TABLE OF CONTENTS

STATE OF HAWAII

DEPARTMENT OF HAWAIIAN HOME LANDS
91-5420 Kapolei Parkway,
Kapolei, HI. 96707

SPECIFICATIONS

FOR

FURNISHING LABOR AND MATERIALS FOR

2-BEDROOM HOUSE RENOVATION (LOT 58-B-1)
&
3-BEDROOM HOUSE RENOVATION (LOT 131-A-3)

HILO, COUNTY OF HAWAII, HAWAII
TAX MAP KEY: (3) 2-1-021:072 & (3) 2-1-021:010

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DIVISION 1 – GENERAL REQUIREMENTS

SECTION 00850 – DRAWING INDEX

COMBINED TITLE SHEET TS

2 BEDROOM HOUSE RENOVATION (LOT 58-B-1)

Sheet No.	Description	Drawing No.
1	TITLE SHEET, INDEX MAP	TS-1
2	NOTES	TS-2
3	EXISTING SITE PLAN, ARCHITECTURAL ABBREVATIONS & SYMBOLS	A1.1
4	EXISTING /DEMOLITION FOUNDATION & FLOOR PLAN/BASEMENT LEVEL, EXISTING/DEMOLITION FLOOR PLAN UPPER LEVEL	A2.1
5	EXISTING/NEW WORK FOUNDATION & FLOOR PLAN/BASEMENT LEVEL, EXISTING/NEW WORK FLOOR PLAN UPPER LEVEL, ROOF FRAMING PLAN (CARPORT)	A2.2
6	DOOR & WINDOW SCHEDULE, LIGHT & VENTILATION REQ. FLASHING DETAILS	A2.3
7	EXISTING/DEMOLITION EXTERIOR ELEVATIONS	A3.1
8	EXISTING/NEW EXTERIOR ELEVATIONS	A3.2
9	EXISTING/DEMOLITION/NEW WORK FOOF PLAN, DETAILS	A4.1
10	EXISTING/DEMOLITION REFLECTED CEILING PLAN/BASEMENT & UPPER LEVEL	A5.1
11	EXISTING/NEW WORK REFLECTED CEILING PLAN/BASEMENT & UPPER LEVEL	A5.2
12	EXISTING/DEMOLITION/NEW WORK INTERIOR ELEVATIONS	A6.1
13	INTERIOR ELEVATIONS	A6.2

14	WALL SECTIONS, DETAILS	A7.1
15	STAIR DETAILS	A7.2
16	SECTION THRU BUILDING, DETAIL	A7.3

3 BEDROOM HOUSE RENOVATION (LOT 131-A-3)

Sheet No.	Description	Drawing No.
1	TITLE SHEET, INDEX MAP	TS-1
2	EXISTING SITE PLAN	A1.1
3	EXISTING/DEMOLITION FLOOR PLAN	A2.1
4	EXISTING /NEW WORK FLOOR PLAN	A2.2
5	EXISTING/DEMOLITION EXTERIOR ELEVATIONS	A3.1
6	EXISTING/NEW WORK EXTERIOR ELEVATIONS	A3.2
7	EXISTING/DEMOLITION/NEW WORK FOOF PLAN, DETAILS	A4.1
8	REFLECTED CEILING PLAN	A5.1
9	EXISTING/DEMOLITION INTERIOR ELEVATIONS	A6.1
10	EXISTING/NEW WORK INTERION ELEVATIONS	A6.2

DIVISION 1 – GENERAL REQUIREMENTS

SECTION 01010 – SUMMARY OF WORK

PART 1 – GENERAL

1.01 RELATED DOCUMENTS

The General Provisions and the Special Provisions apply to this Section. Special attention is directed to the Proposal Schedule.

1.02 SUMMARY

Section Includes:

1. Vehicle Parking
2. Provisions for Field Office/Storage Space
3. Location of the Work
4. Hours of work
5. Safety
6. Disposal of excess soil materials
7. Construction stakes, lines and grades
8. Special project requirements
9. Unforeseen Conditions Allowances

1.03 PROVISIONS FOR FIELD OFFICE/STORAGE SPACE

Pending the availability of space on DHHL property, the State will issue a permit to the Contractor for the use of the space, at no charge, to be used specifically for a field office and/or storage of materials and equipment. Since space on DHHL property is limited, the State does not guarantee that the space provided to the Contractor will be in close proximity to the project site. The State will make every effort to provide the Contractor with space on DHHL property, however, should the State determine that no space is available for such use(s), the responsibility shall then be on the Contractor to find space outside of DHHL property.

1.04 LOCATION OF THE WORK

A. The work to be performed under this contract is located at East Hawaii Keaukaha Tract 1, Waiakea, South Hilo. Refer to the project plans for the jobsite location.

B. Conditions: Upon award of the contract, the Contractor, at their cost, shall obtain all permits required for this project.

1.05 HOURS OF WORK

A. Work can be performed at the construction site between 8:00 am and 4:30 pm, Monday through Friday. Submit a proposed construction schedule to Engineer for review and approval within 14 calendar days prior to start of work. The Contractor shall coordinate their schedule with the Engineer if rescheduling of work or intermittent work is required, such work shall be performed at no extra cost to the State. If the Contractor's obligation to pay.

B. Contractor shall clean work areas at the end of each working shift. Rubbish, loose materials, etc. shall be disposed of daily. Materials shall be safely secured and stored in an area designated by the West Hawaii District Supervisor.

1.06 SAFETY

A. The Contractor shall take the necessary precautions to protect his workers and other personnel from injuries. The rules and regulations promulgated by the Occupational Safety and Health Acts are applicable and made a part of these specifications.

B. Barricades and warning signs shall be erected by the Contractor in the work area to properly protect all personnel in the area.

C. During the progress of the work debris, empty crates, waste, material drippings, etc., shall be removed by the Contractor at the end of each work day, and the work area shall be left clean and orderly.

1.07 DISPOSAL OF EXCESS SOIL MATERIALS

A. At the Construction Manager and/or Engineers discretion, excess useable soil materials may be used as fill material for this project. Best Management Practices shall be employed at all times to control soil erosion and water pollution that may result from stockpiling activities.

B. Off-Site Disposal of Excess Soil Material: Any excess soil material and rubbish disposed of outside the DHHL property shall be the responsibility of the Contractor. The Contractor shall make all arrangements and bear all costs involved therewith.

1.08 CONSTRUCTION STAKES, LINES AND GRADES

A. The Contractor shall perform all construction layout and reference staking necessary for the proper control and satisfactory completion of all structures, grading, paving, drainage, sewer, water, and all other appurtenances required for the completion of the work.

B. Existing horizontal and vertical survey control points for the project are shown on the plans. The Contractor shall verify the location of all control points prior to the start of construction.

C. The Department will not be responsible for delays in setting stakes and marks.

D. All control points and stakes or marks which the Engineer may set shall be preserved by the Contractor. If such control points, stakes or marks are destroyed or disturbed by the Contractor, the cost of replacing such stakes or marks will be charged against the Contractor and deducted from payments due the Contractor.

E. The Contractor shall be responsible for the placement and preservation of adequate ties to all control points whether established by the Contractor or by the Engineer.

F. All original, additional or replacement stakes, marks, references and batter-boards which may be required for the construction operations, shall be furnished, set and properly referenced by the Contractor. The Contractor shall be solely and completely responsible for the accuracy of the line and grade of all features of the work. Any errors or apparent discrepancies found in previous surveys, the plans and specifications shall be called to the Engineer's attention by the Contractor for correction or interpretation prior to the proceeding with the work.

G. Before construction is started on any structure which is referenced to an existing structure or topographical feature, the Contractor shall check the pertinent locations and grades of the existing structures or topographical features to determine whether the locations and grades shown on the plans are correct.

H. All construction staking shall be performed by qualified personnel under the direct supervision of a person with an engineering background who is experienced in the direction of such work and is acceptable to the Engineer.

I. All stakes and markers used for control staking shall be of the same quality as used by the Department for this purpose. For slope limits, pavement edges, gutter lines, etc., where so called “working” stakes are commonly used, stakes of different quality may be acceptable.

J. The Department may check the Contractor’s control of the work at any times as the work progresses. The Contractor will be informed of the results of these checks, but the Department by doing so will in no way relieve the Contractor of his responsibility for the accuracy of the layout work. The Contractor shall at his expense correct or replace any deficient or inaccurate layout and construction work. If, as a result of these deficiencies or inaccuracies, the Department is required to make further studies, redesign, or both, all expenses incurred by the Department due to such deficiencies or inaccuracies, will be deduced from any payment due the Contractor.

K. The Contractor shall furnish all necessary personnel, engineering equipment and supplies, materials, and transportation incidental to the accurate and satisfactory completion of this work.

Unless otherwise provided, all requirements imposed by this section and performed by the Contractor shall be considered incidental to the various contract items and not separate or additional payment will be made thereof.

1.09 SPECIAL PROJECT REQUIREMENTS

A. Upon receipt of the Contract, the Contractor shall process and return the Contract to the State’ Contract Office within five (5) calendar days.

B. The State intends to issue the Notice to Proceed for the Project to the Contractor within 30 calendar days after bid opening. The Contractor shall be able to commence work on this date.

1.10 UNFORSEEN CONDITIONS ALLOWANCE

A. Included in this project is an allowance for unforeseen conditions to be used by the engineer to pay for unknown conditions from either review of the contract documents or existing exposed conditions found at the site or anticipated from the type of work found.

B. All unforeseen conditions that the Contractor is anticipating being compensated for must be brought to the attention of the engineer and acknowledged as an unforeseen condition that will be paid for by the State before the Contactor proceeds with his work.

C. Work accomplished by the Contractor without prior approval by the Engineer will be considered part of the work wand incidental to the work and no additional compensation will be allowed.

PART 2 – PRODUCTS (Not Used)

PART 3 – EXECUTION (Not Used)

PART 4 - MEASUREMENT AND PAYMENT

4.01 BASIS OF MEASUREMENT AND PAYMENT

A. Work under this section will not be measured not paid for separately, but shall be considered incidental to and included in the bid prices for the various items of work in this project.

B. Work under this section for unforeseen conditions shall be paid under an allowance item in the Proposal Schedule. The allowance is an estimate and the Additional charges by the Contractor for overhead, coordination, profit, included in the Contractor's lump sum bid price.

END OF SECTION

SECTION 01300 – SUBMITTALS

PART 1 – GENERAL

1.01 RELATED DOCUMENTS

The General Provisions of the contract, including General and Special Provisions and General Requirements of the Specifications, apply to the work specified in this section.

1.02 PROJECT DOCUMENTATION

The contract will not be considered complete until required submittals have been received and accepted by the State.

1.03 DETAILED CONSTRUCTION SCHEDULE

A. The Contractor shall submit a detailed construction schedule to the Engineer for review, no later than thirty (30) calendar days after award of the Contract. The detailed construction schedule shall be based on a detailed critical path analysis of construction activities and sequence of operations needed for the orderly performance and completion of any separable parts of any work and all work in accordance with the Contract. The schedule shall be Critical Path Method (CPM) type in the form of an arrow diagram and activity listing or comprehensive bar graph. The network diagram shall show in detail and in orderly sequence all activities on a time scale, their description, durations and dependencies, necessary and required to complete all work and any separable parts thereof. The schedule shall show in detail the following information for each activity.

1. Identification by code numbers and description;
2. Duration;
3. Craft and Equipment;
4. Earliest start and finish dates;
5. Latest start and finish dates;
6. Total and free float time; and
7. Highlighted Critical Path

B. The construction schedule shall be complete in all respects, covering in addition to activities at the site of work, off-site activities such as design, fabrication, and procurement of equipment; the scheduled delivery dates of such equipment; submittal and approval of shop drawings and samples; ordering and delivery of materials; inspections; and testing. The schedule shall also include a manpower forecast by crafts. The detailed construction schedule shall be supplemented by a three week schedule prepared by the Contractor and submitted to the Engineer on a weekly basis. The Contractor shall promptly inform the Engineer of any proposed

change in the schedule and shall furnish the Engineer with a revised schedule and cash flow diagram within fifteen (15) calendar days after approval of such change.

The schedule shall be kept up to date, taking into account the actual progress of work and shall be updated if necessary, every thirty (30) calendar days. The updated schedule shall, as determined by the Engineer, be sufficient to meet the requirements for the completion of the separable parts of work and the entire projects as set forth in the contract. Upon commencing work, the Contractor shall submit at the start of each week to the Engineer for review, a detailed two (2) week construction schedule.

C. If at any time during the progress of the Work, the Contractor's actual progress appears to the Engineer to be inadequate to meet the requirements of the contract, the Engineer will notify the Contractor of such imminent or actual noncompliance with the contract. The Contractor shall thereupon take such steps as may be necessary to improve his profess and the Engineer may require an increase in the labor force, the number of shifts, and/or overtime operations, days or work and/or the amount of construction plants all without additional cost to the State. Neither such notice by the Engineer nor the Engineer's failure to issue such notice shall relieve the Contractor from his obligation to achieve the quality of work and rate of profess required by the Contract. Failure of the Contractor to comply with instructions of the Engineer under these provisions may be grounds for determination by the State that the Contractor is not prosecuting work with such diligence as will assure completion within the time specified. Upon such determination, the State may employ labor and equipment and charge the Contractor for the cost thereof, including depreciation for plant and equipment or may terminate the Contractor's right to proceed with the performance of the contract, or any separable part thereof, in accordance with the applicable provisions of the contract.

D. The Contractor shall submit to the Engineer one (1) reproducible and three (3) prints of the detailed construction schedule and of each revised schedule submitted thereafter.

E. The Contractor shall submit the schedule to the Engineer in Microsoft Project Format (.mpp) and Adobe PDF Format (PDF). The Contractor shall submit a narrative explaining the reasoning behind the construction of the schedule including but not limited to the reasons for durations, sequence of work, and a description of all critical path items. The narrative for each updated schedule shall outline all changes to the schedule and include the justification for each change.

1.04 SCHEDULE OF VALUES

A. The Contractor shall submit the Schedule of Values to the Engineer for review, no later than thirty (30) calendar days after award of the Contract.

B. Format and Content: Use the Project Specifications table of contents as a guide to establish the format for the Schedule of Values. Provide at least one line item for each Specification Section. Provide a breakdown of the contract sum in sufficient detail to facilitate continued evaluation of Applications for Payment and progress reports. Break principle work or subcontract amounts down into several smaller identifiable items of work.

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

1. Project name and location
2. Project number
3. Contractor's name and address
4. Contract No.
5. Date of submittal

D. Arrange the schedule of Values in tabular form with separate columns to indicate the following items listed:

1. Related Specification Section or Division
2. Description of work
3. Dollar value and percent complete

E. Correlate line items in the Schedule of Values with other required administrative schedules and forms including;

1. Construction Schedule
2. Application for Payment forms including continuation sheets
3. List of Subcontractors
4. List of principle suppliers and fabricators
5. Schedule of submittals

F. Round amount to nearest whole dollar; the total shall equal the contract sum.

G. Provide a separate line item in the Schedule of Values for each part of the work where Applications for Payment may include materials or equipment, purchased, fabricated or stored, but not yet installed.

H. Schedule Updating: Update and resubmit the Schedule of Values prior to the next Applications for Payment or when Charge Orders or Construction Change Directives result in a change in the Contract Sum.

1.05 OTHER SUBMITTALS REQUIRED BEFORE CONSTRCTION

The Contractor shall submit the following items prior to or at the pre-construction meeting or unless otherwise noted:

A. Name, residence phone number, addresses and scope of authority for the following persons:
   1. Superintendent
   2. Contractor's authorized representative to sign documents
   3. Two (2) additional persons who can be contacted during non-working hours for emergencies
   4. Field Office location and phone numbers (cellular, pager, fax, etc.)

B. Name of Safety Officer

C. Notice of Materials to be furnished

D. Three (3) copies each of Certificates of Insurance. The State of Hawaii, Department of Transportation, Airports Division shall be named as additionally insured. If canceled, thirty (30) days written notice to the State of Hawaii must be given. If certificates are not correct, work cannot proceed.

E. Three (3) copies each Insurance and Tax Rates.

F. List of apprentices who will be working on the project supposed with the Statement of Apprenticeship or copy of the Apprenticeship Agreements register with the State Board, for each apprentice.

G. List of equipment to be used on the job. Designate maximum working height and capacity of equipment involved and their respective rental rates.

H. Three (3) copies of an expenditure (cash flow) plan consisting of an anticipated work completion graph plotting contract time and gross payment anticipated.

1.06 SHOP DRAWINGS, SAMPLES, CATALOG CUTS, AND CERTIFICATES

A. Submittal Schedule: Prior to the submission of any shop drawings or submittals, the Contractor shall submit to the Engineer for review, a submittal schedule. The schedule shall identify the subject matter of each submittal, the corresponding specification section number and the proposed date of submission. During the progress of work, the Contractor shall revise and resubmit the submittal schedule as directed by the Engineer.

B. The Contractor shall submit for review to the Engineer, or to a representative designated by the Engineer, six (6) copies of all shop drawings, samples, catalog cuts and certificates. Three (3) copies will be returned to the Contractor with information of review action. The Contractor shall submit additional quantities for their subcontractor's or supplier's use. Each shop drawing, certificate of compliance, sample, and equipment list shall be checked and certified correct by the Contractor, and shall be identified with the applicable information specified hereinafter under "Submittal Identification."

Items are to be reviewed prior to commencing fabrication or delivery of material to the job site.

C. Each copy of the drawings, certificates, catalog cuts, and lists reviewed by the Engineer will be stamped "REVIEW ACTION" with the appropriate action noted therein. The review of the Engineer shall not be construed as a complete check but will indicate only that the general method of construction and detailing is satisfactory. Acceptance of such drawings will not relieve the Contractor the responsibility of conforming to the contract drawings and specifications or for any error or omission which may exist as the Contractor shall be responsible for the dimensions and design of adequate connections, details, and satisfactory construction of all work. Each shop drawing submitted for review shall have, in the lower right-hand corner just above title, a white space 4" x 4" in which the Engineer can place the stamp and indicate action taken. The Contractor shall also inform their subcontractors to provide this space in their preparation of shop drawings.

1.07 TEST REPORTS

Six copies of test reports for any material used in this Contract shall be submitted when specified or required by the Engineer.

1.08 SUBMITTAL IDENTIFICATION

A. To avoid rejection and to clarify each submittal, the General Contractor shall have a rubber stamp made up in the following format:

B. _____
General Contractor's Name

PROJECT TITLE:_____
THIS SUBMITTAL HAS BEEN CHECKED BY THIS GENERAL CONTRACTOR AND IS CERTIFIED CORRECT AND IN COMPLIANCE WITH THE CONTRACT DRAWINGS AND SPECIFICATIONS.

ITEM NO. _____

SUBMITTAL NUMBER _____
DATE RECEIVED _____
SPECIFICATION SECTION # _____
SPECIFICATION PRARAGRAPH # _____
DRAWING NUMBER _____
SUBCONTRACTOR NAME _____
SUPPLIER NAME _____
MANUFACTURER NAME _____

CERTIFIED BY _____ (Contractor's Signature, Date)
(Contractor's Name and Title)

C. This stamp "filled in" should appear on each reproducible shop drawing, on the cover sheet of copies of test and mill reports, certificates of compliance, catalog cuts, brochures, etc. The stamp should be placed on a heavy stock paper merchandise (approximately 3" x 6") and one tag tied to each sample submitted for approval. The tag on the samples should state what the sample is, so that if the tag is accidentally separated from the sample they can be matched up again.

The back of this tag will be used by the Engineer for receipt, approval, and log stamp for any comments that relates to the sample.

D. Submission Number: Each submission is to be sequentially numbered in the space provided in the Contractor's stamp. Correspondence and transmittal will refer to this number.

E. The Contractor shall ensure that all submittals, including shop drawings, are compete and in conformance to the requirements of the Contract specifications prior to submissions to the State for review and acceptance. Incomplete submittals will not be processed by the State and returned to the Contractor for correction. Any cost impacts and delays in the Project schedule as a result of incomplete submittals shall be the responsibility of the Contactor.

1.09 AS-BUILT DRAWINGS

The Contractor shall maintain on the job site two (2) sets of full-size contract drawings, marking them in red to show all variations between the construction actually provided and that indicated or specified in the contract documents, including buried or concealed construction. Where a choice of material or method is permitted herein or where variations in scope of character of work from that of the original contract or authorized, the drawings shall be marked to define the construction actually provided. Where equipment installation is involved, the size, manufacture's name, model number, power input or output characteristics as applicable shall be shown on the as-built drawings.

The representation of such changes shall conform to standard drafting practice and shall include such supplementary notes, legends, and details as necessary to clearly portray the as-built construction.

The drawings shall be maintained and updated on a daily basis. The Contractor shall stamp, sign, and date each sheet with the following stamp:

AS-BUILT DRAWINGS/SPECIFICATIONS

This certifies that the dimensions and details shown on this sheet reflect the dimensions and details, and specifications as constructed in the field.

_____

CONTRACTOR'S NAME

_____

Signature Date

Monthly and final payments to the Contractor shall be subject to prior approval of the drawings. On completion of the work, both sets of marked-up drawings shall be delivered to the Engineer, and shall be subjected to approval before acceptance.

1.10 GUARANTEES

Guarantee periods shall start at the time of acceptance in writing by the State.

All guarantees and warranties shall be made out to the "State of Hawaii." Supplier and subcontractor guarantees shall be co-signed by the Contractor. The Contractor is solely responsible for coincidence or non-coincidence of factory warranties or equipment guarantees, and the Contractor's own warranties and guarantees as required by the contract. The Contractor is solely responsible for scheduling and coordinating the installation of equipment and materials so as to take maximum advantage of factory warranties.

PART 2 – PRODUCTS (Not Used)

PART 3 – EXECUTION (Not Used)

PART 4 – MEASUREMENT AND PAYMENT

4.01 BASIS OF MEASUREMENT AND PAYMENT

Work under this section will not be measured nor paid for separately, but shall be considered incidental to and included in the bid prices for the various items of work in this project.

END OF SECTION

SECTION 01400 – QUALITY REQUIREMENTS

PART 1 – GENERAL

1.01 GENERAL REQUIREMENTS

A. The Contractor shall establish, provide, and maintain an effective Quality Control Program that details the methods and procedures that will be taken to assure that all materials and completed construction required by this contract conform to contract plans, technical specifications and other requirements, whether manufactured by the Contractor, or procured from subcontractors or vendors. Although guidelines are established and certain minimum requirements are specified here in and elsewhere in the contract technical specifications, the Contractor shall assume full responsibility for accomplishing the stated purpose.

B. The intent of this section is to enable the Contractor to establish a necessary level of control that will:

1. Adequately provide for the production of acceptable quality materials.

2. Provide sufficient information to assure both the Contractor and the Engineer that the specification requirements can be met.

3. Allow the Contractor as much latitude as possible to develop his or her own standard of control.

C. The Contractor shall be prepared to discuss and present, at the pre-construction conference, his/her understanding of the quality control requirements. The Contractor shall not begin any construction or production of materials to be incorporated into the completed work until the Quality Control Program has been reviewed and accepted by the Engineer. No partial payment will be made for materials subject to specific quality control requirement until the Quality Control Program has been reviewed and approved by the Engineer.

D. The quality control requirements contained in this section and elsewhere in the contract technical specifications are in addition to and separate from the acceptance testing requirements. Acceptance testing requirements are the responsibility of the Engineer. All inspection and test reports shall be stamped and signed by a licensed professional engineer.

1.02 DESCRIPTION OF PROGRAM

A. General Description. The Contractor shall establish a Quality Control Program to perform work quality inspections and control testing on all

materials and items of work required by the technical specifications, including those performed by subcontractors. This program shall ensure conformance to applicable specifications and plans with respect to materials, workmanship, constructions, finish, and functional performance the program shall be effective for control of all construction work performed under this Contract, in addition to other requirements of this section, and any other activities deemed necessary by the Contractor to establish an effective level of quality control.

B. Quality Control Program. The Contractor shall describe the Quality Control Program in a written document which shall be reviewed by the Engineer prior to the start of any production, construction, or off-site fabrication. The written Quality Control Program shall be submitted to the Engineer for review thirty (30) calendar days after the date of award.

C. The Quality Control Program shall be organized to address, as a minimum, the following items:

1. Quality control organization;
2. Submittals schedule;
3. Inspection Requirements;
4. Quality control testing plan;
5. Documentation of quality control activities; and
6. Requirements for corrective action when quality control and/or acceptance criteria are not met;
7. A listing of the definable features of work for the project.

The Contractor is encouraged to add any additional elements to the Quality Control Program that he/she deems necessary to adequately control all production and/or construction processes required by this contract.

1.03 QUALITY CONTROL ORGANIZATION

A. The Contractor's Quality Control Program shall be implemented by the establishment of a separate organization that is not a part of the production organization. An organizational chart shall be developed to show all quality control personnel and how these personnel integrate with other management/production and construction functions and personnel. The organizational chart shall identify all quality control staff by name and function, and shall indicate the total staff required to implement all elements of the program, including work quality inspection and control testing on materials for each item or work. At the top of the chart, an

overall Contractor Quality Control System Manager, CQCSM, shall be named and his/her subordinates shall follow thereafter.

B. The quality control organization shall consist of the following minimum personnel:

1. Contractor Quality Control System Manager. The CQCSM shall be a Licensed Engineer of the Contractor, or a consultant engaged by the Contractor. The CQCSM shall have a minimum of 10 years of experience in airport and/or paving and building construction and shall have had prior quality control experience on a project of comparable size and scope as the contract. The CQCSM shall be on the project full time and shall have production duties. The CQCSM shall NOT be the point of contact for the production organization.

   The CQCSM shall have full authority to institute any and all actions necessary for the successful implementation of the Quality Control Program to ensure compliance with the contract plans and technical specifications including authority to independently stop any work not in compliance with the contract. The CQCSM shall report directly to a responsible officer of the construction firm, such officer not being the project Superintendent or Foreman.

2. Quality Control Technicians. A sufficient number of quality control technicians necessary to adequately implement the Quality Control Program shall be provided. These personnel shall either be an engineer, engineering technicians, or experienced craftsman with qualifications in the appropriate fields and shall have a minimum of 7 years of experience in their area of expertise. The Quality Control Technician shall be on the project full time and shall have no production duties.

   The quality control technicians shall report directly to the CQCSM and shall perform the following functions.

   a. Inspection of all materials, construction, plant, and equipment for conformance to the technical specifications, and as required by Section 1.05.
   b. Performance of quality control tests as required by the Contractor's program.

3. Staffing. The Contractor shall provide sufficient qualified control personnel to monitor each work activity at all times. The scheduling and coordinating of all inspection and testing must match the type and pace of work activity. The Quality Control Program shall state

where different technicians will be required for different work elements

All personnel shown on the organizational chart shall have, in resume form, all information regarding their education, any licenses, their present position, previous work experience, etc., included in the Quality Control Program written documentation. These resumes shall be verified by the CQCSM.

1.04 SUBMITTALS SCHEDULE

The Contractor shall submit a detailed listing of all submittals (e.g., mix designs, material certifications, and color samples) and shop drawings required by the technical specifications. The listing can be developed in a spreadsheet format and shall include:

1. Specification item number.
2. Item description.
3. Description of submittal.
4. Specification paragraph requiring submittal; and
5. Scheduled date of submittal.

1.05 INSPECTION REQUIREMENTS

A. Quality control inspection functions shall be organized to provide inspections for all definable features of work, as detailed below. All inspections shall be documented by the Contractor as specified by Section 1.07.

B. Inspections shall be performed daily to ensure continuing compliance with contract requirements until completion of the particular feature of work.

C. Before any definable feature of work is started, the CQCSM shall notify the Engineer of such work at least 48 hours in advance. Upon notification, the Engineer shall determine if a meeting shall be held to discuss the condition of the work area, material and equipment status, what is to be expected and any questions or possible problems. No definable feature work shall commence without the consent of the Engineer and State Project Manager.

1.06 QUALITY CONTROL TESTING PLAN

A. As part of the overall Quality Control Program, the Contractor shall implement a quality control testing plan that the Contractor deems necessary to adequately control production and/or construction processes.

B. The testing plan can be developed in a spreadsheet fashion and shall, as a minimum, include the following:

1. Specification item number;

2. Item description (e.g., plant control, concrete cylinder tests);

3. Test type (e.g., concrete compressive strength);

4. Test standard (e.g., ASTM or AASHTO test number, as applicable);

5. Test results and adjustments made (e.g., to meet specification tolerance requirements; and,)

6. Responsibility (e.g., plant technician, independent lab).

C. The testing plan shall contain a statistically-based procedure of random sampling for acquiring test samples in accordance with ADTM D 3665.

D. All quality control test results shall be documented by the Contractor as required by Article 1.07 of this Section.

1.07 DOCUMENTATION

A. The Contractor shall maintain current quality control records of all inspections and tests performed. These records shall include factual evidence that inspections or tests have been performed, including type, results of inspections or tests; nature of defects, deviations, causes for rejection, etc.; proposed remedial action; and /or corrective actions taken.

B. These records must over both conforming and defective or deficient features and must include a statement that all supplies and materials incorporated in the work are in full compliance with the terms of the contract. Legible copies of these records shall be furnished to the Engineer.

C. Specific Contractor quality control records required for the contract shall include, but are not necessarily limited to, the following records:

1. Daily Inspection Reports. Each Contractor quality control technician shall maintain a daily log of all inspections performed for both Contractor and Subcontractor operations on a form acceptable to the Engineer. These technician's daily reports shall provide factual evidence that continuous quality control inspections have been performed and shall, as a minimum include the following:

a. Technical specification item number and description and location of work performed;

b. Compliance with approved submittals;

c. Proper storage of materials and equipment;

d. Proper operation of all equipment;

e. Adherence to plans and technical specifications;

f. Review of quality control tests; and

g. Safety inspection.

The daily inspection reports shall identify inspections conducted, results of inspections, location and nature of defects found, causes for rejection, and remedial or corrective actions or proposed.

The daily inspection reports shall be stamped and signed by the licensed professional engineer CQCSM. The Engineer shall be provided at least one copy of each daily inspection report on the work day following the day of record.

2. Test Reports. The Contractor shall be responsible for establishing a system which will record all off-site and on-site control test results. Test reports shall document the following information:

a. Technical specification item number and description;

b. Test designation;

c. Location;

d. Date of test;

e. Control requirements;

f. Test results;

g. Causes for rejection;

h. Remedial action and retest results.

Test results shall be submitted to the Engineer within one (1) week of testing. The test reports shall be stamped and signed by the licensed professional engineer CQCSM.

1.08 CORRECTIVE ACTION REQUIREMENTS

A. The Quality Control Program shall indicate the appropriate action to be taken when a process is deemed, or believed, to be out of control (out of tolerance) and detail what action will be taken to bring the process into control. The requirements for corrective action shall include both general requirements for operation of the Quality Control Program as a whole, and for individual items of work contained in the technical specifications.

B. The Quality Control Program shall detail how the results of quality control inspections and tests will be used for determining the need for corrective action and shall contain clear sets of rules to gauge when a process is out of control and the type of correction to be taken to regain process control.

1.09 SURVEILLANCE BY THE ENGINEER AND STATE PROJECT MANAGER

A. all items of material and equipment shall be subject to surveillance by the Engineer at the point of production, manufacture or shipment.

B. Off-site or on-site surveillance by the Engineer does not relieve the Contractor of performing quality control inspections of either the Contractor's or subcontractor's work.

1.10 NONCOMPLIANCE

A. The Engineer or State Project Manager will notify the Contractor of any noncompliance with any of the foregoing requirements. The /contractor shall, after receipt of such notice, immediately take corrective action. Any notice, when delivered by the authorized representative at the sit5e of the work, shall be considered sufficient notice.

B. In cases where quality control activities do not comply with either the Contractor's Quality Control Program or the Contract provisions, or where the Contractor fails to properly operate and maintain an effective Quality Control Program, as determined by the Engineer or State Project Manager, the Engineer or State Project Manager, the Engineer or State Project Manager May:

1. Order the Contractor to replace ineffective or unqualified quality control personnel or subcontractors in accordance with Section 8.5 of the General Provisions

2. Order the Contractor to stop operations in accordance with Section 8.6 of the General Provisions.

3. Determine work performed by the Contractor during periods of noncompliance to be unacceptable and subject to removal or non-payment in accordance with Section 5.8 of the General Provisions.

PART 4 – MEASUREMENT AND PAYMENT

4.01 BASIS OF MEASUREMENT AND PAYMENT

Work under this section will not be measured nor paid for separately, but shall be considered incidental to and included in the prices bid for the various items of work in this project.

END OF SECTION

SECTION 01560 – ENVIRONMENTAL CONTROLS

PART 1 – GENERAL

1.01 RELATED DOCUMENTS

The General Provisions, Special Provisions, and General Requirements of the Specifications, apply to the work specified in this section. Special attention is directed to the General Provisions, Article VI, Control of Materials, Paragraph 6.9 Unacceptable Materials, and the Special Provisions, Article VIII, Prosecution and Progress, Paragraph 8.14 Standard and Codes.

1.02 ENVIRONMENTAL PROTECTION

With the exception of those measures set forth elsewhere in these specifications, environmental protection shall consist of the prevention of environmental pollution as the result of construction operations under this contract. For the purpose of this specification, environmental pollution is defined as the presence of chemical, physical, or biological elements or agents which adversely affects human health or welfare, unfavorably alter ecological balances of importance to human life, environment for aesthetic and recreational purposes.

1.03 APPLICABLE REGULATIONS

In order to provide for abatement and control of environmental pollution arising from the construction activities of the Contractor and their Subcontractors in the performance of this contract, the work performed shall comply with the intent of the applicable Federal, State, and Local laws and regulations concerning environmental pollution control and abatement, including, but not limited to, the following regulations:

A. State of Hawaii, Department of Health, Administrative Rules, Chapter 55, WATER POLLUTION CONTROL; Chapter 54, WATER QUALITY STANDARDS.

B. State of Hawaii, Department of Health, Administrative Rules, Chapter 59, AMBIENT AIR QUALITY; Chapter 60, AIR POLLUTION CONTROL.

C. State of Hawaii, Department of Health, Administrative Rules, Chapter 42, VEHICULAR NOISE CONTROL.

D. State of Hawaii, Occupational Safety and Health Standards, Title 12, Department of Labor and Industrial Relations, Subtitle 8, Division of Occupational Safety and Health, Part 3 Construction Standards, Chapter 145 Asbestos; Environmental Protection Agency, Code of Federal Regulations Title 40, Part 61, Subpart M (Revised Subpart B), NATIONAL EMISSION STANDARDS FOR AIR POLLUTANTS and Subpart B, NATIONAL EMISSION STANDARDS FOR ASBESTOS; Final Rule dated

November 20, 1990, and U.S. Department of Labor – Occupational Safety and Health Administration (OSHA) Asbestos Regulation, Code of Federal Regulations Title 29, Part 1910, 1915 and 1926, Occupational Exposure to Asbestos, Final Rule dated August 10, 1994.

PART 2 – PRODUCTS (Not Applicable)

PART 3 – EXECUTION

3.01 AIR POLLUTION CONTROL

A. Emission: The Contractor shall not be allowed to operate equipment and vehicles that show excessive emissions of exhaust gases until corrective repairs or adjustments are made, as determined by the Engineer.

B. Dust: The Contractor, for the duration of the contract, shall maintain all excavations, embankments, haul roads, permanent access roads, plant sites, waste disposal areas, borrow areas, and all other work areas within or without the project limits free from dust which would cause a hazard to the work, or operations of other Contractors, or to persons or property. Industry-accepted methods of stabilization suitable for the area involved, such as sprinkling or similar methods, will be permitted. Chemical or oil treating shall not be used.

C. Burning on jobsite shall not be permitted.

3.02 WATER POLLUTION CONTROL

A. Wastes: The Contractor shall not deposit at the jobsite or in its vicinity solid waste or discharge liquid waste such as fuels, lubricants, bituminous waste, untreated sewage and other pollutants which may contaminate the body of ground water.

B. Spillage: Care shall be taken to ensure that no petroleum products, bituminous materials, or other deleterious substances, including debris, are allowed to fall, flow, leach, or otherwise enter the sewage systems or storm drains.

C. Erosion: Contractor shall provide any necessary temporary drainage, dikes, and similar facilities to prevent erosion damage to the site. Run-off shall be controlled to prevent damage to surrounding area.

3.03 NOISE CONTROL

Construction equipment shall be equipped with suitable mufflers to maintain noise within levels complying with applicable regulations.

3.04 DISPOSAL

Construction waste, such as crates, boxes, building materials, pipes, and other rubbish shall be disposed of at a Sanitary Landfill. Large size objects shall be reduced to a size acceptable by the Sanitary Landfill Specifications. Other areas or methods proposed by the Contractor will be approved only if the Engineer determines that their effect on the environment is equal to or less than those described herein.

3.05 HAZARDOUS MATERIALS CONTROL

The use of hazardous materials, i.e., asbestos and PCB, in the construction of this project is prohibited. Any corrective action to remove and replace the hazardous material and contaminated work shall be at the sole expense of the Contractor.

PART 4 – MEASUREMENT AND PAYMENT

4.01 BASIS OF MEASUREMENT AND PAYMENT

Work specified in this Section will not be measured for payment, but will be paid for at the Contract Lump Sum Price. The contract price paid shall be full compensation for all labor, tools, equipment and all other incidentals necessary to complete the work.

Item No.	Item	Unit
01560.1	Environmental controls	Lump Sum

END OF SECTION

SECTION 01580 – TEMPORARY FACILITIES AND UTILITIES

PART 1 – GENERAL

1.01 RELATED DOCUMENTS

The General Provisions of the Contract, including General and Special Provisions and General Requirements of the Specifications, apply to the work specified in this section.

1.02 DESCRIPTION

This item shall consist of arranging and maintaining all utilities including, but not limited to, water, electricity, sewage disposal and telephone communications in the work area which the Contractor and Engineer deems necessary to meet the requirements of the work under the contract.

PART 2 – PRODUCTS (Not Applicable)

PART 3 – EXECUTION

3.01 TEMPORARY UTILITIES DURING CONSTRUCTION

A. Water and Sanitation: The Contractor shall provide temporary drinking water and sanitary facilities for the field personnel. The facilities shall be in accordance with the applicable health regulations and shall be maintained clean and operable until the conclusion of the construction work.

B. Telephone: Cellular telephones are acceptable. All costs associated with obtaining and maintaining telephone service shall be borne by the Contractor.

C. Electricity: Contractor shall obtain or provide temporary electric power and shall pay for all connections and energy charges incurred during construction.

D. Metering: Water and electrical services shall be metered and payment for meters and services shall be borne by the Contractor. Temporary connections for water shall include installation of a meter and backflow preventer at the point of connection according to State standards at the Contractor's cost. The Contactor shall submit requests for temporary connection in writing to the Engineer fourteen (14) calendar days prior to the connection and shall include a description of work and a sketch of the proposed installation.

PART 4 – MEASUREMENT AND PAYMENT

4.01 BASIS OF MEASUREMENT AND PAYMENT

Work under this section will not be measured nor paid for separately, but shall be considered incidental to and included in the prices bid for the various items of work in this project.

END OF SECTION

SECTION 01700 – MOBILIZATION AND DEMOBILIZATION

PART 1 – GENERAL

1.01 RELATED DOCUMENTS

The General Provisions of the Contract, including General and Special Provisions and General Requirements of the Specifications, apply to the work specified in this section.

1.02 GENERAL REQUIREMENTS

Section 699 of "Hawaii Standard Specifications for Road, Bridge, and Public Works Construction, 1994," are hereby incorporated into and made a part of these specifications by reference unless otherwise modified hereinafter.

1.03 MOBILIZATION

The Contractor shall mobilize and transport his construction plant and equipment including materials and supplies for operation to the site of work, construct temporary buildings and facilities as necessary, and assemble the equipment at the site as soon as possible after receipt of Notice to Proceed, subject to the provisions of the General Provisions.

1.04 DEMOBILIZATION

The Contractor shall demobilize and transport his construction plant and equipment including materials, supplies and temporary buildings off the site as soon as possible after construction is completed. Demobilization shall include all cleanup required under this contract and as directed by the Engineer. Demobilization and final cleanup shall be completed prior to final acceptance.

1.05 PERFORMANCE BOND

The Contractor shall file and pay for the performance and payment bonds according to Section 3.5 of the Special Provisions, except that the value of the bonds shall equal one hundred percent (100%) of the amount of the contract basic bid amount plus one hundred percent (100%) of the amount of the extra work.

Payment for the Contractor's bond premium will be made in accordance to the terms stated in Part 4 below.

PART 2 – PRODUCTS (Not Applicable)

PART 3 – EXECUTION (Not Applicable)

PART 4 – MEASUREMENT AND PAYMENT

4.01 METHOD OF MEASUREMENT

A. Mobilization shall not be measured for payment. The maximum bid allowed for "Mobilization" is an amount not to exceed size (6) percent of the sum of all items (excluding this item and all Allowances). If the proposal submitted by the bidder indicates an amount in excess of the allowable maximum, the indicated amount or amounts shall be reduced to the allowable maximum; the "Sum of All Items," in the proposal schedule shall be adjusted to reflect any such reduction. For the purpose of comparing bids and determining the contract price to be inserted in the contract awarded to the bidder, if any is so awarded, the "Sum of All Items" adjusted in accordance with the foregoing shall be used and the bidder's proposal shall be deemed to have been submitted for the amounts as reduced and adjusted in accordance herewith.

B. Demobilization will not be measured for payment. A separate line item called "Demobilization" will be added to the Contractor's Schedule of Values after the contract has been awarded. The total amount for this item shall be 2.5% of the Contractor's total bid amount and will be deducted from other line items in the schedule of values as negotiated between the Contractor and the State. **THE CONTRACTOR SHALL NOT MODIFY THE PROPOSAL SCHEDULE BY ADDING A "DEMOBILIZATION" BID ITEM TO THE PROPOSAL SCHEULE.**

4.02 BASIS OF PAYMENT

A. Mobilization will be paid for at the contract lump sum price under Mobilization. Partial payment will be made as follows:

1. When 2 ½ percent of the original contract amount is earned, 50 percent of the bid amount will be paid.
2. When 5 percent of the original contract amount is earned, 75 percent of the bid amount will be paid.
3. When 10 percent of the original contract amount is earned, 100 percent of the bid amount will be paid.

Nothing herein shall be construed or limit or preclude partial payments otherwise provided by the contract.

B. Partial payment will not be paid for Demobilization. Full payment will be made on the Contractor's final payment request. This will occur after the Contractor has fulfilled all of the requirements of the Contract bid documents to the satisfaction of the State and issuance of the Final Acceptance letter to the Contractor by the State.

C. Payment will be made under:

Item No.	Item	Pay Unit
01700.1	Mobilization (Not to exceed 6% of sums of all items, excluding this item and all allowances)	Lump Sum

END OF SECTION

SECTION 01715 – EXISTING CONDITIONS – LEAD-BASED PAINT SURVEYS

PART 1 – GENERAL

1.01 RELATED DOCUMENTS

The General Provisions of the contract, including General and Special Provisions and General Requirements of the Specifications, apply to the work specified in this section.

1.02 SUMMARY

A. This section includes the results of the State of Hawaii's survey for Asbestos and Lead, and is provided for the Contractor's information.

B. Related Sections include the following:

1. SECTION 13280 – LEAD-BASED PAINT ABATEMENT for requirements of all work which disturbs lead-containing paint (LCP).

1.03 ASBESTOS

A. The portions of the facilities to be renovated under this contract were surveyed for the presence of ACBM, using State of Hawaii Chapter 501 requirements. A copy of the survey is included in this Section.

1. The report(s) are included, even when no ACBM was found, for the Contractor's information. Review the attached report for the basis on which the negative ACBM finding was made. Contractor may perform further surveys at their own expense, if ACBM not shown in the report is suspected in the areas of the buildings in which work will be performed. If ACBM is found, notify the Engineer immediately. The State will reimburse the Contractor for the testing cost if ACBM is found.

2. If there is ACBM outside of the areas in which work will be performed, this ACBM shall not be disturbed in any way.

B. If applicable, notify employees, Subcontractors and all other persons engaged on the project on the presence of asbestos in the existing buildings in accordance with the requirements of Chapter 110, Article 12-110-2 (f) (1) (B) of the Occupational Safety and Health Standards, State of Hawaii

C. In the event that work is required in any building or buildings on the site other than the ones designated within this project scope, request copies of the asbestos survey report(s) for such building(s) from the Engineer.

Based on the information contained in the additional survey(s), notify affected personnel per paragraph entitled (ASBESTOS", item B., hereinabove.

D. The Contractor shall follow all applicable rules and regulations pertaining to the handling, removal, and disposal of ACBM.

1.04 LEAD CONTAINING PAINT

A. Inform employees, Subcontactors and all other persons engaged in this project that LCP is present in the existing buildings and at the job site. Follow the requirements of Title 12 (Department of Labor and Industrial Relations), Subtitle 8 (Division of Occupational Safety and Health),Chapter 148 (Lead Exposure in Construction), and Title 11(Department of Health), Chapter 41 (Lead-Based Paint Activities) Hawaii Administrative Rules.

B. Review the attached lead testing data which identify the locations of LCP. Lead testing was for design purposes only, and the results do not satisfy any of the requirements of Chapter 12-148 and HAR 11-41.

C. Review the attached lead testing data which identify the locations of LCP. Lead testing was for design purposed only, and the results do not satisfy any of the requirements of Chapter 12-148 and HAR 11-41.

D. The Contractor may perform additional lead content testing of existing painted surface at their own expense.

E. The Contractor shall follow all applicable rules and regulations pertaining to the handling, removal and disposal of lead paint.

PART 2 – PRODUCTS (Not Used)

PART 3 – EXECUTION

3.01 SURVEY

LEAD-BASED PAINT SURVEY, 48 pages, dated April 6, 2015, prepared byEnvironet, Inc.

LIMITED ASBESTOS SURVEY REPORT, 25 pages, dated September 3, 2015, prepared by EnviroServices & Training Center, LLC.

END OF SECTION

ATTACHMENT

LEAD-BASED PAINT SURVEY

LOT 58-B-1

82 ANDREWS AVE.

Environet, Inc.

April 6, 2015

Subject: **Lead-Based Paint Survey**
Single Family Residence
82 Andrews Avenue
Hilo, HI 96720

Environet, Inc. (Environet) conducted a limited lead-based paint (LBP) survey and a limited risk assessment at a single family residence located at 82 Andrews Avenue, Hilo, Big Island, Hawai'i (hereinafter referred to as the Site; Figure 1). The Site is constructed primarily of wood and consists of two (2) bedrooms, one (1) living room, one (1) bathroom, and one (1) kitchen on the ground floor, as well as second living area and bedroom located in an unfinished basement . All field work activities were conducted by Environet on March 23, 2015.

Kamalana Kobayashi, certified LBP Risk Assessor and Inspector (State of Hawai'i Certification Number PB-0132) conducted the LBP survey at the Site. A copy of his certification documents are attached at the end of this report.

REGULATORY FRAMEWORK

The United States Environmental Protection Agency (EPA) and the Department of Housing and Urban Development (HUD) define LBP as paint or other surface coatings containing lead levels equal to or greater than (≥) 1.0 milligrams per square centimeter (mg/cm^2) or 0.5 percent by weight (other equivalent units are: 5,000 micrograms per gram [µg/g], 5,000 milligrams per kilogram [mg/kg], 5,000 parts per million [ppm] by weight). Lead-containing paint (LCP) is paint containing lead at any level less than (<) 5,000 mg/kg. The EPA Resource Conservation and Recovery Act (RCRA) regulations set the limit of leachable lead in lead-containing waste at 5.0 milligrams per liter (mg/l). This level is established by an analytical method called Toxicity Characteristic Leaching Procedure (TCLP). Waste that contains leachable lead at concentrations ≥5.0 mg/l is defined as hazardous waste and must be transported to a hazardous waste treatment, storage, or disposal (TSD) facility. Lead-containing waste or potential waste shown to have a total lead content ≥100 mg/kg may exceed the RCRA TCLP standard for leachable lead, and must be analyzed by TCLP prior to disposal. Thus, while the EPA does not regard work performed on paint containing 5,000 mg/kg to be a LBP activity, the waste from such activities may still be regarded as hazardous under RCRA.

According to 40 Code of Federal Regulation (CFR) 745, the EPA clearance standard for maximum allowable residual lead dust on floor surfaces is 40 micrograms per square foot ($\mu g/ft^2$). The EPA clearance standards for maximum allowable residual lead dust on window sills and troughs are 250 $\mu g/ft^2$ and 400 $\mu g/ft^2$, respectively. Lead in surface dust can come from weathering and chipping of LBP, renovation, and demolition activities that break a surface painted with LCP (*e.g.*, scraping, sanding), and abrasion on doors and windows.

Lead soil contamination can result when lead paint becomes dislodged from building materials and enters the surrounding soils. In order to characterize potential soil lead contamination, the State of Hawai'i Department of Health (HDOH) recommends utilization of the multi-increment

(MI) sample collection. The MI sampling procedure reduces data variability and increases reproducibility. As a result, soil contamination in a decision unit (DU) can be characterized with a high degree of confidence and appropriate actions can be taken (HDOH, 2011).

The HDOH has established an Environmental Action Level (EAL) for lead in soil. The HDOH EAL for lead in soil is 200 mg/kg for unrestricted land use activities.

PAINT CHIP SAMPLE COLLECTION

Methodology

Environet collected fourteen (14) paint chip samples from painted surfaces of the Site in accordance with the EPA guidelines and recommendations (Figure 2). Each paint chip sample consisted of an approximately two- to four-inch square section of paint scraped off the building material with a paint scraper and placed in a labeled, re-sealable plastic bag. The samples were then placed into a second re-sealable plastic bag for storage. Sampling equipment was cleaned between each sample to avoid cross-contamination. The conditions of the potentially lead-containing material were noted.

The samples were logged and recorded following strict chain-of-custody (COC) procedures and submitted to Hawaii Analytical Laboratories, Inc. (HAL) for analysis by atomic adsorption spectrometry (AAS) using EPA Method 7082M. HAL is accredited for lead analysis in paint chips through the American Industrial Hygiene Association (AIHA) Environmental Lead Proficiency Analytical Testing (ELPAT) Program.

Results

None of the paint chip samples contained concentrations of lead in excess of the EPA/HUD guideline of 5,000 mg/kg, the definition of LBP. However, three (3) of the 14 paint chip samples contained concentrations of lead at levels <5,000 mg/kg, above the laboratory reporting limit (RL), and therefore are considered to be LCP. The lead levels detected below 5,000 mg/kg, above the laboratory RL are summarized below:

Sample ID	Location	Component	Substrate	Color	Result (mg/kg)	Reporting Limit (mg/kg)
82Andrews-L5	Main Entrance	Stairs	Concrete	Red/Gray	500.0	39.0
82Andrews-L8	Exterior Roof	Fascia	Wood	Gray	65.0	39.0
82Andrews-L10	Main Entrance	Stairs	Wood	Gray	110.0	39.0

Notes:
mg/kg = milligrams per kilogram
ID = identification

DUST WIPE SAMPLE COLLECTION

Methodology

Environet collected four (4) dust wipe samples at the Site to identify those locations where lead dust hazards may exist, as well as one (1) blank wipe sample for quality control purposes. Upon arrival, a visual inspection was performed in order to assess conditions that could result in exposure to LBP. Lead dust sampling was performed in accordance with 40 CFR 745 and the EPA Lead Dust Sampling Technician Field Guide (2009; EPA-W-04-022). Federal and State regulations define the following as threshold levels for lead dust in residences: 40 $\mu g/ft^2$ for floors; 250 $\mu g/ft^2$ for window sills; and 400 $\mu g/ft^2$ for window troughs (CFR, 2004).

GhostWipes and a pre-measured 1 square foot (144 square inches) frame/template were used to wipe the prescribed floor surface area for each dust wipe sample. The window sill surface wipe area for each window sill was measured and wiped according to varying size of the window sills at the Site. Wipe area measurements were documented and noted for laboratory reporting purposes.

Each sample was placed into a sealable 50-milliliter (ml) plastic tube, properly labeled and recorded following strict COC procedures, and submitted to HAL for analysis by AAS using EPA Method 7082M. HAL is accredited for lead analysis in dust wipe samples through AIHA ELPAT Program.

Results

Lead was detected at a concentration equal to or exceeding the laboratory RL in two (2) of the samples collected at the Site; however, the detections did not exceed the regulatory limit. Lead was not detected at or above the reporting limit in the blank wipe sample (Table 2).

SOIL SAMPLE COLLECTION

Methodology

Four (4) DUs were defined for the investigation at the Site (Figure 2). According to sampling theory (Pitard, 1993) and HDOH (2011), a minimum of 30 increment samples per DU is generally recommended in order to obtain a reliable estimate of mean concentrations in a given DU. Thirty (30) incremental surface soil samples were randomly collected within each DU (Figure 2).

At each increment soil sample location, a uniform mass of soil was taken and then placed directly into a double-bagged Ziploc® bag. The samples were then delivered to HAL for analysis of total lead using EPA Method 7000B. Following HDOH guidance, a triplicate sample was collected as a field quality control measure, the results of which were within acceptable agreement with the primary sample shown in Table 2.

Results

Four primary MI samples consisting of 30 increments, along with a duplicate and triplicate sample, were collected at the Site. Lead levels detected in two of the four all samples were above the HDOH EAL for unrestricted land use (Table 3). This suggests that the surface soil is contaminated with lead at levels above the HDOH EAL at the Site.

CONCLUSIONS AND RECOMMENDATIONS

Environet collected representative samples of paint chips, dust wipes, and surface soil from the Site. Results indicated the following:

- Three (3) paint chip samples collected from the Site contained concentrations of lead at levels <5,000 mg/kg, and above the laboratory RL. Therefore, LBP is not present in painted surfaces at the Site, however LCP is present at the Site (Table 1).
- Lead dust was detected at a concentration equal to or exceeding the laboratory RL in two (2) of the dust wipe samples collected at the Site; however, the samples were not detected at or in exceedance of the regulatory limit (Table 2).
- Lead was detected at concentrations above the HDOH EAL for unrestricted residential use in all soil samples collected from the Site (Table 3; Figure 2). Therefore, the surface soil is considered contaminated with lead at levels above the HDOH EAL.
- If suspect building components not yet sampled are discovered during renovations, they should be considered hazardous until proven otherwise by qualified lead paint contractor.
- Although the EPA does not require paint with lead to be removed prior to demolition or renovation activities, the United States Occupational Safety and Health Administration (OSHA) and Hawai'i Occupational Safety and Health requirements still apply for the potential of worker exposure to any amount of lead that may be in the paint. Proper engineering controls and monitoring by a qualified lead abatement contractor under controlled conditions is recommended if the tested building components undergo renovations.
- Demolished building materials must undergo TCLP sampling prior to disposal, in order to determine if they contain leachable lead at concentrations equal to or greater than the RCRA limit of 5.0 mg/l. If the TCLP sampling reveals concentrations above 5.0 mg/l, the waste must be transported to a hazardous waste TSD facility. Lead-containing waste or potential waste shown to have a total lead content equal to or exceeding 100 mg/kg may exceed the RCRA TCLP standard for leachable lead, and therefore must be analyzed by TCLP prior to disposal.
- Results of the LBP survey were incorporated into a Limited Lead Risk Assessment Report. The Limited Lead Risk Assessment conducted for the Site is included as

Attachment 4 of this report. The Limited Lead Risk Assessment identifies lead hazards present at the Site, as well as recommendations to address these hazards. Abatement Cost estimates are presented in Attachment 7.

LIMITATIONS

The results presented in this report are limited to the areas sampled. There were no inaccessible areas during this sampling event.

REFERENCES

CFR, 2004. Protection of Environment. Title 40, Part 745. Washington, DC. US Government Printing Office.

HDOH, 2011. Technical Guidance Manual Notes: Decision Unit and Multi-Increment Sample Investigations. March.

Pitard, Francis F., 1993. Piere Gy's Sampling Theory and Sampling Practice: Heterogeneity, Sampling Correctness, and Statistical Process Control. 2nd Ed. Boca Raton, FL: CRC Press.

Should you have any questions, please call me at (808) 833-2225 ext. 1012.

Sincerely,

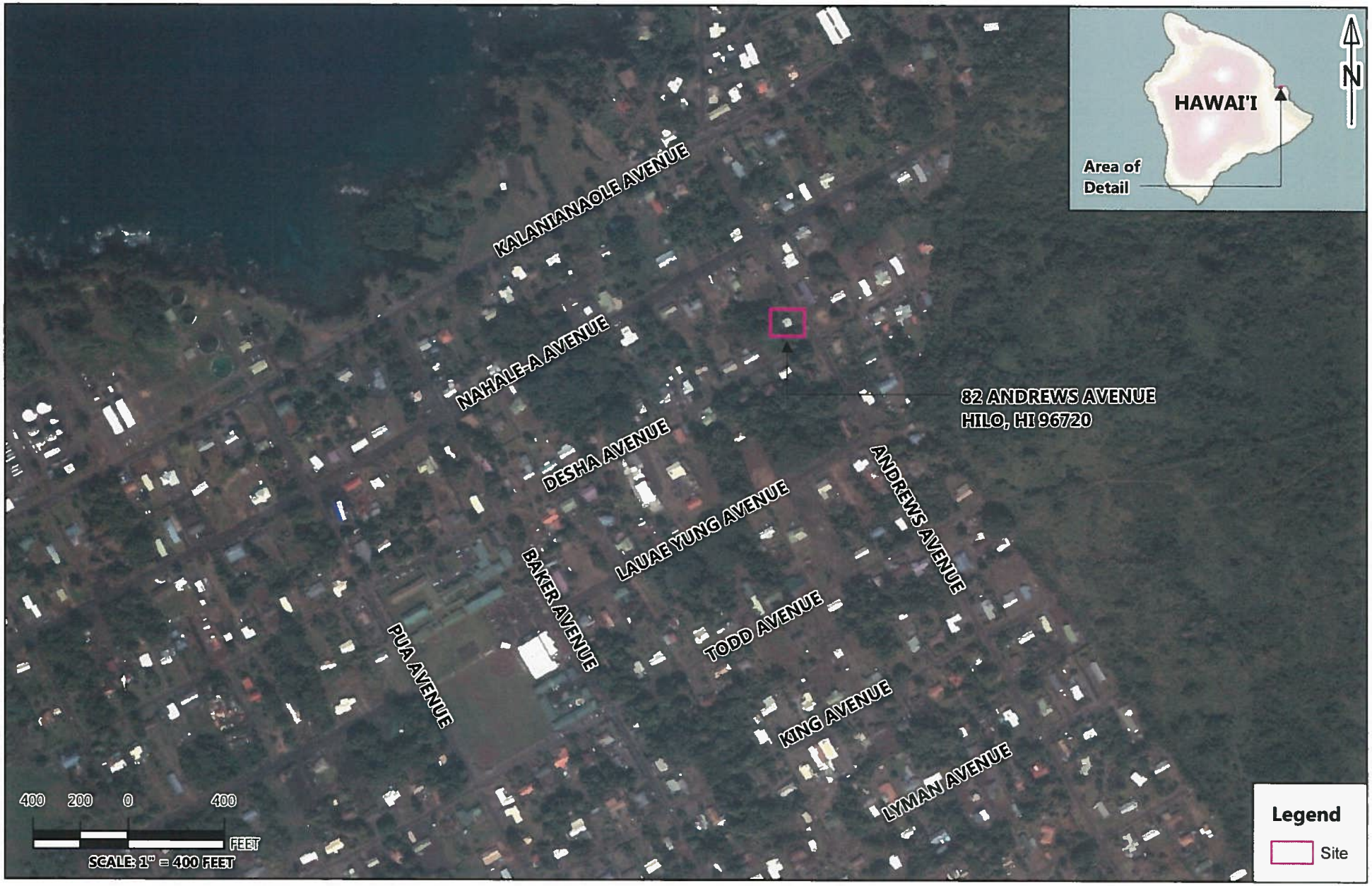
Max Solmssen
Project Manager
ENVIRONET, INC.

Attachments:

Attachment 1: Figures
Attachment 2: Tables
Attachment 3: Photo Log
Attachment 4: Limited Risk Assessment
Attachment 5: Analytical Laboratory Reports
Attachment 6: Personnel Certification Documents
Attachment 7: Abatement Cost Estimates

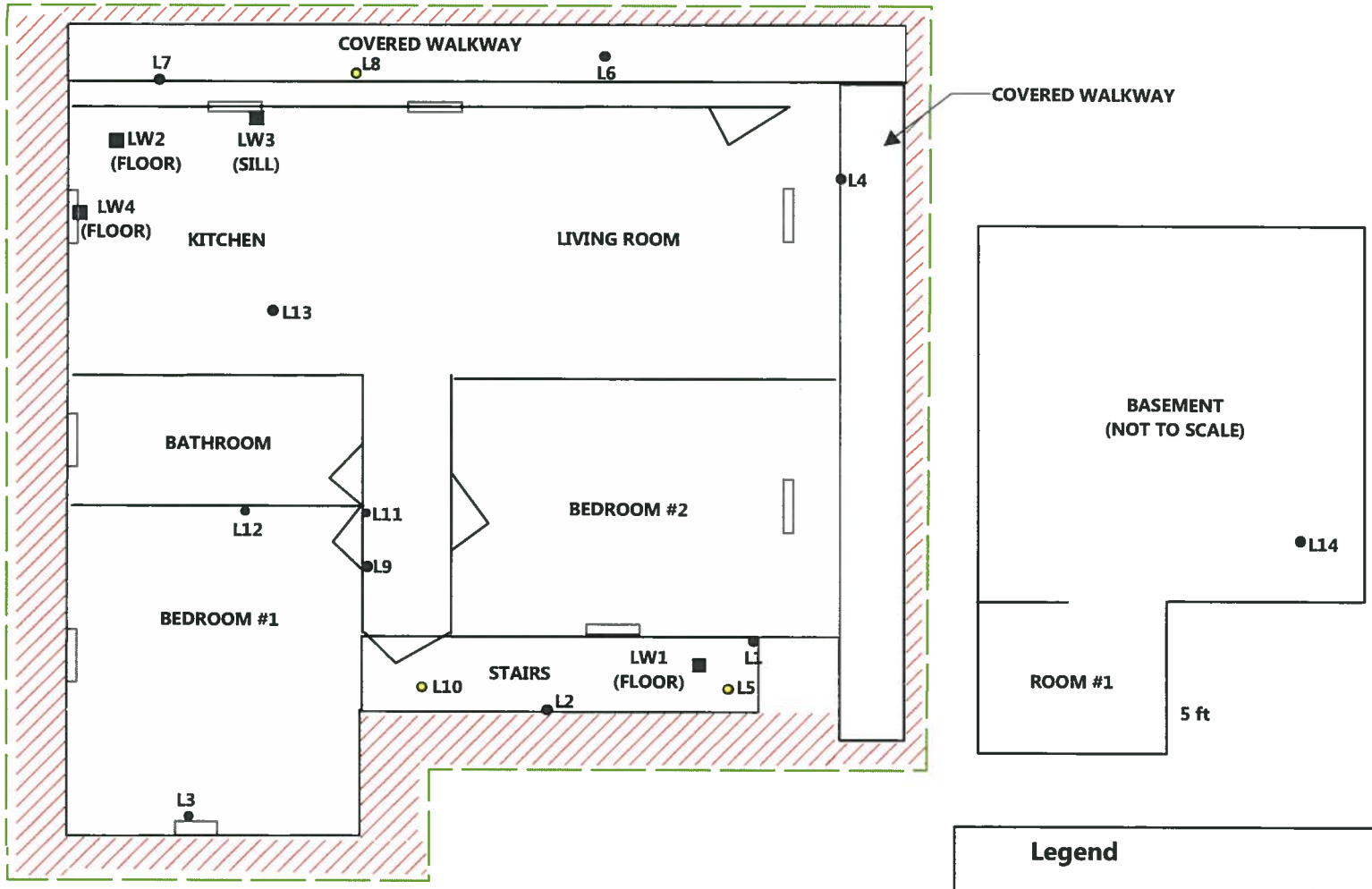
Attachment 1: Figures

Figure 1: Project Location Map



Environet, Inc.	PROJECT NO.: 1194-001	LBP SURVEY	FIGURE 1
	DATE: MARCH 18, 2015		
	DRAWN BY: RM	PROJECT LOCATION MAP	
	REVIEWED BY: MS	82 ANDREWS AVENUE, HILO, HI 96720	

Figure 2: Sampling Locations Map



Note: Not to scale.

Environet, Inc.	PROJECT NO.: 1194-001	LBP SURVEY	FIGURE 2
	DATE: MARCH 27, 2015		
	DRAWN BY: RM	SAMPLING LOCATIONS MAP	
	REVIEWED BY: MS	82 ANDREWS AVENUE, HILO, HI 96720	

Attachment 2: Tables

LBP Survey
Single Family Residence
82 Andrews Avenue
Hilo, HI 96720

Table 1: Lead Levels in Paint Chip Samples Collected from Painted Surfaces

Sample ID	*Location*	*Description*	*Color*	*Substrate*	*Interior/ Exterior*	*Cond.*	*Result (mg/kg)*	*RL (mg/kg)*
82andrews-L1	Throughout	Walls	Green	Wood	Exterior	Fair	ND	40.0
82andrews-L2	Entrance	Stair Railing	Green	Wood	Exterior	Fair	ND	40.0
82andrews-L3	Throughout	Window Frames	Gray	Wood	Exterior	Fair	ND	40.0
82andrews-L4	Awning	Support Posts	Green	Wood	Exterior	Fair	ND	40.0
82andrews-L5	Throughout	Stairs	Red / Gray	Concrete	Exterior	Poor	500.0	40.0
82andrews-L6	Throughout	Walkway	Green	Wood	Exterior	Fair	ND	40.0
82andrews-L7	Throughout	Roof	Green	Metal	Exterior	Fair	ND	40.0
82andrews-L8	Throughout	Roof Fascia	Gray	Wood	Exterior	Fair	65	40.0
82andrews-L9	Throughout	Door Frame	Gray	Wood	Exterior	Fair	ND	40.0
82andrews-L10	Throughout	Stairs	Gray	Wood	Exterior	Fair	110.0	40.0
82andrews-L11	Throughout	Door Jamb	White	Wood	Interior	Fair	ND	40.0
82andrews-L12	Throughout	Wall	White	Sheet rock	Interior	Fair	ND	40.0
82andrews-L13	Kitchen	Ceiling	White	Sheet rock	Interior	Fair	ND	40.0
82andrews-L14	Basement	Ceiling	White	Wood	Interior	Fair	ND	40.0

Notes:
mg/kg = milligrams per kilogram
ID = identification
ND = not detected at or above laboratory reporting limit (RL)

LBP Survey
Single Family Residence
82 Andrews Avenue
Hilo, HI 96720

Table 2: Lead Levels in Dust Wipe Samples Collected from Horizontal Surfaces

Sample ID	*Location*	*Description*	*Observations*	*Substrate*	*Interior/ Exterior*	*Regulatory Lead Limit[1] ($\mu g/ft^2$)*	*Result ($\mu g/ft^2$)*	*RL ($\mu g/ft^2$)*
82 andrews - LW1	Steps	Floor Surface	Moderate dust with no visible paint chips.	Concrete	Poor	40	ND	10
82 andrews- LW2	Kitchen Counter	Counter Surface	Minor dust with no visible paint chips.	Composite	Interior	40	12	10
82 andrews- LW3	Living Room	Window Sill	Minor dust with no visible paint chips.	Wood	Interior	250	33	10
82 andrews- LW4	Kitchen	Window Sill	Minor dust with no visible paint chips.	Wood	Interior	250	ND	10
82 andrews- LW5	NA	Control Sample[2]	NA	NA	NA	NA	ND	10

Notes:
$\mu g/ft^2$ = micrograms per square foot
ID = identification
NA = not applicable
ND = not detected at or above laboratory reporting limit (RL)
[1] = Regulatory limit established by 40 Code of Federal Regulations (CFR) 745 by the United States Environmental Protection Agency (EPA) in 2001.
[2] = Blank wipe used as quality control measure.

LBP Survey
Single Family Residence
82 Andrews Avenue
Hilo, HI 96720

Table 3: Lead Levels in MI Soil Samples

Sample ID	*Analyte*	*Laboratory Analytical Method*	*HDOH EAL[1] (mg/kg)*	*Result (mg/kg)*	*RL (mg/kg)*
82andrews-LS1A (primary)	Lead (Pb)	EPA 7000B	200	**1,000**	40
82andrews -LS1B (duplicate)	Lead (Pb)	EPA 7000B	200	**1,200**	40
82andrews -LS1C (triplicate)	Lead (Pb)	EPA 7000B	200	**1,300**	40
82andrews –LS2	Lead (Pb)	EPA 7000B	200	**1,200**	40
82andrews –LS3	Lead (Pb)	EPA 7000B	200	**1,600**	40
82andrews –LS4	Lead (Pb)	EPA 7000B	200	**700**	40

Notes:
[1]State of Hawai'i Department of Health (HDOH) Environmental Action Level (EAL), unrestricted use.
mg/kg = milligrams per kilograms
EPA = United States Environmental Protection Agency
ID = identification
MI = multi-incremental
RL = laboratory reporting limit
Bold sample concentration results indicate lead levels above the HDOH EAL.

Attachment 3: Photo Log

Photo Log

Photo 1: Single family home located at 82 Andrews Avenue, Hilo, HI.

Photo 2: Exterior green wood siding and support posts in fair condition. LCP detected on gray roof fascia.

Photo 3: LCP detected in deteriorated red/gray paint located on front concrete entry stairs.

Photo 4: Interior substrates ; no LBP or LCP detected.

Photo 5: LCP detected on gray exterior stairs

Photo 6: Lead detected in exposed soil at the Site above screening levels for unrestricted use.

Attachment 4: Limited Risk Assessment

LIMITED LEAD RISK ASSESSMENT

SINGLE FAMILY RESIDENCE
82 ANDREWS AVENUE
HILO, HI 96720

Prepared for:
DEPARTMENT OF HAWAIIAN HOME LANDS

Prepared by:
ENVIRONET, INC.
1286 Queen Emma Street
Honolulu, HI 96813
Tel: (808) 833-2225

April 6, 2015

TABLE OF CONTENTS

APPENDICES

1.0 CERTIFICATIONS AND LIMITATIONS

Environet, Inc. (Environet) has completed this Limited Lead Risk Assessment (Risk Assessment) for the single family residence located at 82 Andrews Avenue, Hilo, Big Island, Hawai'i (herein referred to as the Site). Environet's findings and recommendations contained herein are based on research, site observations, government regulations, and laboratory data, which were gathered at the time and location of the Risk Assessment. Opinions stated in this report do not apply to changes that may have occurred after the services were performed. All field work activities were conducted by Environet on March 23, 2015.

Environet has performed specified services for this project with the degree of care, skill, and diligence ordinarily exercised by professional consultants performing the same or similar services. No other warranty, guarantee, or representation, expressed or implied, is included or intended; unless otherwise specifically agreed to in writing by both Environet and Environet's Client.

This report is intended for the sole use of the Department of Hawaiian Home Lands (DHHL) exclusively for the Site. The DHHL may use and release this report, including making and retaining copies, provided such use is limited to the particular site and project for which this report is provided. However, the services performed may not be appropriate for satisfying the needs of other users. Release of this report to third-parties will be at the sole risk of Environet's Client and/or said user, and Environet shall not be liable for any claims or damages resulting from or connected with such release or any third party's use or reuse of this report.

Prepared By: _____

Kamalana Kobayashi
State of Hawai'i Certified Lead Risk Assessor
Certification #: PB-0132 Expires: 5/16/16

Date: April 6, 2015

2.0 EXECUTIVE SUMMARY

Environet has completed this Risk Assessment for the single family residence located at 82 Andrews Avenue, Hilo, Big Island, Hawai'i. On March 23, 2015 Environet personnel performed site reconnaissance and activities to identify suspect lead hazards.

The Site is a single story residential structure consisting of two (2) bedrooms, one (1) bathroom and a living area. The Site also included an unfinished basement.

During Environet's Risk Assessment, lead paint and soil hazards were identified at the Site. The lead hazards identified during Environet's Risk Assessment are summarized below. The map located in Appendix I identifies the approximate locations of each hazard. The Photograph Log in Appendix II shows the photographs further identifying these hazards.

Identified Lead Paint Hazards and Recommendations
Single Family Residence
82 Andrews Avenue, Hilo, HI 96720

Type of Hazard	*Room/Location*	*Detailed Description*	*Comments*	*Recommendations*[1]
Paint	Exterior	Red/Gray Concrete Stairs	Hazard is due to poor paint condition, likely friction surface, and the possibility of weathering and exposure to surrounding soil.	Proper removal or encapsulation of deteriorated LCP.
Soil	Exterior Soils 0' – 5' Perimeter Surrounding Structure	Surface Soils 0" – 2"	Hazard is due to the possibility of exposure to the surrounding soil.	Abatement of soil: removal of soil or permanent enclosure.

[1] *It is recommended that any activity that disturbs lead paint, lead contaminated soil, lead dust, or any lead hazard corrective action be conducted by personnel certified by United States Environmental Protection Agency's (EPA's) Lead Renovation, Repair, and Painting Program or EPA's Lead-Based Paint Abatement Worker certification.*

In summary, lead hazards associated with lead and soil paint were observed at the Site. Based on Environet's Risk Assessment, Environet recommends the following:

- Immediately incorporate ongoing lead paint maintenance activities into regular maintenance of the Site, unless all lead-containing paint (LCP) has been successfully abated (either removed, or enclosed or encapsulated without failure of those treatments). Examples of control options are provided in Section 6 of this report.

- Eliminate all identified lead hazards identified in this report within 90 days of receiving this report. Corrective measures may involve permanent or temporary elimination of lead hazards.

- Permanent corrective lead hazard control within the identified lead hazard locations include the removal of LCP; enclosure, encapsulation, or replacement of building components coated with LCP; 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 worksite preparation; protection of residents and residents' belongings; cleanup; waste disposal; clearance testing; recordkeeping; and, in some cases, monitoring. Certified or licensed abatement contractors must be used for permanent lead hazard control work, unless the intent of the work is maintenance, renovation, or rehabilitation.

- Temporary corrective measures, using lead-safe work practices, include specialized cleaning, repairs, maintenance, temporary containment, paint stabilization and management and resident education programs. Paint stabilization is the process of repair of any underlying conditions, wet scraping, priming, and repainting surfaces; paint stabilization includes cleanup and clearance.

- If interim controls are used, conduct re-evaluations at two-year intervals by a State of Hawai'i Department of Health (HDOH) certified lead risk assessor, for lead hazards or failures of previous hazard control measures. Interim controls include dust removal; paint stabilization; treatment of friction and impact surfaces; specialized cleaning; installation of soil coverings, such as grass or sod; or land-use controls.

- It is recommended that any activity that disturbs lead paint, lead-contaminated soil, lead dust, or any lead hazard corrective action be conducted by personnel certified by United States Environmental Protection Agency's (EPA's) Lead Renovation, Repair and Painting Program or EPA's Lead-Based Paint Abatement Worker certification.

3.0 INTRODUCTION/PURPOSE

The Risk Assessment was conducted on March 23, 2015, at the Site. The Risk Assessment identified housing conditions considered to be lead hazards that could result in harm to residents, workers and especially to young children. This Risk Assessment report can help owners and/or occupants develop a plan for eliminating any lead hazards that were found, and may aid in establishing an ongoing lead paint maintenance and re-evaluation program, if needed.

4.0 METHODOLOGY

4.1 Lead Risk Assessment

Lead hazards may exist in paint, dust, and/or soil. This Risk Assessment is an onsite interior and exterior investigation to discover any potential lead hazards at the Site. In accordance with the United States Housing and Urban Development (HUD) *Guidance for the Evaluation and Control of Lead-Based Paint Hazards in Housing*, Environet personnel conducted this Risk Assessment for paint, dust, and soil at the Site.

*4.1.1 **Lead Paint Assessment***

Environet personnel evaluated the condition of the painted surfaces at the Site. The extent of any paint deterioration was observed by rating the paint condition as "good," "fair," or "poor." Poor surfaces are considered to be a hazard. Fair surfaces should be repaired, but are not yet considered to be a hazard; if not repaired, they should be monitored frequently. Good surfaces should be monitored to ensure that they remain in a non-hazardous condition.

4.1.2 Lead Dust Assessment

Environet collected four (4) dust wipe samples, including one (1) blank wipe sample for quality control, to identify those locations where lead dust hazards may exist at the Site. Floor dust wipe samples were collected from areas that are likely to be contacted by young children, such as play areas within rooms, high-traffic walkways, room midpoints, or areas immediately underneath windows. Window dust samples in a given room were collected from the window that is most frequently operated or most frequently contacted.

Federal and State regulations define the following as dangerous levels for lead dust in residences: floors greater than or equal to (≥) 40 micrograms per square foot ($\mu g/ft^2$); window sills ≥250 $\mu g/ft^2$; and, window troughs ≥400 $\mu g/ft^2$ (Code of Federal Regulation [CFR], 2004b).

GhostWipes and a pre-measured 1 square foot (144 square inches) frame/template were used to wipe a proscribed floor and window surface area for each dust wipe sample.

Each sample was placed into a sealable 50-milliliter (mL) tube, properly labeled and recorded following strict chain-of-custody (COC) procedures and submitted to Hawaii Analytical Laboratories Inc. (HAL) for analysis via atomic adsorption spectrum (AAS) in accordance with EPA Method 7082m for wipe samples. HAL is accredited for chemical analysis through successful participation in the American Industrial Hygiene Association (AIHA) Environmental Lead Proficiency Analytical Testing (ELPAT) Program.

4.1.3 Lead Soil Assessment

Environet's certified lead risk assessor collected a total of four (4) multi-incremental (MI) samples from the 0-5 foot perimeter of the Site for lead analysis.

Each sample was composited from 30 sub-samples of soil collected from the topsoil layer (depth 0-2 inches) where soil was accessible. The soil was collected into a re-sealable polyethylene bag. The sampling equipment was replaced with clean sampling equipment for each sample collection to avoid cross-contamination between samples.

All samples were properly logged and recorded following strict COC procedures and submitted to HAL for analysis of lead content in accordance with EPA Method 7000B.

5.0 FINDINGS AND RECOMMENDATIONS

During Environet's Risk Assessment, lead paint hazards were identified at the Site. The lead hazards identified during Environet's Risk Assessment are summarized below. The map located in Appendix I identifies the approximate locations of each hazard. The Photograph Log in Appendix II shows the photographs further identifying these hazards.

Identified Lead Paint Hazards and Recommendations
Single Family Residence
82 Andrews Avenue, Hilo, HI 96720

Type of Hazard	*Room/Location*	*Detailed Description*	*Comments*	*Recommendations*[1]
Paint	Exterior	Red/Gray Concrete Stairs	Hazard is due to poor paint condition, likely friction surface, and the possibility of weathering and exposure to surrounding soil.	Proper removal or encapsulation of deteriorated LCP.
Soil	Exterior Soils 0' – 5' Perimeter Surrounding Structure	Surface Soils 0" – 2"	Hazard is due to the possibility of exposure to the surrounding soil.	Abatement of soil: removal of soil or permanent enclosure.

[1] *It is recommended that any activity that disturbs lead paint, lead contaminated soil, lead dust, or any lead hazard corrective action be conducted by personnel certified by United States Environmental Protection Agency's (EPA's) Lead Renovation, Repair, and Painting Program or EPA's Lead-Based Paint Abatement Worker certification.*

6.0 CONTROL OPTIONS

6.1 Control Methods

Interim controls are defined as those measures which temporarily reduce or mitigate exposure to lead hazards. Interim controls include, but are not limited to: paint stabilization (covering with new paint); regular cleaning; regular maintenance; renovation; remodeling; temporary containment (*i.e.*, covering lead paint with a new wall or floor surface); and covering lead containing soil with new sod or mulch.

Abatement is defined as the permanent (greater than 20 years) elimination of lead hazards. If abatement does not involve the complete removal of a lead hazard, the abatement method must be guaranteed by the manufacturer and/or contractor to last a minimum of 20 years, or be designed with at least a 20 year life span. Abatement methods include, but are not limited to: the complete removal of lead paint from substrates and components; the removal of lead paint covered materials; and the permanent enclosure of lead hazards with construction materials.

6.2 General Control Recommendations

It is recommended that the occupants be trained in safe lead work practices and conduct regular (daily) cleaning throughout the Site.

6.3 Ongoing Monitoring

If interim control methods are adopted, an ongoing monitoring schedule must be implemented to prevent the development of new lead hazards. Interim control monitoring requires both re-evaluation and annual visual surveys. A re-evaluation is a limited risk assessment performed by a certified risk assessor that may include dust and soil sampling. A visual survey is an annual assessment performed by the owner of the Site. The HUD Table 6.1 Standard Reevaluation Schedules located in Appendix III provides guidelines for ongoing monitoring.

7.0 REFERENCES

Building and Construction Cost Data. RS Means Construction Publishers and Consultants. Reed Construction Data, 2003.

Code of Federal Regulations. Occupational Safety and Health Standards. Title 29, Part 1910.1025. Washington, DC. US Government Printing Office, 2004a.

Code of Federal Regulations. Protection of Environment. Title 40, Part 745. Washington DC. US Government Printing Office, 2004b.

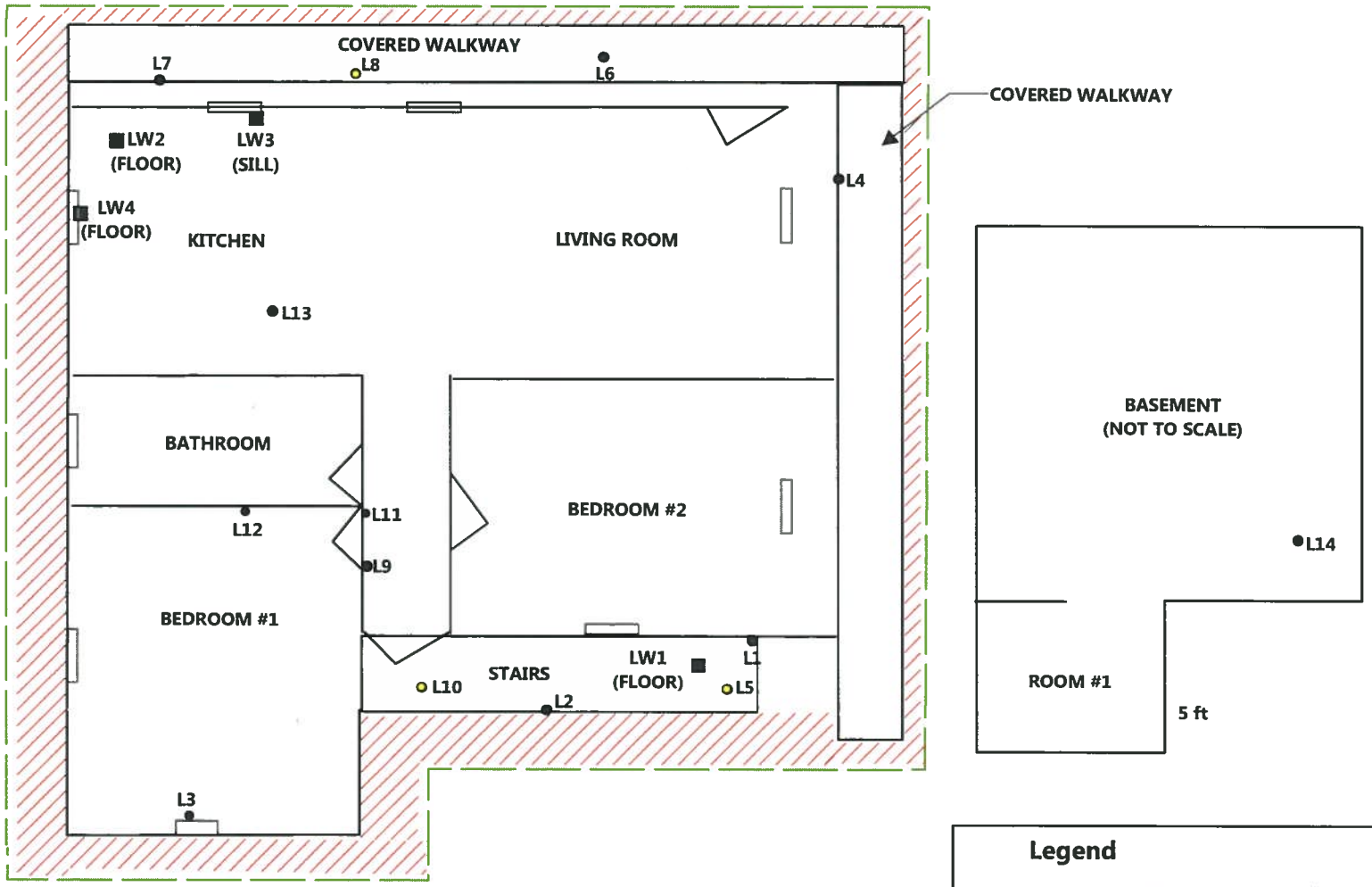
Code of Federal Regulations. Housing and Urban Development. Title 24, Part 35. Washington DC. US Government Printing Office, 2004.

US Department of Housing and Urban Development. Guidance for the Evaluation and Control of Lead-Based Paint Hazards in Housing, 2004.

US Environmental Protection Agency. Risk Assessment Model Curriculum. 1995.

Appendix I

MAP 1. IDENTIFIED LEAD HAZARDS



Note: Not to scale.

Environet, Inc.	PROJECT NO.: 1194-001	LBP SURVEY	MAP 1
	DATE: MARCH 27, 2015		
	DRAWN BY: RM	IDENTIFIED LEAD HAZARDS	
	REVIEWED BY: MS	82 ANDREWS AVENUE, HILO, HI 96720	

Appendix II

PHOTOGRAPH LOG – IDENTIFIED LEAD HAZARDS

Photo Log

Photo 1: Identified lead hazard area from deteriorated red/gray LCP in high traffic area located on front concrete entry stairs.

Photo 2: Lead hazard area in exposed soil at the Site detected above screening levels for unrestricted use.

Appendix III

HUD TABLE 6.1 STANDARD REEVALUATION SCHEDULES FOR ONGOING MONITORING

Table 6.1 Standard Reevaluation Schedules

Schedule	Evaluation Results	Action Taken	Reevaluation Frequency and Duration	Visual Survey (by owner or owner's representative)
1	Combination risk assessment/inspection finds no leaded dust or soil and no lead-based paint.	None.	None.	None.
2	No lead-based paint hazards found during risk assessment conducted before hazard control or at clearance (hazards include dust and soil).	None.	3 Years.	Annually and whenever information indicates a possible problem .
3	The average of leaded dust levels on all floors, interior window sills, or window troughs sampled exceeds the applicable standard, but by less than a factor of 10.	A. Interim controls and/or hazard abatement (or mixture of the two), including, but not necessarily limited to, dust removal. This schedule does not include window replacement.	1 Year, 2 Years.	Same as Schedule 2, except for encapsulants. The first visual survey of encapsulants should be done one month after clearance; the second should be done 6 months later and annually thereafter.
		B. Treatments specified in section A plus replacement of all windows with lead hazards.	1 Year.	
		C. Abatement of all lead-based paint using encapsulation or enclosure.	None.	Same as Schedule 3 above.
		D. Removal of all lead-based paint.	None.	None.
4	The average of leaded dust levels on all floors, interior window sills, or window troughs sampled exceeds the applicable standard by a factor of 10 or more.	A. Interim controls and/or hazard abatement (or mixture of the two), including, but not necessarily limited to dust removal. This schedule does not include window replacement.	6 Months, 1 Year, 2 Years.	Same as Schedule 3.
		B. Treatments specified in section A plus replacement of all windows with lead hazards.	6 Months, 2 Years.	Same as Schedule 3.
		C. Abatement of all lead-based paint using encapsulation and enclosure.	None.	Same as Schedule 3.
		D. Removal of all lead-based paint.	None.	None.

Table 6.1 Standard Reevaluation Schedules (continued)

Schedule	Evaluation Results	Action Taken	Reevaluation Frequency and Duration	Visual Survey (by owner or owner's representative)
5	No leaded dust or leaded soil hazards identified, but lead-based paint or lead-based paint hazards are found.	A. Interim controls or mixture of interim controls and a batement (not including window replacement).	2 Years.	Same as Schedule 3.
		B. Mixture of interim controls and abatement, including window replacement.	3 Years.	Same as Schedule 3.
		C. Abatement of all lead-based paint *hazards*, but not all lead-based paint.	4 Years.	Same as Schedule 3.
		D. Abatement of all lead-based paint using encapsulation or enclosure.	None.	Same as Schedule 3.
		E. Removal of all lead-based paint.	None.	None.
6	Bare leaded soil exceeds standard, but less than 5,000 µg/g.	Interim controls.	None.	Three months to check new ground cover, then annually to identify new bare spots.
7	Bare leaded soil greater than or equal to 5,000 µg/g.	Abatement (paving or removal).	None.	None for removal, annually to identify new bare spots or deterioration of paving.

See notes to table 6.1 on following page.

Notes to Table 6.1:

1. When more than one schedule applies to a dwelling, use the one with the most stringent reevaluation schedule. Do not use the results of a reevaluation for Schedule 2.

2. A lead-based paint hazard includes, but is not limited to, deteriorated lead-based paint and leaded dust and soil above applicable standards. See the Glossary for a more complete definition.

3. The frequency of reevaluations and the interval between reevaluations depends on the findings at each reevaluation and the action taken. For example, a dwelling unit or common area falling under Schedule 3.A would be reevaluated 1 year after clearance. If no lead-based paint hazards are detected at that time, the unit or area would be reevaluated again 2 years after the first reevaluation. If no hazards are found in the second reevaluation, no further reevaluation is necessary, but annual visual monitoring should continue.

   If, on the other hand, the unit or common area fails a reevaluation, a new reevaluation schedule should be determined based on the results of the reevaluation and the action taken. For instance, if the re-evaluation finds deteriorated lead-based paint but no lead-contaminated dust, and the action taken is paint stabilization, Schedule 5.A would apply, which indicates that the next reevaluation should be in 2 years. If, however, the owner of this same property decides to abate all lead-based paint hazards instead of doing only paint stabilization, the property would move to Schedule 5.C, which calls for reevaluation 4 years from the date of clearance after the hazard abatement.

   Following another scenario, suppose a reevaluation of this same dwelling unit or common area finds that the average dust lead levels on sampled window troughs exceeds the applicable standard by a factor of 10 or more, but no other lead-based paint hazards. The owner conducts dust removal. In this case the next reevaluation would be 6 months after clearance followed by another a year later, followed by yet another 2 years later, as indicated by Schedule 4.A.

4. The initial evaluation results determine which reevaluation schedule should be applied. An initial evaluation can be a risk assessment, a risk assessment/ inspection combination, or, if the owner has opted to bypass the initial evaluation and proceed directly to controlling suspected hazards, a combination risk assessment/clearance examination. This type of clearance must be conducted by a certified risk assessor, who should determine if all hazards were in fact controlled. The results of the initial clearance dust tests, soil sampling and visual examination should be used to determine the appropriate schedule. If repeated cleaning was necessary to achieve clearance, use the results of the dust tests *before* repeated cleaning was performed for schedule determination.

5. If a unit fails two consecutive reevaluations, the reevaluation interval should be reduced by half and the number of reevaluations should be doubled. If deteriorated lead-based paint hazards continue to occur, then the offending components/surfaces should be abated. If dwellings with dust hazards but no paint-related hazards repeatedly fail reevaluations, the exterior source should be identified (if identification efforts fail, regular dust removal efforts are needed).

Attachment 5: Analytical Laboratory Reports

Hawaii Analytical Laboratory
ANALYTICAL REPORT

Thursday, March 26, 2015

3615 Harding Avenue, Ste. 308, Honolulu, Hawaii 96816
Phone: (808) 735-0422

Mr. Max Solmssen
Environet, Inc.
1286 Queen Emma Street

Honolulu HI 96813

Phone Number: (808) 833-2225
Facsimile:
Email: msolmssen@environetinc.com

Lab Job No: 20151504
Your Project: DHHL - 82 Andrews Ave, Hilo, HI (3/23/2015)

Lead, total (wipes)

NIOSH/EPA **Method:** 7082m LEAD by FAAS/3051A m

Sample No.	Your Sample Description	Results	Units	Date Submitted	Date Analyzed
201507441	**82Andrews-LW1 (144in2)**	< 10	ugs/ft2	3/24/2015	3/25/2015
Comments					
201507442	**82Andrews-LW2 (144in2)**	12	ugs/ft2	3/24/2015	3/25/2015
Comments					
201507443	**82Andrews-LW3 (72in2)**	33	ugs/ft2	3/24/2015	3/25/2015
Comments					
201507444	**82Andrews-LW4 (72in2)**	< 20	ugs/ft2	3/24/2015	3/25/2015
Comments					
201507445	**82Andrews-LW5 (0in2)**	< 10	ugs/wipe	3/24/2015	3/25/2015
Comments					

All Quality Control data are acceptable unless otherwise noted.
MRL for lead air is 5ug.
MRL for lead wipe is 10ug.
MRL for lead paint or soil is 40 mg/kg for a 0.25g sample.

Mr. Max Solmssen
Environet, Inc.
1286 Queen Emma Street

Honolulu HI 96813

Phone Number: (808) 833-2225
Facsimile:
Email: msolmssen@environetinc.com

Lab Job No: 20151504
Your Project: DHHL - 82 Andrews Ave, Hilo, HI (3/23/2015)

General Comments
All analysts participate in interlaboratory quality control testing to continuously document profiency. The sample[s] analysis subject of this analytical report were conducted in general accordance with the procedures associated with the" analytical method" referenced above. Modifications to this methodology may have been made based upon the analyst's professional judgment and / or sample matrix effects encountered. The analysis of sample relates only to the sample analyzed, and may or may not be representative of the original source of the material submitted for our analysis. This report is not to be duplicated except in full without the expressed written permission of Hawaii Analytical Laboratory. This report should not be construed as an endorsement for a product or a service by the AIHA or any affiliated organizations. Sample and associated sampling / collection data is reported as provided by client. Concentration and TWA values have been calculated based on information supplied by the client that the laboratory cannot verify. Results have not been corrected for blank determinations unless noted in remarks. Unless otherwise indicated the sample condition at the time of receipt was acceptable.

Results and Symbols Definitions
> This testing result is greater than the numerical value listed.
< This testing result is less than the numerical value listed.
 # = Analytical methods marked with an "#" are not within our AIHA Scope of Accreditation.
MRL = Method Reporting Limit.

Ms. Eva Skogsberg
Section Supervisor

Hawaii Analytical Laboratory, is an AIHA CAPT, IHLAP, ELLAP and EMLAP accredited laboratory (Accreditation No. 101812) in the scope of work listed on the AIHA website (www.aiha.org). Hawaii Analytical Laboratory is also an analytical facility accredited in accordance with the recognized ISO/ IEC 17025:2005.

Hawaii Analytical Laboratory
ANALYTICAL REPORT

Wednesday, March 25, 2015

3615 Harding Avenue, Ste. 308, Honolulu, Hawaii 96816
Phone: (808) 735-0422

Mr. Max Solmssen
Environet, Inc.
1286 Queen Emma Street

Honolulu HI 96813

Phone Number: (808) 833-2225
Facsimile:
Email: msolmssen@environetinc.com

Lab Job No: 20151500
Your Project: DHHL - 82 Andrews Ave, Hilo (3/23/0215)

Lead, total (paint chips)

NIOSH **Method:** 7082m LEAD by FAAS

Sample No.	Your Sample Description	Results	Units	Date Submitted	Date Analyzed
201507405	**82Andrews-L1**	< 39	mg/kg	3/24/2015	3/24/2015
Comments					
201507406	**82Andrews-L2**	< 39	mg/kg	3/24/2015	3/24/2015
Comments					
201507407	**82Andrews-L3**	< 38	mg/kg	3/24/2015	3/24/2015
Comments					
201507408	**82Andrews-L4**	< 39	mg/kg	3/24/2015	3/24/2015
Comments					
201507409	**82Andrews-L5**	500	mg/kg	3/24/2015	3/24/2015
Comments					
201507410	**82Andrews-L6**	< 39	mg/kg	3/24/2015	3/24/2015
Comments					
201507411	**82Andrews-L7**	< 38	mg/kg	3/24/2015	3/24/2015
Comments					
201507412	**82Andrews-L8**	65	mg/kg	3/24/2015	3/24/2015
Comments					
201507413	**82Andrews-L9**	< 38	mg/kg	3/24/2015	3/24/2015
Comments					

Hawaii Analytical Laboratory, is an AIHA CAPT, IHLAP, ELLAP and EMLAP accredited laboratory (Accreditation No. 101812) in the scope of work listed on the AIHA website (www.aiha.org). Hawaii Analytical Laboratory is also an analytical facility accredited in accordance with the recognized ISO/ IEC 17025:2005.

Mr. Max Solmssen
Environet, Inc.
1286 Queen Emma Street
Honolulu HI 96813

Phone Number: (808) 833-2225
Facsimile:
Email: msolmssen@environetinc.com

Lab Job No: 20151500
Your Project: DHHL - 82 Andrews Ave, Hilo (3/23/0215)

Lead, total (paint chips)

NIOSH **Method:** 7082m LEAD by FAAS

Sample No.	Your Sample Description	Results	Units	Date Submitted	Date Analyzed
201507414	82Andrews-L10	110	mg/kg	3/24/2015	3/24/2015
Comments					
201507415	82Andrews-L11	< 38	mg/kg	3/24/2015	3/24/2015
Comments					
201507416	82Andrews-L12	< 39	mg/kg	3/24/2015	3/24/2015
Comments					
201507417	82Andrews-L13	< 39	mg/kg	3/24/2015	3/24/2015
Comments					
201507418	82Andrews-L14	< 38	mg/kg	3/24/2015	3/24/2015
Comments					

All Quality Control data are acceptable unless otherwise noted.
MRL for lead air is 5ug.
MRL for lead wipe is 10ug.
MRL for lead paint or soil is 40 mg/kg for a 0.25g sample.

General Comments
All analysts participate in interlaboratory quality control testing to continuously document profiency. The sample[s] analysis subject of this analytical report were conducted in general accordance with the procedures associated with the" analytical method" referenced above. Modifications to this methodology may have been made based upon the analyst's professional judgment and / or sample matrix effects encountered. The analysis of sample relates only to the sample analyzed, and may or may not be representative of the original source of the material submitted for our analysis. This report is not to be duplicated except in full without the expressed written permission of Hawaii Analytical Laboratory. This report should not be construed as an endorsement for a product or a service by the AIHA or any affiliated organizations. Sample and associated sampling / collection data is reported as provided by client. Concentration and TWA values have been calculated based on information supplied by the client that the laboratory cannot verify. Results have not been corrected for blank determinations unless noted in remarks. Unless otherwise indicated the sample condition at the time of receipt was acceptable.

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Ms. Eva Skogsberg
Section Supervisor

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Hawaii Analytical Laboratory
ANALYTICAL REPORT

Thursday, March 26, 2015

3615 Harding Avenue, Ste. 308, Honolulu, Hawaii 96816
Phone: (808) 735-0422

Mr. Max Solmssen
Environet, Inc.
1286 Queen Emma Street

Honolulu HI 96813

Phone Number: (808) 833-2225
Facsimile:
Email: msolmssen@environetinc.com

Lab Job No: 20151499
Your Project: DHHL - 82 Andrews Ave, Hilo, HI (3/23/2015)

Lead, total (soil)

EPA **Method:** 3051m/7000Bm

Sample No.	Your Sample Description	Results	Units	Date Submitted	Date Analyzed
201507399	82Andrews-LS1A	1000	mg/kg	3/24/2015	3/25/2015
Comments	Multi-incremental sampling was performed on the sample.				
201507400	82Andrews-LS1B	1200	mg/kg	3/24/2015	3/25/2015
Comments	Multi-incremental sampling was performed on the sample.				
201507401	82Andrews-LS1C	1300	mg/kg	3/24/2015	3/25/2015
Comments	Multi-incremental sampling was performed on the sample.				
201507402	82Andrews-LS2	1200	mg/kg	3/24/2015	3/25/2015
Comments	Multi-incremental sampling was performed on the sample.				
201507403	82Andrews-LS3	1600	mg/kg	3/24/2015	3/25/2015
Comments	Multi-incremental sampling was performed on the sample.				
201507404	82Andrews-LS4	700	mg/kg	3/24/2015	3/25/2015
Comments	Multi-incremental sampling was performed on the sample.				

All Quality Control data are acceptable unless otherwise noted.
MRL for lead air is 5ug.
MRL for lead wipe is 10ug.
MRL for lead paint or soil is 40 mg/kg for a 0.25g sample.

Mr. Max Solmssen
Environet, Inc.
1286 Queen Emma Street
Honolulu HI 96813

Phone Number: (808) 833-2225
Facsimile:
Email: msolmssen@environetinc.com

Lab Job No: 20151499
Your Project: DHHL - 82 Andrews Ave, Hilo, HI (3/23/2015)

General Comments
All analysts participate in interlaboratory quality control testing to continuously document profiency. The sample[s] analysis subject of this analytical report were conducted in general accordance with the procedures associated with the" analytical method" referenced above. Modifications to this methodology may have been made based upon the analyst's professional judgment and / or sample matrix effects encountered. The analysis of sample relates only to the sample analyzed, and may or may not be representative of the original source of the material submitted for our analysis. This report is not to be duplicated except in full without the expressed written permission of Hawaii Analytical Laboratory. This report should not be construed as an endorsement for a product or a service by the AIHA or any affiliated organizations. Sample and associated sampling / collection data is reported as provided by client. Concentration and TWA values have been calculated based on information supplied by the client that the laboratory cannot verify. Results have not been corrected for blank determinations unless noted in remarks. Unless otherwise indicated the sample condition at the time of receipt was acceptable.

Results and Symbols Definitions
> This testing result is greater than the numerical value listed.
< This testing result is less than the numerical value listed.
 # = Analytical methods marked with an "#" are not within our AIHA Scope of Accreditation.
MRL = Method Reporting Limit.

Ms. Eva Skogsberg
Section Supervisor

Hawaii Analytical Laboratory, is an AIHA CAPT, IHLAP, ELLAP and EMLAP accredited laboratory (Accreditation No. 101812) in the scope of work listed on the AIHA website (www.aiha.org). Hawaii Analytical Laboratory is also an analytical facility accredited in accordance with the recognized ISO/ IEC 17025:2005.

Attachment 6: Personnel Certification Documents

State of Hawai'i

Lead Based Paint Activities Certification

Expiration Dates:

Inspector- n/a
Supervisor- n/a
Risk Assessor- 05/16/2016
Project Designer- n/a
Worker- n/a

Kobayashi

Kamalana

Certification # PB-0132

Attachment 7: Abatement Cost Estimates

Type of Hazard	*Room/Location*	*Detailed Description*	*Estimated Quantity*	*Approximate Abatement Cost*
Paint	Exterior Entry	Red/Gray Concrete Stairs	40 ft2	$960
Soil	Exterior Soils 0'-5' Perimeter Surrounding Structure	Surface Soils 0"-2"	710 ft2	$5,112

ASBESTOS SURVEY

LOT 58-B-1

82 ANDREWS AVE.

LIMITED ASBESTOS SURVEY REPORT

TASK ORDER NO. 7, LOT 58B, 82 ANDREWS AVENUE
DEPARTMENT OF HAWAIIAN HOME LANDS
TMK 3-2-1-021:072
KEAUKAHA, HILO, HAWAII

Prepared for:
WESLEY R. SEGAWA & ASSOCIATES
101 Silva Street, Suite 201
Keaukaha, Hilo, Hawaii 96720

Prepared by:
ENVIROSERVICES & TRAINING CENTER, LLC
505 Ward Avenue, Suite 202
Honolulu, Hawaii 96814
tel: (808) 839-7222

ETC Project No. 15-4042

September 3, 2015

TABLE OF CONTENTS

1.0 CERTIFICATIONS AND LIMITATIONS

EnviroServices & Training Center, LLC (ETC) has completed this Limited Asbestos Survey Report for the residential vacant home located at 82 Andrews Avenue, Keaukaha, Hilo, Hawaii (Subject Site). ETC's findings and recommendations contained herein are based on research, site observations, government regulations and laboratory data, which were gathered at the time and location of the study. Opinions stated in this report do not apply to changes that may have occurred after the services were performed.

ETC has performed specified services for this project with the degree of care, skill and diligence ordinarily exercised by professional consultants performing the same or similar services. No other warranty, guarantee, or representation, expressed or implied, is included or intended; unless otherwise specifically agreed to in writing by both ETC and ETC's Client.

This report is intended for the sole use of Wesley R. Segawa & Associates exclusively for the Subject Site. Wesley R. Segawa & Associates may use and release this report, including making and retaining copies, provided such use is limited to the particular site and project for which this report is provided. However, the services performed may not be appropriate for satisfying the needs of other users. Release of this report to third-parties will be at the sole risk of ETC's Client and/or said user, and ETC shall not be liable for any claims or damages resulting from or connected with such release or any third party's use or reuse of this report.

Prepared By: _____

Velverdee K. Roberts
State of Hawaii Asbestos Building Inspector Certification # HIASB-0315
State of Hawaii Lead Risk Assessor Certification # PB-0041

Date: September 3, 2015

Surveyed By: _____

Cynthia Lewis
State of Hawaii Asbestos Building Inspector Certification # HIASB-3939
State of Hawaii Lead Risk Assessor Certification # PB-0753

Date: August 24, 2015

2.0 EXECUTIVE SUMMARY

ETC has completed this Limited Asbestos Survey Report for the residential home, located at 82 Andrews Avenue, Keaukaha, Hilo, Hawaii (Subject Site). The survey was conducted on August 24, 2015.

Summary of Asbestos Containing Materials Survey

Laboratory analysis determined that one (1) of the sampled materials contained asbestos above the regulatory limit of 1%. The asbestos containing material is summarized below.

Homogenous Area	Material	Condition	Category	Friability	Estimated Quantity
Roof	Black Soffit Sealant with Silver Foil	Good	Misc.	Non Friable I	$3ft^2$

3.0 INTRODUCTION/PURPOSE

The purpose of this Limited Asbestos Survey Report was to investigate the Residential Home located at 82 Andrews Avenue Keaukaha, Hilo, Hawaii (Subject Site) for asbestos materials that will require special handling prior to demolition/renovation activities. Specifically, ETC completed the following tasks:

- Mobilized a State of Hawaii Department of Health (DOH)/Environmental Protection Agency (EPA) certified asbestos building inspector to the Subject Site;
- Performed site reconnaissance at the Subject Site;
- Collected eighteen (18) samples of suspected Asbestos Containing Material (ACM) from various locations throughout the Subject Site;
- Submitted the eighteen (18) samples of suspected ACM to EMC Labs, Inc. (EMC) in Phoenix, Arizona for analysis of asbestos via Polarized Light Microscopy (PLM) in accordance with the Asbestos Hazard Emergency Response Act (AHERA) protocol and the National Institute for Occupational Safety and Health (NIOSH) Method 600/R-93/116; and
- Prepared this report documenting the field activities and the results of the investigation including analytical results, conclusions, and recommendations.

4.0 METHODOLOGY

Asbestos

ETC personnel collected a total of eighteen (18) samples of suspected ACM for asbestos analysis. The suspected ACM samples were collected in accordance with EPA guidelines and recommendations.

The suspected ACM was wetted with amended water before sample collection. A small piece was then carefully cut out and placed into a labeled re-sealable plastic bag. The sampling equipment was cleaned between each sample collection to avoid cross-contamination between samples. The approximate quantity of each suspected ACM was noted. Sample locations were randomly selected in accordance with EPA protocols and recommendations.

Samples were properly logged and recorded following strict chain of custody procedure and submitted to EMC for analysis by PLM in accordance with EPA Method 600/R-93/116. EMC is accredited for bulk asbestos analysis through successful participation in the National Voluntary Lab Accreditation Program (NVLAP).

5.0 RESULTS

Asbestos Inspection

Laboratory analysis determined that the black soffit sealant with silver foil on the roof, contained levels of asbestos above the regulatory limit of 1%. The results of this analysis are contained in Table 1 found in Appendix I.

In accordance with federal and state regulations and industry standard practice ETC determined homogenous areas of each suspect material and collected multiple representative samples of the material from each homogenous area. Typically, all samples for a suspect material will have similar laboratory results. When the results differ, a single result above the regulatory limit is sufficient to determine that the material within the homogenous area is ACM and the entirety of the homogenous area should be treated as ACM. Thus, ETC may request that the laboratory stops analyzing when the first sample in the set is determined to have an asbestos content above 1%. Two (2) samples were not analyzed for this reason.

6.0 RECOMMENDATIONS

Based on ETC's visual inspection of the facility, inventory of potentially hazardous materials, and laboratory data, ETC recommends the following:

- Manage and/or remove and dispose of hazardous and regulated materials in accordance with applicable local, state, and federal regulations, prior to renovation and/or demolition activities that may disturb these materials.
- All friable ACM must be removed and disposed of by a qualified asbestos abatement contractor. Friable ACM is defined as those materials that may be crumbled, pulverized, or otherwise damaged by hand pressure.
- Any non-friable ACM which could be crumbled and pulverized during renovation/demolition activities must be removed and disposed of by a qualified asbestos abatement contractor.
- In addition, the services of a qualified consultant should be obtained to monitor and inspect the removal activities to ensure compliance with applicable Environmental Protection Agency (EPA), Occupational Safety and Health Administration (OSHA), and Hawaii Occupational Safety and Health (HIOSH) regulations pertaining to the handling of asbestos containing material.
- Have air monitoring conducted for airborne asbestos fibers by a State of Hawaii certified Project Monitor during any asbestos abatement and general renovation/demolition activities of areas that were determined to contain this contaminant.

Appendix I

TABLES OF RESULTS

Table 1
Asbestos Survey Results
Department of Hawaiian Homelands Hilo
Task Order No. 7, Lot 58B, 82 Andrews Avenue

Sample ID	*Homogeneous Area*	*Material*	*Condition*	*Category*	*Friability*	*Analysis Layer*	*Asbestos Content*	*Estimated Quantity*
58B-AB-01	1st Floor Throughout	Drywall	Damaged	N/A	N/A	All	None Detected	N/A
58B-AB-02							None Detected	
58B-AB-03							None Detected	
58B-2AB-01	2nd Floor Kitchen and Bathroom	12" x 12" White Ceramic Tile with Grout	Good	N/A	N/A	All	None Detected	N/A
58B-2AB-02							None Detected	
58B-2AB-03							None Detected	
58B-2AB-04	2nd Floor Bathroom	Bathtub Caulking	Good	N/A	N/A	All	None Detected	N/A
58B-2AB-05							None Detected	
58B-2AB-06							None Detected	
58B-2AB-07	2nd Floor Kitchen Sink	White Insulation	Good	N/A	N/A	All	None Detected	N/A
58B-2AB-08							None Detected	
58B-2AB-09							None Detected	
58B-2AB-10	2nd Floor Walls and Ceiling	Drywall	Good	N/A	N/A	All	None Detected	N/A
58B-2AB-11							None Detected	
58B-2AB-12							None Detected	
58B-R-AB-01	Roof	Flashing with Silver Foil	Good	N/A	N/A	All	None Detected	N/A
58B-R-AB-02							None Detected	
58B-R-AB-03							None Detected	
58B-R-AB-04	**Roof**	**Black Soffit Sealant with Silver Foil**	**Good**	**Misc.**	**Non-Friable I**	**Black Sealant**	**Chrysotile 5%**	**3 ft^2**
						Black/Silver Flashing	**Chrysotile 5%**	
58B-R-AB-05						**All**	**Not Analyzed**	
58B-R-AB-06							**Not Analyzed**	

Appendix **II**

LABORATORY ANALYTICAL RESULTS AND CHAIN-OF-CUSTODY FORMS

EMC LABS, INC.

9830 S. 51st Street, Suite B109, Phoenix, AZ 85044
Phone: 800-362-3373 or 480-940-5294 - Fax: (480) 893-1726

Laboratory Report
0159758

Bulk Asbestos Analysis by Polarized Light Microscopy

NVLAP#101926-0

Client:	ENVIROSERVICES & TRAINING CENTER	Job# / P.O. #:	
Address:	505 WARD AVE, STE 202	Date Received:	08/27/2015
	HONOLULU HI 96814	Date Analyzed:	09/01/2015
Collected:	08/25/2015	Date Reported:	09/01/2015
Project Name:	DEPT OF HAWAIIAN HOME LANDS HILO	EPA Method:	EPA 600/R-93/116
Address:	PRJ #15-4042 LOT 58-B (ANDREWS AVE)	Submitted By:	CYNTHIA LEWIS
		Collected By:	

Lab ID / Client ID	Sample Location	Layer Name / Sample Description	Asbestos Detected	Asbestos Type (%)	Non-Asbestos Constituents	
0159758-001 58-AB-01	1ST FL THROUGHOUT	LAYER 1 Drywall, Off White/ Brown	No	None Detected	Cellulose Fiber	12%
					Gypsum Carbonates Mica	88%
		LAYER 2 Texture, White/ Off White	No	None Detected	Cellulose Fiber	<1%
					Carbonates Mica Quartz Binder/Filler	99%
0159758-002 58-AB-02	1ST FL THROUGHOUT	Drywall, Off White/ Brown	No	None Detected	Cellulose Fiber	12%
					Gypsum Carbonates Mica Quartz	88%
0159758-003 58-AB-03	1ST FL THROUGHOUT	Drywall, Off White/ Brown	No	None Detected	Cellulose Fiber	12%
					Gypsum Carbonates Mica	88%

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Project Name:	DEPT OF HAWAIIAN HOME LANDS HILO	EPA Method:	EPA 600/R-93/116
Address:	PRJ #15-4042 LOT 58-B (ANDREWS AVE)	Submitted By:	CYNTHIA LEWIS
		Collected By:	

Lab ID / Client ID	Sample Location	Layer Name / Sample Description	Asbestos Detected	Asbestos Type	(%)	Non-Asbestos Constituents	
0159758-004 58-2AB-01	2ND FL KITCHEN & BATHRM	LAYER 1 Ceramic Floor Tile, White / Tan	No	None Detected			
						Gypsum Quartz Binder/Filler	100%
		LAYER 2 Grout, Lt. Gray	No	None Detected			
						Gypsum Quartz Carbonates Mica Binder/Filler	100%
		LAYER 3 Thin Set, Gray	No	None Detected			
						Carbonates Quartz Gypsum Mica Binder/Filler	100%
0159758-005 58-2AB-02	2ND FL KITCHEN & BATHRM	LAYER 1 Ceramic Floor Tile, White / Tan	No	None Detected			
						Gypsum Quartz Binder/Filler	100%
		LAYER 2 Grout, Lt. Gray	No	None Detected			
						Gypsum Quartz Carbonates Mica Binder/Filler	100%
		LAYER 3 Thin Set, Gray	No	None Detected			
						Carbonates Quartz Gypsum Mica Binder/Filler	100%

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Project Name:	DEPT OF HAWAIIAN HOME LANDS HILO	EPA Method:	EPA 600/R-93/116
Address:	PRJ #15-4042 LOT 58-B (ANDREWS AVE)	Submitted By:	CYNTHIA LEWIS
		Collected By:	

Lab ID / Client ID	Sample Location	Layer Name / Sample Description	Asbestos Detected	Asbestos Type (%)	Non-Asbestos Constituents	
0159758-006 58-2AB-03	2ND FL KITCHEN & BATHRM	LAYER 1 Ceramic Floor Tile, White / Tan	No	None Detected	Gypsum Quartz Binder/Filler	100%
		LAYER 2 Grout, Lt. Gray	No	None Detected	Gypsum Quartz Carbonates Mica Binder/Filler	100%
		LAYER 3 Thin Set, Gray	No	None Detected	Carbonates Quartz Gypsum Mica Binder/Filler	100%
0159758-007 58-2AB-04	2ND FL BATHRM	Caulking, White/ Off White	No	None Detected	Carbonates Quartz Binder/Filler	100%
0159758-008 58-2AB-05	2ND FL BATHRM	Caulking, White/ Off White	No	None Detected	Carbonates Quartz Binder/Filler	100%
0159758-009 58-2AB-06	2ND FL BATHRM	Caulking, White/ Off White	No	None Detected	Carbonates Quartz Binder/Filler	100%
0159758-010 58-2AB-07	2ND FL KITCHEN SINK	Insulation, White/ Off White	No	None Detected	Cellulose Fiber Carbonates Mica Quartz Binder/Filler	5% 95%

EMC LABS, INC.

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Phone: 800-362-3373 or 480-940-5294 - Fax: (480) 893-1726

Laboratory Report
0159758

Bulk Asbestos Analysis by Polarized Light Microscopy

NVLAP#101926-0

Client:	ENVIROSERVICES & TRAINING CENTER	Job# / P.O. #:	
Address:	505 WARD AVE, STE 202	Date Received:	08/27/2015
	HONOLULU HI 96814	Date Analyzed:	09/01/2015
Collected:	08/25/2015	Date Reported:	09/01/2015
Project Name:	DEPT OF HAWAIIAN HOME LANDS HILO	EPA Method:	EPA 600/R-93/116
Address:	PRJ #15-4042 LOT 58-B (ANDREWS AVE)	Submitted By:	CYNTHIA LEWIS
		Collected By:	

Lab ID / Client ID	Sample Location	Layer Name / Sample Description	Asbestos Detected	Asbestos Type (%)	Non-Asbestos Constituents	
0159758-011 58-2AB-08	2ND FL KITCHEN SINK	Insulation, White/ Off White	No	None Detected	Cellulose Fiber	5%
					Carbonates Mica Quartz	
					Binder/Filler	95%
0159758-012 58-2AB-09	2ND FL KITCHEN SINK	Insulation, White/ Off White	No	None Detected	Cellulose Fiber	5%
					Carbonates Mica Quartz	
					Binder/Filler	95%
0159758-013 58-2AB-10	2ND FL WALLS & CEILING	LAYER 1 Drywall, Off White/ Brown	No	None Detected	Cellulose Fiber	12%
					Gypsum Carbonates	
					Mica	88%
		LAYER 2 Joint Compound, White/ Off White	No	None Detected	Cellulose Fiber	1%
					Carbonates Mica	
					Quartz	99%
		LAYER 3 Texture, White/ Off White	No	None Detected		
					Carbonates Mica Quartz	
					Binder/Filler	100%
0159758-014 58-2AB-11	2ND FL WALLS & CEILING	LAYER 1 Drywall, Off White/ Brown	No	None Detected	Cellulose Fiber	12%
					Gypsum Carbonates	
					Mica	88%
		LAYER 2 Texture, White/ Off White	No	None Detected		
					Carbonates Mica Quartz	
					Binder/Filler	100%

EMC LABS, INC.

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Laboratory Report
0159758

Bulk Asbestos Analysis by Polarized Light Microscopy

NVLAP#101926-0

Client:	ENVIROSERVICES & TRAINING CENTER	Job# / P.O. #:	
Address:	505 WARD AVE, STE 202	Date Received:	08/27/2015
	HONOLULU HI 96814	Date Analyzed:	09/01/2015
Collected:	08/25/2015	Date Reported:	09/01/2015
Project Name:	DEPT OF HAWAIIAN HOME LANDS HILO	EPA Method:	EPA 600/R-93/116
Address:	PRJ #15-4042 LOT 58-B (ANDREWS AVE)	Submitted By:	CYNTHIA LEWIS
		Collected By:	

Lab ID / Client ID	Sample Location	Layer Name / Sample Description	Asbestos Detected	Asbestos Type (%)	Non-Asbestos Constituents	
0159758-015 58-2AB-12	2ND FL WALLS & CEILING	LAYER 1 Drywall, Off White/ Brown	No	None Detected	Cellulose Fiber	12%
					Gypsum Carbonates Mica	88%
		LAYER 2 Texture, White/ Off White	No	None Detected		
					Carbonates Mica Quartz Binder/Filler	100%
0159758-016 58-R-AB-01	ROOF	LAYER 1 Flashing, Black	No	None Detected		
					Gypsum Quartz Carbonates Binder/Filler	100%
		LAYER 2 Flashing, Black/ Silver Note: Difficult to separate adjacent layers	No	None Detected	Cellulose Fiber	<1%
					Aluminum Carbonates Binder/Filler	99%
0159758-017 58-R-AB-02	ROOF	LAYER 1 Flashing, Black	No	None Detected		
					Gypsum Quartz Carbonates Binder/Filler	100%
		LAYER 2 Flashing, Black/ Silver Note: Difficult to separate adjacent layers	No	None Detected	Cellulose Fiber	<1%
					Aluminum Carbonates Binder/Filler	99%

EMC LABS, INC.

9830 S. 51st Street, Suite B109, Phoenix, AZ 85044
Phone: 800-362-3373 or 480-940-5294 - Fax: (480) 893-1726

Laboratory Report
0159758

Bulk Asbestos Analysis by Polarized Light Microscopy

NVLAP#101926-0

Client:	ENVIROSERVICES & TRAINING CENTER	Job# / P.O. #:	
Address:	505 WARD AVE, STE 202	Date Received:	08/27/2015
	HONOLULU HI 96814	Date Analyzed:	09/01/2015
Collected:	08/25/2015	Date Reported:	09/01/2015
Project Name:	DEPT OF HAWAIIAN HOME LANDS HILO	EPA Method:	EPA 600/R-93/116
Address:	PRJ #15-4042 LOT 58-B (ANDREWS AVE)	Submitted By:	CYNTHIA LEWIS
		Collected By:	

Lab ID / Client ID	Sample Location	Layer Name / Sample Description	Asbestos Detected	Asbestos Type	(%)	Non-Asbestos Constituents	
0159758-018 58-R-AB-03	ROOF	LAYER 1 Flashing, Black	No	None Detected		Gypsum Quartz Carbonates Binder/Filler	100%
		LAYER 2 Flashing, Black/ Silver Note: Difficult to separate adjacent layers	No	None Detected		Cellulose Fiber Aluminum Carbonates Binder/Filler	<1% 99%
0159758-019 58-R-AB-04	ROOF	LAYER 1 Sealant, Black	Yes	Chrysotile	5%	Carbonates Binder/Filler	95%
		LAYER 2 Flashing, Black/ Silver Note: Difficult to separate adjacent layers	Yes	Chrysotile	5%	Aluminum Carbonates Binder/Filler	95%
0159758-020 58-R-AB-05	ROOF	LAYER 1 Sealant, Black Note: *Not analyzed per client request					
		LAYER 2 Flashing, Black/ Silver Note: *Not analyzed per client request					
0159758-021 58-R-AB-06	ROOF	LAYER 1 Sealant, Black Note: *Not analyzed per client request					
		LAYER 2 Flashing, Black/ Silver Note: *Not analyzed per client request					

EMC LABS, INC.

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Phone: 800-362-3373 or 480-940-5294 - Fax: (480) 893-1726

Laboratory Report
0159758

Bulk Asbestos Analysis by Polarized Light Microscopy

NVLAP#101926-0

Client:	ENVIROSERVICES & TRAINING CENTER	Job# / P.O. #:	
Address:	505 WARD AVE, STE 202	Date Received:	08/27/2015
	HONOLULU HI 96814	Date Analyzed:	09/01/2015
Collected:	08/25/2015	Date Reported:	09/01/2015
Project Name:	DEPT OF HAWAIIAN HOME LANDS HILO	EPA Method:	EPA 600/R-93/116
Address:	PRJ #15-4042 LOT 58-B (ANDREWS AVE)	Submitted By:	CYNTHIA LEWIS
		Collected By:	

Lab ID / Client ID	Sample Location	Layer Name / Sample Description	Asbestos Detected	Asbestos Type (%)	Non-Asbestos Constituents

Analyst - Kenneth Scheske

Signatory - Lab Director - Kurt Kettler

CHAIN OF CUSTODY

EMC Labs, Inc.
9830 S. 51st St., Ste B-109
Phoenix, AZ 85044
(800) 362-3373 Fax (480) 893-1726

LAB#: ~~15279~~ 159758
TAT: 3day
Rec'd: AUG 27 PM

COMPANY NAME:	ENVIROSERVICES & TRAINING CENTER, LLC	BILL TO:	(If Different Location)
	505 Ward Ave. Suite #202		Trina Oshiro
	Honolulu, HI 96814		
CONTACT:	Cynthia Lewis		
Phone/Fax:	(808) 839-7222 Ext. 238		
Email:	clewis@gotoetc.com		

Now Accepting: VISA – MASTERCARD **Price Quoted:** $_____ / Sample $_____ / Layers

COMPLETE ITEMS 1-4: (Failure to complete any items may cause a delay in processing or analyzing your samples)

1. TURNAROUND TIME: [Same Day RUSH] [1-Day] [2-Day] [3-4-5 Day] [6-10 Day]

****Prior confirmation of turnaround time is required
****Additional charges for rush analysis (please call marketing department for pricing details)
****Laboratory analysis may be subject to delay if credit terms are not met

2. TYPE OF ANALYSIS: [Bulk-PLM] [Air-PCM] [Lead] [Point Count] [Fungi: AOC, W-C, Bulk, Swab, Tape]

3. DISPOSAL INSTRUCTIONS: [Dispose of samples at EMC] / [Return samples to me at my expense]
(If you do not indicate preference, EMC will dispose of samples 60 days from analysis.)

4. Project Name: Department of Hawaiian Home Lands Hilo

P.O. Number: _____ **Project Number:** 15-4042 Lot 58-B (Andrews Ave)

EMC SAMPLE #	CLIENT SAMPLE #	DATE & TIME SAMPLED	LOCATION/MATERIAL TYPE	Samples Accepted Yes / No	AIR SAMPLE INFO / COMMENTS ON	OFF	FLOW RATE
	58B-AB-01						
	PLEASE SEE ATTACHED						
21	58B-B-AB-06			6			

SPECIAL INSTRUCTIONS: PLEASE STOP AT FIRST POSITIVE

Sample Collector: (Print) Cynthia Lewis (Signature) _____

Relinquished by: CL Date/Time: 08/25/15 Received by: Diana Federico Date/Time: 8/27/15

Relinquished by: Diana Federico Date/Time: 8/27/15 Received by: _____ Date/Time: 8 27 15

Relinquished by: _____ Date/Time _____ Received by: _____ Date/Time: _____

** In the event of any dispute between the above parties for these services or otherwise, parties agree that jurisdiction and venue will be in Phoenix, Arizona and prevailing party will be entitled to attorney's fees and court costs.

159758

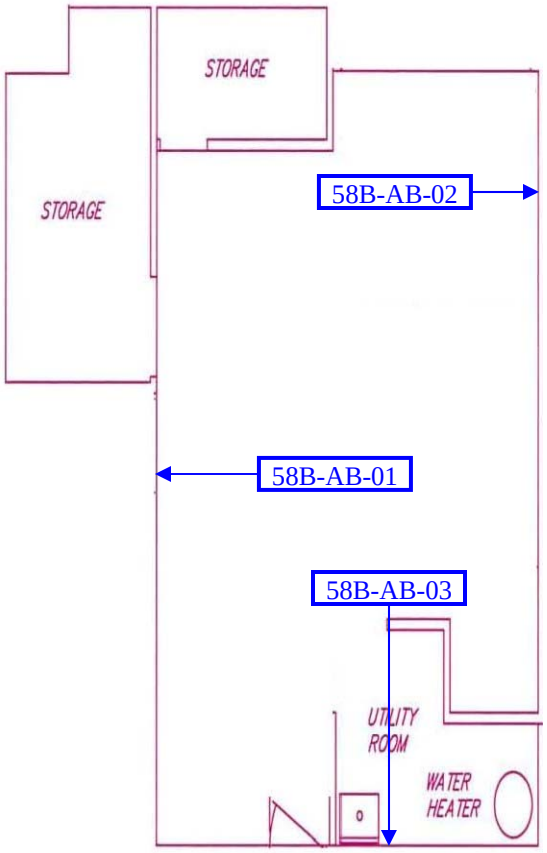
Table 1
Asbestos Survey
Department of Hawaiian Homelands Hilo
82 Andrews Avenue

	Sample ID	*Homogeneous Area*	*Material*
1	58B-AB-01	1st Floor Throughout	Drywall
2	58B-AB-02		
3	58B-AB-03		
4	58B-2AB-01	2nd Floor Kitchen and Bathroom	12" x 12" White Ceramic Tile with Grout
5	58B-2AB-02		
6	58B-2AB-03		
7	58B-2AB-04	2nd Floor Bathroom	Bathtub Caulking
8	58B-2AB-05		
9	58B-2AB-06		
10	58B-2AB-07	2nd Floor Kitchen Sink	White Insulation
11	58B-2AB-08		
12	58B-2AB-09		
13	58B-2AB-10	2nd Floor Walls and Ceiling	Drywall
14	58B-2AB-11		
15	58B-2AB-12		
16	58B-R-AB-01	Roof	Flashing with Silver Foil
17	58B-R-AB-02		
18	58B-R-AB-03		
19	58B-R-AB-04	Roof	Soffit Sealant with Silver Foil
20	58B-R-AB-05		
21	58B-R-AB-06		

Appendix **III**

SAMPLE LOCATION MAPS

ANDREWS AVENUE



enviro SERVICES & TRAINING CENTER, LLC

LIMITED ASBESTOS SURVEY
ASBESTOS SAMPLE LOCATIONS

Legend

58B-AB-XX	Positive (Asbestos Containing Material)
58B-AB-XX	Negative (None Detected)
58B-AB-XX	Not Analyzed
←	Wall Sample
●—	Non-Wall Sample

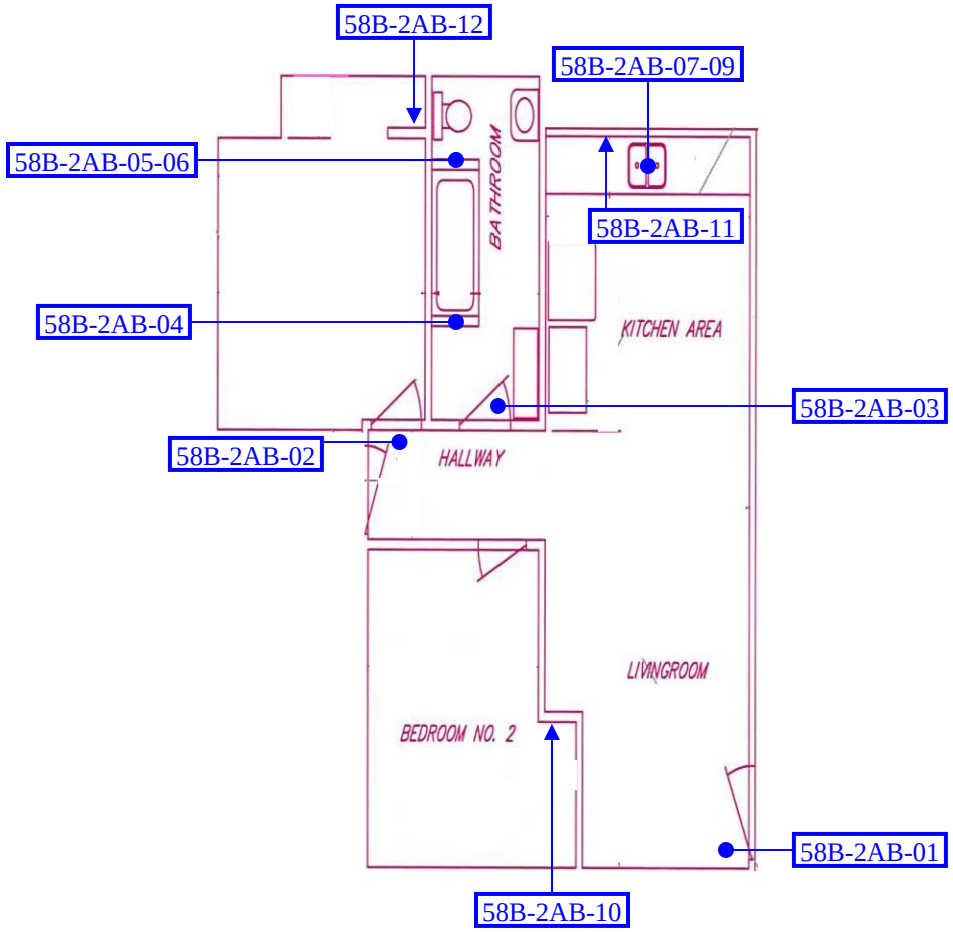
Department of Hawaiian Home Lands Hilo
Task Order No. 7, Lot 58B
82 Andrews Avenue
Hilo, Hawaii

1st Floor

ETC Project No. 15-4042

September 2015

ANDREWS AVENUE



LIMITED ASBESTOS SURVEY
ASBESTOS SAMPLE LOCATIONS

Legend

58B-2AB-XX	Positive (Asbestos Containing Material)
58B-2AB-XX	Negative (None Detected)
58B-2AB-XX	Not Analyzed
←	Wall Sample
●—	Non-Wall Sample

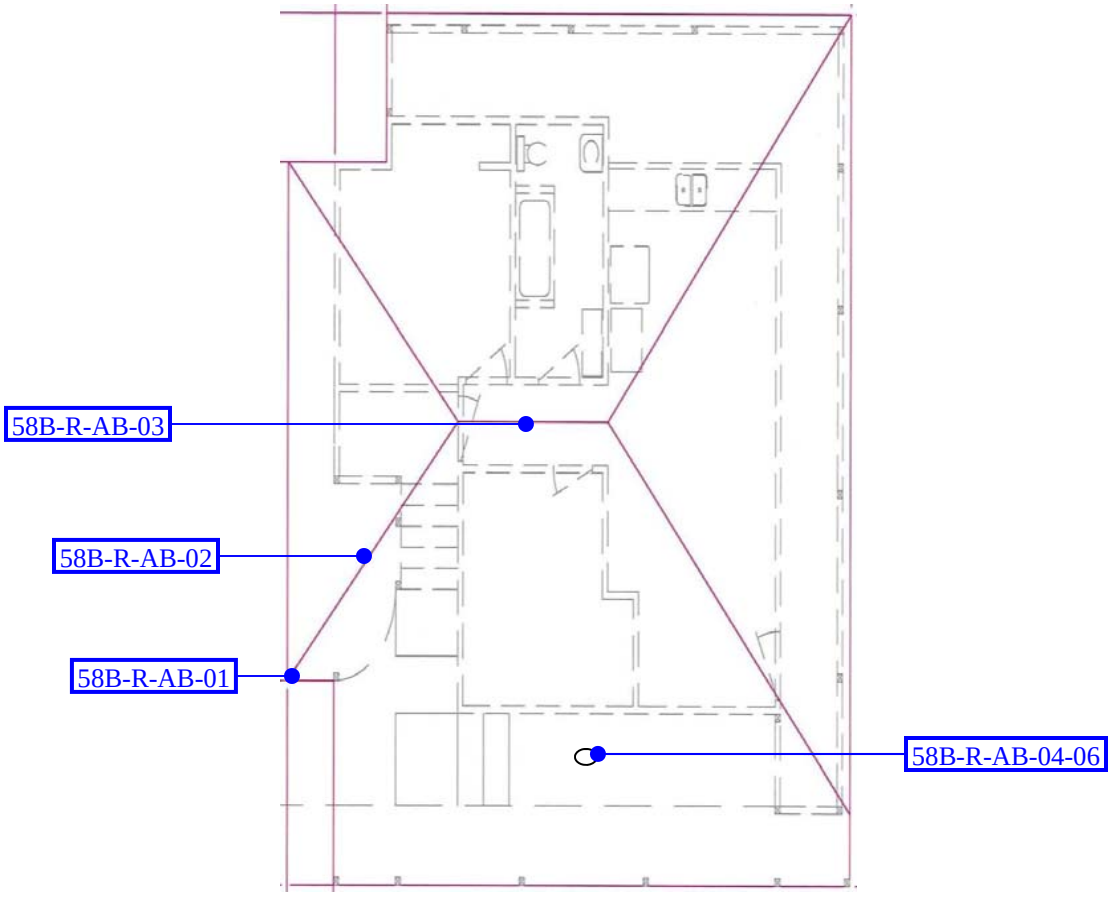
Department of Hawaiian Home Lands Hilo
Task Order No. 7, Lot 58B
82 Andrews Avenue
Hilo, Hawaii

2nd Floor

ETC Project No. 15-4042

September 2015

ANDREWS AVENUE



enviro SERVICES & TRAINING CENTER, LLC

LIMITED ASBESTOS SURVEY
ASBESTOS SAMPLE LOCATIONS

Legend

58B-R-AB-XX	Positive (Asbestos Containing Material)
58B-R-AB-XX	Negative (None Detected)
58B-R-AB-XX	Not Analyzed
←	Wall Sample
●—	Non-Wall Sample

Department of Hawaiian Home Lands Hilo
Task Order No. 7, Lot 58B
82 Andrews Avenue
Hilo, Hawaii

Roof

ETC Project No. 15-4042

September 2015

Appendix **IV**

PHOTO DOCUMENTATION

Photograph 1: Roof, Black Soffit Sealant with Silver Foil

ASBESTOS AND
LEAD-BASED PAINT SURVEY

LOT 131-A-3

372 DESHA AVE.

LIMITED ASBESTOS AND LEAD PAINT SURVEY REPORT

TASK ORDER NO. 6, LOT 131-A
372 DESHA AVENUE
DEPARTMENT OF HAWAIIAN HOME LANDS
TMK 3-2-1-021:010
KEAUKAHA, HILO, HAWAII

Prepared for:
WESLEY R. SEGAWA & ASSOCIATES
101 Silva Street, Suite 201
Keaukaha, Hilo, Hawaii 96720

Prepared by:
ENVIROSERVICES & TRAINING CENTER, LLC
505 Ward Avenue, Suite 202
Honolulu, Hawaii 96814
tel: (808) 839-7222

ETC Project No. 15-4042

September 2, 2015

TABLE OF CONTENTS

TABLES

APPENDICES

1.0 CERTIFICATIONS AND LIMITATIONS

EnviroServices & Training Center, LLC (ETC) has completed this Limited Asbestos and Lead Paint Survey Report for the residential home located at 372 Desha Avenue, Keaukaha, Hilo, Hawaii (Subject Site). ETC's findings and recommendations contained herein are based on research, site observations, government regulations and laboratory data, which were gathered at the time and location of the study. Opinions stated in this report do not apply to changes that may have occurred after the services were performed.

ETC has performed specified services for this project with the degree of care, skill and diligence ordinarily exercised by professional consultants performing the same or similar services. No other warranty, guarantee, or representation, expressed or implied, is included or intended; unless otherwise specifically agreed to in writing by both ETC and ETC's Client.

This report is intended for the sole use of Wesley R. Segawa & Associates exclusively for the Subject Site. Wesley R. Segawa & Associates may use and release this report, including making and retaining copies, provided such use is limited to the particular site and project for which this report is provided. However, the services performed may not be appropriate for satisfying the needs of other users. Release of this report to third-parties will be at the sole risk of ETC's Client and/or said user, and ETC shall not be liable for any claims or damages resulting from or connected with such release or any third party's use or reuse of this report.

Prepared By: 

Velverdee K. Roberts
State of Hawaii Asbestos Building Inspector Certification # HIASB-0315
State of Hawaii Lead Risk Assessor Certification # PB-0041

Date: September 2, 2015

2.0 EXECUTIVE SUMMARY

ETC has completed this Limited Asbestos and Lead Paint Survey Report for the residential home, located at 372 Desha Avenue Keaukaha, Hilo, Hawaii (Subject Site). The survey was conducted on August 24 & 25, 2015.

Summary of Asbestos Containing Materials Survey

Laboratory analysis determined that three (3) of the sampled materials contained asbestos above the regulatory limit of 1%. The asbestos containing materials are summarized below.

Homogenous Area	Material	Condition	Category	Friability	Estimated Quantity
Kitchen and Bathroom Floors	12"x12" White Speckled Vinyl Floor Tile with Adhesive	Damaged	Misc.	Non Friable I	330ft^2
Kitchen	Black Insulation	Good	Misc.	Non Friable I	4ft^2
Roof	Soffit Sealant w/Black Tar	Good	Misc.	Non Friable I	3ft2

Summary of Lead Paint Survey

The two (2) sampled surfaces did not contain detectable levels of lead and are not considered to be lead-containing. The results of this analysis are presented in Table 1, Appendix I.

3.0 INTRODUCTION/PURPOSE

The purpose of this Limited Asbestos and Lead Paint Survey was to investigate the residential home located at 372 Desha Avenue Keaukaha, Hilo, Hawaii (Subject Site) for asbestos and/or lead paint that will require special handling prior to demolition/renovation activities. Specifically, ETC completed the following tasks:

- Mobilized a State of Hawaii Department of Health (DOH)/Environmental Protection Agency (EPA) certified asbestos building inspector and lead risk assessor to the Subject Site;
- Performed site reconnaissance at the Subject Site;
- Collected eighteen (18) samples of suspected Asbestos Containing Material (ACM) from various locations throughout the Subject Site;
- Submitted the eighteen (18) samples of suspected ACM to EMC Labs, Inc. (EMC) in Phoenix, Arizona for analysis of asbestos via Polarized Light Microscopy (PLM) in accordance with the Asbestos Hazard Emergency Response Act (AHERA) protocol and the National Institute for Occupational Safety and Health (NIOSH) Method 600/R-93/116;
- Collected two (2) paint chip samples from the Subject Site;
- Submitted the paint chip samples to EMC for analysis via EPA Method 7000B for total lead content; and
- Prepared this report documenting the field activities and the results of the investigation including analytical results, conclusions, and recommendations.

4.0 METHODOLOGY

4.1 Asbestos

ETC personnel collected a total of eighteen (18) samples of suspected ACM for asbestos analysis. The suspected ACM samples were collected in accordance with EPA guidelines and recommendations.

The suspected ACM was wetted with amended water before sample collection. A small piece was then carefully cut out and placed into a labeled re-sealable plastic bag. The sampling equipment was cleaned between each sample collection to avoid cross-contamination between samples. The approximate quantity of each suspected ACM was noted. Sample locations were randomly selected in accordance with EPA protocols and recommendations.

Samples were properly logged and recorded following strict chain of custody procedure and submitted to EMC for analysis by PLM in accordance with EPA Method 600/R-93/116. EMC is accredited for bulk asbestos analysis through successful participation in the National Voluntary Lab Accreditation Program (NVLAP).

4.2 Lead Paint

ETC personnel collected two (2) paint chip samples from the Subject Site in accordance with EPA guidelines and recommendations.

The suspected leaded paint was wetted with amended water before sample collection. Paint was carefully scraped and placed into a labeled re-sealable plastic bag. The sampling equipment was cleaned between each sample collection to avoid cross-contamination between samples.

All samples were properly logged and recorded following strict chain of custody procedure and submitted to EMC for analysis in accordance with EPA Method 7000B.

5.0 RESULTS

5.1 Asbestos Inspection

Laboratory analysis determined that three (3) of the materials sampled contained levels of asbestos above the regulatory limit of 1%. The results of this analysis are contained in Table 1 found in Appendix I.

In accordance with federal and state regulations and industry standard practice ETC determined homogenous areas of each suspect material and collected multiple representative samples of the material from each homogenous area. Typically, all samples for a suspect material will have similar laboratory results. When the results differ, a single result above the regulatory limit is sufficient to determine that the material within the homogenous area is ACM and the entirety of the homogenous area should be treated as ACM. Thus, ETC may request that the laboratory stops analyzing when the first sample in the set is determined to have an asbestos content above 1%. Six (6) samples were not analyzed for this reason.

5.2 Lead Paint Inspection

The sampled surfaces did not contain lead in excess of the EPA/United States Department of Housing and Urban Development (HUD) guideline of 0.5% by weight defining Lead-Based Paint (LBP) or lead above the laboratory detection limit and are considered to be non lead containing paint. The lead paint survey results are recorded in Table 2, found in Appendix I.

6.0 RECOMMENDATIONS

Based on ETC's visual inspection of the facility, inventory of potentially hazardous materials, and laboratory data, ETC recommends the following:

- Manage and/or remove and dispose of hazardous and regulated materials in accordance with applicable local, state, and federal regulations, prior to renovation and/or demolition activities that may disturb these materials.
- All friable ACM must be removed and disposed of by a qualified asbestos abatement contractor. Friable ACM is defined as those materials that may be crumbled, pulverized, or otherwise damaged by hand pressure.
- Any non-friable ACM which could be crumbled and pulverized during renovation/ demolition activities must be removed and disposed of by a qualified asbestos abatement contractor.
- In addition, the services of a qualified consultant should be obtained to monitor and inspect the removal activities to ensure compliance with applicable Environmental Protection Agency (EPA), Occupational Safety and Health Administration (OSHA), and Hawaii Occupational Safety and Health (HIOSH) regulations pertaining to the handling of asbestos containing material.
- Have air monitoring conducted for airborne asbestos fibers by a State of Hawaii certified Project Monitor and airborne lead by qualified personnel during any asbestos abatement and general renovation/demolition activities of areas that were determined to contain this contaminant.

Appendix I

TABLES OF RESULTS

Table 1
Asbestos Survey Results
Department of Hawaiian Homelands Hilo
Task Order No. 6, Lot 131-A, 372 Desha Avenue

Sample ID	*Homogeneous Area*	*Material*	*Condition*	*Category*	*Friability*	*Analysis Layer*	*Asbestos Content*	*Estimated Quantity*
131-A-AB-01	Throughout Carport and Interior	Textured Drywall Ceiling	Damaged	N/A	N/A	All	None Detected	Not Applicable
131-A-AB-02							None Detected	
131-A-AB-03							None Detected	
131-A-AB-04	Carport Storage Room	Drywall Wall	Damaged	N/A	N/A	All	None Detected	Not Applicable
131-A-AB-05							None Detected	
131-A-AB-06							None Detected	
131-A-AB-07	**Kitchen and Bathroom Floors**	**12" x 12" White Speckled Vinyl Floor Tile w/Adhesive**	**Damaged**	**Misc.**	**Non-Friable I**	**VFT**	**Chrysotile 3%**	**330 ft^2**
						Yellow Adhesive	**None Detected**	
131-A-AB-08						**VFT**	**Not Analyzed**	
						Yellow Adhesive	**None Detected**	
131-A-AB-09						**VFT**	**Not Analyzed**	
						Yellow Adhesive	**None Detected**	
131-A-AB-10	**Kitchen Sink**	**Black Insulation**	**Good**	**Surfacing**	**Friable**	**All**	**Chrysotile 3%**	**2 ft2**
131-A-AB-11						**All**	**Not Analyzed**	
131-A-AB-12							**Not Analyzed**	
131-A-Roof-01	Roof	Soffit - Black Rubber w/Adhesive	Good	Misc.	Non-Friable I	All	None Detected	Not Applicable
131-A-Roof-02							None Detected	Not Applicable
131-A-Roof-03							None Detected	Not Applicable
131-A-Roof-04	**Roof**	**Soffit - Sealant w/Black Tar**	**Good**	**Misc.**	**Non-Friable I**	**Black Tar**	**Chrysotile 8%**	**4 ft2**
131-A-Roof-05						**All**	**Not Analyzed**	
131-A-Roof-06							**Not Analyzed**	

Table 2
Lead Paint Survey Results
Department of Hawaiian Homelands Hilo
Task Order No. 6, Lot 131-A, 372 Desha Avenue

Sample ID	*Location*	*Color*	*Description*	*Condition*	*Reporting Limit (% Pb by weight)*	*Lead Conc. (% Pb by weight)*
131-A-Pb-01	Throughout Carport and Interior	White	Textured Drywall Ceilings	Intact	0.010	BRL
131-A-Pb-02	Carport and Storage Room	Mustard	Drywall Walls	Intact	0.010	BRL

BRL=Below Reportable Limits

Appendix **II**

LABORATORY ANALYTICAL RESULTS AND CHAIN-OF-CUSTODY FORMS

EMC LABS, INC.

9830 S. 51st Street, Suite B109, Phoenix, AZ 85044
Phone: 800-362-3373 or 480-940-5294 - Fax: (480) 893-1726

Laboratory Report
0159762

Bulk Asbestos Analysis by Polarized Light Microscopy

NVLAP#101926-0

Client:	ENVIROSERVICES & TRAINING CENTER	Job# / P.O. #:	15-4042
Address:	505 WARD AVE, STE 202	Date Received:	08/27/2015
	HONOLULU HI 96814	Date Analyzed:	09/01/2015
Collected:	08/25/2015	Date Reported:	09/01/2015
Project Name:	372 DESHA AVE	EPA Method:	EPA 600/R-93/116
Address:	LTD ASB & LEAD PAINT SURVEY	Submitted By:	CYNTHIA LEWIS
		Collected By:	

Lab ID Client ID	Sample Location	Layer Name / Sample Description	Asbestos Detected	Asbestos Type (%)	Non-Asbestos Constituents	
0159762-001 131-AB-01	CARPORT/INTERIOR CEILING	Drywall, White/ Brown	No	None Detected	Cellulose Fiber Gypsum Quartz Carbonates	10% 90%
0159762-002 131-AB-02	CARPORT/INTERIOR CEILING	Drywall, White/ Brown	No	None Detected	Cellulose Fiber Gypsum Quartz Carbonates	10% 90%
0159762-003 131-AB-03	CARPORT/INTERIOR CEILING	Drywall, White/ Brown	No	None Detected	Cellulose Fiber Gypsum Quartz Carbonates	10% 90%
0159762-004 131-AB-04	CARPORT/STORAGE	LAYER 1 Drywall, White/ Brown	No	None Detected	Cellulose Fiber Gypsum Quartz Carbonates	10% 90%
		LAYER 2 Joint Compound, Off White	No	None Detected	Synthetic Fiber Carbonates Mica Quartz Binder/Filler	<1% 99%
0159762-005 131-AB-05	CARPORT/STORAGE	Drywall, White/ Brown	No	None Detected	Cellulose Fiber Gypsum Quartz Carbonates	10% 90%
0159762-006 131-AB-06	CARPORT/STORAGE	Drywall, White/ Brown	No	None Detected	Cellulose Fiber Gypsum Quartz Carbonates	10% 90%

EMC LABS, INC.

9830 S. 51st Street, Suite B109, Phoenix, AZ 85044
Phone: 800-362-3373 or 480-940-5294 - Fax: (480) 893-1726

Laboratory Report
0159762

Bulk Asbestos Analysis by Polarized Light Microscopy

NVLAP#101926-0

Client:	ENVIROSERVICES & TRAINING CENTER	Job# / P.O. #:	15-4042
Address:	505 WARD AVE, STE 202	Date Received:	08/27/2015
	HONOLULU HI 96814	Date Analyzed:	09/01/2015
Collected:	08/25/2015	Date Reported:	09/01/2015
Project Name:	372 DESHA AVE	EPA Method:	EPA 600/R-93/116
Address:	LTD ASB & LEAD PAINT SURVEY	Submitted By:	CYNTHIA LEWIS
		Collected By:	

Lab ID / Client ID	Sample Location	Layer Name / Sample Description	Asbestos Detected	Asbestos Type	(%)	Non-Asbestos Constituents	
0159762-007 131-AB-07		LAYER 1 12"x12" VFT, White/ Speckled	Yes	Chrysotile	3%		
						Carbonates Gypsum Quartz Binder/Filler	97%
		LAYER 2 Adhesive, Yellow	No	None Detected		Cellulose Fiber	<1%
						Carbonates Gypsum Quartz Binder/Filler	99%
0159762-008 131-AB-08		LAYER 1 12"x12" VFT, White/ Speckled Note: *Not analyzed per client request					
		LAYER 2 Adhesive, Yellow	No	None Detected		Cellulose Fiber	<1%
						Carbonates Gypsum Quartz Binder/Filler	99%
0159762-009 131-AB-09		LAYER 1 12"x12" VFT, White/ Speckled Note: *Not analyzed per client request					
		LAYER 2 Adhesive, Yellow	No	None Detected		Cellulose Fiber	<1%
						Carbonates Gypsum Quartz Binder/Filler	99%
0159762-010 131-AB-10	KITCHEN	Sink Insulation, Black	Yes	Chrysotile	3%		
						Carbonates Mica Quartz Binder/Filler	97%

EMC LABS, INC.

9830 S. 51st Street, Suite B109, Phoenix, AZ 85044
Phone: 800-362-3373 or 480-940-5294 - Fax: (480) 893-1726

Laboratory Report
0159762

Bulk Asbestos Analysis by Polarized Light Microscopy

NVLAP#101926-0

Client:	ENVIROSERVICES & TRAINING CENTER	Job# / P.O. #:	15-4042
Address:	505 WARD AVE, STE 202	Date Received:	08/27/2015
	HONOLULU HI 96814	Date Analyzed:	09/01/2015
Collected:	08/25/2015	Date Reported:	09/01/2015
Project Name:	372 DESHA AVE	EPA Method:	EPA 600/R-93/116
Address:	LTD ASB & LEAD PAINT SURVEY	Submitted By:	CYNTHIA LEWIS
		Collected By:	

Lab ID / Client ID	Sample Location	Layer Name / Sample Description	Asbestos Detected	Asbestos Type	(%)	Non-Asbestos Constituents	
0159762-011 131-AB-11	KITCHEN	Sink Insulation, Black Note: *Not analyzed per client request					
0159762-012 131-AB-12	KITCHEN	Sink Insulation, Black Note: *Not analyzed per client request					
0159762-013 131-A-ROOF-01	ROOF SOFFIT	LAYER 1 Rubber, Black	No	None Detected		Carbonates Quartz Binder/Filler	100%
		LAYER 2 Adhesive, Yellow	No	None Detected		Carbonates Gypsum Quartz Binder/Filler	100%
0159762-014 131-A-ROOF-02	ROOF SOFFIT	Rubber, Black	No	None Detected		Carbonates Quartz Binder/Filler	100%
0159762-015 131-A-ROOF-03	ROOF SOFFIT	LAYER 1 Rubber, Black	No	None Detected		Carbonates Quartz Binder/Filler	100%
		LAYER 2 Coating, Silver	No	None Detected		Carbonates Gypsum Binder/Filler	100%
0159762-016 131-A-ROOF-04	ROOF SOFFIT SEALANT	Tar, Black	Yes	Chrysotile	8%	Carbonates Gypsum Quartz Binder/Filler	92%

EMC LABS, INC.

9830 S. 51st Street, Suite B109, Phoenix, AZ 85044
Phone: 800-362-3373 or 480-940-5294 - Fax: (480) 893-1726

Laboratory Report
0159762

Bulk Asbestos Analysis by Polarized Light Microscopy

NVLAP#101926-0

Client:	ENVIROSERVICES & TRAINING CENTER	Job# / P.O. #:	15-4042
Address:	505 WARD AVE, STE 202	Date Received:	08/27/2015
	HONOLULU HI 96814	Date Analyzed:	09/01/2015
Collected:	08/25/2015	Date Reported:	09/01/2015
Project Name:	372 DESHA AVE	EPA Method:	EPA 600/R-93/116
Address:	LTD ASB & LEAD PAINT SURVEY	Submitted By:	CYNTHIA LEWIS
		Collected By:	

Lab ID / Client ID	Sample Location	Layer Name / Sample Description	Asbestos Detected	Asbestos Type (%)	Non-Asbestos Constituents
0159762-017 131-A-ROOF-05	ROOF SOFFIT SEALANT	Note: *Not analyzed per client request			
0159762-018 131-A-ROOF-06	ROOF SOFFIT SEALANT	Note: *Not analyzed per client request			

Analyst - Kurt Kettler

Signatory - Lab Manager - Ken Scheske

CHAIN OF CUSTODY

EMC Labs, Inc.
9830 S. 51st St., Ste B-109
Phoenix, AZ 85044
(800) 362-3373 Fax (480) 893-1726

LAB#: 159762
TAT: 3 day
Rec'd: AUG 27 P.M.

COMPANY NAME: ENVIROSERVICES & TRAINING CENTER, LLC
505 Ward Ave. Suite #202
Honolulu, HI 96814
CONTACT: Vel Roberts
Phone/Fax: (808) 839-7222 ext 232/(808) 839-4455
Email: vel@gotoetc.com

BILL TO: (If Different Location)
Trina Oshiro

Now Accepting: VISA – MASTERCARD Price Quoted: $_____ / Sample $_____ / Layers

COMPLETE ITEMS 1-4: (Failure to complete any items may cause a delay in processing or analyzing your samples)

1. **TURNAROUND TIME:** [Same Day RUSH] [1-Day] [2-Day] (3) 4-5 Day] [6-10 Day]

****Prior confirmation of turnaround time is required
****Additional charges for rush analysis (please call marketing department for pricing details)
****Laboratory analysis may be subject to ~~delay if credit terms are not met~~

2. **TYPE OF ANALYSIS:** [Bulk-PLM] [Air-PCM] [Lead] [Point Count] [Fungi: AOC, W-C, Bulk, Swab, Tape]
3. **DISPOSAL INSTRUCTIONS:** [Dispose of samples at EMC] / [Return samples to me at my expense]
(If you do not indicate preference, EMC will dispose of samples 60 days from analysis.)

4. **Project Name:** Limited Asbestos and ~~Pb~~ Lead Paint Survey - 372 Desha Avenue
P.O. Number: _____ **Project Number:** 15-4042

EMC SAMPLE #	CLIENT SAMPLE #	DATE & TIME SAMPLED	LOCATION/MATERIAL TYPE	Samples Accepted Yes / No	AIR SAMPLE INFO / COMMENTS ON	OFF	FLOW RATE
	~~372-R-~~	~~8-24-15~~ M	(ceiling)	Y N			
1	131-A-AB-01	8-25-15	Carport/Interior - textured drywall	(Y) N			
2	↓ -02	↓	↓	Y N			
3	↓ -03	↓	↓	Y N			
4	131-A-AB-04	8-25-15	Carpoet/Storage - Drywall wall	Y N			
5	↓ -05	↓	↓	Y N			
6	↓ -06	↓	↓	Y N			
7	131-A-AB-07	8-25-15	12x12 white speckle VFT	Y N			
8	↓ -08	↓	w/Adhesive	Y N			
9	↓ -09	↓	↓	Y N			
10	131-A-AB-10	8-25-15	Kitchen - Black Sink Insulation	Y N			
11	↓ -11	↓	↓	Y N			
12	↓ -12	↓	↓	(N) N			
				Y N			
				Y N			

SPECIAL INSTRUCTIONS: Please Stop at First Positive
Sample Collector: (Print) Vel Roberts (Signature) Vel Roberts
Relinquished by: 8-25-15 Date/Time: Received by: Diana Federico Date/Time: 8/24/15
Relinquished by: Diana Federico Date/Time: 8/24/15 Received by: _____ Date/Time: 8/24/15
Relinquished by: _____ Date/Time _____ Received by: _____ Date/Time: _____

** In the event of any dispute between the above parties for these services or otherwise, parties agree that jurisdiction and venue will be in Phoenix, Arizona and prevailing party will be entitled to attorney's fees and court costs.

171238196

Rev. 09/27/08

CHAIN OF CUSTODY

EMC Labs, Inc.
9830 S. 51st St., Ste B-109
Phoenix, AZ 85044
(800) 362-3373 Fax (480) 893-1726

LAB#:
TAT: 159762
Rec'd:

COMPANY NAME: ENVIROSERVICES & TRAINING CENTER, LLC
505 Ward Ave. Suite #202
Honolulu, HI 96814
CONTACT: Vel Roberts
Phone/Fax: (808) 839-7222 ext 232/(808) 839-4455
Email: vel@gotoetc.com

BILL TO: (If Different Location)
Trina Oshiro

Now Accepting: VISA – MASTERCARD

Price Quoted: $_____ / Sample $_____ / Layers

COMPLETE ITEMS 1-4: (Failure to complete any items may cause a delay in processing or analyzing your samples)

1. **TURNAROUND TIME:** [Same Day RUSH] [1-Day] [2-Day] [3-4-5 Day] [6-10 Day]

****Prior confirmation of turnaround time is required
****Additional charges for rush analysis (please call marketing department for pricing details)
****Laboratory analysis may be subject to ~~delay if credit~~ terms are not met

2. **TYPE OF ANALYSIS:** [Bulk-PLM] [Air-PCM] [Lead] [Point Count] [Fungi: AOC, W-C, Bulk, Swab, Tape]

3. **DISPOSAL INSTRUCTIONS:** [Dispose of samples at EMC] / [Return samples to me at my expense]
(If you do not indicate preference, EMC will dispose of samples 60 days from analysis.)

4. Project Name: Limited Asbestos and Lead Paint Survey - 372 Desha Avenue
P.O. Number: _____ Project Number: 15-4042

EMC SAMPLE #	CLIENT SAMPLE #	DATE & TIME SAMPLED	LOCATION/MATERIAL TYPE	Samples Accepted Yes / No	AIR SAMPLE INFO / COMMENTS ON	OFF	FLOW RATE
13	131-A-Roof-01	8-24-15	Roof Soffit - Black Rubber w/adhesive	Y N			
14	-02	↓	↓	Y N			
15	-03	↓	↓	Y N			
16	131-A-Roof-04	8-24-15	Roof Soffit Sealant - Black tar	Y N			
17	-05	↓	↓	Y N			
18	-06	↓	↓	Y N			
				Y N			
				Y N			
				Y N			
				Y N			
				Y N			
				Y N			
				Y N			
				Y N			
				Y N			

SPECIAL INSTRUCTIONS: Please stop at Roof Positive

Sample Collector: (Print) Vel Roberts (Signature) [signature]

Relinquished by: [signature] Date/Time: 8-25-15 Received by: Diana Federico Date/Time: 8/25/15

Relinquished by: Diana Federico Date/Time: 8/25/15 Received by: _____ Date/Time: _____

Relinquished by: _____ Date/Time _____ Received by: _____ Date/Time: _____

** In the event of any dispute between the above parties for these services or otherwise, parties agree that jurisdiction and venue will be in Phoenix, Arizona and prevailing party will be entitled to attorney's fees and court costs.

Rev. 09/27/08

EMC LABS, INC.

9830 South 51st Street, Suite B-109 / PHOENIX, ARIZONA 85044 / 480-940-5294 or 800-362-3373 / FAX 480-893-1726
emclab@emclabs.com

LEAD (Pb) IN PAINT CHIP SAMPLES

EMC SOP METHOD #L01/1 EPA SW-846 METHOD 7420

EMC LAB #:	L56851	**DATE RECEIVED:**	08/27/15
CLIENT:	Enviroservices & Training Center, LLC	**REPORT DATE:**	09/01/15
		DATE OF ANALYSIS:	09/01/15
CLIENT ADDRESS:	505 Ward Ave. Suite #202 Honolulu, HI 96814	**P.O. NO.:**	
PROJECT NAME:	Limited Asbestos and Lead Paint Survey – 372 Desha Ave.	**PROJECT NO.:**	15-4042

EMC # L56851-	SAMPLE DATE /15	CLIENT SAMPLE #	DESCRIPTION	REPORTING LIMIT (%Pb by weight)	%Pb BY WEIGHT
1	08/25	131-A-Pb-01	Carport / Interior / White Paint / Ceilings	0.010	BRL
2	08/25	131-A-Pb-02	Carport / Storage / Mustard Paint on Drywall Wall	0.010	BRL

^ = Dilution Factor Changed ***** = Excessive Substrate May Bias Sample Results **BRL** = Below Reportable Limits **#** = Very Small Amount Of Sample Submitted, May Affect Result

This report applies to the standards or procedures identified and to the samples tested only. The test results are not necessarily indicative or representative of the qualities of the lot from which the sample was taken or of apparently identical or similar products, nor do they represent an ongoing quality assurance program unless so noted. Unless otherwise noted, all quality control analyses for the samples noted above were within acceptable limits.

Where it is noted that a sample with excessive substrate was submitted for laboratory analysis, such analysis may be biased. The lead content of such sample may, in actuality, be greater than reported. EMC makes no warranty, express or implied, as to the accuracy of the analysis of samples noted to have been submitted with excessive substrate. Resampling is recommended in such situations to verify original laboratory results.

ANALYST: Jason Thompson

QA COORDINATOR: Kurt Kettler

Rev. 11/30/08

CHAIN OF CUSTODY

EMC Labs, Inc.
9830 S. 51st St., Ste B-109
Phoenix, AZ 85044
(800) 362-3373 Fax (480) 893-1726

LAB#: 256851
TAT: 3day
Rec'd: 8/27/15

COMPANY NAME: ENVIROSERVICES & TRAINING CENTER, LLC
505 Ward Ave. Suite #202
Honolulu, HI 96814
CONTACT: Vel Roberts
Phone/Fax: (808) 839-7222 ext 232/(808) 839-4455
Email: Vel@gotoetc.com

BILL TO: Trina Oshiro (If Different Location)

Now Accepting: VISA – MASTERCARD Price Quoted: $_____ / Sample $_____ / Layers

COMPLETE ITEMS 1-4: (Failure to complete any items may cause a delay in processing or analyzing your samples)

1. **TURNAROUND TIME:** [Same Day RUSH] [1-Day] [2-Day] [3-4-5 Day] [6-10 Day]

****Prior confirmation of turnaround time is required
****Additional charges for rush analysis (please call marketing department for pricing details)
****Laboratory analysis may be subject to delay if credit terms are not met

2. **TYPE OF ANALYSIS:** [Bulk-PLM] [Air-PCM] [Lead] [Point Count] [Fungi: AOC, W-C, Bulk, Swab, Tape]
3. **DISPOSAL INSTRUCTIONS:** [Dispose of samples at EMC] / [Return samples to me at my expense]
(If you do not indicate preference, EMC will dispose of samples 60 days from analysis.)

4. **Project Name:** Limited Asbestos and Lead Paint Survey - 372 Desha Ave.
P.O. Number: _____ **Project Number:** 15-4042

EMC SAMPLE #	CLIENT SAMPLE #	DATE & TIME SAMPLED	LOCATION/MATERIAL TYPE	Samples Accepted Yes / No	AIR SAMPLE INFO / COMMENTS ON	OFF	FLOW RATE
	~~131-A-Pb-01~~	~~8-25-15~~	~~Textured drywall ceiling - Carport/Interior Ceilings~~	~~Y N~~			
	~~131-A-Pb-02~~	↓	↓	Y N			
			↓	Y N			
1	131-A-Pb-01	8-25-15	Carport/Interior Ceilings - White Paint on textured drywall ceiling	Y N			
				Y N			
				Y N			
2	131-A-Pb-02	8-25-15	Carport/Storage - Mustard Paint on drywall wall	Y N			
				Y N			
				Y N			
				Y N			
				Y N			
				Y N			
				Y N			
				Y N			
				Y N			

SPECIAL INSTRUCTIONS: _____

Sample Collector: (Print) Vel Roberts (Signature) Vel Roberts

Relinquished by: VR Date/Time: 8-25-15 Received by: _____ Date/Time: _____

Relinquished by: _____ Date/Time: _____ Received by: Dorne Date/Time: 8/27/15

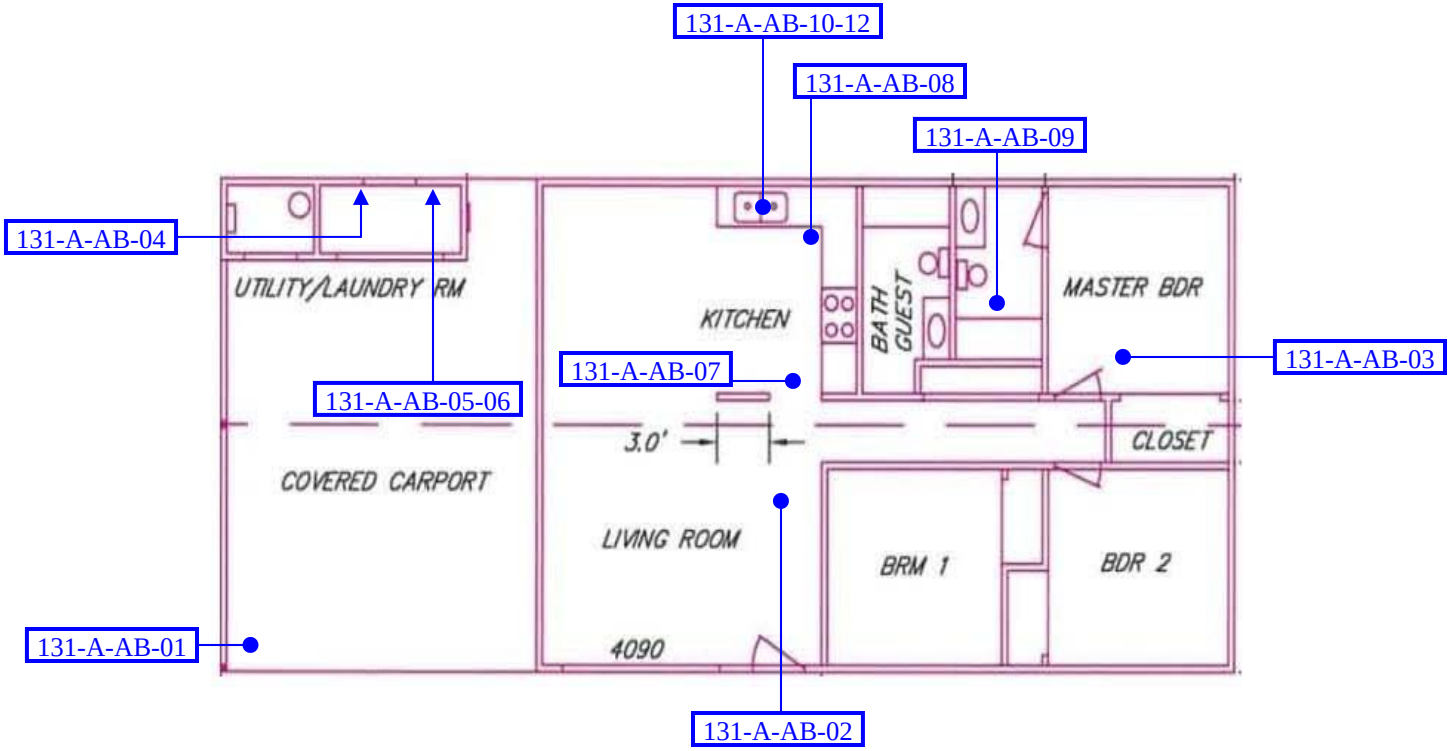
Relinquished by: Dorne Date/Time 8/27/15 Received by: _____ Date/Time: 8/27/15

** In the event of any dispute between the above parties for these services or otherwise, parties agree that jurisdiction and venue will be in Phoenix, Arizona and prevailing party will be entitled to attorney's fees and court costs.

Rev. 09/27/08

Appendix **III**

SAMPLE LOCATION MAPS



DESHA AVENUE

enviro SERVICES & TRAINING CENTER, LLC

LIMITED ASBESTOS AND LEAD PAINT SURVEY
ASBESTOS SAMPLE LOCATIONS

Legend

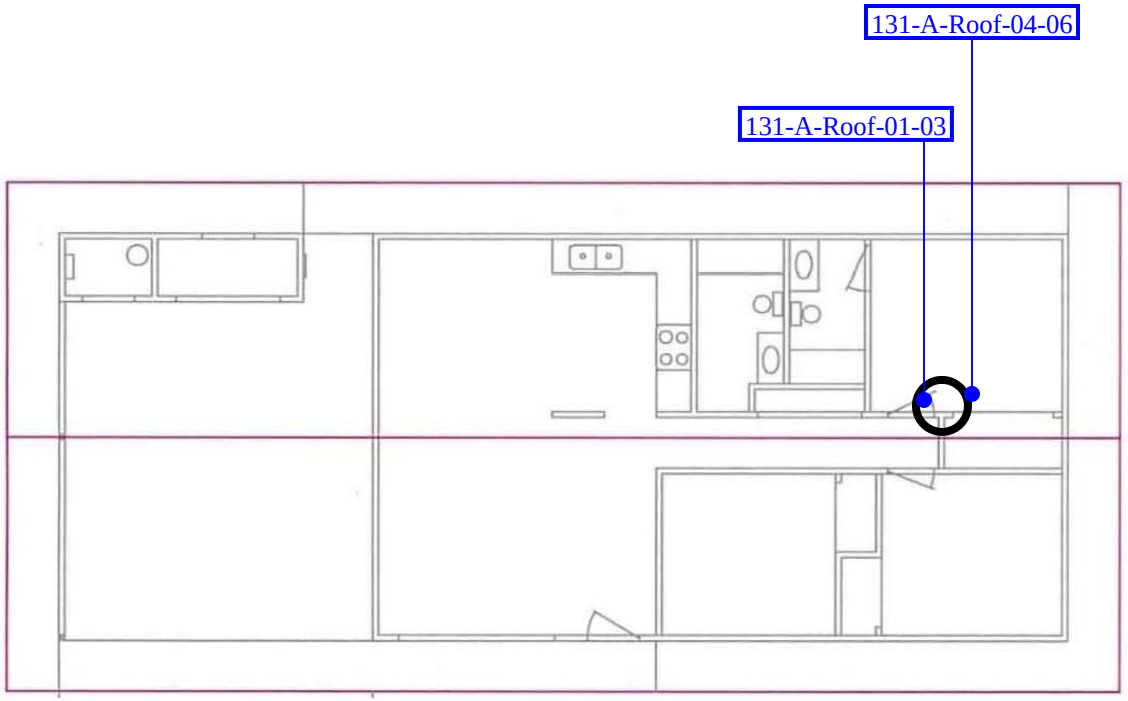
131-A-AB-XX	Positive (Asbestos Containing Material)
131-A-AB-XX	Negative (None Detected)
131-A-AB-XX	Not Analyzed
←	Wall Sample
●	Non-Wall Sample

Department of Hawaiian Home Lands Hilo
Task Order No. 6, Lot 131-A
372 Desha Avenue
Hilo, Hawaii

Floor Plan

ETC Project No. 15-4042

September 2015



DESHA AVENUE

enviro SERVICES & TRAINING CENTER, LLC

LIMITED ASBESTOS AND LEAD PAINT SURVEY
ASBESTOS SAMPLE LOCATIONS

Legend

131-A-Roof-XX	Positive (Asbestos Containing Material)
131-A-Roof-XX	Negative (None Detected)
131-A-Roof-XX	Not Analyzed
←	Wall Sample
●—	Non-Wall Sample

Department of Hawaiian Home Lands Hilo
Task Order No. 6, Lot 131-A
372 Desha Avenue
Hilo, Hawaii

Roof

ETC Project No. 15-4042

September 2015

Appendix **IV**

PHOTO DOCUMENTATION

Photograph 1: Floors, 12”x12” White Speckled Vinyl Floor Tile w/Adhesive

Photograph 2: Kitchen Sink: Black Sink Insulation

Photograph 3: Roof, Soffit - Sealant with Black Tar

DIVISION 2 – SITE WORK

SECTION 02050 – DEMOLITION AND REMOVAL

PART 1 – GENERAL

1.01 GENERAL REQUIREMENTS

As specified in section 01010.

1.02 SUMMARY

Provide all equipment, materials, tools, labor, etc., as required to perform all demolition, removal work, and clearing and grubbing of the construction area, complete, as indicated on the drawings and as specified herein, including careful removal and disposal of material.

1.03 SPECIAL REQUIREMENTS

A. Visit the site, examine the areas and note all existing conditions and extent of work involved for the complete removal and surface preparation work required.

B. Accept obvious conditions of existing premises on date of bid opening as part of the work, even though they may not be indicated on the drawings or may vary there from.

C. Exercise every precaution to preserve and protect from damage all existing structures, plants, trees, walls and utilities above and below ground, etc., that are to remain. Damages shall be repaired to the satisfaction of the University.

D. The existence of underground utility lines other than those shown is not definitely known. Should any be encountered, immediately notify the University and follow directions as to procedures at no additional cost to the Engineer. The locations of underground utilities are shown on the plans for reference purposes and the locations are approximate only.

1.04 PERMITS AND NOTICES

A. Procure and pay for all necessary permits or certificates required in connection with this work.

B. Comply with pollution control regulations and safety code.

PART 2 – PRODUCTS (Not Used)

PART 3 – EXECUTION

3.01 GENERAL

A. All work shall be executed in an orderly and careful manner with due consideration of the existing buildings and septic tanks.

B. Existing utility lines, etc., on/in the buildings shall be protected from damage. Removal of same where required to facilitate renovation work shall be permitted, however, same shall be reinstalled to original location and condition.

C. Backfill all voids, trenches, holes, depressions and pits created by the removal of such miscellaneous improvements as required in other specification sections referenced herein.

D. Any damage caused by the use of motorized equipment, shall be the Contractor's responsibility regardless of permission granted by the DHHL for use of such equipment. All damages shall be repaired or replaced to the satisfaction of the Engineer and at no cost to the Engineer.

3.02 REMOVAL WORK

A. Remove existing buildings, concrete slabs, and asphaltic concrete pavements, as indicated on the drawings. The resulting base shall be scarified in accordance with Section 02200 – EARTHWORK. Repair existing adjacent, asphaltic concrete pavements, concrete, CMU, or other features that may be damaged during removal.

B. Sawcut existing asphaltic concrete to create clean transitions between existing and new surfaces.

C. Items may be removed to implement removal of items noted in this section or elsewhere in these specifications and/or as indicated on the drawings. Such items to be removed and reinstalled shall be carefully removed to avoid damage and securely reinstalled.

D. All removed materials having no salvage value as determined by the Engineer shall become the property of the Contractor and shall be completely removed and hauled away from the premises.

3.03 RESURFACE PREPARATION WORK

A. The entire area shall be inspected by the Engineer before any new work can be started. Should the Contractor start the new work without the Engineer's approval, the Engineer may have the Contractor remove and repair the area at no cost to the Engineer.

B. Repair any damages occurring during the progress of the work.

3.04 PATCHWORK

A. All areas or surfaces damaged as a result of removal work shall be patched to match existing adjacent surfaces and/or areas to the satisfaction of the Engineer.

3.05 TEMPORARY BARRICADES

A. Provide, erect and maintain safety barricades and dust barriers around the project areas during the execution of work under this contract including work done by other sections. At the discretion and approval of the Engineer, alternative means to provide safely around the project area are acceptable.

B. Barricades shall be constructed from durable materials to provide necessary protection and security of the project site.

C. The barricades shall remain until final acceptance of the project or until the hazardous condition no longer remains and approval is given by the Engineer for their removal.

3.06 MAINTENANCE OF TRAFFIC

Conduct operations and schedule work for minimum interference to streets, driveways, sidewalks, etc. To the extent possible, confine all work, equipment, materials, and personnel to the work area as indicated so as not to interfere with the normal operations of the school.

3.07 CLEAN-UP

A. From time to time, as directed by the Engineer and at the completion of the removal work, remove from the site all rubbish, debris, fines, etc., accumulated from this work and leave the area neat and clean to the satisfaction of the Engineer.

B. After the completion of the repair work and before the final acceptance of the project, the Contractor shall clean all areas of all rubbish, debris, fines, etc.

PART 4 – MEASUREMENT AND PAYMENT (Not Applicable)

END OF SECTION

SECTION 02225 – TRENCHING

PART 1 – GENERAL

1.01 GENERAL REQUIREMENTS

This section describes the following:

A. Excavating and backfilling to depths and lines established for drainage structure foundations.

B. Excavating and backfilling trenches for drainage structures.

C. Disposing of surplus material from excavations.

1.02 SUMMARY

Provide all equipment, materials, tools, labor, etc., as required to perform all demolition, removal work, and clearing and grubbing of the construction area, complete, as indicated on the drawing and as specified herein, including careful removal and disposal of material.

PART 2 – PRODUCTS

2.01 MATERIALS

A. Structural Backfill Material – refer to 2005 State Highways Standard Specification, Section 703.20.

B. Trench Backfill Material – refer to 2005 State Highways Standard Specification, Section 703.21.

C. Cullet and Cullet-Made Material – refer to 2005 State Highways Standard Specification, Section 717.

Structural and trench backfill material shall include mixture of aggregate and cullet. When cullet is not produced on the project island, or material unit price of cullet is greater than material unit price of structure backfill or greater than material unit price of trench backfill, cullet may be excluded for the backfill application. Before excluding cullet, submit availability and pricing documentation.

PART 3 – EXECUTION

3.01 GENERAL

A. Structural and Trench Excavation – provide the following:

1. Notify the Engineer 10 working days before excavating for drainage structures.

2. The Contractor shall be responsible for the stability of temporary open cuts during construction of structures or trenches and shall take appropriate measures to meet OSHA requirements.

3. Keep foundation excavation dry by draining, bailing, pumping, driving sheathings, or other methods accepted by the Engineer.

4. In excavation operations, do not disturb ground below bottom of bed course material. If ground below bottom of bed course material is disturbed, excavate disturbed ground until undisturbed ground is reached. Backfill this area with Class D concrete to require bottom elevation of bed course material.

5. Remove solid rock encountered during excavation from drainage structure invert elevation to bottom grade of bed course material. Remove saturated or organic material, material containing debris or trash, and other unsuitable material, to width equal to drainage structure width and to depth ordered by the Engineer. Backfill rock-removal and unsuitable material excavation with bed course material in maximum 6-inch lifts, and compact to relative compaction of not less than 95 percent.

6. When material from excavation does not meet quality requirements specified for backfill, furnish conforming material, as required.

7. Deposit remaining structure and trench excavation material that is not used as backfill, in designated fill areas or as directed by the Engineer.

B. Structure and Trench Backfill – provide the following:

1. For cast-in-place drainage structures, do not deposit fill material against back of outside walls until test samples indicate that concrete has reached the developed strength.

2. Cure test samples under conditions similar to those affecting the structure. Continue backfilling so that excessive unbalanced loads are not introduced against the structure.

3. Place backfill material in uniform horizontal layers not exceeding 8 inches in loose thickness before compaction. Moisten and compact each layer of backfill until relative compaction of not less than 95 percent is achieved. The Engineer may reduce 95 percent

compaction requirement in situations where such compaction is not feasible.

4. The Engineer cannot use field density test, compact each layer of backfill with vibratory, or other equipment acceptable to Engineer, on granular backfill material.

5. Compaction of backfill material by ponding or jetting will not be allowed.

PART 4 – MEASUREMENT AND PAYMENT

4.01 BASIS OF MEASUREMENT AND PAYMENT

Work under section will not be measured nor paid for separately, but shall be considered incidental to and included in the prices bid for the various items of work in this project.

END OF SECTION

SECTION 02900 – LANDSCAPE PLANTING

PART 1 – GENERAL

1.01 GENERAL REQUIREMENTS

This section describes planting of groundcover and grass.

PART 2 – PRODUCTS

2.01 MATERIALS

A. Hydro-Mulch – Mulch shall be specially processed fiber conforming to 2005 State Highways Standard Specifications Section 641.02(C) – Mulch. Seed, sprigs, or stolons shall be added as indicated in the contract documents.

B. Herbicides – Chemical herbicides shall contain either or both glyphosate and cacodylic acid. Use only State Department of Agriculture approved herbicides.

C. Fertilizer

1. Commercial Fertilizer – Fertilizer shall be in new, clean sealed, and properly labeled bags or containers. Fertilizer shall be protected from weather after delivery to the Project.

2. Manure – Manure shall be from chickens, horses, or cattle. Manure shall be aged three months to two years before use.

3. Application Records – Records shall be kept by Contractor of dates of application, type of fertilizer or manure used, quantities, and areas that were covered and shall be submitted to Engineer within 24 hours of application.

C. Mulch and Soil Amendments

1. Wood Chips – Mulching wood chips shall be nitrogen stabilized and free of leaves, twigs, shavings, and bark. Maximum size shall be 3 inches by 1 ½ inches by ½ inch.

2. Aggregates – Aggregates for mulch shall be gravel, crushed stone, lava rock, or coral that passes 3-inch sieve.

3. Burnt Bagasse – Burnt bagasse shall be product of sugar cane waste that is free of weed seed, fungus, chemicals, and materials deleterious to plant growth.

4. Recycled Mulch Material – Recycled material, such as processed newspaper, is allowable for use as mulch if acceptable to Engineer.

PART 3 – EXECUTION

3.01 GENERAL

A. Perform work in accordance with applicable laws, codes, and regulations. Provide inspections and permits required by Federal, State, and local governmental authorities.

B. Preparing Areas for Landscaping

1. Before starting soil preparation work or excavation, remove trash, debris, and weeds from work area. Planting areas shall be free of stones greater than a ½ inch in diameter.

2. Within limit of clearing, grub natural ground to depth necessary to remove stumps, roots, and other objectionable material.

3. Before applying chemical herbicide, obtain Engineer's acceptance of proposed weed control program.

4. Apply herbicide before weeds become taller than 2 inches.

C. Verifying Subgrade Preparation – Excavate and remove material from work area that will be overlaid with aggregate. Obtain Engineer's verification and acceptance of subgrade before proceeding.

D. Planting Soil – Place planting soil as specified by 2005 State Highways Standard Specifications Section 617.

E. Adding Fertilizer and Amendments

1. Uniformly distribute fertilizer and amendments over planting areas. Rototill top four inches of soil to evenly incorporate fertilizer and amendments.

2. Do not add soil amendment when slope is steeper than 3H:1V.

3. Level undulations or irregularities caused by tilling or other work from surface of soil before proceeding to plant.

F. Planting Period – Planting period extends 90 days from date Engineer accepts site to start planting period. When area has mixture of grass, planting period shall not start until all grass areas are planted. Replace grass that fail to develop healthy growth or die during the planting period. Provide replacements within two weeks of receiving notification from Engineer that plants are unacceptable. Apply fertilizer at time of planting and 40 to 50 days after planting. Ground cover application is two pounds per 1,000 square feet. Notify Engineer 24 hours in advance of fertilization.

If satisfactory growth is attained before 90 days, Contractor may submit written request for earlier end of planting period.

G. Hydro-mulching – Perform hydro-mulch planting as specified in 2005 State Highways Standard Specifications Section 641 – Hydro-mulch Seeding.

H. Watering – After initial watering, continue to water in quantity and frequency necessary to sustain plant growth.

I. Plant Establishment Period – Plant establishment period shall extend 90 days from accepted completion date of planting period, unless extended by Engineer because of Contractor's failure to perform required work. During plant establishment period, water, fertilize, cultivate, weed, cut, and apply pesticide when required. Replace grass that fail to develop healthy growth, become injured, or die. Provide replacements within two weeks of receiving notification from Engineer that grass are unacceptable. Keep planted area at least 90 percent free of weeds and grass considered undesirable by Engineer. Remove weeds by pulling roots.

J. Acceptance – Acceptance, if granted, will be at end of establishment period. For hydro-mulched areas, Engineer will base acceptance on 98 percent minimum coverage with healthy, well-established ground cover of grass. Grass shall be at least 3 inches tall. There shall be not more than 2 square feet of bare earth for every 100 square feet of planted area. Plants shall be in healthy growing condition.

PART 4 – MEASUREMENT AND PAYMENT

4.01 BASIS OF MEASUREMENT AND PAYMENT

Hydro-Mulch seeding and planting and 90 day maintenance will be paid on a lump sum basis. Measurement for payment will not apply.

The Engineer will pay for the pay item in the proposed schedule:

Item No.	Item	Pay Unit
02900.1	Temporary Erosion Control, including Hydro-Mulch Seeding (90 Sq. Yds.) and 90 Day Maintenance	Lump Sum

END OF SECTION

DIVISION 3 – CONCRETE

SECTION 03050 – BASIC MATERIALS & METHODS

PART 1 – GENERAL

1.01 GENERAL REQUIREMENTS

This section describes structural concrete consisting of Portland cement, fine aggregate, coarse aggregate, and water. This will include adding admixtures for purpose of entraining air, retarding or accelerating set, and other purposes as required or permitted.

PART 2 – PRODUCTS

2.01 MATERIALS

A. Portland Cement – as specified in 2005 State Highways Standard Specification Section 701.01.

B. Fine Aggregate for Concrete – as specified in 2005 State Highways Standard Specification Section 703.01

c. Course Aggregate for Portland Cement Concrete – as specified in 2005 State Highways Standard Specification Section 703.02

D. Admixtures – as specified in 2005 State Highways Standard Specification Section 711.03

E. Water – as specified in 2005 State Highways Standard Specification Section 712.01.

PART 3 – EXECUTION

3.01 GENERAL

Construction

A. Quality Control – Portland cement concrete production requires Contractor responsibility for quality control of materials during handling, blending, mixing, curing, and placement operations. Sample, test, and inspect concrete to ensure quality control of component materials and concrete. Sampling and testing for quality control in accordance with standard methods shall be performed by certified ACI Concrete Field Technician Grade 1. Perform quality control test for slump, air content, temperature, and unit weight during production of structural concrete other than concrete for incidental construction. Submit quality control test results. Design and Designation of Concrete – Design concrete mixture for

concrete work specified. When requested by the Engineer, submit mix designs using Highways Division for DOT 4-151. Do not start until the Engineer accepts mix design. Proportion concrete designated by compressive strength such that concrete conforms to required strength. When type of concrete is not indicated in the contract documents, use Class A concrete. The Engineer reserves the right to stop work when a series of low strength tests occur. Do not continue concrete work until cause is established and the Engineer is informed of and accepts, necessary corrective action to be taken.

B. Batching – Measure and batch materials in accordance with the following provisions:

1. Portland Cement – Either sacked or bulk cement may be used. Do not use fraction of sack of cement unless cement is weighted. Weigh bulk cement on weighing device accepted by the Engineer. Seal and vent bulk cement-weighing hopper properly to preclude dusting during operation. Do not suspend discharge chute from weighing hopper. Arrange discharge chute so that cement will not lodge in hopper or leak from hopper. Batching accuracy shall be within 1 percent, plus or minus, of required weight.

2. Water – Measure water by volume or by weight. Use readily adjustable device for measurement of water, with accuracy within 1 percent, plus or minus, of quantity of water required for batch. Arrange device so that variable pressure in water supply line does not affect measurements. Equip measuring tanks with outside taps and valves or other accepted means to allow for checking calibration.

C. Aggregates – When storing and stockpiling aggregates, avoid separation of coarse and fine particles within each size, and do not intermix various sizes before proportioning. Protect stored or stockpiled aggregates from dust or other foreign matter. Do not stockpile together, aggregates from different sources and of different gradations. Proportion aggregates by weight, with the exception that aggregates in concrete for minor structures may be proportioned by either volume or weight. For volumetric proportioning, use measuring boxes of know capacity to measure quantity of each aggregate size. Use batch weight based on dry materials plus total weight of moisture (both absorbed and surface) contained in aggregate. Measure individual aggregates to within 2 percent, plus or

minus, of required weight, and total weight of aggregates to within 1 percent, plus or minus, of required weight.

D. Mixing – Mix concrete in mechanically operated mixers. When accepted by Engineer, batches not exceeding 1/3 cubic yard may be hand mixed in accordance to specifications. Unless otherwise indicated in the contract documents or accepted by the Engineer, concrete shall be mixed at proportioning plant. Operate mixer at agitating speed while in transit. Concrete may be truck-mix only when cement or cement and mixing water are added at point of delivery. Begin mixing truck-mixed concrete immediately after introduction of mixing water to cement and aggregates, or introduction of cement to aggregates. Truck mixers shall produce thoroughly mixed and uniform mass of concrete, and shall discharge concrete without segregation. Operate truck mixers at mixing speed designated by manufacturer, but at not less than 6 or more than 18 revolutions per minute. Water may be added to mixture not more than two times after initial mixing is completed. Each time that water is added, turn drum an additional 30 revolutions or more at mixing speed until concrete is mixed uniformly.

E. Transporting Mixed Concrete – Transport central-mixed concrete to delivery point in truck agitators or truck mixers operating at speed designated by equipment manufacturer as agitating speed. For revolving drum trucks mixers transporting central-mixed concrete, limit concrete volume to manufacturer's rated capacity for agitator operation. Maintain agitating speed for both revolving drum mixers and revolving blade type agitators as designated on manufacturer's data plate. Equip truck mixers or truck agitators with electrically or mechanically actuated counters. Actuate counter after introducing cement to aggregates. When truck mixer or agitator is used for transporting central-mixed concrete to delivery point, complete discharge within 1 ½ hours, or before 250 revolutions of drum or blades, whichever comes first after introduction of mixing water to cement and aggregates, or cement to aggregates. Submit delivery tickets from manufacturers of central-mixed concrete with each truckload of concrete before unloading at jobsite.

F. Consistency – Regulate quantity of water used in concrete mixes so that concrete consistency is within nominal slump range. If concrete slump exceeds nominal slump, adjust mixture of subsequent batches. If slump exceeds maximum slump, the Engineer will reject concrete unless deemed satisfactory for its use. The Engineer will also reject harsh or

unworkable concrete that cannot be properly placed. Remove rejected concrete at no increase in contract price or contract time.

PART 4 – MEASUREMENT AND PAYMENT

4.01 BASIS OF MEASUREMENT AND PAYMENT

The Engineer will measure concrete in accordance with applicable sections. The Engineer will pay for the accepted concrete under applicable sections.

END OF SECTION

SECTION 03100 – CONCRETE ACCESSORIES

PART 1 – GENERAL

1.01 GENERAL REQUIREMENTS

This section describes drilling hole and installing dowel reinforcing bars where new concrete is to be joined to existing concrete by means of dowel reinforcing bars grouted into holes drilled into existing concrete.

PART 2 – PRODUCTS

2.01 MATERIALS

A. Reinforcing Steel – refer to Section 602, 2005 State Highways Standard Specifications.

B. Epoxy-Resin Adhesive – refer to Section 712.02, 2005 State Highways Standard Specifications.

C. Epoxy Grout – refer to Section 712.04(B), 2005 State Highways Standard Specifications.

Submit test certifications indicating conformance of materials to standards referred in this subsection.

PART 3 – EXECUTION

3.01 CONSTRUCTION

A. Drilling and Installation – Drill holes by methods that will not shatter or damage concrete adjacent to hole. Unless otherwise specified or shown on plans, diameter of drilled holes shall be ½ inch larger than nominal dowel diameter. Holes encountered longitudinal or transverse reinforcement during drilling will be rejected. Adjacent to rejected hole, drill new hole to required depth, avoiding existing reinforcement. Place dowel reinforcing bars after drilling to depth shown on plans and cleaning holes of dust and residue. Fill holes with epoxy grout after removing fine particles.

B. Inspection – Before filling holes with epoxy grout, notify the Engineer that holes are ready for inspection.

PART 4 – MEASUREMENT AND PAYMENT

4.01 BASIS FOR MEASUREMENT AND PAYMENT

Work under this section will not be measured nor paid for separately, but shall be considered incidental to and included in the prices bid for various items of work in this project.

END OF SECTION

SECTION 03200 – CONCRETE REINFORCEMENT

PART 1 – GENERAL

1.01 GENERAL REQUIREMENTS

This section describes furnishing, storing, and placing reinforcing steel (also referred to as rebar, bar, or reinforcement).

PART 2 – PRODUCTS

2.01 MATERIALS

Reinforcing Steel – Submit certificate of compliance for reinforcing steel. When steel bars, other than bars conforming to ASTM A 706, are to be spliced by welding, or when requested by the Engineer, submit six copies of certified mill test reports showing physical and chemical analyses for each heat and size of reinforcing steel.

PART 3 – EXECUTION

3.01 CONSTRUCTION

A. Order Lists and Bending Diagrams – Submit six copies of reinforcing steel order lists and bending diagrams to the Engineer prior to fabrication. Assume absolute responsibility for accuracy of lists and diagrams.

B. Storage, Surface Condition, and Protection of Reinforcement – Store reinforcing steel above ground surface on platforms, skids, or other supports. Protect reinforcing steel from mechanical damage and surface deterioration caused by exposure to corrosion-producing conditions. When placed in the work, reinforcing steel shall be free from dirt, loose rust or scale, mortar, paint, grease, oil, or other coatings that would destroy or reduce bond. Reinforcing steel shall be free from injurious defects such as cracks and laminations. Bonded rust, surface seams, surface irregularities, or mill scale shall not be cause for rejection, provided minimum dimensions, cross-sectional area, and tensile properties of a hand-wire brushed specimen meet physical requirements for size and grade of steel specified.

C. Fabrication

1. Bending – Bend reinforcing steel cold. Do not field bend bars that are partially embedded in concrete, except as indicated in the contract documents or permitted by the Engineer. Bend or straighten bars in a manner that shall not damage the material. Bars having cracks or splits at bends will be rejected.

Unlessotherwise indicated in the contract documents, bend steel only once at the same location.

2. Hooks and Bend Dimensions – Dimensions of hooks and diameters of bends shall be in accordance with the contract documents. When dimensions of hooks or diameter of bends are not indicated in the contract documents, they shall conform to AASHTO LRFD Bridge Design Specifications, Second Edition, Article 5.10.2-Hooks and Bends.

3. Identification – Ship reinforcing steel in standard bundles. Tag bundles of reinforcing bars showing quantity, grade, size, and identification that allows for checking, sorting, and placing. Tag bundles of welded wire fabric reinforcement showing quantity, style designation, width, and length.

D. Placing and Fasting – Place and fasten reinforcing steel bars in accordance with recommended practices and procedures in CRSI Placing Reinforcing Bars. Accurately place reinforcing steel and hold firmly in position indicated in the contract documents by wiring at intersections and splices; and by using bar supports accepted by the Engineer that have sufficient strength to resist crushing under applied loads. Unless otherwise indicated in the contract documents, place reinforcing steel thin tolerances conforming to Table 602.03-1 – Placement Tolerances, found in 2005 State Highways Standard Specifications. Begin concrete placement only after the Engineer inspects and accepts reinforcing steel position.

Maintain proper clearance between reinforcing steel and boundaries of concrete by precast concrete bar supports of equal compressive strength as concrete to be placed around them, and of shape and dimensions accepted by the Engineer.

Unless otherwise indicated in the contract documents, bar supports and their spacing shall conform to recommendations in Chapter 3 – Bar Supports of CRSI Manual of Standard Practice (MOSP). Steel wire bar supports shall be Class 1 (plastic-protected) bar supports, as described in CRSI MOSP. All plastic bar supports will be allowed for vertical construction only.

Separate bar layers using precast concrete blocks or other bar supports accepted by the Engineer. Use of pebbles, pieces of broken stone or brick, metal pipes, or wooden blocks will not be allowed.

Maintain minimum 2 ½ bar diameters for center-to-center spacing of parallel bars. Minimum clear distance between bundles of bars and

adjacent bundles or single bars shall be not less than the following: bundles of two bars, 2 times diameter of larger bar; bundles of three bars, 2 ½ times diameter of largest bar; bundles of four bars, 3 times diameter of largest bar.

In no case shall clear distance between bars or bundles of bars be less than 1 ½ time maximum coarse aggregate size or less than 1 ½ inches, whichever is greater.

Tie bundled bars together at a distance of not more than 6 feet on centers along length of bar. Limit maximum number of bars in bundle to two bars for No. 14 and No. 18 bars and four bars for other sizes. Bundling bars by tack welding will not be allowed.

Individual bars in bundle that are cut off within span of member shall be terminated at different points, with at least a 40-bar diameter stagger.

Unless otherwise indicated in the contract documents, concrete cover for unprotected main reinforcing steel shall conform to Table 602.03-2 – Concrete Cover (Main Bars), found in 2005 State Highways Standard Specifications. Cover for rebar mechanical connections shall be same as for reinforcing steel.

Cover to ties and stirrups may be ½ inch less than values specified in Table 602.03-2 – Concrete Cover (Main Bars), found in 2005 State Highways Standard Specifications, but shall not be less than 1 inch.

E. Splicing of Bars

1. General – Furnish reinforcing steel in full lengths in accordance with the contract, except in the following cases:

   a. Unless otherwise indicated in the contract documents, when required lengths of bars No. 4 through No. 11 are longer than 40 feet, bar may be spliced by lapping, butt welding, mechanical butt splicing, or mechanical lap splicing.

   b. Lap splicing for bars No. 14 and No. 18 will not be allowed. When required lengths of these bars are longer than commercially available lengths, use butt welding or mechanical but splicing.

   Welded lap splicing and mechanical lap splicing may only be used for bars No. 4, 5, and 6.

   Reinforcing steel may be made continuous at locations where splices are indicated in the contract documents, at the Contractor's option.

Submit splice locations. Locate splices in areas of low stresses. Splicing bottom reinforcing steel at or near centerline of span and splicing top reinforcing steel at or near continuous support will not be allowed.Unless otherwise indicated in the contract documents, splices in adjacent reinforcing bars at any particular section shall be staggered. Minimum distance between staggered lap splices or mechanical lap splices shall be equal to the length required for a lapped splice in the largest bar being spliced. Minimum distance between staggered butt splices shall be 2 feet, measured between splice midpoints, along a line that is centered between axes of the adjacent bars.

Number of bars spliced at sections normal to axis of member shall not exceed 33 percent of total main reinforcing steel in member. If bars cross construction joint, embed each end of reinforcing steel a distance equal to required length of lap, on each side of joint.

Deviation in alignment of reinforcing bars at welded or mechanical splice shall not exceed ¼ inch over a 3 ½ - foot length of bar.

V-groove welded splice and welded lap splicing shall conform to details indicated in the contract documents and the following requirements:

i. On V-groove welded splices, reinforcing bars at joint shall not be offset at weld by more than 1/8 inch.

ii. Trim back or shape ends of reinforcing bars to be spliced by V-groove welding by carbon arc, oxyacetylene cutting, or sawing. Trim back sheared surfaces not less than 1/8 inch.

iii. Unless otherwise specified, weld by manual shielded metal-arc process. Use low hydrogen electrodes conforming to requirements of AWA A5.1 for E7016 or E7018 electrodes.

iv. Purchase electrodes in hermetically sealed containers, or dry for two hours at 450 degrees F. to 500 degrees F. before use. Immediately after removal from hermetically sealed containers or from drying ovens, store electrodes in ovens held at temperature of at least 250 degrees F. Redry electrodes not used within four hours after removal from hermetically sealed containers or from drying or storage ovens.

v. Do not weld in inclement or wet weather unless protection accepted by the Engineer is provided.

vi. Flare welds may be made in one pass. Make butt welds with multiple passes.

vii. Pre-heating or post-heating of ASTM A706 bars in weld area will not be required.

viii. Tack welding for alignment purposes will be allowed when tack weld will be consumed by subsequent weld.

ix. Visual inspection of completed welds shall show no evidence of cracks, lack of fusion, undercutting, excessive piping, porosity, or inadequate size.

x. Prequalify welders by requiring them to make procedure and qualification weld that conforms to provisions in Subsection 602.03(E)(4) – Qualification of Welding and Mechanical Splicing, of the 2005 State Highways Standard Specifications. Perform procedure and qualification welding in presence of the Engineer, using materials similar to those to be welded on the project, in same position as will be encountered in the work.

2. Lapped Splices – Lapped splices shall consist of reinforcing steel placed in contact and wired together in such a manner as to maintain alignment and provide minimum clearances. Non-contact lapped splices will not be allowed.

   Lapped splices will not be allowed at locations where concrete section is insufficient to provide minimum clear distance between splice and nearest adjacent bar, as specified in Subsection 602.03(D) – Placing and Fastening, in 2005 State Highways Standard Specifications, for minimum clear distance between parallel bars or bundle of bars.

   Lapped splices in bundled bars shall conform to the following: in bundles of two bars, make lapped splice length same as single bar lapped splice length; in bundles of three bars, make lapped splice length 1.2 times single bar lapped splice length; in bundles of four bars, make splices by butt welding or by mechanical butt splicing.

3. Butt-Jointed Splices – Butt-jointed splices shall be either welded or mechanical splices. Do not locate splices on ben portions of bars. Butt-jointed splices shall be capable of resisting flexural and other load effects due to construction activities, including handling and placing of reinforcing steel. Completed butt splices shall develop

not less than 125 percent of specified yield strength of the unspliced bars.

Prior to use in the work, qualify welded and mechanical butt splices by test made on sample splices, as specified in Subsection 602.03(E)(4) – Qualification of Welding and Mechanical Splicing, in 2005 State Highways Standard Specifications. Perform job control tests on sample splices representing each lot of mechanical butt splices as specified in Subsection 602.03(E)(5) – Job Control Tests, in 2005 State Highways Standard Specifications. Test sample splices for qualification and job control tests for compliance with splices requirements in accordance with the contract. The Contractor shall fabricate and test sample splices and shall submit copy of test results to the Engineer.

a. Welded Butt Splices – Welded butt splices in reinforcing steel shall be complete joint penetration butt welds conforming to requirements of AWS D1.4 and the contract documents.

   Shop-produced resistance butt welds conforming to requirements of the contract documents and produced by fabricator accepted by the Engineer may be used.

   Use only joint details and dimensions as shown in Figure 3.2 –
   Direct Butt Joints of AWS D1.4-98, for making complete joint penetration butt welds of reinforcing steel. Split pipe backing will not be allowed.

   Use flat plate in accordance with ASTM A 709, Grade 36, as backing for complete joint penetration butt welds of reinforcing steel. Flat plate shall be ¼ inch thick, with width as measured perpendicular to bar axis, equal to nominal bar diameter; and length not exceeding twice nominal bar diameter. Fit flat plate backing tightly to bar, with weld root centered on plate. Grind smooth and flush with adjacent surface, bar deformations or obstructions preventing a tight fit. Locate tack welds used to fit backing plates, within weld root area, so that tack welds are completely consumed by finished weld. Do not remove backing plates.

   Make butt welds with multiple weld passes using stringer bead, without appreciable weaving motion. Maximum stringer bead width be 2.5 times electrode diameter.

Perform slagging between each weld pass. Weld reinforcement shall not exceed 1/8 inch in convexity.

Terminate or initiate welds made on unbent portion of cold bent reinforcing steel, at minimum distance of two bar diameters from points of tangency for radius created by cold bending.

Before any electrodes or flux-electrode combinations are used, submit at no increase in contract price or contract time, certified copies of test reports for pertinent tests specified in AWS A5.1, AWS A5.5, AWS A5.18, or AWS A5.20, whichever is applicable, made on electrodes or flux-electrode combinations of the same class, brand, and nearest specified size as the electrodes to be used. Tests may have been made for process qualification or quality control, and shall have been made within one year prior to manufacturer of electrodes and fluxes to be used. Include in report manufacturer's certification that process and

material requirements were same for manufacturing tested electrodes and electrodes to be used. Certification shall be specified in Subsection 106.07 – Certificate of Compliance, in 2005 State Highways Standard Specifications.

Electrodes for manual shielded metal arc welding of ASTM A 6015, Grade 60 bars shall conform to AWS A5.5 for E9018-M or E10018-M electrodes.

Electrodes for manual shielded metal arc welding of ASTM A 706 bars shall conform to AWS A5.5 for E8016-C3 or E8018-C3 electrodes.

Solid and composite electrodes for semiautomatic gas metal-arc and flux-cored arc welding of Grade 40 reinforcing bars shall conform to AWS A5.18 for ER70S-2, ER70S-3, ER70S-6, or ER70S-7 electrodes; or AWS A5.20 for E70T-1, E70T-5, E70T-6, E70T-8 electrodes.

Electrodes for semiautomatic welding of ASTM A 615, Grade 60 and ASTM A 706 bars shall produce weld metal deposit with properties conforming to Section 5.3.4 in AWS D1.1 for ER80S-Ni1, ER80S-Ni2, ER80S-Ni3, ER80S-D2, E90T1-K2 and E90T1-K2 electrodes.

Prior to welding ASTM A 615 bars, preheat bars for a distance of not less than 6 inches on each side of joint.

For all welding of ASTM A 615, Grade 40 or Grade 60 bars, requirements of Table 5.2 – Minimum Preheat and Interpass Temperatures of AWS D1.4-98 are superseded by the following:

b. Minimum preheat and interpass temperatures shall be 400 degrees F. for Grade 40 bars and 600 degrees F. for Grade 60 bars. Immediately after completing welding, cover at least 6 inches of bar on each side of splice with insulated wrapping to control rate of cooling. Keep insulated wrapping in place until bar has cooled below 200 degrees F.

When welding different grades of reinforcing steel, electrode shall conform to Grade 40 bar requirements and preheat shall conform to Grade 60 bar requirements.

If specified preheat interpass, or post weld cooling temperatures are not met, remove all weld and heat-affected zone metal and reweld splice.

Protect welding from air currents, drafts, and precipitation in a manner accepted by the Engineer.

Direct butt splicing of reinforcing steel by thermite welding will not be allowed.

c. Mechanical Butt Splices

1. General – The following mechanical butt splices may be used:
sleeve-filler metal type, sleeve-threaded type, sleeve-swaged type, sleeve-fill grout type, sleeve-lockshear bolt type, two-part sleeve-forged bar type, or two-part sleeve-friction bar type.

Use mechanical butt splices of design accepted by the Engineer. The Engineer's acceptance of a new design will be based upon the following: technical data, including test results, and other proof of satisfactory performance submitted by manufacturer; and test results by the Engineer or the Engineer's authorized representative on manufacturer-furnished sample splices and splice material. Resubmit design

if change is made in details or materials previously submitted and accepted.

Total slip of reinforcing steel with splice sleeve, after loading in tension of 30,000 pound per square inch and relaxing to 3,000 pounds per square inch, shall not exceed values in Table 602.03-3 – Allowable Total Slip, in 2005 State Highways Standard Specifications. Slip may be measured between gap points that are clear of splice sleeve.

Slip requirements shall not apply to mechanical lap splices.

Splice procedures shall conform to manufacturer's recommendations, except as modified in this section. Make splices using manufacturer's standard equipment, jigs, clamps, and other required accessories.

Cut ends of reinforcing bars to be butt-spliced, nominally square.

Splice sleeves shall have concrete cover of not less than 1 ¾ inches, measured from concrete surface to outside of sleeve. Adjust or relocated stirrups, ties, and other bars, and place additional reinforcing steel, if necessary, to provide planned concrete cover to reinforcing steel.

2. Sleeve-Filler Metal Mechanical Butt Splices – Sleeve-filler metal type of mechanical butt splices shall consist of a steel splice sleeve that fits closely over the reinforcing bar, with ferrous fill metal in annular space between reinforcing steel and sleeve, and between ends of reinforcing steel. Melt filler metal by exothermic reaction. Splicing process shall not fuse filler metal with reinforcing steel or heat reinforcing steel to its melting point, except for nominal melting of ends of reinforcing steel at mid-length of splice sleeve.

   Remove oversize projection and distortions of reinforcing steel within sleeve by grinding.

Clean surfaces of reinforcing steel within sleeve and for 2 inches beyond end of sleeve, of slag, mill scale, rust, and other foreign materials. Clean either by oxyacetylene torch followed by power wire brushing or by abrasive blast cleaning.

Immediately prior to adding filler material to splice sleeve, preheat cleaned bar ends and entire splice sleeve to 300 degrees F., plus or minus 50 degrees F. When gas torches are used for preheating, do not direct flame into the inside of splice sleeve.

In completed splice, sound, non-porous filler metal shall be visible completely around reinforcing steel, at both ends of splice sleeve and at tap hole in center of sleeve.

Fill annular space between reinforcing steel and sleeve with filler material, to the extent that the average depth of any recess, over entire perimeter, caused by use of packing ring, and voids due to other causes, at each end of sleeve, does not exceed ½ inch. Depth of recesses and voids will be measured by wire probe inserted to deepest points of recesses and voids.

3. Sleeve-Threated Mechanical Butt Splices – Sleeve-threaded type of mechanical butt splices shall consist of a steel splice sleeve, with tapered interior threads,that joins reinforcing bars with matching tapered threads. Taper threads to such a degree that cross threading will not occur during assembly.

   Mark each splice sleeve with heat treatment lot number.

   After completion of assembly, tighten splice to torque value recommended by manufacturer.

4. Sleeve-Swaged Mechanical Butt Splices – Sleeve-swaged type of mechanical butt splices shall consist of a seamless steel sleeve applied over ends of reinforcing bar and swaged to bars by means of a hydraulic press.

5. Sleeve-Filler Grout Mechanical Butt Splice – Sleeve-filler grout type of mechanical butt splice shall consist of a steel splice sleeve that fits closely over reinforcing bars with nob-shrink grout filler in annular space between reinforcing steel and sleeve, and between ends of reinforcing steel.

   Allow no vibration or movement of reinforcing bar or sleeve at splice while splice is developing sufficient strength to support reinforcing bar. Submit complete details of bracing and clamping system to eliminate vibration or movement at splice during setup of filler, as specified in Subsection 105.03 – Shop Drawings, in 2005 State Highways Standard Specifications.

6. Sleeve-Lockshear Bolt Mechanical Butt Splice – Sleeve-lockshear bolt type of mechanical butt splices shall consist of seamless steel sleeve, center hole with centering pin, and bolts that are tightened until both heads shear off, leaving both ends embedded in reinforcing bar. Seamless steel sleeve shall be either formed into a V configuration or shall have two serrated steel strips welded to inside of sleeve.

7. Two-Part Sleeve-Forged Bar Mechanical Butt Splices – Two-part sleeve-forged bar type of mechanical butt splices shall consist of a shop-machined, two=part threaded steel sleeve that interlocks two hot-forged reinforcing bar ends. Forged bar ends may be either shop-produced or field-produced.

8. Two-Part Sleeve-Friction Bar Mechanical Butt Splices – Two-part sleeve-friction bar type of mechanical butt splices shall consist of a shop machined, two-part threaded steel sleeve whose ends are friction welded, in the shop, to reinforcing bar ends.

9. Qualification of Welding and Mechanical Splicing – Procedures to be used in splicing reinforcing bar and welders and operators who will apply these procedure shall be qualified by tests performed by the Contractor on sample splices of the type to be used, before making splices in the work.

For welded splices, submit written welding procedure specifications (WPS) and welder qualification tests to be used that conform to AWS D1.4.

Fabricator accepted by the Engineer shall produce resistance butt weld.

Each operator qualification test for mechanical splices shall consist of two sample splices. Each mechanical splice procedure test shall consist of two sample splices.

For sleeve-filler, sleeve-threaded, sleeve-lockshear bolt, and two-part sleeve friction bar mechanical butt splices, make sample splices on largest reinforcing bar size to be spliced by procedure or operator being tested, except that no. 14 bars may be substituted for No. 18 bars.

For sleeve-swaged and two-part sleeve-forged mechanical butt splices, and mechanical lap splices, make sample splices on largest reinforcing bar size, of each deformation pattern to be spliced by procedure or operator being tested. When joining new reinforcing bar to existing reinforcing bar, make qualification test sample bars using only deformation patterns of new reinforcing bar to be joined. If operator is qualified for mechanical splicing of reinforcing bar of a give size, that operator will also be considered qualified for reinforcing bar sizes smaller than those used in making tests.

Perform separate operator qualification test or procedure test for each mechanical splicing position and procedure that operator is expected to use in the work.

Operator and procedure qualification tests may be performed simultaneously.

The Engineer will accept mechanical splice procedures and operators based upon acceptance of previous tests performed on appropriate sample splices.

Submit completed sample splices at least 60 inches long, with splice at mid-length.

Make and test sample splices in the presence of the Engineer or the Engineer's representative, including test performed by a commercial agency.

10. Job Control Test – When mechanical butt splices, shop-produced complete joint penetration butt-welded splices, or shop-produced resistance butt-welded splices are used, submit job control tests from a qualified testing laboratory. Job control test shall consist of fabrication, under conditions used to produce splice, and physical testing of three sample splices for each lot of 150 splices.

    A mechanical butt splice lot is defined as 150, or fraction thereof, of the same type of mechanical butt splices used for each combination of bar size deformation pattern that is used in the work.

    A shop-produced, complete joint penetration butt-welded splice lot, or shop-produced, resistance butt-welded splice lot, is defined as 150, or fraction thereof, of the same type of welds used for each combination of bar size and bar deformation pattern that is used in the work.

    When joining new reinforcing bar to existing bars, make job control test using only deformation patterns of new reinforcing steel to be joined.

    Sample splice shall consist of splice made at job site to connect two 30-inch long minimum length bars, using sample splice materials, position, location, and equipment, and following same procedures as are being used to make splices in the work. Shorter sample splice bars may be used if accepted by the Engineer.Make and test sample splices in the presence of the Engineer or the Engineer's representative.

    Identify sample splices with weatherproof marking prior to shipment to testing laboratory.

For sleeve-threaded mechanical butt splices, fabricate reinforcing bars to be used for job control tests on a random basis, during thread cutting on reinforcing steel of each lot. Ship job control test samples to jobsite with material they represent.

For shop-produced, complete joint penetration butt welds, shop-produced, resistance butt-welded splices, and all types of mechanical butt splices, except sleeve-threaded type, the Engineer will designate when job control test samples are to be fabricated, and will determine limits of lot represented by each job control test.

Should average of test results made on three sample splices, or should more than one sample splice in any job control test fail to meet requirements for splices, all splices represented by that test will be rejected as specified in Subsection 106.08 – Non Conforming Materials, in 2005 State Highways Standard Specifications. Rejection shall prevail unless the Contractor, at no increase in contract price or contract time, obtains and submits evidence acceptable to the Engineer, that strength and quality of splices in the work are acceptable.

11. Nondestructive Splice Tests – The Contractor shall perform required radiographic examinations of complete joint penetration butt-welded splices in accordance with requirements of AWS D1.4 and as otherwise indicated in the contract documents.

    Prior to radiographic examination, welds shall conform to requirements of Subsection 4.4 – Quality of Welds, of AWS D1.4-98

F. Splicing of Welded Wire Fabric – Overlap flat sheets of welded wire fabric (WWF) to maintain uniform strength. Fasten sheets of WWF at ends and edges. Use edge lap not less than the following: one spacing of cross wires plus 2 inches; or 6 inches; or the numerical value of the longitudinal wire size (W-Size Number) times 4.3 divided by the longitudinal wire spacing in inches.

PART 4 – MEASUREMENT AND PAYMENT

4.01 BASIS OF MEASURE AND PAYMENT

Work under this section will not be measured nor paid for separately, but shall be considered incidental to and included in the prices bid for the various items of work in this project.

END OF SECTION

SECTION 03300 – CONCRETE STRUCTURES

PART 1 – GENERAL

1.01 GENERAL REQUIREMENTS

This section describes construction of concrete drop inlet and shallow drywell.

PART 2 – PRODUCTS

2.01 MATERIALS

A. Structural Concrete – Refer to Section 601, 2005 State Highways Standard Specifications.

B. Reinforcing Steel – Refer to Section 602, 2005 State Highways Standard Specifications.

PART 3 – EXECUTION

3.01 CONSTRUCTION

A. Foundation – Excavate and backfill foundations in accordance with Section 206 – Excavation and Backfill for Drainage Facilities, 2005 State Highways Standard Specifications, and as indicated in the contract documents.

B. Forms – Use wood or metal forms that are mortar tight and sufficiently rigid to prevent distortion due to pressure of concrete and other loads, including vibration, incidental to construction. Construct and maintain forms to prevent joints from opening.

Unless otherwise indicated in the contract documents, place minimum ¾ inch by ¾ inch chamfer at sharp corners. Give girder and coping forms a bevel or draft to ensure easy removal.

Set and maintain forms true to lines designated. When forms appear to be unsatisfactory, either before or during concrete placement, the Engineer may stop work until defects are corrected.

When forms are submerged in water and concrete is placed in the dry, make forms watertight below high water level.

Cover knotholes and damaged areas in wood forms with metal patches.

Control rate of depositing concrete in forms to prevent form deflection or form panels that exceed permitted deflections. When structure height is greater than 6 feet, submit rate of depositing concrete. Use forms for concrete surfaces not completely enclosed or hidden below permanent ground surface that conform to requirements, in this subsection, for

exposed-surface forms. Interior surfaces of underground drainage structures will be considered completely enclosed surfaces.

Before using forming systems for exposed surfaces, submit form design and materials data for each system.

Design and construct forms for exposed concrete surfaces so that formed surface of concrete does not undulate excessively between studs, joists, form stiffeners, form fasteners, or walls. Undulations exceeding either 3/32 inch or 1/270 of center-to-center distance between studs, joists, form stiffeners, or walls will be considered to be excessive. The Engineer will reject portions of concrete structure will surface undulations over limits specified herein.

Form exposed surfaces of each concrete structure element with same forming material or with materials that produce similar concrete surface texture, color, and appearance.

For exposed surfaces, provide form panel facing consisting of continuous sections of form facing material, unbroken by joint marks, against which concrete is placed.

C. Form Lumber – Use form lumber, except for curved and special surfaces, of five ply panel boards or dressed shiplap, used with or without form liners. Rough lumber may be used for unexposed surfaces in finished structure. Three-ply boards may be used for forming soffit of unexposed portions of box girder top slabs.

Use plywood conforming to latest edition of “United States Product Standard PS-1 for Construction and Industrial Plywood” for forms. Place form panels in uniform widths of not less than 36 inches and in uniform lengths of not less than 6 feet, except where dimensions of members formed are less than specified panel dimensions. Place plywood panels with grain of outer plys in direction of span.

Place form panels in neat, symmetrical pattern, subject to acceptance of the Engineer. Place panels with long dimension horizontal and with horizontal joints level and continuous. Stagger and position perpendicular to vertical joints, as shown in the contract documents.

D. Form Ties – Use form ties of sufficient strength and number to hold form securely in place and prevent spreading of forms during concrete placement. The following will not be allowed:

a. Ties consisting of twisted wire loops to hold forms in position.

b. Non-metallic forming ties, anchorages, forming supports or other accessories that may be embedded permanently in concrete.

c. Drive type anchorages for fastening forms or form supports to concrete.

Construct form ties or anchorages within forms to permit removal to depth of least 1 inch from face, without injury to concrete. Design fittings for form ties or anchorages so that, upon removal, cavities left are of the smallest possible size. Fill cavities completely with cement mortar and leave surface sound, smooth, even, and uniform in color.

E. Surface Treatment – Immediately before each use, clean and treat forms with non-staining form oil that will permit ready release of forms and will not discolor concrete.

F. Metal Forms – Specifications for forms regarding design, mortar tightness, filleted corners, beveled projections, bracing, alignment, removal, reuse, and oiling apply to metal forms. Metal thickness used for forms shall be such that forms will remain true to shape. Countersink bolts and rivet heads. Design clamps, pins, or other connecting devices to hold forms rigidly together and to allow removal without injury to concrete. Metal forms that are rough or crooked will not be allowed.

G. Reuse of Forms – Maintain shape, strength, rigidity, watertightness, and surface smoothness of reused forms. Resize warped or bulged lumber before using.

H. Removal of Forms – Remove support using method that permits concrete to uniformly and gradually take stresses caused by its own weight.

After placing concrete, remove forms no earlier than removal times specified in Table 503.03-1, 2005 State Highways Standard Specifications. The Engineer will determine exact removal time.

I. Loading – Inducing loading, outside of its own weight, onto any part of a structure will
not be allowed until the following conditions have been met: at least 15 days have elapsed since placing concrete; and test specimens show that concrete has developed compressive strength of either 3,000 psi or required 28-day compressive strength, whichever is greater.

J. Placing Concrete – Place and consolidate concrete by methods that shall not cause aggregate segregation or unsound concrete and shall result in dense, homogeneous concrete, free of voids, rock pockets and other defects. Use concrete while it is plastic and has sufficient workability for

placement. Retempering or remixing concrete that has partially hardened will not be allowed. Allow no more than 30 minute interval between placement of two consecutive batches or partially hardened will not be allowed. Allow no more than 30 minutes interval between placement of two consecutive batches or loads of concrete.

Do not deviate from schedule for placing concrete without permission from the Engineer.

Water blast laitance and foreign material and moisten interface surfaces with water immediately before placing concrete over subgrade or construction joint.

Submit method and sequence of concrete placement. Place concrete on structure only after forms have been cleared of debris and the Engineer has checked and accepted forms and reinforcing steel.

Place concrete for foundations and bottom slabs of drainage structures on ground that is free of water. Dewater, sheath, place filter material, and do other work, as required by field conditions, to ensure saturated surface dry foundation bed. Costs for obtaining saturated surface dry foundation bed will be part of structure excavation.

Excavate and place sides of concrete not supported on piles or rock to neat lines.

Begin placing concrete at low point and proceed upgrade. Remove struts, braces, or blockings when concrete placed has reached elevation rendering them unnecessary.

Deposit concrete in approximate horizontal layers to avoid flowing along forms. When less than a complete layer is placed in one operation, terminate layer in vertical bulkhead. Layer depth shall not exceed 20 inches and shall be such that succeeding layer shall be placed before previous layer has attained its initial set. Place concrete in layers that can be satisfactorily consolidated with vibrators.

Thoroughly work external surface of concrete with vibrator. Work to force coarse aggregate from surface and to bring mortar against forms, producing a smooth finish, nearly free from water and air pockets, and honeycomb.

Fill each part of form by depositing concrete as close to final position as possible. Work coarse aggregate from forms and around reinforcement without displacing bars. After initial set of concrete, do not jar forms and do not place stress on ends of projecting reinforcing. After concrete placement stops, remove accumulations of mortar on reinforcing steel and

surfaces of forms, before next concrete placement. If concrete is wet, prevent dried mortar chips, other foreign material, and dust from falling onto wet concrete surface. If concrete has set, clean reinforcing steel in a manner that will not be detrimental to concrete-steel bond.

K. Drop Inlet – Place and allow base slab of drop inlet to set at least 12 hours before constructing remainder of drop inlet. Monolithically construct sidewalls and top slab of drop inlet 4 feet or less, in height.

L. Chutes and Troughs – The use of aluminum for chutes, tremies, troughs or pipes will not be allowed. Place concrete so as to avoid segregation of materials and displacement of reinforcement.

Use of long troughs, chutes, and pipes of minimum 6-inch diameter will be allowed only with written authorization of the Engineer. Incline chutes or pipes to allow concrete to flow at required consistency. Addition of water to concrete mix to promote free flow in chutes of low inclination will not be allowed.

Do not drop concrete into forms from vertical distance of more than 5 feet unless confined by closed chutes or pipes.

Keep chutes, troughs, and pipes clean and free from coatings of hardened concrete by thoroughly flushing them with water after each run. Discharge flushing water away from in-place concrete.

M. Vibrating – Consolidate concrete, except for concrete placed under water, using high frequency internal vibrators. Minimum transmitted vibration frequency shall be 4,500 impulses per minute, and shall be such as to visibly affect mass of concrete of 1-inch slump over radius of at least 18 inches. Use sufficient number of vibrators to properly consolidate incoming concrete within 15 minutes after depositing concrete in forms.Make at least two vibrators available at structure site when placing more than 25 cubic yards of concrete. Apply vibrators at uniformly spaced points and not farther apart than is visibly effective. Attaching vibrators to or holding them against forms or reinforcing steel will not be allowed. Insert vibrators in vertical position at a uniform spacing over the entire concrete placement area. Dragging vibrators through concrete will not be allowed.

External vibrators accepted by the Engineer may be used to consolidate concrete when concrete is inaccessible for adequate consolidation, provided forms are constructed sufficiently rigid to resist displacement or damage from external vibration.

When required, supplement vibration by hand spading with suitable tools to ensure proper and adequate compaction. Manipulate vibrators to work concrete thoroughly around reinforcement and imbedded fixtures; and into corners and angles of forms. Using vibrators to cause concrete to flow or run into position, instead of placing, will not be allowed. Vibrate sufficiently to compact, but avoid prolonging vibration to the point where segregation occurs.

N. Joints

1. Construction Joints – Place construction joints only at locations indicated in the contract documents, perpendicular to principal lines of stress and at points of minimum shear.

   After placing substrate concrete to construction joint and letting concrete set, thoroughly clean by abrasive blast cleaning, the entire joint surface, including projecting reinforcement. Remove laitance, curing compound, and other material foreign to concrete, and expose cleaned coarse aggregate, and roughen construction joint surface to full amplitude of approximately ¼ inch, after curing period or immediately before placing concrete on substrate concrete at construction joint, whichever occurs first.

   Before placing new concrete, draw forms tightly against concrete already in place. Thoroughly clean, water blast laitance and foreign material, and saturate old surface with water to a saturated surface-dry condition immediately before placing new concrete. Place concrete in substructures so that horizontal construction joints are truly horizontal. Where possible, place joints such that they will be hidden from view in finished structure. Where vertical construction joints are necessary, extend reinforcing bars across joint to make structure monolithic. Do not place construction joints through paneled wing walls or other large surfaces that are to be treated architecturally.

   When construction joint is necessary because of emergency, furnish and place reinforcing steel across construction joint as ordered by the Engineer, at no increase in contract price or contract time.

2. Expansion Joint – Construct expansion joints of type and in location indicated in the contract documents. Expansion joints may be friction, open, filled compression, mortise, or special type. Refer to Section 503.03 – Concrete Structures, 2005 State Highways

Standard Specification for details on Expansion Joints, Waterproofing, and Joint Sealing.

O. Protection and Curing – Protect concrete from mechanical damage and damage caused by exposure to sun, rain, and flowing water. Do not allow concrete to dry out from time of concrete placement until end of minimum curing period. Minimum curing period shall be as follows:

1. Cure structures for at least 7 days. Maintain temperature of structural concrete at not less than 45 degrees F. for 72 hours after placing. Maintain temperature at not less than 40 degrees F. for an addition 4 days. Submit written outline of proposed method for protecting concrete.

2. Water Curing – Water cure by keeping concrete continuously wet with fresh water, using water sprays, acceptable water saturated coverings, or ponding. Keep wood forms that remain in place sufficiently damp to prevent opening at joints and drying of concrete.

   After surface water has evaporated, apply moisture to concrete surface using fog spray nozzle. Continue applying moisture to surface until regular curing begins. Use adequate water supply and sufficient moisture to fog and water cure concrete without damaging surface or texture of concrete.

3. Impervious Membrane Curing – Seal concrete surface thoroughly with liquid
   membrane-forming compound. Apply compound uniformly in two or more applications. Use ratio of at least 1 gallon for each 125 square feet of concrete surface.

   Use curing compound that will not permanently darken concrete on exposed surfaces of completed structure. Keep concrete surfaces moist before applying impervious membrane. If membrane film is broken or damaged during specified curing period, apply new treatment to affected area, duplicating first application.

4. Forms-In-Place Curing – Cure formed surfaces of concrete by retaining forms in place. Maintain forms in place for minimum period of 7 days after concrete placement. Keep all form joints and joints between end of forms and concrete, moisture-tight during curing period. Reseal cracks in forms and cracks between forms and concrete by methods accepted by the Engineer.

P. Finishing Concrete Surfaces – Apply Class 1 Ordinary Surface Finish to the concrete surfaces, either as final finish or preparatory to applying a higher-class finish. On surfaces to be buried underground or that are enclosed, removal of fins and form marks and rubbing of mortared surfaces to obtain a uniform color will not be required.

After removing forms, remove form bolts and ties to depth of at least 1 inch below concrete surface. Clean, wet, and fill resulting holes or depressions with mortar. Mortar shall consist of one part cement to two parts sand by volume. Add white cement to mortar in sufficient quantity to tint mortar a shade lighter than 1 hour old and that bonds indistinguishably with concrete. After mortar has thoroughly hardened, rub surface with carbonrundum stone to obtain same color in mortar as in surrounding concrete. Remove fins caused by form joints and other projections. Remove stains and discolorations visible from traveled way.

Clean and fill pockets with mortar, except for those scattered pockets or pinholes less than ½ inch long or wide and less than 3/8 inch deep. Pockets shall not affect strength of structure or shorten life of steel reinforcement. Fill pockets on surfaces visible to pedestrian traffic and surfaces exposed to stream flow. Use mortar for filling pockets, as specified for bolt and tie holes. When rock pockets affect strength or structure materially or shorten life of steel reinforcement, the Engineer will declare concrete unacceptable and require removal and replacement of affected structure.

Q. Cleaning Up – Upon completion of finishing operation and before final acceptance of structure, remove forms, excavated or useless material, rubbish, and temporary structures. Replace or restore property damaged during prosecution of work. Leave job site in neat and presentable condition.

PART 4 – MEASUREMENT AND PAYMENT

4.01 BASIS OF MEASUREMENT AND PAYMENT

Work under this section will not be measured nor paid for separately, but shall be considered incidental to and included in the prices bid for the various items of work in this project.

END OF SECTION

DIVISION 6 - WOOD AND PLASTICS

SECTION 06200 – FINISH CARPENTRY

PART 1 – GENERAL

1.01 RELATED DOCUMENTS

The General Provisions of the Contract, including General and Special Provisions and General Requirements of the Specifications, apply to the work specified in this section.

1.02 SUMMARY

Section Includes: Furnishing and installing all carpentry, millwork, and related items.

1.03 QUALITY ASSURANCE

A. Millwork shall be manufactured in accordance with the standards established in the amended latest Edition of the "Manual of Millwork" of the Woodwork Institute (WI) in the Grade indicated.

B. Plywood shall comply with "Softwood Plywood, Construction and Industrial" Product Standard PS-1-74 of U.S. Department of Commerce, Bureau of Standards.

1.04 DELIVERY. STORAGE. AND HANDLING

A. Place materials in area protected from weather and ultra-violet exposure immediately upon delivery to storage facility and to job site.

B. Protect sheet materials from damage while unloading and when stored.

C. Store materials out of the way of Work-in-progress in well-ventilated rooms. Comply with manufacturer's guidelines to prevent exposure to damaging changes of temperature and humidity.

PART 2 - PRODUCTS

2.01 MATERIALS

A. Door and Window Frames. Millwork, Siding and Trim:

1. Interior

a. Lumber Species shall be: Oak for stained finish,

Pine/Poplar for painted finish.

b. Interior Standing and Running Trim and Rails. Grade: Select and Better.

c. Interior Door Frames. Grade: Select and Better.

d. Interior Miscellaneous Ornamental Items. Grade: Select and Better.

e. Trim profile and dimension to match existing.

f. New trim may consist of two pieces. Window and door trim shall have no sea at per meter edges, unless matching existing conditions.

g. If existing window or door lacks interior trim, provide trim that matches other existing trim in dwelling. If no interior trim exists, provide standard trim samples for Property Owner's selection.

h. Intended Finish: Semi-gloss, stain or transparent finish to match existing, as specified in Section 09910 - PAINTING.

2. Exterior Trim:

a. Redwood, vertical grain, S4S, sill and casing shapes to match existing, new items in profiles as indicated on Details. Finger joints not permitted if transparent finish is required. Window and door trim shall have no seams at perimeter edges, unless matching existing conditions.

b. WI Grade: Custom

c. Intended Finish: Semi-gloss or transparent finish to match existing, as specified in Section 09910 - PAINTING.

B. Framing Lumber: Construction grade Douglas Fir or better. Appearance grade where exposed; S4S. 19 percent maximum moisture content. Provide headers at widened openings.

C. Building Paper. 15-pound non-perforated asphalt-saturated felt.

D. Flashing Paper: Fortifiber Corporation “Moistop EZ Seal" or approved equal.

E. Sealing Tape: Carlisle "Hardcast" BRT-801 or approved equal.

F. Rough Hardware: Furnish items required to complete the Work.

1. Toggle Bolts, Expansion Anchors, Bolts, Nuts, and Washers: Hot-dipped galvanized ASTM A 153. Washers shall be malleable iron.

2. Nails: Hot-dipped galvanized, aluminum or stainless steel in locations exposed to moisture; electro-galvanized not acceptable.

3. Metal Connectors: Simpson strong Tie, Silver or Teco; types and sizes as required.

G. Attic Access Panel: Exterior Grade plywood, Medium Density Overlay (MDO) face veneer, A-C faces. Provide hardwood edge banding on all four sides. Paint exposed surface as specified in Section 09910 - PAINTING, color to match ceiling.

H. Attic Platforms and Walkways to Mechanical Equipment: Plywood, not less than 1/2-inch thick, Douglas Fir, C-C faces.

I. Insulation on Panels and Baffles: As shown on panel and baffle Details and as specified in Section 07210 - BUILDING INSULATION

2.02 FABRICATION

A. Job measurements shall be made as required for the proper fabrication of the Work.

B. Fabricate items to profiles shown or to match existing profiles.

PART 3 – EXECUTION

3.01 PREPARATION

Condition new woodwork to average prevailing humidity conditions in installation areas.

3.02 INSTALLATION AND APPLICATI ON

A. Millwork and Trim.

1. Install all millwork plumb, true, and in accordance with referenced standards. Shim as required with concealed shims. Install to a tolerance of 1/8" in 8'- 0" for plumb and level with no variations in flushness of adjoining surfaces. Install to a 1/16" maximum offset for reveal installation or to

match existing reveal.

2. Attach woodwork to anchor or blocking built in or directly attach to substrate. Secure to blocking grounds or stripping with countersink concealed fasteners and blind nailing as required for a complete installation. Nail through solid material. Fill, stain and finish nail holes to match adjacent surfaces Use fine finishing nails for exposed nailing, countersink and fill flush with wood putty.

3. Sealant called for in Drawings shall be inspected by State Engineer prior to being concealed.

4. Ease all exposed edges of all millwork.

5. Install millwork as indicated on the Drawings and as required for complete finish Work. Miter corners of running trim and finished frames.

6. Where applicable, new trim shall align with existing trim and be cut or, coped as necessary to match existing.

7. Where existing trim is scribed to fit ceramic tile or other wall materials. New trim pieces shall be similarly scribed to fit existing conditions.

8. If baseboard replacement is needed at a patched area, replace for the entire wall length.

9. Provide millwork in lengths as long as are available. Where joints are unavoidable, scar such joints and stagger locations of joints on adjacent pieces.

10. All exterior millwork and trim shall be prime painted on all surfaces prior to installation. Wood shall be prime painted in accordance with Section 09910 - PAINTING.

B. Enlarged Window Openings:

1. Where lowering window sills is indicated on the Drawings, remove existing finishes, framing, trim and portion of existing window frame as required to enlarge and prepare the opening for the new window.

2. Field verify all dimensions to assure correct size of opening and that opening meets egress requirements (at required locations).

3. Construct rough opening as required for new window.

4. Install building paper, flashing paper, sealing tape and sheet metal flashing as required to direct water to the exterior.

C. Soffits, Chases, Furred Ceilings and Other Duct Enclosures:

1. Provide enclosure of new horizontal and vertical duct runs in finished rooms and in closets. Provide new trim and rework closet rods and shelves as required to put area back in working order. Verify duct run location and enclosure with Property Owner prior to installation. At all times, minimize the amount of space lost due to duct enclosure(s).

2. At enclosures in living areas, tape, mud and prime paint gypsum board, and provide base trim or other trim to match existing adjacent conditions. Stain or paint trim to match existing.

3. At enclosures in closet areas, provide enclosures of gypsum board. Tape and mud gypsum board, prime paint, and paint to match adjacent surfaces.

   a. 16 gauge galvanized steel, primed white, or

   b. Primed M.D.O, with wood outside corner or miter at vertical seams.

4. Provide a pressure relief at chases and soffits containing new ductwork and located adjacent to attics or exterior walls. Pressure relief shall be one 4" x 10" or equivalent sized grille. Locate pressure relief between chase or soffit and interior of house in an inconspicuous location acceptable to homeowner.

D. Wood Finishing: Leave ready for finish as indicated, in accordance with Section 09910 - PAINTING.

E. Nailing:

1. Use only hot-dipped galvanized fasteners as specified or aluminum nails or stainless steel nails for installation of exterior millwork and finish carpentry Work.

2. Use appropriate rough hardware where other anchorage is indicated.

3. Secure Work tight to wall with finishing nail s or screws as required, unless otherwise indicated. Countersink heads of finishing nails and screws, and fill with wood filler.

4. Hammer marks, tool marks, nail head depressions, marred surfaces and edges are not acceptable on exposed surfaces.

F. Install all items specified under other Sections that are not to be installed by manufacturer or supplier.

1. Install in accordance with the Drawings, manufacturer's printed instructions, and any additional requirements included in the respective Specification Section.

2. All wall-mounted items shall be securely fastened to solid backing or blocking as specified in the detailed Drawings.

3. Where new attic access panels are required install at locations indicated. Enlarge existing openings and panels where indicated.

3.01 ADJUSTING AND CLEANING

A. After completion of installation, clean exposed surfaces, touch up finish as required, remove and refinish damaged or soiled areas of finish, and adjust and repair damaged or defective Work as directed.

B. Provide protection for installed Work until final acceptance of Project.

PART 4 - MEASUREMENT & PAYMENT

4.01 BASIS OF MEASUREMENT AND PAYMENT

Work under this Section will not be measured for payment but will be paid for at the Contract Lump Sum Price.

Item No.	Item	Unit
06200.1	Carpentry	Lump Sum

END OF SECTION

DIVISION 7 - THERMAL AND MOISTURE PROTECTION

SECTION 07920 – JOINT SEALANTS

PART 1 – GENERAL

1.01 RELATED DOCUMENTS

The General Provisions of the contract, including General and Special Provisions and General Requirements of the Specifications, apply to the work specified in this section.

1.02 SUMMARY

Section Includes: Furnishing and installing of all exterior and interior caulking and sealing.

1.03 PERFORMANCE

Provide sealants that establish and maintain watertight and airtight continuous seals without staining or deteriorating finishes or substrates.

1.04 SUBMITTALS

A. Submit in accordance with Section 01300 - SUBMITTALS.

B. Product Data: Manufacturer's specifications recommendations, and installation instruction, including cleaning of joints surfaces, for each type of material required

C. Samples: Each color required for each of exposed sealant.

1.05 QUALITY ASSURANCE

A. Each material shall be installed in a manner and under conditions approved by the material manufacturer, comply with manufacturer's printed instruction, except where more stringent requirements are indicated.

B. Before application of each required material, confirm its compatibility with all other materials as per manufacturer's recommendations.

C. Exterior sealants shall be ultra-violet stabilized.

1.06 DELIVERY. STORAGE. AND HANDLING

A. Deliver materials to project site in original, unopened containers or bundles with labels intact.

B. Store and handle materials per manufacturer's written instructions to prevent deterioration or damage.

1.07 PROJECT CONDITION

Environmental Limitations: Do not proceed with installation of sealants when

1. Ambient and substrate temperature conditions are outside limits allowed by sealant manufacturer.

2. Substrates are wet (dry substrate if possible).

3. Joint widths are not within limits allowed by manufacturer for application required.

4 Contaminants present are capable of interfering with adhesion.

1.08 WARRANTY

A. Period: Two (2} years from date of Substantial Completion.

B. Manufacturer's Warranty: Written warranty, signed by sealant manufacturer agreeing to furnish products to repair or replace those that fail within the specified warranty period.

C. Installer's Warranty: Written warranty, signed by installer agreeing to repair or replace sealants which do not comply within specified warranty period.

PART 2 – PRODUCT

2.01 APPROVED MANUFACTUERS

A. Single Component Non-sag Polyurethane Sealant:

1. Approved Sealants:

a. Chern-Caulk 900, Bostik

b. Vulkem 116, Mameco

c. 77-A. Manus Bond

d. Sikaflex, Dika Corp

e. NP1, SonoJastic

f. Dymonic, Tremco

g. Flexiprene 1000, Polymeric Systems, Inc.

B. Single Component Non-Sag Silconized Acrylic:

1. Approved Sealants:

a. Alex Plus, OAP

b. Glidden Paint Co.

c. 67-A, Manus Bond

d. Sololax, Sonneborn Building Products Division. ChemRex Inc.

e. Tremco, Tremflex 834

C. Mildew-Resistant Silcone Sealant:

1. Approved Sealants:

a. 786 Mildew Resistant; Dow Corning

b. Sanitary 1700; GE Silicones

c. NuFlex 302; NUCO Industries, Inc.

d. 898 Silicone Sanitary Sealant; Pecora Corporation

e. PSI-601; Polymeric Systems, Inc.

f. Omniplus, Sonneborn Building Products Division, ChemRex, Inc.

g. Tremsil600 White; Tremco

D. Acoustical Sealant:

Approved Sealants:

a. AC-20 FTR Acoustical and Insulation Sealant;Pecora Corp.

b. Sheetrock Acoustical Sealant; USA Corp.

c. Tremflex 834; Tremco

2.02 AVAILABLE PRODUCTS

A. Compatibility: Provide sealants, backings and other related materials compatible with one another and with substrates.

B. Colors: To match existing adjacent materials as closely as possible.

C. Elastomeric Sealant Standard: Comply with ASTM C920 for each liquid-applied, chemically cured sealant.

D. Stain-Test Characteristics: Non-staining to porous substrates according to ASTM C 1248.

2.03 ACRYLIC LATEX SEALANT

A. Comply with ASTM C834 for interior use.

1. Characteristics:
Type and Grade: S (single component) and NS (Non-Sag).

2. Class 5.

3. Use: Non Traffic (NT).

4. Paintable, non-toxic, water based, silconize acrylic, dries clear within 24 hours.

2.04 ACOUSTI CAL SEALANT

A. Provide manufacturer's non-sag, paintable, non-staining and permanently flexible sealant to comply with ASTM C 834. Product shall effectively reduce airborne sound transmission through perimeter joints and openings in building construction as demonstrated by testing representative assemblies per ASTM E90-02 (and later revisions). Concealed Joints

B. Provide manufacturer's standard, non-drying, non-hardening, non-skinning, non-staining, gun-able synthetic rubber sealant recommended.

2.05 ELASTOMETRIC SEALANT

A. Comply with ASTM C 920, for exterior use including attics and unheated spaces.

B. Characteristics:

1. Type and Grade: S (single component) and NS (Non-Sag).

2. Class: 25.

3. Use: Non-Traffic (NT).

2.06 MILDEW RESISTANT SILICONE SEALANT

A. Provide products formulated with fungicide intended for sealing interior ceramic tile joints and other non-porous substrates subject to in-service exposures to high humidity and temperature extremes.

1. Characteristics:

2. Type and Grade: S (single component) and NS (Non-Sag).

3. Class: 25.

4. Use: Non-Traffic (NT).

2.07 MISCELLANEOUS MATERIALS

A. A Joint Primer/Sealer: As recommended by sealant manufacturer where required for adhesion of sealant to substrate.

B. Provide sealant backings of materials and type that are non-staining, compatible with substrates, sealant, primers and other joint fillers; and are approved for applications

C. Cylindrical Backings: ASTM C1330, of type indicated below and of size and density to control sealant depth and contribute to optimum performance.

1. Type C: Closed cell material with a surface skin.

2. Type O: Open-cell material.

3. Type B: Bicellular material with a surface skin.

D. Bond-Breaker Tape: Polyethylene or plastic tape for hack of joint to prevent sealant adhesion to substrate, self-adhesive where applicable.

E. Cleaners: Chemical cleaners acceptable to manufacturers of sealants and sealant backing materials, free of oily residues or other substances capable of staining or harming substrates and adjacent finishes.

F. Masking Tape: Non-staining, non-absorbent material compatible with sealants and surfaces adjacent to joints.

G. All materials used in association with sealants shall comply with requirements of sealant manufacture, and shall be compatible with adjacent sealants.

PART 3 - EXECUTION

3.01 INSTALLATION

A. Clean joint surfaces immediately before installation of sealant.

1. Remove dirt, mortar, dust, debris, insecure coatings, moisture, and other substances that would interfere with bond of sealant.

2. Apply sealant according to manufacturer's specified conditions for humidity levels.

3. Use cleaning solvent to clean all joint surfaces.

4. Wipe joints free of solvent, using clean, dry, white cotton cloths or white, lint less paper.

5. Remove excess solvent immediately from all surfaces.

B. Prime or seal joint surfaces to receive sealant. Install continuous sealant at all joints between new Work and existing construction, at all joints between components of new Work , at all locations shown on Details, and at all locations where required to prevent moisture from entering the building or penetrating into the structure of roofs, walls and floors.

1. All surfaces to receive sealant shall be primed with primer recommended by sealant manufacturer.

2. Do not allow primer/sealer to spill or migrate onto adjoining surfaces.

C. Install sealant backer rod for elastomeric sealants where joints are wider than 3/16 inch, except where recommended to be omitted by sealant manufacturer for application shown, or backed by other solid substrate.

D. Install bond-breaker tape wherever backer rod is not used and wherever required by manufacturer's recommendations to ensure that elastomeric sealants will perform properly.

E. Employ manufacturer's installation guidelines to ensure that sealants will be deposited in uniform, continuous ribbons without gaps or air pockets, with complete "wetting" of joint bond surfaces equally on opposite sides. Apply by gun with cartridge nozzle cut to width of joint where possible. Fill joint completely, forcing sealant to contact sides of joint.

1. Except as otherwise indicated, fill sealant rabbet to a slightly concave surface, slightly below adjoining surfaces.

2. Where horizontal joints are between a horizontal surface and a vertical surface, fill joint to form a slight cove, so that joint will not trap moisture and dirt.

F. Install sealants to depths as recommended by sealant manufacturer, but within following general limitations. Fill joints wider than ¼ inch to a depth no greater than the joint width, but not more than ½ inch deep or less than ¼ inch deep.

3.02 CLEANING AND CURING

A. Clean adjoining surfaces with methods safe for the finishes of adjoining surfaces.

B. Cure sealants in compliance with manufacturer's recommendations to obtain high early-bond strength, internal cohesive strength, and surface durability.

C. Leave the Work free of sags, smears, droppings and discontinuous coverage.PART 4 - MEASUREMENT AND PAYMENT

4.01 BASIS OF MEASUREMENT AND PAYMENT

Work under this Section will not be measured for payment but will be paid for at the Contract Lump Sum Price.

Item No.	Item	Unit
07920.1	Sealants and Caulking	Lump Sum

END OF SECTION

DIVISION 8 – DOORS AND WINDOWS

SECTION 08050 – BASIC DOORS, MATERIALS & METHODS

PART 1 – GENERAL

1.01 RELATED DOCUMENTS

The General Provisions of the contract, including General and Special Provisions and General Requirements of the Specifications, apply to the work specified in this section.

1.02 SUMMARY

Section Includes: Furnishing and installing all fiberglass doors, including factory preparation (pre-machining) for finish hardware.

1.03 SUBMITTALS

A. Submit in accordance with Section 01300 - SUBMITTALS.

B. Product Data: Manufacturer's specifications for doors proposed for this Project

C. Shop Drawings: Indicate location, size, and hand of each door; elevation of each kind of door.

D. Maintenance Instructions: Provide door manufacturer's maintenance instructions to each property owner with new door

E. Warranty: Submit samples of manufacturer's warranty.

1.04 QUALITY ASSURANCE

Manufacturers: Firms regularly engaged in manufacture of fiberglass doors of the types and sizes required, whose products have been in satisfactory use in similar service for not less than 5 years.

1.05 DELIVERY. STORAGE. AND HANDLING

A. Manufacturer shall prime all four edges of doors before shipment. Primer shall be compatible with specified finish.

B. Manufacturer shall provide clearly labeled protective wrapping or containers for shipping. Comply with door manufacturer's

recommendations for handling, storage and protection.

C. Schedule deliveries so that no interruption or delay in work will occur.

1.06 WARRANTY

Provide a door manufacturer's written warranty against defects in materials and workmanship. Warranty shall include removal of defective doors and refinishing and reinstallation that may be required because of repair or replacement of defective doors. Exterior doors shall have a warranty period of 1O years from recordation of Notice of Completion.

PART 2 – PRODUCTS

2.01 DOORS

Manufacturer: Masonite, Weathermaster, Jeld-wen, Steven & Sons

1. Door Type: Jalousie Storm Doors (16 louvers, full jalousie)

2. Door Type: Slab, 1-3/4 inch thick, Woodgrain Flush Solid Core unfinished hardwood slab or pre-hung.

3. Or approved equal

2.02 MATERIALS

1. Panels, Stiles, and Rails
   Door Skins: Smooth Flush Hardwood solid core hardwood material.
2. Or approved equal

A. Provide the following door clearances, unless otherwise noted.

1. Provide 1/8-inch at head and jambs.

2. Provide 3/8-inch maximum between bottom of door and top of threshold.

PART 3 – EXECUTION

3.01 PREPARATION

A. Remove existing doors and weather-stripping, if any. Verify that size and condition of door frames are as required for proper installation of doors.

B. Repair or replace out-of-plumb openings that would hinder installation of doors.

3.02 INSTALLATION

A. Install doors in accordance with requirements of manufacturer's warranty.

1. All new doors shall be installed the same day that the existing doors they are to replace are removed.

2. Temporary doors, boards, plywood or other means of closing the openings will not be permitted.

B. Fit to frames and machine for hardware to whatever extent not previously worked at factory as required for proper fit and uniform clearance at each edge. Finish: Apply to all six surfaces of doors and to muntins, frames, stops, and trim in accordance with manufacturer's instructions.

1. Paint: Semi-gloss finish as specified.

2. Stain: Stain finish as specified.

C. Install new hardware as specified.

3.03 ADJUST AND CLEAN

A. Replace or re-hang doors that are hinge-bound and do not swing or operate freely.

B. Factory Finished Doors: Replace doors that are damaged or do not comply with requirements. Repair or refinish doors if work complies with requirements and shows no evidence of repair or refinishing.

PART 4 - MEASUREMENT AND PAYMENT

4.01 BASIS OF MEASUREMENT AND PAYMENT

Work under this Section will not be measured for payment but will be paid for at the Contract Lump Sum Price.

Item No.	Item	Unit
08050.1	Doors	Lump Sum

END OF SECTION

SECTION 08520 - ALUMINUM WINDOWS

PART 1 – GENERAL

1.01 RELATED DOCUMENTS

The General Provisions of the Contract, including General and Special Provisions and General Requirements of the Specifications, apply to the work specified in this section.

1.02 SUMMARY

Section Includes: Furnishing and installing vinyl windows.

1.03 SUBMITTALS

A. Submit in accordance with Section 01300 - SUBMITTALS.

B. Product Data: Manufacturer's specifications and installation recommendations, including standard hardware.

C. Shop Drawings: Show full size sections at head, jamb and sill for each window type at each wall condition. Show window frame interface with adjacent wall materials for each type of construction. Include methods of anchorage, glazing, weather stripping, sealant and screens.

D. Samples: Three 6-inch tong extrusions showing permissible range of each color specified in this Section.

E. Certification: Submit certified test reports less than 5 years old verifying that windows meet specified design criteria and Sound Transmission Class ratings. Tests shall be certified by independent testing laboratories for the average size window of each type used on this Project.

F. Warranties: Submit sample warranties from manufacturer and Contractor describing coverage and terms of each warranty, and showing name and telephone number of local person responsible for resolving claims.

1.04 WARRANTY

A. Provide window manufacturer's written warranty against defects in materials and workmanship. Warranty shall cover removal and repair or replacement of defective windows and installation of new windows. Warranty period shall be for 10 years from recordation of Notice of Completion. Warranty shall be transferable to subsequent Property Owners throughout the warranty period.

B. Pigmented organic finishes on windows and component parts (such as

panning and muntins) shall be certified as complying fully with requirements of AAMA 603.8 for pigmented organic coating and shall be fully warranted against chipping, peeling, cracking and blistering for 10 years from recordation of Notice of Completion. Warranty shall be transferable to subsequent Property Owners throughout the warranty period.

PART 2 – PRODUCTS

2.01 ALUMINUM WINDOWS

A. Manufactures:

1. Jeld-Wen
    a. Horizontal Sliding: 200 Series, White.
    b. Glazing type: Double Pane.
    c. Fixed: Left Hand/Right Hand.
    d. Casement: Aluminum Frames.
2. Ply Gem
    a. Horizontal Sliding: (white).
    b. Fixed: Left Hand/Right Hand.
    c. Glazing type: Double Pane.
    d. Casement: Aluminum Frames.
3. Or approved equal.

B. Screens: Charcoal gray fiberglass mesh, in aluminum frame finished to match windows. Provide screens at operable sash.

C. Exterior Panning: Manufacturer's standard shapes.

D. Interior Trim: Manufacturer's standard strap.

2.02 MATERIALS

A. Extrusions: As recommended by windows manufacturer for strength, corrosion resistance and application.

B. Fasteners and Miscellaneous Fastening Devices: Material and strength as recommended by window manufacturer.

C. Weather-stripping: Woven pile to comply with ASTM 701.

E. Hardware: Manufacturer's standard, to comply with requirements of this Section.

1. Primary Sash Locks: Extruded aluminum, stainless steel or bronze; no plastic or die cast zinc.

2. Sash Stops: Locate to prevent over-travel of sash.

3. Sash Balances: Block and tackle type.

4. Latches: Provide single latches at horizontal sliding windows less than 3'-6" high and at double-hung windows less than 3'-0" wide. At horizontal sliding windows 3'-6" high and larger, and at double-hung windows 3'-0" wide and larger, provide two latches. Determine the number of latches by field measurements.

5. Limit Stop: Provide manufacturer's standard type.

6. Egress Windows: Provide at Bedrooms where required by applicable Code. Comply with requirements for dimensions for all egress windows.

PART 3 - EXECUTION

3.01 PREPARATION

A. Do not remove existing windows until new windows are ready for immediate installation.

B. Remove existing items carefully, to avoid damage to existing construction to remain.

C. New windows shall be sized by field measurement so that typical shim space is 1/8 inch, and no shim space exceeds 1/4 inch.

3.02 INSTALLATION

A. Field verify all dimensions and conditions of window openings. Provide blocking, shim, pack voids with insulation and sealants as indicated and required. In bedrooms with only one exit, operable portions of at least one bedroom window are subject to egress requirements of not less than 20 inches clear width, not less than 24 inches clear height, and not less than 5.7 square feet of clear open area, with finished sill height not more than 44 inches above the finished floor. Notify the Engineer if an existing finished opening needs to be enlarged to meet these requirements.

B. Modify existing openings as required to accept new windows. Work includes cutting back existing finished surfaces (such as ceramic tile,

sheetrock and wood paneling) at some window openings. Patch openings with new materials to match existing. Modifications shall not include the replacement of headers or other structural members without notification of the Engineer.

1. Where structural weakening of the existing rough window opening caused by dry rot or termite damage has been uncovered the Contractor shall proceed as follows: If the weakened material is within the first 1-1/2 inches of rough opening and wall cladding measured on all sides of the window, submit a cost proposal for repair (Change Request). Upon review and approval of the proposed cost, the State Representative will authorize the performance of this Work and issuance of a Change Order.

2. If the weakened material extends beyond the first 1-1/2 inches of rough opening and wall cladding measured on all sides of the window, notify the State Representative, then if requested submit a cost proposal to property owner for repair of all structural weakening.

3. Insert windows shall be installed over existing aluminum or vinyl nail-fin frames or existing wood frames. Wood frames exposed by removal of existing windows shall be prime painted prior to installation of new windows. Where nail-fin windows are used, install as recommended by manufacturer. Application of prime paint shall be in accordance with Section 09910 - PAINTING. Install exterior panning where required. Install interior trim at perimeter of each window.

C. Install exterior trim and sills. Finger jointed trim will not be allowed if transparent finish is required. Replace existing deteriorated window sills with new Redwood sills matching the existing sill profile. Nail with corrosion resistant finish nails. Countersink nail heads and fill with an exterior grade wood filler such as "Spackle". Before installing new exterior wood trim and sills, prime paint all surfaces in accordance with Section 0991O - PAINTING.

D. Install interior trim and sills. Finger jointed trim will not be allowed if transparent finish is required. Prior to installation of new wood trim and sills, prime paint all surfaces in accordance with Section 09910 - PAINTING.

E. Provide all exterior and interior patching and filling at openings damaged during window removal. Installation will be over lath and flashing felts in accordance with specifications of the Lathing and Plastering Contractors

Association for a complete weather-tight job. Exterior siding materials shall match accurately with adjoining surfaces.

F. Whenever wall finish is broken to remove existing windows, joints between existing sashes shall be sealed with tape, to prevent dust from penetrating the joints.

G. Removal of existing windows shall be limited to the quantity of new replacement windows to be installed the same day. In no event shall window openings be allowed to be "temporarily boarded up" with plywood, boards, etc. All replacement windows shall be installed the same day existing windows are removed.

PART 4 - MEASUREMENT AND PAYMENT

4.01 BASIS OF MEASUREMENT AND PAYMENT

Work under this Section will not be measured for payment but will be paid for at the Contract Lump Sum Price.

Item No.	Item	Unit
08520.1	Aluminum Windows	Lump Sum

END OF SECTION

SECTION 08700 - DOOR HARDWARE

PART 1 – GENERAL

1.01 RELATED DOCUMENTS

The General Provisions of the Contract, including General and Special Provisions and General Requirements of the Specifications, apply to the work specified in this section.

1.02 SUMMARY

Section Includes: Furnishing and installing door hardware and salvaging and reinstalling certain existing hardware.

1.03 SUBMITTALS

A. Submit in accordance with Section 01300 - SUBMITTALS.

B. Hardware List: Submit a complete hardware list showing the hardware groups, quantities, types, manufacturers, catalog numbers, finish samples and locations of the various articles of hardware required. Hardware groups will be referenced to door numbers which are shown on the Drawings.

1. Hardware will not be ordered until hardware list has been approved and returned.

2. Engineer's approval of hardware list will not be construed as certifying that this list is complete.

C. Close-Out Documentation Samples:

1. Provide manufacturers' warranty.

2. Provide operation and maintenance instructions to each property owner with new door hardware.

D. Samples:

1. Submit full-size operating hardware when requested by the Engineer. If substitution is requested, submit both the specified item and the proposed substitute.

2. Samples will be returned if requested by the Contractor.

1.04 QUALITY ASSURANCE

Finish hardware will comply with applicable building codes and security codes.

1.05 DELIVERY, STORAGE, AND HANDLING

A. Hardware will be delivered so that the Work on the Project may progress without delay or interruption.

B. Each article of hardware shall be individually packaged in manufacturer's original container, properly marked or labeled in conformity with the approved hardware list.

C. Templates: Furnish templates required by manufacturers of doors and frames to enable frame and door manufacturers to make proper provisions to receive hardware.

PART 2 – PRODUCTS

2.01 MATERIALS

A. General Requirements:

1. This Section is intended to specify hardware for all doors in the Project and establish a type and standard of quality , but it is the responsibility of the Contractor to furnish proper hardware for all openings ,whether specified or not.

2. If there are omissions or discrepancies in hardware groups, they shall be called to the attention of the Engineer when the hardware list is submitted.

3. No extra cost will be allowed because of changes or corrections necessary to facilitate the proper installation of any hardware.

4. All locksets and deadbolts for a building shall be from the same manufacturer.

B. Hinges: Stanley or approved equal. Widths shall be sufficient to clear trim projection when door swings 180 degrees. Hinge pins at out swinging exterior doors shall be non-removable. Hinge screws shall be countersunk flat-head wood screws not less than 1-1/2 inches long.

C. At 1-3/8 Inch Thick Doors (3'-0" x 6'-8"):1-1/2 pair per door, size 4-1/2 inches x 4-1/2 inches. Unless otherwise noted in "General Hardware Notes" on drawings, furnish and install Cylindrical Locksets and Latch sets as noted on “Door Hardware Modifications” schedule: Corbin-Russwin. Yale, Sargent, or approved equal, meeting ANSI A156.2 Series 4000, Grade 2, Entry lockset ANSI F81 or F109. Knob shall be Corbin-Russwin (4400 Series, GWC Design), Yale (4300 Series, Carolina Design), Sargent

(6 Line, 6G05, OB Design) or approved equal, with 2- 3/8 inch or 2-3/4inch backset.

D. Single Cylinder Deadbolts: Corbin-Russwin, Yale. Sargent, meeting ANSI

A 156.5, Grade 2, or approved equal, unless existing is reused. Backset shall be 2-3/8 inches, throw shall be 1 inch. Series and designs to match lockset/latchset. Miscellaneous Hardware: The following items or approved equal. Not all of the following items may be required.

1. Thresholds:

   a. Exterior Doors: Pemko 114A, Pemko 1148, Pemko 1140 or Pemko 114G.

   b. Interior Doors: Pemko 173A, Pemko 1730 or Pemko 173G.

2. Door Shoes:

   a. Exterior Doors: Pemko 216AV, Pemko 216DV, Pemko 216GV or Pemko 216PWV.

   b. Interior Doors: Pemko 220AV. Pemko 220DV or Pemko 220GV.

3. Weather-strips: Pemko 303AS, Pemko 303DS.Pemko 303GS or Pemko 303PWS.

4. Rain Drip: Pemko 346C, Pemko 3460, Pemko 346G or Pemko 346PW.

5. Door Stop: Ives 64-MB3 or Ives 64-MB26D.

F. Fasteners: Furnish necessary screws, bolts, nuts and other items as required or suitable types and sizes.

1. Fasteners shall match hardware material and finish.

2. Furnish required wedge anchors and other anchors as recommended by the hardware manufacturer.

3. Furnish machine screws for hardware fastened to concrete.

G. Keys and Keying:

1. Key all new locksets and deadbolts alike at each living unit, and key locksets and deadbolt at each living unit differently from all other living units. Master key new locksets and deadbolts in each building.

2. Furnish two sets of keys for new locksets and deadbolts and two

master keys per building to property owner.

H. Hinge Lockset and Deadbolt Finishes: Unless shown otherwise on the Drawings under "Door Hardware Modifications" or "Miscellaneous Modifications" provide hardware finishes to match existing hardware. Finishes indicated on the Drawings are:

1. Hinge Finishes:

a. Bright Brass 605 (US3).

b. Satin Chrome: 626 (US26D).

c. Bright Chrome: 625 (US026).

d. Oil-Rubbed Bronze: 613 (US10B).

2. Lockset and Deadbolt Finishes:

a. Bright Brass: 605 (US3).

b. Satin Chrome: 626 (US260).

c. Bright Chrome: 625 (US026).

d. Oil-Rubbed Bronze: 613 {US10B).

PART 3 – EXECUTION

3.01 INSTALLATION APPLICATION

A. Finish hardware shall be neatly and properly installed in accordance with the best practices as prescribed by the manufacturer. Where existing hardware is reused, salvage, clean and reinstall existing hardware in accordance with accepted trade practices. Rain Drip: Install rain drip in bed of silicone sealant, using fasteners of adequate length to attach rain drip securely.

B. Items of hardware not definitely specified herein, but necessary for completion of the Work shall be provided at no additional cost. Such items shall be the type and quality suitable for the service required and comparable to adjacent hardware.

C. Hardware specified herein ls for typical door conditions. If conditions at certain doors are not typical, provide hardware of the same quality suitable for such conditions, with specified operational and functional features, and with the same finish. Sizes shall be adequate for service to which articles of hardware shall be subjected in course of normal use. Such hardware

will be subject to approval of the Engineer and shall be provided at no additional cost.

3.02 CLEANING

At completion of the Work, all protective coverings shall be removed and all hardware shall be cleaned and polished.

PART 4 - MEASUREMENT AND PAYMENT

4.01 BASIS OF MEASUREMENT AND PAYMENT

Work under this Section will not be measured for payment but will be paid for at the Contract Lump Sum Price.

Item No.	Item	Unit
08710.1	Door Hardware	Lump Sum

END OF SECTION

DIVISION 9 – FINISHES

SECTION 09290 - GYPSUM BOARD

PART 1 – GENERAL

1.01 RELATED DOCUMENTS

The General Provisions of the contract, including General and Special Provisions and General Requirements of the Specifications, apply to the work specified in this section.

1.02 SUMMARY

Section Includes: Furnishing and installing gypsum board, complete with all related accessories and fasteners.

1.03 QUALITY CONTROL

A. Manufacturers: Gypsum board throughout the Project, including accessories and fasteners, shall be produced by one manufacturer.

B. Codes and Standards: Work shall comply with the applicable requirements of Gypsum Association publication GA-216, "Recommended Specifications for the Application and Finishing of Gypsum Board," and the Uniform Building Code, Chapter 25.

C. Construction Tolerances:

1. Gypsum board surfaces shall have no measurable variation in any 2-foot direction and a maximum variation of 118-inch in 10-feet 0-inches when a straight-edge is laid on the surface in any direction.

2. Shim Work as required to comply with specified tolerances.

3. Do not exceed 1/16-inch offset between planes of abutting sheets at edges or ends.

1.04 DELIVERY. STORAGE. AND HANDLING

A. Store materials inside under cover and stack flat.

B. Stack gypsum board so that longer lengths are under shorter lengths. Gypsum board shall not be stored or stacked on floors of new Work in excess of forty pounds per square foot equivalent loading.

1.05 PROJECT CONDITIONS

A. Environmental Conditions:

1. Temperature: During cold weather, in areas receiving gypsum board installation, maintain temperature range between 55 degrees and 70 degrees F for (24) hours before, during and after gypsum board and joint treatment application.

2. Ventilation:

   a. Provide ventilation during and following adhesives and joint treatment applications.

   b. Use temporary air circulators in enclosed areas lacking natural ventilation.

   c. Under slow drying conditions allow additional drying time between coats of joint treatment.

   d. Protect installed materials from drafts during hot, dry weather.

B. Protection: Protect adjacent surfaces against damage and stains.

PART 2 – PRODUCTS

2.01 MATERIALS

A. Gypsum Board: U.S. Gypsum, National Gypsum, Dotmar Gypsum or approved equal.

   1. Regular Board:

      a. ASTM C 36 or FS SS-L-30, Type Ill, Grade R, Class 1.

      b. Thickness: 1/2-inch, unless shown otherwise.

   2. Water-Resistant Regular Board:

      a. ASTM C 630.

   3. Thickness: 1/2-inch, unless shown otherwiseFire-Rated Board: As required by applicable code, 5/8 inch and 1 inch thickness.

B. Fasteners:

   1. Phillips head screws with bugle shape, Type W at wood framing.

   2. Sizes of fasteners shall be as required by code and as recommended by gypsum board manufacturer

C. Metal Reinforcements, Channels and Casing: Electro-galvanized.

   1. Exterior Corner: 1-inch x 1-inch flange: USG #101 Dur-A-Bead or

approved equal.

2. Intersection of Wallboard with Dissimilar Material: USG #200-B metal trim or approved equal.

D. Gypsum Board Joint Treatment Materials:

1. Joint Tape:

a. ASTM C 475 or FS SS-J 570, Type II.

b. Perforated Tape.

2. Joint and Finishing Compound:

a. ASTM C 475 or FS SS-J-570, Type I.

b. Ready-mixed joint compounds.

c. All-purpose joint compound.

d. U.S. Gypsum W/R Compound for water-resistant board.

3. Pre-fill Joint Compound:

a. ASTM C475 or FS SS-J-570, Type I.

b. Powdered joint compound.

E. Mechanical Access Panels: As required for access to mechanical equipment.

1. Resilient Channels and Metal Studs: 2-1/2 inch structural stud, 20 gauge, ClarkDietrich Building Systems.

2. RC Deluxe Resilient Channel. ClarkDietrich Building Systems

PART 3 – EXECUTION

3.01 INSPECTION

A. Check framing for accurate spacing and alignment.

B. Verify that spacing of installed framing does not exceed maximum allowable for thickness of board to be used.

C. Do not proceed with installation until deficiencies are corrected and surfaces are acceptable.

D. Protrusions of framing, twisted framing members, or unaligned

members must be repaired before installation of wallboard is started.

3.02 INSTALLATION

A. Work shall comply with all applicable requirements of GA-216, except where more stringent requirements are specified herein, by local codes, or by manufacturer of board.

1. Apply water-resistant gypsum board at locations exposed to water.

2. Construct all gypsum board enclosures, shafts, furring and suspended ceilings indicated on Drawings, to conceal ducts and pipes installed for this Project. Install components of suspended ceilings and fire-rated assemblies in accordance with requirements of applicable codes.

B. Attach boards with fasteners as specified here in.

C. Apply boards with long dimension perpendicular to framing members with all abutting ends and edges over supports.

D. Neatly fit and stagger all end joints.

E. Brush cut edges and penetrations of water-resistant board with thinned water resistant CN/R) compound.

F. Make joints occur on different studs at opposite sides of partition.

G. Cut and fit neatly around an outlets and switches. Erection technique shall result in plumb and straight surfaces with no waves or buckles, free of unevenness at joints.

H. Installation of Gypsum Board Fasteners:

1. Space fasteners as required by code.

2. Screws: Spaced not more than 16-inches at walls, 12-inches at ceiling.

3. Modify fastener spacing as recommended by gypsum board manufacturer and as required to comply with fire-rating requirements.

4. Do not locate fasteners less than 3/8-inch from edges or ends of sheets.

5. Space fasteners in accordance with GA-216 recommendations.

6. Drive screws with power screwdriver recommended by gypsum board manufacturer.

7. Do not hammer-drive screws.

8. Do not break through paper surface of gypsum board.

9. Set fastener heads slightly below surface of gypsum board, but not break or strip paper face around fastener.

10. Stagger fasteners opposite each other on adjacent ends or edges.

11. Omit fasteners at edges where metal edge trim will be installed.

I. Metal Trim:

1. Apply trim at all exterior corners and at interior corners where gypsum board intersects metal or other dissimilar material.

2. No splicing permitted.

3. Run trim straight and square with all planes.

J. Remove and replace sheets damaged in handling or installation.

K. For conditions not specified or shown on the Drawings, follow procedures recommended by U.S. Gypsum Company.

3.03 Leave surfaces in a clean condition, ready for taping and painting.

3.03 TEXTURED FINISHING

A. Surface Preparation and Primer: Prepare and prime drywall and other surfaces in strict accordance with texture finish manufacturer's instructions. Apply primer to all surfaces to receive texture finish.

B. Finish Application : Mix and apply finish to drywall and other surfaces to receive finish in strict accordance with manufacturer's instructions to produce uniform texture, without starved spots or other evidence of thin application and free of application patterns. Provide base coat of textured finish on rebuilt ceiling with textured finish. Apply a prime coat over rebuilt, existing ceiling.

C. Remove all texture drippings or over spray from doors, windows, frames, walls, floor and other adjoining construction.

3.04 TAPING AND FINISHING

A. Mix joint and finishing compounds in accordance with manufacturer's

directions.

B. Center tape over joint and embed in uniform layer of joint compound of sufficient width and depth to provide firm and complete bond.

1. Apply skim coat while embedding tape.

2. At water-resistant gypsum board, fill all fastener heads, penetrations, and joints with water-resistant f>N/R) compound.

C. Treat angles with reinforcing tape folded to conform to adjacent surfaces and straight, true angles.

D. Provide minimum twenty-four (24) hours drying time between applications of compounds.

E. Apply coat of finishing compound over Joint compound and tape.

1. Spread evenly and feather out beyond edge of gypsum board.

2. After first finishing coat is thoroughly dry, cover with second coat with edges feathered out slightly beyond the preceding coat.

F. Give all dimples at fastener heads and all marred spots on surface of gypsum board one coat joint compound and two coats finishing compound, applied in same manner as for joints specified above.

G. Conceal flanges of metal reinforcement with minimum two coats compound. Compound shall extend 8-inches to 10-inches each side of metal nosing.

H. After each application of joint or finishing compound has dried, lightly sand joints. Leave gypsum board and treated areas uniformly smooth and ready for painting or other decoration.

I. Provide fire taping only at joints of unexposed gypsum board application.

J. Texture Finish: Apply to match texture on existing adjacent surfaces.

3.05 CLEAN-UP

Before Substantial Completion and at least two days after final mudding and sanding, "vacuum clean" all areas (not just work areas) where dust has settled.

3.06 PROTECTI ON OF WORK

Provide final protection and maintain conditions, in a manner suitable to Engineer, which ensures Work is without damage or deterioration at the time of

Substantial Completion.

PART 4 - MEASUREMENT AND PAYMENT

4.01 BASIS OF MEASUREMENT AND PAYMENT

Work under this Section will not be measured for payment but will be paid for at the Contract Lump Sum Price.

Item No.	Item	Unit
09290.1	Gypsum Board	Lump Sum

END OF SECTION

SECTION 09910 – PAINTING

PART 1 - GENERAL

1.01 RELATED DOCUMENTS

The General Provisions of the contract, including General and Special Provisions and General Requirements of the Specifications, apply to the work specified in this section.

1.02 SUMMARY

Section Includes: Furnishing of materials and equipment and completion of painting and painter's finish on exposed exterior and interior surfaces as required to complete finishing of the Work.

1.03 SUBMITTALS

A. Submit in accordance with Section 01300 - SUBMITTALS.

B. Product Data:

1. Submit a complete list of materials proposed for use, together with manufacturer's specifications.

2. Paint materials and products will be subject to the Engineer's approval.

1.04 QUALITY ASSURANCE

A. Each completed painted surface shalt have a uniform, finished appearance.

B. Touch-up painting will not be permitted unless approved by the Engineer.

1.05 DELIVERY. STORAGE. AND HANDLING

A. Deliver sealed containers with labels legible and intact.

B. Storage of Materials:

1. Store only acceptable Project materials.

2. Store in a secure location. No items shall be stored within the property owner's premises.

3. Restrict storage to paint materials and related equipment.

4. Comply with health and fire regulations.

1.06 PROJECT CONDITIONS

A. Environmental Requirements:

1. Comply with manufacturer's recommendations as to environmental conditions under which coatings and coating systems can be stored and applied.

2. Do not apply finish in areas where dust is being generated.

B. Protection: Cover or otherwise protect finish Work of other trades and surfaces not being painted concurrently or not to be painted.

PART 2 – PRODUCTS

2.01 MATERIALS

A. Products specified are as manufactured by Sherwin-Williams, Mautz, Pittsburg Paints, Valspar, Glidden, Benjamin Moore, or approved equal.

B. Materials selected for coating systems for each type surface shall be the product of a single manufacturer.

C. Materials for General Use:

1. Thinner: As recommended by each manufacturer for their respective product.

2. Linseed Oil: Pure first quality, conforming to Federal Specification TT-0-364 or ASTM D 260.

3. Putty: Pure linseed-oil putty of standard manufacture, with sufficient varnish; thoroughly mixed to prevent the possibility of shrinkage. Color will match the final finish of adjoining surfaces.

4. Turpentine: FS TT-T-801.

5. Shellac: Type I, bleached, No. 4, cut with pure grain alcohol, conforming to Federal Specifications TT-V-916 or ASTM D 207.

D. Primer: As specified in this Section for each painting system. Unsuitability of Specified Products: Claims concerning unsuitability of any material specified (or his inability to satisfactorily produce the Work) will not be entertained, unless such claim is made in writing to the Engineer before the Work is started.

2.02 COLORS

A. Color and sheen of new paint shall match color and sheen of existing paint on same or adjacent surface.

B. The Engineer will be the sole judge of the acceptability of colors.

2.03 MIXING AND TINTING

A. Deliver paints ready mixed to the job site.

B. Accomplish job mixing and job tinting only when acceptable to the paint manufacturer.

C. Mix only in mixing pails placed in suitably sized nonferrous or oxide-resistant metal pans.

D. Use tinting colors recommended by manufacturer for specific type of finish.

PART 3 – EXECUTION

3.01 INSPECTION

A. Examine surfaces scheduled to receive paint and finishes for conditions that will adversely affect execution, permanence, or quality of Work and that cannot be put into acceptable condition through preparatory Work as included in Article 3.02, "Preparation of Surfaces". Repair and patch existing surfaces as required. New Work shall match existing.

B. Do not proceed with surface preparation or coating application until conditions are suitable.

3.02 PREPARATION OF SURFACES

A. Metals:

1. Remove mill scale, rust, and corrosion.

2. Clean oils, grease, and dust from surfaces using mineral spirits. Touch up all chipped or abraded areas in shop coatings using appropriate primer.

3. Galvanized surfaces shall be brushed with a wash coat made by dissolving 8 ounces copper acetate or copper sulfate in 1gallon of water.

B. Stucco:

1. Patch to match existing, where existing finish is disturbed for new Work. Fill cracks and irregularities with grout or patching mortar to provide uniform surface texture.

2. Surfaces shall not be painted until they have completely cured and have a stabilized moisture content, within limits recommended by paint manufacturer.

3. Where stucco is patched on two or more openings of the same wall plane, that entire wall shall be repainted.

C. Gypsum Board or Plaster:

1. Patch to match existing, where existing finish is disturbed for new Work. Fill narrow cracks and small holes with spackling compound.

2. Sand smooth after drying; do not raise nap of paper on board.

3. Where gypsum board or plaster is patched on two or more openings of the same wall plane, that entire wall shall be repainted.

D. Wood:

1. Fill nail holes, cracks, open joints and other defects with filler.

2. Sand to smooth and even surfaces.

3. Prior to the installation of new Work, prime-paint existing exterior wood sills, millwork, trim and wood surfaces exposed by the removal of existing doors and windows, or damaged by installation of new Work. Use primer specified for the applicable exterior wood painting system.

E. Surfaces that cannot be prepared or painted as specified shall be immediately brought to the attention of the Engineer in writing.

1. Starting Work without such written notification shall be considered acceptance by the Contractor of surfaces involved.

2. The Contractor shall replace unsatisfactory work caused by improper or defective surfaces, as directed by the Engineer, at no additional cost to the State.

3.03 APPLICATION

A. Do not apply initial coating until moisture content of surface is within limitations recommended by paint manufacturer.

B. Painting:

1. Apply paint with suitable brushes, rollers, or spraying equipment.

2. Rate of application shall not exceed that as recommended by paint manufacturer for surface involved.

3. Apply prime paint to all new wood surfaces prior to installation. All surfaces shall include surfaces to be concealed by construction.

C. Comply with recommendation of product manufacturer for drying time between succeeding coats.

D. Finish coats shall be smooth and free from brush marks streaks, laps or pile-up of paints, and skipped or missed areas.

E. Leave all parts of moldings and ornaments clean and true to details with no undue amount of paint in corners and depressions.

F. Make edges of paint adjoining other materials or colors clean and sharp with no overlapping.

G. When repainting existing surfaces, paint entire surface to natural break, such as corner or joint. Repaint entire door frame and window frame; touch-up shall not be accepted.

H. Hardware, hardware accessories, plates, lighting fixtures, and similar items in place shall be removed prior to painting and replaced upon completion of each space.

I. Items adjacent to walls shall be disconnected by workers skilled in the appropriate trades, and moved to permit surfaces to be painted. Following completion of painting, items shall be expertly replaced and reconnected Paint doors with prime and finish coats on all six sides and cutouts.

3.04 CLEANING

A. Clean, prime, touch up and restore prime coat and/or finish where damaged.

B. Remove spilled, splashed, or spattered paint from all surfaces.

C. Do not mar surface finish or item being cleaned.

D. Premises shall be left in exact condition as found.

3.05 PAINT SYSTEMS

A. General: All exposed surfaces of new materials shall be shop painted,

except as specified under "Surfaces Not to Be Painted". All concealed surfaces of new exterior materials shall be primed. Prime coat may be omitted when painting over existing paint.

1. Interior paint systems are specified and identified herein by letter and exterior paint systems by number.

2. All materials in any one system shall be products of one manufacturer.

3. Miscellaneous items and areas within a room or space shall be treated with suitable system.

4. This Specification shall serve as a guide and is meant to establish procedure and quality; confer with the Engineer to determine exact finish desired.

5. Number of coats scheduled is minimum. Additional coat shall be applied at no additional cost if necessary to completely hide base material, produce uniform color, and provide satisfactory finish results.

B. Surfaces Not To Be Painted:

1. Items with factory-applied final finish.

2. All pipes and conduit.

3. Concrete or wood surfaces except where specifically noted on the Drawings to be painted.

4. Wall-mounted shelving, hooks, electrical cover plates.

C. Approval of Final Colors: Final coat of paint shall not be accepted until approved by the Engineer.

D. Interior Painting Systems:

1. System A - Flat Finish on Gypsum Board

1 coat W 101 Pigmented Sealer
2 coats W 401 Acrylic Copolymer

2. System B - Eggshell Finish on Gypsum Board

1 coat W 101 Pigmented Sealer
2 coats W 440 Acrylic Enamel

3. System C - Semi gloss Finish on Gypsum Board

1 coat W 101 Pigmented Sealer
2 coats W 450 Acrylic Enamel

4. System D - Semi gloss Finish on Wood

1 coat W 707 Enamel Undercoat
2 coats W 450 Acrylic Enamel

5. System E - Transparent Finish on Wood

1 coat V 108 Stain
1 coat V 161 Sealer
2 coats V 163 Varnish

E. Exterior Painting Systems:

1. System 1 - Flat Finish on Cement Plaster

1 coat W 718 Epoxy Primer
2 coats W 701 Acrylic Latex

2. System 2 - Semi gloss Finish on Galvanized Metal

1 coat 4-7 Primer (Omit where factory primed)
2 coats W 901 Acrylic Latex Enamel

3. System 3 - Semi gloss Finish on Ferrous Metal 1 coat 43-5 Primer

2 coats W 901Acrylic Latex Enamel.

4. System 4 - Semi gloss Finish on Wood

1 coat W 708 Acrylic Primer
2 coats W 901 Acrylic Latex Enamel

5. System 5 - Transparent Finish on Wood

1 coat V 108 Stain
1 coat V 161 Sealer
2 coat McCloskey "Man O'War" 6507 Marine
Spar Varnish with UV!

PART 4 - MEASUREMENT AND PAYMENT

4.01 BASIS OF MEASUREMENT AND PAYMENT

Work under this Section will not be measured for payment but will be paid for at the Contract Lump Sum Price.

Item No.	Item	Unit
09910.1	Painting	Lump Sum

END OF SECTION

DIVISION 10 - SPECIALTIES

SECTION 10520 – FIRE PROTECTION DEVICES

PART 1 - GENERAL

1.01 RELATED DOCUMENTS

The General Provisions of the contract, including General and Special Provisions and General Requirements of the Specifications, apply to the work specified in this section.

1.02 SUMMARY

Section Includes: Furnishing and installing miscellaneous specialties.

1.03 SUBMITTALS

A. Submit in accordance with Section 01300 - SUBMITTAL$.

B. Product Data: Manufacturer's catalog cuts and data sheets, complete parts list, and installation requirements for each item specified.

1.04 DELIVERY, STORAGE. AND HANDLING

A. Deliver items in manufacturer's original unopened protective packaging.

B. Store materials in original protective packaging to prevent soiling, physical damage, or wetting.

C. Handle so as to prevent damage to finished surfaces.

D. Protection:

1. Maintain protective covers on all units until installation is complete.

2. Remove protective covers at final cleanup of installation.

1.05 PROJECT CONDITIONS

Coordinate submissions of installation instruction so that backing, blocking, framing, and formwork can be properly installed and Work of other trades will not be delayed.

PART 2 - PRODUCTS

2.01 SPECIALTIES

A. Smoke Detector: Battery powered multi-purpose ionization unit with alarm as manufactured by Kidde Safety, BRK Brands Inc., First alert or equal.

1. Features: Low battery beeping signal, capability to test for proper operation.

2. Meets Underwriters Laboratories (UL) 217 Standard.

3. Approved by the California State Fire Marshall.

PART 3 - EXECUTION

3.01 INSPECTION

A. Check areas to receive specialties for conditions that would affect quality and execution of Work.

B. Verify spacing of items that affect installation of specialties.

C. Do not begin installation of specialties until conditions are acceptable.

3.02 INSTALLATION

A. Install specialties where indicated in the "Miscellaneous Modifications". Install in accordance with manufacturer's recommendations.

1. Smoke Detector: Provide in each building included in this Contract in locations shown on floor plans. Install in accordance with manufacturer's recommendations and code requirements.

a. Prior to final inspection, test alt existing smoke detectors for proper operation. If any fail to operate, submit written proposal for cost (Change Request) to make smoke detectors operable to State Engineer.

b. When directed by Change Order, perform work necessary to make all inoperable existing smoke detectors operable.

3.03 ADJUST AND CLEAN

A. Adjust specialties for proper operation.

B. After completion of installation, clean and polish all exposed surfaces of specialties and adjacent surfaces affected by the installation.

PART 4 - MEASUREMENT AND PAYMENT

4.01 BASIS OF MEASUREMENT AND PAYMENT

Work under this Section will not be measured for payment but will be paid for at the Contract Lump Sum Price.

Item No.	Item	Unit
10520.1	Miscellaneous Specialties	Lump Sum

END OF SECTION

DIVISION 13-SPECIAL CONSTRUCTION

SECTION 13280 – HAZRDOUS MATERIAL REMEDIATION

PART 1- GENERAL

1.01 RELATED DOCUMENTS

The General Provisions of the Contract, including General and Special Provisions and General Requirements of the Specifications, apply to the work specified in this section.

1.02 DESCRIPTION

This item of work shall include the furnishing of all labor, materials, tools and equipment necessary for preparation of the project site; disposal procedures; and removal or stabilization of building components coated with deteriorated lead containing paint. Work shall be performed in accordance with applicable State of Hawaii Department of Health (DOH), Environmental Protection Agency (EPA), United States (U.S.) Department of Transportation (DOT) and the Occupational Safety and Health Administration (OSHA) regulations. Lead work is regulated by OSHA 29 CFR 1926.62; State of Hawaii Occupational Safety and Health (HIOSH) 12-148.1; and EPA 40 CFR 261. Specifically, this item of work shall include the special provisions for handling and disposal of potentially hazardous materials such as lead-based paint (LBP), and lead containing paint at the Keaukaha Subdivision site.

The abatement contractor shall furnish all labor, materials, services, insurance, equipment, and decontamination facilities to carry out the work identified in these special provisions. All work shall be supervised by persons experienced in asbestos and lead abatement. During all phases of work, the abatement contractor shall have at least one supervisory employee currently certified by DOH per work area. All work shall be performed by employees currently certified by DOH as certified lead workers as specified in Hawaii Administrative Rules (HAR) 11-41.

Keaukaha Subdivision site: Areas sampled for suspect LBP include all interior/exterior portions and painted surfaces of the selected houses located at the Keaukaha Subdivision site.

1.03 SUBMITTALS

A. Submit in accordance with Section 01300 – SUBMITTALS

B. Individual written letter reports describing sampling methodology, laboratory results, recommendations, and a photo log of the sample locations and affected areas if present.

C. Contractor work plan, including review, comment and back check.

D. Lead abatement worker certification forms.

1.04. LBP HANDLING

A. The United States Environmental Protection Agency (EPA) and the Department of Housing and Urban Development (HUD) define LBP as paint or other surface coatings containing lead levels equal to or greater than (≥) 1.0 milligrams per square centimeter (mg/cm^2) or 0.5 percent by weight (other equivalent units are: 5,000 micrograms per gram [µg/g], 5,000 milligrams per kilogram [mg/kg], 5,000 parts per million [ppm] by weight). Lead-containing paint (LCP) is paint containing lead at any level less than (<) 5,000 mg/kg The EPA Resource Conservation and Recovery Act (RCCA) regulations set the limit of leachable lead in lead-containing waste at 5.0 milligrams per liter (mg/l). This level is established by an analytical method called Toxicity Characteristic Leaching Procedure (TCLP). Waste that contains leachable lead at concentrations ≥5.0 mg/l is defined as hazardous waste and must be transported to a hazardous waste treatment, storage, or disposal (TSD) facility. Lead-containing waste or potential waste shown to have a total lead content ≥100 mg/kg may exceed the RCRA TCLP standard for leachable lead, and must be analyzed by TCLP prior to disposal. Thus, while the EPA does not regard work performed on paint containing 5,000 mg/kg to be a LBP activity, the waste from such activities may still be regarded as hazardous under RCRA.

B. According to 40 Code of Federal Regulation (CFR) 745, the EPA clearance standard for maximum allowable residual lead dust on floor surfaces is 40 micrograms per square foot (µg/ft^2). The EPA clearance standards for maximum allowable residual lead dust on window sills and troughs are 250 µg/ft^2 and 400 µg/ft^2, respectively. Lead in surface dust can come from weathering and chipping of LBP, renovation, and demolition activities that break a surface painted with LCP (e.g., scraping, sanding), and abrasion on doors and windows.

C. Lead soil contamination can result when lead paint becomes dislodged from building materials and enters the surrounding soils. In order to characterize potential soil lead contamination, the State of Hawaii Department of Health (HDOH) recommends utilization of the multi-increment (MI) sample collection. The MI sampling procedure reduces data variability and increases reproducibility. As a result, soil contamination in a decision unit (DU) can be characterized with a high degree of confidence and appropriate actions can be taken (HDOH, 2011).

The HDOH has established an Environmental Action Level (EAL) for lead in soil. The HDOH EAL for lead in soil is 200 mg/kg for unrestricted land use activities.

2 BEDROOM HOUSE RENOVATION

LEAD-PAINT SURVEY

1.05 PAINT CHIP SAMPLE COLLECTION

A. Methodology

1. Environet collected fourteen (14) paint chip samples from painted surfaces of the Site in accordance with the EPA guidelines and recommendations (figure 2). Each paint chip sample consisted of an approximately two- to four-inch square section of pain scraped off the building material with a paint scraper and placed in a labeled, re-sealable plastic bag. The samples were then placed into a second re-sealable plastic bad for storage. Sampling equipment was cleaned between each sample to avoid cross-contamination. The conditions of the potentially lead-containing material were noted.

2. The samples were logged and recorded following strict chain-of-custody (COC) procedures and submitted to Hawaii Analytical Laboratories, Inc. (HAL) for analysis by atomic adsorption spectrometry (AAS) using EPA Method 7082M. HAL is accredited for lead analysis in paint chips through the American Industrial Hygiene Association (AIHA Environmental Lead Proficiency Analytical Testing (ELPAT) Program.

B. Results

1. None of the paint chip samples contained concentrations of lead in

excess of the EPA/HUD guideline of 5,000 mg/kg, the definition of LBP. However, three (3) of the 14 paint chip samples contained concentrations of lead at levels <5,000 mg/kg, above the laboratory reporting limit (RL), and therefore are considered to be LCP. The lead levels detected below 5,000 mg/kg, above the laboratory RL are summarized below:

Sample ID	Location	Component	Substrate	Color	Result (mg/kg)	Reporting Limit (mg/kg)
82Andrews-L5	Main Entrance	Stairs	Concrete	Red/Gray	500.0	39.0
82Andrews-L8	Exterior Roof	Fascia	Wood	Gray	65.0	39.0
82Andrews-L10	Main Entrance	Stairs	Wood	Gray	110.0	39.0

Notes:
mg/kg = milligrams per kilogram
ID = identification

1.06 DUST WIPE SAMPLE COLLECTION

A. Methodology

1. Environet collected four (4) dust wipe samples at the Site to identify those locations where lead dust hazards may exist, as well as one (1) blank wipe sample for quality control purposes. Upon arrival, a visual inspection was performed in order to assess conditions that could result in exposure to LBP. Lead dust sampling was performed in accordance with 40 CFR 745 and the EPA Lead Dust Sampling Technician Field Guide (2009; EPA-W-04-022). Federal and State regulations define the following as threshold levels for lead dust in residence: 40 µg/ft² for floors; 250 µg/ft² for window sills; and 400 µg/ft² for window troughs (CRF, 2004).

2. Ghost Wipes and pre-measured 1 square foot (144 square inches) frame/template were used to wipe the prescribed floor surface area for each dust wipe sample. The window sill surface wipe area for each window sill was measured and wiped according to varying size of the window sills at the Site. Wipe area measurements were documented and noted for laboratory reporting purposes.

3. Each sample was placed into a sealable 50-milliliter (ml) plastic tube, properly labeled and recorded following strict COC procedures, and submitted to HAL for analysis by AAS using EPA Method 7082M. HAL is accredited for lead analysis in dust wipe

samples through AIHA ELPAT Program.

B. Results

1. Lead was detected at a concentrate equal to or exceeding the laboratory RL in two (2) of the samples collected at the Site; however, the detections did not exceed the regulatory limit. Lead was not detected at or above the reporting limit in the blank wipe sample (Table 2). (See Division 1, Section 01715, Attachment; Lead-Based Paint Survey Inspection Pgs. 1-48)

1.07 SOIL SAMPLE COLLECTION

A. Methodology

1. Four (4) DUs were defined for the investigation at the Site (Figure2). According to sampling theory (Pitard, 1993) and HDOF (2011), a minimum of 30 increment samples per DU is generally recommended in order to obtain a reliable estimate of mean concentration in a given DU. Thirty (30) incremental surface soil samples were randomly collected within each DU (Figure 2). (See Division 1, Section 01715, Attachment; Lead-Based Paint Survey Inspection Pgs. 1-48)

2. At each increment soil sample location, a uniform mass of soil was taken and then placed directly into a double-bagged Ziploc® bag. The samples were then delivered to HAL for analysis of total lead using EPA Method 7000B. Following HDOH guidance, a triplicate sample was collected as a field quality control method, the results of which were within acceptable agreement with the primary sample shown in Table 2. (See Division 1, Section 01715, Attachment; Lead-Based Paint Survey Inspection Pgs. 1-48)

B. Results

1. Four primary MI samples consisting of 30 increments, along with a duplicate and triplicate sample, were collected at the Site. Lead levels detected in two of the four all samples were above the HDOH EAL for unrestricted land use (Table 3). This suggests that the surface soil is contaminated with lead at levels above the HDOH EAL at the Site. (See Division 1, Section 01715, Attachment; Lead-Based Paint Survey Inspection Pgs. 1-48)

1.08 CONCLUSIONS AND RECOMMENDATIONS

A. Environet collected representative samples of paint chips, dust wipes, and surface soil from the Site. Results indicated the following:

1. Three (3) paint chip samples collected from the Site contained concentration of lead at levels <5,000 mg/kg, and above the laboratory RL. Therefore, LBP is not present in painted surfaces at the Site, however LCP is present at the Site (Table 1).

2. Lead dust was detected at a concentration equal to or exceeding the laboratory RL in two (2) of the dust wipe samples collected at the Site; however, the samples were not detected at or in exceedance of the regulatory limit (Table 2). (See Division 1, Section 01715, Attachment; Lead-Based Paint Survey Inspection Pgs. 1-48)

3. Lead was detected at concentrations above the HDOH EAL for unrestricted residential use in all soil samples collected from the Site (Table 3; Figure 2).

   (See Division 1, Section 01715, Attachment; Lead-Based Paint Survey Inspection Pgs. 1-48). Therefore, the surface soil is considered contaminated with lead at levels above the HDOH EAL.

4. If suspect building components not yet sampled are discovered during renovations, they should be considered hazardous until proven otherwise by qualified lead paint contractor.

5. Although the EPA does not require paint with lead to be removed prior to demolition or renovation activities, the United States Occupational Safety and Health Administration (OSHA) and Hawaii Occupational Safety and Health requirements still apply for the potential of worker exposure to any amount of lead that may be in the paint. Proper Engineering controls and monitoring by a qualified lead abatement contractor under controlled conditions is recommended if the tested building components undergo renovations.

6. Demolished building materials must undergo TCLP sampling prior to disposal, in order to determine if they contain leachable lead at

concentrations equal to or greater than the RCRA limit of 0.5 mg/l. If the TCLP sampling reveals concentrations above 5.0 mg/l, the waste must be transported to a hazardous waste TSD facility. Lead-containing waste or potential waste shown to have a total lead content equal to or exceeding 100mg/kg may exceed the RCRA TCLP standard for leachable lead, and therefore must be analyzed by TCLP prior to disposal.

7. Results of the LBP survey were incorporated into a Limited Lead Risk Assessment Report. The Limited Lead Risk Assessment conducted for the Site is included as attachment 4 of this report. The Limited Lead Risk Assessment identifies lead hazards present at the Site, as well as recommendations to address these hazards. Abatement Cost estimates are presented in Attachment 7. (See Division 1, Section 01715, Attachment; Lead-Based Paint Survey Inspection Pgs. 1-48)

2 BEDROOM HOUSE RENOVATION

ASBESTOS SURVEY

1.09 INTRODUCTION/PURPOSE

The purpose of this Limited Asbestos Survey Report was to investigate the Residential Home located at 82 Andrews Avenue Keaukaha, Hilo, Hawaii (Subject Site) for asbestos materials that will require special handling prior to demolition/renovation activities. Specifically, ETC completed the following tasks:

Mobilized a State of Hawaii Department of Health (DOH)/Environmental Protection Agency (EPA) certified asbestos building inspector to the Subject Site;

Performed site reconnaissance at the Subject Site;

Collected eighteen (18) samples of suspected Asbestos Containing Material (ACM) from various locations throughout the Subject Site;

Submitted the eighteen (18) samples of suspected ACM to EMC Labs, Inc. (EMC) in Phoenix, Arizona for analysis of asbestos via Polarized Light Microscopy (PLM) in accordance with the Asbestos Hazard Emergency Response Act (AHERA) protocol and the National Institute for Occupational Safety and Health (NIOSH) Method 600/R- 93/116; and

Prepared this report documenting the field activities and the results of the

investigation including analytical results, conclusions, and recommendations.

1.10 METHODOLOGY

A. Asbestos

1. ETC personnel collected a total of eighteen (18) samples of suspected ACM for asbestos analysis. The suspected ACM samples were collected in accordance with EPA guidelines and recommendations.

2. The suspected ACM was wetted with amended water before sample collection. A small piece was then carefully cut out and placed into a labeled re-sealable plastic bag. The sampling equipment was cleaned between each sample collection to avoid cross-contamination between samples. The approximate quantity of each suspected ACM was noted. Sample locations were randomly selected in accordance with EPA protocols and recommendations.

3. Samples were properly logged and recorded following strict chain of custody procedure and submitted to EMC for analysis by PLM in accordance with EPA Method 600/R-93/116. EMC is accredited for bulk asbestos analysis through successful participation in the National Voluntary Lab Accreditation Program (NVLAP)

1.11 RESULTS

A. Asbestos Inspection

1. Laboratory analysis determined that the black soffit sealant with silver foil on the roof, contained levels of asbestos above the regulatory limit of 1%. The results of this analysis are contained in Table 1 found in Appendix I.

2. In accordance with federal and state regulations and industry standard practice ETC determined homogenous areas of each suspect material and collected multiple representative samples of the material from each homogenous area. Typically, all samples for a suspect material will have similar laboratory results. When the results differ, a single result above the regulatory limit is sufficient to determine that the material within the homogenous area is ACM

and the entirety of the homogenous area should be treated as ACM. Thus, ETC may request that the laboratory stops analyzing when the first sample in the set is determined to have an asbestos content above 1%. Two (2) samples were not analyzed for this reason.

1.12 RECOMMENDATIONS

Based on ETC's visual inspection of the facility, inventory of potentially hazardous materials, and laboratory data, ETC recommends the following:

Manage and/or remove and dispose of hazardous and regulated materials in accordance with applicable local, state, and federal regulations, prior to renovation and/or demolition activities that may disturb these materials.

All friable ACM must be removed and disposed of by a qualified asbestos abatement contractor. Friable ACM is defined as those materials that may be crumbled, pulverized, or otherwise damaged by hand pressure.

Any non-friable ACM which could be crumbled and pulverized during renovation/demolition activities must be removed and disposed of by a qualified asbestos abatement contractor.

In addition, the services of a qualified consultant should be obtained to monitor and inspect the removal activities to ensure compliance with applicable Environmental Protection Agency (EPA), Occupational Safety and Health Administration (OSHA), and Hawaii Occupational Safety and Health (HIOSH) regulations pertaining to the handling of asbestos containing material.

Have air monitoring conducted for airborne asbestos fibers by a State of Hawaii certified Project Monitor during any asbestos abatement and general renovation/demolition activities of areas that were determined to contain this contaminant.

3 BEDROOM HOUSE RENOVATION

LEAD-PAINT AND ASBESTOS SURVEY

1.13 INTRODUCTION/PURPOSE

A. The purpose of this Limited Asbestos and Lead Paint Survey was to investigate the residential home located at 372 Desha Avenue Keaukaha. Hilo. Hawaii (Subject Site) for asbestos and/or lead paint that will require special handling prior to demolition /renovation activities. Specifically,

EnviroServices & Training Center (ETC) completed the following tasks:

B. Mobilized a State of Hawaii Department of Health (DOH)/Environmental Protection Agency (EPA) certified asbestos building inspector and lead risk assessor to the Subject Site;

C. Performed site reconnaissance at the Subject Site;

D. Collected eighteen (18) samples of suspected Asbestos Containing Material (ACM) from various locations throughout the Subject Site;

E. Submitted the eighteen (18) samples of suspected ACM to EMC Labs. Inc. (EMC) i n Phoenix. Arizona for analysis of asbestos via Polarized Light Microscopy (PLM) in accordance with the Asbestos Hazard Emergency Response Act (AHERA) protocol and the National Institute for Occupational Safety and Health (NIOSI I) Method 600/R- 93/ 116;

F. Collected two (2) paint chip samples from the Subject Site;

G. Submitted the paint chip samples to EMC for analysis via EPA Method 7000B for total lead content; and

H. Prepared this report documenting the field activities and the results of the investigation including analytical results, conclusions, and recommendation.

1.14 METHODOLOGY

A. Asbestos

1. ETC personnel collected a total of eighteen (18) samples of suspected ACM for asbestos analysis. The suspected ACM samples were collected in accordance with EPA guidelines and recommendations.

2. The suspected ACM was wetted with amended water before sample collection. A small piece was then carefully cut out and placed into a labeled re-scalable plastic bag. The sampling equipment was cleaned between each sample collection to avoid cross-contamination between samples. The approximate quantity of each suspected ACM was noted.

3. Sample locations were randomly selected in accordance with EPA protocols and recommendations.

4. Samples were properly logged and recorded following strict chain of custody procedure and submitted to EMC for analysis by PLM in accordance with EPA Method 600/R-93/ 1 16. EMC is accredited for bulk asbestos analysis through successful participation in the National Voluntary Lab Accreditation Program (NVLAP).

A. Lead Paint

1. ETC personnel collected t\\O (2) paint chip samples from the Subject Site accordance with EPA guidelines and recommendations.

2. The suspected leaded paint was wetted with amended water before sample collection. Paint "as carefully scraped and placed into a labeled re-sealable plastic bag. The sampling equipment was cleaned between each sample collection to avoid cross-contamination between samples.

3. All samples were properly logged and recorded following strict chain of custody procedure and submitted to EMC for analysis in accordance with EPA Method 7000B.

1.15 RESULTS

A. Asbestos Inspection

1. Laboratory analysis determined that three (3) of the materials sampled contained levels of asbestos above the regulatory limit of 1 %. The results of this analysis arc contained in Table I found in Appendix I. (Limited Asbestos and Lead Paint Survey pgs. 1-25)

2. In accordance with federal and state regulations and industry standard practice ETC determined homogenous areas of each suspect material and collected multiple representative samples of the material from each homogenous area. Typically, all samples for a suspect material will have similar laboratory results. When the results differ, a single result above the regulatory limit is sufficient to determine that the material within the homogenous area is ACM and the entirety of the homogenous s area should be treated as ACM. Thus. ETC may request that the laboratory stops analyzing when the first sample in the set is determined to have an asbestos content above I %. Six (6) samples were not analyzed for this

reason.

B. Lead Paint Inspection

1. The sampled surfaces did not contain lead in excess or the EPA/United States Department of Housing and Urban Development (HUD) guideline of 0.5% b) weight defining Lead-Based Paint (LBP) or lead above the laboratory detection limit and arc considered to be non-lead containing paint The lead paint survey results arc recorded in Table 2, found in Appendix I. (Limited Asbestos and Lead Paint Survey pgs. 1-25)

1.16 RECOMMENDATIONS

A. Based on ETC's visual inspection of the facility, inventory of potentially hazardous materials, and laboratory data, ETC recommends the following:

1. Manage and/or remove and dispose of hazardous and regulated materials in accordance with applicable local, state, and federal regulations, prior to renovation and/or demolition activities that may disturb these materials.

2. All friable ACM must be removed and disposed of by a qualified asbestos abatement contractor. Friable ACM is defined as those materials that may be crumbled, pulverized, or otherwise damaged by hand pressure.

3. Any non-friable ACM which could be crumbled and pulverized during renovation / demolition activities must be removed and disposed of by a qualified asbestos abatement contractor.

4. In addition, the services of a qualified consultant should be obtained to monitor and inspect the removal activities to ensure compliance with applicable Environmental Protection Agency (EPA), Occupational Safety and Health Administration (OSHA), and Hawaii Occupational Safety and Health (HIOSH) regulations pertaining to the handling of asbestos containing material.

5. Have air monitoring conducted for airborne asbestos fibers by a State of Hawaii certified Project Monitor and airborne lead by qualified personnel during any asbestos abatement

and general renovation/demolition activities of areas that were determined to contain this contaminant.

1.17 LBP DISPOSAL

A. The EPA RCRA regulations set the limit of leachable lead in lead-containing waste at 5.0 mg/L. This level is established by an analytical method called TCLP.

B. Waste that contains leachable lead at concentrations equal to or greater than the RCRA limit is defined as hazardous waste and must be transported to a hazardous waste TSO facility. Lead-containing waste or potential waste shown to have a total lead content equal to or exceeding 100 mg/kg may exceed the RCRA TCLP standard for leachable lead, and must be analyzed by TCLP prior to disposal. Thus, while the EPA does not regard work performed on paint containing less than 5,000 mg/kg to be a LBP activity, the waste from such activities may still be regarded as hazardous under RCRA.

1.18 HEALTH HAZARDS

A. Description: Pure lead is a heavy metal at room temperature and pressure. A basic chemical element, it can combine with various other substances to form numerous lead compounds. Lead has been poisoning workers for thousands of years. Lead can damage the central nervous system, cardiovascular system, reproductive system, hematological system, and kidneys. When absorbed into the body in high enough doses, lead can be toxic. In addition, workers' lead exposure can harm their children's development.

Short-term (acute) overexposure (as short as days) can cause acute encephalopathy, a condition affecting the brain that develops quickly into seizures, coma, and death from cardiorespiratory arrest. Short-term occupational exposures of this type are highly unusual but not impossible.

Extended, long-term (chronic) overexposure can result in severe damage to the central nervous system, particularly the brain. It can also damage the blood-forming, urinary, and reproductive systems. There is no sharp dividing line between rapidly developing acute effects of lead and chronic effects that take longer to develop. Symptoms of chronic overexposure include:

1. Loss of appetite.

2. Constipation.

3. Nausea.

4. Excessive tiredness.

5. Headache.

6. Fine tremors.

7. Colic with severe abdominal pain.

8. Metallic taste in the mouth.

9. Weakness.

10. Nervous irritability.

11. Hyperactivity.

12. Muscle and joint pain or soreness.

13. Anxiety.

14. Pallor.

15. Insomnia.

16. Numbness.

17. Dizziness.

B. Reproductive Risks: Lead is toxic to both male and female reproductive systems. Lead can alter the structure of sperm cells and there is evidence of miscarriage and stillbirth in women exposed to lead or whose partners have been exposed. Children born to parents who were exposed to excess lead levels are more likely to have birth defects, mental retardation, or behavioral disorders or to die during the first year of childhood.

Workers who desire medical advice about reproductive issues related to lead should contact qualified medical personnel to arrange for a job

evaluation and medical follow-up (particularly if they are pregnant or actively seeking to have a child). Employers whose employees may be exposed to lead and who have been contacted by employees with concerns about reproductive issues must make medical examinations and consultations available. Under certain limited circumstances, a physician may prescribe special drugs called chelating agent to reduce the amount of lead absorbed in body tissues. Using chelation as a preventive measure - that is, to lower blood level but continue to expose a worker - is prohibited and therapeutic or diagnostic chelations of lead that are required must be done under the supervision of a licensed physician in a clinical setting, with thorough and appropriate medical monitoring. The employee must be notified in writing before treatment of potential consequences and allowed to obtain a second opinion.

C. Worker Exposure: Lead is most commonly absorbed into the body by inhalation. When workers breathe in lead as a dust, fume, or mist, their lungs and upper respiratory tract absorb it into the body. They can also absorb lead through the digestive system if it enters the mouth and is ingested. A significant portion of the lead inhaled or ingested gets into the bloodstream. Once in the blood stream, lead circulates through the body and is stored in various organs and body tissues. Some of this lead is filtered out of the body quickly and excreted, but some remains in the blood and tissues. As exposure continues, the amount stored will increase if the body absorbs more lead than it excretes. The lead stored in the tissue can slowly cause irreversible damage, first to individual cells, then to organs and whole body systems.

D. Lead Usage: In construction, lead is used frequently for roofs, cornices, tank linings, and electrical conduits. In plumbing, soft solder, used chiefly for soldering tinplate and copper pipe joints, is an alloy of lead and tin. Soft solder has been banned for many uses in the United States. In addition, the Consumer Product Safety Commission bans the use of lead-based paint in residences. Because lead-based paint inhibits the rusting and corrosion of iron and steel, however, lead continues to be used on bridges, railways, ships, lighthouses, and other steel structures, although substitute coatings are available. Construction projects vary in their scope and potential for exposing workers to lead and other hazards. Projects such as removing paint from a few interior residential doors may involve limited exposure. Others projects, however, may involve removing or stripping substantial quantities of lead-based paints on large bridges and other structures.

E. Most Vulnerable Workers: Workers potentially at risk for lead exposure

include those involved in iron work; demolition work; painting; LBP abatement; plumbing; heating and air conditioning maintenance and repair; electrical work; and carpentry, renovation, and remodeling work. Plumbers, welders, and painters are among those workers most exposed to lead. Significant lead exposures also can arise from removing paint from surfaces previously coated with lead-based paint such as bridges, residences being renovated, and structures being demolished or salvaged. With the increase in highway work, bridge repair, residential lead abatement, and residential remodeling, the potential for exposure to lead-based paint has become more common. Workers at the highest risk of lead exposure are those involved in:

1. Abrasive blasting.

2. Welding, cutting, and burning on steel structures.

3. Lead burning.

4. Using lead-containing mortar.

5. Power tool cleaning without dust collection systems.

6. Rivet busting.

7. Cleanup activities where dry expendable abrasives are used.

8. Movement and removal of abrasive blasting enclosures.

9. Manual dry scraping and sanding.

10. Manual demolition of structures.

11. Heat-gun applications.

12. Power tool cleaning with dust collection systems.

13. Spray painting with lead-based paint.

F OSHA's Lead Standard for the Construction Industry, Title 29 Code of Federal Regulations 1926.62, covers lead in a variety of forms, including metallic lead, all inorganic lead compounds, and organic lead soaps.

G Exposure Limits: The standard establishes maximum limits of exposure to lead for all workers covered, including a Permissible Exposure Limit (PEL)

and Action Level (AL). The PEL sets the maximum worker exposure to lead: 50 micrograms of lead per cubic meter of air (50 µg/m3 averaged over an eight-hour period. If employees are exposed to lead for more than eight hours in a workday, their allowable exposure as a TWA for that day must be reduced according to this formula: Employee exposure (in µg/m3)=400 divided by the hours worked in the day. The AL, regardless of respirator use, is an airborne concentration of 30 µg/m3 averaged over an eight-hour period. The AL is the level at which an employer must begin specific compliance activities outlined in the standard.

H Applicability to Construction: OSHA's lead in construction standard applies to all construction work where an employee may be exposed to lead. All work related to construction, alteration, or repair, including painting and decorating, is included. Under this standard, construction includes, but is not limited to:

1. Demolition or salvage of structures where lead or materials containing lead are present.

2. Removal or encapsulation of materials containing lead.

3. New construction, alteration, repair, or renovation of structures, substrates, or portions or materials containing lead.

4. Installation of products containing lead.

5. Lead contamination from emergency cleanup.

6. Transportation, disposal, storage, or containment of lead or materials containing lead where construction activities are performed.

7. Maintenance operations associated with these construction activities.

1.19 EMPLOYERS RESPONSIBILITIES

A. Worker Protections: Employers of construction workers are responsible for developing and implementing a worker protection program. At a minimum, the employer's worker protection program for employees exposed to lead at concentrations exceeding the PEL should include:

1. Hazard determination, including exposure assessment.

2. Medical surveillance and provisions for medical removal.

3. Job-specific compliance programs.

4. Engineering and work practice controls.

5. Respiratory protection.

6. Protective clothing and equipment.

7. Housekeeping.

8. Hygiene facilities and practices.

9. Signs.

10. Employee information and training.

11. Recordkeeping.

B. Because lead is a cumulative and persistent toxic substance and health effects may result from exposure over prolonged periods, employers must use these precautions to minimize employee exposure to lead. The employer should, as needed, consult a qualified safety and health professional to develop and implement an effective, site-specific worker protection program. These professionals may work independently or may be associated with an insurance carrier, trade organization, or onsite consultation program.

C. Elements of a Compliance Program: For each job where employee exposure exceeds the PEL, the employer must establish and implement a written compliance program to reduce employee exposure to the PEL or below. The compliance program must provide for frequent and regular inspections of job sites, materials, and equipment by a competent person. Written programs, which must be reviewed and updated at least every six months, must include:

1. Description of each activity in which lead is emitted (such as equipment used, material involved, controls in place, crew size, employee job responsibilities, operating procedures, and maintenance practices).

2. The means to be used to achieve compliance and engineering plans and studies used to determine the engineering controls selected where they are required.

3. Information on the technology considered to meet the PEL.

4. Air monitoring data that documents the source of lead emissions.

5. A detailed schedule for implementing the program, including copies of documentation (such as purchase orders for equipment, construction contracts).

6. A work practice program.

7. An administrative control schedule, if applicable.

8. Arrangements made among contractors on multi-contractor sites to inform employees of potential lead exposure.

1.20 HAZARD ASSESSMENT

A. An employer is required to conduct an initial employee exposure assessment of whether employees are exposed to lead at or above the AL based on:

1. Any information, observation, or calculation that indicates employee exposure to lead.

2. Any previous measurements of airborne lead.

3. Any employee complaints of symptoms attributable to lead exposure.

B. Objective data and historical measurements of lead may be used to satisfy the standard's initial monitoring requirements.

C. Initial Employee Exposure Assessment: Initial monitoring may be limited to a representative sample of those employees exposed to the greatest concentrations of airborne lead. Representative exposure sampling is permitted when there are a number of employees performing the same job, with lead exposure of similar duration and level, under essentially the same conditions. For employees engaged in similar work, the standard requires that the members of the group reasonably expected to have the highest exposure levels be monitored. This result is then attributed to the other employees of the group.

The employer must establish and maintain an accurate record documenting the nature and relevancy of previous exposure data. Instead of performing initial monitoring, the employer may in some cases rely on objective data that demonstrate that a particular lead-containing material or product cannot result in employee exposure at or above the action level when t is processed, used, or handled.

D. Biological Monitoring Tests: Analysis of blood lead samples must be conducted by an OSHA-approved lab and be accurate (to a confidence level of 95 %) within plus or minus 15 %, or 6 µg/dl, whichever is greater. If an employee's airborne lead level is at or above the AL for more than 30 days in any consecutive 12 months, the employer must make biological monitoring available on the following schedule:

1. At least every two months for the first six months and every six months thereafter for employees exposed at or above the action level for more than 30 days annually.

2. At least every two months for employees whose last blood sampling and analysis indicated a blood lead level at or above 40 µg/dl.

3. At least monthly while an employee is removed from exposure due an elevated blood lead level.

E. Pending Employee Exposure Assessment: Until the employer performs an exposure assessment and documents that employees are not exposed to concentrations of lead that exceed the PEL, OSHA requires some degree of interim protection for employees. This means providing respiratory protection, protective work clothing and equipment, hygiene facilities, biological monitoring, and training (as specified by the standards) for certain tasks prone to produce high exposure. These include:

1. Manual demolition of structures such as dry wall, manual scraping, manual sanding, and use of a heat gun where lead-containing coatings or paints are present.

2. Power tool cleaning with or without local exhaust ventilation.

3. Spray painting with lead-containing paint.

4. Lead burning.

5. Use of lead-containing mortar.

6. Abrasive blasting, rivet busting, welding, cutting, or torch-burning on any structure where lead-containing coatings or paint are present.

7. Abrasive blasting enclosure movement and removal.

8. Cleanup of activities where dry expendable abrasives are used.

9. Any other task the employer believes may cause lead exposures in excess of the PEL.

F. Test Results Showing No Overexposures: If the initial assessment indicates that no employee is exposed to concentrations of lead above the AL, the employer may discontinue monitoring. Further exposure testing is not required unless there is a change in processes or controls that may result in additional employees being exposed to lead at or above the AL, or may result in employees already exposed at or above the AL being exposed above the PEL. The employer must keep a written record of the determination, including the date, location within the work site and the name and social security number of each monitored employee.

G. Employee Notification of Monitoring Results: The employer must notify each employee in writing of employee exposure assessment results within five working days of receiving them. Whenever the results indicate that the representative employee exposure to lead. without the use of respirators, is above the PEL, the employer must include a written notice stating that the employee's exposure exceeded the PEL and describing corrective action taken or to be taken to reduce exposure to or below the PEL.

1.21 MEDICAL SURVEILLANCE

A. When an employee's airborne exposure to lead is at or above the Al for more than 30 days in any consecutive 12 months, an immediate medical consultation is required when the employee notifies the employer that he or she:

1. Has developed signs or symptoms commonly associated with lead-related disease.

2. Has demonstrated difficulty in breathing during respirator use or a fit test.

3. Desires medical advice concerning the effects of past or current lead exposure on the employee's ability to have a healthy child.

4. Is under medical removal and has a medically appropriate need.

B. Medical Exams: The best indicator of personal lead exposure is through a blood test to indicate elevated blood lead levels. A medical exam must also include:

1. Detailed work and medical histories, with particular attention to past lead exposure (occupational and no occupational), personal habits (smoking and hygiene), and past gastrointestinal, hematologic, renal, cardiovascular, reproductive, and neurological problems.

2. A thorough physical exam, with particular attention to gums, teeth, hematologic, gastrointestinal, renal, cardiovascular, and neurological systems; evaluation of lung function if respirators are used.

3. A blood pressure measurement.

4. A blood sample and analysis to determine blood lead level.

5. Hemoglobin and hematocrit determinations, red cell indices, and an exam of peripheral smear morphology.

6. Zinc protopor-phyrin; blood urea nitrogen; and serum creatinine.

7. A routine urinalysis with microscopic exam.

8. Any lab or other test the examining physician deems necessary.

C. Information for the Examining Physician: The employer must provide all examining physicians with a copy of the lead in construction standard, including all appendices, a description of the affected employees duties as they relate to the employee's exposure, the employees lead exposure level or anticipated exposure level, a description of personal protective equipment used or to be used, prior blood lead determinations, and all prior written medical opinions for the employee.

D. When Monitoring Shows No Employee Exposures to Lead above the AL: Employers must make available, at no cost to the employee, initial medical surveillance for employees exposed to lead on the job at or above the action level on any one day per year. This initial medical surveillance consists of biological monitoring in the form of blood sampling and

analysis for lead and zinc protoporyr in (ZPP) levels. In addition, a medical surveillance program with biological monitoring must be made available to any employee exposed at or above the action level for more than 30 days in any consecutive 12 months.

E. After the Medical Examination: Employers must obtain and provide the employee a copy of a written opinion from each examining or consulting physician that contains only information related to occupational exposure to lead and must include:

1. Whether the employee has any detected medical condition that would increase the health risk from lead exposure.

2. Any special protective measures or limitations on the worker's exposure to lead.

3. Any limitation on respirator use.

4. Results of the blood lead determinations. In addition, the written statement may include a statement that the physician has informed the employee of the results of the consultation or medical examination and any medical condition that may require further examination or treatment.

The employer must instruct the physician that findings, including lab results or diagnoses unrelated to the worker's lead exposure, must not be revealed to the employer or included in the written opinion to the employer. The employer must also instruct the physician to advise employees of any medical condition, occupational or non-occupational, that necessitates further evaluation or treatment. In addition, some states also require laboratories and health care providers to report cases of elevated blood lead concentrations to their state health departments.

1.22 MEDICAL REMOVAL PROVISIONS

A. Temporary medical removal can result from an elevated blood level or a written medical opinion. More specifically, the employer is required to remove from work an employee with a lead exposure at or above the AL each time periodic and follow-up (within two weeks of the periodic test) blood sampling tests indicate that the employee's blood level is at or above 50 micrograms per deciliter (µg/dl). The employer also must remove from work an employee with lead exposure at or above the AL each time a final medical determination indicates that the employee needs reduced lead exposure for medical reasons. If the physician who is implementing the employer's medical program makes a final written

opinion recommending the employee's removal or other special protective measures, the employer must implement the physician's recommendation.

For an employee removed from exposure to lead at or above the AL due to a blood lead level at or above 50 µg/dl, the employer may return that employee to former job status when two consecutive blood sampling tests indicate that the employee's blood lead level is below 40 µg/dl. For an employee removed from exposure to lead due to a final medical determination, the employee must be returned when a subsequent final medical determination results in a medical finding, determination, or opinion that the employee no longer has a detected medical condition that places the employee at increased risk of lead exposure.

The employer must remove any limitations placed on employees or end any special protective measures when a subsequent final medical determination indicates they are no longer necessary. If the former position no longer exists, the employee is returned consistent with whatever job assignment discretion the employer would have had if no removal occurred.

B. Worker Protections and Benefits: The employer must provide up to 18 months of medical removal protection (MRP) benefits each time an employee is removed from lead exposure or medically limited. As long as the position/job exists, the employer must maintain the earnings, seniority, and other employment rights and benefits as though the employee had not been removed from the job or otherwise medically limited. The employer may condition medical removal protection benefits on the employee's participation in follow-up medical surveillance.

If a removed employee files a worker's compensation claim or other compensation for lost wages due to a lead-related disability, the employer must continue medical removal protection benefits until the claim is resolved.

However, the employers MRP benefits obligation will be reduced by the amount that the employee receives from these sources. Also, the employer's MRP benefits obligation will be reduced by any income the employee receives from employment with another employer made possible by virtue of the employee's removal.

C. Records Requirements Involving Medical Removal: In the case of medical removal, the employer's records must include:

1. The worker's name and social security number.

2. The date of each occasion that the worker was removed from current exposure to lead.

3. The date when the worker was returned to the former job status.

4. A brief explanation of how each removal was or is being accomplished and a statement indicating whether the reason for the removal was an elevated blood lead level.

1.23 RECORDKEEPING

A. Employer Requirements: The employer must maintain any employee exposure and medical records to document ongoing employee exposure, medical monitoring, and medical removal of workers. This data provides a baseline to evaluate the employee's health properly. Employees or former employees, their designated representatives, and OSHA must have access to exposure and medical records in accordance with 29 CFR 1910.1020. Rules of agency practice and procedure governing OSHA access to employee medical records are found in 29 CFR 1913.10.

B. Exposure Assessment Records: The employer must establish and maintain an accurate record of all monitoring and other data used to conduct employee exposure assessments as required by this standard and in accordance with 29 CFR 1910.1020. The exposure assessment records must include:

1. The dates, number, duration, location, and results of each sample taken, including a description of the sampling procedure used to determine representative employee exposure.

2. A description of the sampling and analytical methods used and evidence of their accuracy.

3. The type of respiratory protection worn, if any.

4. The name, social security number, and job classification of the monitored employee and all others whose exposure the measurement represents.

5. Environmental variables that could affect the measurement of employee exposure.

C. Medical Surveillance Records: The employer must maintain an accurate record for each employee subject to medical surveillance, including:

1. The name, social security number, and description of the employee's duties.

2. A copy of the physicians written opinions.

3. The results of any airborne exposure monitoring done for the employee and provided to the physician.

D. Any employee medical complaints related to lead exposure.

In addition, the employer must keep or ensure that the examining physician keeps the following medical records:

1. A copy of the medical examination results including medical and work history.

2. A description of the laboratory procedures and a copy of any guidelines used to interpret the test results.

3. A copy of the results of biological monitoring.

E. The employer or physician or both must maintain medical records in accordance with 29 CFR 1910.1020.

F. Documents for Employees Subject to Medical Removal: The employer must maintain (for at least the duration of employment) an accurate record for each employee subject to medical removal, including:

1. The name and social security number of the employee.

2. The date on each occasion that the employee was removed from current exposure to lead and the corresponding date which the employee was returned to former job status.

3. A brief explanation of how each removal was or is being accomplished.

4. A statement about each removal indicating whether the reason for removal was an elevated blood level.

G. Documents for Employees Subject to Medical Removal: The employer must establish and maintain an accurate record documenting the nature

and relevancy of objective data relied on to assess initial employee exposure in lieu of exposure monitoring. The employer must maintain the record of objective data relied on for at least 30 years

H. Documents for OSHA and NIOSH Review: The employer must make all records (including exposure monitoring, objective data, medical removal, and medical records) available upon request to affected employees, former employees, and their designated representatives and to the OSHA Assistant Secretary and the Director of the NIOSH for examination and copying in accordance with 29 CFR 1910.1020.

I. When Closing a Business: When an employer ceases to do business, the successor employer must receive and retain all required records. If no successor is available, these records must be sent to the Director of NIOSH.

1.24 EXPOSURE REDUCTION AND EMPLOYEE PROTECTION

The most effective way to protect workers is to minimize their exposure to lead through engineering controls, good work practices and training, and use of personal protective clothing and equipment. Including respirators, where required. The employer needs to designate a competent person capable of identifying existing and predictable lead hazards and who is authorized to take prompt corrective measures to eliminate such problems. The employer should, as needed, consult a qualified safety and health professional to develop and implement an effective worker protection program. These professionals may work independently or may be associated with an insurance carrier, trade organization, or onsite consultation program.

1.25 ENGINEERING CONTROLS

A. Engineering measures include local and general exhaust ventilation, process and equipment modification, material substitution, component replacement, and isolation or automation. Examples of recommended engineering controls that can help reduce worker exposure to lead are described as follows:

1. Exhaust Ventilation: Equip power tools used to remove lead-based paint with dust collection shrouds or other attachments so that paint is exhausted through a High-Efficiency Particulate Air (HEPA) vacuum system. For operations such as welding, cutting/burning, or heating, use local exhaust ventilation. Use HEPA vacuums during cleanup operations.

For abrasive blasting operations, build a containment structure that is designed to optimize the flow of clean ventilation air past the workers' breathing zones. This will help reduce the exposure to airborne lead and increase visibility. Maintain the affected area under negative pressure to reduce the chances that lead dust will contaminate areas outside the enclosure. Equip the containment structure with an adequately sized dust collector to control emissions of particulate matter into the environment.

Enclosure or Encapsulation: One way to reduce the lead inhalation or ingestion hazard posed by LBP is to encapsulate it with a material that bonds to the surface, such as acrylic or epoxy coating or flexible wall coverings. Another option is to enclose it using systems such as gypsum wallboard, plywood paneling, and aluminum, vinyl, or wood exterior siding. Floors coated with LBP can be covered using vinyl tile or linoleum.

The building owner or other responsible person should oversee the custodial and maintenance staff and contractors during all activities involving enclosed or encapsulated LBP. This will minimize the potential for an inadvertent lead release during maintenance, renovation, or demolition.

B. Substitution: Choose materials and chemicals that do not contain lead for construction projects. Among the options are:

1. Use zinc-containing primers covered by an epoxy intermediate coat and polyurethane topcoat instead of lead-containing coatings.

2. Substitute mobile hydraulic shears for torch cutting under certain circumstances.

3. Consider surface preparation equipment such as needle guns with multiple reciprocating needles completely enclosed within an adjustable shroud, instead of abrasive blasting under certain conditions. The shroud captures dust and debris at the cutting edge and can be equipped with a HEPA vacuum filtration with a self-drumming feature. One such commercial unit can remove lead-based paint from flat steel and concrete surfaces, outside edges, inside corners, and pipes.

C. Choose chemical strippers in lieu of hand scraping with a heat gun for work on building exteriors, surfaces involving carvings or molding, or

intricate iron work. Chemical removal generates less airborne lead dust. Be aware, however, that these strippers themselves can be hazardous and that the employer must review the material safety data sheets (MSDSs) for these stripping agents to obtain information on their hazards.Component Replacement: Replace lead-based painted building components such as windows, doors, and trim with new components free of lead-containing paint. Another option is to remove the paint offsite and then repaint the components with zinc-based paint before replacing them.

D. Process or Equipment Modification: When applying lead paints or other lead containing coatings, use a brush or roller rather than a sprayer. This application method introduces little or no paint mist into the air to present a lead inhalation hazard. (Note that there is a ban on the use of lead-based paint in residential housing).

Use non-silica-containing abrasives such as steel or iron shot/grit sand instead of sand in abrasive blasting operations when practical. The free silica portion of the dust presents a respiratory health hazard.

When appropriate for the conditions, choose blasting techniques that are less dusty than open-air abrasive blasting. These include hydro- or wet-blasting using high-pressure water with or without an abrasive or surrounding the blast nozzle with a ring of water, and vacuum blasting where a vacuum hood for material removal is positioned around the exterior of the blasting nozzle.

When using a heat gun to remove lead-based paints in residential housing units, be sure it is of the flameless electrical softener type. Heat guns should have electronically controlled temperature settings to allow usage below 700 degrees Fahrenheit (°F}. Equip heat guns with various nozzles to cover all common applications and to limit the size of the heated work area.

When using abrasive blasting with a vacuum hood on exterior building surfaces, ensure that the configuration of the heads on the blasting nozzle match the configuration of the substrate so that the vacuum is effective in containing debris.

Ensure that HEPA vacuum cleaners have the appropriate attachments for use on unusual surfaces. Proper use of brushes of various sizes, crevice and angular tools, when needed, will enhance the quality of the HEPA-vacuuming process and help reduce the amount of lead dust released into the air.

Isolation: Although it is not feasible to enclose and ventilate some abrasive blasting operations completely, it is possible to isolate many operations to help reduce the potential for lead exposure. Isolation consists of keeping employees not involved in the blasting operations as far away from the work area as possible, reducing the risk of exposure.

1.26 HOUSEKEEPING AND PERSONAL HYGIENE

A. Lead is a cumulative and persistent toxic substance that poses a serious health risk. A rigorous housekeeping program and the observance of basic personal hygiene practices will minimize employee exposure to lead. In addition, these two elements of the worker protection program help prevent workers from taking lead-contaminated dust out of the worksite and into their homes where it can extend the workers' exposures and potentially affect their families' health.

B. Housekeeping Practices: An effective housekeeping program involves a regular schedule to remove accumulations of lead dust and lead-containing debris. The schedule should be adapted to exposure conditions at a particular worksite. OSHA's Lead Standard for Construction requires employers to maintain all surfaces as free of lead contamination as practicable. Vacuuming lead dust with HEPA-filtered equipment or wetting the dust with water before sweeping are effective control measures. Compressed air may not be used to remove lead from contaminated surfaces unless a ventilation system is in place to capture the dust generated by the compressed air.

In addition, put all lead-containing debris and contaminated items accumulated for disposal into sealed, impermeable bags or other closed impermeable containers. Label bags and containers as lead containing waste. These measures provide additional help in controlling exposure.

C. Personal Hygiene Practices: Emphasize workers' personal hygiene such as washing their hands and face after work and before eating to minimize their exposure to lead. Provide and ensure that workers use washing facilities. Provide clean change areas and readily accessible eating areas. If possible, provide a parking area where cars will not be contaminated with lead. These measures:

1. Reduce workers' exposure to lead and the likelihood that they will ingest lead.

2. Ensure that the exposure does not extend beyond the worksite.

3. Reduce the movement of lead from the worksite.

4. Provide added protection to employees and their families.

D. Change Areas: The employer must provide a clean change area for employees whose airborne exposure to lead is above the PEL. The area must be equipped with storage facilities for street clothes and a separate area with facilities for the removal and storage of lead-contaminated protective work clothing and equipment. This separation prevents cross contamination of the employee's street and work clothing.

Employees must use a clean change area for taking off street clothes, suiting up in clean protective work clothing, donning respirators before beginning work, and dressing in street clothes after work. No lead-contaminated items should enter this area.

Work clothing must not be worn away from the jobsite. Under no circumstances should lead-contaminated work clothes be laundered at home or taken from the worksite, except to be laundered professionally or for disposal following applicable federal, state, and local regulations.

E. Showers and Washing Facilities: Showers must be provided for use by employees whose airborne exposure to lead is above the permissible exposure limit so they can shower before leaving the worksite. Where showers are provided, employees must change out of their work clothes and shower before changing into their street clothes and leaving the worksite. If employees do not change into clean clothing before leaving the worksite, they may contaminate their homes and automobiles with lead dust, extending their exposure and exposing other members of their household to lead.

In addition, employers must provide adequate washing facilities for their workers. These facilities must be close to the worksite and furnished with water, soap, and clean towels so employees can remove lead contamination from their skin.

Contaminated water from washing facilities and showers must be disposed of in accordance with applicable local, state, or federal regulations. Personal Practices: The employer must ensure that employees do not enter lunchroom facilities or eating areas with protective work clothing or equipment unless surface lead dust has been removed.

HEPA vacuuming and use of a downdraft booth are examples of cleaning methods that limit the dispersion of lead dust from contaminated work clothing.

In all areas where employees are exposed to lead above the PEL, employees must observe the prohibition on the presence and consumption or use of food, beverages, tobacco products, and cosmetics. Employees whose airborne exposure to lead is above the PEL must wash their hands and face before eating, drinking, smoking, or applying cosmetics.

F. End-Of-Day Procedures: Employers must ensure that workers who are exposed to lead above the permissible exposure limit follow these procedures at the end of their workday:

1. Place contaminated clothes, including work shoes and personal protective equipment to be cleaned, laundered, or disposed of, in a properly labeled closed container.

2. Take a shower and wash their hair. Where showers are not provided, employees must wash their hands and face at the end of the work shift.

3. Change into street clothes in clean change areas.

1.27 PROTECTIVE CLOTHING ANO EQUIPMENT

A. Employer Requirements: Employers must provide workers who are exposed to lead above the PEL or for whom the possibility of skin or eye irritation exists with clean, dry protective work clothing and equipment that are appropriate for the hazard. Employers must provide these items at no cost to employees. Appropriate protective work clothing and equipment used on construction sites includes:

1. Coveralls or other full-body work clothing.

2. Gloves, hats, and shoes or disposable shoe coverlets.

3. Vented goggles or face shields with protective spectacles or goggles.

4. Welding or abrasive blasting helmets.

5. Respirators.

B. Clean work clothing must be issued daily for employees whose exposure levels to lead are above 200 µg/m3 weekly if exposures are above the PEL but at or below 200 µg/m or where the possibility of skin or eye irritation exist.

C. Handling Contaminated Protective Clothing: Workers must not be allowed to leave the worksite wearing lead-contaminated protective clothing or equipment. This is an essential step in reducing the movement of lead contamination from the workplace into the worker's home and provides added protection for employees and their families.

Disposable coveralls and separate shoe covers may be used, if appropriate, to avoid the need for laundering. Workers must remove protective clothing in change rooms provided for that purpose.

Employers must ensure that employees leave the respirator use area to wash their faces and respirator face pieces as necessary. In addition, employers may require their employees to use HEPA vacuuming, damp wiping, or another suitable cleaning method before removing a respirator to clear loose particle contamination on the respirator and at the face-mask seal.

Place contaminated clothing that is to be cleaned, laundered, or disposed of by the employer in closed containers. Label containers with the warning: "Caution: Clothing contaminated with lead. Do not remove dust by blowing or shaking.

Dispose of lead-contaminated wash water in accordance with applicable local, state, or federal regulations."

Workers responsible for handling contaminated clothing, including those in laundry services or subcontractors, must be informed in writing of the potential health hazard of lead exposure. At no time shall lead be removed from protective clothing or equipment by brushing, shaking, or blowing. These actions disperse the lead into the work area.

D. Preventing Heat Stress: Workers wearing protective clothing, particularly in hot environments or within containment structures can face a risk from heat stress if proper control measures are not used.

Heat stress is caused by several interacting factors, including environmental conditions, type of protective clothing worn; the work activity required and anticipated work rate, and individual employee characteristics such as age, weight, and fitness level. When heat stress is a concern, the employer should choose lighter, less insulating protective clothing over heavier clothing, as long as it provides adequate protection. Other measures the employer can take include: discussing the possibility of heat stress and its signs and symptoms with all workers; using appropriate work/rest regimens; and providing heat stress monitoring that includes measuring employees' heart rates, body temperatures, and weight loss. Employers must provide a source of water or electrolyte drink in a non-contaminated eating and drinking area close to the work area so workers can drink often throughout the day. Workers must wash their hands and face before drinking any fluid if their airborne exposure is above the PEL.

1.28 RESPIRATORY PROTECTION

A. Although engineering and work practice controls are the primary means of protecting workers from exposure to lead, source control at construction sites sometimes is insufficient to control exposure. In these cases, airborne lead concentrations may be high or may vary widely. Respirators often must be used to supplement engineering controls and work practices to reduce worker lead exposures below the PEL. When respirators are required, employers must provide them at no cost to workers.

The standard requires that respirators be used during periods when an employee's exposure to lead exceeds the PEL, including:

1. Periods necessary to install or implement engineering or work practice controls.

2. Work operations for which engineering and work practice controls are insufficient to reduce employee exposures to or below the PEL.

B. Respirators also must be provided upon employee request. A requested respirator is included as a requirement to provide increased protection for those employees who wish to reduce their lead burden below what is required by the standard, particularly if they intend to have children in the near future. In addition, respirators must be used when performing previously indicated high exposure or "trigger" tasks, before completion of the initial assessment.

C. Providing Adequate Respiratory Protection: Before any employee first starts wearing a respirator in the work environment, the employer must perform a fit test. For all employees wearing negative or positive pressure tight-fitting face piece respirators, the employer must perform either qualitative or quantitative fit tests using an OSHA-accepted fit testing protocol. In addition, employees must be fit tested whenever a different respirator face piece is used, and at least annually thereafter. Where daily airborne exposure to lead exceeds 50 µg/m3 affected workers must don respirators before entering the work area and should not remove them until they leave the high-exposure area or have completed a decontamination procedure. Employers must assure that the respirator issued to the employee is selected and fitted properly to ensure minimum leakage through the face piece-to-face seal.

D. Respiratory Protection Programs: When respirators are required at a worksite, the employer must establish a respiratory protection program in accordance with the OSHA standard on respiratory protection, 29 CFR 1910.134. At a minimum, an acceptable respirator program for lead must include:

1. Procedures for selecting respirators appropriate to the hazard.

2. Fit testing procedures.

3. Procedures for proper use of respirators in routine and reasonably foreseeable emergency situations, including cartridge change schedules.

4. Procedures and schedules for cleaning, disinfecting, storing, inspecting, repairing, discarding, and otherwise maintaining respirators.

5. Training of employees in the respiratory hazard to which they are potentially exposed during routine and emergency situations.

6. Training of employees in the proper use of respirators, including putting on and removing them, any limitations of their use, and their maintenance.

7. Procedures for regularly evaluating the effectiveness of the program.

8. Procedures to ensure air quality when supplied air is used.

9. A written program and designation of a program administrator.

10. Recordkeeping procedures.

E. In addition, the construction industry lead standard stipulates medical evaluations of employees required to use respirators. If an employee has difficulty in breathing during a fit test or while using a respirator, the employer must make a medical examination available to that employee to determine whether he or she can wear a respirator safely.

Selecting a Respirator: The employer must select the appropriate respirator from Table 1 of the lead standard, 29 CFR 1926.62(f)(3)(i). The employer must provide a powered air-purifying respirator when an employee chooses to use this respirator and it will provide the employee adequate protection. A NIOSH-certified respirator must be selected and used in compliance with the conditions of its certification. In addition, if exposure monitoring or experience indicates airborne exposures to contaminants other than lead such as silica, solvents, or polyurethane coatings, these exposures must be considered when selecting respiratory protection.

Select type CE respirators approved by NIOSH for abrasive blasting operations. Currently, there are two kinds of CE respirators with the following assigned protection factors (APFs): a continuous-flow respirator with a loose-fitting hood, APF 25; and a full face piece supplied-air respirator operated in a positive-pressure mode, APF 2,000. (Note: OSHA recognizes Bullard Helmets, Models 77 and 88 (1995); Clemco Appello, Models 20 and 60 (1997); and 3M Model 8100 (1998) as having APFs of 1,000.) For any airline respirator, it is important to follow the manufacturer's instructions regarding air quality, air pressure, and inside diameter and length of hoses. Be aware that using longer hoses or smaller inside diameter hoses than the manufacturer specifies or hoses with bends or kinks may reduce or restrict the airflow to a respirator.

1.29 EMPLOYEE INFORMATION AND TRAINING

A. The employer must inform employees about lead hazards according to the requirement of OSHAs Hazard Communication standard for the construction industry, 29 CFR 1926.59, including-but not limited to - the requirements for warning signs and labels, material safety data sheets (MSDSs), and employee information and training. (Refer to 29 CFR 1910.1200.)

B. Program Requirements: Employers must institute an information and training program and ensure that all employees subject to exposure to lead or lead compounds at or above the action level on any day

participate. Also covered under information and training are employees who may suffer skin or eye irritation from lead compounds. Initial training must be provided before the initial job assignment. Training must be repeated at least annually and, in brief summary, must include:

1. The content of the OSHA lead standard and its appendices.

2. The specific nature of operations that could lead to lead exposure above the action level.

3. The purpose, proper selection, fit, use, and limitations of respirators.

4. The purpose and a description of the medical surveillance program, and the medical removal protection program.

5. Information concerning the adverse health effects associated with excessive lead exposure.

6. The engineering and work practice controls associated with employee's job assignments.

7. The contents of any lead-related compliance plan in effect.

8. Instructions to employees that chelating agents must not be used routinely to remove lead from their bodies and when necessary only under medical supervision and at the direction of a licensed physician.

9. The right to access records under "Access to Employee Exposure and Medical Records," 29 CFR 1910.1020.

All materials relating to the training program and a copy of the standard and its appendices must be made readily available to all affected employees.

D. Warning Signs: Employers are required to post these warning signs in each work area where employee exposure to lead is above the PEL:

WARNING

LEAD WORK AREA

POISON

NO SMOKING OR EATING

All signs must be well lit and kept clean so that they are easily visible. Statements that contradict or detract from the signs meaning are prohibited. Signs required by other statutes, regulations, or ordinances, however, may be posted in addition to, or in combination with, this sign.

PART 2 - PRODUCTS

NOT USED

PART 3 – EXECUTION

NOT USED

PART 4 - MEASUREMENT AND PAYMENT

4.01 BASIS OF MEASUREMENT AND PAYMENT

Work under this Section will not be measured for payment but will be paid for at the Contract Lump Sum Price.

Item No.	Item	Units
13280	Hazardous Material Remediation	Lump Sum

END OF SECTION

DIVISION 15 - MECHANICAL

SECTION 15000 - GENERAL MECHANICAL REQUIREMENTS

PART 1 - GENERAL

1.01 RELATED DOCUMENTS

The General Provisions of the contract, including General and Special Provisions and General Requirements of the Specifications, apply to the work specified in this section.

1.02 GENERAL MECHANICAL REQUIREMENTS

A. These general mechanical requirements govern work specified under all sections of DIVISION 15 MECHANICAL.

B. The Contractor shall furnish all labor, materials, tools and equipment and perform all work and services necessary for complete and properly operating mechanical equipment and systems, as shown on drawings and as specified, in accordance with provisions of the Contract Documents and completely coordinated with work of all other trades.

C. The Contractor shall completely examine the Contract Documents and shall report to the State any error, inconsistency or omission he discovers.

D. Furnish and install all supplementary or miscellaneous items, details, appurtenances and devices incidental to or necessary for a sound, secure and complete mechanical system where work required is not specifically indicated.

E. Drawings and specifications shall be taken together. Provide work specified and not indicated or work indicated and not specified as though mentioned in both.

F. The Contractor shall warrant that all materials and equipment furnished under this Contract will be new and that all work will be of good quality, free from faults and defects and in conformance with Contract Documents for a guaranteed period of one year after the date of acceptance as specified.

G. The Contractor shall maintain at the site one (1) copy of all Drawings, Specifications, Addenda, approved Shop Drawings, Change Orders and other modifications, in good order and marked (in red) to record all changes made during construction. These shall be made available to the State.

H. The Contractor at all times shall keep the premises free from accumulation of waste materials or rubbish caused by its operations. At the completion of the work, he shall remove all its waste materials and rubbish from and about the project as well as all its tools, construction equipment, machinery and surplus materials and shall clean all new equipment and accessories.

I. The Contractor shall give the State timely notice of its readiness for testing any work including the data arranged so the State may observe such testing. The Contractor shall bear all cost of such tests.

J. The State shall have the right to accept or reject material, equipment, and/or workmanship and determine when the Contractor has complied with the contract documents.

1.03 INSPECTION OF SITE

The Contractor shall visit the site and examine the conditions affecting its work before submitting its proposal. The submission of the proposal shall be considered evidence that the Contractor has visited the site and no extra payments will be allowed to the Contractor on account of extra work made necessary by its failure to visit the site. If there are any questions or discrepancies in the design, the Contractor shall bring it to the attention of the State before submitting its proposal.

1.04 SUBMITTALS

A. Submit shop drawings, manufacturer's data and certificates for equipment, materials and finish and pertinent details for each system and have them approved before procurement, fabrication or delivery of the items to the job site. Partial submittals will not be acceptable and will be returned without review. Submit in accordance with Section 01300 SUBMITTALS. Submittals shall include the manufacturer's name, trade name, catalog model or number, nameplate data, size, layout dimensions, capacity, project specification and paragraph reference, applicable industry and technical society publication references and other information necessary to establish contract compliance of each item the Contractor proposed to furnish.

1. Shop Drawings: Drawings shall be a minimum of 24 inches by 36 inches in size, except as specified otherwise. Drawings shall include floor plans, sectional views, wiring diagrams and installation details of equipment; and equipment spaces identifying and indicating proposed location, layout and arrangement of items of equipment, control panels, accessories, piping and other items that

must be shown to assure a coordinated installation. Wiring diagrams shall identify circuit terminals and indicate the internal wiring for each item of equipment and interconnection on between each type of equipment. Drawings shall indicate adequate clearance for operation, maintenance and replacement of operating equipment devices. If equipment is disapproved, drawings shall be revised to show acceptable equipment and be resubmitted.

a. The Contractor shall review, stamp with its approval and submit, all Shop Drawings required by the Contract Documents or subsequently by the Engineer as covered by modifications. At the time of submission, the Contractor shall inform the Engineer in writing of any deviation in the Shop Drawings from the requirements of the Contract Documents. By approving and submitting Shop Drawings, the Contractor certifies that he has determined and verified all field measurements and obstructions, field construction criteria, materials, catalog numbers and similar data, that he has checked and coordinated each Shop Drawing with the requirements of the work and of the Contract Documents and that all equipment fits within designated spaces.

2. Manufacturer's Data: Submittals for each manufactured item shall be manufacturer's descriptive literature of cataloged products, equipment drawings, diagrams, performance and characteristic curves and catalog cuts.

3. Standards Compliance: When materials or equipment must conform to the standards of organizations such as the American National Standards Institute (ANSI), American Society for Testing and Materials (ASTM), National Electrical Manufacturers Association (NEMA) and Underwriters Laboratories (UL), proof of such conformance shall be submitted to the State for approval. If an organization uses a label or listing to indicate compliance with a particular standard, the label or listing will be acceptable evidence, unless otherwise specified in the individual sections. In lieu of the label or listing, the Contractor shall submit a certificate from an independent testing organization, which is competent to perform acceptable test and is approved by the State. The certificate shall state that the item has been tested in accordance with the specified organization's test methods and that the item conforms to the specified organization's standard. For materials and equipment whose compliance with organizational standards or specifications is not regulated by an organization using its own listing or label as

proof of compliance, a certificate of compliance from the manufacturer shall be submitted for approval. The certificate shall identify the manufacturer, the product and the referenced standard and shall simply state that the manufacturer certifies that the product conforms to all requirements of the project specification and of the referenced standards listed. Certified Test Reports: Before delivery of materials and equipment, certified copies of all test reports specified in the individual section shall be submitted for approval.

4. Certificates of Conformance or Compliance: Submit certification from the manufacturer attesting that materials and equipment to be furnished for this project comply with the requirements of this specification and of the reference publications. Pre-printed certifications will not be acceptable; certifications shall be in the original. The certification shall not contain statements that could be interpreted to imply that the product does not meet all requirements specified, such as "as good as"; "achieve the same end use and result as materials formulated in accordance with the referenced publication", "equal or exceed the service and performance of the specified material". The certification shall simply state that the product conforms to the requirements specified.

5. "Field Posted As-Built" Drawings: Keep at the job site a complete, accurate record of all approved deviations from the contract drawings, shop drawings and specifications. Keep these changes on prints of the drawings affected and turn over one (1) set to the State at the completion of the project.

1.05 LAWS. REGULATIONS AND CODES

A. All work shall be in accordance with government laws, ordinances, rules and regulations and orders.

B. The following shall govern where applicable; the Plumbing Code of the County of Hawaii, the Building Code of the County of Hawaii, State of Hawaii Department of Health Regulations, U.S. Department of H.E.W., Applicable National Fire Protection Association Standards, OSHA, Rules and Regulations, County of Hawaii Energy Code and all other codes and standards referenced in these specifications. Where requirements differ in these code and standards, the more stringent shall apply.

1.06 TRADE NAME

Mentioning of a trade name in the plans and specifications indicates that the

Manufacturer is acceptable to the State. However, certain specified construction and details may not be regularly included in the manufacturer's catalogued product. The Mechanical Contractor shall provide the material or equipment complete as specified.

1.07 PERMITS AND INSPECTIONS

A. Applications for permits will be done by the contractor; the Contractor shall pay for all necessary licenses, permits and fees.

B. The Mechanical Contractor shall apply and pay for all necessary inspections required by any public authority having jurisdiction.

1.08 DISCREPANCIES

A. The Drawings and Specifications are intended to be cooperative. Any materials, equipment or system related to this section and exhibited on the Architectural, Structural, Electrical or Mechanical Drawings but not mentioned in the Specifications are to be executed to the intent and meaning thereof, as if it were both mentioned in the Specifications and set forth on the Drawings.

B. In case of differences between the Drawings and Specifications, the Specifications shall govern first, and then the Drawings. Large scale details shall take precedence over small scale Drawings as to the shape and details of construction. Specifications shall govern as to materials.

C. Drawings and Specifications are intended to be fully cooperative and to agree, but should any discrepancy or apparent difference occur between Drawings and Specifications or should error occur in the work of others affecting the work, the Contractors shall notify the State at once. If the Contractor proceeds with the work affected without instructions from the State, he shall make good any resultant damage or defect. All interpretations of Drawings and specifications shall be clarified by the State.

1.09 WORKMANSHIP AND MATERIALS

A. Workmanship shall be of the best quality and none but competent mechanics skilled in their trades shall be employed. The Contractor shall furnish the services of an experienced superintendent, who will be constantly in charge of the erection of the work, until completed and accepted.

B. Unless otherwise hereinafter specified, each article of its kind shall be the standard product of a single manufacturer. Whenever the words "or

approved equal" or other words of similar intent or meaning are used, implying that judgment is to be exercised, it is understood that it is the judgment of the State that is referred to.

C. Pre-bid approval is required for all substitutions. Post-bid substitutions accepted on limited basis only or for value stating purposes.

D. The State shall have the right to accept or reject material, equipment, and/or workmanship and determine when the Contractor has complied with the requirements herein specified. All manufactured materials shall be delivered and stored in their original containers equipment shall be clearly marked or stamped with the manufacturer's name and rating. Equipment and materials shall be carefully handled, properly stored and adequately protected to prevent damage before and during installation, in accordance with the manufacturer's recommendations and as approved by the State. Damaged or defective items, in the opinion of the State, shall be replaced.

E. Reference to standards is intended to be the latest revision of the standard specified.

1.10 MANUFACTURER'S RECOMMENDATIONS

Equipment installed under this Division of the Specifications shall be installed according to manufacturer's recommendations, unless otherwise shown on the drawings or herein specified. Where installation procedures or any part thereof are required to be in accordance with the recommendations of the manufacturer of the material being installed, printed copies of these recommendations shall be furnished to the State, prior to installation. Installation of the item will not be allowed to proceed until the recommendations are received. Failure to furnish these recommendations can be cause of rejection of the material.

1.11 OPENINGS, CUITING AND REPAIRING

A. The Mechanical Contractor shall cooperate with the work to be done under other sections in providing information as to openings required in walls and slabs for all piping including sleeves where required.

B. Any drilling or cutting required for the performance of work under this Section shall be the responsibility of this Contractor and the cost shall be borne by him.

C. Holes in Concrete: The Mechanical Contractor shall pay all costs for cutting holes. All holes through existing concrete shall be either core drilled or saw cut. All holes required shall have the approval of the State prior to cutting and drilling.

D. It shall be the responsibility of this Contractor to ascertain that all openings are properly located.

1.12 ELECTRICAL WORK

A. All power wiring, including final hook-up to all mechanical equipment will be provided. Control devices required on the power wiring shall be provided by the Mechanical Contractor, to be wired by the Electrical Contractor. The Mechanical Contractor shall furnish all starters for installation by the Electrical Contractor. The Mechanical Contractor shall turn over these items to the Electrical Contractor at the site after receipt of notice from the Electrical Contractor that he is ready to install said items.

PART 2 – PRODUCTS

2.01 MATERIALS

A. As specified in all sections of Division 15 - Mechanical.

B. Materials and equipment shall be cataloged products of manufacturers regularly engaged in production of such materials or equipment and shall be manufacturer's latest design that comply with the specification requirements. Materials and equipment shall be duplicate items that have been in satisfactory commercial or industrial use at least 2 years prior to bid opening. Where two or more items of the same class of equipment are required, these items shall be products of a single manufacturer, however, the component parts of the items need not be the products of the same manufacturer. Each item of equipment shall have the manufacturer's name, address, model number and serial number on the nameplate

2.02 SUBSTITUTIONS

A. The material, products and equipment described in these specifications establish a standard of required function, quality, dimension, capacity, and appearance to be met by any proposed substitution.

B. Specific product listings in these specifications shall not preclude alternate product selections of comparable or superior quality. The Contractor may make reasonable substitutions, provided that these are submitted to the State for acceptance prior to bid in accordance with the Special Provisions and General Requirements and Covenants. The Contractor shall be responsible for design changes to accommodate the substituted product, at no additional costs to the State.

PART 3 – EXECUTION

3.01 MECHANICAL EQUIPMENT. FIXTURES AND ACCESSORIES

A. Mechanical Equipment, Fixtures and Accessories:

1. All mechanical equipment, accessories, plumbing fixtures and plumbing accessories shall be purchased by a Hawaii based manufacturer's representative who is factory authorized to furnish these items in the State of Hawaii. The manufacturer's representative shall be knowledgeable in the operation and functioning of the items furnished by him and must meet the following conditions:

   a. The manufacturer's representative shall furnish recommendations on the installation and operation of the items furnished in a capacity conforming to that of the actual manufacturer.

   b. The manufacturer's representative shall stock a reasonable amount of replacement parts locally.

   c. The manufacturer's representative shall have the ability to provide warranty replacement parts for equipment in a timely fashion to reduce the down time of equipment.

B. Maintenance Service Contractor: The maintenance service contractor shall have a local office, staffed with competent and qualified field service personnel. The personnel shall be certified by the manufacturer to perform service and maintenance tasks on all equipment in accordance with the one year maintenance service contract and the terms and conditions of all equipment manufacturers' warranties and recommendations. Field service personnel shall be fully capable of providing technical assistance instruction, routine maintenance and emergency maintenance service on all system equipment components.

C. Trouble Calls:

1. Emergency service and repairs required between regular service calls shall be rendered within 24 hours after the Contractor is notified, non-work days excluded.

2. The Contractor shall call the State, the next working day after being notified of the problem and report the status of repairs.

D. Manufacturer's Representative: Air conditioning equipment to be considered for bid purposes shall be purchased from a manufacturer 's sales and service representative located in the State of Hawaii that has locally stocked spare parts and support of a service organization within the State of Hawaii which has serviced manufacturer's unit of comparable type, size and capacity as those specified. The manufacturer must have other units of comparable type, size and capacity installed and operating satisfactorily in the State of Hawaii for a minimum of two years prior to bid opening. The Contractor shall provide a list of locations in Hawaii with addresses and telephone numbers when requested by the State.

E. Mechanical Equipment:

1. The mechanical equipment supplier shall maintain a local support office within the State of Hawaii, staffed with factory trained representatives or staff, capable of providing instruction on operation and installation of all system components.

2. Provide competent and qualified manufacturer's factory-trained and certified field service personnel on-site to be responsible for execution of all diagnostic testing in accordance with equipment manufacturer's installation and start-up certification requirements and warranty terms and conditions.

3. The Contractor shall provide manufacturer's representative and/or service technicians for any field modifications to equipment. The Contractor shall ensure that any modifications to equipment will not invalidate the manufacturer's warranties.

3.02 PIPING I DENTIFICATION

A. Identification of all pipe lines shall be by means of colored, waterproof, all temperature, self-adhering labels and directional arrow.

B. At Contractor's option, each and every system may be identified by painting with contrasting colors, using 314" high minimum stencil letters. Painting shall be done by the Mechanical Contractor.

C. All exposed pipes, whether insulated or not shall be identified. Labels may be omitted from piping where the use is obvious, due to its connection to equipment and where the appearance would be objectionable in finished rooms, as approved by the State.

D. Identification labels shall be placed as follows:

1. Near each valve and branch connection.

2. Wherever piping merges or disappears from view from the floor of

the room in which it is installed.

3. Labels shall not be more than 50 feet apart.

3.03 VALVE INDEX

The Mechanical Contractor shall provide brass or plastic tags on all valves with letters stamped or engraved thereon designating service of each valve.

3.04 FIELD TEST

The Mechanical Contractor shall perform all tests of the installed work and shall provide all services, labor, equipment, materials and instruments needed for the tests. During pressure tests, all items in the system to be tested, not designed for test pressures shall be removed or isolated from the system and shall be reconnected or unblocked after tests are completed. Should operating tests require the presence of manufacturers' representatives, the Mechanical Contractor shall cooperate with them and shall place at their disposal all assistance, materials and services required to perform such test. The Mechanical Contractor shall certify in writing that all work has passed all required tests.

3.05 POSTED OPERATING INSTRUCTION

Furnish approved operating instructions for each principal item of equipment for the use of the operation and maintenance personnel. The operating instructions shall include wiring diagrams, control diagrams and control sequence for each principal item of equipment. Operating instruction shall be printed or engraved and shall be framed under glass or in approved laminated plastic and posted where directed by the State. Operating instructions shall be attached to or posted adjacent to each principal item of equipment including start up, procedure in the event of equipment failure and other items of instruction as recommended by the manufacturer of each item of equipment. Operating instructions exposed to the weather shall be made of weather-resistant materials or shall be suitably enclosed to be weather protected. Operating instructions shall not fade when exposed to sunlight and shall be secured to prevent easy removal or peeling.

3.06 INSTRUCTION TO MAINTENANCE PERSONNEL

The Contractor shall furnish the services of competent instructors who will give full instruction to the designated personnel in the adjustment, operation and maintenance, including pertinent safety requirements, of the equipment or system specified. Each instructor shall be thoroughly familiar with all parts of the installation and shall be trained in operating theory as well as practical operation and maintenance work. Instruction shall be given during the first regular work week after the equipment or system has been accepted and turned over to the

State for regular operation. When significant changes or modifications in the equipment or systems are made under the term of the contract, additional instruction shall be provided to acquaint the operating personnel with the changes or modifications.

3.07 SAFETY REQUIREMENTS

Belts, pulleys, chains, gears, couplings, projecting setscrews, keys and other rotating parts located so that any person can come in close proximity thereto shall be fully enclosed or properly guarded. High temperature equipment and piping so located as to endanger personnel or create a fire hazard shall be properly guarded or covered with insulation of a type as specified herein. Items such as catwalks, ladders and guardrails shall be provided where required for safe operation and maintenance of equipment.

3.08 INSPECTIONS

A. All work and materials are subject to field observation at any and all times by the State.

B. Contractor shall notify the State a minimum of two days prior to testing any piping or ducting systems which must be witnessed and approved before they are covered up or enclosed. Should the Contractor fail to notify the State at the times prescribed, it shall then be the Contractor's responsibility to make duct work accessible, expose any concealed lines, or demonstrate the acceptability of any part of the system. Any extra cost caused by the removal of such work shall be borne by the Contractor.

C. If the State finds any material or work not conforming to these Specifications, Contractor within three days of being notified shall remove said materials from the premises and replace with approved material, at no cost to the State.

3.09 FINAL INSPECTION

Final inspection shall be requested by the Contractor only after submittal of all required certificates. No final inspection will be made until all moving parts of equipment are properly guarded, all controls and safety devices tested and operative, all painting required done and the site cleaned up.

3.10 ONE YEAR GUARANTEE AND MAINTENANCE SERVICE CONTRACT

A. In addition to the Guaranty on material and workmanship, the installer shall submit Seven (7) copies the Maintenance Service Contract, countersigned by the Contractor, that will validate said Guaranty.

B. The Guarantee and maintenance services shall extend for a period of one year commencing after 30 consecutive days of trouble-free operation after

the Project Acceptance Date, and shall include all labor, materials, equipment and parts necessary to service the complete system, in accordance with the Schedule of Maintenance Service (see Section 3.12), so as to assure proper operation and function of the system. All costs for the periodic maintenance, including emergency calls, shall be borne by the Contractor. This maintenance period and the Guaranty period shall run concurrently (same start and end dates).

Trouble-free operation is defined as a non-disabling condition or a non-recurring failure or disruption and the following:

1. The system shall be free of all discrepancies, contamination and debris which require correction in excess of those described for the monthly service which is included in the Schedule of Maintenance.

2. The system is maintaining operational conditions and other parameters measured during acceptance tests.

C. The Installer shall include a listing of the following items along with the Maintenance Service Contract:

1. Name of the servicing contractor.

2. Mechanical system acceptance date.

3. Service contract expiration date.

4. Monthly inspection schedule for the maintenance period.

5. Itemized listing of the equipment covered under the service contract, including a description of the equipment identified, its serial number(s) and manufacturer's name(s).

D. The Maintenance Service Contract shall be submitted along with the Operations and Maintenance Manual on/or before the Project Acceptance Date.

Note to Contractor: Equipment specified shall have either replacement parts which are locally stocked and an in-state service organization able to provide the necessary repair and maintenance service.

Distribution of Submittal:

1 Copy: Contractor
1 Copy: Homeowner
1 Copy: State

3.11 OPERATIONAL AND MAINTENANCE MANUAL

A. Submit Three (3) hard bound copies of the Operating and Maintenance Manual on all equipment and the system as a whole. The manual shall identify project name and number, contractor, consultant, date and all equipment provided. It shall include the equipment manufacturer's name, model and serial number, tag no., capacity, quantity of units, their location and area (room) served and shall include the manufacturer's operation and maintenance manuals including control and wiring diagrams and source of service and replacement parts. When standard manufacturers brochures are used, adequately indicate (highlight, arrow, etc.) the project related information and delete (X or cross-out) the non-applicable information.

B. Distribution of Submittal:

1 Copy: State
1 Copy: Homeowner

3.12 SCHEDULE OF MAINTENANCE SERVICE

All services performed by the Contractor shall include applicable items listed but shall not be limited to the following maintenance tasks:

A. Fan Coil Unit

Monthly Service

1. Flush all related condensate drain lines with nitrogen. (Contractor may be liable for water damage due to clogged drains). Install pan tablets if necessary to control algae.
2. Clean all air filters at least once a month.
3. Lubricate and oil all fan and motor bearings and connections.
4. Check all drives for wear; adjust accordingly.
5. Operate equipment to check for proper operation, unusual noise and vibration; adjust or repair all equipment and controls as required; clean-up all equipment.
6. Certify performance of monthly services and that all discrepancies are reported and corrected.

Annual Service

1. Adjust alignment of bearings; lubricate fan and motor bearings.

Replace worn or noisy parts. Clean cooling coils of dirt accumulation using nitrogen, high pressure air, or chemical coil cleaner solution.

2. Clean supply and return air grilles.

3. Clean all fan wheels and interior and exterior of equipment housings.

4. Secure all loose housing, seal leaks and touch-up paint after cleaning all rust.

5. Check and calibrate all electric temperature controls.

6. Certify performance of annual service and correct and report all discrepancies.

B. Air Cooled Condensing Unit

Monthly Service

1. Perform the tasks of Item A. Fan Coil Unit: Monthly Service.

2. Check compressor oil level and refrigerant sight glass; add oil as needed and change filter/drier if moisture indicated.

3. Check refrigerant system for leaks, unusual noise and vibration and record suction, discharge and oil pressures in maintenance log book and correct and report all deficiencies.

Annual Service

1. Perform the tasks of Item A. Fan Coil Unit: Annual Service.

2. Check compressor coupling alignment: lubricate or replace noisy bearings.

3. Clean condenser coils of dirt accumulation using nitrogen, high pressure air/water, and steam or chemical coil cleaner solution.

4. Test compressor crankcase oil and replace if contaminated or submit oil test results. Clean or replace strainer and oil filter (open compressor).

5. Test and check system response at various cooling load conditions for proper operation, record settings, adjust as required. Re-calibrate all safeties, capacity, and temperature controls to proper

settings.

6. Check and clean all unit housing (inside and outside and components), seal leaks and remove rust from exterior components and touch-up paint. Megger (electrical test to measure wire insulation resistance, i.e. condition) compressor motor and submit report and recommendation; check starter, relays, and control contacts and electrical connections for tightness and clean as required.

C. Ventilation Fans (Exhaust)

Quarterly Service

1. Remove and wash intake grille.

2. Certify performance of quarterly fan maintenance service and correct and report all discrepancies.

Semi-Annual Service

1. Check and clean fan wheels and housings of dust. dirt, and grease.

2. Remove and wash all intake grilles.

3. Certify performance of semi-annual fan maintenance service and correct and report all discrepancies.

D. Temperature Controls

Quarterly Service

1. Check control devices for proper operation, sticking stems, and calibration; repair/replace weak or broken springs and all other parts.

2. Certify performance of quarterly maintenance service and that all discrepancies are reported and corrected.

E. Solar Water Heating System

Semi-Annual Service

1. Check temperature sensors, circulation pump, and control panel for proper operation. Repair/replace parts as necessary.

F. Certify performance of semi-annual maintenance service and that all discrepancies are reported and corrected.

G. Work Schedule:

All maintenance work shall be performed between the hours of 7:30 a.m. and 4:00 p.m. on normal working days, Monday through Friday, excluding Holidays.

H. Trouble Calls:

Emergency service and repairs required between regular service calls shall be rendered within 24 hours after the Contractor is notified, non-work days excluded.

I. Maintenance Report/Checklist:

The Contractor shall prepare and maintain a maintenance service report/checklist which shall include the following:

1. Date maintenance service was performed.
2. The name of the mechanic who performed said maintenance.
3. The type and cost (labor, materials, parts and equipment) of repair work performed on the unit, if any.
4. Documents and other data pertaining to the maintenance performed.
5. Service (Monthly, Quarterly, Annual) check list of status of all items per schedule and operation and maintenance manual.

It will be the responsibility of the Contractor to maintain the report/checklist by recording the above noted data after each scheduled maintenance and emergency repairs, and have the checklist available for inspection at the site. The report shall be sufficiently detailed to properly reflect the past maintenance history of the equipment.

Reports shall be certified by a representative of the facility being served and shall be submitted to the State monthly.

3.13 CLEANUP AND WORK PRACTICES

A. The Contractor shall keep the job site free of debris, litter, discarded parts, etc. and shall clean all oil drippings during the daily progress of work. The Contractor shall remove all tools, parts and equipment from the service areas upon completion of the work.

B. The Contractor shall exercise caution during the progress of its maintenance and repair work to prevent damage to the ceilings, roofing

and other building structure.

The Contractor shall restore all damages, caused by its negligence, to its original condition at its own expense.

PART 4 - MEASUREMENT AND PAYMENT

4.01 BASIS OF MEASUREMENT AND PAYMENT

Work under this section will not be measured nor paid for separately, but shall be considered incidental to and included in the prices bid for the various items of work in this project.

END OF SECTION

SERVICE MAINTENANCE REPORT

Date: SHEET NO.

Name of Service Personal:

Name of Facility and Location:

Date of Service Call:

Time In, Time Out at Site:

Person(s) Contacted:

Nature of Service Call - (Routine Maintenance or Emergency - Explain and Cost Breakdown).

Equipment Readings and Maintenance Performed.

Remarks:

SECTION 15250 - INSULATION OF MECHANICAL SYSTEMS

PART 1 – GENERAL

1.01 RELATED DOCUMENTS

The General Provisions of the contract, including General and Special Provisions and General Requirements of the Specifications, apply to the work specified in this section.

1.02 GENERAL REQUIREMENTS FOR THIS SECTION

Section 15000, "General Mechanical Requirements", with the additions and modifications specified herein, applies to this section.

1. Manufacturer's Stamp or Label: Every package or standard container of insulation, jackets, cements, adhesives and coatings delivered to the project site for use must have the manufacturer's stamp or label attached giving name of manufacturer, brand and description of material. Insulation packages and containers shall be marked "asbestos-free".

2. Fire Resistance: Insulation, adhesives, vapor-barrier materials and other accessories, except as specified herein, shall be noncombustible. The materials shall have a flame-spread rating not more than 25 and a smoke-developed rating not more than 50 in accordance with NFPA 255, ASTM E 84-80 or UL 723.

    a. Materials Tests: Test factory-applied materials assembled. Field-applied materials may be tested individually. Use no fugitive or corrosive treatments to impart flame resistance. UL label or satisfactory certified test report from an approved testing laboratory will be required to indicate that fire hazard ratings for materials proposed for use do not exceed those specified. Flame- proofing treatments subject to deterioration due to effects of moisture or high humidity are not acceptable.

    b. Materials Exempt from Fire-Resistant Rating:

        1) Nylon anchors

        2) Treated wood inserts

1.03 SUBM1ITALS

A. Submit in accordance with Section 01300 - SUBMITTALS.

B. The items for which the submittal requirements of Section 15000, "General Mechanical Requirements", apply are as follows:

1. Manufacturer's Data:

a. Insulation

b. Jackets

c. Vapor-barrier materials

d. Accessory-materials

2. Standards Compliance. Standards compliance labels are required on each container or package:

a. Insulation

b. Jackets

c. Vapor-barrier materials

d. Accessory materials

1.04 DEFINITIONS

A. Finished Spaces: Habitation or occupancy spaces where rough surfaces are plastered, paneled or otherwise treated to provide a pleasing appearance.

B. Unfinished Spaces: Storage or work areas where appearance is not a factor, unexcavated spaces, crawl spaces, etc.

C. Concealed Spaces: Spaces between a ce1hng and floor construction above or between double walls or furred-in areas; pipe and duct shafts, etc.

D. Exposed: Open to view inside the building. For example, pipe run through a room and not covered by other construction, is exposed.

E. Fugitive Treatments: Treatment of materials subject to deterioration due to aging, moisture, high humidity, oxygen, ozone and heat. Fugitive means entrapped materials that can cause deterioration e.g., solvents, water vapor, etc.

F. Outside: Open to view beyond the exterior side of walls, above the roof and unexcavated or crawl spaces, above or beneath pier floors, in tunnels or exposed on all sides in trenches connected or not connected to an exterior portion of a building.

1.05 PIPING REQUIRING INSULATION

A. Hot Water Piping.
B. Cold Water Piping
C. Refrigerant Piping
D. Condensate Drain Piping

PART 2 – PRODUCTS

2.01 PIPING INSULATION

Insulation exterior shall be cleanable, grease resistant, non-flaking and non-peeling. Pipe insulation shall conform to the referenced publications and the specified temperature ranges and densities in pounds per cubic foot (pcf). Insulation for fittings and flanges shall be pre-molded, pre-cut or job-fabricated insulation of the same thickness and conductivity as used on adjacent piping.

1. Refrigerant Piping: All refrigerant piping shall be insulated with 1" AP Armaflex closed cell insulation, provide with Pittwrap and finish with Johns Manville, Zeston 2000 PVC Jacket, 0.20 mils thick, or approved equal
2. Interior Cold Water Piping: All interior cold water piping shall be insulated with: 3/4" Rubatex or equal.
3. Interior Hot Water Piping: hot water piping shall be insulated with 1" fiberglass insulation with insulation jacket.
4. Condensate Drain Piping: All interior condensate drain piping shall be insulated with 3/4" Rubatex or equal.

2.02 INSULATION JACKETS

Vapor-Barrier Material: Material shall be resistant to flame and moisture penetration and not support mold growth. Provide vapor-barrier material on insulation in exposed locations with a white surface suitable for painting without sizing. Perm rating of .01.

2.03 ADHESIVES. SEALANTS AND COMPOUNDS

Shall be compatible with materials to which applied and suitable for the service.

1. Vapor-Barrier and Jacket Adhesive: Fire resistant type. Foster Products or approved equal
2. Lagging Adhesive: Fire resistant type. Foster Products or approved equal.

3. Mineral Fiber Insulation Cement: ASTM C 195, thermal conductivity 0.85 max at 200 degrees F mean when tested per ASTM C 177.

4. Bedding Compound and Joint Sealer· Fire resistant type. Foster Products or approved equal.

5. Vapor-Barrier Coating: Fire resistant type. Perm rating of .05. Foster Products or approved equal.

2.04 ACCESSORIES

A. Staples: Corrosion-resistant outside-clinch type.

B. Anchor Pins: Provide anchor pins and speed washers recommended by the insulation manufacturer.

C. Glass Cloth and Tape. Textile Glass.

D. Vapor-Barrier Material Tape. Pressure-Sensitive adhesive backed. Arno or approved equal.

PART 3 - EXECUTION

3.01 INSTALLATION

A. Install insulation system in accordance with manufacturer's recommendations using tradesman skilled in this trade and approved by the insulation manufacturer. Provide insulation products with a composite (insulation, jacket and adhesive) fire and smoke hazard rating as tested under ASTM E84, NFPA 255 and UL 723 not exceeding a flame spread of 25 and smoke developed of 50s.

B. Pipe Insulation Thickness: insulation thickness shall conform to Table 1.

PIPE INSULATION THICKNESS (Inches Nominal)				
	PIPE DIAMETERS (Inches)			
	.25-1.25	1.5-3	3.5-5	6-10
Flexible Cellular/foam Glass	1	1	2	3

Table 1.

C. Expansion Clearances: At points where pipe will move during expansion and contraction (expansion joints, Z-bends, expansion loops and ells), clearances between the pipe and encased insulation shall be sized to permit full pipe movement without cracking or damaging insulation and jacket.

3.02 FIELD INSPECTION

Visually inspect to insure that materials used conform to specifications. Inspect installation progressively for compliance with requirements.

PART 4 - MEASUREMENT AND PAYMENT

4.01 BASIS OF MEASUREMENT AND PAYMENT

Work under this Section will not be measured for payment but will be paid for at the Contract Lump Sum Price.

Item No.	Item	Unit
15250.1	Insulation of Mechanical Systems	Lump Sum

END OF SECTION

SECTION 15400 - PLUMBING PIPING AND SPECIALTIES

PART 1- GENERAL

1.01 RELATED DOCUMENTS

The General Provisions of the contract, including General and Special Provisions and General Requirements of the Specifications, apply to the work specified in this section.

1.02 SCOPE

Plumbing work as indicated on the drawings including tightness test, disinfection of potable water lines, clean-up, and record drawings and product warranty certificates. Connection to the water service and sanitary system.

1.03 WORK SPECIFIED JN THIS SECTION

All materials, labor and equipment necessary for complete and operating interior plumbing system within 5 feet of building face, including complete sanitary and potable water lines.

1.04 WORK SPECIFIED IN OTHER SECTIONS

A. Section 15000: General Mechanical Requirements

B. Section 15250: Insulation of Mechanical Systems

C. Section 15450: Plumbing Fixtures and Trim

1.05 STANDARDS AND CODES

Installation shall conform to all applicable provisions of the latest editions of the following:

A. County of Hawaii Plumbing Code.

B. State of Hawaii, Title 11 Administrative Rules, Department of Health.

C. Water System Standards, State of Hawaii.

D. American Water Works Association Standards.

E. American Society for Testing and Material (ASTM) Standards.

F. American National Standards Institute (ANSI) Standards.

G. Hawaii County Energy Code.

H. All Other Applicable Codes and Standard.

Where the Specifications indicate materials or construction in excess of code requirements, the Specifications shall govern. The Contractor shall be responsible with conforming to all codes and standards regulating this work whether specifically mentioned or not in these specifications.

1.06 SUBMITTALS

A. Submit in accordance with Section 01300 - SUBMITIALS.

B. The items for which the submittal requirements of Section 15000 "General Mechanical Requirements", apply are as follows:

1. Manufacturer's Data:

a. Water Piping and Valves

b. Unions

c. Escutcheons

d. Hangers and Supports

PART 2 - PRODUCTS

2.01 GENERAL

A. All materials shall be new, free of defects and conform to the Local Codes. Materials that are defective or unsatisfactory to the Engineer shall be replaced at no additional compensation from the State.

B. These product specifications are general and encompass piping items found in typical commercial work. Some items may not be applicable to this particular project. Contractor shall also provide any other products, not specifically mentioned here which are part of normal accepted trade practice for the installation of a functioning plumbing system.

2.02 Specific product listings in this Part shall not preclude alternative product selections of comparable or superior quality. Contractor may make reasonable substitutions, provided that these are submitted to the Engineer for approval PRIOR TO BID opening. The Contractor shall be responsible for design changes to accommodate the substituted product, at no additional cost to the State.

2.03 POTABLE WATER PIPING

A. Water Lines Above Grade; Copper Type L, hard temper, with wrought

copper or cast bronze fittings made up with silvabrite 100 lead free solder. All copper piping in walls and thru floors shall be provided with IPS Weld-On Pipe Insulators at all wood contact with the copper piping.

B. Ball Valves/Balancing Valves: Nibco S-FP-600 brass ball valves, provide with locking lever for balancing valves or approved equal.

C. Check Valve: Horizontal Swing, 200 psi CWP. Nibco S-413-Y-LF or approved equal.

2.04 UNIONS

A. Copper. Bronze body, 200 psi using ground joints for 2' piping and smaller.

B. Dielectric Unions shall separate all ferrous and nonferrous metals in all piping systems. Unions shall match those above, except that of metal-to-metal contact shall be avoided. Where flanges are used, the bolts shall be electrically insulated from the body of the flange.

2.05 AIR CHAMBERS

Air chambers shall be 12" Jong copper tubing, the same size as branch pipe to fixture. Pipe shall be capped, crimping is not allowed.

2.06 ESCUTCHEONS

Brass body, chrome-plated finish. Of sizes sufficient to cover pipe openings through the floor, wall, or ceiling. Escutcheons shall be secured in place by either spring clips or setscrews.

2.07 PIPE SLEEVES

Schedule 40 galvanized steel pipe sleeves in concrete, 18 gauge galvanized sheet metal sleeves in other construction. Sleeves shall be sized to provide a minimum of 1/4" clearance around bare or insulated piping or as otherwise required by Code.

2.08 PIPE HANGERS AND SUPPORTS

A. General: All hangers and supports shall be of the res1hent type as indicated below.

B. For Uninsulated Copper Tubing: Acousto-Plumb Systems.

C. For Insulated Copper Tubing: Acousto-Plumb Systems.

D. Riser Clamps: Black steel, Fee and Mason No. 241. PVC coated, Erica, Acousto-Plumb Systems for Copper Piping.

E. Hanger Spacing:

Pipe	Maximum Spacing
Copper Tubing, 1-1/2" and smaller	6 ft.
Copper Tubing, 2" and larger	10 ft.

F. Hanger Rods: Continuous threaded rod conforming to ASTM A-107. Eye rods shall be Fee and Mason Figure No. 228 and 228 WL. Sizes shall be as follows:

Pipe Size	Rod size
½" to 2"	3/8"
2 ½" to 3"	½"
4" to 6"	5/8"

2.08 PLUMBING FIXTURES AND TRIM

As indicated in Section 15450.

PART 3 - EXECUTION

3.01 PROPOSED WORK APPROVAL

Do not commence with installation until shop drawing and equipment brochure submittals are approved.

3.02 FIELD INVESTIGATIONS

Existing utility locations shall be field-verified. Unforeseen obstructions or lack of invert depth shall be brought to the attention of the State.

3.03 WORKMANSHIP AND COORDINATION

A. All work shall be of the highest standard. Poor workmanship will be rejected by the Engineer and shall be replaced at no additional cost to the State.

B. Coordinate this work with schedules of other trades, specifically sanitary gas and water lines below concrete slabs or concealed in walls.

C. Lay out piping to insure a neat and orderly arrangement, with vertical lines plumb.

D. Carefully handle all exposed piping to avoid tool marking. Handle polished fittings with extra care so tool marks do not show.

3.04 PIPING I NSTALLATION

A. Cutting and Patching:

1. Cutting and patching to accommodate this work shall be done by that trade experienced in the particular type of work required.

2. Where cutting of framing or structural members is unavoidable, obtain the approval of the Engineer before proceeding.

B. Roughing-In:

1. Proceed with the rough-in work as rapidly as general construction will permit and have all of the roughing-in stubbed out and tested before any finished work are in place.

2. Fit all piping to follow the building structural elements as closely as possible.

C. General Installation Guidelines:

1. Inspect all pipes fully inside and out for defects. Ream out ends of pipe and remove all burrs. Water and gas lines shall be protected during construction to prevent contamination of interior surfaces.

2. Do not close up before pipe inspection and approval is given by the Engineer.

3. Provide pipe sleeves where pipes pass through masonry below grade. Fill annular space within sleeves with nonstick grout or fire stop. Flashing around base of pipes penetrating the roof shall be provided under another section.

4. Protect copper tubing from coming in contact with dissimilar metal with dielectric union. Provide plastic sleeves for underground copper lines.

5. All piping shall be properly and safely supported. Support soil stacks at their bases and at each floor with metal clamps. Horizontal pipes above grade shall be supported with hangers not more than 18 inches from every joint. Provide seismic sway bracing at all horizontal supported piping.

3.05 FIXTURE INSTALLATION

A. Set all plumbing fixtures in an approved workman like manner. Point up edges against wall with approved sealant

B. Adjust equipment and plumbing fixtures to operate properly and clean all fixtures just prior to final inspection.

3.06 DISINFECTION OF WATER LINES

A. Flush out water lines to remove foreign matter. After flush water runs clear, disinfect the lines with chlorine in accordance with AWWA Standard C601, pertaining to methods, concentrations, and contact times. Flush out until residual is reduced to 0.3 ppm. Submit a certificate of completion for this work from a contractor experienced and licensed to do disinfecting work.

B. Obtain two water samples from selected points and submit them to a licensed laboratory for bacteriological testing. Water shall meet Federal Water purity standards. Submit the laboratory report. All costs of testing shall be borne by the Contractor. Notify the Engineer in writing if the County water supply to the site exceeds maximum permissible limits for coliform content.

3.07 TESTS AND ACCEPTANCE INSPECTIONS

A. Test all new plumbing lines in accordance with methods described in Section 318 of the Plumbing Code.

B. The Contractor shall arrange for inspections by the County and conduct required tests in the presence of the Engineer and inspectors from the County.

C. Tests shall be repeated as necessary to satisfy the Engineer, or such tests shall be made by the Engineer and charged to the Contractor.

3.08 CLEAN-UP AND REPAIRS

A. Upon completion of the work, remove all debris, excess materials, tools, etc., resulting from this work from the job site, and leave the location broom-clean in a manner acceptable to the Engineer.

B. Clean all fixtures and equipment of oil, grease, stains, paint, etc. All plates, trim, etc., shall be polished. Traps and drains shall be clean and unobstructed. All equipment piping and lines shall be thoroughly cleaned before leaving the work.

3.09 WARRANTY

A. Guarantee work against defects for one year after acceptance. Furnish manufacturer's product warranty certificates in a binder.

PART 4 - MEASUREMENT AND PAYMENT

4.01 BASIS OF MEASUREMENT AND PAYMENT

Work under this Section will not be measured for payment but will be paid for at the Contract Lump Sum Price.

Item No.	Item	Unit
15400.1	Plumbing Piping and Specialties	Lump Sum

END OF SECTION

SECTION 15450 - PLUMBING FIXTURES

PART 1- GENERAL

1.01 RELATED DOCUMENTS

The General Provisions of the contract, including General and Special Provisions and General Requirements of the Specifications, apply to the work specified in this section.

1.02 WORK SPECIFIED I N THIS SECTION

A. All materials, labor and equipment necessary for complete and operating interior plumbing fixtures.

B. A complete system of drain piping.

C. A complete hot water and cold water system including point of connection as indicated on drawings.

D. Painting of exposed plumbing pipes and supports.

1.03 WORK SPECIFIED IN OTHER SECTIONS

Section 15000: General Mechanical Requirements

Section 15250: Insulation of Mechanical Systems

Section 15400: Plumbing

Section 09910: Painting

1.04 QUALITY ASSURANCE

A. Products of the following manufacturers are acceptable in lieu of those specified hereinafter, subject to submittal and shop drawing requirements specified in Section 15000 - MECHANICAL GENERAL REQUIREMENTS. All additional related work caused by the product installation and operational requirements shall be the contractor's responsibility at no additional cost to the DHHL.

1. Valves: Nibco, Stockholm.

2. Insulation: Owens Corning, Mansville, Certaineed.

3. Pipe Supports: Elceen, Fee and Mason, Grinnell, Unistrut.

4. Solar Hot Water Tank: SunEarth, Ruud, Rheem

5. Solar Heater Panels: SunEarth. Radco, Rheem, Solahart.

6. Solar Heater Circulation Pump: Taco, Bell & Gossett, Grundfos.

7. Mixing Valves: Cash ACME, Watts, Leonard, Symmons, Powers.

8. Differential Temperature Controls: Steca, SunEarth, Goldline

9. Time Switch: Intermatic, GE, Sylvania, Woods.

B. Comply with the latest recommendations and requirements of the Codes and Standards listed hereafter in addition to detailed requirements of this specification. In the event of conflicting requirements, these specifications shall prevail.

American Society for Testing and Materials Publications (ASTM):

A53/A53M Standard Specification for Pipe, Steel, Black and Hot-Dipped, Zinc-Coated, Welded and Seamless.

B88 Seamless Copper Water Tube.

American National Standards Institute Publications (ANSI):

B16.8 Cast-Bronze Solder-Joint Pressure Fittings with Addenda 816.1Ba-967.

B16.22 Wrought Copper and Bronze Solder-Joint Pressure Fittings.

B16.23 Cast-Bronze Fittings for Flared Copper Tubes.B16.26 Wrought Copper and Wrought Copper Alloy Solder-Joint Drainage Fittings.

C1 National Electrical Code.

American Society of Mechanical Engineers (ASME):

ERRATA Boiler and Pressure Vessel Codes.

National Fire Protection Association Publication (NFPA):

255 Surface Burning Characteristics of Building Materials, Test Methods.

Underwriters' Laboratories Publications (UL):

732 Surface Burning Characteristics of Building Materials, tests for.

1.05 SUBMITTALS

A. Submit in accordance with Section 01300 - SUBMITTALS.

B. The items for which the submittal requirements of Section 15000, "General Mechanical Requirements", apply are as follows:

1. Manufacturer's Data:

a. Plumbing Fixtures

PART 2 - PRODUCTS

2.01 PLUMBING FIXTURES

A. Solar Hot Water Tank/Back-Up Heater: SunEarth Model SUBOTC-1, 80 gallon storage capacity with 4500 watt heating element.

B. On-Demand Gas Water Heater (WH-1): Rheem ModelRTG-95DULN, Indoor direct vent, temperature range 80℉ to 140℉, GPM at 40℉ temperature rise of 7.4, and maximum GPM 9.5.

C. Solar Water Heating Panels:4' x 10' Solar Panels shall be SunEarth model EC40.

D. Solar Heater Circulation Pump: Circulation pump shall have 3-speed motor with Stainless Steel Union Housing. Motor shall be a 2-pole, single phase motor and operate off of a 115v source. Pump shall be capable of delivering 2 GPM at 11 feet of head, Grundfos Model UPS 35-SUC.

E. Mixing Valve: Cash Acme Mixing Valve 110-DLF Series, 95 degrees to 120 degrees.

F. Mounting Hardware: Bronzed Anodized Sola Strut, with 316 Stainless Steel Strut Nuts and Hanger Bolts.

G. Differential Temperature Controller: Microprocessor-based differential temperature control shall have LCD with adjustable temperature setting for on/off differential and high limit. Control shall have 3 outputs for temperature sensors with varistor high voltage spike protection and one 120VAC output for circulation pump control. Steca SETR 0301 U, provide with PT1000 Probe and PT1000 Lug Temperature Sensors.

H. Time Switch: The time switch shall be of the 24 hour dial type capable of permitting up to 12 ON/OFF operations each day. The time switch shall provide a minimum ON or OFF time of 1 hour. The time switch to be powered by 208-277 volt AC, 60 Hz power supply. The time switch motor

shall be a synchronous motor which shall be designed to withstand a minimum of 6000 volt transients. Time switch shall include a skipper feature and shall provide for maintaining a selected schedule during the week and allow the load to remain ON as required during weekend or other desired time periods.

The time switch mechanism shall be a snap in design to provide ease of mechanism removal for mounting the enclosure. The time switch enclosure shall be a NEMA 1 lockable steel enclosure. The time switch shall include an external override to allow overriding of the time switch without opening the cover and to provide override capability when the cover is padlocked. A visual indicator shall be provided in the time switch for inspecting clock motor operation. The time switch shall provide clear terminal identification on a see-through non-curling terminal insulator.

Terminal connections shall be made using teeter type terminal screws to provide secure connections for wire sizes up to 8 AWG. Switch shall have a UL listed rating of:

40 amps per pole, Resistive, Inductive Tungsten 125/208/240/277 Volts AC

1. 1000 VA Pilot Duty, 125/208/240/277 Volts AC
2. HP (24 FLA), 125 Volts AC
3. 5 HP (28 FLA), 240 Volts AC

Time switch shall be UL listed under UL category 917 Clock Operated Switches and shall be Intermatic Model WH40.

I. Gas Water Heater: 3"/5" Concentric Vent System with Integrated Condensate Collector (indoor models only) connects to Metal Fab Inc., 3"/5" Concentric Venting without an adapter. Next Generation Burner Technology. .26 GPM Minimum Flow Rate. .40 GPM Minimum Activation Flow Rate. UMC-117 remote control and 10 ft. of thermostat wire is included. Exclusive! Guardian OFW™ overheat film wrap. All Rheem tank-less models are third-party efficiency certified by GAMA. Continuous hot water, energy saving and compact, space saving design. Intelligent electronic controls designed to increase energy efficiency and safety. Self-Diagnostic System. Digital display shows temperature setting and maintenance codes. Built-in electric blower. Supplied with a 120 volt power cord. Environmentally friendly Low NOx burner meets SCAQMD rule 1146 requirements. Freeze protection to -30° F.

J. Solar Storage Tank: Tank shall be specifically designed for installation as a thermal storage tank. Water port fittings shall be located at front of storage tank. Tank shall have full port, full flow brass drain valve. Tank shall have factory installed temperature and pressure relief valve and vacuum breaker. Tank shall be Rheem Marathon 50 gallon capacity, MTS50200 or approved equal.

PART 3 - EXECUTION

3.01 EQUIPMENT SUBSTITUTIONS APPROVAL

Do not commence with installation until proposed equipment substitution submittals are approved.

3.02 FIXTURE INSTALLATION

A. Set all plumbing fixtures in an approved workmanlike manner. Point up edges against wall with approved caulking.

B. Flanges at wall penetrations shall be flush against wall and shall not spin when rotated by hand.

Adjust equipment and plumbing fixtures and trim to operate properly and clean all fixtures just prior to final inspection.

C. Provide individual accessible stop valves on all fixture and equipment supply piping.

D. All exposed metal parts, accessories and fittings associated with plumbing fixtures (including piping) shall be chrome finished unless another finish is specifically indicated otherwise. Provide polished chrome plated brass escutcheons at all exposed piping structure penetrations (wall, floor, ceiling, etc.) and fixture connections.

E. Install all fixtures according to manufacturer's recommendations.

PART 4 - MEASUREMENT AND PAYMENT

4.01 BASIS OF MEASUREMENT AND PAYMENT

Work under this Section will not be measured for payment but will be paid for at the Contract Lump Sum Price.

Item No.	Item	Unit

15450.1	Plumbing Fixtures	Lump Sum

END OF SECTION

DIVISION 16 – ELECTRICAL

SECTION 16100 - ELECTRICAL WORK

PART 1 - GENERAL

1.01 RELATED DOCUMENTS

The General Provisions of the Contract, including General and Special Provisions and General Requirements of the Specifications apply to the work specified in this section.

1.02 SUBMITI ALS

A. Submit in accordance with Section 01300 - SUBMITTALS.

B. Shop Drawings: Submit complete shop drawings and manufacturer's literature for Engineer's review before any work is fabricated. Submit manufacturer's literature for the following:

1. Loadcenter.
2. Combination Meter Socket with Disconnect.
3. Combination Meter Socket with Loadcenter.
4. Disconnect Switches.
5. Receptacles.
6. Non Metallic Sheathed Cable.
7. Service Entrance Cable.
8. Raceways.
9. Junction Boxes.

Intent of Shop Drawing and Catalog Cut Review:

1. Shop drawing and catalog cut submittals processed by the Engineer are not Change Orders. The purpose of the submittals by the Contractor is to demonstrate to the Engineer that he understands the design concept, that he demonstrates his understanding by indicating which equipment and material he intends to furnish and install and by detailing the fabrication and installation methods he intends to use.
2. If deviations, discrepancies or conflicts between shop drawings and specifications are discovered either prior to or after shop drawing submittals are processed by the Engineer, the design drawings and specifications shall control and shall be followed.

3. Prequalification: Where materials or products specified herein are designated by manufacturer's name, any request to substitute materials or products other than those specified shall be approved by the Engineer during the bidding period, as specified in the SPECIAL PROVISIONS. Burden of proof of equality of proposed substitutions will be the responsibility of the Contractor.

4. Shop drawings and catalogue cuts for substitute materials shall clearly specify compliance with and/or deviation from specified material. Certification shall not contain statements to imply that the item does not meet requirements specified, such as "as good as"; and "achieve the same end use and results as materials formulated in accordance with the referenced publications". Certifications shall simply state that the item conforms to the requirements specified. Certificates shall be printed on the manufacturer's letterhead and shall be signed by the manufacturer's official authorized to sign certificates of compliance. Review of shop drawings and catalogue cuts shall not release Contractor from complying with intent of drawings and specifications.

1.03 GUARANTEE AND CERTIFICATE

Any item of material, apparatus, equipment, furnished and installed, or construction by the Contractor showing defects in design, construction, quality or workmanship within one year from the date of final acceptance by the State shall be replaced by such new material, apparatus or parts as may be found necessary to make such defective portion of the complete system conform to the true intent and meaning of the specification and/or the drawings. Such repairs or replacement shall be made by the Contractor or his surety, free of all expense to the State.

1.04 GENERAL REQUIREMENTS

The Contractor shall furnish all labor. materials {except as hereinafter noted), tools, equipment and appliances required to provide and install all electrical work , complete, as indicated on the drawings and/or as herein specified. The drawings note various sizes of equipment as determined for basis of design; the electrical work, however, shall be installed to comply with the equipment furnished by the successful supplier. The work shall include but not necessarily be limited to, the following:

1. Provide complete electrical system for all new mechanical equipment including ACCU, FCU, exhaust fans, electric water heaters, etc.

2. Before bidding on this work. Carefully, examine each of the drawings and the site. By submitting a proposal of the work included in this Contract, the Contractor shall be deemed to have made such examination and to be familiar with and accept all conditions of the job site.

3. Prior to ordering equipment, the Contractor shall examine the plans to verify the amount of space allocated for the electrical equipment and to determine if the material proposed will fit within the allotted space. It shall be the contractor's responsibility to provide equipment that will fit within the allotted space.

4. Rules and Permit: The entire installation shall be made in strict accordance with the latest rules and regulations of the National Board of Fire Underwriters, the currently adopted edition of the National Electrical Code (NEC) and the local Electrical Bureau. The Contractor shall obtain and pay for the electrical permit as required by local laws and rules. All work shall be inspected by the proper local authorities as it progresses. The Contractor shall pay all inspection fees and shall deliver certificates of completion and inspection to the State before final payment will be made. Costs of permits and inspection fees shall be included in the Contractor's bid price.

5. Make detailed arrangements and pay for all work by utility companies (HELCO) pertaining to contract.

1.04 COORDINATION WITH UTILITY COMPANIES AND OTHER TRADES

During bidding and construction, Contractor shall coordinate his work with utilities, and other trades to avoid omissions and overlapping of responsibilities. Contractor shall submit all service upgrade requests to HELCO. Contractor shall be responsible for all engineering designs, building department permit resubmittals and construction for all changes required by HELCO. Comply with all HELCO requirements and provide any additional requirements (junction boxes, utility poles, guy wires, etc.) as indicated by HELCO.

PART 2 - PRODUCTS

2.01 MATERIALS

A. All materials shall be new, except as specifically noted, and shall bear the label of Underwriters Laboratories (UL) whenever standards have been established and label service is normally and regularly furnished by the agency.

B. Loadcenter: Surface/flush-mounted as noted, rated as indicated on the drawings, with solid neutral, copper bussing, circuit breaker compliment as shown, complete with door, trim, 2-ply plastic nameplate and directory. Short circuit withstand capacity of load center shall match existing equipment, confirm rating with

HELCO. Provide NEMA 1 rating for interior locations and NEMA 3R for exterior locations.

C. Individual Circuit Breaker: UL listed, molded plastic case circuit breaker with toggle operated mechanism and thermal-magnetic overload trips. Toggle positions "ON" and "OFF" engraved or embossed on body. Provide arc fault interrupter type breaker for circuits feeding the dining rooms, living rooms, bedrooms, hallways, etc. per NEC 210 .12. Half width plug-in breakers are not permitted. For fan coil unit, exhaust fan and electric water heater circuits, provide breakers capable of being locked in the off position per NEC 422.31.

D. Combination Meter Socket with Disconnect Meter socket shall be NEMA 3R, rain tight, fabricated from painted, galvanized steel, rated for 120/240V, 1-phase, 3-wire with four (4) jaw, with integrated circuit breaker and comply with all HELCO and EUSERC requirements. Short circuit withstand capacity of load center shall match existing equipment, confirm rating with HELCO.

E. Combination Meter Socket with Loadcenter: Meter socket shall be NEMA 3R, rain tight, fabricated from painted, galvanized steel, rated for 120/240V, 1-phase, 3-wire with four (4) jaw, with integrated load center and comply with all HELCO and EUSERC requirements. Provide solid neutral, copper bussing, circuit breaker compliment as shown, complete with door, trim, 2-ply plastic nameplate and directory. Short circuit withstand capacity of load center shall match existing equipment, confirm rating with HELCO.

G. Disconnect Switches: General-duty, horse-power rated when used as motor disconnect, non-fusible, lever-operated contacts, spring-loaded, 3P60A. Provide NEMA 3R enclosure. Handle shall be capable of being locked in the off position. Single Receptacles: Single receptacles rated at 20-ampere, 125-volt, back and side wired, 3-wires, in ivory plastic body with parallel and ground U-shaped slots, specification grade. Provide surface mounted in outlet box and device plate. Provide weatherproof, while-in-use hinged cover.

H. Nonmetallic Sheathed Cable: Nonmetallic sheathed cable shall be copper, No. 12 minimum. 10 AWG and smaller, solid, No. 8 AWG and larger, stranded cable shall be UL-listed Type UF-8, sunlight, moisture and fungus resistant PVC Jacket.

I. Service Entrance Cable: Service entrance cable shall be THHN/THWN stranded copper conductors, UL-listed Type SE, weather resistant PVC jacketed.

J. Conductors and Cables: Conductors shall be copper, No. 12 AWG minimum; No. 10 AWG and smaller, solid; No. 8 AWG and larger, stranded. Conductors shall be type THHN/THWN for interior use and RHW-USE for exterior use.

K. Raceways:

1. Galvanized rigid steel (GRS): Hot dipped galvanized, 3/4" minimum diameter for exterior locations.

2. Non-Metallic Conduit: PVC Schedule 80, rated for direct bury.

3. Flexible Metal Conduit: Hot dipped galvanized steel construction, fully interlocked; for wet or moist areas - liquid-tight with factory fittings, exterior rated with UV sunlight resistant jacket, UL-listed per UL-360.

L. Outlet and Small Junction Boxes: In all conditions and for all cases, outlet and junction on boxes shall be increased in size to conform to NEC Article 314 fill requirements. Minimum size of box to be 4-11/16" square by 2-1/8" deep. Boxes shall be cast iron, stainless steel, ferrous alloy, or as noted on drawings, prime painted and enamel finished, with threaded hubs for conduit connection.

M. Large Junction Boxes: For dry interior locations, the box shall be fabricated from NEC gauge galvanized steel with matching screw-on type cover, field punched knockouts. For exterior and wet locations, the box shall be NEMA 3R galvanized steel. All screws shall be galvanized steel.

PART 3 - EXECUTION

3.01 GENERAL

A. Rules and Permit The entire installation shall be made in strict accordance with the latest rules and regulations of the National Board of Fire Underwriters, the currently adopted edition of the National Electrical Code (NEC) and the local Electrical Bureau. All work shall be inspected by the proper local authorities as it progresses. The Contractor shall pay all inspection fees and shall deliver certificates of completion and inspection to the Engineer before final payment will be made. Costs of permits and inspection fees shall be included in the Contractor's bid price.

B. Qualification of Installers:

1. For actual fabrication, installation and testing of the work of this section, use only thoroughly trained and experienced workmen completely familiar with items required and with manufacturers' recommended methods of installation. In acceptance or rejection of installed work, no allowance will be made for lack of skill on part of workmen.

2. Workmanship shall meet the approval of Engineer who shall be afforded every opportunity to determine skill and competency. Concealed work shall be reopened at random during formal inspection by Engineer at his request.

C. Construction Methods: Construction shall conform to construct ion practices as recommended by the American Electricians Handbook by Croft (latest

edition), Edison Electric Institute, National Electrical Code, National Electrical Safety Code and applicable instructions of manufacturers of equipment and material supplied for this project.

D. Provide structural bracing for equipment permanently attached to the building. Structural bracing shall resist the effects of earthquake motions in accordance with ASCE 7 per 2006 IBC, Section 1613.

E. Field-Posted As-Built Drawings: The Contractor shall maintain an accurate and adequate record of each change as it occurs, regardless of how ordered and submit as-built drawings after project completion.

F. Plans and Specification: This specification is intended to cover all labor, materials and standards of workmanship to be employed in the work indicated on the plans and called for in the specification or reasonably implied therein. The plans and specification supplement one another. Any part of the work mentioned in one and not represented in the other, shall be done the same as if it had been mentioned In both. The Contractor shall not make alterations to the drawings and specification.

G. Discrepancies and Interpretations:

1. Should the Contractor find any discrepancies in or omissions from any of the documents or be in doubt as to their meaning, he shall advise the Engineer who will issue any necessary clarification within a time period which does not disrupt the progress of the work.

2. All interpretation and supplemental instructions will be in the form of a written addenda to the Contract Documents.

3. Should any discrepancy arise from the failure of the Contractor to notify the Engineer, the higher quality or larger quantity of item shall prevail. Engineer shall make the final interpretation and judgment.

4. In the event of a discrepancy between small scale drawings and large scale details, or between drawings and specification, on which is in violation of any regulations, ordinances, laws or codes, the discrepancy, if known by the Contractor, shall be immediately brought to the attention of the Engineer for a decision before proceeding with the particular work involved. Work carried out disregarding these instructions will be subject to removal and replacement at the Contractor's expense.

H. Symbols: The standard electrical symbols together with the special symbols,

notes and instructions shown on the drawings indicate the work required and are all to be included as a part of this specification.

I. Coordination: This specification is accompanied by floor plans of the affected buildings, elevations, and site plans indicating locations of all boxes, electrical connections, service runs, and other electrical apparatus. These locations are approximate and, before installing, the Contractor shall study the adjacent architectural details and actually make the installation in the most logical manner. The circuit routing is typical only and may be varied in any logical manner.

3.02 INSTALLATION

A. Grounding:

1. All metallic enclosures, raceways, and electrical equipment shall be grounded according to requirements of NEC Article 250. Final connection to equipment, raceways and other metallic parts directly exposed to ungrounded electric conductors shall be No. 12 AWG minimum, copper, NEC type TW, green insulation. Use approved bonding terminal at loadcenters.

2. All grounding wire runs within building shall be routed together with circuit conductors.Bond and ground all feeder conduit to loadcenter enclosures.

B. Wiring System:

1. For direct bury, use Schedule 80 PVC. Provide separate ground wire and rise out of ground with PVC. Transition to flexible conduit as required within 6" of finished grade or floor.

2. Flexible conduit shall be used for connecting air cooled condensing units, electric water heaters and other equipment subject to vibration, movement or exposure to weather.

3. Conduit shall be cut square and inner edges reamed. Butt together evenly in couplings.

4. Bends and offsets shall be made with hickey or conduit bending machine. Do not use vise or pipe tee. Bends shall be made so that interior cross- sectional areas will not be reduced. Radius of curve of inner edge of field bend shall not be less than ten times internal diameter of conduit.

5. Use of running threads and set screw couplings will not be permitted. Where conduit cannot be joined by standard threaded couplings, approved watertight conduit union or compression couplings shall be used.

6. Cap conduit, during construction, with plastic or galvanized pipe caps to prevent entrance of dirt or moisture. All conduits shall be swabbed out and dried before wires or cables are pulled in.

7. Conduit shall be mounted clear of other piping, valves or mechanical equipment.

8. Fish wires, cords strings, chains or the like shall not be placed or inserted into the conduit system during installation. Insulating bushings and two locknuts shall be installed on the end of every run of conduit at sheet metal enclosures and boxes.

9. Securely fasten conduit to Junction boxes and to structure support. Project adequate number of conduit threads through box for bushings. Anchorage for 1- 1/2" and smaller conduit shall be made with two-hole galvanized conduit straps or clamps. Two-inch and larger conduits shall be anchored with galvanized wrought iron one-hole clamps or equal fittings.Exposed conduit shall be parallel with, or at right angles to, structural or architectural elements, and securely fastened in place with two-hole galvanized pipe straps with screws, or with approved beam clamps, or approved single or gang pipe hangers spaced not more than five feet apart as conditions required. Vertical runs shall be supported at intervals not exceeding five feet approved clamp hangers.

10. Pullwire shall be installed in empty conduit Pullwire shall be #12 AWG type TW insulated wire or nylon pull line. Pullwires shall be tagged at conduit terminations to identify conduit use (i e. power. telephone, data, etc.).

C. Conductors:

1. Mechanical means for pulling shall be torque-limiting type and not used for

   #2 AWG and smaller wires.

2. Pulling tension shall not exceed wire manufacturer's recommendations.

3. Where necessary, powdered soapstone may be used as a lubricant for drawing wires through conduit. No other means of lubricating will be allowed.

4. Form neatly in enclosures for minimum of crossovers. Tag all feeders.

5. All nonmetallic sheathed cable installations shall conform to NEC 334.10 requirements.

D. Splicing of Wire and Cable:

1. Wires shall be formed neatly in enclosures and boxes.

2. Splices made according to NEC Article 110.

3. Splices shall be reinsulated. Remove all sharp points that can pierce tape. Use Minnesota Mining and Manufacturing Co. "Scotch" #33 tape or equal Splices in boxes for exterior locations shall be water-tight.

E. Trench Excavation:

1. Dimensions and locations of trenches for pullboxes and ductlines shall be as indicated on drawings. Trench width and depths shall be sufficient to accommodate proper installation of conduit banks and cables.

2. Where a trench is excavated on slope, sides are to be vertical, and depth measured at lowest side. AU measurements are to be based on final grades.

3. Bottom of trenches to be flat and smooth.

4. Trenches shall be widened at pullbox sites to permit proper entry of ducts.

5. All excavations for pullboxes in excess of the required depths shall be filled with concrete.

6. Sheathing and bracing as required shall be provided to support sides of excavations from cave-ins.

7. Provide drainage and pumps to keep trenches dry.

8. Excavated material may be placed alongside trench.

F. Backfill:

1. Backfilling shall be to finished grades indicated on accompanying drawings, and matching existing conditions.

2. Backfill material shall be completely free of wood or other debris.

3. Backfill material shall be placed in maximum of 12" layers in loose thickness before compacting. Backfill shall be thoroughly compacted

with hand or mechanical tampers, and in no case shall tamping be accomplished by using the wheels or tracks of a vehicle.

G. Conduit and Duct Bank:

1. Bottom of trenches for all systems shall be clean, smooth and well graded prior to installation of conduits.

2. Saw cut, ream and taper ducts and conduits with manufacturers' approved tool.

3. Couplings and bells shall be tight to prevent entry of dirt into ducts and conduits.

4. Provide spacers to maintain proper separation between ducts. Changes in direction of greater than 5° shall be accomplished by using special couplings or bends manufactured for this purpose. Where ducts enter pull boxes, they shall be terminated in end bells. Ducts shall be thoroughly cleaned before laying. When it is necessary to cut tapered end of duct at site, cut shall be made with saw and tapered with lathe designed to match original taper. Coordinate placement of duct runs with other utilities, building structures, existing facilities and landscaping elements to avoid conflicts. When necessary, obtain acceptance from the Engineer for relocation and adjustments at no additional cost to the State.

6. Ducts shall be clean and free from debris and rubbish.

7. After each day's work, provide temporary conduit plugs at the end of conduit banks to prevent entry of dirt, rubbish, or debris.

8. Pass smooth bullet-shaped, blunt tip wooden test mandrel through the entire length of each duct or conduit to test for burrs and obstructions. Unless indicated otherwise, mandrel shall be 14" long and shall have diameter of 2" less than inside diameter of duct or conduit. If burrs or obstructions are encountered, that section shall be replaced at no additional cost to the State.

9. Unless indicated otherwise, install #12 AWG galvanized iron pulling wire or polypropylene cord in each conduit after testing.

10. Apply thin coat of sealing compound on ducts and conduits at couplings and bells.

11. Provide duct seals at each entry point into pull boxes to prevent water from flowing between pull boxes.

12. A 4" wide warning tape, with black imprinted message "WARNING - ELECTRICAL LINE BELOW" shall be placed 12" below finish grade

over electrical ductlines. Color shall be as noted on drawings.

H. Finishing:

1. All cutting that may be required for complete installation of the electrical work shall be carefully performed, and all patching shall be finished in first-class condition by the Contractor.

2. Close unused knockouts in boxes or enclosures with metal cap.

Wipe clean all exposed raceways and boxes with rag and solvent. Unfinished raceways and boxes shall be prime- painted and finished to blend into background.

I. Miscellaneous Details:

1. Cut, drill and patch as required to install electrical system. Repair any surface damaged or marred by notching, drilling or any other process necessary for installation of electrical work. Cutting, repairs and refinishing subject to the approval of the Engineer. Need for remedial work determined by Engineer as attributable to poor coordination and workmanship shalt be cause for reconstruction to the satisfaction of the State of Hawaii.

2. Attachment of electrical equipment to wood by non-ferrous wood screws. Attachment to concrete by expansion anchors. Powder-charge-driven studs and anchors permitted only with prior approval.

3. Complete all loadcenter circuit directories, using typewriter. Verify "room" and "use" designations before typing.

4. Furnish necessary test equipment and make all test necessary to check for unspecified grounding, shorts and wrong connections. Correct faulty conditions, if any.

3.03 TESTING AND INSPECTION

A. If the State (or its representative} discovers any errors, the Contractor, at his own expense, shall go over alt similar portions of the entire job, taking the necessary or directed remedial action.

B. Interior installations 600 volts and fess shall be tested for insulation resistance after all wiring is completed and ready for connection to fixtures and equipment. Using a 500V megger, measure and record the insulation resistance from phase to phase and phase to neutral. The above tests shall be witnessed by the Engineer and the records turned over to him for proper

disposition. The Contractor shall notify the Engineer when this test is to be performed.

C. The Contractor shall re-tape splices which have been bared for inspection. The Contractor shall test all portions of the electrical system furnished by him for proper operation and freedom from accidental grounds. All tests shall be subject to the approval of the Engineer. Wherever test or inspection reveals faulty equipment or installation, the Contractor shall take corrective action, at his own expense, repairing or replacing equipment or installation as directed.

PART 4 - MEASUREMENT AND PAYMENT

4.01 BASIS OF MEASUREMENT AND PAYMENT

Work under this section will not be measured for payment but will be paid for at the Contract Lump Sum Price.

Item No.	Item	Unit
16100.1	Electrical Work	Lump Sum
16100.2	Utility Companies Expense Allowance	Allowance

END OF SECTION