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:

17 Elaine Road

Milford, CT 06460

DTC

2321 Whitney Avenue, Suite 301

Hamden, CT 06518

203-239-4200

Project #:1085

EQUAL HOUSING OPPORTUNITY

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Section 1 **ADVERTISEMENT FOR BIDS**

Project: Carlino Residence

DOH # 1085

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 Carlino Residence, 17 Elaine Road, Milford, CT 06460; Project #1085** will be received by **DTC, 2321 Whitney Avenue, Hamden, CT 06518** until **4:00** o'clock PM on **Wednesday, July 15, 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 DTC, 2321 Whitney Avenue, Hamden, Connecticut 06518 until **4:00** o'clock PM on **Wednesday, July 15, 2015** and then at said office publicly opened and read aloud. The envelopes containing the bids must be sealed, addressed to **DTC, 2321 Whitney Avenue, Hamden, Connecticut 06518** and designated as **Bid for Carlino Residence, 17 Elaine Road, Milford, Connecticut 06460 – Project Number 1085**.

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 **3:00 PM on Tuesday, June 30, 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: Michael P. Casey, Project Manager at DTC, michael.casey@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 # _____

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. #1085 and Addenda No. _____ and _____ thereto, as prepared by DTC, 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. #1085 located at 17 Elaine Road, in Milford, State of Connecticut, all in accordance with the Drawings and Specifications, for the sum of:

_____

AMOUNT IN WORDS

_____Dollars ($)

BREAKDOWN OF BID PRICES	Dollars and Cents
General Construction	$
Asbestos Abatement	$
Lead Abatement	$
Selective Demolition	$
Building Raising	$
Concrete Work	$
Carpentry & Framing	$
Insulation, Weather Barriers, & Sealants	$
Siding	$
Roofing	$
Doors, Openings	$
Wallboard Assemblies	$
Finishes and Painting	$
Mechanical & Plumbing	$
Electrical	$
Site Work	$
Contingency Allowance	$ 10,000.00
Sum: (Being inclusive of all the work and equal to the Sum as stated above)	$

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.

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 _____, 2014.

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 cooperation 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 cooperate 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 cooperative agreement; or the modification of any Federal contract, grant, loan, or cooperative 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 cooperative 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 June 19, 2014 is appended to this Document.

END OF SECTION 003132

ATTACHMENT

Geotechnical Study for Proposed New Foundation/Raising of

Carlino Residence, 17 Elaine Road, Milford CT

June 19, 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

June 19, 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 Carlino Residence
17 Elaine Road, Milford, CT

Dear Mr. Casey:

1.0 Herewith are the boring data pertaining to the above. One boring was drilled to a depth of 41.5 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.12. There is a VE20 flood zone located within 400±feet south of the residence. No survey or site plan of the subject lot was available at the time of this report. The existing grades on the lot are assumed to be at about Elev.8. The CTDEEP (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 by 1.25. It is assumed that first floor level would be 2 feet above the design flood or about Elev.17. 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 possible flood zone requirements,***

the proposed new or reconstruction residence could be supported on a spread footing type foundation.

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

Bituminous Concrete to 1.5"

FILL; fine to coarse SAND, some Gravel, little to some Silt to 5 feet, loose

Fine to coarse SAND, little Silt and Gravel to 8 feet, dense

Fine to medium to fine to coarse SAND, trace to little Silt, trace Gravel to about 25 feet, medium compact

Fine SAND, little to some Silt to 33 feet, medium compact

Stratified SILT and fine SAND to 41+ feet, dense

3.1 The **Water Table** was at 9 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 Milford, CT are $S_s = 0.253$ for a short period and $S_1 = .062$ for a 1 second period. The friction value for sliding of concrete against the soils can be 0.55.

5.0 Apart from possible FEMA requirements for design within a flood zone, the foundation for the new or reconstructed residence could be with spread footings. The footings should be on the natural undisturbed inorganic soils with the required preparation or on a controlled fill placed after the removal of any existing fills, disturbed soils and organic soils. There should be a minimum 6" of 3/8" crushed stone beneath the foundations. Based on the height of the first floor above the existing

ground and flood design requirement, it is assumed that the foundations will include individual piers up to the first floor level. To address possible localized scour or erosion the pier foundations could be tied together.

5.1 The **Allowable Bearing Pressure** for spread footings on the crushed stone over the natural inorganic soils or on a controlled fill can be 1.5 Tons/sf.

5.2 The **Frost Protection Depth (by code)** is 3.5 feet below finish grades in areas, which are exposed to weather.

5.3 Retaining walls, which are a part of the structure, should be designed using the at rest pressures. The pressure coefficient is cited in section 5.4 below.

5.4 The following is a **summary of the foundation design parameters**:

Parameter	Value
Soil Weight (Backfill)	125 pcf
At Rest Coefficient	0.45
Active Coefficient (with horizontal backfill)	0.28
Allowable Bearing Pressure	1.5 Tons/sf
Frost Protection Depth	3.5 feet
Sliding Coefficient	0.55
IBC Site Soil Profile Classification	"D"
Mapped MCE Spectral Acceleration S_s for a short period	0.253
Mapped MCE Spectral Acceleration S_1 for a 1 second period	0.062

6.0 Regarding **Controlled Compacted Structural Fill, Backfill of Excavations for Columns and Walls** 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.

DR. CLARENCE WELTI, PE, PC
P.O. BOX 397
GLASTONBURY, CONNECTICUT 06033 • (860) 633-4623

CLIENT DTC
PROJECT 17 Elaine Road Milford CT
SUBJECT Test Borings
BY MW DATE 6/4/08 SHEET NO.

Test Borings Location

CLARENCE WELTI ASSOC., INC.
P.O. BOX 397
GLASTONBURY, CONN 06033

CLIENT: DTC

PROJECT NAME: CARLINO RESIDENCE

LOCATION: 17 ELAINE ROAD, MILFORD, 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 9.0 FT. AFTER 0 HOURS
AT FT. AFTER HOURS

START DATE 6/4/14
FINISH DATE 6/4/14

DEPTH	SAMPLE NO.	BLOWS/6"	DEPTH	A	STRATUM DESCRIPTION + REMARKS	ELEV.
0					BITUMINOUS CONCRETE 0.1	
					BR. FINE-CRS. SAND, SOME GRAVEL, TRACE SILT 0.5	
	1	5-5-5-4	1.00'-3.00'		BR. FINE-CRS. SAND, SOME GRAVEL, LITTLE TO SOME SILT - FILL	
	2	3-1-2-4	3.00'-5.00'			
5	3	12-14-21-22	5.00'-7.00'		BR.FINE-CRS.SAND, LITTLE SILT & GRAVEL 5.0	
					GREY/BR. FINE-CRS. SAND, TRACE SILT & GRAVEL 8.0	
10	4	8-11-11	10.00'-11.50'			
					GREY/BR. FINE-MED.SAND, TRACE SILT 14.0	
15	5	4-8-12	15.00'-16.50'			
20	6	10-12-15	20.00'-21.50'		GREY/BR. FINE-MED. SAND, LITTLE SILT 20.0	
25	7	8-8-12	25.00'-26.50'		BR./GREY FINE SAND, SOME SILT 25.0	
30	8	15-28-42	30.00'-31.50'		GREY FINE-MED.SAND, LITTLE SILT 30.0	
					GREY SILT AND FINE SAND 33.0	
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: T. CZMYR
INSPECTOR:

CLARENCE WELTI ASSOC., INC. P.O. BOX 397 GLASTONBURY, CONN 06033	CLIENT DTC	PROJECT NAME CARLINO RESIDENCE LOCATION 17 ELAINE ROAD, MILFORD, CT.

DEPTH	SAMPLE NO.	SAMPLE BLOWS/6"	SAMPLE DEPTH	A	STRATUM DESCRIPTION + REMARKS	ELEV.
	9	15-19-20	35.00'-36.50'			
40	10	16-23-30	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: T. CZMYR
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 for storm damage repairs and renovations 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 Carlino Residence, OORR Project Number 1085.

1. Project Location: 17 Elaine Road, Milford, CT.

B. Owner: Joseph Carlino, 17 Elaine Road, Milford, CT.

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

D. Architect/Engineer: DTC, 2123 Whitney Avenue, Suite 301, Hamden, CT 06518.

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

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

1. This project generally includes repairs and mitigation work for a residential home damaged by Storm Sandy. The work entails the following as shown on the plans and specified herein:
   a. Environmental Abatement; Asbestos, Lead Abatement
   b. Selective Building Demolition and Foundations and Footings & misc. elements.
   c. Building Raising
   d. New Footings, Piers, Foundations & misc. supports.
   e. New Slab on Grade
   f. Structural Steel
   g. New Structural Framing & Repairs to Framing
   h. New Entry Stairs and Decks
   i. Alteration Work: Siding, Framing, Mechanical & Electrical, misc.
   j. Site Work; Excavation, Dewatering, Paving, Utility Work, Grading Loam & Seed

1.4 ACCESS TO SITE

A. General: Contractor shall limit his use of Project site to areas required to perform construction operations.

B. Condition of Existing Building: Maintain portions of existing building affected by construction operations in a weathertight condition throughout construction period. Repair damage caused by construction operations to include repairs to windows and doors for proper operation, repairs of cracks in walls, floors, or ceilings.

1.5 OWNER ACCESS

A. Owner has the right to access the property at any time during construction. Owner shall coordinate with Contractor and may 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.

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: Carpeting Allowance: Include the unit price of $4.00 per Square Foot for carpeting material selected by the owner. It is expected that 400 square feet of carpeting will be installed.

B. Allowance No. 2: 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 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 VALUES

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. Contractor's name and address.

e. 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 Engineer and paid.

B. Payment Application Times: Submit Application for Payment to the Engineer by the twenty-fifth [25th] 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 [7] days prior to due date for review by the Engineer.

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. Stored Materials: Include in Application for Payment amounts applied for materials or equipment purchased or fabricated and stored, but not yet installed. Differentiate between items stored on-site and items stored off-site.

1. Provide certificate of insurance, evidence of transfer of title to Owner, and consent of surety to payment, for stored materials.
2. Provide supporting documentation that verifies amount requested, such as paid invoices. Match amount requested with amounts indicated on documentation; do not include overhead and profit on stored materials.
3. Provide summary documentation for stored materials indicating the following:

    a. Value of materials previously stored and remaining stored as of date of previous Applications for Payment.
    b. Value of previously stored materials put in place after date of previous Application for Payment and on or before date of current Application for Payment.
    c. Value of materials stored since date of previous Application for Payment and remaining stored as of date of current Application for Payment.

F. 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.

G. 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. Sustainable design submittal for project materials cost data.
4. Contractor's construction schedule (preliminary if not final).
5. Combined Contractor's construction schedule (preliminary if not final) incorporating Work of multiple contracts, with indication of acceptance of schedule by each Contractor.
6. Products list (preliminary if not final).
7. Sustainable design action plans.
8. Schedule of unit prices.
9. Submittal schedule (preliminary if not final).
10. List of Contractor's staff assignments.
11. List of Contractor's principal consultants.

12. Copies of building permits.
13. Copies of authorizations and licenses from authorities having jurisdiction for performance of the Work.
14. Initial progress report.
15. Certificates of insurance and insurance policies.
16. Performance and payment bonds.
17. Data needed to acquire Owner's insurance.

H. Application for Payment at Substantial Completion: After Engineer 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.

I. 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.
9. Final liquidated damages settlement statement.

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. Coordination drawings.
3. Requests for Information (RFIs).
4. Project Web site.
5. 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 013200 "Construction Progress Documentation" for preparing and submitting Contractor's construction schedule.
2. Section 017300 "Execution" for procedures for coordinating general installation and field-engineering services, including establishment of benchmarks and control points.
3. Section 017700 "Closeout Procedures" for coordinating closeout of the Contract.

1.2 DEFINITIONS

A. RFI: Request from Owner, Engineer, 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.

B. Key Personnel Names: Within fifteen **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. Preinstallation 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 7 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 according to Section 012600 "Contract Modification Procedures."

    a. If Contractor believes the RFI response warrants change in the Contract Time or the Contract Sum, notify Engineer in writing within ten [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 fifteen 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 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, record Product Data and Operations and Maintenance Manuals.

1.2 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. 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.

1.3 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.

1.4 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. It is the responsibility of the contractor to indicate selections on the submittals. 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 013516 - ALTERATION PROJECT PROCEDURES

PART 1 - GENERAL

1.1 SUMMARY

A. Section includes special procedures for alteration work.

1.2 DEFINITIONS

A. Alteration Work: This term includes remodeling, renovation, repair, and maintenance work performed within existing spaces or on existing surfaces as part of the Project.

B. Dismantle: To remove by disassembling or detaching an item from a surface, using gentle methods and equipment to prevent damage to the item and surfaces; disposing of items unless indicated to be salvaged or reinstalled.

C. Match: To blend with adjacent construction and manifest no apparent difference in material type, species, cut, form, detail, color, grain, texture, or finish; as approved by Architect.

D. Refinish: To remove existing finishes to base material and apply new finish to match original, or as otherwise indicated.

E. Repair: To correct damage and defects, retaining existing materials, features, and finishes. This includes patching, piecing-in, splicing, consolidating, or otherwise reinforcing or upgrading materials.

F. Replace: To remove, duplicate, and reinstall entire item with new material. The original item is the pattern for creating duplicates unless otherwise indicated.

G. Replicate: To reproduce in exact detail, materials, and finish unless otherwise indicated.

H. Reproduce: To fabricate a new item, accurate in detail to the original, and from either the same or a similar material as the original, unless otherwise indicated.

I. Retain: To keep existing items that are not to be removed or dismantled.

J. Strip: To remove existing finish down to base material unless otherwise indicated.

1.3 QUALITY ASSURANCE

A. Title X Requirement: Each firm conducting activities that disturb painted surfaces shall be a "Lead-Safe Certified Firm" according to 40 CFR 745, Subpart E, and use only workers that are trained in lead-safe work practices.

B. Alteration Work Program: Prepare a written plan for alteration work for whole Project, including each phase or process and protection of surrounding materials during operations. Show compliance with indicated methods and procedures specified in this and other Sections. Coordinate this whole-Project alteration work program with specific requirements of programs required in other alteration work Sections.

1. Dust and Noise Control: Include locations of proposed temporary dust- and noise-control partitions and means of egress from occupied areas coordinated with continuing on-site operations and other known work in progress.

C. Safety and Health Standard: Comply with ANSI/ASSE A10.6.

1.4 STORAGE AND HANDLING OF SALVAGED MATERIALS

A. Salvaged Materials for Reinstallation:

1. Repair and clean items for reuse.
2. Protect items from damage during storage.
3. Reinstall items in locations indicated. Comply with installation requirements for new materials and equipment unless otherwise indicated. Provide connections, supports, and miscellaneous materials to make items functional for use indicated.

B. Existing Materials to Remain: Protect construction indicated to remain against damage and soiling from construction work. Where permitted by Architect, items may be dismantled and taken to a suitable, protected storage location during construction work and reinstalled in their original locations after alteration and other construction work in the vicinity is complete.

C. Storage: Store items within a weather tight enclosure where they are protected from moisture, weather, condensation, and freezing temperatures.
1. Secure stored materials to protect from theft.
2. Control humidity so that it does not exceed 85 percent. Maintain temperatures 5 deg F (3 deg C) or more above the dew point.

1.5 FIELD CONDITIONS

A. Survey of Existing Conditions: Record existing conditions that affect the Work by use of **preconstruction photographs.** Submit photographs to the Architect for project record.

B. Field Building Conditions: The existing building is an older construction. It is not the intent of the drawings to show the complete condition. The contractor shall consider all field conditions in his bid to provide complete work ready for use by the owner. Corners of the existing building shall be located so as not to encroach upon the existing building setback lines. Discrepancies: Notify Architect of discrepancies between existing conditions and Drawings before proceeding with removal and dismantling work.

1.6 Submittals:

A. Preconstruction Photographs.
B. Notices of Field Adjustments and Building and Plan Variations

PART 2 - PRODUCTS - (Not Used)

PART 3 - EXECUTION

3.1 PROTECTION

A. Protect persons, motor vehicles, surrounding surfaces of building, building site, plants, and surrounding buildings from harm resulting from alteration work.

1. Use only proven protection methods, appropriate to each area and surface being protected.

2. Provide temporary barricades, barriers, and directional signage to exclude the public from areas where alteration work is being performed.
3. Erect temporary barriers to form and maintain fire-egress routes.
4. Erect temporary protective covers over walkways and at points of pedestrian and vehicular entrance and exit that must remain in service during alteration work.
5. Contain dust and debris generated by alteration work, and prevent it from reaching the public or adjacent surfaces.
6. Provide shoring, bracing, and supports as necessary. Do not overload structural elements.
7. Protect floors and other surfaces along hauling routes from damage, wear, and staining.
8. Provide supplemental sound-control treatment to isolate demolition work from other areas of the building.

B. Temporary Protection of Materials to Remain:

1. Protect existing materials with temporary protections and construction. Do not remove existing materials unless otherwise indicated.
2. Do not attach temporary protection to existing surfaces except as indicated as part of the alteration work program.

C. Comply with each product manufacturer's written instructions for protections and precautions. Protect against adverse effects of products and procedures on people and adjacent materials, components, and vegetation.

D. Existing Roofing: Prior to the start of work in an area, install roofing protection.

3.2 PROTECTION FROM FIRE

A. General: Remove and keep area free of combustibles, including rubbish, paper, waste, and chemicals, unless necessary for the immediate work

B. Fire-Control Devices: Provide and maintain fire extinguishers, fire blankets, and rag buckets for disposal of rags with combustible liquids. Maintain each as suitable for the type of fire risk in each work area. Ensure that nearby personnel and the fire-watch personnel are trained in fire-extinguisher and blanket use.

3.3 PROTECTION DURING APPLICATION OF CHEMICALS

A. Protect motor vehicles, surrounding surfaces of building, building site, plants, and surrounding buildings from harm or spillage resulting from applications of chemicals and adhesives.

B. Cover adjacent surfaces with protective materials that are proven to resist chemicals selected for Project unless chemicals being used will not damage adjacent surfaces as indicated in alteration work program. Use covering materials and masking agents that are waterproof and UV resistant and that will not stain or leave residue on surfaces to which they are applied. Apply protective materials according to manufacturer's written instructions. Do not apply liquid masking agents or adhesives to painted or porous surfaces. When no longer needed, promptly remove protective materials.

C. Do not apply chemicals during winds of sufficient force to spread them to unprotected surfaces.

D. Neutralize alkaline and acid wastes and legally dispose of off Owner's property.

E. Collect and dispose of runoff from chemical operations by legal means and in a manner that prevents soil contamination, soil erosion, undermining of paving and foundations, damage to landscaping, or water penetration into building interior.

3.4 GENERAL ALTERATION WORK

A. Notify Architect of visible changes in the integrity of material or components whether from environmental causes including biological attack, UV degradation, freezing, or thawing or from structural defects including cracks, movement, or distortion.

1. Do not proceed with the work in question until directed by Architect.

END OF SECTION 013516

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.
   1. Contractor shall assume full responsibility for utilities during the construction period.

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: Contractor shall provide temporary water and sewer service. Provide connections and extensions of services as required for construction operations. Provide and pay for water usage during the construction period.

C. Electric Power Service Contractor shall provide temporary electric service. Provide connections and extensions of services as required for construction operations. Provide and pay for power during the construction period.

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.

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.

D. Hardboard Covering to protect existing surfaces to remain.

E. Boot covers shall be provided at entry doors and used by workers to protect existing flooring from dirt and debris.

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.

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. Provide and pay for power during the construction period.

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, provided stairs are cleaned and maintained in a condition acceptable to Owner. At Substantial Completion, restore stairs to condition existing before initial use.

1. Provide protective coverings, barriers, devices, signs, or other procedures to protect stairs and to maintain means of egress. If stairs become damaged, restore damaged areas so no evidence remains of correction work.

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 weather tight 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 occupied by Owner from fumes and noise.

1. Construct dustproof partitions with gypsum wallboard with joints taped on occupied side, and fire-retardant-treated plywood on construction operations side.

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 a FEMA Flood Certificate signed by licensed 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 of A-2, T-2 survey signed by land surveyor.

E. Final Property Survey: Submit Two (**2)** copies of A-2, T-2 Certified Surveys showing the Work performed and record survey data. Include as-built data. Submit copies of Certified survey data to the City of Milford as may be required under the building permit. File one copy in the public land records.

F. FEMA Flood Certificate: Provide a FEMA Flood Certificate for the property at completion of the work.

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 Engineer of locations and details of cutting and await directions from Engineer 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 Engineer'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 Engineer 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 Engineer 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 Engineer promptly.
   1. It is the intent of the contract to raise the existing building vertically and place it in its current horizontal location. The new foundations will require field layout of piers and footings to accommodate the field conditions. Contractor shall notify the Engineer of the field adjustments and their deviation from plan. Approval of layout of structural elements is subject to the approval of the Engineer.

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 Engineer 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 the Connecticut Land Surveyors Association and the authorities having jurisdiction.

C. Site Improvements: Locate and lay out site improvements, including pavements, grading, fill and topsoil placement, utility slopes, and rim and invert elevations.

D. Building Lines and Levels: Locate and lay out control lines and levels for structures, building foundations, column grids, and floor levels, including those required for mechanical and electrical work. Transfer survey markings and elevations for use with control lines and levels. Level foundations and piers from two or more locations.

E. Record Log: Maintain a log of layout control work. Record deviations from required lines and levels. Include beginning and ending dates and times of surveys, weather conditions, name and duty of each survey party member, and types of instruments and tapes used. Make the log available for reference by Engineer.

3.4 FIELD ENGINEERING

A. Reference Points: Locate existing permanent benchmarks, control points, and similar reference points before beginning the Work. Preserve and protect permanent benchmarks and control points during construction operations.

1. Do not change or relocate existing benchmarks or control points without prior written approval of Engineer. Report lost or destroyed permanent benchmarks or control points promptly.
2. Replace lost or destroyed permanent benchmarks and control points promptly. Base replacements on the original survey control points.

B. Benchmarks: Establish and maintain a minimum of **two** permanent benchmarks on Project site, referenced to data established by survey control points. Comply with authorities having jurisdiction for type and size of benchmark.

1. Record benchmark locations, with horizontal and vertical data, on Project Record Documents.
2. Where the actual location or elevation of layout points cannot be marked, provide temporary reference points sufficient to locate the Work.
3. Remove temporary reference points when no longer needed. Restore marked construction to its original condition.

C. Certified Survey: On completion of foundation walls, 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.

D. 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 a FEMA flood certificate for the property upon completion of the construction work.

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 Engineer.
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 weather tight 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 & EXISTING BUILDING ELEMENTS TO REMAIN.

A. Protect existing flooring and building components. Provide dust covers and barriers, temporary flooring protection including hardboard flooring and boot covers at entry doors.

B. Provide final protection and maintain conditions that ensure installed Work is without damage or deterioration at time of Substantial Completion.

C. 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
1. Protect items from damage during transport and storage and retrieval.
2. 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 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 Engineer'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, Engineer will either proceed with inspection or notify Contractor of unfulfilled requirements. Engineer 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 Engineer, 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 Engineer's Substantial Completion inspection list of items to be completed or corrected (punch list), endorsed and dated by Engineer. 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.

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, Engineer will either proceed with inspection or notify Contractor of unfulfilled requirements. Engineer 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 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. Operations and Maintenance Manuals
4. 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 OPERATIONS AND MAINTENANCE MANUAL

A. Preparation: Prepare an Operations and Maintenance Manual for owner's record. Include Manufacturer's operations and maintenance manuals. Include detailed maintenance information as well as cleaning instructions.
   1. Prepare Operations and Maintenance Manuals for:
      a. Equipment – Furnaces, Boilers, Water Heaters,
      b. Systems - Heat Trace Systems, Fire/Smoke Detection Systems
      c. Products – Flooring, Countertop

   2. Provide Model Numbers, Product Numbers and Serial Numbers of installed items.

   3. Give particular attention to information on concealed products and installations that cannot be readily identified and recorded later.
   4. 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 Paper Copy and annotated PDF electronic file.

2.4 MISCELLANEOUS RECORD SUBMITTALS

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

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 REMOVAL TECHNICAL SPECIFICATIONS

CARLINO RESIDENCE

SITE 011 – 17 ELAINE ROAD, MILFORD, CT

APPLICATION #1085

JUNE 2015

Prepared by

Daniel P. Sullivan

Accredited Asbestos Abatement Project Designer,
State of Connecticut, USEPA

Certificate # PD-001-405 Chem Scope Training Division

Licensed Asbestos Consultant, State of Connecticut DPH,
Project Designer License # 000096, Validation # 03-183828

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

CERT# PD-001 - 405

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

2/26/2015 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: 2/26/2015

Expiration Date: 2/26/2016

This training course has been accredited by the State of Connecticut

Ronald D. Arena
Training Manager

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

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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

DANIEL P. SULLIVAN

CERTIFICATE NO
000096

CURRENT THROUGH
04/30/16

VALIDATION NO
03-183828

SIGNATURE

COMMISSIONER

Section 020800

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PART 1 - BACKGROUND INFORMATION

1.1 REASON FOR THE WORK:

A. The asbestos removal at this facility is being done to accommodate the planned renovation to repair storm damage. The scope of the renovations involves:

1. Based on the storm damage, the house is scheduled to be renovated and raised. We understand the house suffered mainly from water and wind damage in relation to the storm and that the owner has already completed some repairs. The scope of the renovation work would involve disturbance of all flooring (except hardwood), disturbance of select walls, disturbance of select ceilings all on the first floor, and re-insulation of the crawlspace.

1.2 BUILDING DESCRIPTION:

A. The subject site is a single family, one-story with crawlspace, wood frame house, built in 1928, and totals approximately 1020 SF. The subject house suffered damage as a result of hurricane Sandy on October 29-30, 2012 and is scheduled to be renovated and raised.

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 17 Elaine Road, Milford, CT. The asbestos removal to be performed will be as needed to support the renovation 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 renovation must be removed prior to the renovation of the subject building. Except where noted, perform incidental demolition to access materials to be removed where removal is indicated.

D. 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 removal 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 and final completion of the removal. Final visual inspection will be conducted by a CT DPH Licensed Project Monitor for all removal work completed.

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

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

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

H. See Separate Lead Abatement Specifications and Preliminary Mold Assessment report for further details.

I. All replacement materials will be put in by others. Only non-asbestos replacement materials can be used.

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

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

L. 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 Contractor shall refer to the Asbestos Pre-Renovation 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 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 all ACM as delineated in Schedule A. The quantities (if given) of these materials in Schedule A are approximate. In all cases before removal, review the General Contractor's latest plans before doing any demolition to insure that materials to remain are not demolished.

D. If the ACM sink undercoat can be removed 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. If it is determined that the ACM sink undercoat will not be removed intact, then the abatement work must be done by a licensed asbestos abatement contractor using proper procedures and practices. In any case Asbestos Containing Materials (ACM) must be properly packaged and properly disposed of. Please see attached CT DPH Circular Letter #2003-10.

2.3 SCHEDULE A:

MATERIAL	***LOCATION***	***AMOUNT***
Gray crumbly ACM sink undercoat (from stainless steel sink)	1st Floor – Kitchen	5 SF
Gray hard granular ACM flue cement (on wood panel wall, formerly around metal flue pipe)	1st Floor – Kitchen	< 3 SF
Gray pliable linoleum on orange/black mastic on gray fibrous paper residue on **white/gray ACM floor tile debris** on plywood on white pliable non-ACM flooring with black non-ACM paper mastic on wood)	1st Floor – Bathroom	< 3 SF

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. Pre-existing damage to any equipment, fixture or surface in the area must be documented with narrative and photographs before the work by the Contractor and verified by the owner before project start.

B. 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 Contractor.

C. 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.

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

E. Protect all surfaces and equipment against damage. The Contractor shall be responsible for repairing any damage or marring caused to surfaces or equipment except surfaces to be abated. Clean all marks from surfaces left by glue, duct tape or otherwise restore and refinish, if necessary to restore surfaces.

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

G. Perform related work to access the window glazing materials to be removed including any necessary demolition.

H. The Contractor is responsible for proper disposal of all wastes.

I. Replacement will be done by others. **Use only Asbestos-free replacement materials.**

3.2 REMOVAL USING NEGATIVE PRESSURE ENCLOSURE GLOVEBAG PROCEDURES

A. This method pertains to the removal of < 3 sq ft of ACM material using the ventilated glove bag technique. Areas for removal will be marked by the Engineer prior to the work.

B. Removal Procedure:

1. Prepare the Work Area as an OSHA regulated area, excluding unauthorized personnel from the immediate area and installing warning signs.

2. Asbestos laborers involved in the negative pressure enclosure glovebag procedure shall wear two disposable suits, including gloves, hood and footwear, and respiratory protection in accordance with regulatory guidance. All street clothes shall be removed and stored in a Clean Room within the work site. The double layer disposable suit shall be worn during the installation of the negative pressure enclosure and throughout the procedure if a decontamination unit with a shower is not contiguous to the Work Area. If a decontamination unit (with Shower and Clean Room) is contiguous to the Work Area, only one layer of disposable personal protective equipment shall be required.

3. No disturbance of ACM shall occur during installation of the glovebag. This is a single use device that shall not be reused once dismantled or collapsed. The negative pressure enclosure shall be constructed of 6-mil plastic sheeting supported as necessary or secured to existing finishes, with seams double-folded, stapled and taped airtight and then taped flush with the adjacent negative pressure enclosure wall.

4. A centrally located remote Decontamination Facility shall be installed.

5. Demonstrate the tightness of the glove bag to the exterior wall surface. A critical barrier should be placed over the inside of the window frame.

6. During removal, periodically wet the inside surfaces of bag and any waste for better visibility and fiber control. Use cold water to prevent fogging.

7. During removal, periodically use HEPA-vacuum to compensate for any leaks and to reduce airborne fiber levels.

8. Remove all ACM, within the scope of work, within the glovebag.

9. After removal of the ACM, wash down all surfaces to below the levels where the bag will be sealed, and saturate the waste. Ensure the absence of residue.

10. Glove bags shall be used for only one operation and then be disposed of. Glove bag shall not be reused.

3.3 REMOVAL USING NEGATIVE PRESSURE MINI ENCLOSURE PROCEDURES

A. This method pertains to the removal of < 3 sq ft of ACM material using the ventilated glove bag technique. Areas for removal will be marked by the Engineer prior to the work.

B. Removal Procedure:

1. Prepare the Work Area as an OSHA regulated area, excluding unauthorized personnel from the immediate area and installing warning signs.

2. Asbestos laborers involved in the negative pressure mini-enclosure procedure shall wear two disposable suits, including gloves, hood and footwear, and respiratory protection in accordance with regulatory guidance. All street clothes shall be removed and stored in a Clean Room within the work site. The double layer disposable suit shall be worn during the installation of the negative pressure enclosure and throughout the procedure if a decontamination unit with a shower is not contiguous to the Work Area. If a decontamination unit (with Shower and Clean Room) is contiguous to the Work Area, only one layer of disposable personal protective equipment shall be required.

3. No disturbance of ACM shall occur during installation of the enclosure. This is a single use containment that shall not be reused once dismantled or collapsed. The negative pressure enclosure shall be constructed of 6-mil plastic sheeting supported as necessary or secured to existing finishes, with seams double-folded, stapled and taped airtight and then taped flush with the adjacent negative pressure enclosure wall.

4. A centrally located remote Decontamination Facility shall be installed.

5. Demonstrate the tightness of the enclosure to the exterior wall surface. A critical barrier should be placed over the inside of the window frame.

6. During removal, periodically wet the inside surfaces of the enclosure and any waste for better visibility and fiber control.

7. During removal, periodically use HEPA-vacuum to compensate for any leaks and to reduce airborne fiber levels.

8. Remove all ACM, within the scope of work, within the negative pressure enclosure.

9. After removal of the ACM, wash down all surfaces and saturate the waste. Ensure the absence of residue.

10. After removal is complete it must pass a visual inspection by a licensed project monitor.

11. The containment shall be used for only one operation and then be disposed of. The containment shall not be reused.

PART 4- DIVISION 1 – ASBESTOS REMOVAL

4.1 REGULATIONS:

A. The 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. 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
      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)
   3. 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. Contractor's Personal Air Samples: Personal air sampling shall be conducted by the 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.

C. Lab Qualifications:

1. Analysis of the air samples by NIOSH 7400 will be made by an 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.

4.3 CONTRACTOR QUALIFICATIONS AND TECHNICAL SUBMITTALS, PRE-WORK MEETING

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

1. Copies of worker training certificates for each employee, to be used for the project including a minimum of 16 hour OSHA Class III Training. 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.

2. Independent 3rd party certification that HEPA vacuums, and Negative Air units conform to ANSI Z9.2-1979 and that they are in reliable working order.

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

4. 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.

B. The 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 regulated 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.

B. Any existing damage: The Contractor shall submit to Owner in writing a list of any pre-existing damaged items on building and fixture condition prior to commencement of Work. The submittal shall include a photographic record of prior damage and/or deficiencies.

4.6 SAFETY AND SECURITY

A. 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. 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 Contractor will allow only authorized personnel into the work area.

4.7 WORKER PROTECTION TO BE PROVIDED

A. 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. The 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.

C. 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 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, 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 Regulated 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. Workers shall 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.

4.9 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 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.

4.10 NEIGHBORHOOD CONSIDERATIONS

A. Work will be conducted so as to avoid disturbing the neighborhood. 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. 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 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.

D. 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 Contractor shall have sufficient personal Air Monitoring equipment to monitor each type of activity in each Work Area.

B. The Contractor shall provide suitable tools for Asbestos Removal.

C. 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, ladders, shower units, Decontamination Enclosures, water filtration units and all other equipment required by Regulations and by this Specification.

4.13 PREPARATION OF THE 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. 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.

4.14 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.

4.15 INITIAL CLEARANCE INSPECTION

A. After cleaning the Work Area, the 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 Contractor shall repeat the cleaning at His expense until the Work Area is in compliance.

4.16 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 Contractor is in compliance with the OSHA asbestos standard cited herein.

2. 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 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 monitoring 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 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.

4.16 MULTI-EMPLOYER WORKSITES (CONT)

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.)

4.17 EXPOSURE ASSESSMENT

A Each employer, who has a workplace where asbestos removal 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 removal 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

4.18 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.

4.19 REINSTALLATION OF DISPLACED EQUIPMENT

A. Relocate objects moved to temporary locations in the course of the Work to their proper positions.

B. Re-secure mounted objects removed in the course of the Work in their former positions.

C. Re-establish HVAC, mechanical and electrical systems in proper working order and in conformance with all applicable building, mechanical and electrical codes.

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. *Encapsulation:* All herein specified procedures necessary to apply an encapsulant to Asbestos-containing building materials to control the possible release of Asbestos fibers into the ambient air. The practice of spraying water damaged, loose, or hanging Asbestos material is not considered a satisfactory control method and is not considered Encapsulation for the purposes of this Specification. Encapsulation requires the same work area prep as removal and includes all the steps specified as follows: a. Remove damaged, loose, or hanging areas of existing Asbestos material and place in sealable plastic bags for transport. b. Repair damaged and missing areas to obtain a suitable base for sealing using Asbestos free replacement material in accordance with manufacturer's instructions. c. Apply a final spray with Encapsulant.

V. *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:* Carlino

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.	1A	LOCATION OF ACM MATERIALS IN SCOPE OF WORK

APPENDIX A

ChemScope INDUSTRIAL HYGIENE • ENVIRONMENTAL CHEMISTRY
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Scott Feulner
Diversified Technology Consultants
2321 Whitney Avenue, Suite 301
Hamden CT 06518

5/14/2014

ASBESTOS PRE-RENOVATION INSPECTION
SITE 011 – 17 ELAINE ROAD, MILFORD CT
APPLICATION # 1085
CS#183-100, 4/30/2014, Page 1 of 5

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2	Introduction
3-4	Inspection Report Synopsis
4	Limitations of Inspection
5	Recommendations

Attachments:

- Scope of Inspection Drawing(s), 2 page(s)
- ACM Location Drawing(s), 1 page(s)
- 5/7/2014 – PLM Certificate of Analysis Report, 8 page(s)
- Chain of Custody Document, 2 page(s)
- Sample Location Drawing(s), 2 page(s)
- CT DPH Circular Letter #2003-10, 2 page(s)

Report Distribution:

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File Location:

NAS AAUM-Reports\AsbInsp\NY-PRERENO_2014.doc

INTRODUCTION

EXECUTIVE SUMMARY: Asbestos containing materials (ACM) were detected within the scope of this inspection and will need to be properly removed (abated) and disposed of prior to renovation 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. See Inspection Report Synopsis and Recommendation sections for further details.

BUILDING DESCRIPTION: The subject site is a single family, one-story with crawlspace, wood frame house, built in 1928, and totals approximately 1020 SF.

BACKGROUND: We understand the subject house suffered damage as a result of hurricane Sandy on October 29-30, 2012 and is scheduled to be renovated and raised. We also understand that the scope of the renovation work would involve disturbance of all flooring (except hardwood), disturbance of select walls, disturbance of select ceilings all on the first floor, and re-insulation of the crawlspace. Please see attached Scope of Inspection Drawings for details.

SCOPE OF INSPECTION: Asbestos Pre-Renovation Inspection at the subject house, as directed by our client.

Our work included the following:

- Collection and analysis of building materials within the scope of renovation 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-Renovation Inspection intended to identify the presence, location, and quantity of any asbestos containing building materials which are part of the Renovation 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, and is a Connecticut Approved Environmental Laboratory for Asbestos Analysis.

INSPECTION REPORT SYNOPSIS

LOCATION NAME AND ADDRESS: Site 011, Application # 1085
7 Elaine Road, Milford CT

INSPECTION DATE(S): 4/30/2014

QUALIFICATIONS: The Inspection was conducted by Nathan Yergeau (assisted by Ziyang Wang):

Mr. Yergeau is certified as follows:
- EPA and State of Connecticut Accredited Asbestos Inspector, Project Monitor and Project Designer.
- State of Connecticut Licensed Asbestos Inspector/Management Planner (#000298)
- State of Connecticut Licensed Asbestos Project Monitor (#000634)
- State of Connecticut Licensed Asbestos Project Designer (#000288)

FINDINGS:
The following asbestos containing materials (ACM) were detected within the Scope of the Inspection (cont):

MATERIAL	***LOCATION***	***~FOOTAGE***
INTERIOR:		
Gray hard granular ACM flue cement (on wood panel wall, formerly around metal flue pipe)	1st Floor – Kitchen	<3 SF
Gray crumbly ACM sink undercoat (from stainless steel sink)	1st Floor – Kitchen	5 SF
Gray pliable linoleum on orange/black mastic on gray fibrous paper residue on **white/gray ACM floor tile debris** on plywood on white pliable non-ACM flooring with black non-ACM paper mastic on wood)	1st Floor – Bathroom	<3 SF

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):

Location	Material	Sample #'s	Findings
Throughout	Gray powdery sheetrock with tan fibrous paper layers with white hard brittle taping compound (from walls and ceilings)	183-100-35,36, 37,38,39,40	No Asbestos Detected
Throughout	Beige hard brittle coating on brown fibrous ceiling board (on wood from under sheetrock ceiling)	183-100-3,4,5,6	No Asbestos Detected
Crawlspace	Beige fibrous paper with black tar coating (from fiberglass batt insulation)	183-100-1,2	No Asbestos Detected
1st Floor – Bathroom	Yellow hard pliable glue (from under vinyl wall tile on sheetrock wall)	183-100-8,9	No Asbestos Detected

INSPECTION REPORT SYNOPSIS (CONT)

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):

Location	Material	Sample #'s	Findings
1st Floor – Kitchen	Off white with blue streaks linoleum with brown fibrous jute backing (on wood shelf)	183-100-10,11	No Asbestos Detected
1st Floor – Kitchen	Blue/white self adhesive 12x12 floor tile on white 9x9 floor tile with black paper mastic on off white linoleum with gray/black fibrous backing (on wood)	183-100-14,15, 16,17,18,19,20, 44	No Asbestos Detected
1st Floor – Kitchen	Beige hard brittle patch compound (on brown fibrous ceiling board)	183-100-7	No Asbestos Detected
1st Floor – Rear Hallway	Beige pliable self adhesive linoleum (on plywood) with black fibrous paper residue (on hardwood)	183-100-21,22, 23	No Asbestos Detected
1st Floor - Bathroom	Gray pliable linoleum on orange/black mastic with gray fibrous paper residue (with white/gray floor tile residue) on wood on white pliable flooring on black paper mastic (on wood)	183-100-24,25, 26,27,28,29,31, 32,33,34	No Asbestos Detected
1st Floor – Living Room	Gray soft fibrous insulation (from behind sheetrock and wood panel wall)	183-100-41,42, 43	No Asbestos Detected

LIMITATIONS OF THE INSPECTION

It is important to note that every effort is made to detect asbestos (ACM) in the path of the renovation by our inspectors. It is not practical or prudent to demolish the entire floor, wall, and ceiling systems during an inspection. The owner should be aware of this in case suspect materials or other 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 renovation, or if the scope of the renovation changes to include disturbance of new materials not inspected, then renovation must stop and the materials must be sampled by a CT DPH licensed asbestos inspector prior to disturbance of these materials.

The following materials/areas were not in the scope of this inspection:

1. Underneath hardwood floors
2. Window components
3. Exterior materials
4. Mechanical/heating components

RECOMMENDATIONS

All Asbestos Containing Materials (ACM) detected in the path of the renovation must be removed prior to disturbance of these materials during the renovation of this site.

Asbestos removal is regulated by federal and state agencies. The abatement work must be done by a licensed asbestos abatement contractor using proper procedures and practices, including containment, decontamination facilities and negative air units. Final re-occupancy testing is also required (if the building is going to be reoccupied after the asbestos removal) for removal of greater than three (3) sq ft or linear ft of ACM.

For the ACM sink undercoat: If the ACM sink undercoat can be removed 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. If it is determined that the ACM sink undercoat will not be removed intact, then the abatement work must be done by a licensed asbestos abatement contractor using proper procedures and practices. In any case Asbestos Containing Materials (ACM) must be properly packaged and properly disposed of. Please see attached CT DPH Circular Letter #2003-10.

For the <3 SF of ACM flue cement and floor tile: The work may be done as outlined in CT DPH regulations 19a-332a-10 for spot repairs. CT DPH defines a spot repair as any asbestos abatement performed within a facility involving not more than three (3) linear feet or three (3) square feet of asbestos containing material. Final re-occupancy testing is not required, as the amount of asbestos being removed is less than 3 square feet.

Notification to the DPH is required for asbestos abatement involving greater than 10 linear feet or 25 square feet of ACM when renovation or demolition activities are performed. Disposal of all ACM is regulated by EPA and the Connecticut DEEP; an EPA approved landfill must be used.

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.

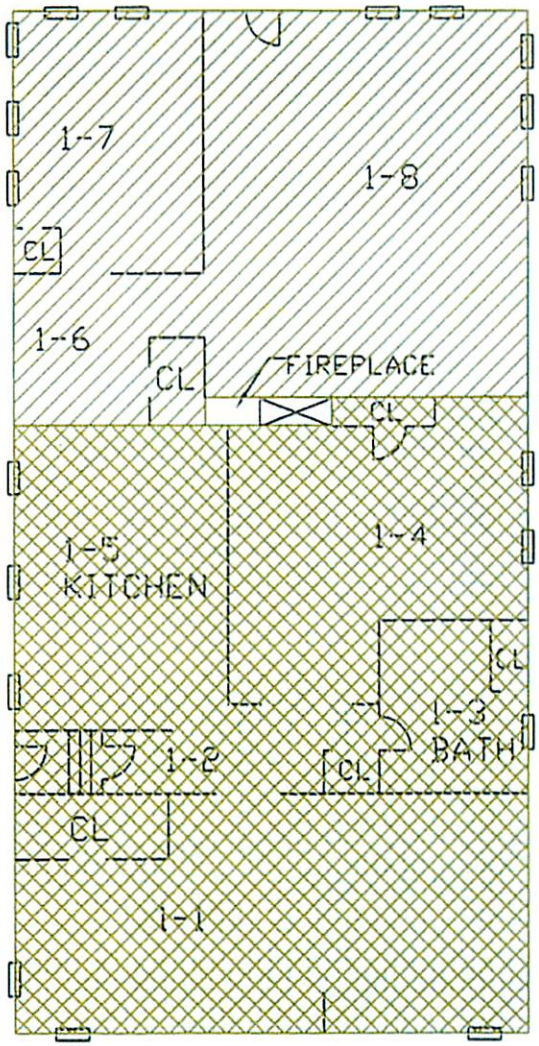
If you have any questions or need further information please call me.

Sincerely,

Nathan Yergeau
Assistant Field Operations Manager

ChemScope Inc.

Site 011
17 Elaine Road, Milford, CT
Main Floor
CS# 183-100, 4-30-2014



Scope of Inspection Drawing

Location of walls to be replaced within scope of inspection

Location of floors (except hardwood), walls, and ceilings to be replaced within scope of inspection

LEGEND OF SYMBOLS

NOTATIONS

DRAWN BY:
LEIGH HONOROF

ChemScope Inc.

SHEET TITLE:

ASBESTOS, LEAD & MOLD INSPECTION

17 ELAINE RD
MILFORD, CT

MAIN FLOOR

CHEMSCOPE NUMBER:	DRAWING NUMBER
CS# 183-100	1
SCALE: NOT TO SCALE	
DATE: 4/30/14	

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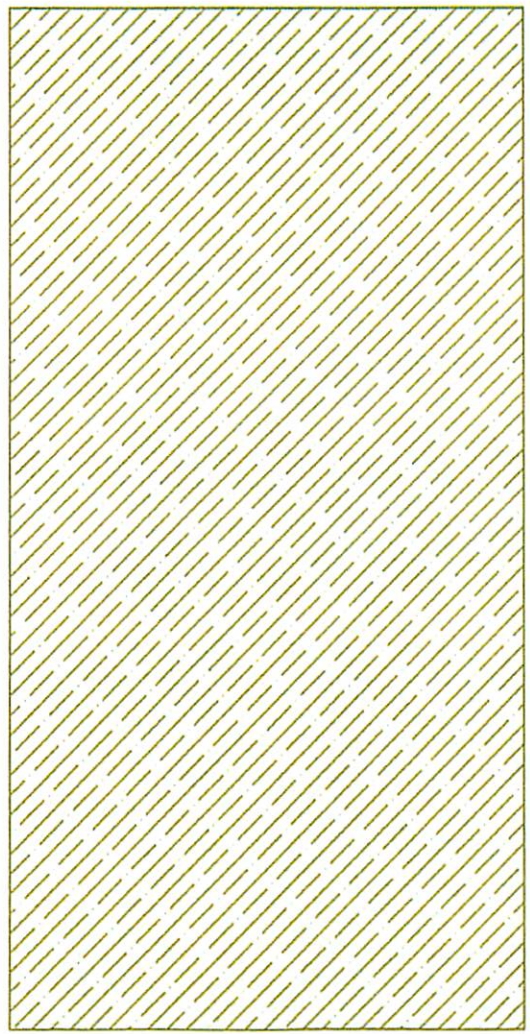
Site 011
17 Elaine Road, Milford, CT
Crawlspace
CS# 183-100, 4-30-2014

Scope of Inspection Drawing



Location of crawlspace to be re-insulated within scope of inspection

LEGEND OF SYMBOLS

NOTATIONS

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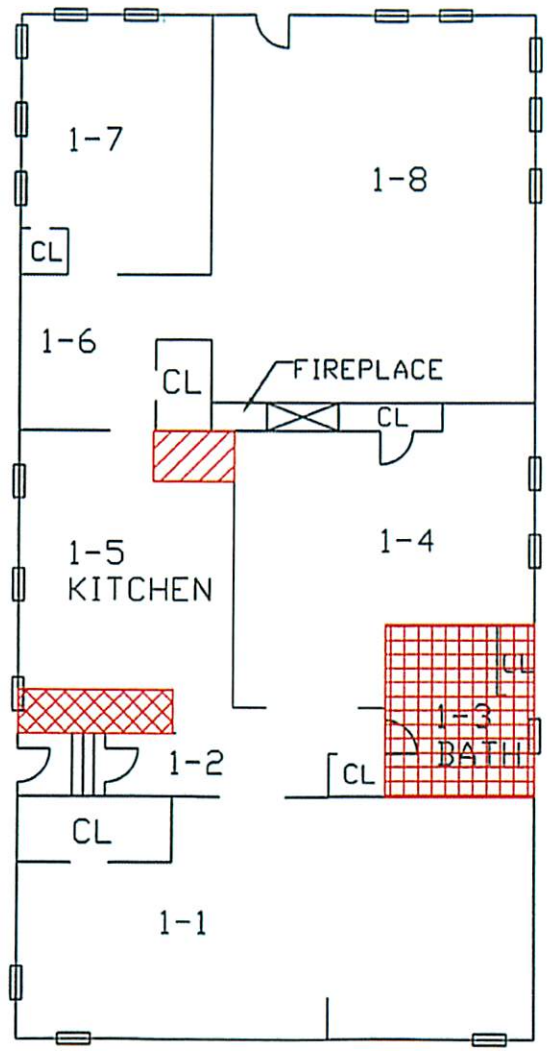
MILFORD, CT

CRAWLSPACE

CHEMSCOPE NUMBER:	DRAWING NUMBER
CS# 183-100	2
SCALE: NOT TO SCALE	
DATE: 4/30/14	

ChemScope Inc.

Site 011
17 Elaine Road, Milford, CT
Main Floor
CS# 183-100, 4-30-2014



ACM Location Drawing

Approx. location of gray hard granular ACM flue cement (on wood panel wall and chimney, formerly around metal flue pipe)

Approx. location of gray crumbly ACM sink undercoat (from stainless steel sink)

Approx. location of gray pliable linoleum on orange/black mastic on gray fibrous paper residue on whtie/gray ACM floor tile debris (on plywood) on white pliable flooring on black paper mastic (on wood)

LEGEND OF SYMBOLS

NOTATIONS

DRAWN BY:
LEIGH HONOROF

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SHEET TITLE:

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17 ELAINE RD
MILFORD, CT

MAIN FLOOR

CHEMSCOPE NUMBER:	DRAWING NUMBER
CS# 183-100	1
SCALE: NOT TO SCALE	
DATE: 4/30/14	

ChemScope INDUSTRIAL HYGIENE • ENVIRONMENTAL CHEMISTRY
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Certificate Of Analysis

Diversified Technology Consultants (DTC) - Scott Feulner
2321 Whitney Avenue
Suite 301
Hamden CT 06518

5/7/2014
CS# 183-100

Bulk sample(s) from Site 011, Application #1085, 17 Elaine Road, Milford, CT collected by Nathan Yergeau on 4/30/2014

Asbestos Identification in the samples. Examination made by Polarized Light Microscopy (PLM) per EPA Test Method 600/R-93/116

Sample Identification	Findings (Analyzed 5/7/14)
183-100-1 Beige fibrous paper with black tar coating (from fiberglass batt insulation (11)) / Crawlspace	*No Asbestos Detected* *7% Non- Fibrous Particles* *70% Volatile on Ignition* *23% Mineral Wool*
183-100-2 Beige fibrous paper with black tar coating (from fiberglass batt insulation (12)) / Crawlspace	*No Asbestos Detected* *11% Non- Fibrous Particles* *72% Volatile on Ignition* *17% Mineral Wool*
183-100-3 Beige hard brittle coating (on brown fibrous ceiling board on wood from under sheetrock ceiling) / Rear Hallway	*No Asbestos Detected* *59% Non- Fibrous Particles* *41% Volatile on Ignition*
183-100-4 Beige hard brittle coating (on brown fibrous ceiling board on wood from under sheetrock ceiling) / Kitchen	*No Asbestos Detected* *64% Non- Fibrous Particles* *36% Volatile on Ignition*
183-100-5 Brown fibrous ceiling board (from sample # 3) / Rear Hallway	*No Asbestos Detected* *8% Non- Fibrous Particles* *92% Volatile on Ignition*

Bulk sample(s) from Site 011, Application #1085, 17 Elaine Road, Milford, CT collected by Nathan Yergeau on 4/30/2014

Asbestos Identification in the samples. Examination made by Polarized Light Microscopy (PLM) per EPA Test Method 600/R-93/116

Sample Identification	**Findings (Analyzed 5/7/14)**
183-100-6 Brown fibrous ceiling board (from sample # 4) / Kitchen	*No Asbestos Detected* *8% Non- Fibrous Particles* *92% Volatile on Ignition*
183-100-7 Beige hard brittle patch compound (on brown fibrous ceiling board) / Kitchen	*No Asbestos Detected* *58% Non- Fibrous Particles* *42% Volatile on Ignition* *<1% Wollastonite*
183-100-8 Gray hard granular flue cement (on wood panel wall, formerly around metal flue pipe) / Kitchen	*32% Chrysotile Asbestos* *58% Non- Fibrous Particles* *8% Volatile on Ignition* *2% Wollastonite*
183-100-9 Yellow hard pliable glue (from under vinyl wall tile on sheetrock wall) / Bathroom	*No Asbestos Detected* *60% Non- Fibrous Particles* *40% Volatile on Ignition*
183-100-10 Yellow hard pliable glue (from under vinyl wall tile on sheetrock wall) / Bathroom	*No Asbestos Detected* *49% Non- Fibrous Particles* *51% Volatile on Ignition*
183-100-11 Gray crumbly sink undercoat (from stainless steel sink) / Kitchen	*18% Chrysotile Asbestos* *71% Non- Fibrous Particles* *11% Volatile on Ignition*
183-100-12 Off white with blue streaks linoleum with brown fibrous jute backing (on wood shelf) / Kitchen	*No Asbestos Detected* *42% Non- Fibrous Particles* *58% Volatile on Ignition*

Bulk sample(s) from Site 011, Application #1085, 17 Elaine Road, Milford, CT collected by Nathan Yergeau on 4/30/2014

Asbestos Identification in the samples. Examination made by Polarized Light Microscopy (PLM) per EPA Test Method 600/R-93/116

Sample Identification	**Findings (Analyzed 5/7/14)**
183-100-13 Off white with blue streaks linoleum with brown fibrous jute backing (on wood shelf) / Kitchen	*No Asbestos Detected* *43% Non- Fibrous Particles* *57% Volatile on Ignition*
183-100-14 Blue/white self adhesive 12x12 floor tile (on white 9x9 floor tile with black paper mastic on off white linoleum with gray/black fibrous backing on wood) / Kitchen	*No Asbestos Detected* *84% Non- Fibrous Particles* *16% Volatile on Ignition*
183-100-15 Blue/white self adhesive 12x12 floor tile (on white 9x9 floor tile with black paper mastic on off white linoleum with gray/black fibrous backing on wood) / Kitchen	*No Asbestos Detected* *85% Non- Fibrous Particles* *15% Volatile on Ignition*
183-100-16 White 9x9 floor tile (from sample # 14) / Kitchen	*No Asbestos Detected* *73% Non- Fibrous Particles* *27% Volatile on Ignition*
183-100-17 White 9x9 floor tile (from sample # 15) / Kitchen	*No Asbestos Detected* *71% Non- Fibrous Particles* *29% Volatile on Ignition*
183-100-18 Black paper mastic (from sample # 14) / Kitchen	*No Asbestos Detected* *22% Non- Fibrous Particles* *78% Volatile on Ignition*
183-100-19 Black paper mastic (from sample # 15) / Kitchen	*No Asbestos Detected* *25% Non- Fibrous Particles* *75% Volatile on Ignition*

Bulk sample(s) from Site 011, Application #1085, 17 Elaine Road, Milford, CT collected by Nathan Yergeau on 4/30/2014

Asbestos Identification in the samples. Examination made by Polarized Light Microscopy (PLM) per EPA Test Method 600/R-93/116

Sample Identification	**Findings (Analyzed 5/7/14)**
183-100-20 Off white linoleum with gray/black fibrous backing (from sample # 15) / Kitchen	*No Asbestos Detected* *42% Non- Fibrous Particles* *58% Volatile on Ignition*
183-100-21 Beige pliable self adhesive linoleum (on plywood on black fibrous paper residue on hardwood) / Rear Hallway	*No Asbestos Detected* *6% Non- Fibrous Particles* *71% Volatile on Ignition* *23% Fiberglass*
183-100-22 Beige pliable self adhesive linoleum (on plywood on black fibrous paper residue on hardwood) / Rear Hallway	*No Asbestos Detected* *6% Non- Fibrous Particles* *71% Volatile on Ignition* *23% Fiberglass*
183-100-23 Black fibrous paper residue (from sample # 21) / Rear Hallway	*No Asbestos Detected* *28% Non- Fibrous Particles* *72% Volatile on Ignition*
183-100-24 Gray pliable linoleum (on orange/black mastic with gray fibrous paper residue and with white/gray floor tile debris on plywood on white pliable flooring with black paper mastic on hardwood) / Bathroom	*No Asbestos Detected* *7% Non- Fibrous Particles* *64% Volatile on Ignition* *29% Fiberglass*
183-100-25 Gray pliable linoleum (on orange/black mastic with gray fibrous paper residue and with white/gray floor tile debris on plywood on white pliable flooring with black paper mastic on hardwood) / Bathroom	*No Asbestos Detected* *7% Non- Fibrous Particles* *65% Volatile on Ignition* *28% Fiberglass*
183-100-26 Orange/black mastic (from sample # 24) / Bathroom	*No Asbestos Detected* *42% Non- Fibrous Particles* *58% Volatile on Ignition*

Bulk sample(s) from Site 011, Application #1085, 17 Elaine Road, Milford, CT collected by Nathan Yergeau on 4/30/2014

Asbestos Identification in the samples. Examination made by Polarized Light Microscopy (PLM) per EPA Test Method 600/R-93/116

Sample Identification	**Findings (Analyzed 5/7/14)**
183-100-27 Orange/black mastic (from sample # 25) / Bathroom	*No Asbestos Detected* *42% Non- Fibrous Particles* *58% Volatile on Ignition*
183-100-28 Gray fibrous paper residue (from sample # 24) / Bathroom	*No Asbestos Detected* *27% Non- Fibrous Particles* *50% Volatile on Ignition* *23% Fiberglass*
183-100-29 Gray fibrous paper residue (from sample # 25) / Bathroom	*No Asbestos Detected* *26% Non- Fibrous Particles* *52% Volatile on Ignition* *22% Fiberglass*
183-100-30 White/gray floor tile debris (from sample # 24) / Bathroom	*9% Chrysotile Asbestos (point counted)* *61% Non- Fibrous Particles* *30% Volatile on Ignition*
183-100-31 White pliable flooring (from sample # 24) / Bathroom	*No Asbestos Detected* *70% Non- Fibrous Particles* *30% Volatile on Ignition*
183-100-32 White pliable flooring (from sample # 25) / Bathroom	*No Asbestos Detected* *70% Non- Fibrous Particles* *30% Volatile on Ignition*
183-100-33 Black paper mastic (from sample # 24) / Bathroom	*No Asbestos Detected* *35% Non- Fibrous Particles* *65% Volatile on Ignition*

Bulk sample(s) from Site 011, Application #1085, 17 Elaine Road, Milford, CT collected by Nathan Yergeau on 4/30/2014

Asbestos Identification in the samples. Examination made by Polarized Light Microscopy (PLM) per EPA Test Method 600/R-93/116

Sample Identification	**Findings (Analyzed 5/7/14)**
183-100-34 Black paper mastic (from sample # 25) / Bathroom	*No Asbestos Detected* *49% Non- Fibrous Particles* *51% Volatile on Ignition*
183-100-35 Gray powdery sheetrock with tan fibrous paper layers (with white hard brittle taping compound on brown fibrous ceiling board on wood from ceiling) / Kitchen	*No Asbestos Detected* *77% Non- Fibrous Particles* *23% Volatile on Ignition*
183-100-36 Gray powdery sheetrock with tan fibrous paper layers (with white hard brittle taping compound on wood from wall) / Front Bedroom	*No Asbestos Detected* *79% Non- Fibrous Particles* *21% Volatile on Ignition*
183-100-37 Gray powdery sheetrock with tan fibrous paper layers (with white hard brittle taping compound on wood from wall) / Bathroom	*No Asbestos Detected* *73% Non- Fibrous Particles* *27% Volatile on Ignition*
183-100-38 White hard brittle taping compound (from sample # 35) / Kitchen	*No Asbestos Detected* *93% Non- Fibrous Particles* *7% Volatile on Ignition*
183-100-39 White hard brittle taping compound (from sample # 36) / Front Bedroom	*No Asbestos Detected* *95% Non- Fibrous Particles* *5% Volatile on Ignition*
183-100-40 White hard brittle taping compound (from sample # 37) / Bathroom	*No Asbestos Detected* *86% Non- Fibrous Particles* *14% Volatile on Ignition*

Bulk sample(s) from Site 011, Application #1085, 17 Elaine Road, Milford, CT collected by Nathan Yergeau on 4/30/2014

Asbestos Identification in the samples. Examination made by Polarized Light Microscopy (PLM) per EPA Test Method 600/R-93/116

Sample Identification	**Findings (Analyzed 5/7/14)**
183-100-41 Gray soft fibrous insulation (from behind sheetrock on wood paneling wall) / Living Room	*No Asbestos Detected* *14% Non- Fibrous Particles* *86% Volatile on Ignition*
183-100-42 Gray soft fibrous insulation (from behind sheetrock on wood paneling wall) / Living Room	*No Asbestos Detected* *22% Non- Fibrous Particles* *78% Volatile on Ignition*
183-100-43 Gray soft fibrous insulation (from behind sheetrock on wood paneling wall) / Living Room	*No Asbestos Detected* *19% Non- Fibrous Particles* *81% Volatile on Ignition*
183-100-44 Off white linoleum with gray/black fibrous backing (from sample # 14) / Kitchen	*No Asbestos Detected* *40% Non- Fibrous Particles* *60% 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 011

Sample Source: 17 Elaine Road, Milford, CT CS Job CS# 183-100

Sampled by: [illegible] Date Sampled: 4/30/14 Customer Name: Diversified Technology Consultants (DTC) -

CS Sample#	Client Sample#	Sample Description	Comments
183-100-(1-43)			
*See Attached			

Sample Turnaround: 1 week

Analysis Requested(if variable, use comment column) PLM

Check if you want sample returned ____ (sampled will be disposed of after 30 days).

Relinquished by [illegible] Date 5/1/14 Time 1055 am Received by Lab Inbox
Relinquished by _____ Date _____ Time _____ Received by _____

Other Special Instructions: _____

Result Transmittal Instructions (for Chem Scope to transmit): Tell Ny

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.

COC-1 revised 11/1/13
(Issued By SC)

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:
_____

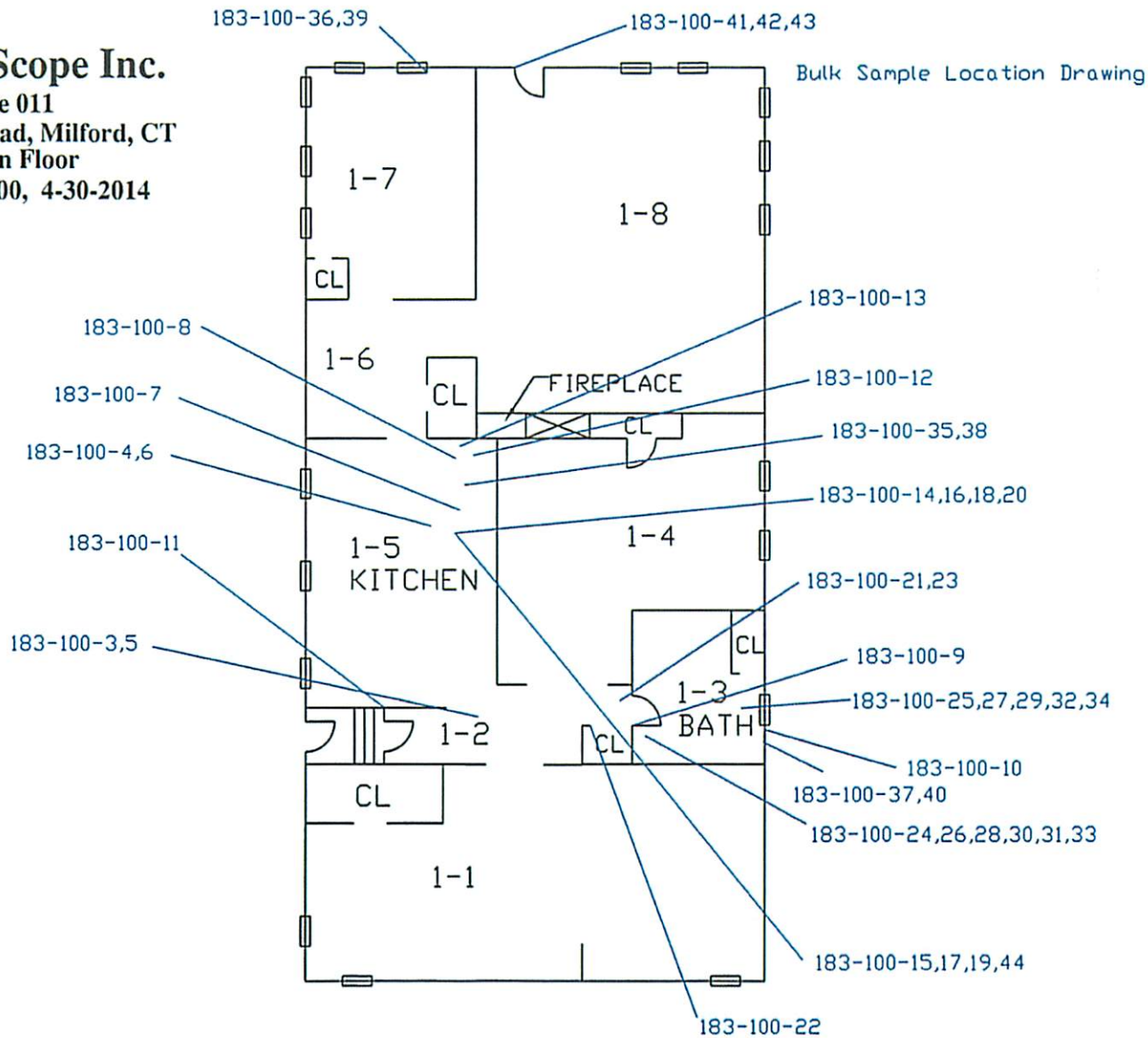
Name _____ Company _____

Address _____ Telephone/e-mail _____

Can we contact you regarding this survey? ☐ YES ☐ NO

ChemScope Inc.

Site 011
17 Elaine Road, Milford, CT
Main Floor
CS# 183-100, 4-30-2014



LEGEND OF SYMBOLS

NOTATIONS

DRAWN BY:
LEIGH HONOROF

ChemScope Inc.

SHEET TITLE:

ASBESTOS, LEAD & MOLD INSPECTION

17 ELAINE RD
MILFORD, CT

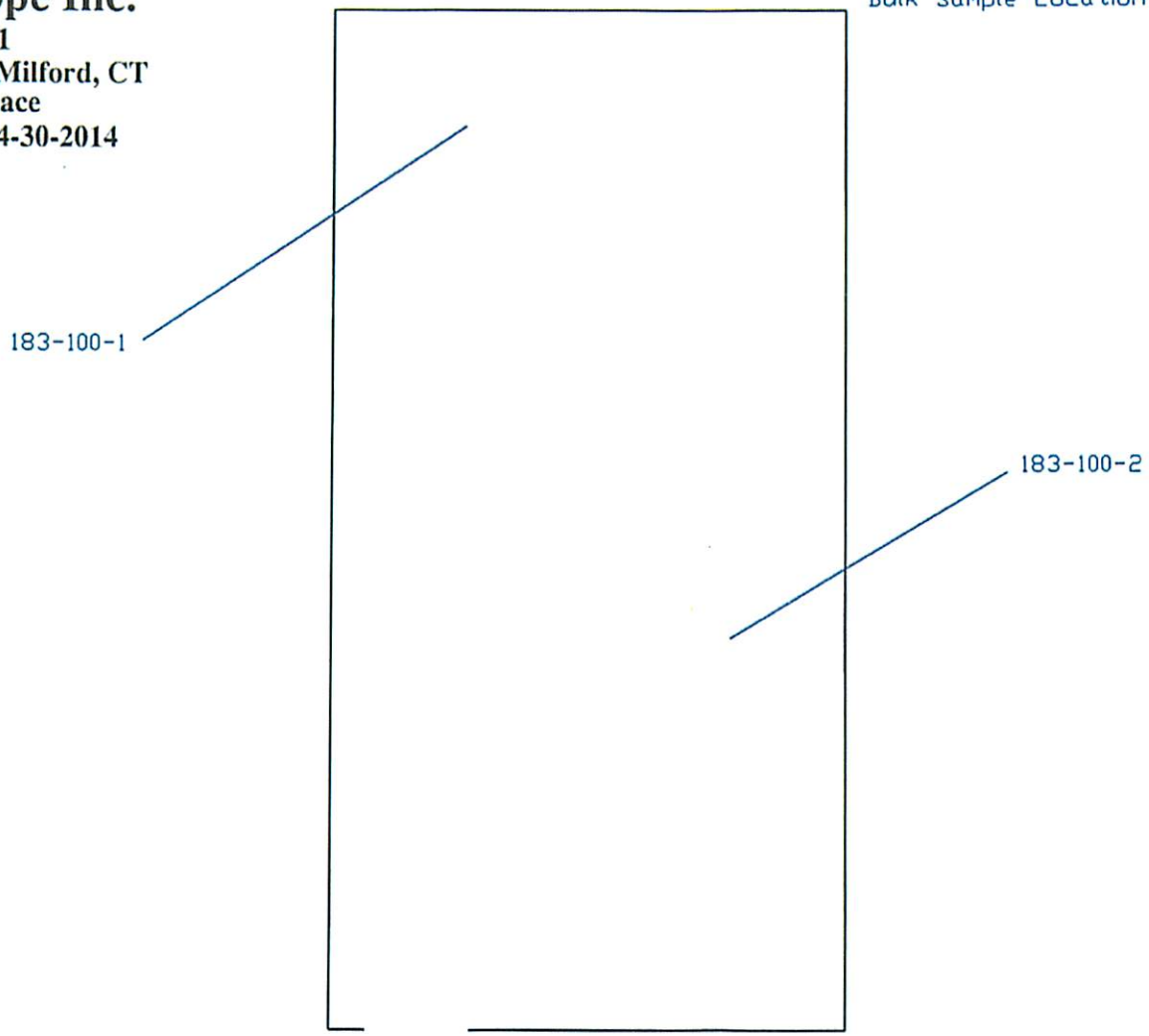
MAIN FLOOR

CHEMSCOPE NUMBER:	DRAWING NUMBER
CS# 183-100	1
SCALE: NOT TO SCALE	
DATE: 4/30/14	

ChemScope Inc.

Site 011
17 Elaine Road, Milford, CT
Crawlspace
CS# 183-100, 4-30-2014

Bulk Sample Location Drawing



N

LEGEND OF SYMBOLS

NOTATIONS

DRAWN BY:
LEIGH HONOROF

ChemScope Inc.

SHEET TITLE:

ASBESTOS, LEAD & MOLD INSPECTION

17 ELAINE RD
MILFORD, CT

CRAWLSPACE

CHEMSCOPE NUMBER:	DRAWING NUMBER
CS# 183-100	2
SCALE: NOT TO SCALE	
DATE: 4/30/14	

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) 509-7378
Telephone Device for the Deaf (860) 509-7191
410 Capitol Avenue - MS # 51 AIR
P.O. Box 340308 Hartford, CT 06134
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.

LEAD ABATEMENT TECHNICAL SPECIFICATIONS

CARLINO RESIDENCE

SITE 011 – 17 ELAINE ROAD, MILFORD, CT

APPLICATION #1085

JUNE 2015

Prepared by

Daniel P. Sullivan

Accredited Lead Planner Designer,
State of Connecticut, USEPA

Certificate # L-700-281 Chem Scope Training Division

Licensed Lead Consultant, State of Connecticut DPH,
Lead Planner Designer License # 002124, Validation # 03-183824

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

LEAD PLANNER/PROJECT DESIGNER

DANIEL P. SULLIVAN

CERTIFICATE NO
002124

CURRENT THROUGH
04/30/16

VALIDATION NO
03-183824

SIGNATURE

COMMISSIONER

CERT# L-700 - 281

CHEMSCOPE TRAINING DIVISION

LEAD PLANNER DESIGNER REFRESHER

8HOUR TRAINING CERTIFICATE

Daniel P. Sullivan

15 Moulthrop Street , North Haven CT

Has attended an 8 hour Course on the subject discipline in English on

11/13/2014 and has passed a written and hands on skills examination.

The above named individual has successfully completed the above training course approved in accordance with the Department of Public Health Standards established pursuant to Section 20-477 of the Connecticut General Statutes.

Course syllabus includes all required topics of the State of Connecticut DPH and EPA.

Examination Date: 11/13/2014

Expiration Date: 11/13/2015

Under civil and criminal penalties of law for the making or submission of false or fraudulent statements or representations (U.S.C. 1001 and 15 U.S.C. 2615), I certify that this training complies with all applicable requirements of Title IV of TSCA, 40 CFR part 745 and any other applicable Federal, State, or local requirements.

Ronald D. Arena
Training Manager

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

© GOES 340

Litho in U.S.A.

Section 020900

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TABLE OF CONTENTS

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PART 2	3-6	LEAD SCOPE OF WORK
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PART 5	27	LIST OF DRAWINGS
ATTACHED	28	APPENDIX A PRE-REHABILITATION LEAD HAZARD RISK ASSESSMENT & LEAD BASED PAINT PRE-RENOVATION XRF SCREENING REPORT (50 PAGES)

PART 1 BACKGROUND INFORMATION

1.1 REASON FOR THE WORK:

A. The lead abatement at this residence is being done to accommodate the planned renovation to repair storm damage. The scope of the renovations involves:

1. Based on the storm damage, the house is scheduled to be renovated and raised. We understand the house suffered mainly from water and wind damage in relation to the storm and that the owner has already completed some repairs. The scope of the renovation work would involve disturbance of all flooring (except hardwood), disturbance of select walls, disturbance of select ceilings all on the first floor, and re-insulation of the crawlspace.

2. Based on Chem Scope's Pre-Rehabilitation Lead Hazard Risk Assessment & Lead Based Paint Pre-Renovation XRF Screening Report (CS#183-100, dated 7/18/2014), it was found that lead-based surface coatings (paint) and Lead Based Paint Hazards (dust and soil) were present at the subject property as of the date of the Assessment.

1.2 BUILDING DESCRIPTION:

A. The subject site is a single family, one-story with crawlspace, wood frame house, built in 1928, and totals approximately 1020 SF. The subject house suffered damage as a result of hurricane Sandy on October 29-30, 2012 and is scheduled to be renovated and raised. At the time of the Lead Risk Assessment (6/20/2014), there were no children under the age of six residing at this subject house and the house was not being used as a daycare facility.

1.3 RELATED DOCUMENTS

A. See Separate Asbestos Specifications for further details.

B. Architect's Plans and Specifications

PART 2 - LEAD SCOPE OF WORK

2.1 BASIC SERVICES:

A. Lead 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 lead based paint and materials containing lead located at 31 Morehouse Avenue, Milford, CT. The lead abatement to be performed will be as needed to support the renovation 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 lead in the path of the renovation shall be removed prior to the renovation 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 Lead Abatement Contractor (LAC) to perform the lead abatement work of this Section.

E. Lead Abatement must have been conducted under the supervision of a certified lead-based paint abatement supervisor, as per §35.165(d)(2).

F. As required by §35.1330(4), except for amounts of work at or below de minimis levels* Lead Interim Controls must be conducted by a person trained in accordance with 29 CFR 1926.59 AND either be supervised by an individual certified as a lead-based paint abatement supervisor or have successfully completed one of the following courses:
   1. A lead-based paint abatement supervisor course accredited in accordance with 40 CFR 745.225;
   2. A lead-based paint abatement worker course accredited in accordance with 40 CFR 745.225;
   3. The Lead-Based Paint Maintenance Training Program, ``Work Smart, Work Wet, and Work Clean to Work Lead Safe," prepared by the National Environmental Training Association for EPA and HUD;
   4. ``The Remodeler's and Renovator's Lead-Based Paint Training Program," prepared by HUD and the National Association of the Remodeling Industry; or
   5. Another course approved by HUD for this purpose after consultation with EPA.
   6. EPA RRP training, except that every individual working on this HUD job site must receive the EPA RRP training and be currently EPA RRP certified, with RRP refresher courses completed every 5 years.

   *De minimis levels
   (1) 20 square feet (2 square meters) on exterior surfaces;
   (2) 2 square feet (0.2 square meters) in any one interior room or space; or
   (3) 10 percent of the total surface area on an interior or exterior type of component with a small surface area. Examples include window sills, baseboards, and trim

2.1 BASIC SERVICES (cont):

G. Contractor must be EPA certified and trained in lead-safe work practices when conducting renovation, repair and painting activities that will disturb more than six (6) square feet of painted surfaces on the interior of a building or more than twenty (20) square feet on the exterior and all window replacements jobs.

H. Contractor must be EPA RRP trained by training providers accredited by the EPA in the use of lead safe work practices, the firm must be certified with the EPA and the contractor must follow the specific work practice standards outlined under the EPA's RRP rule.

I. Engineer shall retain an Industrial Hygiene firm, with a State of Connecticut Licensed Lead inspector or lead inspector risk assessor (IH) that shall be designated as the authorized representative of the Owner for purposes of monitoring the lead abatement work. The level of monitoring shall be at the discretion of the Engineer. The Contractor will regard the IH'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 Lead inspector or lead inspector risk assessor for all lead removal work completed. Cooperate with the client and testing laboratory in scheduling and obtaining any samples.

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

K. LAC is responsible for proper disposal of all lead wastes, see separate mold and asbestos specifications for disposal issues regarding these items.

L. Quantities given either in this specification are estimated; The LAC is responsible for accepting the quantities or measuring them to His satisfaction. The LAC shall have no claim as to added work as the result of accepting said measurements or other stated conditions. The LAC shall report any discrepancies to the Owner, the Engineer and to Chem Scope, Inc. or accept the amounts or quantities to be correct as herein stated.

M. All replacement materials will be put in by others.

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

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

P. 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 LAC shall refer to the Pre-Rehabilitation Lead Hazard Risk Assessment & Lead Based Paint Pre-Renovation XRF Screening Report (CS#183-99, dated 7/17/2014) in Appendix A of these Specifications and the instructions to follow.

B. Items to be removed, replaced, re-finished, etc are covered in the architect's Scope of Work. In any case where removal or demolition is specified, the work also includes proper cleaning of the building areas for reoccupancy or re-use and proper disposal.

C. Remove all Lead Based Paint Hazards as delineated in Schedule A. The quantities (if given) of Lead 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. Items, which are coated with lead-based paint, are listed in the appended inspection report.

E. Complete all work in compliance with Part 3 of this specification.

F. Instructions in Part 3 cover the highlights of the requirements. The regulations cited provide additional details which the contractor is expected to follow.

2.3 SCHEDULE A:

A. Correct the following items containing Lead in Table 2.3.1:

Table 2.3.1

Component/Description	Location	Defective	Friction	Correction Methods
White painted wooden window sills, aprons, casings	1-1, 1-3, 1-4	Yes	No	LENCAP
Off white painted wood panel walls	1-5 Kitchen	Yes	No	REP, LENCAP or RENCAP
Off white painted fiberboard ceiling	Throughout	No	No	None Required Intact
White painted wooden wall trim	1-8 Living Room	No	No	None Required Intact
Green painted wooden walls	1-5 Kitchen & 1-6	Yes	No	LENCAP

B. Key:

(REM) : Removal Stripping of paint.

(REP) : Replacement Removal of architectural component and replacement with lead free component.

(RENCAP) : Rigid encapsulation (e.g. enclosure using materials such as siding, paneling, sheetrock, plywood, etc.

(LENCAP) : Liquid Encapsulation.

C. The following Dust Lead-Hazards in Table 2.3.2 must be corrected, see section 3.19 for cleaning of window sills for lead contamination.

Table 2.3.2 Dust Lead Hazards:

Location	Surface	Dust Wipe Result (ug/sq ft)	CT-DPH Standard (ug/sq ft)
1-1 Bedroom	Window Sill	4971.1	250

D. The following Soil Lead-Hazards in Table 2.3.3, must be corrected, see section 3.18 for Soil Interim Control Treatments. HUD allows for interim control methods for soils with < 5,000ppm Lead.

Table 2.3.3 Soil Lead Hazards

Location	Soil Concentration (mg/kg)	CT-DPH Standard (mg/kg)
Side B, 2' from A/B corner	1050.3	400

Note: All excavated soils associated with the identified soil hazards shall remain onsite and placed within areas designated by the Engineer

END 2.3 SCHEDULE A

PART 3: EXECUTION OF WORK:

3.1 REGULATIONS

A. Conform to all applicable Federal State and Local Regulations. The principal Applicable Regulations are:

1. 24 CFR Part 35 Subpart J, (HUD regulations for rehabilitation)
2. HUD Lead Safe Housing Rule, 24 CFR 35, subparts B through R
3. EPA's Lead Repair, Renovation, and Painting Rule 40 CFR part 745
4. CT DPH regulations 19a-111-1 through 11
5. Construction Industry Lead Standard CFR 29 1926.62.
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. 1926.402 and .416-.417 (Electrical safety)
    e. 1926.51 (Personal Hygiene, washing facilities)
    f. 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
        1910.120 hazardous waste
        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
    g. 1926.22 (Recording and Reporting of Injuries)
    h. 1926.23 (First Aid and Medical Attention)
    i. 1910.141 (Shower and Sanitation requirements)
    j. 1926.59 (Hazard Communication)

7. OSHA 29 CFR 1926.16 Arrangements made among contractors on multi-employer sites with respect to informing affected employees of potential exposure to lead and with respect to responsibility for compliance.
8. Connecticut General Statutes Sec 22a 449 (c) sec 1-42 and 100-110, Hazardous wastes.
9. Connecticut General Statutes Sec 25-54 cc (c) sec 1-48, Hazardous wastes.
10. 40 CFR Parts 260-270 inclusive, US EPA Regulations for Hazardous wastes.
11. All State, County, and City or Municipal codes and ordinances as applicable.

B. Where applicable State, Federal and Local Regulations differ, the more stringent portion of the regulation applies.

3.2 OCCUPANT PROTECTION

A. Occupants shall not be permitted to enter the worksite during hazard reduction activities (unless they are employed in the conduct of these activities at the worksite), until after hazard reduction work has been completed and clearance, if required, has been achieved.

A. Occupants shall be temporarily relocated before and during hazard reduction activities to a suitable, decent, safe, and similarly accessible dwelling unit that does not have lead-based paint hazards.

B. Written notice will be given to the occupants 5 working days prior to the abatement start date. The notice shall inform occupants which surfaces are to be abated. Additionally, warning signs shall be posted at all entrances and exits to the abatement area prior to abatement.

C. In accordance with § 35.125, when hazard reduction activities are undertaken, each designated party shall:

1. Provide a notice to occupants not more than 15 calendar days after the hazard reduction activities (including paint stabilization) have been completed. Notice of hazard reduction shall include, but not be limited to:
   a. A summary of the nature, dates, scope, and results (including clearance) of the hazard reduction activities;
   b. A contact name, address, and telephone number for more information;
   c. Available information on the location of any remaining lead-based paint in the rooms, spaces, or areas where hazard reduction activities were conducted, on a surface-by-surface basis; and
   d. The date of the notice.
2. Update the notice, based on reevaluation of the residential property and as any additional hazard reduction work is conducted.
3. Provision of a notice of hazard reduction is not required if a clearance examination is not required.

D. In accordance with § 35.125, the notices above shall conform with the following:

1. The notices of evaluation, presumption, and hazard reduction shall be of a size and type that is easily read by occupants.
2. To the extent practicable, each notice shall be made available, upon request, in a format accessible to persons with disabilities (e.g., Braille, large type, computer disk, audio tape).
3. Each notice shall be provided in the occupants' primary language or in the language of the occupants' contract or lease.
4. The Contractor shall provide each notice to the occupants by:
   a. Posting and maintaining it in centrally located common areas and distributing it to any dwelling unit if necessary because the head of household is a person with a known disability; or
   b. Distributing it to each occupied dwelling unit affected by the evaluation, presumption, or hazard reduction activity or serviced by common areas in which an evaluation, presumption or hazard reduction has taken place.

3.2 OCCUPANT PROTECTION (cont)

E. In accordance with § 35.130, the contractor shall provide to each occupied dwelling unit, the lead hazard information pamphlet developed by EPA, HUD and the Consumer Product Safety Commission pursuant to section 406 of the Toxic Substances Control Act (15 U.S.C. 2686), or an EPA-approved alternative; except that the designated party need not provide a lead hazard information pamphlet if the designated party can demonstrate that the pamphlet has already been provided in accordance with the lead-based paint notification and disclosure requirements at Sec. 35.88(a)(1), or 40 CFR 745.107(a)(1) or in accordance with the requirements for hazard education before renovation at 40 CFR part 745, subpart E.

F. In accordance with § 745.84, no more than 60 days before beginning renovation activities in the subject residential dwelling, the contractor performing the renovation must:
   1. Provide the owner of the unit with the pamphlet entitled Renovate Right: Important Lead Hazard Information for Families, Child Care Providers and Schools, and comply with one of the following:
      a. Obtain, from the owner, a written acknowledgment that the owner has received the pamphlet.
      b. Obtain a certificate of mailing at least 7 days prior to the renovation.

3.3 SUBMITTALS CONCERNING LEAD PAINT RELATED RENOVATION:

A. Before the Work:

1. Lead Contractor's Lead Compliance plan in accordance with 29 CFR 1926.62 and supporting documentation including training, respirator fit testing and medical examination records required.
2. Copies of training required for compliance with 29 CFR 1926.59, which requires that all employees covered by the "Lead Exposure in Construction" standard receive hazard communication training.
3. Copy of Lead Contractor License and Copies of DPH certifications for supervisor(s) and workers to be used. A certified supervisor is required for abatement.
4. Certifications that all contractors (including renovation, repair and painting workers, plumbers, electricians, HVAC professionals, etc.) working on this project meet the requirements of 2.1.6 above.
5. Certification that persons performing "interim controls" are trained in accordance with §35.1330(4) according to the requirements of 2.1.6 above.
6. Any available prior assessments or evaluations of the potential lead exposure for specific work operations, including personal air sampling data.
7. A list of any hazardous chemicals as defined in CFR 29 1926.59, to be brought to the site, including amounts to be brought in and Material Safety Data Sheets (MSDS's) for each chemical.
8. LAC to supply Laboratory name/address/phone number along with current state of CT DPH Certification to be used for sample collection and analysis.
9. The name, address and phone number of the licensed TSD to be used for transportation and disposal of hazardous wastes.
10. The name, address and phone number of firms to be used for transportation and disposal of non-hazardous wastes
11. Plan for recycling of materials.
12. Contractor to supply all Names, address, phone number, contact name, etc. for supplier for import materials to satisfy Section 3.17 requirements

3.3 SUBMITTALS CONCERNING LEAD PAINT RELATED RENOVATION (CONT):

B. After the Work:
   1. Personal air sampling records and lab results
   2. Results of TCLP Testing or other documentation regarding evaluation of wastes.
   3. Waste disposal manifests for any Hazardous Wastes.

3.4 EMPLOYEE INFORMATION AND TRAINING:

A. Employees performing work with Lead containing materials must be knowledgeable, qualified, and trained in demolition and related renovation tasks.

B. A person who has completed an accredited lead supervisor course is required for the project. This is required for abatement work.

C. Employees performing demolition or other dusty operations shall be issued respirators in accordance with 1926.62 and 1910.134 and other protective equipment as per the regulations cited above and be properly trained in the use of this equipment.

D. Information and training shall include the contents of OSHA Construction Lead Standard CFR 29 1926.62.

E. As required by §35.1330(4), Lead Interim Controls must be conducted a person trained in accordance with 29 CFR 1926.59 AND either be supervised by an individual certified as a lead-based paint abatement supervisor or meet the requirements of 2.1.6 above.

3.5. EXPOSURE ASSESSMENT:

A. A list of items with lead based paint is in the appended inspection report.

B. Contractor is responsible for determining if any employee may be exposed to lead above the OSHA Action Level during the work.

C. This determination of exposure is accomplished by personal monitoring of the present job or from historical data from air monitoring of previous similar jobs.

D. The contractor must select the appropriate respirators and other protection based on this assessment.

3.6 REQUIRED PERSONAL AIR SAMPLES:

A. General:
   1. Personal air sampling shall be conducted to ensure workers are using proper respiratory protection at the expense of their employer.

B. Method:
   1. Personal air sampling is conducted according to NIOSH Method 7082.

3.7 WORKER PROTECTION

A. Regulated Areas:

1. General:
   a. Establish a regulated area where demolition, cutting or abrasion of lead painted surfaces occurs. The regulated area shall include temporary enclosures and barricades clearly marked with signs and any other methods that will limit access to the site to authorized trained and properly equipped personnel.

2. Non-dusty Operations:
   a. Where work such as removal of intact parts is done without dust to be generated, the work area may be isolated by closing access doors, or where there are no doors, by isolating with barrier tape.

3. Dusty Operations:
   a. Where dust generation is anticipated, such as for demolition of ceilings, sanding and scraping: Critical Barriers, contiguous decontamination units and HEPA filtered negative air ventilation units must be used in addition to the above specified protection.

   b. Protective Clothing, Personal Equipment, Decontamination and Personal Hygiene:
      1) Work Area Entry:
         a)All persons entering the Work Area shall wear prescribed protective clothing, equipment and respirators, which shall be provided by the Contractor at no cost to his employees. This includes disposable coveralls or similar full body covering, shoe covers, gloves, and hats and appropriate respirators. The respirator shall be inspected, put on, and then fit checked (for respirator types required) before entering the Work Area.

3.7 WORKER PROTECTION (CONT)

2) Work Area Exit:
   a) Before leaving the Work Area, each person shall HEPA vacuum any dust contamination from protective clothing.
   b) Provide a washing and clean change area.
   c) For work involving demolition or other dusty operations, provide a 3 stage connected shower decontamination unit identical to that specified for asbestos removal in CFR 29 1926.1101.
   d) In all cases, before taking a break or leaving the site, proceed to the clean change area and remove all protective garments and equipment. Dress in street clothes or otherwise distinctively different clothing for use outside the Work Area than suits used inside the Work Area. Dirty disposable suits shall be placed in a waste bag provided for and labeled "contaminated suits". Clean the reusable protective equipment such as the respirator, boots/shoes, safety glasses, hard hats, etc. Thoroughly wash hands with soap and water.

3) Persons will not smoke, drink, eat, apply cosmetics or chew gum or tobacco in the Work Area. Food or beverages are not to be present or consumed. Tobacco products are not to be present or used and cosmetics are not to be applied in the Work Area. Employees must wash their hands prior to leaving the job site to eat, drink, smoke or apply cosmetics.

4) Employees are not to leave the job site wearing any clothing or equipment worn during the work shift that may be contaminated with lead.

c. Respiratory protection

1) Use at least 1/2 or full face negative pressure respirators in the regulated areas when demolition is occurring or dust from demolition is present.

2) Provide additional respiratory protection for other chemical substances, which are to be used according to the MSDS for each chemical substance.

d. Health Monitoring:

1) Health monitoring shall be conducted as required by 1926.62.

e. Engineering Controls During Lead Paint Demolition or Removal

1) General:

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

3.7 WORKER PROTECTION (CONT)

2) HEPA Filtered Ventilation Equipment (Negative Air Units):

a) For operations where dust may be generated including cutting of lead painted walls, portable local exhaust blowers equipped with HEPA filtration shall be used to create exhaust ventilation in the regulated area and capable of maintaining a constant discharge of filtered air outside the Work Area perimeter and creating suction so that air flow direction moves from uncontaminated areas into the Work Area and exhausts in a direction away from workers. Place the intake of the suction line to draw dust away from the worker.

3) Containment: When work may generate dust, the work area shall be properly contained using materials such as 6 mil polyethylene sheeting sealed with duct tape to prevent lead dust from contaminating the building or environment. The containment shall include Critical Barriers, covering floors (except where these surfaces are in the scope of the remediation work) and objects with 6-mil polyethylene, covering any air vents in the work area and covering any other surfaces that may become contaminated with lead dust.

3.8 SAFETY AND SECURITY OF THE WORK AREA

A. The Contractor has responsibility to establish workplace safety and security. The Contractor shall maintain a Competent person on site at all times. Duties of the Competent person shall include:

1. Posting warning signs at entries to the Work Area.

2. Guarding the Work Area against unauthorized intrusion.

3. Ensuring proper decontamination procedures and that the safety equipment is properly functioning.

4. Maintaining at the work site daily logs of activities and the names of all persons entering the site.

5. Ensuring the general condition of the Work Area during and at the completion of the work including cleanliness.

6. Ensuring compliance with the specifications and the regulations.

3.9 SPECIAL MATERIALS, TOOLS AND EQUIPMENT

A. Impermeable containers are to be used to receive and retain any Hazardous Wastes. Containers shall be labeled in accordance with DEEP regulations and shall be both water and air tight.

B. Sufficient hazardous waste labels shall be provided in conformity to DEEP Regulations.

C. High-Phosphate Wash or non-phosphate equivalent

1. Sufficient quantity of detergent with a high phosphate content (containing at least 5% trisodium phosphate (TSP) or non-phosphate equivalent.

D. Signs to be posted at the Work Areas shall be in sufficient quantity to post at all entries to Work Areas. Signs will be of sufficient size and contrast to be easily read. Minimum letter height will be 2 inches. The signs shall convey the following or equivalent information:

WARNING LEAD WORK AREA

POISON

NO SMOKING OR EATING

E. The Contractor shall have sufficient personal Air Monitoring equipment to monitor each type of activity in each Work Area, filter cartridges, spare fitted masks for each worker and air sample cassettes.

F Contractor shall have sufficient quantity of protective clothing and safety and control equipment including grounded power cables, GFCI units, HEPA vacuums, HEPA filtered negative air units and all other equipment required by Regulations.

3.10 HEPA VACUUM PROCEDURES:

A. Never use an ordinary vacuum cleaner where lead dust may be present since it will blow fine lead dust all over the area.

B. Applications required for Use of the HEPA Vacuum
1. Cleaning surfaces before, during and after work

2. Cleaning self before leaving work area

3. As a dust control attachment for sanders and other abrasive equipment

3.10 HEPA VACUUM PROCEDURES (CONT):

C. HEPA Vacuum Procedures

1. Follow the operating instructions provided by the manufacturer of the machine.

2. Use attachments appropriate for use on each type of surfaces including brushes of various sizes, crevice tools, and angular tools.

3. HEPA vacuum all surfaces from the top down.

4. Pay particular attention to horizontal surfaces including ridges.

5. Move the vacuum slowly since lead dust is heavy, sticks to surfaces and is hard to pick up.

6. When feasible, first TSP (or non-phosphate equivalent) wash the surfaces before HEPA vacuuming because the TSP (OR NON-PHOSPHATE EQUIVALENT) curdles up the lead dust and makes it easier to pick up.

7. Start at the furthest point from the exit and finish at the exit.

8. Repetitive cleaning is required. Lead dust adheres very tenaciously, especially on rough or porous materials and weathered or worn wood surfaces, masonry surfaces and cracks

D. Maintenance of the HEPA Vacuum:

1. Change the filters when machine flow begins to get restricted:
   a. In a contained area.
   b. Wear a full set of protective clothing and equipment, including appropriate respirators
   c. Change bag and prefilter first and if the flow is normal, the HEPA filter need not be changed.
   d. Check the hose for blockage and clean by reversing suction. Do not blow out the hose since this will contaminate the area.
   e. Check gaskets, filters and vacuum bag for tears and replace as needed.
   f. A second HEPA unit shall be used to clean out the unit being serviced.
   g. Use extreme caution to avoid release of lead dust into the environment.
   h. Used HEPA filters and vacuumed debris are to be included with the hazardous waste.
   i. Turn on the machine briefly and check the operation.
   j. Clean up the area

2. Check daily for damage, especially power cords and switches.

3. At the end of the job if the dirty cleaner is to be taken out of the work area:

   a. Clean each attachment by sucking through the vacuum while tapping and wet wipe each attachment. Place the cleaned parts in a sealable plastic bag.
   b. Suck out and seal the end of the hose with duct tape to prevent dust from leaking over clean areas.
   c. Unplug and damp wipe the unit clean.

3.11 WET CLEANING PROCEDURES USING TSP (OR NON-PHOSPHATE EQUIVALENT) DETERGENT

A. Precautions

1. Rubber gloves
2. Eye Protection: TSP (OR NON-PHOSPHATE EQUIVALENT) can cause eye damage
3. Wash gloves with water and wipe dry with a clean towel before taking off to prevent contamination inside gloves and on hands and body.
4. Then wash hands
5. Never rub eyes when working with chemicals

B. Techniques:

1. Pour the TSP (OR NON-PHOSPHATE EQUIVALENT) solution from a jug onto the rag or mophead or spray on the surface (garden sprayer or plastic spray jug). (Never put rag into the cleaner since this will contaminate the cleaner).
2. Wash the surface with the TSP (OR NON-PHOSPHATE EQUIVALENT)
3. Squeeze out the rag or mophead into the dirty container
4. Replace the wash rag or mop frequently.
5. Rinse with fresh water.
6. Work from cleaner areas to dirtier areas: for example
   a. From the top down on any surface
   b. Do window frames generally before window sills and window wells last.
   c. Do center of floor and work toward one wall.
   d. Always change the mop or rag when finishing a dirty area

3.12 GENERAL INSTRUCTIONS FOR SET-UP OF THE WORK AREA:

A. Post warning signs as described above at all entrances to the work area.

B. Remove movable objects in the way of the work including:

1. Furniture, equipment, appliances and carpets.

C. Clean, cover and seal the things in the area of work which cannot be moved.

1. HEPA vacuum and wipe off with a damp rag anything that can't be moved.

2. Cover all these objects including permanent fixtures with 6 mil polyethylene sheeting and seal with duct tape.

D. Shut off and seal off existing HVAC system in the area of work

1. Shut off at electrical box. Lock the box with a padlock and place a sign on it that says danger do not operate.

2. Cover and seal the vents with polyethylene and duct tape.

3. During cold weather, provide temporary heat in a safe location sufficient to permit work and protect pipes from freezing or other damage to the building.

E. Shut off, lock out and tag out electrical components which may create a hazard if energized during work.

F. For dusty work, use containment, negative air units and a shower decontamination unit.

3.13 INTACT REMOVAL OF LEAD-PAINTED PARTS:

A. Shoe molding and any other Wood Trim:

1. Work shall be done very neatly by disassembly and prying with minimal dust.

2. Mist the part to be removed with water.

3. Use a sharp stiff putty knife or similar bladed tool.

4. A screwdriver or prybar may next be used

5. Do not pry too far at one location to avoid splitting the piece.

6. Work the piece gradually keeping it near parallel to the surface.

7. Use a small piece of plywood as a guard to protect wall or other surface resting the fulcrum of the prybar on the plywood.

8. Remove nails promptly and collect in a container to prevent injury.

9. HEPA vacuum or wet wipe the surfaces of the piece removed and clean any dust.

3.14 LIQUID ENCAPSULANT FOR LEAD BASED PAINT COMPONENTS (NON-FRICTION AND NON-IMPACT SURFACE ONLY):

A. A permanent cover shall be installed over the lead-based surface. Encapsulant materials shall bind to the substrate and not just the surface paint. The encapsulant used must be on the list of CT-DPH approved encapsulants (Appendix B, 4 pages). See also the attached Liquid Encapsulant Guide from CT-DPH for use of liquid encapsulants (Appendix C, 15 pages). Any chemicals proposed for use are subject to rejection by the Engineer and/or owner. By allowing the use of any particular chemical(s), the Engineer and owner assume no responsibility for the results of their use or failure thereof.

B. Encapsulation shall be done subject to passing X-cut tape tests after preparation and priming per manufacturer's specifications and directions using the following or equivalent materials:

   1. Test patches, at least 36 square inches:

      a. Prepare surface and apply Primer: Lead Barrier Compound Type III and allow to cure (Must be >38 deg F during the application and cure.) Apply test patch on each representative exterior and interior surface.

      b. Conduct X-cut tape tests. Contact the IH when ready to do the test and a certified lead inspector or lead inspector risk assessor will be provided for the test.

C. Application:
   1. Prepare surface and apply Primer: Lead Barrier Compound Type III and allow to cure (Must be >38 deg F during the application and cure.) (The same primed surfaces prepared above in step 1 may be used.)
   2. Apply encapsulant: Lead Barrier Compound Type III (eggshell/architectural Matte finish).
   3. Coordinate colors and finishes with owner.

D. The following cannot be used as encapsulants:
   1. A new coat of paint or primer.
   2. Wall paper coverings.
   3. Contact paper.

3.15 RIGID ENCAPSULANT FOR LEAD BASED PAINT COMPONENTS:

A. If the surfaces are peeling or deteriorating then wet scraping is necessary prior to encapsulation. Wet scraping involves misting the peeling paint before scraping and thus reducing the amount of lead dust generated during this process. Surfactants may be added to the water to facilitate clean up.

B. The following are some types of rigid encapsulating materials: gypsum dry wall, fiberglass, wood and vinyl siding.

C. All seams must be sealed to prevent the escape of lead dust.

3.16 CLEANUP PROCEDURES DURING AND AFTER WORK:

A. Use a high efficiency particulate air (HEPA) vacuum to clean the surfaces.

B. After dusty operations, wash surfaces with TSP or non-phosphate equivalent: Use a high-phosphate (or non-phosphate equivalent) detergent to wash all the surfaces of the Work Area or contaminated surfaces in adjacent areas using detergent with a high phosphate content (containing at least 5% trisodium phosphate (TSP) or non-phosphate equivalent. Follow the specific manufacturer's instructions for the proper use of the detergent. Use eye protection and waterproof gloves. The cleaning mixture should be changed at least daily.

C. HEPA-vacuum again.

D. Clean Tools and Equipment. This cleaning shall consist of a thorough HEPA vacuuming and washing with a high-phosphate solution. If equipment is removed from the Work Area prior to cleaning it must be wrapped and sealed in 6 mil polyethylene sheeting or bags.

3.17 FINAL CLEAN-UP

A. Remove plastic sheeting used for Containment.

   1. This contaminated plastic sheeting must be removed and disposed of very carefully. Removal must start with upper-level plastic, such as that on cabinets and counters. The plastic must first be sprayed or misted with water to hold down dust, and then folded in upon itself to trap any dust residues inside. Before removal of floor plastic, it must be HEPA vacuumed and must be folded carefully from the corners/ends to the middle to trap any remaining Lead-dust and placed into double 4-mil or single 6-mil plastic bags that are then sealed and removed.

B. HEPA-vacuum surfaces once again.

C. Wash with TSP (OR NON-PHOSPHATE EQUIVALENT):

D. HEPA-vacuum again.

E. Clean Supplies, Tools and Equipment

   1. Supplies

      a. Consumable/disposal supplies such as mop heads, sponges, and rags shall be replaced regularly, at least at the end of each day.

   2. Equipment

      a. Durable equipment such as power and hand tools, generators, scaffolds, ladders, and vehicles must be cleaned at least at the end of activities in each work area. This cleaning shall consist of a thorough HEPA vacuuming and washing with a high-phosphate solution. If equipment is removed from the Work Area prior to cleaning it must be wrapped and sealed in 6 mil polyethylene sheeting or bags.

3.18 INTERIM CONTROLS OF SOIL LEAD HAZARDS:

A. HUD Lead Safe Housing Rule, 24 CFR Sec. 35.1325, allows for interim controls of soil where the levels of lead contamination are less than 5,000 ppm. The following acceptable interim control methods for soil lead are impermanent surface coverings and land use controls.

1. Impermanent surface coverings may be used to treat lead- contaminated soil if applied in accordance with the following requirements. Examples of acceptable impermanent coverings include gravel, bark, sod, and artificial turf.

   a. Impermanent surface coverings selected shall be designed to withstand the reasonably-expected traffic. For example, if the area to be treated is heavily traveled, neither grass or sod shall be used.
   b. When loose impermanent surface coverings such as bark or gravel are used, they shall be applied in a thickness not less than six (6) inches deep.
   c. The impermanent surface covering material shall not contain more than 400 µg/g (which is equal to 400 mg/kg and 400 ppm) of lead.
   d. Adequate controls to prevent erosion shall be used in conjunction with impermanent surface coverings. Erosion control work is to be done by others.
   e. Please note that the Engineer, at their discretion, will review and sample any and all import materials at their source location to determine acceptability as specified above. The contractor is herby notified that laboratory turnaround time for these samples is expected to be fifteen (15) working days (Turnaround time is the period of time beginning when the Contractor notifies the Engineer which source location(s) it intends to use and ending with the Contractor's receipt of the laboratory analytical results). Any change of intended source location or materials to be utilized will prompt the Engineer's need to resample and will therefore restart the time required for laboratory turnaround and analysis. Results from such sampling will be furnished to the Engineer. Upon receipt, the Engineer will make available to the Contractor the results of the sample(s) collected, and final determination on its acceptability. **No delay claim will be considered based upon the Contractor's failure to accommodate the laboratory turnaround time, or if results indicate non-conformance, thus requiring submission/approval for additional source materials and collection of representative samples to satisfy these requirements.**

3.19 INTERIM CONTROLS OF DUST LEAD HAZARDS:

A. HUD Lead Safe Housing Rule, 24 CFR Sec. 35.1325, calls for cleaning of lead dust hazards where the levels of lead in dust are greater than 40 micrograms/sq. ft on floor surfaces or greater than 200 micrograms/sq. ft. on window sills. The following are acceptable control methods for lead dust contamination.
   1. Removal and replacement of all existing floor surfaces OR
   2. Dust control shall involve a thorough cleaning of all horizontal floor surfaces

      a. Use a high efficiency particulate air (HEPA) vacuum to clean the surfaces.
      b. Wash surfaces with TSP or non-phosphate equivalent: Use a high-phosphate (or non-phosphate equivalent) detergent to wash all the surfaces of the Work Area or contaminated surfaces in adjacent areas using detergent with a high phosphate content (containing at least 5% trisodium phosphate (TSP) or non-phosphate equivalent. Follow the specific manufacturer's instructions for the proper use of the detergent. Use eye protection and waterproof gloves. The cleaning mixture should be changed at least daily.
      c. HEPA-vacuum again.

3.20 INDUSTRIAL HYGIENIST INSPECTION AND TESTING

A. Before areas are released, visual inspection of each work area shall be done by the IH. The area must be free of visible dust. Areas, which have dust as determined by the IH, shall be re-cleaned by the Contractor at contractor's expense until the inspection shows no visible dust.
B. The IH will collect surface dust samples within and adjacent to the work area. Dust samples shall be analyzed by laboratory determination of lead via AAS
C. Passing Criteria for Final Test:

1. Results must be below the following values:

Floors:	40 micrograms/sq. ft.
Window sills:	200 micrograms/sq. ft.
Window wells:	800 micrograms/sq. ft.

C. Lead in dust sampling method:

1. Wipe sampling procedure: The inspector shall use wipes provided or recommended by the laboratory to be used. The standard sample size in this technique is one square foot, which is obtained with a plastic template or measuring device according to the formula: length times width divided by 144 equals the fraction or multiple of one square foot. Disposable gloves are worn throughout the sampling procedure. A pre-moistened wipe or towelette is placed flat on the surface to be sampled. The wipe is rubbed in a "S" pattern over the entire measured area. The wipes then folded in half and rubbed once over the surface again at a 90 degree angle to the first series of wipes. Finally, the wipe is folded and placed in a marked tube or plastic bag for laboratory determination of lead via AAS, GFAAS or ICP-AES. A minimum of 2 unused wipes or 1 wipe for every 20 used, whichever number is greater, is submitted to the laboratory as a blank.

2. Alternative Vacuum dust procedure: Modification of NIOSH Method 7082: This technique is used for surfaces where it is not feasible to use the wet method for sampling including rough or porous surfaces, carpeting, and fabric. The technique gives the same result as the wet method when used on smooth surfaces and more reliable results on other surfaces. Contamination of templates and other sources of contamination associated with handling the wet wipes are avoided. The filter media are submitted for lab analysis.

   a. Equipment and materials:

      1) Suction pump with a capability to deliver a flow of 20 liters/minute through the filter cassette. (a high volume air sampling pump, Allegro, Gast or equivalent may be used)

      2) Filter cassettes, each 37 mm diameter, mixed cellulose ester, 0.8 micron porosity filter, and 3 piece housing, with cotton back-up pads to support the filter. (The same cassettes are used for NIOSH Method 7082, lead dust in air.)

      3) Tubing, ¼ inch ID, heavy wall plastic or elastomer, suitable for use with vacuum, fitted to the pump and cassettes.

      4) Template, Stainless steel, or Plastic, 0.004 - 0.006 inches thickness, 2 x 9 inches measured aperture to measure and normalize test results to sq ft of surface sampled.

3.20 INDUSTRIAL HYGIENIST INSPECTION AND TESTING (CONT)

b. Calibration:

1) Pumps shall be calibrated using a ball rotometer upstream of the sampling filter to check actual flow. The ball rotometer must be initially factory calibrated and checked when new using a primary standard such as a soap bubble meter.

c. Procedure:

1) Remove plastic inlet and outlet plugs, and inlet cover from a clean cassette. Install the cassette on the suction tubing connected to the pump. Keep the plugs and cover in a clean sealed reclosable polyethylene bag. Label the sample at this time.

2) Do not perform this test on wet surfaces; allow to air dry.

3) Turn on the pump and check the flow rate. Vacuum the measured surface area thoroughly making 3 passes over the area with one edge of the cassette inlet touching the surface and the opposite edge just above but not touching the surface. Use the inner edge of the template as a guide. Caution: do not press firmly against a smooth surface while the filter is under suction as the filter may be damaged by the change in pressure.

4) Inspect the filter for rupture or deformity and reject and repeat the test if the filter is damaged. If excessive dust is observed on the filter, it may be prudent to reject the area and request the area to be recleaned before further testing.

5) Replace the plugs and cover and secure the cassette in the sample bag.

6) At the completion of sampling, reserve an two unused cassette as blanks from the same filter lot as used for sampling. Label and place the blanks in the bag with the samples.

7) Finally, the sample is submitted for laboratory determination of lead via AAS. The lab preparation and analysis is the same as for NIOSH 7082.

B. Testing Soil for Lead (Not Applicable)

1. Before the work, the owner's IH will collect surface soil samples from the top 1-3 inches. Soil samples shall be analyzed by laboratory determination of lead via AAS.
2. After the work, the IH will collect surface soil samples at the same locations. Soil samples shall be analyzed by the same laboratory and method.
3. Passing Criteria for Final Soil Samples:

   a. Below 400 PPM lead or
   b. Not statistically higher than values before the work begun:

3.21 WASTE DISPOSAL OPERATIONS:

A. Contractor shall evaluate the wastes to determine which types are hazardous under the RCRA and DEEP regulations. This evaluation may be done by sampling and TCLP testing of materials as set forth in 40 CFR Part 261 as amended, or by "knowledge of process". Consult the DEEP Guidelines of 11/4/94, "Guidance for Management and Disposal of Lead Containing Materials Generated in Lead Abatement, Renovation and Demolition Industries" for further information. EPA RCRA hazardous wastes which fail due to lead content have extractable lead of 5 mg/l according to the test specified in CFR 40 part 261. Other components besides lead may need to be included in the TCLP testing.

B. Whether or not wastes are classified as hazardous, the contractor is responsible for proper disposal:

C. If the wastes are determined to be hazardous, packaging storage and transportation of the wastes will be according to DEEP regulations. Consult the TSD used for details of these requirements.

3.22 RESTORATION OF THE AREA:

A. After Final Inspection is complete, relocate objects moved to temporary locations in the course of the work to their proper positions.

B. Reestablish mechanical and electrical systems in proper working order and in conformance with all applicable building, mechanical and electrical codes.

PART 4 DEFINITIONS

A. Action Level: OSHA exposure level of 30 ug/m3 over an 8 hour period.

B. Air Monitoring: The process of measuring the contaminant content of a specific volume of air in a stated period of time.

C. Atomic absorption spectrophotometer (AA) means an instrument which measures the lead content in parts per million (PPM) using a lead source lamp, a flame capable of measuring the absorbed energy and converting it to concentration.

D. CFR: Code of Federal Regulations.

E. Clean Change Area: An uncontaminated area or room adjacent to the work area with provisions for storage of worker's street clothes and protective equipment, a HEPA vacuum for removing contamination from protective clothing.

F. Competent Person: As regards lead hazards. A person experienced in demolition of lead painted surfaces who meets 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."

G. Containment is a process for protecting workers, other individuals and the environment by controlling exposures to lead dust and debris created during abatement.

H. Critical Barrier: Six mil polyethylene sheeting separating Work Areas from non Work Areas and used to cover fixed objects to prevent contamination.

I. 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 (6) feet apart form an Airlock.

J. DEEP: Connecticut Dept. of Energy and Environmental Protection

K. De minimis levels: HUD (24 CFR 35.1350) states that safe work practices are not required when maintenance or hazard reduction activities do not disturb painted surfaces that total more than:
   1. 20 square feet (2 square meters) on exterior surfaces;
   2. 2 square feet (0.2 square meters) in any one interior room or space; or
   3. 10 percent of the total surface area on an interior or exterior type of component with a small surface area. Examples include window sills, baseboards, and trim.

L. EPA: US Environmental Protection Agency

M. Fit Test: Check of the respirator fit every six months.

N. GFCI: Ground Fault Circuit Interrupter, a safety device to prevent death from electrical shock.

O. Graphite furnace atomic absorption spectrophotometer (GFAA) is an instrument that functions the same as an AA with one exception. The flame is replaced by an electrically heated chamber, a graphite tube, into which the sample is deposited.

P. Half-Mask, Half Face: type of respirator.

Q. HEPA Filter: A high efficiency particulate air (HEPA) filter that traps extremely small, micron-sized particles. These filters can filter out particles of 0.3 microns or greater (from a body of air) at 99.97% efficiency or greater.

R. HEPA Vacuum Equipment: Vacuum Equipment with a HEPA filter system for filtering the air effluent from the unit.

S. High Efficiency Particulate Air or HEPA means a filtering system capable of filtering out particles of 0.3 microns or greater diameter from a body of air at 99.97% efficiency or greater.

T. High Phosphate Detergent is detergent, which contains at least five (5%) percent tri-sodium phosphate (TSP).

U. HVAC: Heating, ventilation and air conditioning system.

V. Inductively coupled plasma atomic emission spectrophotometer (ICP) means an instrument which measures lead in PPM using a heat source (plasma torch) to dissociate and ionize lead atoms thereby emitting energy. This emission energy is measured and converted to concentration by the detector.

W. Interim controls means a set of measures designed to reduce temporarily human exposure or likely exposure to lead-based paint hazards. Interim controls include, but are not limited to, repairs, painting, temporary containment, specialized cleaning, clearance, ongoing lead-based paint maintenance activities, and the establishment and operation of management and resident education programs.

X. Lead: CAS # 7439-92-1. A naturally occurring metallic element, atomic number 82 atomic weight 207.2, chemical formula Pb and compounds thereof. It is a heavy ductile, soft gray solid in elemental form and forming compounds of white or colored solid material.

Y. Lead Material/ Lead Containing Material: A material which contains more than hazardous or toxic levels of lead: 1) EPA RCRA hazardous lead containing material is a material with extractable lead of 5 mg/l according to the test specified in regulations CFR 40-261. 2) A paint containing more than .5 % of lead in the dry film. 3) A floor surface with more than 200 micrograms/sqft, or a window sill with more than 500 micrograms/sqft or a window well with more than 800 micrograms/sqft. 4) For purposes of the OSHA lead construction standard; a material containing any detectable amount of lead.

Z. m3: Cubic meter

AA. Movable Object: A unit of Equipment or furniture in the Work Area, which can be removed from the Work Area.

BB. MSDS: Material safety data sheet.

CC. mg: Milligram

DD. 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.

EE. NIOSH; National Institute for Occupational Safety and Health.

FF. Owner: Carlino

GG. Permissible Exposure Limit (PEL): OSHA Standard. The employer shall ensure that no employee is exposed to an airborne concentration of Lead, or its compounds in excess of the PEL of 0.200 mg/m3 for the construction industry and 0.050 mg/m3 for general industry (milligrams per cubic meter) as an eight (8) hour time weighted average (TWA).

HH. Poly: Short for polyethylene, a plastic sheet.

II. PPM: Parts per million.

JJ. RCRA: Resource Conservation and Recovery Act

KK. Regulated Area: The work area.

LL. TCLP: Toxicity characteristic leaching procedure as specified by EPA- RCRA regulations (CFR 40 part 261).

MM. TSD: Treatment, Storage and Disposal Facility. A list of authorized firms may be obtained from DEEP.

NN. TSP means tri-sodium phosphate.

OO. TWA means time- weighted average

PP. ug: microgram.

QQ. Wet Cleaning: The process of eliminating Lead contamination from building surfaces and objects by using cloths or other cleaning tools which have been dampened with TSP or non-phosphate equivalent and water, and by afterwards disposing of these cleaning items as Lead contaminated waste.

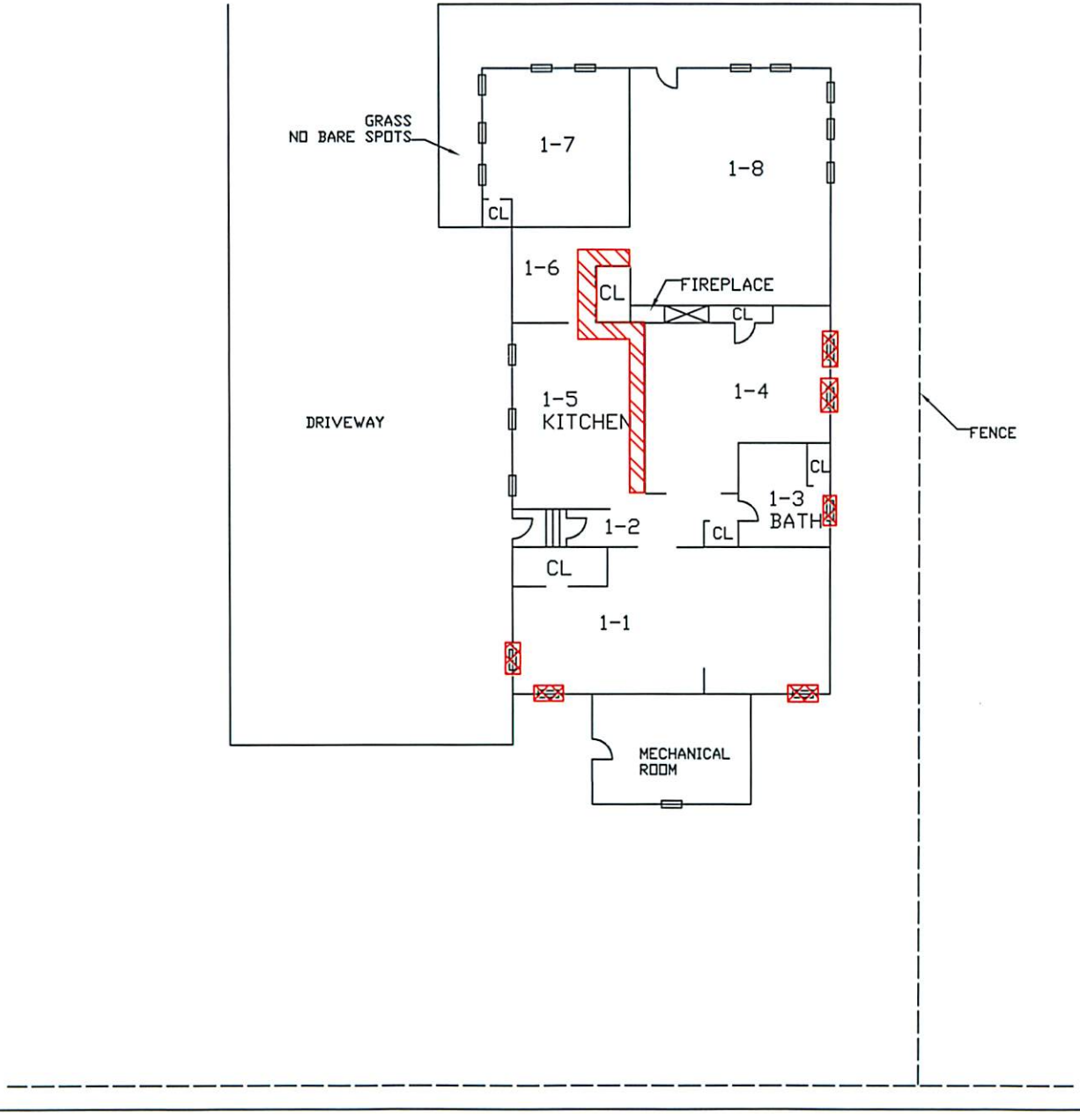
RR. Work Area: An area where Lead Paint Demolition or other work involving disturbance of lead paint are performed which is isolated by physical boundaries and other controls to prevent the spread of lead dust or debris.

PART 5 - LIST OF DRAWINGS

5.1	DRAWING NUMBER	DESCRIPTION
A.	1L	LOCATION OF LEAD COMPONENTS TO BE CORRECTED, IN SCOPE OF WORK
B.	1LD	LOCATION OF LEAD DUST HAZARDS IN SCOPE OF WORK
C.	1LS	LOCATION OF LEAD SOIL HAZARDS IN SCOPE OF WORK

ChemScope Inc.

Site 011
17 Elaine Road, Milford, CT
Main Floor
CS# 183-100, 6-27-2014



LEGEND OF SYMBOLS

Location of wooden walls, in Scope of Work

Location of Windows in Scope of Work

NOTATIONS

DRAWN BY:
LEIGH HONOROF

ChemScope Inc.

SHEET TITLE:

LEAD RISK ASSESSMENT

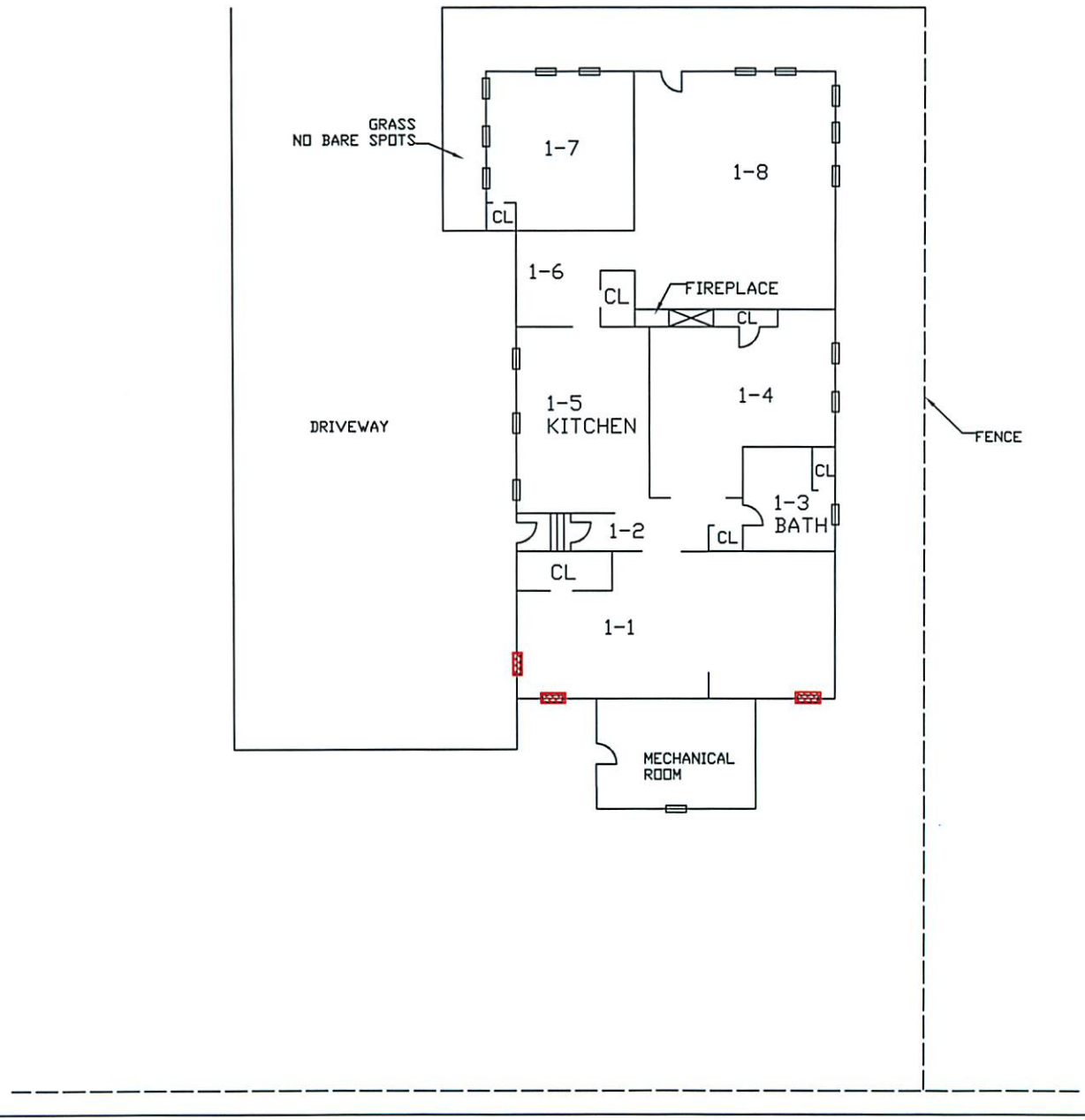
17 ELAINE RD
MILFORD, CT

MAIN FLOOR

CHEMSCOPE NUMBER:	DRAWING NUMBER
CS# 183-100	1L
SCALE: NOT TO SCALE	
DATE: 6/27/14	

ChemScope Inc.

Site 011
17 Elaine Road, Milford, CT
Main Floor
CS# 183-100, 6-27-2014



LEGEND OF SYMBOLS

Location of Lead Dust Hazard in Scope of Work

NOTATIONS

DRAWN BY:
LEIGH HONOROF

ChemScope Inc.

SHEET TITLE:

LEAD RISK ASSESSMENT

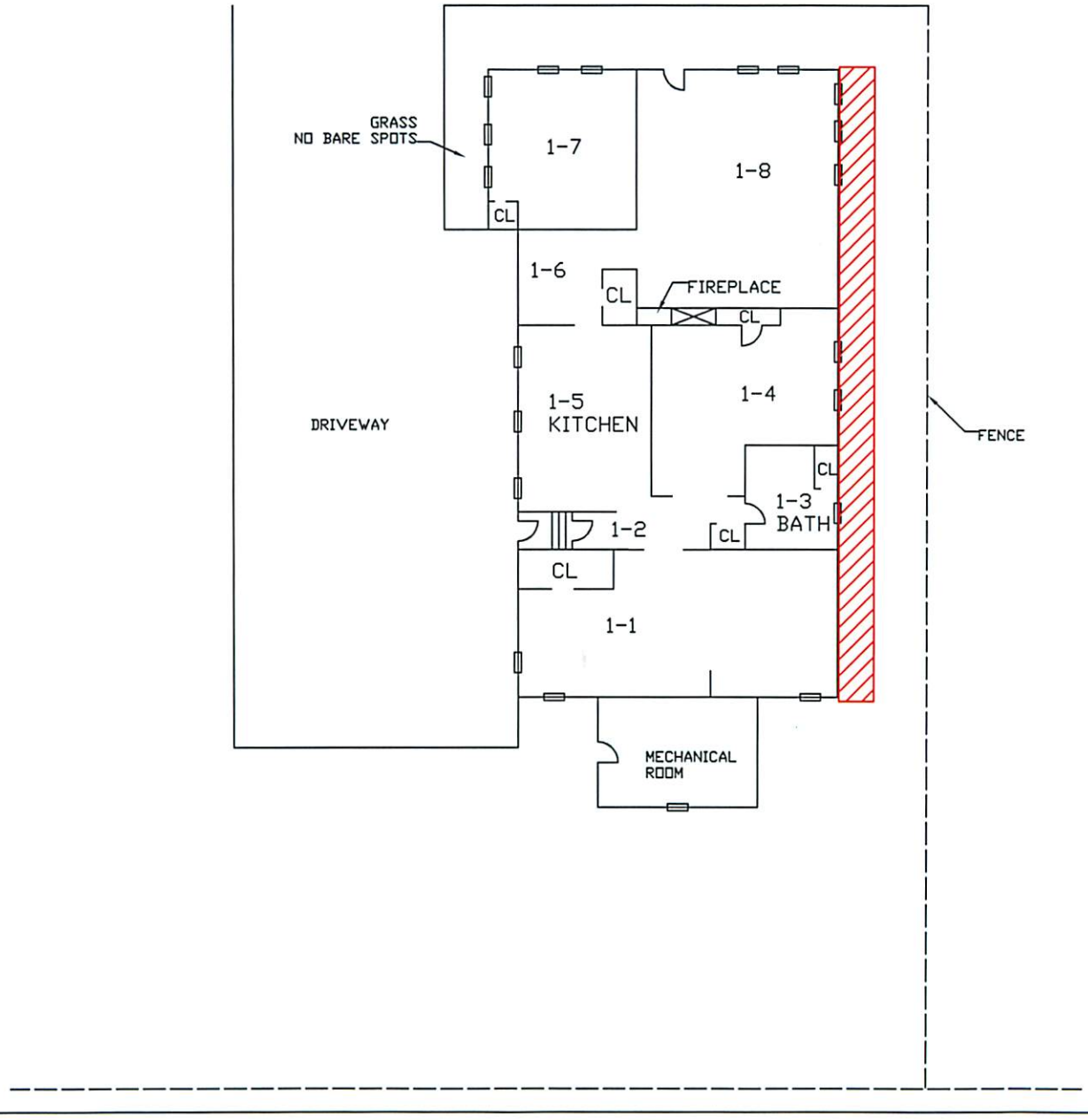
17 ELAINE RD
MILFORD, CT

MAIN FLOOR

CHEMSCOPE NUMBER:	DRAWING NUMBER
CS# 183-100	1LD
SCALE: NOT TO SCALE	
DATE: 6/27/14	

ChemScope Inc.

Site 011
17 Elaine Road, Milford, CT
Main Floor
CS# 183-100, 6-27-2014



LEGEND OF SYMBOLS

Location of Lead Soil Hazard in Scope of Work

NOTATIONS

DRAWN BY:
LEIGH HONOROF

ChemScope Inc.

SHEET TITLE:

LEAD RISK ASSESSMENT

17 ELAINE RD
MILFORD, CT

MAIN FLOOR

CHEMSCOPE NUMBER:	DRAWING NUMBER
CS# 183-100	1 LS
SCALE: NOT TO SCALE	
DATE: 6/27/14	

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

7/18/2014

**PRE-REHABILITATION LEAD HAZARD RISK ASSESSMENT &
LEAD BASED PAINT PRE-RENOVATION XRF SCREENING
SITE 011 (CARLINO) – 17 ELAINE ROAD, MILFORD CT
APPLICATION # 1085, CS#183-100, 4/30/2014 and 6/27/2014, Page 1 of 13**

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Recommendations	11-13

Attachments:

Appendix A: XRF Lead–Based Paint Testing Results with quality evaluation sheet, 5 pages
Appendix B: Dust Wipe and Soil Sample Analytical Data and Chain of Custody Document, 7 pages
Appendix C: Sample Location Drawings, 2 pages
Appendix D: Lead Hazardous Waste Evaluation Worksheet, 1 page(s)
Appendix E: Copy of Risk Assessor's License/Certification, 2 pages
Appendix F: Copy of Firm's Lead Activity License/Certification, 3 pages
Appendix G: Copy of XRF Training Certificate and LPA–1 Performance Characteristics Sheet, 5 pages
Appendix H: "LEAD SPEAK" – A Brief Glossary, 2 pages
Appendix I: Additional Lead and Lead Safety Resource Data, 1 page

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File Location:

NAS AAUM-Reports\LeadInsp\DS-RiskAssess_June2014.doc

INTRODUCTION

EXECUTIVE SUMMARY: As a result of the Lead Hazard Risk Assessment and the limited Lead-Based Paint Testing (Assessment) conducted on 4/29/2014 and 6/20/2014, it was found that lead-based surface coatings (paint) and lead hazards were present on the subject property as of the date of the Assessment. 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 was detected on surfaces and/or components within the scope of the inspection. 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. (Contact us for assistance with the personal samples and further interpretation. General information is contained in the recommendations to follow.) Because lead based paint was detected, a Hazardous Waste Evaluation was done per CT DEEP regulations to determine if the waste products from the renovation are potentially a hazardous waste. The hazardous waste evaluation was done using a modified "knowledge of process" technique. This modified method resulted in the waste being **5133 mg/kg of lead**, which **is** considered likely to be a lead hazardous waste since it is > 100 mg/kg (the threshold for this modified method). **Both lead Dust and Lead Soil hazards are present. See dust and soil sampling results for details.**

BUILDING DESCRIPTION: The subject site is a single family, one-story with crawlspace, wood frame house, built in 1928, and totals approximately 1020 SF. There is a crawlspace under the main portion of the house (not including the mechanical room). At the time of our screening, there were no children under the age of six residing at this subject house and the house was not being used as a daycare facility.

BACKGROUND: We understand the subject house suffered damage as a result of hurricane Sandy on October 29-30, 2012 and is scheduled to be renovated and raised. We also understand that the scope of the renovation work would involve disturbance of all flooring (except hardwood), disturbance of select walls, disturbance of select ceilings all on the first floor, and re-insulation of the crawlspace. Please see attached Scope of Inspection Drawing for details.

SCOPE OF OUR WORK: Our work would include the following:

- A Lead Hazard Risk Assessment
- XRF Screening of Lead Based Paint of representative painted surfaces on the 1st floor. as directed by our client.
- A hazardous waste evaluation.
- A report of the findings with site drawings.

Lead paint chip and TCLP sampling are not in our scope of work.

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.

INTRODUCTION (cont)

QUALIFICATIONS: The Inspection was conducted by Daniel P. Sullivan, CT DPH Certified DPH Lead Inspector/Risk Assessor #002131, Radiation Safety Training, RMD 12/2/94 and Nathan Yergeau, CT DPH Certified Lead Inspector/Risk Assessor #002225, Radiation Safety Training, RMD 3/12/2009. Dan and Nathan were assisted by Ziyang Wang. Chem Scope's DPH lead license # is CC000164.

METHOD OF TESTING: Spectrum Analyzer XRF (x-ray fluorescence). Instrument used: RMD LPA-1, Serial # 1647 in Quick Mode. The unit source (Cobalt 57) for unit 1647 was replaced November 2nd, 2012. The XRF detects paint in all layers down to the painted substrate. In other words if lead paint is painted over with new paint, the lead paint is still detected by this procedure. When paint is covered with metal or plastic trim such as siding or by carpet, the lead paint is usually not detectable. This instrument is registered with the State of Connecticut Dept of Energy and Environmental Protection and is Generally Licensed under the NRC. This is one of the two methods, which are approved under the CT Dept of Public Health (DPH) regulations. This is a non-destructive test.

The dust and soil samples were sent for analysis to Eastern Analytical Services (EAS), an AIHA accredited Laboratory and a CT DPH approved Environmental Laboratory in regards to this test, using Atomic Absorption analysis.

TEST PARAMETERS FOR XRF TESTING USING THIS INSTRUMENT: *OSHA 1926.62 Definition: Lead* means metallic lead, all inorganic lead compounds, and organic lead soaps. Excluded from this definition are all other organic lead compounds. XRF readings of 1.0 mg/cm^2 or higher are lead based paint as defined by USC Title 15 – Chapter 53- Toxic Substance Control and XRF reading with any detectable amount of lead detected are defined as Lead by OSHA standard 1926.62.

XRF CALIBRATION CHECK: Standard Reference Material (SRM) paint film nearest to 1.0 mg/cm^2 within the National Institute of Standards and Technology (NIST) SRM is used to Calibrate the XRF. Calibration Readings are taken at the beginning and end of a job and every four (4) hours during the job with three (3) readings per set. The expiration date of the standard used is 7/1/20.

QUALITY CONTROL PROCEDURES: The XRF is used in accordance with Manufacturer's Performance Characteristics Sheet and instructions. See test data attached for details. Ten (or if <10, then the total number of tests conducted) testing combinations for re-testing from each unit are selected and checked in either 15 second or 60 second readings.

STATEMENT ON ACCURACY: The XRF Calibration checks were acceptable with each of the three (3) readings before, during (if applicable) and after the testing between 0.7 mg/cm^2 and 1.3 mg/cm^2. See attached XRF data sheets for documentation of proper calibration check sequence.

REPORT CONVENTIONS: Rooms are sometimes given arbitrary numbers to avoid ambiguity. Please refer to the enclosed schematic drawings of the site. Samples are referenced by the side of the building they are facing, as indicated on the drawings. Side A is the street side (front), Side B is the left side, Side C is the rear and Side D is the right side.

INTRODUCTION (cont)

ONGOING MONITORING: Ongoing monitoring is necessary in all dwellings in which LBP is known or presumed to be present. At these dwellings, the very real potential exists for LBP hazards to develop. Hazards can develop by means such as, but not limited to: the failure of lead hazard control measures; previously intact LBP becoming deteriorated; dangerous levels of lead-in-dust (dust lead) re-accumulating through friction, impact, and deterioration of paint; or, through the introduction of contaminated exterior dust and soil into the interior of the structure. Ongoing monitoring typically includes two different activities: re-evaluation and annual visual assessments. A re-evaluation is a risk assessment that includes limited soil and dust sampling and a visual evaluation of paint films and any existing lead hazard controls. Re-evaluations are supplemented with visual assessments by the Client, which should be conducted at least once a year, when the Client or its management agent (if the housing is rented in the future) receives complaints from residents about deteriorated paint or other potential lead hazards, when the residence (or if, in the future, the house will have more than one dwelling unit, any unit that turns over or becomes vacant), or when significant damage occurs that could affect the integrity of hazard control treatments (e.g., flooding, vandalism, fire). The visual assessment should cover the dwelling unit (if, in the future, the housing will have more than one dwelling unit, each unit and each common area used by residents), exterior painted surfaces, and ground cover (if control of soil-lead hazards is required or recommended). Visual assessments should confirm that all Paint with known or suspected LBP is not deteriorating, that lead hazard control methods have not failed, and that structural problems do not threaten the integrity of any remaining known, presumed or suspected LBP.

The visual assessments do not replace the need for professional re-evaluations by a certified risk assessor. The re-evaluation should include:
1. A review of prior reports to determine where lead-based paint and lead-based paint hazards have been found, what controls were done, and when these findings and controls happened;
2. A visual assessment to identify deteriorated paint, failures of previous hazard controls, visible dust and debris, and bare soil;
3. Environmental testing for lead in dust, newly deteriorated paint, and newly bare soil; and
4. A report describing the findings of the reevaluation, including the location of any lead-based paint hazards, the location of any failures of previous hazard controls, and, as needed, acceptable options for the control of hazards, the repair of previous controls, and modification of monitoring and maintenance practices.

The first reevaluation should be conducted no later than two years after completion of hazard controls, or, if specific controls or treatments are not conducted, two years from the beginning of ongoing lead-based paint monitoring and maintenance activities. Subsequent reevaluations should be conducted at intervals of two years, plus or minus 60 days. If two consecutive reevaluations are conducted two years apart without finding a lead-based paint hazard, reevaluation may be discontinued.
Please refer to your community development agency, housing authority, or other applicable agency for additional local/regional regulations and guidelines governing re-evaluation activities.

INTRODUCTION (cont)

DISCLOSURE REGULATIONS: A copy of this complete report must be made available to new lessees (tenants) and/or must be provided to purchasers of this property under Federal law before they become obligated under any future lease or sales contract transactions (Section 1018 of Title X – found in 24 CFR Part 35 and 40 CFR Part 745), until the demolition of this property. Landlords (Lessors) and/or sellers are also required to distribute an educational pamphlet developed by the EPA entitled *"Protect Your Family From Lead in Your Home"* and include standard warning language in their leases or sales contracts to ensure that parents have the information they need to protect their children from LBP hazards.

FUTURE REMODELING PRECAUTIONS: It should be noted that during this Assessment, a limited number of areas were tested for the presence of LBP. All LBP, dust, and soil hazards that were identified are addressed in this report. However, LBP, dust lead hazards, and/ or soil lead hazards may be present at other locations of the property. Additional paint testing should precede any future remodeling activities that occur at any untested areas. Additional dust and/or soil sample collection and analysis should follow any hazard control activity, repair, remodeling, or renovation effort, and any other work efforts that may in any way disturb LBP and/or any lead containing materials. These Assessment activities will help the Client and owner to ensure the health and safety of the occupants and the neighborhood. Details concerning lead-safe work techniques and approved hazard control methods can be found in the HUD publication entitled: *"Guidelines for the Evaluation and Control of LBP Hazards in Housing"* (*www.hud.gov/offices/lead*). Remodeling, repair, renovation and painting at the residence beyond the scale of minor repair and maintenance activities must be conducted in accordance with the EPA's Lead Repair, Renovation, and Painting Rule (within 40 CFR part 745); see the EPA's website on the RRP Rule at *http://www.epa.gov/lead/pubs/renovation.htm* for the scope and requirements of that Rule. Lead-based paint abatement or lead-based paint hazard abatement at the residence must be conducted in accordance with the EPA's Lead Abatement Rule (also within 40 CFR 745); see the EPA's website for Lead Abatement Professionals at *http://www.epa.gov/lead/pubs/traincert.htm*.

CONDITIONS & LIMITATIONS: Staff of ChemScope Inc. has performed the tasks listed above requested by the our client in a thorough and professional manner consistent with commonly accepted standard industry practices, using state of the art practices and best available known technology, as of the date of the assessment. ChemScope cannot guarantee and does not warrant that this Assessment/Limited LBP Testing has identified all adverse environmental factors and/or conditions affecting the subject property on the date of the Assessment. ChemScope cannot and will not warrant that the Assessment/Limited Testing that was requested by the client will satisfy the dictates of, or provide a legal defense in connection with, any environmental laws or regulations. It is the responsibility of the client to know and abide by all applicable laws, regulations, and standards, including EPA's Renovation, Repair and Painting regulation.

The results reported and conclusions reached by ChemScope are solely for the benefit of the client. The results and opinions in this report, based solely upon the conditions found on the property as of the date of the Assessment, will be valid only as of the date of the Assessment. ChemScope assumes no obligation to advise the client of any changes in any real or potential lead hazards at this residence that may or may not be later brought to our attention. Further conditions and limitations to this contracted report are included in the general terms and conditions supplied to the client with the contract for services.

INSPECTION REPORT SYNOPSIS

LOCATION NAME AND ADDRESS: Site 011 (Carlino)
17 Elaine Road, Milford CT
Application #1085

INSPECTION DATE(S): 4/30/2014 and 6/27/2014

XRF Testing Results: Limited LBP Testing, conforming with HUD regulation 24 CFR 35.930(c), (d) was accomplished at this residence on surfaces found to have deteriorated paint and/or where it was indicated to the Assessor that planned renovation would occur. No paint chip samples were taken. On 4/30/2014, a total of 56 tests (assays) were taken at a limited number of specified surfaces on the inside and outside of the residence using a x-ray fluorescence analyzer. Deteriorated paint and areas that were specified to be disturbed during the planned renovation project were tested. Lead concentrations that meet or exceed the HUD published levels identified as being potentially dangerous (e. g., greater than or equal to 1.0 milligrams per centimeter square [> 1.0 mg/cm2]) were encountered on a few interior surfaces (see list of lead based paint items listed below).

The following surface(s) and/or component(s) contained Lead as defined by OSHA regulations 29 CFR 1926.62, in addition the **items in bold are Lead Based Paint** as defined by USC Title 15 – Chapter 53- Toxic Substance Control:

Component/Description	Location	Defective
White painted wooden window casings, sills, aprons, sashes, etc	**Throughout**	**Yes**
Off white painted wood panel walls	**Throughout**	**Yes**
Off white painted fiberboard ceiling	**Throughout**	**No**
White painted wooden wall trim	**Living Room**	**No**
Green painted wooden walls	**1-6**	**Yes**

OSHA 1926.62 Definition: Lead means metallic lead, all inorganic lead compounds, and organic lead soaps. Excluded from this definition are all other organic lead compounds.

XRF readings of 1.0 mg/cm^2 or higher are lead based paint as defined by USC Title 15 – Chapter 53- Toxic Substance Control and XRF reading with any detectable amount of lead detected are defined as Lead by OSHA standard 1926.62.

LIMITATIONS OF SCREENING: Not all painted surfaces were tested. Consequently, if a surface was not tested assume it contains Lead until proven otherwise. See attached data sheets for a list of surfaces tested.

INSPECTION REPORT SYNOPSIS (cont)

RESIDENT QUESTIONNAIRE: A resident questionnaire was completed as part of the Assessment, to help identify particular use patterns, which may be associated with potential LBP hazards, such as opening and closing windows painted with LBP. The answers to the questionnaire were obtained during a phone interview with the owner/occupant, Joe Carlino on 6/27/2014. Following is a summary of the information obtained during the interview:

Children in the Household:	None, they have three children who visit regularly
Children's bedroom locations:	1-8, if they stay overnight
Children's eating locations:	1-5 Kitchen
Primary interior play area(s):	1-7 Office
Primary exterior play area(s):	Backyard
Toy Storage:	1-7 Office
Pets:	No
Children's blood lead testing history:	Unkown
Observed chewed surfaces:	None
Women of child bearing age:	No
Previous lead testing:	None
Most frequently used entrances:	Side D Side Foyer door
Most frequently opened windows:	All of them seasonally
Structure cooling method:	Window A/C units
Gardening – type and location(s):	Back yard
Plans for landscaping:	Yard to be torn up to excavate around house
Cleaning regiment:	Daily
Cleaning methods:	Mopping, sweeping, dusting, vacuuming
Recently completed renovations:	Repaired damage to lower walls after hurricane in 1-6, 1-7, 1-8
Demolition debris on site:	No had a dumpster
Resident(s) with work lead exposure:	None
Planned renovations:	The scope of the renovation involves raising house and removing flooring from first floor.

INSPECTION REPORT SYNOPSIS (cont)

Building Conditions Survey

Date of Construction:	1928
Apparent Building Use:	Residential
Setting:	Residential
Front Entry Faces:	Side A, Faces West
Design:	1-Story, Ranch-Style
Construction Type:	Wood framed, wood siding
Lot Type:	Flat
Roof:	Good, no apparent roof leaks (new roof 6 yrs old)
Foundation:	Cinderblock with crawlspace (soil floor) – Note: House is scheduled to be elevated for future flood protection as part of the planned work
Front Lawn Condition:	No bare soil
Back Lawn Condition:	Approx. < 10% bare soil
Drip Line Condition:	Good – no paint chips seen
Site Evaluation:	Good – other than hurricane damage
Exterior Structural Condition:	Exterior structural is good for the house
Interior Structural Condition:	Good
Overall Building/Site Condition:	Good other than storm related damage

PAINT CONDITION SURVEY

Please Note: EPA and HUD have provided a specific definition for the term "deteriorated paint." Deteriorated paint is defined as "any interior or exterior paint or other coating that is peeling, chipping, chalking or cracking, or any paint or coating located on an interior or exterior surface or fixture that is otherwise damaged or separated from the substrate." This definition is most typically associated with surface conditions only. Usage of this term in describing conditions other than those associated with surface coatings are not known to be defined by EPA or HUD.

Continued

INSPECTION REPORT SYNOPSIS (cont)

Identified Deteriorated Paint, Paint Conditions, Lead Content, & Most Apparent Cause of Deterioration:

- White painted window components, most likely causes of damage friction, age and contact damage.
- Off-white painted wood panel walls, most likely age related damage and contact damage
- Off-white painted fiberboard ceilings, most likely age related damage
- White painted wooden wall trim in the Living Room 1-8, most likely cause of damage storm related.
- Green painted wooden walls in 1-6 Laundry Area, , most likely age related damage

The remaining paint exhibited no apparent signs of deterioration, as of the date of the Assessment.

INTERIOR DUST SAMPLING:
A total of 9 single surface dust wipe samples were collected in an effort to help to determine the levels of lead-containing dust on the interior window sills and floors. These samples were collected from areas most likely to be lead-contaminated if lead-in-dust is present. These samples were collected in accordance with the requirements of ASTM Standard E-1728, Standard Practice for Field Collection of Settled Dust Samples Using Wipe Sampling Methods for Lead Determination by Atomic Spectrometry Techniques. EPA, HUD and State of Connecticut regulations define the following as hazardous levels for lead dust in residences: floors – ≥40 mg/ft2 (micrograms per square foot); interior window sills – ≥250 mg/ft2. There is no EPA dust-lead hazard standard for window troughs. Please refer to *Appendix B – Dust Wipe Analytical Results* for the laboratory reports and to *Appendix I – Lead and Lead Safety Information and Resources* for a list of publications and resources addressing lead hazards and their health effects; both are located at the end of this report.

Eight of the nine samples collected were within acceptable levels. A summary list is given below, see attached analysis reports and drawings for details. **Samples noted in bold below exceeded HUD and CT-DPH standards and represent dust-lead hazards. These samples constitute dust-lead hazards in those rooms.**

Sample #	Date	Location	Surface	Dust Wipe Result (ug/sq ft)	CT-DPH Standard (ug/sq ft)
183-100-1D	6/27/2014	1-8 Living Room by door	Floor	BDL <12.9	40
183-100-2D	6/27/2014	1-8 Living Room	Window Sill	86.8	250
183-100-3D	6/27/2014	1-5 Kitchen	Floor	BDL <12.9	40
183-100-4D	6/27/2014	1-5 Kitchen	Window Sill	BDL <22.1	250
183-100-5D	6/27/2014	1-1 Bedroom	Floor	BDL <12.9	40
183-100-6D	**6/27/2014**	**1-1 Bedroom**	**Window Sill**	**4971.1**	**250**
183-100-7D	6/27/2014	1-7 Spare Bedroom	Floor	BDL <12.9	40
183-100-8D	6/27/2014	1-7 Spare Bedroom	Window Sill	BDL <32.5	250
183-100-9D	6/27/2014	1-2 Side Foyer	Floor	15.8	40
183-100-10D	6/27/2014	-	Blank	BDL <12.9	-
183-100-11D	6/27/2014	-	Blank	BDL <12.9	-

INSPECTION REPORT SYNOPSIS (cont)

SOIL SAMPLING AND LABORATORY INFORMATION: Three (3) soil samples were collected at this residence in accordance with the requirements of ASTM Standard E-1727, Standard Practice for Field Collection of Soil Samples for Lead Determination by Atomic Spectrometry Techniques. One of the samples identified lead concentrations above the levels that EPA, HUD or CT-DPH identifies as hazardous. See the following table for a summary of the soil sampling results. Please refer to *Appendix C – Soil Sample Analytical Data* for the detailed analytical reports. Testing data in **bold face** indicates soil lead levels at or above the EPA Hazardous Levels of Lead regulations that were published on January 5, 2001.

Sample #	Date	Location	Surface	Soil Concentra (mg/kg)	CT-DPH Sta (mg/kg
183-100-1S	**6/27/2014**	**Side B, 2' from A/B corner**	**Soil 2" deep**	**1050.3**	**400**
183-100-2S	6/27/2014	2' from Side D of Mech Rm, 8' Side C of house	Soil 2" deep	373.7	400
183-100-3S	6/27/2014	30' from Window 1 of 1-1	Soil 2" deep	126.6	400

HAZARDOUS WASTE EVALUATION :Because toxic levels of lead were detected, a Hazardous Waste Evaluation was done to determine if the waste products from the renovation are potentially a hazardous waste.

An initial hazardous evaluation was done using a modified (for XRF data as opposed to paint chip data) "knowledge of process" technique intended to approximate the method described by the CT Department of Energy and Environmental Protection (DEEP). That method is one of six methods outlined in the CT DEEP "Guidance for the Management and Disposal of Lead-Contaminated Materials Generated in the Lead Abatement, Renovation and Demolition Industries" (11/4/94) for hazardous waste evaluation. For our modified method, data gathered during the XRF inspection is used to calculate for hazardous waste vs. other methods that require TCLP (Toxicity Characteristic Leaching Procedure) testing. This method is the least expensive method of hazardous waste evaluation but has limited applicability. The other methods include the following:

- Demolish and Test (TCLP test and needs to be done during the renovation or demolition)
- Composite-Sample and Demolish (TCLP test done before the renovation and destructive testing required and challenging to do for renovations if we don't know what the waist stream is actually going to be in the dumpster)

This modified method resulted in the waste being **5133 mg/kg of lead**, which is considered likely to be a lead hazardous waste since it is > 100 mg/kg (the threshold for this modified method). Based on the findings we recommend one of the following three options:

Option A: Remove all of the components (hot spots) that contain lead-based paint prior to renovation. This must be done according to applicable regulations (DEEP and OSHA), by properly trained personnel using proper work practices and procedures including proper disposal as of waste as lead hazardous.

Option B: With additional testing costs, further evaluation of the waste could be made using TCLP testing as outlined above. There are potentially a number of possible strategies, which may be employed to assess lead-contaminated debris while attempting to minimizing disposal costs (there is no guarantee that disposal costs will be minimized with further testing). We could provide a separate proposal if needed or this could be done by other qualified persons.

Option C: Properly remove and dispose of all renovation debris as hazardous lead waste, excluding any asbestos containing materials which have to be disposed of as a special waste.

RECOMMENDATIONS

Lead Hazard Control Options Lead-safe work practices and worker/occupant protection practices complying with current EPA, HUD and OSHA standards will be necessary to safely complete all work involving the disturbance of LBP coated surfaces and components. In addition, any work considered lead hazard control will enlist the use of interim control (temporary) methods and/or abatement (permanent) methods. It should be noted that all lead hazard control activities have the potential of creating additional hazards or hazards that were not present before.

Details for the listed lead hazard control options and issues surrounding occupant/worker protection practices can be found in the publication entitled: *Guidelines for the Evaluation and Control of LBP Hazards in Housing* published by HUD, the Environmental Protection Agency (EPA) lead-based paint regulations, and the Occupational Safety and Health Administration (OSHA) regulations found in its Lead in Construction Industry Standard. The associated cost estimates, unless otherwise noted, include the labor and materials to accomplish the stated activity and most additional funds typically found to be necessary to complete worker protection, site containment, and cleanup procedures. These are approximate estimates only and due to a variety of potential factors, may not accurately reflect all local cost factors. A precise estimate must be obtained from a certified LBP abatement contractor or a contractor trained in lead-safe work practices. Properly trained and/ or licensed persons, as well as properly licensed firms (as mandated) should accomplish all abatement/interim control activities conducted at this residence.

Interim controls, as defined by HUD, means a set of measures designed to temporarily reduce human exposure to LBP hazards and/or lead containing materials. These activities include, but are not limited to: component and/or substrate repairs; paint and varnish repairs; the removal of dust-lead hazards; renovation; remodeling; maintenance; temporary containment; placement of seed, sod or other forms of vegetation over bare soil areas; the placement of at least 6 inches of an appropriate mulch material over an impervious material, laid on top of bare soil areas; the tilling of bare soil areas; extensive and specialized cleaning; and, ongoing LBP maintenance activities.

Abatement, as defined by HUD, means any set of measures designed to permanently eliminate LBP and/ or LBP hazards. The product manufacturer and/or contractor must warrant abatement methods to last a minimum of twenty (20) years, or these methods must have a design life of at least twenty (20) years. These activities include, but are not necessarily limited to: the removal of LBP from substrates and components; the replacement of components or fixtures with lead containing materials and/or lead containing paint; the permanent enclosure of LBP with construction materials; the encapsulation of LBP with approved products; the removal or permanent covering (concrete or asphalt) of soil-lead hazards; and, extensive and specialized cleaning activities. (EPA's definition is substantively the same.)

RECOMMENDATIONS (cont)

CT DEEP Hazardous Waste evaluation: Contractor generated waste from lead paint chips or component removal must be evaluated to determine if it is hazardous using one of the many techniques as described in the CT Department of Energy and Environmental Protection (DEEP) Guidance for the Management and Disposal of Lead-Contaminated Materials Generated in the Lead Abatement, Renovation and Demolition Industries" (11/4/94). This guidance document allows for homeowners to take up to 10 cubic yards to be disposed of as part of normal house hold waste (even if it contains lead). Under the household waste exclusion, in order for the waste to be exempt, the homeowner must have the means to dispose of it in a manner typical for routine household wastes: that is, either via curbside pickup, or by taking it themselves to their local transfer station.

EPA's RRP rule sets up requirements for firms and individuals performing renovations in pre-1978 housing and child-occupied facilities, such as schools and day cares. The RRP Rule requires that renovators be trained in the use of lead safe work practices, that renovators and firms be certified, that providers of renovation training be accredited, and that renovators follow specific work practice standards.

Because this is a pre-1978 house, contractors (including renovation, repair and painting workers, plumbers, electricians, HVAC professionals, etc.) working on this project must be EPA certified and trained in lead-safe work practices when conducting renovation, repair and painting activities that will disturb more than six (6) square feet of painted surfaces on the interior of a building or more than twenty (20) square feet on the exterior and all window replacements jobs. Additional information on this rule can be found at http://www.epa.gov/lead/pubs/renovation.htm.

OSHA 1926.62 (worker protection): Work that disturbs surfaces that contain Lead Based Paint (or any detectable amount of Lead) such as is the case for this work must be done according to OSHA regulation 1926.62 OSHA requires employers to conduct air sampling on workers disturbing lead to establish exposure levels to lead for those workers. The recorded levels are then compared to two different airborne concentrations in the OSHA standard: the action limit (AL) and the permissible exposure limit (PEL). Currently, the AL is set at 30 micrograms of lead per cubic meter of air (µg/m3) and the PEL is 50 µg/m3. At a minimum the following is required even for air sample results below the action level (this is known as Category 1):

1. Train employees
2. Conduct Exposure Monitoring (air sampling, as mentioned above)
3. Maintain Records

See details below if your sampling exceeds the standards. Chem Scope, Inc could help with compliance assistance as needed.

RECOMMENDATIONS (cont)

OSHA 1926.62 – Additional Details:

Category 2: OSHA regulations require; Same as category I, plus: Provide respirator at employee request, Conduct exposure monitoring every 3 months, and Conduct blood lead monitoring when the exposure monitoring results are 30–50 ug/m3 (above the action level, but below the PEL).

Category 3: OSHA Regulations require; Same as category II, plus, enforce respirator use, enforce use of protective clothing, develop monitoring every 6 months, enforce housekeeping, provide hygiene facilities and enforce washing when the exposure monitoring results are 50 ug/m3 and over (above the PEL).

See separate Asbestos Pre-renovation Inspection report and Mold Assessment report for additional details.

If you have any questions or need more information please call me. Thank you for calling on us.

Sincerely,

Dan Sullivan
Vice President, Operations

Appendix A XRF Lead–Based Paint Testing Results

ChemScope, Inc. **LEAD INSPECTION DATA FORM FOR XRF – COVER PAGE** XRF Data Form LI-1 (8/11)

Site Name: Site 011 Date of Inspection: 4/30/2014

Site Address: 17 Elaine Road, Milford, CT CS# 183-100

Customer Name: Diversified Technology Consultants (DTC)

Customer Address: 2321 Whitney Avenue, Suite 301 / Hamden, CT 06518

Work Area: Throughout Page 1 of 4

Site Description: Single-Family Residential of wood frame construction, total lins ~1020 SF Year of Construction: 1928

Name of Individual Doing Testing: Dan Sullivan CT DPH Lic# 2131

CO-57 Date Source Installed: October 30th 2012 Software version # N/A Serial # 1647

Test #	Clock Time	NIST Calibration Standard	Results QM (mg/CM2)
1	10:22 am	NIST SRM 2573 Red	1.0
2	10:23 am	NIST SRM 2573 Red	1.0
3	10:24 am	NIST SRM 2573 Red	1.0
65	11:14 a.m	NIST SRM 2573 Red	1.0
66	11:15 a.m	NIST SRM 2573 Red	1.0
67	11:16 a.m	NIST SRM 2573 Red	1.0
		NIST SRM 2573 Red	
		NIST SRM 2573 Red	
4	10:25 am	NIST SRM 2570 White (Blank)	0.2
68	11:17 a.m	NIST SRM 2570 White (Blank)	-0.1

Note: each entry represents a single test on the surface indicated.

- Acceptance limits for calibration are 0.7-1.3.
- 1.0 mg/cm² or higher = lead based paint (LBP)
- **All values run under Quick Mode (QM), unless noted otherwise under comments above.**
- **Calibration std SRM 2573 has 1.0 mg/cm² of lead, expiration of std is 7/1/20.**
- **DEF under comments means the surface has defective lead based paint**

INSPECTOR SIGNATURE/Date/REVIEWED BY/Date: [signature], 4/30/14, [signature], 5-15-14

ChemScope, Inc. **LEAD INSPECTION DATA FORM FOR XRF** XRF Data Form LI-1 (8/11)

Site Name: Site 011 Date of Inspection: 4/ 30 /2014

Site Address: 17 Elaine Road, Milford, CT CS#183-100

Work Area: Throughout Page 2 of 4

Test # / Side		Int/Ext	Room #	Component	Defective (Y/N)	Color	Substrate	Results QM (mg/CM2)	LPB (Y/N)	
5	A	Int	1-8	wall	Y	beige	SR	-0.3	N	
6	"	"	"	"	"	"	"	-0.3	N	QC
7	"	"	"	"	"	stand	wood	-0.0	N	
8	"	"	"	"	"	"	"	-0.4	N	QC
9		"	"	floor	"	"	"	-0.1	N	
10		"	"	"	"	"	"	-0.3	N	QC
11	A	"	"	upper trim	"	off white	wood	-0.4	N	
12	"	"	"	"	"	"	"	-0.1	N	QC
13	"	"	"	door	"	"	"	-0.2	N	
14	"	"	"	"	"	"	"	-0.0	N	QC
15	"	"	"	door frame	"	white	wood	-0.1	N	
16	"	"	"	~~door stop~~ zw 4/30	"	"	"	-0.1	N	QC
17	"	"	"	door stop	"	"	"	-0.0	N	
18	"	"	"	"	"	"	"	-0.0	N	QC
19	B	"	"	wall	"	beige	SR	0.1	N	
20	"	"	"	"	"	"	"	0.0	N	QC
21	A	"	"	window casing	"	white	wood	+9.1	~~Y~~ N zw 4/30	
22	"	"	"	"	"	"	"	9.4	Y	QC
23	"	"	"	window sill	"	"	"	>9.9	Y	
24	"	"	"	"	"	"	"	>9.9	Y	QC
25	"	"	"	window apron	"	"	"	>9.9	Y	
26	A	"	"	radiator cover	N	white	metal	-0.1	N	
27	C	"	"	wall trim	"	"	wood	>9.9	Y	
28	A	"	1-7	wall	"	Lt gray	SR	-0.3	N	
29	B	"	"	wall	"	Dark gray	SR	-0.1	N	
30	A	"	"	wood baseboard	Y	white	wood	-0.2	N	
31	A	"	"	floor	"	stand	wood	-0.1	N	

Signature: [signature] Date: 4/30/14

ChemScope, Inc. **LEAD INSPECTION DATA FORM FOR XRF** XRF Data Form LI-1 (8/11)

Site Name: Site 011 Date of Inspection: 4/ 30 /2014

Site Address: 17 Elaine Road, Milford, CT CS#183-100

Work Area: Throughout Page 3 of 9

Test # / Side	Int/Ext	Room #	Component	Defective (Y/N)	Color	Substrate	Results QM (mg/CM2)	LPB (Y/N)
32 A	Int	1-6	wall	Y	beige	SR	-0.3	N
33	"	"	ceiling	"	white	SR	0.0	N
34 A	"	"	base board	"	stand	wood	-0.1	N
35 "	"	"	door casing	"	"	"	-0.1	N
36 "	"	"	door frame	"	"	"	-0.1	N
37 "	"	"	door stop	"	"	"	-0.3	N
38 "	"	"	door	"	"	"	-0.2	N
39 D	"	"	wall	"	green	~~SR~~ 2W 4/30 wood	1.7	Y
40 "	"	"	chairrail	"	white	wood	-0.0	N
41 A	"	1-6CL	wall	"	off white	wood	-0.1	N
42	"	1-5	ceiling	"	"	SR	-0.1	N
43 A	"	"	panel	"	stand	wood	-0.1	N
44 "	"	"	wall	"	beige	SR	-0.1	N
45 B	"	"	wall	"	off white	~~SR~~ wood	>9.9	Y
46 B	"	"	ceiling	N	"	FB	>9.9	Y
47 D	"	"	window apron	N	"	wood	8.7	Y
48 C	"	1-4	wall	Y	pink	SR	-0.4	N
49 C	"	"	ceiling	"	white	SR	-0.2	N
50 D	"	"	base board	"	stand	wood	0.3	N
51 C	"	"	door	"	"	"	-0.3	N
52 C	"	"	door casing	"	"	"	-0.1	N
53 C	"	"	door frame	"	"	"	-0.1	N
54 "	"	"	door stop	"	"	"	-0.1	N
55 B	"	1-3	wall	Y	blue	SR	-0.2	N
56 A	"	1-CL	wall	"	off white	wood	-0.1	N
57 B	"	1-3	ceiling	"	"	SR	-0.3	N
58	"	1-3	wall trim	"	whit	wood	-0.0	N

Signature: [signature] Date: 4/30/14

ChemScope, Inc. **LEAD INSPECTION DATA FORM FOR XRF** XRF Data Form LI-1 (8/11)

Site Name: Site 011 Date of Inspection: 4/ 30 /2014

Site Address: 17 Elaine Road, Milford, CT CS#183-100

Work Area: Throughout Page 4 of 4

Test # / Side	Int/Ext	Room #	Component	Defective (Y/N)	Color	Substrate	Results QM (mg/CM2)	LPB (Y/N)
59 C	Int	1-3	base board	Y	white	wood	-0.2	N
60 D	"	"	door casing	"	white	"	-0.1	N
61 D	"	"	door frame	"	"	"	0.0	N
62 A	"	1-1	wall	Y	"	SR	-0.1	N
63 A	"	"	ceiling	"	"	"	-0.1	N
64 D	"	1-5	base board	Y	stained	wood	-0.2	N

Signature: [signature] Date: 4/30/14

EVALUATING THE QUALITY OF XRF:					
Site Name: Site 011					C 18 00
Site Address: 17 Elaine Road, Milford, CT					Date: 4/ /14
	Location	Original Reading	Retest Reading	Square of Original Reading	Square of Retest Reading
1.	Interior - Room 1-8 - Wall - Side A	-0.3	-0.3	0.09	0.09
2.	Interior - Room 1-8 - Wall - Side A	0.0	-0.4	0.00	0.16
3.	Interior - Room 1-8 - Floor - Side A	-0.1	-0.3	0.01	0.09
4.	Interior - Room 1-8 - Upper Trim - Side A	-0.4	-0.1	0.16	0.01
5.	Interior - Room 1-8 - Door - Side A	-0.2	0.0	0.04	0.00
6.	Interior - Room 1-8 - Door Frame - Side A	-0.1	-0.1	0.01	0.01
7.	Interior - Room 1-8 - Door Stop - Side A	0.0	0.0	0.00	0.00
8.	Interior - Room 1-8 - Wall - Side B	0.1	0.0	0.01	0.00
9.	Interior - Room 1-8 - Window Casing - Side A	9.1	9.4	82.81	88.36
10.	Interior - Room 1-8 - Window Sill - Side A	9.9	9.9	98.01	98.01
	Sum of ten squared averages ("C"):			181.14	186.73
	"C" times 0.0072 ("D"):			1.304208	1.34446
	"D" plus 0.032 ("E"):			1.336208	1.376456
	Square root of "E" ("F"):			1.15594	1.173224616
	"F" times 1.645 (Retest Tolerance Limit):			1.9015	1.9300
	Average of the ten XRF Readings:			1.80	1.81
	Absolute difference of the two averages:			0.0100	
	If the difference is less than the Retest Tolerance Limit, the inspection has passed the retest.				

Appendix B Lead in Dust and Soil Sample Analysis Reports

ChemScope INDUSTRIAL HYGIENE • ENVIRONMENTAL CHEMISTRY
15 Moulthrop Street, North Haven, CT 06473-3686 • Phone (203) 865-5605 • Fax (203) 498-1610

Diversified Technology Consultants
2321 Whitney Avenue, Suite 301
Hamden CT 06518

Application #1085
7/7/2014
CS# 183-100

LEAD ANALYSIS BY ATOMIC ABSORPTION

Lead dust wipe and soil samples from Site 011, 17 Elaine Road, Milford CT, collected by ChemScope, Inc., on 6/27/2014:

See attached chain of custody and EAS Analytical Services, Inc., reports for sample descriptions and analytical data; and applicable standards on reverse side of this page.

*NOTE: The EAS Analytical Services, Inc. report provides the lead soil concentration in mg/kg which is equivalent to ppm (parts per million).

Suzanne Cristante or
Laboratory Director
SC

Izabela Kremens or
Quality Manager
IK

Ronald D. Arena
President
RDA

Gina I2\C\My Documents\lead100-present.doc

LEAD STANDARDS AND GUIDELINES
(Revised 4/2013)

The following are some existing known standards and guidelines as they relate to lab analysis for lead by AAS. ChemScope assumes no liability for the use of these data. All values are expressed as pure lead, Pb.

1. *Lead in Dust Standards: Connecticut DPH, EPA & HUD:*

   Dust-Wipe Re-Occupancy Testing:
   Floors: 40 micrograms/sq ft
   Sills: 250 micrograms/sq ft
   Window Wells: 400 micrograms/sq ft

   Toxic Level of lead in dry paint: 0.5%

   **NOTE: City of Stamford has a stricter standard of .06%*

2. *For Air Samples: OSHA PEL (Permissible Exposure Limit) is 50 micrograms/cubic meter and the AL (Action Level) is 30 micrograms/cubic meter.*

3. *For Soil: 400 PPM is considered contaminated.*

   State regulations (CT DEEP RCSA 22a-133K) require lead-contaminated soil to be cleaned up to a concentration of 500 ppm in residential areas and 1,000 ppm in industrial and commercial areas. But in practice the Department of [Energy and] Environmental Protection (DEEP) and state and local health departments apply a 400 ppm standard in residential areas. DEEP has begun the process of adopting the 400 ppm standard in regulation.
   OLR Research Report, October 11, 2006, 2006-R-0596

4. *For any material to be disposed of: the DEP and EPA Standard for TCLP lead is 5 milligrams/liter. In addition, other substances besides lead may need to be tested which are not in the scope of this test report.*

5. *Consumer Product Safety Commission: Lead in paint for sale 0.06%.*

6. *For Drinking Water Samples (First Draw and Fully Flushed samples):*

   State of Connecticut Action Level: 0.015 mg/l
   EPA Action Level: 15 ppb

   NOTE: .015 mg/l = 15 ppb

Eastern Analytical Services, Inc.

Wipe Sample Report

RE: CPN 183-100 - Diversified Technology Consultants (DTC) - Site 011 - Application 1085 - 17 Elaine Road - Milford, CT

Date Collected: 06/27/2014
Collected By: Dan Sullivan
Date Received: 06/30/2014
Date Analyzed: 07/01/2014
Analyzed By: Everton Byron Barrett
Signature:
Analyte: Pb Dust
Analytical Method: EPA 3050B/7000B
NYS Lab Number: 10851

Client: Chem Scope, Inc.
15 Moulthrop Street
North Haven, CT 06473

Sample ID# / Lab ID#	Sample Location	Sample Notes	Concentration
183-100-1D 2296586	1-8 Living Room - Floor	Dust Wipe - 12" x 12" Area	BDL < 12.9 µg/ft²
183-100-2D 2296587	1-8 Living Room - Window Sill	Dust Wipe - 3" x 33" Area	86.8 µg/ft²
183-100-3D 2296588	1-5 Kitchen - Floor	Dust Wipe - 12" x 12" Area	BDL < 12.9 µg/ft²
183-100-4D 2296589	1-5 Kitchen - Window Sill	Dust Wipe - 3" x 28" Area	BDL < 22.1 µg/ft²
183-100-5D 2296590	1-1 Bedroom - Floor	Dust Wipe - 12" x 12" Area	BDL < 12.9 µg/ft²
183-100-6D 2296591	1-1 Bedroom - Window Sill	Dust Wipe - 3" x 27.5" Area	4971.1 µg/ft²
183-100-7D 2296592	1-7 - Floor	Dust Wipe - 12" x 12" Area	BDL < 12.9 µg/ft²
183-100-8D 2296593	1-7 - Window Sill	Dust Wipe - 3" x 19" Area	BDL < 32.5 µg/ft²
183-100-9D 2296594	1-2 - Side Foyer - Floor	Dust Wipe - 12" x 12" Area	15.8 µg/ft²

BDL = Below Detectable Limits Reporting Limit = 0.3 ppm
Liability Limited to Cost of Analysis
Results Applicable to Those Items Tested Results are Not Blank Corrected All QC within Control Limits Unless Otherwise Indicated
AIHA Accreditation No. 100263 Rhode Island DOH No. AAL-072T3 Massachusetts DOL No. A A 000072 Connecticut DOH No. PH-0622 Maine DEP No. LA-024 Vermont DOH No. AAS-2095

Eastern Analytical Services, Inc.

Wipe Sample Report

RE: CPN 183-100 - Diversified Technology Consultants (DTC) - Site 011 - Application 1085 - 17 Elaine Road - Milford, CT

Date Collected: 06/27/2014
Collected By: Dan Sullivan
Date Received: 06/30/2014
Date Analyzed: 07/01/2014
Analyzed By: Everton Byron Barrett
Signature:
Analyte: Pb Dust
Analytical Method: EPA 3050B/7000B
NYS Lab Number: 10851

Client: Chem Scope, Inc.
15 Moulthrop Street
North Haven, CT 06473

Sample ID# / Lab ID#	Sample Location	Sample Notes	Concentration
183-100-10D 2296595	Not Applicable	Field Blank	BDL < 12.9 µg
183-100-11D 2296596	Not Applicable	Field Blank	BDL < 12.9 µg

BDL = Below Detectable Limits Reporting Limit = 0.3 ppm
Liability Limited to Cost of Analysis
Results Applicable to Those Items Tested Results are Not Blank Corrected All QC within Control Limits Unless Otherwise Indicated
AIHA Accreditation No. 100263 Rhode Island DOH No. AAL-072T3 Massachusetts DOL No. A A 000072 Connecticut DOH No. PH-0622 Maine DEP No. LA-024 Vermont DOH No. AAS-2095

Eastern Analytical Services, Inc.

Bulk Sample Report

RE: CPN 183-100 - Diversified Technology Consultants (DTC) - Site 011 - Application 1085 - 17 Elaine Road - Milford, CT

Date Collected: 06/27/2014
Collected By: Dan Sullivan
Date Received: 06/30/2014
Date Analyzed: 07/01/2014
Analyzed By: Everton Byron Barrett
Signature:
Analyte: Pb Bulk
Analytical Method: EPA 3050B/7000B
NYS Lab Number: 10851

Client: Chem Scope, Inc.
15 Moulthrop Street
North Haven, CT 06473

Sample ID# / Lab ID#	Sample Location	Sample Notes	Concentration
183-100-1S 2296597	Side B	2 Feet from Side B at A Corner	1050.3 mg/kg 0.11 %
183-100-2S 2296598	Side C	2 Feet from Side D of Mech. Room, 8 Feet from Side C of House	373.7 mg/kg 0.04 %
183-100-3S 2296599	Side C	30 Feet from Window 1 of 1-1 Bedroom	127.6 mg/kg 0.01 %

BDL = Below Detectable Limits Reporting Limit = 0.3 ppm
Liability Limited to Cost of Analysis
Results Applicable to Those Items Tested Results are Not Blank Corrected All QC within Control Limits Unless Otherwise Indicated Soil Samples Reported on Dry Weight Basis - Paint Samples Reported as Received
AIHA Accreditation No. 100263 Rhode Island DOH No. AAL-072T3 Massachusetts DOL No. A A 000072 Connecticut DOH No. PH-0622 Maine DEP No. LA-024 Vermont DOH No. AAS-2095

PO#1264

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 011, Application #1085

Sample Source: 17 Elaine Road, Milford, CT CS Job CS# 183-100

Sampled by: Dan Sull Date Sampled: 6/27/14 Customer Name: Diversified Technology Consultants (DTC) -

CS Sample#	~~Client Sample#~~ Room #	Sample Description	Comments
183-100-1D	1-8 Living Room	Floor 12"x12" on hardwood	1.0 sq ft
-2D	"	Sill 3"x33" on white painted sill sheet	0.69 sq ft
-3D	1-5 Kitchen	Floor 12"x12" on 12x12 Floor tile	1.0 sq ft
-4D	"	Sill 3"x28" on wood stain sill	0.58 sq ft
-5D	1-1 Bedroom	Floor 12"x12" on gray carpet floor	1.0 sq ft
-6D	"	Sill 3"x27.5" on white painted sill	0.57 sq ft
-7D	1-7	Floor 12"x12" on hardwood	1.0 sq ft
-8D	1-7	Sill 3"x19" on white wood sill side D	0.40 sq ft
-9D	1-2 Side Foyer	Floor 12"x12" on ceramic tile Floor	1.0 sq ft
-10D	—	Blank	—
-11D	—	Blank	—
183-100-1S	Side B	2' from Side B at A corner	2" deep
-2S	Side C	2' from Side D of Mech Rm, 8' from side C of house	2" deep
-3S	Side C	3' from window 1 of 1-1 Bedroom	2" deep

Lead in Dust

Lead in Soil

Sample Turnaround: 96-hr

Analysis Requested(if variable, use comment column) Lead in Dust(ug/ft²) / Lead in Soil (ppm)

Check if you want sample returned ____ (sampled will be disposed of after 30 days).

Relinquished by Dan Sull Date 6/27/14 Time 5:30pm Received by Fed Ex
Relinquished by_____ Date _____ Time _____ Received by _____

Other Special Instructions: email to sullivan.chemscope@snet.net

Result Transmittal Instructions (for Chem Scope to transmit): Tell us for report

FOR CHEM SCOPE, INC. TO FILL OUT IF SAMPLES ARE GOING TO OUTSIDE LAB:

Name of Laboratory: EAS Method of Transportation to Laboratory: Fed Ex

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:
_____

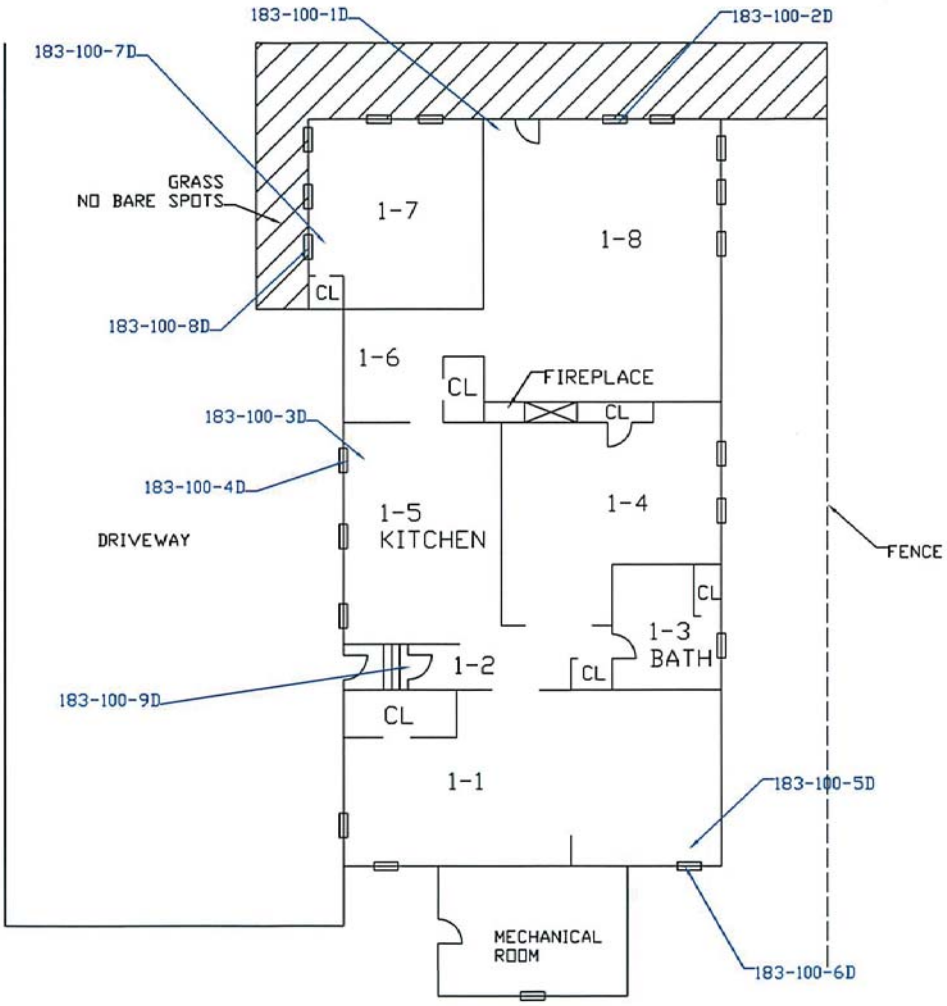
Name _____ Company _____

Address _____ Telephone/e-mail _____

Can we contact you regarding this survey? ☐ YES ☐ NO

Appendix C Sample Location Drawings

ChemScope Inc.
Site 011
17 Elaine Road, Milford, CT
Main Floor
CS# 183-100, 6-27-2014



LEGEND OF SYMBOLS	
ID	LEAD DUST SAMPLE

NOTATIONS

DRAWN BY:
LEIGH HONOROF

ChemScope Inc.

SHEET TITLE:

LEAD RISK ASSESSMENT

17 ELAINE RD MILFORD, CT

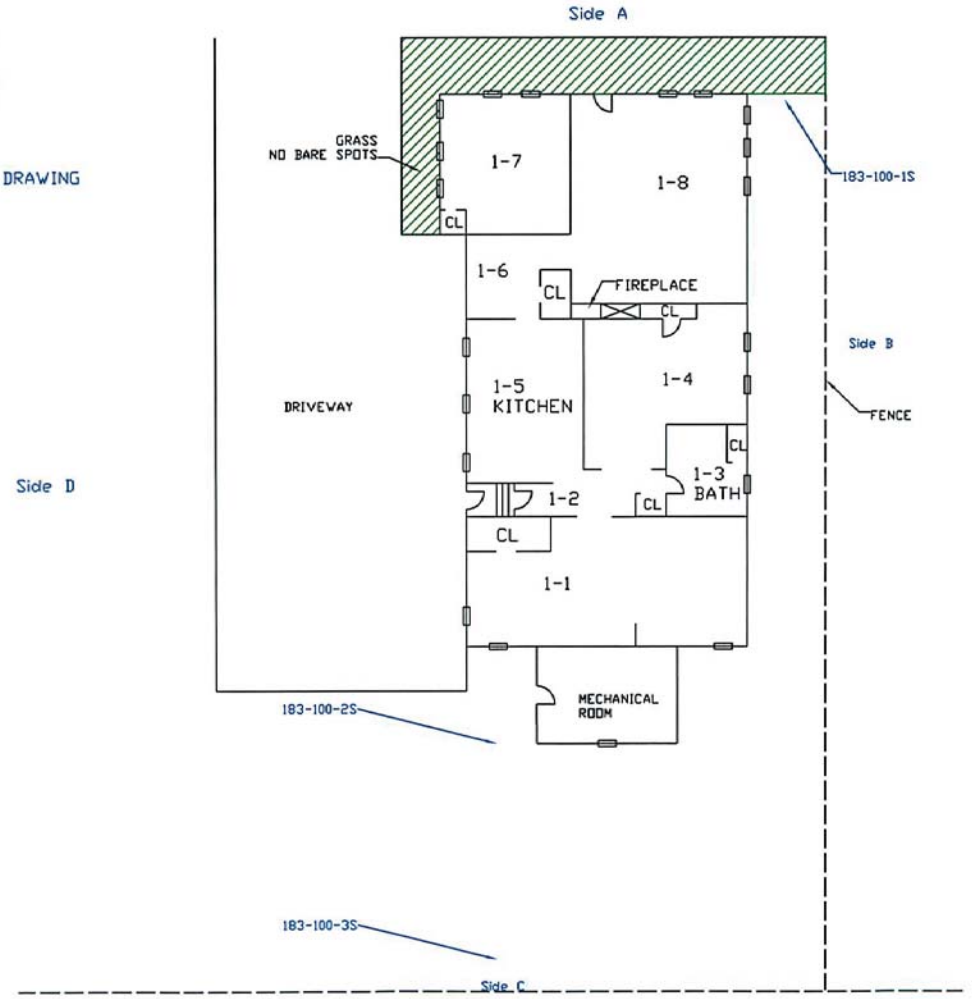
MAIN FLOOR

CHEMSCOPE NUMBER	DRAWING NUMBER
CS# 183-100	1 D
SCALE: NOT TO SCALE	
DATE: 6/27/14	

ChemScope Inc.

Site 011
17 Elaine Road, Milford, CT
Main Floor
CS# 183-100, 6-27-2014

LEAD IN SOIL SAMPLES LOCATION DRAWING



LEGEND OF SYMBOLS	
1S	LEAD SOIL SAMPLE
	Areas of grass without bare spots

NOTATIONS

DRAWN BY:
LEIGH HONOROF

ChemScope Inc.

SHEET TITLE:

LEAD RISK ASSESSMENT

17 ELAINE RD MILFORD, CT

MAIN FLOOR

CHEMSCOPE NUMBER	DRAWING NUMBER
CS# 183-100	1S
SCALE: NOT TO SCALE	
DATE: 6/27/14	

Appendix D Hazardous Waste Evaluation Worksheet

Site Name: Site 011, Application # 1085
Site Address: 17 Elaine Road, Milford CT

CS# 183-100
Date: 4/30/2014

Building Component	Average XRF Readings w/ hot spots	Average XRF Readings w/o hot spots	Material Mass g/cm²	mg Lead/kg of Mass w/hot spots	mg Lead/kg of Mass w/o hot spots	Component Est % of Mass	Weighting Factor	Weighting Factor x mg/kg of lead w/ hot spots	Weighting Factor x mg/kg of lead w/o hot spots
Painted Wood	3.56	0.00	0.6	5933.3	0.0	15	0.15	890.0	0.0
Sheetrock	0.00	0.00	0.45	0.0	0.0	30	0.30	0.0	0.0
Unpainted Wood	0.00	0.00	0.6	0.0	0.0	35	0.35	0.0	0.0
Ceiling Tile	9.9	0.00	0.35	28285.7	0.0	15	0.15	4242.9	0.0
Metal	recycle	recycle				5	0.10	0.0	0.0
					Total	100	Total*	5132.9	0.0

*Compared to criterion of > 100 mg/kg lead - (DEEP: "Guidance for the Management and Disposal of Lead-Contaminated Materials Generated in the Lead Abatement, Renovation and Demolition Industries" (11/4/94)

A value by this method of >100 mg/kg lead indicates the material is potentially a hazardous waste.

NOTES:

Wood Trim 3/4" = .60 g/cm2
SR 5/8" = .45 g/cm2
Plaster (typical two coat) = 1 g/cm2
Brick (one course - 2 1/4") = 32 g/cm2
Brick (two course - 4 1/2") = 64 g/cm2
Concrete 4" = 60 g/cm2
Cinder Block 5" = 60 g/cm2

Ceramic Tile (typical floor) = 1.3 g/cm2
Ceramic Tile (typical wall) = 1.5 g/cm2
Linoleum = 0.2 g/cm2
Carpet = 0.2 g/cm2

To get g/cm2:

1. Weight the material and convert to grams (453 g = 1 lb)
2. Measure the material surface in CM to get cm2
3. Grams divided by CM2 = g/cm2

Appendix E Copy of Risk Assessor's License/Certification

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

LEAD INSPECTOR RISK ASSESSOR

CERTIFICATION NO.
002131
CURRENT THROUGH
04/30/15
VALIDATION NO.
03-790779

DANIEL P. SULLIVAN

SIGNATURE

COMMISSIONER

CERT# L-600 - 763

CHEMSCOPE TRAINING DIVISION

LEAD INSPECTOR/RISK ASSESSOR REFRESHER

8HOUR TRAINING CERTIFICATE

Daniel P. Sullivan

15 Moulthrop Street , North Haven CT

Has attended an 8 hour course on the subject discipline on

11/08/2013 and has passed a written and hands on skills examination.

The above individual has successfully completed the above training course approved in accordance with the Department of Public Health Standards established pursuant to Section 20-477 of the Connecticut General Statutes.

Course syllabus includes all required topics of State of Connecticut DPH and EPA.

Examination Date: 11/08/2013

Expiration Date: 11/08/2014

Under civil and criminal penalties of law for the making or submission of false or fraudulent statements or representations (U.S.C. 1001 and 15 U.S.C. 2615), I certify that this training complies with all applicable requirements of Title IV of TSCA, 40 CFR part 745 and any other applicable Federal, State, or local requirements.

Ronald D. Arena or Brian Santos
Training Director Training Manager

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

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Litho in U.S.A.

Appendix F Copy of Firm's Lead Activity License/Certification

STATE OF CONNECTICUT

DEPARTMENT OF PUBLIC HEALTH

PURSUANT TO THE PROVISIONS OF THE GENERAL STATUTES OF CONNECTICUT

THE INDIVIDUAL NAMED BELOW IS LICENSED
BY THIS DEPARTMENT AS A

LEAD CONSULTANT CONTRACTOR

CHEMSCOPE INC

LICENSE NO
000164

CURRENT THROUGH
07/31/15

VALIDATION NO.
03-847539

SIGNATURE

COMMISSIONER

Connecticut Department of
Energy & Environmental Protection
79 Elm Street
Hartford, CT 06106-5127
www.ct.gov/deep

CHEM SCOPE, INC.
15 MOULTHROP STREET
NORTH HAVEN, CT 06473

12/30/2013

Dear Registrant:

Enclosed is a Certificate of Use for the Radioactive Materials and Industrial X-Ray Device Registration submitted by your facility to the department.

This certificate will serve two purposes. First, this is a way for us to acknowledge to you that your registration has been processed. Second, it is a way for our inspection staff to know that you have the appropriate registration for your radioactive materials and equipment.

The Radioactive Materials and Industrial X-Ray Device Registration must be renewed each year. Notification will be sent to you in the month of November prior to the expiration of this registration to renew your registration.

When corresponding with our office regarding your registration please use the "Application No." indicated on the certificate. This number is unique to your facility and its location.

If you have any questions regarding the Radioactive Materials and Industrial X-Ray Device Registration please feel free to call the Radiation Division at 860-424-3029.

Enclosure

Connecticut Department of
Energy & Environmental Protection
79 Elm Street
Hartford, CT 06106-5127
www.ct.gov/deep

Certificate of Use

Issued To

CHEM SCOPE, INC.

For

Radioactive Material and Industrial X-Ray Device Registration

Daniel C. Esty
Commissioner

Site Located at:
15 Moulthrop St,
North Haven, CT 06473
Reference: 0808-2014

Application No: 201306468
Issue Date: 12/24/2013
Expiration Date: 12/31/2014

Appendix G Copy of XRF Training Certificate and XRF Performance Characteristics Sheet

Certificate of Achievement

This is to certify that

Daniel P. Sullivan
of Chem Scope

on the 2nd day of December 1994 successfully completed the factory training for

RMD's LPA-1 Lead Paint Inspection System

including, but not limited to, the topics of Radiation Safety
and the Proper Use of the Instrument.

Jacob Paster, Vice-President of RMD
44 Hunt St., Watertown, Massachusetts

Performance Characteristic Sheet

EFFECTIVE DATE: **December 1, 2006** **EDITION NO.: 5**

MANUFACTURER AND MODEL:

Make: ***Radiation Monitoring Devices***
Model: ***LPA-1***
Source: ***^{57}Co***
Note: This sheet supersedes all previous sheets for the XRF instrument of the make, model, and source shown above ***for instruments sold or serviced after June 26, 1995. For other instruments, see prior editions.***

FIELD OPERATION GUIDANCE

OPERATING PARAMETERS:

Quick mode or 30-second equivalent standard (Time Corrected) mode readings.

XRF CALIBRATION CHECK LIMITS:

0.7 to 1.3 mg/cm^2 (inclusive)

SUBSTRATE CORRECTION:

For XRF results below 4.0 mg/cm^2, substrate correction is recommended for:

Metal using 30-second equivalent standard (Time Corrected) mode readings.
None using quick mode readings.

Substrate correction is not needed for:

Brick, Concrete, Drywall, Plaster, and Wood using 30-second equivalent standard (Time Corrected) mode readings
Brick, Concrete, Drywall, Metal, Plaster, and Wood using quick mode readings

THRESHOLDS:

30-SECOND EQUIVALENT STANDARD MODE READING DESCRIPTION	SUBSTRATE	THRESHOLD (mg/cm^2)
Results corrected for substrate bias on metal substrate only	Brick	1.0
	Concrete	1.0
	Drywall	1.0
	Metal	0.9
	Plaster	1.0
	Wood	1.0

QUICK MODE READING DESCRIPTION	SUBSTRATE	THRESHOLD (mg/cm^2)
Readings not corrected for substrate bias on any substrate	Brick	1.0
	Concrete	1.0
	Drywall	1.0
	Metal	1.0
	Plaster	1.0
	Wood	1.0

BACKGROUND INFORMATION

EVALUATION DATA SOURCE AND DATE:

This sheet is supplemental information to be used in conjunction with Chapter 7 of the HUD *Guidelines for the Evaluation and Control of Lead-Based Paint Hazards in Housing* ("HUD Guidelines"). Performance parameters shown on this sheet are calculated from the EPA/HUD evaluation using archived building components. Testing was conducted on approximately 150 test locations in July 1995. The instrument that performed testing in September had a new source installed in June 1995 with 12 mCi initial strength.

OPERATING PARAMETERS:

Performance parameters shown in this sheet are applicable only when properly operating the instrument using the manufacturer's instructions and procedures described in Chapter 7 of the HUD Guidelines.

XRF CALIBRATION CHECK:

The calibration of the XRF instrument should be checked using the paint film nearest 1.0 mg/cm^2 in the NIST Standard Reference Material (SRM) used (e.g., for NIST SRM 2579, use the 1.02 mg/cm^2 film).

If readings are outside the acceptable calibration check range, follow the manufacturer's instructions to bring the instruments into control before XRF testing proceeds.

SUBSTRATE CORRECTION VALUE COMPUTATION :

Chapter 7 of the HUD Guidelines provides guidance on correcting XRF results for substrate bias. Supplemental guidance for using the paint film nearest 1.0 mg/cm^2 for substrate correction is provided:

XRF results are corrected for substrate bias by subtracting from each XRF result a correction value determined separately in each house for single-family housing or in each development for multifamily housing, for each substrate. The correction value is an average of XRF readings taken over the NIST SRM paint film nearest to 1.0 mg/cm^2 at test locations that have been scraped bare of their paint covering. Compute the correction values as follows:

> Using the same XRF instrument, take three readings on a <u>bare</u> substrate area covered with the NIST SRM paint film nearest 1 mg/cm^2. Repeat this procedure by taking three more readings on a second <u>bare</u> substrate area of the same substrate covered with the NIST SRM.
>
> Compute the correction value for each substrate type where XRF readings indicate substrate correction is needed by computing the average of all six readings as shown below.
>
> For each substrate type (the 1.02 mg/cm^2 NIST SRM is shown in this example; use the actual lead loading of the NIST SRM used for substrate correction):
>
> $$\text{Correction value} = (1^{st} + 2^{nd} + 3^{rd} + 4^{th} + 5^{th} + 6^{th}\ \textit{Reading}) / 6 - 1.02\ \text{mg/cm}^2$$
>
> Repeat this procedure for each substrate requiring substrate correction in the house or housing development.

EVALUATING THE QUALITY OF XRF TESTING:

Randomly select ten testing combinations for retesting from each house or from two randomly selected units in multifamily housing. Use either the Quick Mode or 30-second equivalent standard (Time Corrected) Mode readings.

Conduct XRF re-testing at the ten testing combinations selected for retesting.

Determine if the XRF testing in the units or house passed or failed the test by applying the steps below.

Compute the Retest Tolerance Limit by the following steps:

Determine XRF results for the original and retest XRF readings. Do not correct the original or retest results for substrate bias. In single-family and multi-family housing, a result is defined as a single reading. Therefore, there will be ten original and ten retest XRF results for each house or for the two selected units.

Calculate the average of the original XRF result and retest XRF result for each testing combination.

Square the average for each testing combination.

Add the ten squared averages together. Call this quantity C.

Multiply the number C by 0.0072. Call this quantity D.

Add the number 0.032 to D. Call this quantity E.

Take the square root of E. Call this quantity F.

Multiply F by 1.645. The result is the Retest Tolerance Limit.

Compute the average of all ten original XRF results.

Compute the average of all ten re-test XRF results.

Find the absolute difference of the two averages.

If the difference is less than the Retest Tolerance Limit, the inspection has passed the retest. If the difference of the overall averages equals or exceeds the Retest Tolerance Limit, this procedure should be repeated with ten new testing combinations. If the difference of the overall averages is equal to or greater than the Retest Tolerance Limit a second time, then the inspection should be considered deficient.

Use of this procedure is estimated to produce a spurious result approximately 1% of the time. That is, results of this procedure will call for further examination when no examination is warranted in approximately 1 out of 100 dwelling units tested.

BIAS AND PRECISION:

Do not use these bias and precision data to correct for substrate bias. These bias and precision data were computed without substrate correction from samples with reported laboratory results less than 4.0 mg/cm^2 lead. The data which were used to determine the bias and precision estimates given in the table below have the following properties. During the July 1995 testing, there were 15 test locations with a laboratory-reported result equal to or greater than 4.0 mg/cm^2 lead. Of these, one 30-second standard mode reading was less than 1.0 mg/cm^2 and none of the quick mode readings were less than 1.0 mg/cm^2. The instrument that tested in July is representative of instruments sold or serviced after June 26, 1995. These data are for illustrative purposes only. Actual bias must be determined on the site. Results provided above already account for bias and precision. Bias and precision ranges are provided to show the variability found between machines of the same model.

30-SECOND STANDARD MODE READING MEASURED AT	SUBSTRATE	BIAS (mg/cm^2)	PRECISION* (mg/cm^2)
0.0 mg/cm^2	Brick	0.0	0.1
	Concrete	0.0	0.1
	Drywall	0.1	0.1
	Metal	0.3	0.1
	Plaster	0.1	0.1
	Wood	0.0	0.1
0.5 mg/cm^2	Brick	0.0	0.2
	Concrete	0.0	0.2
	Drywall	0.0	0.2
	Metal	0.2	0.2
	Plaster	0.0	0.2
	Wood	0.0	0.2
1.0 mg/cm^2	Brick	0.0	0.3
	Concrete	0.0	0.3
	Drywall	0.0	0.3
	Metal	0.2	0.3
	Plaster	0.0	0.3
	Wood	0.0	0.3
2.0 mg/cm^2	Brick	-0.1	0.4
	Concrete	-0.1	0.4
	Drywall	-0.1	0.4
	Metal	0.1	0.4
	Plaster	-0.1	0.4
	Wood	-0.1	0.4

*Precision at 1 standard deviation.

CLASSIFICATION RESULTS:

XRF results are classified as positive if they are greater than the upper boundary of the inconclusive range, and negative if they are less than the lower boundary of the inconclusive range, or inconclusive if in between. The inconclusive range includes both its upper and lower bounds. Earlier editions of this *XRF Performance Characteristic Sheet* did not include both bounds of the inconclusive range as "inconclusive." While this edition of the Performance Characteristics Sheet uses a different system, the specific XRF readings that are considered positive, negative, or inconclusive for a given XRF model and substrate remain unchanged, so previous inspection results are not affected.

DOCUMENTATION:

An EPA document titled *Methodology for XRF Performance Characteristic Sheets* provides an explanation of the statistical methodology used to construct the data in the sheets, and provides empirical results from using the recommended inconclusive ranges or thresholds for specific XRF instruments. For a copy of this document call the National Lead Information Center Clearinghouse at 1-800-424-LEAD. A HUD document titled *A Nonparametric Method for Estimating the 5th and 95th Percentile Curves of Variable-Time XRF Readings Based on Monotone Regression* provides supplemental information on the methodology for variable-time XRF instruments. A copy of this document can be obtained from the HUD lead web site, www.hud.gov/offices/lead.

This XRF Performance Characteristic Sheet was developed by QuanTech, Inc., under a contract from the U.S. Department of Housing and Urban Development (HUD). HUD has determined that the information provided here is acceptable when used as guidance in conjunction with Chapter 7, Lead-Based Paint Inspection, of HUD's *Guidelines for the Evaluation and Control of Lead-Based Paint Hazards in Housing.*

Appendix H "LEAD SPEAK" – A Brief Glossary

Abatement: A measure or set of measures designed to permanently eliminate lead-based paint hazards or lead-based paint. Abatement strategies include the removal of lead-based paint, enclosure, encapsulation, replacement of building components coated with lead-based paint, removal of lead-contaminated dust, and removal of lead-contaminated soil or overlaying of soil with a durable covering such as asphalt (grass and sod are considered interim control measures). All of these strategies require preparation; cleanup; waste disposal; post-abatement clearance testing; recordkeeping; and, if applicable, monitoring. (For full EPA definition, see 40 CFR 745.223).

Bare soil: Soil not covered with grass, sod, some other similar vegetation, or paving, including the sand in sandboxes.

Chewable surface: An interior or exterior surface painted with lead-based paint that a young child can mouth or chew. A chewable surface is the same as an "accessible surface" as defined in 42 U.S.C. 4851b(2). Hard metal substrates and other materials that cannot be dented by the bite of a young child are not considered chewable.

Deteriorated paint: Any paint coating on a damaged or deteriorated surface or fixture, or any interior or exterior lead-based paint that is peeling, chipping, blistering, flaking, worn, chalking, alligatoring, cracking, or otherwise becoming separated from the substrate.

Dripline/foundation area: The area within 3 feet out from the building wall and surrounding the perimeter of a building.

Dust-lead hazard: Surface dust in residences that contains an area or mass concentration of lead equal to or in excess of the standard established by the EPA under Title IV of the Toxic Substances Control Act. EPA standards for dust-lead hazards, which are based on wipe samples, are published at 40 CFR 745.65(b); as of the publication of this edition of these *Guidelines*, these are 40 µg/ft2 on floors and 250 µg/ft2 on interior windowsills. Also called lead-contaminated dust.

Friction surface: Any interior or exterior surface, such as a window or stair tread, subject to abrasion or friction.

Garden area: An area where plants are cultivated for human consumption or for decorative purposes.

Impact surface: An interior or exterior surface (such as surfaces on doors) subject to damage by repeated impact or contact.

Interim controls: A set of measures designed to temporarily reduce human exposure or possible exposure to lead-based paint hazards. Such measures include, but are not limited to, specialized cleaning, repairs, maintenance, painting, temporary containment, and the establishment and operation of management and resident education programs. Monitoring, conducted by owners, and reevaluations, conducted by professionals, are integral elements of interim control. Interim controls include dust removal; paint film stabilization; treatment of friction and impact surfaces; installation of soil coverings, such as grass or sod; and land use controls. Interim controls that disturb painted surfaces are renovation activities under EPA's Renovation, Repair and Painting Rule.

Lead-based paint: Any paint, varnish, shellac, or other coating that contains lead equal to or greater than 1.0 mg/cm2 as measured by XRF or laboratory analysis, or 0.5 percent by weight (5000 mg/g, 5000 ppm, or 5000 mg/kg) as measured by laboratory analysis. (Local definitions may vary.)

Lead-based paint hazard: A condition in which exposure to lead from lead-contaminated dust, lead-contaminated soil, or deteriorated lead-based paint would have an adverse effect on human health (as established by the EPA at 40 CFR 745.65, under Title IV of the Toxic Substances Control Act). Lead-based paint hazards include, for example, **paint-lead hazards, dust-lead hazards, and soil-lead hazards.**

Paint-lead hazard: Lead-based paint on a friction surface that is subject to abrasion and where a dust-lead hazard is present on the nearest horizontal surface underneath the friction surface (e.g., the window sill, or floor); damaged or otherwise deteriorated lead-based paint on an impact surface that is caused by impact from a related building component; a chewable lead-based painted surface on which there is evidence of teeth marks; or any other deteriorated lead-based paint in any residential building or child-occupied facility or on the exterior of any residential building or child-occupied facility.

Play area: An area of frequent soil contact by children of under age 6 as indicated by, but not limited to, such factors including the following: the presence of outdoor play equipment (e.g., sandboxes, swing sets, and sliding boards), toys, or other children's possessions, observations of play patterns, or information provided by parents, residents, care givers, or property owners.

Soil-lead hazard: Bare soil on residential property that contains lead in excess of the standard established by the EPA under Title IV of the Toxic Substances Control Act. EPA standards for soil-lead hazards, published at 40 CFR 745.65(c), as of the publication of this edition of these *Guidelines*, is 400 µg/g in play areas and 1,200 µg/g in the rest of the yard. Also called lead-contaminated soil.

Appendix I Additional Lead and Lead Safety Resource

Key Units of Measurement

Gram (g or gm): A unit of mass in the metric system. A nickel weighs about 1 gram, as does a 1 cube of water 1 centimeter on each side. A gram is equal to about 35/1000 (thirty-five thousandths of an ounce). Another way to think of this is that about 28.4 grams equal 1 ounce.
µg (microgram): A microgram is 1/1000th of a milligram. To put this into perspective, a penny weighs 2 grams. To get a microgram, you would need to divide the penny into 2 million pieces. A microgram is one of those two million pieces.
µg/dL (microgram per deciliter): used to measure the level of lead in children's and worker's blood to establish whether intervention is needed. A deciliter is a little less than a half a cup.
µg/ft^2 (micrograms per square feet): the unit used to express levels of lead in dust samples. All reports should report levels of lead in dust in µg/ft2.
mg/cm2 (milligrams per square centimeter): used to report levels of lead in paint thru XRF testing.
ppm (parts per million): Typically used to express the concentrations of lead in soil. Can also be used to express the amount of lead in a surface coating on a mass concentration basis. This measurement can also be shown as: µg/g, mg/kg or mg/l.
ppb (parts per billion): Typically used to express the amount of lead found in drinking water. This measurement is also sometimes expressed as: µg/L (micrograms per liter).
EPA/HUD Lead-Based Paint and Lead-Based Paint Hazard Standards

Lead-Based Paint (may be determined in either of two ways)
- Surface concentration (mass of lead per area) 1.0 µg/cm2
- Bulk concentration (mass of lead per volume) 0.5%, 5000 µg/g, or 5000 ppm

Dust-thresholds for Lead-Contamination
- Floors 40 µg/ft2
- Interior Window Sills 250 µg/ft2
- Window Troughs (clearance examination only) 400 µg/ft2

Soil-thresholds for Lead Contamination
- Play areas (used by children under age 6) 400 µg/g, or 400 ppm
- Other areas 1200 µg/g, or 1200 ppm

Resources For Additional Information On Lead-Based Paint And Lead-Based Paint Hazards:
National Lead information Center & Clearinghouse: 1-800-424 LEAD
www.epa.gov/lead/pubs/nlic.htm
Centers for Disease Control and Prevention Lead Program: *www.cdc.gov/lead* Toll-free CDC Contact Center: 800-CDC-INFO; TTY 888-232-6348
Consumer Product Safety Commission *www.cpsc.gov* Toll-free consumer hotline: 1-800-638-2772; TTY 301-595-7054
Environmental Protection Agency Lead Program: *www.epa.gov/lead* 202-566-0500
HUD Office of Healthy Homes and Lead Hazard Control: *www.hud.gov/offices/lead* 202-402-7698
Connecticut Department of Public Health, Lead Poisoning Prevention Program
http://www.ct.gov/dph/
Hearing- or speech-challenged individuals may access the federal agency numbers above through TTY by calling the toll-free Federal Relay Service at 800-877-8339; see also *http://www.federalrelay.us/tty.*

SECTION 024119 – SELECTIVE DEMOLITION

1.0 SCOPE

A. Remove existing foundations, footings, piers and structural members and other building components as called for on the plans or is needed to construct the new foundation and building systems. Coordinate selective demolition with and asbestos & lead abatement work.

2.0 PRODUCTS

A. Comply with governing EPA notification regulations before beginning selective demolition. Comply with hauling and disposal regulations of authorities having jurisdiction.

B. Comply with ANSI/ASSE A10.6 and NFPA 241.

3.0 EXECUTION

A. Survey existing conditions and correlate with requirements indicated to determine extent of selective demolition required.

B. Existing Services/Systems to Be Removed, Relocated, or Abandoned: Locate, identify, disconnect, and seal or cap off indicated utility services and mechanical/electrical systems serving areas to be selectively demolished.

C. Remove refrigerant from mechanical equipment to be selectively demolished according to 40 CFR 82 and regulations of authorities having jurisdiction.

D. Conduct selective demolition and debris-removal operations to ensure minimum interference with roads, streets, walks, walkways, and other adjacent occupied and used facilities.

E. Provide temporary barricades and other protection required to prevent injury to people and damage to adjacent buildings and facilities to remain.

F. Provide and maintain shoring, bracing, and structural supports as required to preserve stability and prevent movement, settlement, or collapse of construction and finishes to remain, and to prevent unexpected or uncontrolled movement or collapse of construction being demolished.

G. Demolish and remove existing construction only to the extent required by new construction or as indicated

H. Do not demolish building elements beyond what is indicated on Drawings without Engineer's approval.

END OF SECTION 024119

SECTION 024316.13 – BUILDING RAISING

1.0 GENERAL

A. Scope:

1. Raise structures to elevations required for new construction.
2. Provide temporary building supports, cribbing, shoring, and bracing. Secure building during lifting operations and raised building condition until foundations and substructures are complete.
3. Maintain temporary supports and adjust as required for safety and coordinated construction activities.
4. Lower structure onto new foundations and framing. Shim and set building in preparation of new connection to structure.
5. Remove all temporary supports and building raising equipment.

B. Definitions

1. Building Raising: The operation of lifting a building structure in its entirety as separated from its foundation and repositioning it on new foundations at new elevations. Includes the methods of supporting, jacking, temporary supporting, bracing, and final placement on new construction.

C. Qualifications:

1. Building Raising Contractor shall be a company experienced in building raising for a period of no less than 5 years of related building raising and moving projects.

D. Insurance Requirements:

1. Building Contactor shall maintain the insurance requirements as per the general conditions of the contract.
2. Building Raising Contractor shall maintain Cargo Insurance in the amount of $250,000 in accordance with the general conditions of the contract.

E. Submittals:

1. Qualifications
2. Insurance Certificates
3. Jacking and Temporary Supports Coordination Plan

2.0 PRODUCTS

A. Jacking, Raising, and Lifting and Moving Systems

1. Contractors shall use an hydraulic jacking system capable of raising the structure and the building mass in a synchronized jacking operation similar to the Unified Jacking Systems.

B. Temporary Supports:

1. Cribbing: Cribbing wood shall be oak or other materials with limited compressibility.
2. Jacking Supports and Rails: Sized and Selected by the contractor for the performance of the work.

3. Bracing and Misc. Supports: As needed to secure the building.

3.0 EXECUTION

A. Prior to start of work, contractor shall assess the existing building structure and determine jacking methods.

B. Coordinate with foundation and framing contractor to develop a jacking, moving and support plan to enable properly supporting the structure to allow for new construction activities including excavation, concrete placement, and new framing member installation. Coordinate sequence of the work with Micropile Contractor, Foundation Contractor, and Framing Contractor

C. Assess the soils conditions, grade, and boring logs to assure adequate bearing for jacking operations and temporary supports.

D. Jacking the building shall be done in a manner that will minimize damage to the existing building including, but not limited to the walls, ceilings, flooring, doors, windows, structure, and other building components.

E. Jack the house in accordance with jacking system manufacturer's instructions. Jack the house in multiple lifts having a maximum lift per the lift manufacturer's instructions or no greater than 8" per lift. Allow the structure and jacking system to stabilize after each lift.

F. Provide cribbing, shoring, bracing, and shimming and secure structure for the duration of the construction work. Temporary supports shall be capable of securing the building against adverse weather conditions including storms and high winds.

G. Re-lift the house as needed for sequencing the construction work and staged excavation, foundation, and framing construction. Re-establish temporary support system.

H. Monitor the temporary support system during the construction period. Evaluate building condition. Evaluate cribbing, bracing, shoring, and bearing conditions of temporary supports. Make adjustments as needed to secure the building.

I. Final Placement on New Foundation and/or framing systems. Remove temporary bracing, jack the structure, remove cribbing and other temporary foundation supports, and lower the building onto the new superstructure. Perform lowering operation in coordination with other subcontractors to allow for framing, shimming, and adjustment of final placement of the building at the new raised elevation.

J. Make repairs to the building due to lifting operations. Repair cracked walls, re-adjust/re-set windows and doors for proper operation, repair cracked flooring in accordance with the requirements for section 017300 Execution.

END OF SECTION 024316.13 BUILDING RAISING

SECTION 033000 - CONCRETE WORK

1.0 GENERAL

A. Quality Control: Section 014000.

B. Rough Carpentry: Section 061000

C. Structural Steel: Section 051200.

1.1 SCOPE

A. Concrete walls, footings, piers, slabs & misc. concrete work including all formwork.

1.2 SUBMITTALS

A. Refer to Section 013300.

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 a mix design 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 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 compression 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:

2013 Amendment of the Connecticut State Building Code; 2009 International Residential Code and amendments.

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 against Freezing: Protect completed work at footing level with sufficient temporary or permanent cover and heat as required to protect concrete work and adjacent sub-grade against possibility of freezing; maintain freezing protection for the cure period during periods of potential frost.

1.5 FIELD QUALITY CONTROL

A. The Owner will retain a materials testing laboratory to conduct field testing and inspections. The contractor must notify and coordinate with the testing laboratory.

The Testing Laboratory may 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

B. The Testing Laboratory will perform the following field tests when applicable:

1. Testing as required for special inspections as required by the building code.

2. Secure samples in accordance with ASTM C 172, except modified for slump to comply with ASTM C94.

3. Slump: ASTM C 143; one test for each 50 cubic yards, or fraction thereof, at point of discharge for each day's pour of each class of concrete; additional tests when concrete consistency seems to have changed.

4. 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.

5. 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.

6. 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.

7. 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.

8. 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.

9. 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.

10. 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.

11. 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 the number of joints.

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, dampproofing or finishes. Provide form coating 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, dampproofing or finish coating material.

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.

Use one brand of cement throughout project, unless otherwise acceptable to Engineer.

B. Aggregates: ASTM C 33.

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 if used): 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 Engineer.

2.5 PROPORTIONING AND DESIGN OF MIXES

A. Contractor shall be solely responsible for providing concrete to meet performance, strength, workability and delivery method requirements.

B. Composition:

The concrete shall be composed of Portland Cement, fine aggregate, coarse aggregate and water. Include water reducing admixture, retarders, air entraining admixture, etc. where required to meet performance, strength, workability and delivery method requirements.

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 Requirements	Strength @ 28 Days	Maximum Water/Cement	Slump	Notes
Footings	3000 PSI	0.58	5”	
Piers	4000 psi	0.34	4”	Entrained Air
Foundation Wall	4000 psi	0.34	4”	Entrained Air
Slab on Grade	4000 psi	0.34	4”	Entrained Air

Slump values are those which will be measured at the point of discharge.

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 Engineer shall be taken to assure the load-carrying capacity of the structure under design loads. Failure to achieve the test results will result in rejection of the work in place. Rejected work shall be removed and replaced at the contractors expense.

C. Admixtures:

Use water-reducing admixture in concrete if 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 5% 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. Wall 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: Construction joints are not allowed in the height of concrete piers or walls where visible. 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 Engineer. Construction joints in slabs on grade can be substituted for contraction joints except do not continue reinforcement or wire mesh through the joint.

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 piers, columns, foundation walls, grade beams, and elsewhere as indicated, using ¼" thick pre-molded 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 is 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 spacing 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. Pre-placement 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. Rub Concrete Finish: For formed concrete surfaces exposed to view and not to receive applied materials patch and repair tie holes and defective areas. Rub down or chip off fins and other projections. Rub entire concrete surface for a uniform finish.

3.8 SLAB FINISHES

A. Trowel Finish: Apply trowel finish to slab surfaces under the footprint of the house.

B. Broom Finish: Apply light broom finish to exterior slab surfaces. Trowel edges to ½” radius edge trowel. Trowel expansion and contraction joints.

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 03310

SECTION 051200 - STRUCTURAL STEEL

PART 1 - GENERAL

1.1 RELATED WORK SPECIFIED IN OTHER SECTIONS

A. Division 03 Section “Concrete Work”.

1.2 SUMMARY

A. Provide hot dipped galvanized, anchors, bolts, expansion anchors and other items attached to structural steel for attachment of work of other trades.

B. Structural Steel Sections, shop primed, punched as called for on drawings.

C. Verify dimensions at site prior to fabrication without causing delay in the work.

1.3 SUBMITTALS

A. General: Submit each item in this article according to the Conditions of the Contract and Division 01 Specification Sections.

D. Product Data: For each type of product indicated.

E. Shop Drawings: Submit shop drawings including complete details for fabrication and assembly of structural steel. Include plan, member details, and anchor plans.

1. The omission from the shop drawings of any material shown on the contract drawings shall not relieve the Contractor from furnishing same, even though the drawings have been returned reviewed.

2. The Contractor alone shall be responsible for all errors of detailing, fabrication, and for the correct fitting of the structural members.

3. The Contractor shall be responsible for the correct coordination of his work where it comes in conjunction and/or contact with any other work. Dimensions are the responsibility of the Contractor. Indicate provisions to be made for connection of other work such as stair stringers and supports for equipment and apparatus. Indicate information relative to holes, cut-outs, and fittings as required by the work of other trades.

4 Fabrication of any material or performance of any work shall not proceed until shop drawings have been reviewed and accepted by the Engineer of Record.

5. All weld symbols, both shop and field shall be those shown in the latest edition of “Symbols for Welding and Nondestructive Testing”, AWS A2.4.

6. Indicate welds by standard AWS symbols, distinguishing between shop and field welds, and show size, length, and type of each weld.

1.7 QUALITY ASSURANCE

A. Codes and standards: comply with provisions of following:

1. AISC "Code of Standard Practice for Steel Buildings and Bridges", dated March 18, 2005.

2. AISC "Specifications for Structural Steel Buildings, " March 9, 2005 with commentary.

3. AISC "Specifications for Structural Joints using ASTM A 325 or A 490 Bolts" June 30, 2004.

4. American Welding Society (AWS) D1.1 "Structural Welding Code - Steel".

B. Qualifications for Welding Work: Qualify welding processes and welding operators in accordance with AWS "Standard Qualification Procedure".

E. Welding: Qualify procedures and personnel according to AWS D1.1, “Structural Welding Code – Steel.”

1. Present evidence that each welder has satisfactorily passed AWS qualification tests for welded processes involved and, if pertinent, has undergone recertification.

PART 2 - PRODUCTS

2.1 MATERIALS

A. Structural steel W Shapes: ASTM A572 Grade 50 or A992.

B. Structural steel angles and plates: ASTM A36

C. Post-installed anchors: See details

D. High-strength thread fasteners: Heavy hexagon structural bolts, heavy hexagon nuts, and hardened washers, quenched and tempered medium-carbon material complying with ASTM A 325.

E. Anchor Bolts: ASTM F 1554 grade 36, headed type unless otherwise indicated.

F. Electrodes for welding: AISC Specification for Structural Steel Buildings, Section A3.6, with nominal tensile strength of 70 ksi minimum.

G. Structural Steel Primer: Lead and chromate free metal primer equivalent to Tnemec No. 10-1009 Grey Metal primer.

H. Nonmetallic, Shrinkage-Resistant Grout: Premixed, nonmetallic, noncorrosive, nonstaining grout complying with ASTM C 1107, of consistency suitable for application, 30 minute working time and seven day compressive strength of 6000 psi.

2.2 FABRICATION

A. Fabricate items of structural steel in accordance with AISC Specifications and as indicated on final shop drawings.

B. Properly mark and match-mark materials for field installation.

C. Welded construction: comply with AWS Code for procedures, appearance and quality of welds, and methods used in correcting welding work.

D. Holes for Other Work: Provide holes required for securing other work to structural steel framing, and for passage of other work through steel framing members, as shown on final shop drawings. Shop cut, drill, or punch holes perpendicular to metal surfaces. Do not flame cut holes or enlarge holes by burning.

E. Steel Fabrications and Shapes shall be surface prepared in accordance with Steel Structures Painting Council (SSPC) classification SP-3 “Power Tool Cleaning”. Immediately after surface preparation, apply structural steel primer paint in accordance with manufacturer’s instructions and at a rate to provide dry film thickness of not less than 1.5 mils. .

PART 3 - EXECUTION

3.1 ERECTION

A. Anchor brackets to concrete piers using galvanized post-installed anchors as indicated. Coordinate locations with deck framing.

B. Install pier and beam connectors to each house support pier (square concrete piers).

C. All beams shall be erected with the natural camber up.

D. Field Welds, bolted connections, and defects in hot dipped galvanization shall be prepared and coated with field applied zinc based galvanizing coating.

END OF SECTION 051200

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.
8. Sill Seal Gasket

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.

6. Sill Seal Gasket – Polyethelyne Foam or EPDM preformed gasket.
   a. Owens Corning Foam SealR
   b. Conservation Technologies pre-formed sill gasket.

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.

3.13 SILL SEAL GASKET

A. Place sill seal gasket below any wood framing placed on concrete.

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

1.2 RELATED SECTIONS
A. 061000 – Rough Carpentry
B. 062000 - Carpentry

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. Interior Trim
D. Blocking
E. Misc. Materials – flashings etc.
F. Installation of Items specified in other sections.

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: Composite Wood Products shall emit low/no formaldehyde and must be certified to comliant with California 93120. 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. Screws: Select material, type, size, and finish required for each use. Comply with ASME B18.6.1 for applicable requirements.
C. Nails: Select material, type, size, and finish required for each use. Comply with FS FF-N-105 for applicable requirements.
D. 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.
E. Adhesives, General: Do not use adhesives that contain urea formaldehyde. Adhesives shall be low-voc/no-voc

3.0 EXECUTION

A. 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

B. Install 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 finish carpentry with materials and systems in or adjacent to it. Provide cutouts for mechanical and electrical items that penetrate interior finish carpentry.

C. 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.

D. END OF SECTION 062000

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 in new wall construction at doors.

1.1 SUBMITTALS

A. Provide product data and Installation Instructions for rigid foam insulation and 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.
    1. Install insulation in layers until full thickness of insulation is achieved. Do not exceed manufacturer’s recommended maximum thickness for each layer. Allow for adequate curing as directed by the manufacturer before applying next layer.

2. Provide protection of mechanical or electrical devices as directed by the 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 Extruded 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: Square
   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 072216.13

SECTION 072500 - WEATHER BARRIER

PART 1 – GENERAL

1.1 SECTION INCLUDES

A. Maintain & Completion of Weather Barrier Systems
B. Provide new weather barrier at new work.
C. Weather barrier and Air barrier membrane (DuPont™ Tyvek® HomeWrap®)
D. Seam Tape (DuPont™ Tyvek® Tape)
E. 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 072600
VAPOR RETARDERS

PART 1 GENERAL

1.1 SUMMARY

A. Section Includes:
1. Sheet and sealant materials for controlling vapor diffusion at floors, exterior walls, and concrete slabs.

B. Related Sections:
1. Division 01: Administrative, procedural, and temporary work requirements.

1.2 REFERENCES

A. ASTM International (ASTM):
1. D882 - Standard Test Method for Tensile Properties of Thin Plastic Sheeting.
2. D1709 - Standard Test Method for Impact Resistance of Plastic Film by the Free-Falling Dart Method.
3. E96/E96M - Standard Test Method for Water Vapor Transmission of Materials.
4. E154 - Standard Test Method for Water Vapor Retarders Used in Contact with Earth Under Concrete Slabs, on Walls, or as Ground Cover.
5. E1643 - Standard Practice for Selection, Design, Installation, and Inspection of Water Vapor Retarders Used in Contact with Earth or Granular Fill Under Concrete Slabs.
6. E1745 - Standard Test Method for Water Vapor Retarders Used in Contact with Soil or Granular Fill Under Concrete Slabs.

1.3 SUBMITTALS

A. Submittals for Review:
1. Product Data: Include product description and performance characteristics.
2. Samples: 12 x 12 inch vapor retarder samples.

PART 2 PRODUCTS

2.1 MANUFACTURERS

A. Acceptable Manufacturers:
1. Griffolyn, Division of Reef Industries. (www.reefindustries.com)
2. Raven Industries. (www.rufco.com)
3. Stego Industries. (www.stegoindustries.com)
4. W.R. Meadows, Inc. (www.wrmeadows.com)

B. Substitutions: Under provisions of Division 01.

2.2 MATERIALS

A. Vapor Retarder: ASTM E1745, Class A, minimum 10 mil thick clear polyethylene film.

2.3 ACCESSORIES

A. Adhesive:
1. Compatible with vapor retarder and substrate, permanently non hardening.

B. Joint Tape: Minimum 2 inches wide, pressure sensitive, waterproof, compatible with vapor retarder.

PART 3 EXECUTION

3.1 INSTALLATION - UNDER SLABS ON GRADE

A. Install in accordance with manufacturer's instructions and ASTM E1643.

B. Remove sharp rocks and objects that could puncture vapor retarder.

C. Install vapor retarder without tears, voids, and holes.

D. Lap ends and edges minimum 6 inches over adjacent sheets.

E. Tape seal lapped joints, tears, holes, perimeter, and penetrations through vapor retarder.

3.2 REPAIR

A. Inspect vapor retarder for damage just prior to covering.

B. Clean damaged areas and cover with additional vapor retarder material cut minimum 6 inches larger than damaged area on all sides. Seal to main vapor retarder with continuous tape.

END OF SECTION 072600

SECTION 073113 - ASPHALT SHINGLE ROOFING

PART 1 GENERAL

1.1 SUMMARY

A. Provide new roofing system to match existing roofing system in accordance with these specifications to complete openings left by demolition activities.

B. Section Includes:
1. Granular surfaced asphalt shingle roofing.
2. Underlayment
3. Ice dam protection.
4. Metal flashings and accessories.
5. Roofing Cement

C. Related Sections:
1. Section 076200 - Sheet Metal Flashing and Trim.

1.2 REFERENCES

A. ASTM International (ASTM):
1. C1549 - Standard Test Method for Determination of Solar Reflectance Near Ambient Temperature Using a Portable Solar Reflectometer.
2. D1970 - Standard Specification for Self-Adhering Polymer Modified Bituminous Sheet Materials Used as Steep Roofing Underlayment for Ice Dam Protection.
3. D3161 - Standard Test Method for Wind-Resistance of Asphalt Shingles (Fan-Induced Method).
4. D3462 - Standard Specification for Asphalt Shingles Made from Glass Felt and Surfaced with Mineral Granules.
5. D4586 - Standard Specification for Asphalt Roof Cement, Asbestos Free.
6. D6381 - Standard Test Method for Measurement of Asphalt Shingle Mechanical Uplift Resistance.
7. D7158 - Standard Test Method for Wind Resistance of Sealed Asphalt Shingles (Uplift Force/Uplift Resistance Method).
8. E1980 - Standard Practice for Calculating Solar Reflectance Index of Horizontal and Low-Sloped Opaque Surfaces.

B. National Roofing Contractors Association (NRCA) - Steep Roofing Manual.

C. Underwriters Laboratories (UL):
1. 790 - Standard for Standard Test Methods for Tests of Roof Coverings.
2. 997 - Standard for Wind Resistance of Prepared Roof Covering Materials.
3. 2218 - Standard for Impact Resistance of Prepared Roof Covering Materials.
4. 2390 - Standard for Tests for Wind Resistant Asphalt Shingles with Sealed Tabs.

1.3 SUBMITTALS

A. Submittals for Review:
1. Product Data: Manufacturer's product description and installation instructions.
2. Samples: Shingle samples showing available colors. Color to match existing.
3. Warranty: Sample warranty form.

1.4 QUALITY ASSURANCE

A. Installer Qualifications: Minimum 5 years documented experience in work of this Section.

B. Shingles:
   1. Wind uplift resistance: Class F tested to D3161.
   2. Fire hazard classification Class A tested to UL 790.
   3. Impact resistance: Class 3, tested to UL 2218.

C. Perform work in accordance with NRCA Manual.

1.5 PROJECT CONDITIONS

A. Do not install underlayment or shingles at ambient or surface temperatures less than 40 degrees F or on wet or frozen substrate.

1.6 WARRANTIES

A. Furnish manufacturer’s 20 year warranty providing coverage against water leakage through shingles.

B. Provide manufacturer's 10 year warranty providing coverage against shingle discoloration due to algae growth.

C. Provide manufacturer's 15 year warranty providing coverage shingle damage due to winds up to 80 MPH.

PART 2 PRODUCTS

2.1 MANUFACTURERS

A. Acceptable Manufacturers:
   1. Match Existing Roofing Material

2.2 MATERIALS

A. Asphalt Shingles:
   1. Provide Asphalt Shingles to Match the Existing Asphalt Shingles.
   2. Product: Match existing
   3. Type: 3-Tab. Match existing.
   4. Size: Match existing
   5. Color: Match Existing. To be selected from manufacturer's full color range.
   6. Provide matching hip shingles.

2.3 ACCESSORIES

A. Ice Dam Protection: Underlayment/Leak Barrier
   1. WR Grace Ice & Water Shield or equivalent.
   2. Elongation: Minimum 250 percent, tested to ASTM D412.
   3. Tensile strength: Minimum 250 PSI, tested to ASTM D412.
   4. Source: GAF or approved substitute. http://www.gaf.com

B. Roofing Underlayment:
   1. GAF DeckArmor.

C. Fasteners: Stainless steel nails, minimum 3/8 inch head diameter, 10 gage barbed shank, length to penetrate minimum 3/4 inch into sheathing.

D. Plastic Cement: ASTM D4586, Type I, non-running, heavy body material composed of asphalt and other mineral ingredients.

E. Metal Flashings: Specified in Section 076200.

F. Flashing Boots: Preformed EPDM or equivalent synthetic rubber material, sized to fit penetration being flashed, with minimum 4 inch wide deck flange and stainless steel draw band at top.

PART 3 EXECUTION

3.1 INSTALLATION OF ICE DAM PROTECTION

A. Starting from eave edge of roof apply one ply modified bitumen underlayment horizontally (Ice and Water Sheild) on roof. Weather-lap each sheet 4 inches over preceding sheet. Lap ends 6 inches minimum.

B. Press to full bond with substrate without voids, wrinkles, bridging, or fishmouths. Seal ends and edges.

C. Extend ice dam protection minimum 48 inches beyond interior face of exterior walls.

D. Provide one ply modified bitumen underlayment at roof intersections with vertical walls. Extend underlayment 12” up the vertical face and 24” onto the roof.

E. Provide one ply modified bitumen underlayment 3 feet around new roof penetrations. Lap the underlayment 4” up the penetration.

3.2 INSTALLATION OF UNDERLAYMENT

A. Starting at low edge, apply underlayment horizontally on roof. Weather-lap each sheet 4 inches over preceding sheet. Lap ends 6 inches minimum.

B. Press to full bond with substrate without voids, wrinkles, bridging, or fishmouths. Seal ends and edges.

C. Lap underlayment minimum 12 inches over hips and ridges from both sides. Apply 36 inch wide strip centered lengthwise over ridge.

D. Extend minimum 4 inches up abutting vertical surfaces.

3.3 FLASHINGS

A. Rake Edges:
   1. Install metal drip edge at rake edges with top flange on top of underlayment.
   2. Weather lap ends 2 inches minimum and seal with plastic cement.
   3. Nail top flange to decking at 8 inches on center maximum.
   4. Apply plastic cement to cover nail heads and at edge of flashings for entire length of metal.

B. Drip Edges:

1. Apply drip edge at eave with top flange directly on deck; extend underlayment to outer face of drip edge.
2. Lap ends 2 inches minimum and seal with plastic cement.
3. Nail in place at 8 inches on center maximum.
4. Apply plastic cement to cover nail heads and at edge of flashings for entire length of metal.

C. Stepped Flashings:
1. Install 4 inch high x 2 inch wide x 7 inch long tins concurrent with shingles. Place with ends slightly above with shingle butt ends.
2. Place stepped counter-flashing over tins at masonry.

D. Round Penetrations:
1. Place preformed flashing boot over penetration.
2. Fasten flange to deck with minimum of four fasteners.
3. Tighten draw band to watertight condition.

E. Other Flashings:
1. Weather lap ends 2 inches minimum and seal with plastic cement.
2. Nail in place at 8 inches on center maximum.
3. Apply plastic cement to cover nail heads and at edge of flashings for entire length of metal.

3.4 INSTALLATION OF SHINGLES

A. Install shingles in accordance with manufacturer's instructions. Tooth-in shingles to blend into existing roofing material. Remove shingles to end of existing original shingle. Do not cut existing full shingles to match new shingles. Overlap ice & water shield, underlayment and drip edges a minimum of 6”.

B. Place shingles in straight coursing pattern, in straight horizontal lines square with building lines, with 5 inch exposure to produce double thickness over roof area.

C. Remove foreign matter between shingles to ensure uniform contact.

D. Cut shingles at perimeter and around penetrations. Do not use damaged shingles.

E. Provide double course of shingles at eaves set in mastic. Extend shingles 3/8 inch beyond metal drip edges.

F. Fasten shingles along nailing guide line through laminated portion with minimum of six fasteners per shingle.

G. Cap hips with individual shingles, maintaining same exposure as shingles.

END OF SECTION 073113

SECTION 074600 – VINYL SIDING

PART 1 GENERAL

1.1 SUMMARY

A. Scope: The work of this section is to provide vinyl siding systems to match and complete the exterior enclosure with architecturally and aesthetically matching systems.

B. Section Includes:
1. Vinyl siding, soffits, and fascia.
2. Trim, anchorage, and accessories.

C. Related Sections:
1. Section 079200 - Joint Sealants.
2. Section 072216.13 – Rigid Thermal Insulation
3. Section 072500 – Weather Barrier

1.2 SUBMITTALS

A. Submittals for Review:
1. Product Data: Indicate materials, profiles, sizes, construction details, fastening methods, surface texture, finishes, and accessories.
2. For vinyl siding, include VSI's official certification logo printed on product data.
3. Warranty: sample of special warranty.
4. Samples:
   a. 3 x 3 inch plastic samples showing available colors.
   b. 12 inch long by actual width of selected color for siding
   c. 12 inch long by actual width of selected color for soffit
   d. 12 inch long by actual width of selected color for trim

1.3 QUALITY ASSURANCE

A. Installer Qualifications: Minimum 3 years documented experience in work of this Section.

1.4 PROJECT CONDITIONS

A. Do not install siding on wet or frozen substrate.

B. Do not install siding at temperatures below 40 degrees F.

PART 2 PRODUCTS

2.1 MANUFACTURERS

A. Acceptable Manufacturers:
1. Match Existing
2. Mastic Home Exteriors

3. Georgia Pacific
4. CertainTeed Corp
5. Heartland Building Products, Inc.

B. Substitutions: Under provisions of Division 01.

2.2 MATERIALS

A. Vinyl Siding:
1. Match Existing vinyl siding.
2. Material: Integrally colored vinyl siding complying with; ASTM D 3679.
3. Siding:
   a. Profile: Clapboard
   b. Exposure: 8 inch exposure in plain, double, 4 inch board style.
   c. Finish: Wood grain, low gloss.
   d. Thickness: 0.044 inch minimum
   e. Butt edge: 1/2 inch minimum
   f. Nailing hem: Double thickness
4. Soffits:
   a. Profile: Solid
   b. Finish: Smooth, low gloss.
   c. Thickness: 0.044 inch minimum
5. Fascia:
   a. Finish: Smooth, low gloss.
   b. Thickness: 0.044 inch minimum
6. Trim:
   a. Size: 3-1/2” inches wide x maximum practical length.
   b. Provide trim for enclosure
   c. Finish: Smooth, low gloss.
7. Colors: To be selected from manufacturer’s full color range.

2.3 ACCESSORIES

A. Fasteners: Type recommended by siding manufacturer for applicable substrate. Where exposed to view, use prefinished aluminum fasteners in color to match item being fastened.

B. Joint Sealers: Specified in Section 079200.

PART 3 EXECUTION

3.1 INSTALLATION

A. Inspect the substrate to insure all elements are in place including weather barriers, air barriers, flashings and sealants to be installed by others. Notify the contractor if any condition exists that would result in an unacceptable installation. Do not proceed until conditions are corrected.

B. Install siding, trim, and accessories in accordance with manufacturer's instructions.

C. Install aligned, level, and plumb.

D. Lock each siding panel into preceding panel.

E. Cut panels with clean, smooth edges to provide maximum 1/8 inch gaps. Layout the work to minimize cuts and small pieces.

F. Fasten at maximum 16 inches on center with fasteners through slotted hole in flange. Locate fasteners in center of hole. Do not drive fasteners tight; allow for thermal movement.

G. Install trim at internal and external corners and where siding abuts dissimilar material or stops with edge exposed.

H. Install flashings materials for coordinated installation with other work.

I. Apply joint sealer between siding and trim and adjacent surfaces as specified in Section 079200. Ensure watertight condition.

END OF SECTION 074633

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 076500 - FLEXIBLE FLASHINGS

PART 1 PART 1 GENERAL

1.1 SUMMARY

A. Section Includes:
1. Rubberized asphalt sheet for concealed wall flashings
2. Foam Sill Seal

B. Related Sections:
1. Division 01: Administrative, procedural, and temporary work requirements.

1.2 REFERENCES

A. ASTM International (ASTM) D1970 - Standard Specification for Self-Adhering Polymer Modified Bituminous Sheet Materials Used as Steep Roofing Underlayment for Ice Dam Protection.

1.3 SUBMITTALS

A. Submittals for Review:
1. Product Data: Manufacturer's descriptive data and installation instructions.

1.4 PROJECT CONDITIONS

A. Do not apply flashings at ambient or surface temperatures less than 40 degrees F.

PART 2 PRODUCTS

2.1 MANUFACTURERS

A. Acceptable Manufacturers:
1. Grace Construction Products. (www.graceconstruction.com)
2. W.R. Meadows, Inc. (www.wrmeadows.com)
3. Polyguard Products, Inc. (www.polyguardproducts.com)

B. Substitutions: Under provisions of Division 01.

2.2 MATERIALS

A. Rubberized Asphalt Flashings:
1. Description: ASTM D1970; minimum 32 mil thick butyl rubber modified asphalt laminated to 8 mil thick cross-laminated HDPE film, release paper facing, self adhering.

2.3 ACCESSORIES

A. Termination Mastic: Type recommended by flashing manufacturer.

PART 3 EXECUTION

3.1 INSTALLATION

A. Provide flexible flashings in exterior wall assemblies at:
1. Base of walls.
2. Heads of openings in walls.

3. Top of walls under copings.
4. Transitions between materials.
5. Around openings and penetrations through walls.

B. Lap ends 4 inches minimum.

C. Press to full bond with substrate without voids, wrinkles, bridging, or fishmouths.

D. Roll ends and edges with hand held roller; ensure tight seal.

E. Apply trowel coat of mastic along flashing at top edge, seams, cuts, and penetrations.

END OF SECTION 076500

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

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.

3.5 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

PART 1 GENERAL

1.1 SUMMARY

A. Section Includes:
   1. Firestopping perimeter of, and penetrations through fire rated assemblies.

1.2 REFERENCES

A. ASTM International (ASTM):
   1. E814 - Standard Test Method for Fire Tests of Through-Penetration Firestops.
   2. E1966 - Standard Test Method for Fire-Resistive Joint Systems.
   3. E2307 - Standard Test Method for Determining Fire Resistance of Perimeter Fire Barrier Systems Using Intermediate-Scale, Multi-Story Test Apparatus.

B. Underwriters Laboratories, Inc. (UL):
   1. 1479 - Fire Tests of Through-Penetration Firestops.
   2. 2079 - Fire Resistance of Building Joint Systems.

1.3 SYSTEM DESCRIPTION

A. Provide continuous protection against passage of heat, fire, smoke, and gases at perimeter of and penetrations through rated assemblies.

1.4 SUBMITTALS

A. Submittals for Review:
   1. Product Data:
      a. Firestopping schedule; prepare in tabular format and identify:
         1) Type of assembly receiving firestop and required fire rating.
         2) Type of penetrating item.
         3) Proposed firestop system.
      b. Include UL or equivalent details for each firestop system.
   2. Test Reports: Indicate conformance with ASTM E814, ASTM E1966, ASTM E2307, UL 1479, or UL 2079.

B. Quality Control Submittals:
   1. Certificates of Compliance: Indicate conformance of installed systems with specified requirements.

1.5 QUALITY ASSURANCE

A. Applicator Qualifications: Minimum 5 years documented experience in work of this Section.

B. Firestopping: Fire resistance rating of 1 hour, tested to ASTM E814, ASTM E1966, ASTM E2307, UL 1479, or UL 2079.

1.6 PROJECT CONDITIONS

A. Do not apply sealants, mortars, or putties when temperature of substrate material and surrounding air is below 40 degrees F or is anticipated to drop below that temperature within 24 hours after installation.

PART 2 PRODUCTS

2.1 MANUFACTURERS

A. Acceptable Manufacturers:
1. Hilti, Inc. (www.us.hilti.com)
2. 3M Fire Protective Products. (www.3m.com)
3. Nelson Firestop Products. (www.nelsonfirestop.com)
4. Rectorseal. (www.rectorseal.com)
5. Specified Technologies, Inc. (www.stifirestop.com)
6. Tremco, Inc. (www.tremcosealants.com)

B. Substitutions: Under provisions of Division 01.

2.2 MATERIALS

A. Firestopping: One or more of the following:
1. Silicone elastomer compound: Single or multiple component, low modulus, moisture curing silicone sealant.
2. Ceramic sealant: Single component, moisture curing ceramic sealant.
3. Intumescent sealant: Single component, water based intumescent sealant.
4. Acrylic sealant: Single component acrylic sealant, suitable for painting.
5. Putty: Single component ceramic fiber base putty or intumescent elastomer putty that expands on exposure to surface heat gain.
6. Mortar: Hydraulic cementitious mortar.
7. Pillows or blocks: Formed intumescent or mineral fiber pillows or blocks.
8. Intumescent strips: Solvent free intumescent wrap strips.
9. Mechanical devices: Incombustible fillers or silicone elastomer covered with sheet stainless steel jacket, joined with collars, penetration sealed with flanged stops.
10. Cast-in-place devices: Containing intumescent material and smoke/water seals.

B. Sealants must comply with regulation 8, rule 51, of the Bay Area Quality Management District.

2.3 ACCESSORIES

A. Forming and Damming Materials: As recommended by firestopping manufacturer for intended use.
1. Permanent: Mineral fiber board, mineral fiber matting, or mineral fiber putty.
2. Temporary: Plywood, particle board, or other.

PART 3 EXECUTION

3.1 PREPARATION

A. Prepare openings to receive firestopping as directed by manufacturer:
   1. Remove incidental and loose materials from penetration opening.
   2. Remove free liquids and oil from involved surfaces and penetration components.
   3. Install damming materials to accommodate and ensure proper thickness and fire rating requirements and provide containment during installation.
   4. Remove combustible materials and materials not intended for final penetration seal system.

3.2 INSTALLATION

A. Install firestopping at perimeter of and penetrations through fire rated assemblies.

B. Apply materials in accordance with manufacturer's instructions.

C. Apply firestopping material in sufficient thickness to achieve required ratings.

D. Compress fibered material to achieve a density of 40 percent of its uncompressed density.

E. Place foamed material in layers to ensure homogenous density, filling cavities and spaces. Place sealant to completely seal junctions with adjacent dissimilar materials.

F. Place intumescent coating in sufficient coats to achieve rating required.

G. Remove dam material after firestopping material has cured.

H. Finish exposed surfaces to smooth, flush appearance.

END OF SECTION - 078400

SECTION 079200 - JOINT SEALANTS

PART 1 GENERAL

1.1 SUMMARY

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

B. Section Includes:
1. Joint backup materials.
2. Joint sealers.

1.2 SUBMITTALS

A. Submittals for Review:
1. Product Data: Indicate sealers, primers, backup materials, bond breakers, and accessories proposed for use.
2. Warranty: Sample warranty form.

1.3 QUALITY ASSURANCE

A. Applicator Qualifications: Minimum 5 years documented experience in work of this Section.

A. Field Pre-Construction Testing:
1. Perform field testing for sealant adhesion in accordance with ASTM C1521 on exterior mockup, prior to beginning application, and for each 1000 feet of installed sealer.
2. Install sealers using joint preparation methods and materials recommended by sealer manufacturer.
3. When tests indicate sealant adhesion failure, modify joint preparation, primer, or both and retest until joint passes sealant adhesion test.

1.4 PROJECT CONDITIONS

A. Do not apply sealers at temperatures below 40 degrees F unless approved by sealer manufacturer.

1.5 WARRANTIES

A. Furnish manufacturer's 10 year warranty providing coverage for exterior sealers and accessories that fail to provide air and water tight seal, exhibit loss of adhesion or cohesion, or do not cure.

PART 2 PRODUCTS

2.1 MANUFACTURERS

A. Acceptable Manufacturers:
1. BASF Building Systems. (www.buildingsystems.basf.com)
2. Dow Corning Corp. (www.dowcorning.com)
3. GE Silicones. (www.siliconeforbuilding.com)

4. Pecora Corp. (www.pecora.com)
5. Sika Corp. (www.sikausa.com)
6. Tremco, Inc. (www.tremcosealants.com)

2.2 MATERIALS

Sealants must comply with regulation 8, rule 51, of the Bay Area Quality Management District. Select sealant suitable for the application and substrates being sealed.

A. Joint Sealer Type 1:
1. ASTM C920, Grade NS, single component polyurethane type, non sag.
2. Movement capability: Plus or minus 25 percent.
3. Color: To be selected from manufacturer's full color range.

B. Joint Sealer Type 2:
1. ASTM C920, Grade NS, single component silicone type, nonstaining, field tintable, non sag.
2. Movement capability: Plus or minus 25 percent.
3. Color: To be selected from manufacturer's full color range.

C. Joint Sealer Type 3:
1. ASTM C920, Grade NS, single component butyl rubber type, non sag.p
2. Movement capability: Plus or minus 12-1/2 percent.
3. Color: To be selected from manufacturer's full color range.

D. Joint Sealer Type 4:
1. ASTM C834, single component acrylic latex, non sag.
2. Movement capability: Plus or minus 7-1/2 percent.
3. Color: White.

E. Joint Sealer Type 5:
1. ASTM C920, Grade NS, single component silicone, non sag, mildew resistant.
2. Movement capability: Plus or minus 25 percent.
3. Color: To be selected from manufacturer's full color range.

2.3 ACCESSORIES

A. Primers, Bondbreakers, and Solvents: As recommended by sealer manufacturer.

B. Joint Backing:
1. ASTM C1330, closed cell polyethylene foam, preformed round joint filler, non absorbing, non staining, resilient, compatible with sealer and primer, recommended by sealer manufacturer for each sealer type.
2. Size: Minimum 1.25 times joint width.

PART 3 EXECUTION

3.1 PREPARATION

A. Remove loose and foreign matter that could impair adhesion. If surface has been subject to chemical contamination, contact sealer manufacturer for recommendation.

B. Clean and prime joints in accordance with manufacturer's instructions.

C. Protect adjacent surfaces with masking tape or protective coverings.

D. Sealer Dimensions:
   1. Minimum joint size: 1/4 x 1/4 inch.
   2. Joints 1/4 to 1/2 inch wide: Depth equal to width.
   3. Joints over 1/2 inch wide: Depth equal to one half of width.

3.2 APPLICATION

A. Apply products in accordance with manufacturer's instructions.

B. Install sealers and accessories in accordance with ASTM C1193.

C. Install joint backing to maintain required sealer dimensions. Compress backing approximately 25 percent without puncturing skin. Do not twist or stretch.

D. Use bondbreaker tape where joint backing is not installed.

E. Fill joints full without air pockets, embedded materials, ridges, and sags.

F. Tool sealer to smooth profile.

G. Apply sealer within manufacturer’s recommended temperature range.

3.3 CLEANING

A. Remove masking tape and protective coverings after sealer has cured.

B. Clean adjacent surfaces.

END OF SECTION - JOINT SEALANTS

SECTION 081416
FLUSH WOOD DOORS

PART 1 GENERAL

1.1 SUMMARY

A. Section Includes:
1. Wood veneer faced flush doors.
2. Factory finishing.

B. Related Sections:
1. Division 01: Administrative, procedural, and temporary work requirements.
2. Section 08 7100 - Door Hardware.
3. Section 08 8000 - Glazing.

1.2 REFERENCES

A. Architectural Woodwork Institute/Architectural Woodwork Manufacturers of Canada/Woodwork Institute (AWI/AWMAC/WI) - Architectural Woodwork Standards.

B. National Fire Protection Association (NFPA) 80 - Standard for Fire Doors and Fire Windows.

C. Underwriters Laboratories (UL):
1. 10B - Standard for Fire Tests of Door Assemblies.
2. 10C - Standard for Positive Pressure Fire Tests of Door Assemblies.

D. Window and Door Manufacturers Association (WDMA) - I.S.1A - Industry Standard for Architectural Flush Wood Doors.

1.3 SUBMITTALS

A. Submittals for Review:
1. Shop Drawings: Show locations, elevations, dimensions, fire ratings, and preparation for hardware.
2. Samples:
   a. 6 x 6 inch door samples showing edges, core, and faces.
   b. 12 x 12 inch veneer samples showing selected color and finish.
3. Warranty: Sample warranty form.

B. Quality Control Submittals:
1. Certificates of Compliance: Manufacturer's certification that doors comply with specified fire rating requirements.

1.4 QUALITY ASSURANCE

A. Fire Door Construction: Conform to UL 10B.

B. Installed Fire Rated Door Assembly: Conform to NFPA 80.

1.5 DELIVERY, STORAGE AND HANDLING

A. Package doors in heavy plastic with identifying marks; slit plastic wrap on site to permit ventilation, but do not remove from plastic until ready to install.

B. Do not deliver doors until building is substantially water and weather tight.

C. Store doors flat and level, with spacers between doors to allow for air circulation, in protected, dry area.

D. Environmental Requirements: Maintain following conditions in building for minimum 7 days prior to, during, and after installation of doors:
   1. Temperature: 60 to 80 degrees F.
   2. Humidity: 17 to 50 percent.

1.6 WARRANTIES

A. Furnish manufacturer's 1 year warranty providing coverage against defects in materials and workmanship and warpage beyond specified amount.

PART 2 PRODUCTS

2.1 MANUFACTURERS

A. Acceptable Manufacturers:
   1. Algoma Hardwoods, Inc. (www.algomahardwoods.com)
   2. Eggers Industries. (www.eggersindustries.com)
   3. Marshfield DoorSystems, Inc. (www.marshfielddoors.com)
   4. Oshkosh Door Co. (www.oshkoshdoor.com)
   5. VT Industries, Inc. (www.vtindustries.com)
   6. Masonite Doors www.masonite.com)

B. Substitutions: Under provisions of Division 01.

2.2 MATERIALS

A. Flush Wood Doors:
   1. AWI/AWMAC/WI Architectural Woodwork Standards, Section 9.
   2. Core type:
      a. Solid, fire rated: Fire-Resistant Composite Core.
      b. Solid, non-rated: Staved Lumber.
   3. Wood veneer faces: Close grain hardwood, of quality suitable for opaque finish.
   4. Adhesives: Waterproof type.

2.3 ACCESSORIES

A. Glass and Glazing Accessories: Specified in Section 08 8000.

2.4 FABRICATION

A. Fabricate doors in accordance with AWI/AWMAC/WI Architectural Woodwork Standards, Section 9.
   1. Grade: Premium.
   2. Performance Level: Heavy Duty.

3. Edge Type: Solid wood.
4. Number of plies: 7

B. Prefitting; fit doors to frames at factory with following clearances:
1. Fire rated doors:
a. Width: Cut lock edge only; 3/16 inch maximum.
b. Height: Cut bottom edge only; 1 inch maximum.
2. Non-rated doors:
a. Width: Cut hinge and lock edges equally.
b. Height: Cut bottom edge only; maximum 3/4 inch.
3. Edge clearances:
a. Jambs and head: 1/8 inch maximum between door and frame.
b. Sills without thresholds: 1/8 inch maximum between door and top of finish floor.
c. Sills with thresholds: 1/4 inch maximum between door and top of threshold.
d. Meeting stiles of pairs: 1/8 inch maximum between doors.
4. Lock edge: Bevel 1/8 inch in 2 inches.

C. Premachining: Machine doors at factory to receive hardware specified in Section 08 7100.

2.5 FINISHES

A. Factory Finishing:
1. Factory finish doors in accordance with AWI/AWMAC/WI Architectural Woodwork Standards, Section 5.
2. Finish system: Latex Acrylic, Water Based.
3. Color: To be selected from manufacturer's full color range.
4. Sheen: To be selected by owner.

PART 3 EXECUTION

3.1 PREPARATION

A. Condition doors to average humidity that will be encountered after installation.

3.2 INSTALLATION

A. Install doors in accordance with AWI/AWMAC/WI Architectural Woodwork Standards.

B. Install doors plumb and level.

C. Field Fitting to Frames:
1. Fire rated doors:
a. Width: Cut lock edge only; 3/16 inch maximum.
b. Height: Cut bottom edge only; 1 inch maximum.
2. Non-rated doors:
a. Width: Cut hinge and lock edges equally.
b. Height: Cut bottom edge only; maximum 3/4 inch.
3. Edge clearances:
a. Jambs and head: 1/8 inch maximum between door and frame.
b. Sills without thresholds: 1/8 inch maximum between door and top of finish floor.
c. Sills with thresholds: 1/4 inch maximum between door and top of threshold.
d. Meeting stiles of pairs: 1/8 inch maximum between doors.

4. Lock edge: Bevel 1/8 inch in 2 inches.
5. Do not cut doors down to opening sizes smaller than those for which they were manufactured.

D. Seal field cut surfaces with same finish as door faces.

E. Install door hardware in accordance with Section 087100.

F. Installation Tolerances:
1. Warp: Maximum 1/4 inch in any 3'-0" x 7'-0" portion of door, measured with taut string or straight edge on concave face of door.

END OF SECTION 081416

SECTION 081615 – STEEL EXTERIOR DOORS

PART 1 GENERAL

1.1 SECTION INCLUDES

A. Steel 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 minimum 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.
   1. Material: Steel
   2. Style: Profile
   3. Design Pressure: 50

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. Low-E, Argon

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 081615

SECTION 087100 - DOOR HARDWARE

PART 1 GENERAL

1.1 SUMMARY

A. Section Includes:
1. Hardware for wood and fiberglass doors.
2. Weatherstripping and thresholds.
3. Smoke seals.
4. Hardware for other sections referencing this section.

B. Related Sections:
1. Division 01: Administrative, procedural, and temporary work requirements.

1.2 REFERENCES

A. American National Standards Institute/Builders Hardware Manufacturers Association (ANSI/BHMA):
1. A156.1 - Butts and Hinges.
2. A156.2 - Bored and Preassembled Locks and Latches.
3. A156.4 - Door Controls - Closers.
4. A156.5 - Auxiliary Locks and Associated Products.
5. A156.13 - Mortise Locks and Latches.
6. A156.18 - Materials and Finishes.

1.3 SUBMITTALS

A. Submittals for Review:
1. Shop Drawings: Schedule hardware by door type and location; show door size, hand, thickness, edge bevel, hardware components and quantities, keying, and finishes.
2. Product Data: Manufacturer's descriptive data for each component.
3. Samples: One sample of each hardware item, if requested. Samples will be returned for installation on Project.
4. Warranty: Sample warranty form.

1.4 QUALITY ASSURANCE

A. Installer Qualifications: Minimum 5 years documented experience in work of this Section.

B. Provide hardware labeled by recognized independent testing laboratory and meeting requirements of NFPA 80 for fire rated doors.

C. Conform to applicable accessibility code for locating hardware and for door opening force requirements.

1.5 DELIVERY, STORAGE AND HANDLING

A. Pack hardware items separately, with fasteners, installation instructions, and templates.

1.6 WARRANTIES

A. Furnish manufacturer's limited lifetime warranty for locksets, latchsets and door closers.

PART 2 PRODUCTS

2.1 MANUFACTURERS

A. Acceptable Manufacturers - Butt Hinges:
1. Bommer Industries, Inc. (www.bommer.com)
2. Hager Companies. (www.hagerco.com)
3. McKinney Products Co., Inc. (www.mckinneyhinge.com)
4. Stanley Black and Decker. (www.stanleyblackanddecker.com)

B. Acceptable Manufacturers - Locksets, Latchsets, Deadbolts, and Cylinders:
1. Best Access Systems. (www.bestaccess.com)
2. Corbin Russwin, Inc. (www.corbin-russwin.com)
3. Schlage by Allegion. (www.allegion.com)
4. Sargent Manufacturing Company. (www.sargentlock.com)
5. Yale Security, Inc. (www.yalelocks.com)

C. Acceptable Manufacturers - Closers:
1. Corbin Russwin, Inc. (www.corbin-russwin.com)
2. Dorma Door Controls, Ltd. (www.dorma-usa.com)
3. LCN by Allegion. (www.allegion.com)
4. Sargent Manufacturing Company. (www.sargentlock.com)
5. Yale Security, Inc. (www.yalelocks.com)

D. Acceptable Manufacturers - Door Seals:
1. Hager Companies. (www.hagerco.com)
2. National Guard Products, Inc. (www.ngpinc.com)
3. Pemko Manufacturing Co., Inc. (www.pemko.com)
4. Reese Enterprises, Inc. (www.reeseusa.com)
5. Zero International. (www.zerointernational.com)

E. Substitutions: Under provisions of Division 01.

2.2 MANUFACTURED UNITS

A. Butt Hinges:
1. Description: ANSI/BHMA A156.1, full mortise type, five knuckle, non-rising pin, hole in bottom tip for pin removal.
2. Exterior out-swinging doors: Provide set screw in barrel making hinge non-removable when door is closed.
3. Weight: Standard weight.
4. Bearing type: Plain bearing.
5. Size: 4-1/2 x 4-1/2 inches.

B. Locksets, Latchsets, Deadbolts, and Cylinders:
1. Locksets and latchsets:

a. To be selected from manufacturer's full range of selections.
b. See Drawings & Door Schedule product requirements.

2. Deadbolts:
   a. Type: ANSI/BHMA A156.5, cylindrical type with 1 inch bolt throw.
   b. Functions: As directed by Owner.
3. Strike plates: Curved lip, minimum lip projection necessary to protect door frame and trim and to conceal edges of strike cutout.
4. Strike boxes: Steel.
5. Cylinders: Seven pin, solid brass, removable core type.
6. Keys: Solid brass or nickel silver.
7. Keying:
   a. Key alike, cross key, or otherwise key as directed by Owner.
   b. Provide four keys for each lock and 4 for each master key system.
   c. Inscribe keys with lock manufacturer and notation DO NOT DUPLICATE.

C. Closers:
1. Description: ANSI/BHMA A156.4, overhead concealed, metal cover, sized to door conditions.
2. Construction: Cast aluminum body, rack and pinion operation with compression spring, fully hydraulic.
3. Closing and latching speeds and back-check: Controlled by independently adjustable concealed valves.
4. Mounting: Surface mounted, non-handed with universal regular or parallel arm. Suitable for mounting on 1-3/4 inch minimum door top rail or transom bar without drop plate.
5. Adjustable opening force and delayed closing in accordance with applicable accessibility code.

D. Door Stops: Wall or base mounted, with resilient bumper. Color to be selected by owner to match door hardware.

E. Weatherstripping:
1. Head and jambs:

2.3 FINISHES

A. Finishes: To ANSI/BHMA A156.18.

B. Door Closers: Selected by owner.

C. Hinges at Fire-Rated Doors: Selected by owner.

D. Threshold: Selected by owner to match door/floor as appropriate.

PART 3 EXECUTION

3.1 INSTALLATION

A. Install hardware in accordance with approved hardware schedule and manufacturer's instructions.

B. Install mortise items flush with adjacent surfaces.

C. Install locksets, closers, and trim after finish painting.

D. Set thresholds in mastic and secure.

E. Mount closers so that closers and closer arms are not visible on corridor or public side of doors or on exterior of building.

F. Mounting Heights - Finished Floor to Center Line of:
   1. Locksets: 38 inches.
   2. Dead locks: 48 inches.
   3. Top hinge: Maximum 10 inches from frame head.
   4. Bottom hinge: Maximum 12-1/2 inches from floor.
   5. Intermediate hinges: Equally spaced.

3.2 PROTECTION

A. Remove or protect hardware until painting is completed.

3.3 ADJUSTING

A. Test and adjust hardware for quiet, smooth operation, free from binding and rattling.

B. Adjust doors to operate with maximum opening forces in accordance with applicable building code.

END OF SECTION 087100

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 #1540-510 Concrete Wall Application
   a. Material: Stainless Steel
   b. Flood Coverage: 200 sq.ft.
   c. Size: 16 inches W by 8 inches H.
   d. Rough Opening: 16-1/4 inches W by 8-1/4 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 - 089543

SECTION 092900 GYPSUM BOARD

1.0 SCOPE

A. Gypsum Board and Gypsum Board Assemblies
B. Interior ceilings and walls.
C. Install 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:
    a. Interior Applications: Per Manufacturer's recommendation as allowed by building code.
    b. Exterior Applications: 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 (including under first floor application) - 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 096816 - SHEET CARPETING

PART 1 - GENERAL

1.1 SUMMARY

A. Section Includes:

1. Carpet
2. Carpet cushion.

B. Related Requirements:

1. Section 012100 “Allowances” for contractor allowance values to be carried in the bid.
2. Section 024119 "Selective Demolition" for removing existing floor coverings.

1.2 ASBESTOS NOTICE

A. Notice is given hereby that this carpet will be installed over an asbestos flooring. Contractor shall refer to the asbestos abatement specifications and reports and review the materials and conditions of the work.

1.3 PREINSTALLATION MEETINGS

A. Preinstallation Conference: Conduct conference at **Project site**.

1. Review methods and procedures related to carpet installation including, but not limited to, the following:

a. Review delivery, storage, and handling procedures.
b. Review ambient conditions and ventilation procedures.
c. Review subfloor preparation procedures.
d. Review carpet splicing location plan.

1.4 ACTION SUBMITTALS

A. Product Data: For the following, including installation recommendations for each type of substrate:

1. Carpet: For each type indicated. Include manufacturer's written data on physical characteristics, durability, and fade resistance.
   a. For carpet, documentation indicating compliance with testing and product requirements of CRI's "Green Label Plus" program.
   b. For carpet cushion, documentation indicating compliance with testing and product requirements of CRI's "Green Label" program.
   c. For installation adhesive, including printed statement of VOC content.

2. Carpet Cushion: For each type indicated. Include manufacturer's written data on physical characteristics and durability.

B. Environmental Submittals:

1. Product Data:

a. For carpet, documentation indicating compliance with testing and product requirements of CRI's "Green Label Plus" program.
b. For carpet cushion, documentation indicating compliance with testing and product requirements of CRI's "Green Label" program.
c. For installation adhesive, including printed statement of VOC content.

C. Shop Drawings: Show the following:
1. Carpet type, color, and dye lot.
2. Seam locations, types, and methods.
3. Type, color, and location of edge, transition, and other accessory strips.
4. Transition details to other flooring materials.
5. Type of carpet cushion.

D. Samples: For each of the following products and for each color and texture required. Label each Sample with manufacturer's name, material description, color, pattern, and designation indicated on Drawings and in schedules.

1. Carpet: 12-inch- (300-mm-) square Sample.
2. Exposed Edge, Transition, and Other Accessory Stripping: 12-inch- (300-mm-) long Samples.
3. Carpet Cushion: 6-inch- (150-mm-) square Sample.
4. Carpet Seam: 6-inch (150-mm) Sample.

1.5 INFORMATIONAL SUBMITTALS

A. Qualification Data: For qualified Installer.
B. Sample Warranties: For special warranties.

1.6 CLOSEOUT SUBMITTALS

A. Maintenance Data: For carpet to include in maintenance manuals. Include the following:

1. Methods for maintaining carpet, including cleaning and stain-removal products and procedures and manufacturer's recommended maintenance schedule.
2. Precautions for cleaning materials and methods that could be detrimental to carpet and carpet cushion.

B. Warranty

1.7 DELIVERY, STORAGE, AND HANDLING

A. Comply with CRI 104.

1.8 FIELD CONDITIONS

A. Comply with CRI 104 for temperature, humidity, and ventilation limitations.

B. Environmental Limitations: Do not deliver or install carpet and carpet cushion until spaces are enclosed and weathertight, wet work in spaces is complete and dry, and ambient temperature and humidity conditions are maintained at occupancy levels during the remainder of the construction period.

C. Where demountable partitions or other items are indicated for installation on top of carpet, install carpet before installing these items.

1.9 WARRANTY

A. Special Warranty for Carpet: Manufacturer agrees to repair or replace components of carpet installation that fail in materials or workmanship within specified warranty period.

1. Warranty does not include deterioration or failure of carpet due to unusual traffic, failure of substrate, vandalism, or abuse.
2. Warranty Period: 25 year quality warranty and Lifetime Stain & Soil Warranty from date of Substantial Completion.
3. Warranty: Carpet cushion- manufacturer's standard warranty.

PART 2 - PRODUCTS

2.1 CARPET

A. Basis-of-Design Product: Subject to compliance with requirements, provide the following:
1. Manufacturer: Mohawk
2. Fiber: SmartStrand w/DuPont Sorona Triexta PTT(Bio-Sorona)
3. Color: As selected by owner
4. Pattern: No Pattern
5. Emissions: Provide carpet that complies with testing and product requirements of CRI's "Green Label Plus" program.

B. Performance Characteristics: As follows:
1. Critical Radiant Flux Classification: Not less than [**0.45 W/sq. cm**] [**0.22 W/sq. cm**].
2. Emissions: Provide carpet that complies with the 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."

2.2 CARPET CUSHION

A. Basis-of-Design Product: Subject to compliance with requirements, provide the following:
1. Manufacturer: Mohawk
2. Product: SmartCushion
3. Provide 8 Lb. carpet cushion

B. Performance Characteristics: As follows:
1. Emissions: CRI "Green Label"
2. Spill Safe Moisture Guard.
3. Non-Allergenic
4. Anti-Microbial to inhibit mildew, mold, & fungus growth.
5. Insulation Value: 2.1

2.3 INSTALLATION ACCESSORIES

A. Trowelable Leveling and Patching Compounds: Latex-modified, hydraulic-cement-based formulation provided or recommended by carpet and cushion manufacturer.

B. Adhesives: Water-resistant, mildew-resistant, nonstaining type to suit products and subfloor conditions indicated, that complies with flammability requirements for installed carpet and is recommended or provided by carpet and carpet cushion manufacturers.

1. Use adhesives with VOC content not more than 50 g/L when calculated according to 40 CFR 59, Subpart D (EPA Method 24).
2. Use adhesives that comply with the 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."

C. Tackless Carpet Stripping: Water-resistant plywood, in strips as required to match cushion thickness and that comply with CRI 104, Section 12.2.

D. Seam Adhesive: Hot-melt adhesive tape or similar product recommended by carpet manufacturer for sealing and taping seams and butting cut edges at backing to form secure seams and to prevent pile loss at seams.

E. Metal Edge/Transition Strips: Extruded aluminum finish of profile and width shown, of height required to protect exposed edge of carpet, and of maximum lengths to minimize running joints. Provide Tile to Carpet transitions strip profile.EXECUTION

2.4 EXAMINATION

A. Examine substrates, areas, and conditions, with Installer present, for compliance with requirements for installation tolerances, and other conditions affecting carpet performance. Examine carpet for type, color, pattern, and potential defects.

B. For wood subfloors, verify the following:
1. Underlayment surface is free of irregularities and substances that may interfere with adhesive bond or show through surface.

C. Proceed with installation only after unsatisfactory conditions have been corrected.

2.5 PREPARATION

A. General: Comply with CRI 104, Section 7.3, "Site Conditions; Floor Preparation," and with carpet manufacturer's written installation instructions for preparing substrates.

B. Use trowelable leveling and patching compounds, according to manufacturer's written instructions, to fill cracks, holes, depressions, and protrusions in substrates. Fill or level cracks, holes and depressions 1/8 inch (3 mm) wide or wider, and protrusions more than 1/32 inch (0.8 mm), unless more stringent requirements are required by manufacturer's written instructions.

C. Remove coatings, including curing compounds, and other substances that are incompatible with adhesives and that contain soap, wax, oil, or silicone, without using solvents. Use mechanical methods recommended in writing by carpet & cushion manufacturer.

D. Broom and vacuum clean substrates to be covered immediately before installing carpet.

2.6 INSTALLATION

A. Comply with CRI 104 and carpet and carpet cushion manufacturers' written installation instructions for the following:
   1. Stretch-in Installation: Comply with CRI 104, Section 12, "Stretch-in Installations."
   2. Stair Installation: Comply with CRI 104, Section 13, "Carpet on Stairs" for stretch-in installation.

B. Comply with carpet manufacturer's written recommendations and Shop Drawings for seam locations and direction of carpet; maintain uniformity of carpet direction and lay of pile. At doorways, center seams under the door in closed position.

C. Cut and fit carpet to butt tightly to vertical surfaces, permanent fixtures, and built-in furniture including cabinets, pipes, outlets, edgings, thresholds, and nosings. Bind or seal cut edges as recommended by carpet manufacturer.

D. Extend carpet into toe spaces, door reveals, closets, open-bottomed obstructions, removable flanges, alcoves, and similar openings.

E. Comply with carpet cushion manufacturer's written recommendations.

F. Transition Strip – Flooring transition strip shall be installed in one continuous piece. Cope ends to meet detail of moldings at wall or jamb interface.

2.7 CLEANING AND PROTECTING

A. Perform the following operations immediately after installing carpet:

   1. Remove excess adhesive, seam sealer, and other surface blemishes using cleaner recommended by carpet manufacturer.
   2. Remove yarns that protrude from carpet surface.
   3. Vacuum carpet using commercial machine with face-beater element.

B. Protect installed carpet to comply with CRI 104, Section 16, "Protecting Indoor Installations."

C. Protect carpet against damage from construction operations and placement of equipment and fixtures during the remainder of construction period. Use protection methods indicated or recommended in writing by carpet manufacturer and carpet cushion manufacturer.

END OF SECTION 096816

SECTION 099100 - PAINTING

PART 1 GENERAL

1.1 SUMMARY

A. Section Includes:

1. Surface preparation and field application of paints and coatings.
2. Paint in color and finish as selected by the owner
3. Stains in colors and finishes as selected by the owner
4. Polyurethane floor 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

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 & Coatings:
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. Interior Wood Flooring:
1. Wipe off dust and grit.
2. Sand New Hardwood and Hardwood flooring to be refinished.
3. Apply stains to match existing flooring.
4. Fill imperfections with clear epoxy wood filler compatible with polyurethane finish.
5. Apply polyurethane coatings in accordance with manufacturer’s instructions.

L. Exterior Wood:
1. Remove dust, grit, and foreign matter.
2. Seal knots, pitch streaks, and sappy sections.

M. 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 & coatings 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.

END OF SECTION 099100

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 and Vent

1. Solid wall PVC pipe with socket fittings.

B. Domestic Water

1. Type L copper tubing with cast bronze or ASME B16.22 wrought-copper solder fittings.

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. Gas Piping

1. Black steel pipe, schedule 40, Type E or S, Grade B with malleable-iron threaded fittings or wrought-steel welding fittings for butt welding and socket welding.

E. 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 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..

9.0 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.

10.0 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.

11.0 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
CPVC (1” or smaller)	3	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.

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 all equipment, labor, supplies, supervision and all materials not specifically mentioned, ready for use, plumbing components. 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.

4. All materials furnished and all work installed shall comply with the rules and recommendations of the national board of fire underwriters, with all requirements of local utilities companies, with the recommendations of the fire insurance rating organization having jurisdiction.

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. SHOP DRAWINGS:
   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. <u>DEFINITIONS:</u>

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. EXAMINATION OF PREMISES - SPECIAL NOTE:
   1. No consideration or allowance will be granted for the failure to visit the site, or any alleged misunderstanding or material to be furnished, or work to be done. It being that tender of proposal indicated with its agreement to items and conditions referred to herein or indicated on aforementioned drawings.

P. 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

Q. 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.

R. 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.

S. CONTINUITY OF EXISTING SYSTEM:
   1. Maintain continuity of the existing vent, waste, soil, hot and cold water systems to the areas not affected by this alteration.

T. DEMOLITION:
   1. Contractor shall furnish all labor, materials, equipment, etc., required to complete all demolition work necessary for the full completion of this contract. Protect all parts and equipment that are to remain. Assume full responsibility for damage.

   2. All items being removed shall remain the property of the owner unless otherwise indicated by the owner. Equipment and devices the owner does not wish to retain shall become the property of the contractor and removed from the site. All material chosen to be retained by the owner shall be delivered by the contractor to such a point as designated by the owner.

U. 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.

V. ELECTRICAL CONNECTIONS:

1. Power supply and alarm wiring shall be provided including but not limited to connections made to any heat tracing 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. DISSIMILAR METALS:

a. Where copper or brass alloy is connected to galvanized metal, the two shall be separated with an dielectric connection fitting.

B. VALVES:

a. 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, Milwaukee Valve Co., Crane Co; Crane Valve Group; Jenkins Valves, Crane Valves, Stockham Division, Grinnell Corporation, Walworth Company, Nibco Inc

b. 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, Milwaukee Valve Co., Crane Co.; Crane Valve Group; Jenkins Valves, Stockham Division, Grinnell Corporation, Walworth Company, Nibco Inc., Vertical, Cincinnati Valve Co.

C. 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.

D. 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 output in response to temperature along its 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.

E. ROUND METAL DUCT

a. General Fabrication Requirements: Comply with SMACNA's "HVAC Duct Construction Standards - Metal and Flexible," Chapter 3, "Round, Oval, and Flexible Duct," based on indicated static-pressure class unless otherwise indicated.

b. Transverse Joints: Select joint types and fabricate according to SMACNA's "HVAC Duct Construction Standards - Metal and Flexible," Figure 3-1, "Round Duct Transverse Joints," for static-pressure class, applicable sealing requirements, materials involved, duct-support intervals, and other provisions in SMACNA's "HVAC Duct Construction Standards - Metal and Flexible."

c. Longitudinal Seams: Select seam types and fabricate according to SMACNA's "HVAC Duct Construction Standards - Metal and Flexible," Figure 3-2, "Round Duct Longitudinal Seams," for static-pressure class, applicable sealing requirements, materials involved, duct-support intervals, and other provisions in SMACNA's "HVAC Duct Construction Standards - Metal and Flexible."

d. Tees and Laterals: Select types and fabricate according to SMACNA's "HVAC Duct Construction Standards - Metal and Flexible," Figure 3-5, "90 Degree Tees and Laterals," and Figure 3-6, "Conical Tees," for static-pressure class, applicable sealing requirements, materials involved, duct-support intervals, and other provisions in SMACNA's "HVAC Duct Construction Standards - Metal and Flexible."

F. BACKDRAFT DAMPER

a. Description: Gravity balanced

b. Maximum Air Velocity: 1000 fpm

c. Maximum System Pressure: 1-inch wg

d. Frame: Hat shaped with welded corners or mechanically attached

e. Blades: Multiple single-piece blades, maximum 6-inch width with sealed edges

f. Blade action: Parallel

G. MOTORIZED DAMPER

a. Low-leakage rating, with linkage outside airstream, and bearing AMCA's Certified Ratings Seal for both air performance and air leakage.

H. EXHAUST TERMINATION

a. Wall cap for 6” round duct, spring loaded backdraft damper and bird screen, 22 GA steel with attachment collar.

I. DUCT TESTING

a. Ducts Connected to Fans Exhausting (ASHRAE 62.1, Class 1 and 2) Air:

i. Pressure Class: Negative 1-inch wg (250 Pa)
ii. Minimum SMACNA Seal Class: B
iii. SMACNA Leakage Class for Rectangular: 24
iv. SMACNA Leakage Class for Round and Flat Oval: 12

3.0 EXECUTION

A. 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.

B. ESCUTCHEON INSTALLATION:
   a. Provide escutcheon on pipe protrusions at walls, partitions, ceiling and floors. Escutcheon shall fit snuggly around piping and cover surface openings.

C. 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.

D. CONNECTIONS TO EXISTING WORK:
   a. Plan installations of new work and connections to existing work to insure minimum interference to regular operation of existing facilities. All temporary shutdown of services are to be made during normal working hours. To insure continuous operation, make temporary connections between new and existing work.

E. 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.

F. MECHANICAL COUPLINGS: Use manufacturer's materials and methods

G. MATERIALS

a. Contractor shall provide hangers with galvanized coating or nonmetallic coating for copper pipe and thermal shield inserts for insulated pipe.

H. EQUIPMENT: APPROVED MANUFACTURERS

I. INSULATION: Manville, Knauf, Owens Corning

J. CLEANING:
   a. Clean pipe prior to painting.
   b. Upon completion of work, perform the following cleaning procedures:
      i. Remove protective covers after painting
      ii. Clean piping and equipment
      iii. Remove surplus materials and rubbish
      iv. Restore damaged surface finishes

K. 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.

L. 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. Circuit breakers
2. Lighting
3. Conduit, wire and cable
4. Devices (receptacles and toggle switches)
5. Detector – smoke

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. 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.

F. Cable Ties

1. Cable ties shall be fabricated of one-piece with no metal parts. Manufactured by Burndy, T&B, Panduit or Blackburn.

G. 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.

H. 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.

2. All 20A 1 pole bedroom circuit breakers shall be AFCI type.

I. 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%.

J. 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.

K. 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.

2. All receptacles shall be 125V and 20A unless otherwise noted.

3. Receptacles that are located in areas subject to weather conditions, shall be GFCI type.

4. 125V 20A receptacles located in kitchen, basement, storage area and outdoors shall be GFCI type.

5. All 125V 15 and 20A receptacles located at 5-1/2' above finish floor or below shall be tamper resistant type.

6. 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.

7. Switches shall be 120V and 20A. Switches that are located in areas subject to weather conditions, shall be placed in a weatherproof enclosure.

8. 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.

9. Wall plates for switches and receptacles shall be smooth thermoplastic or nylon in finished areas. Color shall be white unless otherwise noted. Manufactured by Hubbell, Pass & Seymour, Leviton, or Mulberry.

L. 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, energy star rated, and shall be controlled by an integral photocell.

3. Surface mounted lighting fixtures in garage shall be wet location listed, energy star rated and resistant to salt spray.

4. Furnish and install new lamps during the course of construction up to and including the date of final completion of the project.

5. Clean and remove all paint, stickers, dirt, smudges and fingerprints from lighting fixtures after final building clean-up.

M. 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.

N. Detectors

1. Smoke detectors shall be battery operated wireless interconnect type, UL listed and manufactured by Kidde or approved equal.

O. Ceiling Fans

1. Ceiling fans shall be combination type with integral fluorescent lighting fixture, reversible blades, energy star rated and provided with thermoplastic remote for fan speed control.

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.

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.

C. 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. Armor clad cable shall be used for wiring all smoke, heat and combination smoke/carbon monoxide detectors.

10. Common neutral for multiple branch circuits is not acceptable. Provide separate neutral for each branch circuit.

11. 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.

12. Install copper green insulated grounding conductor in all conduits and raceways.

D. 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.

E. Identification

1. Furnish and install nameplates for all electrical equipment, identifying name, function and/or control.

F. 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. Drawings and general provisions of the Contract, including General and Supplementary Conditions and Division 01 Specification Sections, apply to this Section.

B. References to the Standard Specifications for this section shall mean 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. Clearing and grubbing.
3. Stripping and stockpiling topsoil.
4. Removing above- and below-grade site improvements.
5. Temporary erosion and sedimentation control.
6. Excavating and filling for rough grading the Site.
7. Preparing subgrades for slabs-on-grade walks pavements and turf and grasses.
8. Excavating and backfilling for buildings and structures.
9. Drainage course for concrete slabs-on-grade.
10. Subbase course for asphalt paving.
11. Subsurface drainage backfill for walls and trenches.
12. Excavating and backfilling trenches for utilities and pits for buried utility structures.

B. Related Requirements:

1. Section 013200 "Construction Progress Documentation" Section 013233 "Photographic Documentation" for recording preexcavation and earth-moving progress.
2. Section 033000 "Cast-in-Place Concrete" for granular course if placed over vapor retarder and beneath the slab-on-grade.
3. Section 312319 "Dewatering" for lowering and disposing of ground water during construction.
4. Section 316329 "Drilled Concrete Piers and Shafts" for excavation of shafts and disposal of surplus excavated material.
5. Section 329200 "Turf and Grasses" for finish grading in turf and grass areas, including preparing and placing planting soil for turf areas.

1.3 DEFINITIONS

A. Backfill: Soil material or controlled low-strength material used to fill an excavation.

1. Initial Backfill: Backfill placed beside and over pipe in a trench, including haunches to support sides of pipe.
2. Final Backfill: Backfill placed over initial backfill to fill a trench.

B. Bedding Course: Aggregate layer placed over the excavated subgrade in a trench before laying pipe.

C. Borrow Soil: Satisfactory soil imported from off-site for use as fill or backfill.

D. Drainage Course: Aggregate layer supporting the slab-on-grade that also minimizes upward capillary flow of pore water.

E. Excavation: Removal of material encountered above subgrade elevations and to lines and dimensions indicated.

1. Authorized Additional Excavation: Excavation below subgrade elevations or beyond indicated lines and dimensions as directed by Engineer. Authorized additional excavation and replacement material will be paid for according to Contract provisions for unit prices changes in the Work.
2. Bulk Excavation: Excavation more than 10 feet in width and more than 30 feet in length.
3. Unauthorized Excavation: Excavation below subgrade elevations or beyond indicated lines and dimensions without direction by Engineer. Unauthorized excavation, as well as remedial work directed by Engineer, shall be without additional compensation.

F. Fill: Soil materials used to raise existing grades.

G. Rock: Rock material in beds, ledges, unstratified masses, conglomerate deposits, and boulders of rock material that exceed 1 cu. yd. for bulk excavation or 3/4 cu. yd. for footing, trench, and pit excavation that cannot be removed by rock-excavating equipment equivalent to the following in size and performance ratings, without systematic drilling, ram hammering, ripping, or blasting, when permitted:

1. Equipment for Footing, Trench, and Pit Excavation: Late-model, track-mounted hydraulic excavator; equipped with a 42-inch- maximum-width, short-tip-radius rock bucket; rated at not less than 138-hp flywheel power with bucket-curling force of not less than 28,700 lbf and stick-crowd force of not less than 18,400 lbf with extra-long reach boom.

H. Structures: Buildings, footings, foundations, retaining walls, slabs, tanks, curbs, mechanical and electrical appurtenances, or other man-made stationary features constructed above or below the ground surface.

I. Subbase Course: Aggregate layer placed between the subgrade and hot-mix asphalt pavement, or aggregate layer placed between the subgrade and a cement concrete pavement or a cement concrete or hot-mix asphalt walk.

J. Subgrade: Uppermost surface of an excavation or the top surface of a fill or backfill immediately below subbase, drainage fill, drainage course, or topsoil materials.

K. Subsoil: Soil beneath the level of subgrade; soil beneath the topsoil layers of a naturally occurring soil profile, typified by less than 1 percent organic matter and few soil organisms.

L. Surface Soil: Soil that is present at the top layer of the existing soil profile. In undisturbed areas, surface soil is typically called "topsoil," but in disturbed areas such as urban environments, the surface soil can be subsoil.

M. Topsoil: Top layer of the soil profile consisting of existing native surface topsoil or existing in-place surface soil; the zone where plant roots grow.

N. Utilities: On-site underground pipes, conduits, ducts, and cables as well as underground services within buildings.

O. Vegetation: Trees, shrubs, groundcovers, grass, and other plants.

1.4 PREINSTALLATION MEETINGS

A. Preinstallation Conference: Conduct preexcavation conference at Project site.

1. Review methods and procedures related to earthmoving, including, but not limited to, the following:

a. Personnel and equipment needed to make progress and avoid delays.
b. Coordination of Work with utility locator service.
c. Extent of trenching by hand or with air spade.
d. Field quality control.

1.5 MATERIAL OWNERSHIP

A. Except for materials indicated to be stockpiled or otherwise remain Owner's property, cleared materials shall become Contractor's property and shall be removed from Project site.

1.6 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.

1.7 INFORMATIONAL SUBMITTALS

A. Qualification Data: For qualified testing agency.

B. 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.

C. 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.

D. Topsoil stripping and stockpiling program.

1.8 QUALITY ASSURANCE

A. Geotechnical Testing Agency Qualifications: Qualified according to ASTM E 329 and ASTM D 3740 for testing indicated.

B. Topsoil Stripping and Stockpiling Program: Prepare a written program to systematically demonstrate the ability of personnel to properly follow procedures and handle materials and equipment during the Work. Include dimensioned diagrams for placement and protection of stockpiles.

1.9 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.
2. Provide alternate routes around closed or obstructed traffic ways if required by Owner or authorities having jurisdiction.

B. Utility Locator Service: Notify "Call Before You Dig" for area where Project is located before beginning earth-moving operations.

C. Salvageable Improvements: Carefully remove items indicated to be salvaged and store on Owner's premises.

D. Do not commence site clearing operations until temporary erosion- and sedimentation-control and plant-protection measures are in place.

E. Soil Stripping, Handling, and Stockpiling: Perform only when the soil is dry or slightly moist.

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. 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.

E. 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.

F. 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.

G. 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.

3.4 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 OF SURPLUS AND WASTE MATERIALS

A. Remove surplus soil material, unsuitable topsoil, obstructions, demolished materials, and waste materials including trash and debris, and legally dispose of them off Owner's property.

B. Separate recyclable materials produced during site clearing from other nonrecyclable materials. Store or stockpile without intermixing with other materials, and transport them to recycling facilities. Do not interfere with other Project work.

3.6 DEWATERING

A. Prevent surface water and ground water from entering excavations, from ponding on prepared subgrades, and from flooding Project site and surrounding area.

B. Protect subgrades from softening, undermining, washout, and damage by rain or water accumulation.

1. Reroute surface water runoff away from excavated areas. Do not allow water to accumulate in excavations. Do not use excavated trenches as temporary drainage ditches.

3.7 EXPLOSIVES

A. Explosives: Do not use explosives.

3.8 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.
2. Remove rock to lines and grades indicated to permit installation of permanent construction without exceeding the following dimensions:

a. 24 inches outside of concrete forms other than at footings.
b. 12 inches outside of concrete forms at footings.
c. 6 inches outside of minimum required dimensions of concrete cast against grade.
d. Outside dimensions of concrete walls indicated to be cast against rock without forms or exterior waterproofing treatments.
e. 6 inches beneath bottom of concrete slabs-on-grade.
f. 6 inches beneath pipe in trenches and the greater of 24 inches wider than pipe or 42 inches wide.

B. Classified Excavation: Excavate to subgrade elevations. Material to be excavated will be classified as earth and rock. Do not excavate rock until it has been classified and cross sectioned by Engineer. The Contract Sum will be adjusted for rock excavation according to unit prices included in the Contract Documents. Changes in the Contract Time may be authorized for rock excavation.

1. Earth excavation includes excavating pavements and obstructions visible on surface; underground structures, utilities, and other items indicated to be removed; and soil, boulders, and other materials not classified as rock or unauthorized excavation.

a. Intermittent drilling; ram hammering; or ripping of material not classified as rock excavation is earth excavation.

2. Rock excavation includes removal and disposal of rock. Remove rock to lines and subgrade elevations indicated to permit installation of permanent construction without exceeding the following dimensions:

    a. 24 inches outside of concrete forms other than at footings.
    b. 12 inches outside of concrete forms at footings.
    c. 6 inches outside of minimum required dimensions of concrete cast against grade.
    d. Outside dimensions of concrete walls indicated to be cast against rock without forms or exterior waterproofing treatments.
    e. 6 inches beneath bottom of concrete slabs-on-grade.
    f. 6 inches beneath pipe in trenches and the greater of 24 inches wider than pipe or 42 inches wide.

3.9 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 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 Tanks, Basins, and 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.

3.10 EXCAVATION FOR WALKS AND PAVEMENTS

A. Excavate surfaces under walks and pavements to indicated lines, cross sections, elevations, and subgrades.

3.11 EXCAVATION FOR UTILITY TRENCHES

A. Excavate trenches to indicated gradients, lines, depths, and elevations.

1. Beyond building perimeter, excavate trenches to allow installation of top of pipe below frost line.

B. Excavate trench walls vertically from trench bottom to 12 inches higher than top of pipe or conduit unless otherwise indicated.

C. 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.

3.12 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.

3.13 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 as directed by Engineer.

3.14 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.

1. Stockpile soil materials away from edge of excavations. Do not store within drip line of remaining trees.

3.15 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.

3.16 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.

3.17 SOIL FILL

A. Plow, scarify, bench, or break up sloped surfaces steeper than 1 vertical to 4 horizontal so fill material will bond with existing material.

B. Place and compact fill material in layers to required elevations as follows:

1. Under grass and planted areas, use satisfactory soil material.
2. Under walks and pavements, use satisfactory soil material.
3. Under steps and ramps, use engineered fill.
4. Under building slabs, use engineered fill.
5. Under footings and foundations, use engineered fill.

C. Place soil fill on subgrades free of mud, frost, snow, or ice.

3.18 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.

3.19 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.

3.20 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.

3.21 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.

3.22 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.

3.23 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.

3.24 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.

3.25 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. 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 construction dewatering.

B. Related Requirements:

1. Section 013233 "Photographic Documentation" for recording preexisting conditions and dewatering system progress.
2. Section 312000 "Earth Moving" for excavating, backfilling, site grading, and controlling surface-water runoff and ponding.

1.3 PREINSTALLATION MEETINGS

A. Preinstallation Conference: Conduct conference at Project site.

1. Verify availability of Installer's personnel, equipment, and facilities needed to make progress and avoid delays.
2. Review condition of site to be dewatered including coordination with temporary erosion-control measures and temporary controls and protections.
3. Review geotechnical report.
4. Review proposed site clearing and excavations.
5. Review existing utilities and subsurface conditions.
6. Review observation and monitoring of dewatering system.

1.4 ACTION SUBMITTALS

A. Shop Drawings: For dewatering system, prepared by or under the supervision of a qualified professional engineer.

1. Include plans, elevations, sections, and details.
2. Show arrangement, locations, and details of wells and well points; locations of risers, headers, filters, pumps, power units, and discharge lines; and means of discharge, control of sediment, and disposal of water.
3. Include layouts of piezometers and flow-measuring devices for monitoring performance of dewatering system.

4. Include written plan for dewatering operations including sequence of well and well-point placement coordinated with excavation shoring and bracings and control procedures to be adopted if dewatering problems arise.

1.5 INFORMATIONAL SUBMITTALS

A. Qualification Data: For Installer and professional engineer.

B. Field quality-control reports.

C. 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.

D. Record Drawings: Identify locations and depths of capped wells and well points and other abandoned-in-place dewatering equipment.

1.6 QUALITY ASSURANCE

A. Installer Qualifications: An experienced installer that has specialized in design of dewatering systems and dewatering work.

1.7 FIELD CONDITIONS

A. Project-Site Information: A geotechnical report has been prepared for this Project and is available for information only. The opinions expressed in this report are those of a geotechnical engineer and represent interpretations of subsoil conditions, tests, and results of analyses conducted by a geotechnical engineer. Owner is not responsible for interpretations or conclusions drawn from this data.

1. Make additional test borings and conduct other exploratory operations necessary for dewatering according to the performance requirements.
2. The geotechnical report is referenced elsewhere in Project Manual.

B. Survey Work: Engage a qualified land surveyor or professional engineer to survey adjacent existing buildings, structures, and site improvements; establish exact elevations at fixed points to act as benchmarks. Clearly identify benchmarks and record existing elevations.

PART 2 - PRODUCTS

2.1 PERFORMANCE REQUIREMENTS

A. Dewatering Performance: Design, 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. Design dewatering system, including comprehensive engineering analysis by a qualified professional engineer.
2. 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.
3. Prevent surface water from entering excavations by grading, dikes, or other means.
4. Accomplish dewatering without damaging existing buildings, structures, and site improvements adjacent to excavation.
5. 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.

1. Prevent surface water and subsurface or ground water from entering excavations, from ponding on prepared subgrades, and from flooding site or surrounding area.
2. Protect subgrades and foundation soils from softening and damage by rain or water accumulation.

B. Install dewatering system to ensure minimum interference with roads, streets, walks, and other adjacent occupied and used facilities.

1. Do not close or obstruct streets, walks, or other adjacent occupied or used facilities without permission from Owner and authorities having jurisdiction. Provide alternate routes around closed or obstructed traffic ways if required by authorities having jurisdiction.

C. Provide temporary grading to facilitate dewatering and control of surface water.

D. Protect and maintain temporary erosion and sedimentation controls, which are specified in Section 311000 "Site Clearing," during dewatering operations.

3.2 INSTALLATION

A. Install dewatering system utilizing wells, well points, or similar methods complete with pump equipment, standby power and pumps, filter material gradation, valves, appurtenances, water disposal, and surface-water controls.

1. Space well points or wells at intervals required to provide sufficient dewatering.
2. Use filters or other means to prevent pumping of fine sands or silts from the subsurface.

B. Place dewatering system into operation to lower water to specified levels before excavating below ground-water level.

C. Provide sumps, sedimentation tanks, and other flow-control devices as required by authorities having jurisdiction.

D. Provide standby equipment on-site, installed and available for immediate operation, to maintain dewatering on continuous basis if any part of system becomes inadequate or fails.

3.3 OPERATION

A. Operate system continuously until drains, sewers, and structures have been constructed and fill materials have been placed or until dewatering is no longer required.

B. 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.
2. Reduce hydrostatic head in water-bearing strata below subgrade elevations of foundations, drains, sewers, and other excavations.
3. Maintain piezometric water level a minimum of 24 inches below bottom of excavation.

C. 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.

D. Remove dewatering system from Project site on completion of dewatering. Plug or fill well holes with sand or cut off and cap wells a minimum of 36 inches below overlying construction.

3.4 FIELD QUALITY CONTROL

A. Observation Wells: Provide observation wells or piezometers, take measurements, and maintain at least the minimum number indicated; additional observation wells may be required by authorities having jurisdiction.

1. Observe and record daily elevation of ground water and piezometric water levels in observation wells.

2. Repair or replace, within 24 hours, observation wells that become inactive, damaged, or destroyed. In areas where observation wells are not functioning properly, suspend construction activities until reliable observations can be made. Add or remove water from observation-well risers to demonstrate that observation wells are functioning properly.
3. Fill observation wells, remove piezometers, and fill holes when dewatering is completed.

B. 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.

C. Provide continual observation to ensure that subsurface soils are not being removed by the dewatering operation.

D. Prepare reports of observations.

3.5 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. 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 temporary excavation support and protection systems.

B. Related Requirements:

1. Section 013233 "Photographic Documentation" for recording preexisting conditions and excavation support and protection system progress.
2. Section 312000 "Earth Moving" for excavating and backfilling and for controlling surface-water runoff and ponding.
3. Section 312319 "Dewatering" for dewatering excavations.

1.3 PREINSTALLATION MEETINGS

A. Preinstallation Conference: Conduct conference at Project site .

1. Review geotechnical report.
2. Review existing utilities and subsurface conditions.
3. Review coordination for interruption, shutoff, capping, and continuation of utility services.
4. Review proposed excavations.
5. Review proposed equipment.
6. Review monitoring of excavation support and protection system.
7. Review coordination with waterproofing.
8. Review abandonment or removal of excavation support and protection system.

1.4 ACTION SUBMITTALS

A. Product Data: For each type of product.

1. Include construction details, material descriptions, performance properties, and dimensions of individual components and profiles, and calculations for excavation support and protection system.

B. Shop Drawings: For excavation support and protection system, prepared by or under the supervision of a qualified professional engineer.

1. Include plans, elevations, sections, and details.
2. Show arrangement, locations, and details of soldier piles, piling, lagging, tiebacks, bracing, and other components of excavation support and protection system according to engineering design.
3. Indicate type and location of waterproofing.
4. Include a written plan for excavation support and protection, including sequence of construction of support and protection coordinated with progress of excavation.

1.5 INFORMATIONAL SUBMITTALS

A. Qualification Data: For professional engineer.

B. Contractor Calculations: For excavation support and protection system. Include analysis data signed and sealed by the qualified professional engineer responsible for their preparation.

C. Existing Conditions: Using photographs or video recordings, show existing conditions of adjacent construction and site improvements that might be misconstrued as damage caused by inadequate performance of excavation support and protection systems. Submit before Work begins.

D. Record Drawings: Identify locations and depths of capped utilities, abandoned-in-place support and protection systems, and other subsurface structural, electrical, or mechanical conditions.

1.6 FIELD CONDITIONS

A. Interruption of Existing Utilities: Do not interrupt any utility serving facilities occupied by Owner 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.

B. Project-Site Information: A geotechnical report has been prepared for this Project and is available for information only. The opinions expressed in this report are those of a geotechnical engineer and represent interpretations of subsoil conditions, tests, and results of analyses conducted by a geotechnical engineer. Owner is not responsible for interpretations or conclusions drawn from the data.

1. Make additional test borings and conduct other exploratory operations necessary for excavation support and protection according to the performance requirements.
2. The geotechnical report is referenced elsewhere in Project Manual.

C. Survey Work: Engage a qualified land surveyor or professional engineer to survey adjacent existing buildings, structures, and site improvements; establish exact elevations at fixed points to act as benchmarks. Clearly identify benchmarks and record existing elevations.

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. Contractor Design: Design excavation support and protection system, including comprehensive engineering analysis by a qualified professional engineer.
2. Prevent surface water from entering excavations by grading, dikes, or other means.
3. Install excavation support and protection systems without damaging existing buildings, structures, and site improvements adjacent to excavation.
4. 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. General: Provide materials that are either new or in serviceable condition.

B. Structural Steel: ASTM A 36/A 36M, ASTM A 690/A 690M, or ASTM A 992/A 992M.

C. Steel Sheet Piling: ASTM A 328/A 328M, ASTM A 572/A 572M, or ASTM A 690/A 690M; with continuous interlocks.

1. Corners: Roll-formed corner shape with continuous interlock.

D. Wood Lagging: Lumber, mixed hardwood, nominal rough thickness of size and strength required for application.

E. Cast-in-Place Concrete: ACI 301, of compressive strength required for application.

F. Reinforcing Bars: ASTM A 615/A 615M, Grade 60, deformed.

G. Tiebacks: Steel bars, ASTM A 722/A 722M.

H. Tiebacks: Steel strand, ASTM A 416/A 416M.

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 SOLDIER PILES AND LAGGING

A. Install steel soldier piles before starting excavation. Extend soldier piles below excavation grade level to depths adequate to prevent lateral movement. Space soldier piles at regular intervals not to exceed allowable flexural strength of wood lagging. Accurately align exposed faces of flanges to vary not more than 2 inches from a horizontal line and not more than 1:120 out of vertical alignment.

B. Install wood lagging within flanges of soldier piles as excavation proceeds. Trim excavation as required to install lagging. Fill voids behind lagging with soil, and compact.

C. Install wales horizontally at locations indicated on Drawings and secure to soldier piles.

3.3 SHEET PILING

A. Before starting excavation, install one-piece sheet piling lengths and tightly interlock vertical edges to form a continuous barrier.

B. Accurately place the piling, using templates and guide frames unless otherwise recommended in writing by the sheet piling manufacturer. Limit vertical offset of adjacent sheet piling to 60 inches. Accurately align exposed faces of sheet piling to vary not more than 2 inches from a horizontal line and not more than 1:120 out of vertical alignment.

C. Cut tops of sheet piling to uniform elevation at top of excavation.

3.4 TIEBACKS

A. Drill, install, grout, and tension tiebacks.

B. Test load-carrying capacity of each tieback and replace and retest deficient tiebacks.

1. Have test loading observed by a qualified professional engineer responsible for design of excavation support and protection system.

C. Maintain tiebacks in place until permanent construction is able to withstand lateral earth and hydrostatic pressures.

3.5 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.

3.6 FIELD QUALITY CONTROL

A. Survey-Work Benchmarks: Resurvey benchmarks regularly during installation of excavation support and protection systems, excavation progress, and for as long as excavation remains open. Maintain an accurate log of surveyed elevations and positions for comparison with original elevations and positions. Promptly notify Engineer if changes in elevations or positions occur or if cracks, sags, or other damage is evident in adjacent construction.

B. Promptly correct detected bulges, breakage, or other evidence of movement to ensure that excavation support and protection system remains stable.

C. Promptly repair damages to adjacent facilities caused by installation or faulty performance of excavation support and protection systems.

3.7 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 321216 - ASPHALT PAVING

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.

B. References to the Standard Specifications for this section shall mean 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. Cold milling of existing asphalt pavement.
2. Hot-mix asphalt patching.
3. Hot-mix asphalt paving.
4. Hot-mix asphalt overlay.
5. Asphalt curbs.
6. Asphalt traffic-calming devices.
7. Asphalt surface treatments.

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 PREINSTALLATION MEETINGS

A. Preinstallation Conference: Conduct conference at Project site.

1. Review methods and procedures related to hot-mix asphalt paving including, but not limited to, the following:

a. Review proposed sources of paving materials, including capabilities and location of plant that will manufacture hot-mix asphalt.
b. Review requirements for protecting paving work, including restriction of traffic during installation period and for remainder of construction period.

1.4 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.

1.5 INFORMATIONAL SUBMITTALS

A. Qualification Data: For manufacturer and installer.

B. Material Certificates: For each paving material.

C. Material Test Reports: For each paving material, by a qualified testing agency.

D. Field quality-control reports.

1.6 QUALITY ASSURANCE

A. Manufacturer Qualifications: A paving-mix manufacturer registered with and approved by authorities having jurisdiction or the Connecticut Department of Transportation.

B. Testing Agency Qualifications: Qualified according to ASTM D 3666 for testing indicated.

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.

1.7 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.

H. 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:

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. Replace and compact hot-mix asphalt where core tests were taken.

F. Remove and replace or install additional hot-mix asphalt where test results or measurements indicate that it does not comply with specified requirements.

3.8 WASTE HANDLING

A. Except for material indicated to be recycled, remove excavated materials from Project site and legally dispose of them in an EPA-approved landfill.

1. Do not allow milled materials to accumulate on-site.

END OF SECTION 321216

SECTION 329200 - TURF AND GRASSES

PART 1 - GENERAL

1.1 RELATED DOCUMENTS

A. Drawings and general provisions of the Contract, including General and Supplementary Conditions and Division 01 Specification Sections, apply to this Section.

1.2 SUMMARY

A. Section Includes:

1. Seeding.
2. Turf renovation.
3. Erosion-control material(s).

B. Related Requirements:

1. Section 329300 "Plants" for trees, shrubs, ground covers, and other plants as well as border edgings and mow strips.
2. Section 334600 "Subdrainage" for below-grade drainage of landscaped areas.

1.3 DEFINITIONS

A. Finish Grade: Elevation of finished surface of planting soil.

B. Pesticide: A substance or mixture intended for preventing, destroying, repelling, or mitigating a pest. Pesticides include insecticides, miticides, herbicides, fungicides, rodenticides, and molluscicides. They also includes substances or mixtures intended for use as a plant regulator, defoliant, or desiccant.

C. Pests: Living organisms that occur where they are not desired or that cause damage to plants, animals, or people. Pests include insects, mites, grubs, mollusks (snails and slugs), rodents (gophers, moles, and mice), unwanted plants (weeds), fungi, bacteria, and viruses.

D. Planting Soil: Existing, on-site soil; imported soil; or manufactured soil that has been modified with soil amendments and perhaps fertilizers to produce a soil mixture best for plant growth. See Section 329113 "Soil Preparation" Section 329115 "Soil Preparation (Performance Specification)" and drawing designations for planting soils.

E. Subgrade: The surface or elevation of subsoil remaining after excavation is complete, or the top surface of a fill or backfill before planting soil is placed.

1.4 PREINSTALLATION MEETINGS

A. Preinstallation Conference: Conduct conference at Project site.

1.5 INFORMATIONAL SUBMITTALS

A. Qualification Data: For landscape Installer.

B. 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.

C. Product Certificates: For fertilizers, from manufacturer.

D. Pesticides and Herbicides: Product label and manufacturer's application instructions specific to Project.

1.6 CLOSEOUT SUBMITTALS

A. Maintenance Data: Recommended procedures to be established by Owner for maintenance of turf during a calendar year. Submit before expiration of required maintenance periods.

1.7 QUALITY ASSURANCE

A. Installer Qualifications: A qualified landscape installer whose work has resulted in successful turf establishment.

1. Installer's Field Supervision: Require Installer to maintain an experienced full-time supervisor on Project site when work is in progress.

1.8 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.

1.9 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 when beneficial and optimum results may be obtained. 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.

2.3 EROSION-CONTROL MATERIALS

A. Erosion-Control Blankets: Biodegradable wood excelsior, straw, or coconut-fiber mat enclosed in a photodegradable plastic mesh. Include manufacturer's recommended steel wire staples, 6 inches long.

B. Erosion-Control Fiber Mesh: Biodegradable burlap or spun-coir mesh, a minimum of 0.92 lb/sq. yd., with 50 to 65 percent open area. Include manufacturer's recommended steel wire staples, 6 inches long.

C. Erosion-Control Mats: Cellular, nonbiodegradable slope-stabilization mats designed to isolate and contain small areas of soil over steeply sloped surface, of 3-inch nominal mat thickness. Include manufacturer's recommended anchorage system for slope conditions.

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.

B. Proceed with installation only after unsatisfactory conditions have been corrected.

C. If contamination by foreign or deleterious material or liquid is present in soil within a planting area, remove the soil and contamination as directed by Engineer and replace with new planting soil.

3.2 PREPARATION

A. Protect structures; utilities; sidewalks; pavements; and other facilities, trees, shrubs, and plantings from damage caused by planting operations.

1. Protect 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.

C. Before planting, obtain Engineer's acceptance of finish grading; restore planting areas if eroded or otherwise disturbed after finish grading.

3.4 PREPARATION FOR EROSION-CONTROL MATERIALS

A. Prepare area as specified in "Turf Area Preparation" Article.

B. For erosion-control mats, install planting soil in two lifts, with second lift equal to thickness of erosion-control mats. Install erosion-control mat and fasten as recommended by material manufacturer.

C. Fill cells of erosion-control mat with planting soil and compact before planting.

D. For erosion-control blanket or mesh, install from top of slope, working downward, and as recommended by material manufacturer for site conditions. Fasten as recommended by material manufacturer.

E. Moisten prepared area before planting if surface is dry. Water thoroughly and allow surface to dry before planting. Do not create muddy soil.

3.5 SEEDING

A. Sow seed with spreader or seeding machine. Do not broadcast or drop seed when wind velocity exceeds 5 mph.

1. Evenly distribute seed by sowing equal quantities in two directions at right angles to each other.
2. Do not use wet seed or seed that is moldy or otherwise damaged.
3. Do not seed against existing trees. Limit extent of seed to outside edge of planting saucer.

B. Sow seed at a total rate of 5 to 8 lb/1000 sq. ft.

C. Rake seed lightly into top 1/8 inch of soil, roll lightly, and water with fine spray.

D. Protect seeded areas with slopes exceeding 1:4 with erosion-control blankets and 1:6 with erosion-control fiber mesh installed and stapled according to manufacturer's written instructions.

E. Protect seeded areas with erosion-control mats where indicated on Drawings; install and anchor according to manufacturer's written instructions.

F. Protect seeded areas with slopes not exceeding 1:6 by spreading straw mulch. Spread uniformly at a minimum rate of 2 tons/acre to form a continuous blanket 1-1/2 inches in loose thickness over seeded areas. Spread by hand, blower, or other suitable equipment.

1. Bond straw mulch by spraying with asphalt emulsion at a rate of 10 to 13 gal./1000 sq. ft. Take precautions to prevent damage or staining of structures or other plantings adjacent to mulched areas. Immediately clean damaged or stained areas.

G. Protect seeded areas from hot, dry weather or drying winds by applying peat mulch within 24 hours after completing seeding operations. Soak areas, scatter mulch uniformly to a thickness of 3/16 inch, and roll surface smooth.

3.6 TURF RENOVATION

A. Renovate existing turf where indicated.

B. 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 as required.

C. Remove sod and vegetation from diseased or unsatisfactory turf areas; do not bury in soil.

D. Remove topsoil containing foreign materials, such as oil drippings, fuel spills, stones, gravel, and other construction materials resulting from Contractor's operations, and replace with new planting soil.

E. Mow, dethatch, core aerate, and rake existing turf.

F. Remove weeds before seeding. Where weeds are extensive, apply selective herbicides as required. Do not use pre-emergence herbicides.

G. Remove waste and foreign materials, including weeds, soil cores, grass, vegetation, and turf, and legally dispose of them off Owner's property.

H. Till stripped, bare, and compacted areas thoroughly to a soil depth of 6 inches.

I. Apply initial fertilizer required for establishing new turf and mix thoroughly into top 4 inches of existing soil. Install new planting soil to fill low spots and meet finish grades.

1. Initial Fertilizer: Slow-release fertilizer applied according to manufacturer's recommendations.

J. Apply seed and protect with straw mulch as required for new turf.

K. Water newly planted areas and keep moist until new turf is established.

3.7 TURF MAINTENANCE

A. General: Maintain and establish turf by watering, fertilizing, weeding, mowing, trimming, replanting, and performing other operations as required to establish healthy, viable turf. Roll, regrade, and replant bare or eroded areas and remulch to produce a uniformly smooth turf. Provide materials and installation the same as those used in the original installation.

1. Fill in as necessary soil subsidence that may occur because of settling or other processes. Replace materials and turf damaged or lost in areas of subsidence.
2. In areas where mulch has been disturbed by wind or maintenance operations, add new mulch and anchor as required to prevent displacement.

3. Apply treatments as required to keep turf and soil free of pests and pathogens or disease. Use integrated pest management practices whenever possible to minimize the use of pesticides and reduce hazards.

B. Watering: Install and maintain temporary piping, hoses, and turf-watering equipment to convey water from sources and to keep turf uniformly moist to a depth of 4 inches.

1. Schedule watering to prevent wilting, puddling, erosion, and displacement of seed or mulch. Lay out temporary watering system to avoid walking over muddy or newly planted areas.
2. Water turf with fine spray at a minimum rate of 1 inch per week unless rainfall precipitation is adequate.

C. Mow turf as soon as top growth is tall enough to cut. Repeat mowing to maintain specified height without cutting more than one-third of grass height. Remove no more than one-third of grass-leaf growth in initial or subsequent mowings. Do not delay mowing until grass blades bend over and become matted. Do not mow when grass is wet. Schedule initial and subsequent mowings to maintain the following grass height:

1. Mow bentgrass to a height of 1/2 inch or less.
2. Mow bermudagrass to a height of 1/2 to 1 inch.
3. Mow carpetgrass centipedegrass perennial ryegrass zoysiagrass to a height of 1 to 2 inches.
4. Mow Kentucky bluegrass buffalograss annual ryegrass chewings red fescue to a height of 1-1/2 to 2 inches.
5. Mow bahiagrass turf-type tall fescue St. Augustinegrass to a height of 2 to 3 inches.

D. 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.

3.8 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.

B. Use specified materials to reestablish turf that does not comply with requirements, and continue maintenance until turf is satisfactory.

3.9 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 temporary fencing or barricades and warning signs as required to protect newly planted areas from traffic. Maintain fencing and barricades throughout initial maintenance period and remove after plantings are established.

D. Remove nondegradable erosion-control measures after grass establishment period.

3.10 MAINTENANCE SERVICE

A. Turf Maintenance Service: Provide full maintenance by skilled employees of landscape Installer. Maintain as required in "Turf Maintenance" Article. Begin maintenance immediately after each area is planted and continue until acceptable turf is established, but for not less than the following periods:

1. Seeded Turf: 60 days from date of planting completion.

a. When initial maintenance period has not elapsed before end of planting season, or if turf is not fully established, continue maintenance during next planting season.

END OF SECTION 329200