation support and protection system operations.

1. Shore, support, and protect utilities encountered.

B. Install excavation support and protection systems 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 authorities having jurisdiction.

C. Locate excavation support and protection systems clear of permanent construction so that construction and finishing of other work is not impeded.

3.2 BRACING

A. Bracing: Locate bracing to clear columns, floor framing construction, and other permanent work. If necessary to move brace, install new bracing before removing original brace.

1. Do not place bracing where it will be cast into or included in permanent concrete work unless otherwise approved by Engineer.

2. Install internal bracing if required to prevent spreading or distortion of braced frames.

3. Maintain bracing until structural elements are supported by other bracing or until permanent construction is able to withstand lateral earth and hydrostatic pressures.

3.3 FIELD QUALITY CONTROL

A. Promptly correct detected bulges, breakage, or other evidence of movement to ensure that excavation support and protection system remains stable.

B. Promptly repair damages to adjacent facilities caused by installation or faulty performance of excavation support and protection systems.

3.4 REMOVAL AND REPAIRS

A. Remove excavation support and protection systems when construction has progressed sufficiently to support excavation and earth and hydrostatic pressures. Remove in stages to avoid disturbing underlying soils and rock or damaging structures, pavements, facilities, and utilities.

1. Remove excavation support and protection systems to a minimum depth of 48 inches below overlying construction and abandon remainder.
2. Fill voids immediately with approved backfill compacted to density specified in Section 312000 "Earth Moving."
3. Repair or replace, as approved by Engineer, adjacent work damaged or displaced by removing excavation support and protection systems.

END OF SECTION 315000

SECTION 316219 - TIMBER PILES

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 round timber piles.

1.3 UNIT PRICES

A. Contract Sum: Base Contract Sum on 36 piles, 40 feet in length from tip to cutoff, plus not more than 12 inches (305 mm) of overlength for cutting piles at cutoff elevations.

B. Work of this Section is affected as follows:

1. Additional payment for pile lengths in excess of that indicated, and credit for pile lengths less than that indicated, is calculated at unit prices stated in the Contract, based on net addition or deduction to total pile length as determined by Engineer and measured to nearest 12 inches (305 mm).

    a. Additional payment for splices required to extend pile lengths in excess of that indicated is calculated at unit prices stated in the Contract.

2. Additional payment for number of piles in excess of that indicated, and credit for number of piles less than that indicated, is calculated at unit prices stated in the Contract.
3. Unit prices include labor, materials, tools, equipment, and incidentals for furnishing, driving, cutting off, capping, and disposing of cutoffs.
4. Test piles that become part of permanent foundation system are considered as an integral part of the Work.
5. No payment is made for rejected piles, including piles driven out of tolerance, defective piles, or piles damaged during handling or driving, or additional piles driven to compensate for piles out of tolerance.

1.4 ACTION SUBMITTALS

A. Product Data: For each type of product.

B. Shop Drawings: For timber piles. Show fabrication and installation details for piles, including details of driving shoes, tips or boots, and pile butt protection.

1.5 INFORMATIONAL SUBMITTALS

A. Qualification Data: For Installer.

B. Round timber pile treatment data as follows, including chemical treatment manufacturer's written instructions for handling, storing, installing, and finishing treated material:

1. For each type of preservative-treated timber product, include certification by treating plant stating type of preservative solution and pressure process used, net amount of preservative retained, and compliance with applicable standards.
2. For waterborne-treated products, include statement that moisture content of treated materials was reduced to levels indicated before shipment to Project site.

C. Pile-Driving Equipment Data: Include type, make, and rated energy range; weight of striking part of hammer; weight of drive cap; and, type, size, and properties of hammer cushion.

D. Pile-Driving Records: Submit within three days of driving each pile.

E. Certified Piles Survey: Submit within seven days of pile driving completion.

F. Field quality-control reports.

G. Material Certificates: For preservative-treated piles. Indicate type of preservative used and net amount of preservative retained.

H. Preconstruction Photographs: Photographs or video of existing conditions of adjacent construction. Submit before the Work begins.

1.6 QUALITY ASSURANCE

A. Installer Qualifications: An authorized representative who is trained and approved by manufacturer.

1. Installer's responsibility includes engaging a qualified professional engineer to prepare pile-driving records.

1.7 PRECONSTRUCTION TESTING

A. General: Static pile tests are used to verify driving criteria and pile lengths and to confirm allowable load of piles.

1. Furnish test piles10 feet longer than production piles.

B. Pile Tests: Arrange and perform the following pile tests:

C. Drive test piles at locations indicated to the driving resistance indicated. Use test piles identical to those required for Project, and drive with appropriate pile-driving equipment operating at rated driving energy to be used in driving permanent piles. Use test piles to determine actual pile lengths to satisfy penetration resistance requirements.

1. Pile Design Load: 15 tons.

D. Test piles that comply with requirements, including location tolerances, may be used on Project.

1.8 DELIVERY, STORAGE, AND HANDLING

A. Deliver piles to Project site in such quantities and at such times to ensure continuity of installation. Handle and store piles at Project site to prevent breaks, cuts, abrasions, or other physical damage and as required by AWPA M4.

1. Do not drill holes or drive spikes or nails into pile below cutoff elevation.

1.9 FIELD CONDITIONS

A. Protect structures, underground utilities, and other construction from damage caused by pile driving.

B. Site Information: A geotechnical report has been prepared for this Project and is included elsewhere in the Project Manual for information only.

C. Preconstruction Photographs: Inventory and record the condition of adjacent structures, underground utilities, and other construction. Document conditions that might be misconstrued as damage caused by pile driving. Comply with Section 013233 "Photographic Documentation."

PART 2 - PRODUCTS

2.1 TIMBER PILES

A. Round Timber Piles: ASTM D 25, unused, clean peeled, one piece from butt to tip; of the following species and size basis:

1. Species: Coastal Douglas fir or Southern yellow pine.
2. Size Basis: Tip circumference, 8-inch tip and natural taper.

B. Pressure-treat round timber piles according to AWPA U1 as follows:

1. Service Condition: UC4C Ground Contact, Extreme Duty.
2. Treatment: Creosote or creosote solution.

2.2 FABRICATION

A. Pile Butt: Trim pile butt and cut perpendicular to longitudinal axis of pile. Chamfer and shape butt to fit tightly to driving cap of hammer.

B. Field-Applied Wood Preservative: Treat field cuts, holes, and other penetrations according to AWPA M4.

1. Coal-tar roofing cement for treating drilled holes or sealing cutoffs shall be free of asbestos.

C. Pile Splices: Splices are not permitted.

D. Pile-Length Markings: Mark each pile with horizontal lines at 12-inch (305-mm) intervals; label the distance from pile tip at 60-inch (1524-mm) intervals. Maintain markings on piles until driven.

PART 3 - EXECUTION

3.1 EXAMINATION

A. Site Conditions: Do not start pile-driving operations until earthwork fills have been completed or excavations have reached an elevation of 6 to 12 inches (152 to 305 mm) above bottom of footing or pile cap.

3.2 DRIVING EQUIPMENT

A. Pile Hammer: Air-, steam-, hydraulic-, or diesel-powered type capable of consistently delivering adequate peak-force duration and magnitude to develop the ultimate capacity required for type and size of pile driven and character of subsurface material anticipated.

B. Hammer Cushions and Driving Caps: Between hammer and top of pile, provide hammer cushion and steel driving cap as recommended by hammer manufacturer and as required to drive pile without damage.

C. Leads: Use fixed or semifixed pile-driver leads that hold the full length of pile firmly in position and in axial alignment with hammer.

3.3 DRIVING PILES

A. General: Continuously drive piles to penetration resistance indicated. Establish and maintain axial alignment of leads and piles before and during driving.

B. Spudding: Drive spud piles through overlying highly resistant strata or obstructions and withdraw for reuse.

C. Heaved Piles: Redrive heaved piles to tip elevation at least as deep as original tip elevation with a driving resistance at least as great as original driving resistance.

D. Driving Tolerances: Drive piles without exceeding the following tolerances, measured at pile heads:

1. Location: 4 inches from location indicated after initial driving, and 6 inches after pile driving is completed.
2. Plumb: Maintain 1 inch in 48 inches from vertical, or a maximum of 4 inches, measured when pile is aboveground in leads.

E. Withdraw damaged or defective piles and piles that exceed driving tolerances, and install new piles within driving tolerances.

1. Fill holes left by withdrawn piles using cohesionless soil material such as gravel, broken stone, and gravel-sand mixtures. Place and compact in lifts not exceeding 72 inches (1830 mm).
2. Fill holes left by withdrawn piles as directed by Engineer.

F. Abandon and cut off rejected piles as directed by Engineer. Leave rejected piles in place and install new piles in locations as directed by Engineer.

G. Cut off butts of driven piles square with pile axis and at elevations indicated.

1. Cover cut-off piling surfaces with minimum three coats of preservative treatment according to AWPA M4.

H. Certified Piles Survey: Engage a land surveyor to prepare a piles survey showing final location of piles in relation to the property survey and existing benchmarks.

1. Notify Engineer when deviations from locations exceed allowable tolerances.

3.4 FIELD QUALITY CONTROL

A. Testing Agency: Owner will engage a qualified testing agency to perform tests and inspections.

B. Tests and Inspections:

1. Dynamic Pile Testing: High-strain dynamic monitoring shall be performed and reported according to ASTM D 4945 during initial driving and during restriking on 2 piles.
2. Pile-Driving Records: Maintain accurate driving records for each pile, compiled and attested to by a qualified professional engineer. Include the following data:
   a. Project name and number.
   b. Name of Contractor.
   c. Pile species.
   d. Pile location in pile group and designation of pile group.
   e. Sequence of driving in pile group.
   f. Pile dimensions.
   g. Ground elevation.
   h. Elevation of tips after driving.
   i. Final tip and cutoff elevations of piles after driving pile group.
   j. Records of redriving.
   k. Elevation of splices.
   l. Type, make, model, and rated energy of hammer.
   m. Weight and stroke of hammer.
   n. Type of pile-driving cap used.
   o. Cushion material and thickness.
   p. Actual stroke and blow rate of hammer.
   q. Pile-driving start and finish times, and total driving time.
   r. Time, pile-tip elevation, and reason for interruptions.
   s. Number of blows for every 12 inches (305 mm) of penetration, and number of blows per 1 inch (25 mm) for the last 6 inches (152 mm) of driving.
   t. Pile deviations from location and plumb.
   u. Preboring, jetting, or special procedures used.
   v. Unusual occurrences during pile driving.

3.5 DISPOSAL

A. Remove withdrawn piles and cutoff sections of piles from site and legally dispose of them off Owner's property.

END OF SECTION 316219

SECTION 321216 - ASPHALT PAVING

PART 1 - GENERAL

1.1 RELATED DOCUMENTS

A. The Standard Specifications for this section shall be the State of Connecticut Department of Transportation Standard Specifications for Roads, Bridges and Incidental Construction Form 816 supplemented and amended through the date of this project bid.

1.2 SUMMARY

A. Section Includes:

1. Hot-mix asphalt paving.

B. Related Requirements:

1. Section 312000 "Earth Moving" for subgrade preparation, fill material, unbound-aggregate subbase and base courses, and aggregate pavement shoulders.

1.3 ACTION SUBMITTALS

A. Product Data: For each type of product.

1. Include technical data and tested physical and performance properties.
2. Job-Mix Designs: Certification, by authorities having jurisdiction, of approval of each job mix proposed for the Work.

1.4 INFORMATIONAL SUBMITTALS

A. Qualification Data: For manufacturer and installer.

B. Material Certificates: For each paving material.

1.5 QUALITY ASSURANCE

A. Manufacturer Qualifications: A paving-mix manufacturer registered with the Connecticut Department of Transportation.

A. Regulatory Requirements: Comply with materials, workmanship, and other applicable requirements of the Connecticut Department of Transportation for asphalt paving work.

1. Measurement and payment provisions and safety program submittals included in standard specifications do not apply to this Section.

1.6 FIELD CONDITIONS

A. Environmental Limitations: Do not apply asphalt materials if subgrade is wet or excessively damp, if rain is imminent or expected before time required for adequate cure, or if the following conditions are not met:

1. Tack Coat: Minimum surface temperature of 60 deg F.
2. Asphalt Surface Course: Minimum surface temperature of 60 deg F at time of placement.

PART 2 - PRODUCTS

2.1 MIXES

A. Hot-Mix Asphalt: Dense, hot-laid, hot-mix asphalt plant mixes approved by the Connecticut Department of Transportation and complying with the following requirements:

1. Comply with Form 816 Section M.04 – Bituminous Concrete Materials..
2. Base Course: Form 816 Section M.04 Class 1, and Class 4.
3. Surface Course: Form 816 Section M.04 Class 2

PART 3 - EXECUTION

3.1 EXAMINATION

A. Verify that subgrade is dry and in suitable condition to begin paving.

B. Proof-roll subgrade below pavements with heavy pneumatic-tired equipment to identify soft pockets and areas of excess yielding. Do not proof-roll wet or saturated subgrades.

1. Completely proof-roll subgrade in one direction. Limit vehicle speed to 3 mph.
2. Proof roll with a loaded 10-wheel, tandem-axle dump truck weighing not less than 15 tons.
3. Excavate soft spots, unsatisfactory soils, and areas of excessive pumping or rutting, as determined by Architect, and replace with compacted backfill or fill as directed.

C. Proceed with paving only after unsatisfactory conditions have been corrected.

3.2 SURFACE PREPARATION

A. General: Immediately before placing asphalt materials, remove loose and deleterious material from substrate surfaces. Ensure that prepared subgrade is ready to receive paving.

B. Tack Coat: Apply uniformly to surfaces of existing pavement at a rate of 0.05 to 0.15 gal./sq. yd..

1. Allow tack coat to cure undisturbed before applying hot-mix asphalt paving.
2. Avoid smearing or staining adjoining surfaces, appurtenances, and surroundings. Remove spillages and clean affected surfaces.

3.3 PLACING HOT-MIX ASPHALT

A. Machine place hot-mix asphalt on prepared surface, spread uniformly, and strike off. Place asphalt mix by hand in areas inaccessible to equipment in a manner that prevents segregation of mix. Place each course to required grade, cross section, and thickness when compacted.

1. Place hot-mix asphalt surface course in single lift.
2. Spread mix at a minimum temperature of 250 deg F.
3. Begin applying mix along centerline of crown for crowned sections and on high side of one-way slopes unless otherwise indicated.
4. Regulate paver machine speed to obtain smooth, continuous surface free of pulls and tears in asphalt-paving mat.

B. Place paving in consecutive strips not less than 10 feet wide unless infill edge strips of a lesser width are required.

1. After first strip has been placed and rolled, place succeeding strips and extend rolling to overlap previous strips. Overlap mix placement about 1 to 1-1/2 inches from strip to strip to ensure proper compaction of mix along longitudinal joints.

2. Complete a section of asphalt base course before placing asphalt surface course.

C. Promptly correct surface irregularities in paving course behind paver. Use suitable hand tools to remove excess material forming high spots. Fill depressions with hot-mix asphalt to prevent segregation of mix; use suitable hand tools to smooth surface.

3.4 JOINTS

A. Construct joints to ensure a continuous bond between adjoining paving sections. Construct joints free of depressions, with same texture and smoothness as other sections of hot-mix asphalt course.

1. Clean contact surfaces and apply tack coat to joints.

2. Offset longitudinal joints, in successive courses, a minimum of 6 inches.

3. Offset transverse joints, in successive courses, a minimum of 24 inches.

4. Construct transverse joints at each point where paver ends a day's work and resumes work at a subsequent time. Construct these joints using either "bulkhead" or "papered" method according to AI MS-22, for both "Ending a Lane" and "Resumption of Paving Operations."

5. Compact joints as soon as hot-mix asphalt will bear roller weight without excessive displacement.

6. Compact asphalt at joints to a density within 2 percent of specified course density.

3.5 COMPACTION

A. General: Begin compaction as soon as placed hot-mix paving will bear roller weight without excessive displacement. Compact hot-mix paving with hot, hand tampers or with vibratory-plate compactors in areas inaccessible to rollers.

1. Complete compaction before mix temperature cools to 185 deg F.

B. Breakdown Rolling: Complete breakdown or initial rolling immediately after rolling joints and outside edge. Examine surface immediately after breakdown rolling for indicated crown, grade, and smoothness. Correct laydown and rolling operations to comply with requirements.

C. Intermediate Rolling: Begin intermediate rolling immediately after breakdown rolling while hot-mix asphalt is still hot enough to achieve specified density. Continue rolling until hot-mix asphalt course has been uniformly compacted to the following density:

1. Average Density: 92 percent of reference maximum theoretical density according to ASTM D 2041, but not less than 90 percent or greater than 96 percent.

D. Finish Rolling: Finish roll paved surfaces to remove roller marks while hot-mix asphalt is still warm.

E. Edge Shaping: While surface is being compacted and finished, trim edges of pavement to proper alignment. Bevel edges while asphalt is still hot; compact thoroughly.

F. Repairs: Remove paved areas that are defective or contaminated with foreign materials and replace with fresh, hot-mix asphalt. Compact by rolling to specified density and surface smoothness.

G. Protection: After final rolling, do not permit vehicular traffic on pavement until it has cooled and hardened. Erect barricades to protect paving from traffic until mixture has cooled enough not to become marked.

3.6 INSTALLATION TOLERANCES

A. Pavement Thickness: Compact each course to produce the thickness indicated within the following tolerances:

1. Surface Course: Plus 1/4 inch, no minus.

B. Pavement Surface Smoothness: Compact each course to produce a surface smoothness within the following tolerances as determined by using a 10-foot straightedge applied transversely or longitudinally to paved areas: Revise "Base Course" or "Surface Course" Subparagraph below to suit Project.

1. Surface Course: 1/8 inch.

2. Crowned Surfaces: Test with crowned template centered and at right angle to crown. Maximum allowable variance from template is 1/4 inch.

3.7 FIELD QUALITY CONTROL

A. Testing Agency: Owner will engage a qualified testing agency to perform tests and inspections.

B. Thickness: In-place compacted thickness of hot-mix asphalt courses will be determined according to ASTM D 3549.

C. Surface Smoothness: Finished surface of each hot-mix asphalt course will be tested for compliance with smoothness tolerances.

D. In-Place Density: Testing agency will take samples of uncompacted paving mixtures and compacted pavement according to ASTM D 979 or AASHTO T 168.

1. Reference maximum theoretical density will be determined by averaging results from four samples of hot-mix asphalt-paving mixture delivered daily to site, prepared according to ASTM D 2041, and compacted according to job-mix specifications.

2. In-place density of compacted pavement will be determined by testing core samples according to ASTM D 1188 or ASTM D 2726.

a. One core sample will be taken for every 1000 sq. yd. or less of installed pavement, with no fewer than three cores taken.

b. Field density of in-place compacted pavement may also be determined by nuclear method according to ASTM D 2950 and correlated with ASTM D 1188 or ASTM D 2726.

E. Remove and replace or install additional hot-mix asphalt where test results or measurements indicate that it does not comply with specified requirements.

END OF SECTION 321216

SECTION 329200 - TURF AND GRASSES

PART 1 - GENERAL

1.1 RELATED DOCUMENTS

A. The Standard Specifications for this section shall be the State of Connecticut Department of Transportation Standard Specifications for Roads, Bridges and Incidental Construction Form 816 supplemented and amended through the date of this project bid.

1.2 SUMMARY

A. Section Includes:

1. Seeding.
2. Turf renovation.

1.3 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.

B. Product Certificates: For fertilizers, from manufacturer.

C. Pesticides and Herbicides: Product label and manufacturer's application instructions specific to Project.

1.4 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 compliance with state and Federal laws, as applicable.

1.5 FIELD CONDITIONS

A. Coordinate installation of planting materials during normal planting seasons for each type of plant material required.

B. Weather Limitations: Proceed with planting only when existing and forecasted weather conditions permit planting to be performed. Apply products during favorable weather conditions according to manufacturer's written instructions.

PART 2 - PRODUCTS

2.1 SEED

A. Grass Seed: Fresh, clean, dry, new-crop seed complying with AOSA's "Rules for Testing Seeds" for purity and germination tolerances.

B. Lawn areas noted as “loam & seed” are all basic lawn areas. The seed mix is as follows:

60% Nassau Kentucky Bluegrass
20% Jamestown Chewings Fescue
20% Palmer Perennial Ryegrass

2.2 FERTILIZERS

A. 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.

PART 3 - EXECUTION

3.1 EXAMINATION

A. Examine areas to be planted for compliance with requirements and other conditions affecting installation and performance of the Work.

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. Suspend planting operations during periods of excessive soil moisture until the moisture content reaches acceptable levels to attain the required results.
3. Uniformly moisten excessively dry soil that is not workable or which is dusty.
4. Confirm finished grades have been achieved by topsoil.

B. Proceed with installation only after unsatisfactory conditions have been corrected.

3.2 PREPARATION

A. Protect structures; utilities; sidewalks; pavements; and other facilities, trees, shrubs, and plantings from damage caused by planting operations.

1. 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. Placing Planting Soil: Place and mix planting soil in place over exposed subgrade.

B. Moisten prepared area before planting if soil is dry. Water thoroughly and allow surface to dry before planting. Do not create muddy soil.

3.4 SEEDING

A. Sow seed with spreader or seeding machine. Do not broadcast or drop seed when wind velocity exceeds 5 mph. Sow seed at a total rate of 5 to 8 lb/1000 sq. ft.

B. Rake seed lightly into top 1/8 inch of soil, roll lightly, and water with fine spray.

C. Protect seeded areas with slopes not exceeding 1:6 by spreading straw mulch. Spread uniformly at a minimum rate to form a continuous blanket 1-1/2 inches in loose thickness over seeded areas.
   1. Utilize landscape netting over straw to hold in place. Stake netting for positive attachment to ground with decomposable landscaping stakes.
   2. Soak areas after installed to complete installation..

D. Renovate turf damaged by Contractor's operations, such as storage of materials or equipment and movement of vehicles.
   1. Reestablish turf where settlement or washouts occur or where minor regrading is required.
   2. Install new planting soil to support turf growth.

3.5 TURF MAINTENANCE

A. General: Maintain and establish turf by watering, fertilizing, weeding, mowing, trimming, replanting, 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. Watering: Schedule watering to prevent wilting, puddling, erosion, and displacement of seed or mulch. Water turf with fine spray at a minimum rate of 1 inch per week unless rainfall precipitation is adequate.
   2. Maintain until Satisfactory Turf is established. Perform initial cutting. Provide Post-fertilization after initial moweing.

B. Turf Postfertilization: Apply slow-release fertilizer after initial mowing and when grass is dry.
   1. Use fertilizer that provides actual nitrogen of at least 1 lb/1000 sq. ft. to turf area.

3.6 SATISFACTORY TURF

A. Turf installations shall meet the following criteria as determined by Engineer:
   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.

3.7 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. Remove surplus soil and waste material, including excess subsoil, unsuitable soil, trash, and debris, and legally dispose of them off Owner's property.

C. Erect and maintain temporary fencing or barricades and warning signs as required to protect newly planted areas from traffic. Repair damage to turf due to failure to protect work.

D. Remove nondegradable erosion-control measures after grass establishment period.

END OF SECTION 329200