State of Hawaii
DEPARTMENT OF LAND AND NATURAL RESOURCES
ENGINEERING DIVISION
Honolulu, Hawaii

BOARD OF LAND AND NATURAL RESOURCES

Dawn N.S. Chang
Chairperson

CONTRACT SPECIFICATIONS AND PLANS

DLNR JOB NO: F70C616H
SAND ISLAND STATE RECREATION AREA
IMPROVEMENTS PH. VI
TAX MAP KEY: (1) 1-5-041:006
HONOLULU, OAHU, HAWAII

Architect: G70
Structural Engineer: Martin, Chock & Carden, Structural Engineers

April 2026

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Approved: _____

ALAN B. CARPENTER
Acting Administrator
Division of State Parks

Approved: _____

DINA U. LAU, P.E.
Acting Chief Engineer
Engineering Division

April 2026

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NOTICE TO BIDDERS
(Chapter 103D, HRS)

COMPETITIVE BIDS for Job No. F70C616H, Sand Island SRA Park Improvements Ph IV, Honolulu, Hawaii shall be submitted to the Department of Land and Natural Resources, Engineering Division on the specified date and time through the Hawaii State e-Procurement (HIePRO). HIePRO is accessible through the State Procurement Office website at www.spo.hawaii.gov.

The Department of Land and Natural Resources Interim General Condition, dated October 1994, as amended, and the General Conditions –AG008, latest revision shall be made part of the specifications.

The project is located at 1499 Sand Island Pkwy, Honolulu, O‘ahu

The work shall generally consist of: The rehabilitation and stabilization of existing historic structures at Sand Island, including selective demolition, repair, and preservation treatments. Work also includes modifications to site circulation, including relocation of portions of the existing walkway, and associated site improvements in accordance with project drawings and applicable regulations.

To be eligible to submit a bid, the Bidder must possess a valid State of Hawaii Contractor’s license classification **A**

All interested parties are invited to attend a State conducted site visit, we will meet at the first parking lot by the entrance, and voluntary pre-bid conference. The site visit will be held at the project site on April 27, 2026, at 10 a.m.

The estimated cost of construction is $1,100,00-1,700,00.

The award of the contract, if it be awarded, will be subject to the availability of funds.

Since the estimated cost of construction is $250,000 or more, the apprenticeship agreement preference pursuant to Hawaii Revised Statutes §103-55.6 (ACT 17, SLH 2009) shall apply.

Should there be any questions, please refer to the HIePRO solicitation.

INFORMATION AND INSTRUCTIONS TO BIDDERS

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INFORMATION AND INSTRUCTIONS TO BIDDERS

A. PROJECT LOCATION AND SCOPE OF WORK: The project location and scope of work shall be as generally described in the Notice to Bidders.

B. PROPOSALS**:** Bidders shall submit their bid, including the completed proposal form, bid bond, and any other documents required by the solicitation as part of their bid through the State of Hawaii e-Procurement System (HIePRO). See Item D, PROPOSAL FORM.

C. GENERAL CONDITIONS: The Department of Land and Natural Resources Interim General Conditions dated October 1994, as amended, shall be made a part of these contract specifications and are referred to hereafter as the General Conditions.

D. PROPOSAL FORM: **The Bidders shall fill out and upload the electronic copy of the proposal form to the HIePRO website when submitting the bid. Bid Proposals shall not be mailed, faxed or delivered to the State, unless requested to do so after the designated closing date. The successful Bidder shall fill out and print a hard copy of the proposal form, sign and submit the form with the contract award package.**

E. OMISSIONS OR ERASURES: Any proposal which contains any omission or erasure or alteration not properly initialed, or conditional bid, or other irregularity may be rejected by the Board of Land and Natural Resources (Board).

F. NOTICE OF INTENT TO BID AND QUESTIONNAIRE:
A Notice of Intent to Bid is not required for this project. In compliance with HRS Section 103D-310, the lowest responsive and responsible bidder may be required to complete a questionnaire. When requested by the State, the completed questionnaire shall be submitted to the Chief Engineer for evaluation. Failure to furnish the requested information within the time allowed may be grounds for a determination of non-responsibility, in accordance with HRS Section 103D-310 and HAR Section 3-122-108.

G. BID SECURITY: A bid security will be furnished by each bidder as provided in sub-section 2.7 of the General Conditions. The successful bidder's bid security will be retained until Contract execution and furnished a performance and payment bond in an amount equal to one hundred percent (100%) of the total Contract price, including an amount estimated to be required for extra work, is furnished.

The Board reserves the right to hold the bid securities of the four lowest bidders until the successful bidder has entered into a contract and has furnished the required performance bond. All bid securities will be returned in accordance with sub-section 3.5 of the General Conditions.

Should the successful bidder fail to enter into a contract and furnish a satisfactory performance bond within the time stated in the proposal, the bid security shall be forfeited as required by law.

H. CONTRACTOR'S LICENSE REQUIRED: The Board will reject all bids received from contractors who have not been licensed by the State Contractors License Board in accordance

with Chapter 444, HRS; Title 16, Chapter 77, Hawaii Administrative Rules; and statutes amendatory thereto.

I. IRREGULAR BIDS: No irregular bids or propositions for doing the work will be considered by the Board.

J. WITHDRAWAL OF BIDS: No bidder may withdraw his bid between the time of the opening thereof and the award of contract.

K. EVALUATION CRITERIA:

1. The total lump sum base bid price and additives will be adjusted to reflect the applicable preferences.

2. Evaluating Bids with Additive Bid Items:

   a. After the solicitation ends, the State will announce the project control budget. All bids will be evaluated on the basis of the same additive item.

   b. If the Base Bids of all the Bidders are within the project control budget (after application of the various preferences), Additive #4, then Additive #2, then Additive #3, and then Additive #1 are added to the Base Bid amount. This (these) sum(s) are compared to the project control budget and must be within the project control budget.

   c. The Bidder with the lowest Base Bid or aggregate amount (Base Bid plus additives), within the project control budget, is the "Low Bidder" for that project and is designated for award.

L. METHOD OF AWARD:

1. The contract will be awarded to the lowest responsive and responsible Bidder whose bid (including any additive(s) which may be selected) meets the requirements and criteria set forth in the solicitation documents and as determined by the Board of Land and Natural Resources.

2. In the event the Lump Sum Base Bid of all bidders exceeds the project control budget, the Department reserves the right to make an award to the bidder with the lowest total lump sum base bid, after application of the preferences is designated, if additional funds are available or by reducing the scope of work through negotiation.

M. SUCCESSFUL BIDDER TO FILE PERFORMANCE AND PAYMENT BONDS: The successful bidder will be required to file performance and payment bonds each; in the amount equal to the total contract price, including amounts estimated to be required for extra work, as provided in sub-section 3.6 of the General Conditions.

N. NUMBER OF EXECUTED ORIGINAL COUNTERPARTS OF CONTRACT DOCUMENTS: If requested by the Board, six copies of the Contract, performance and payment bonds shall be executed.

O. CHANGE ORDERS: No work of any kind in connection with the work covered by the plans and specifications shall be considered as change order work, or entitle the Contractor to extra compensation, except when the work has been ordered in writing by the Chief Engineer (Engineer) and in accordance with sub-section 4.2 of the General Conditions.

The Contractor shall clearly identify and inform the Engineer in writing of any deviations from the contract documents at the time of submission and shall obtain the Engineer's written approval to the specified deviation prior to proceeding with any work.

P. WAGES AND HOURS: In accordance with sub-sections 7.3 to 7.9 of the General Conditions relative to hours of labor, minimum wages and overtime pay, the current minimum wage rates promulgated by the Department of Labor and Industrial Relations (DLIR) shall be paid to the various classes of laborers and mechanics engaged in the performance of this contract on the job site. The minimum wages shall be increased during the performance of the contract in an amount equal to the increase in the prevailing wages for those kinds of work as periodically determined by the DLIR.

The Department of Land and Natural Resources will not recognize any claim for additional compensation because of the payment by the Contractor of any wage rate in excess of the said minimum wage rates. The possibility of wage increase is one of the elements to be considered by the Contractor in determining his bid, and will not, under any circumstances, be considered as the basis of a claim against the Department under this Contract.

No work shall be done on Saturdays, Sundays, legal State holidays, and/or in excess of eight (8) hours each day without the written consent of the Engineer. Should permission be granted to work at such times, the Contractor shall pay for all inspection administrative costs thereof. No work shall be done at night unless authorized by the Engineer.

Q. PERMITS: The State will process permit applications whenever possible, and the Contractor shall procure the pre-processed permits and pay the required fees. If permit applications are not processed by the State, the Contractor shall process the permit applications, permits and licenses, and pay all charges and fees. In all cases, the Contractor shall give all notices necessary and incident to the due and lawful prosecution of the work.

R. PROPERTY DAMAGE: It shall be the responsibility of the contractor to respect State property and to prevent damage to existing improvements. The Contractor will be responsible for damages resulting from construction operations. Immediately upon discovery, the Contractor shall repair such damage to the satisfaction of the Engineer.

All trees and shrubbery outside the excavation, embankment or construction limits shall be fully protected from injury.

S. TIME: The time of completion is specified in the Proposal. It is the Board's intention to insist the Contractor diligently prosecute the work to completion within the specified time.

Prospective bidders are reminded that the State has the option to proceed with or abandon a project depending on whether the project can be completed for occupancy in the specified time.

It is the bidder's responsibility to check the availability of all materials before bidding. The bidder shall select sub-contractors and suppliers who can warrant availability and delivery of all specified or qualified materials to assure project completion within the specified time.

The successful bidder must assume all risks for completing the project by the specified date. There shall be no extension of time for any reason except for delays caused by acts of God, labor disputes involving unions, or actions of the State. If for any reason the project falls behind schedule, the Contractor shall at its own cost, take necessary remedial measures to get the project back on schedule, i.e., working overtime, air freighting all materials, etc. In addition, if the Contractor fails to fully complete the project by the completion date, Contractor will be required to make the facility usable at its own cost.

T. BIDDER'S RESPONSIBILITY TO PROVIDE PROPER SUPERINTENDENCE: The successful low bidder shall designate in writing to the Engineer the name of its authorized superintendent (Superintendent), who will be present at the job site whenever any work is in progress. The Superintendent shall be responsible for all work, receiving and implementing instructions from the Engineer in a timely manner. The cost for superintendence shall be considered incidental to the project.

If the Superintendent is not present at the site of work, the Engineer shall have the right to suspend the work as described under sub-section 5.5 c. and 7.20 - Suspension of Work of the General Conditions.

U. LIQUIDATED DAMAGES: Liquidated damages in the amount specified in the Proposal will be assessed for each and every calendar day from and after the expiration of the time period stated in the Contract for the completion of the project.

V. HIRING OF HAWAII RESIDENTS: The Contractor shall comply with Act 68, SLH 2010, in the performance and for the duration of this contract. The Contractor shall ensure that Hawaii residents compose not less than eighty percent of the workforce employed to perform the contract work on the project. The eighty percent requirement shall be determined by dividing the total number of hours worked on the contract by Hawaii residents, by the total number of hours worked on the contract by all employees of the Contractor in the performance of the contract. The hours worked by any Subcontractor of the Contractor shall count towards the calculation for this section. The hours worked by employees with shortage trades, as determined by the Department of Labor and Industrial Relations (DLIR), shall not be included in the calculation for this section.

The requirements shall apply to any subcontract of $50,000 or more in connection with the Contractor, that is, such Subcontractors must also ensure that Hawaii residents compose not less than eighty percent of the Subcontractor’s workforce used to perform the subcontract.

W. WATER AND ELECTRICITY: The Contractor shall make all necessary arrangements and pay all expenses for water and electricity used in the construction of this project.

X. PUBLIC CONVENIENCE AND SAFETY: The Contractor shall conduct construction operations with due regard to the convenience and safety of the public at all times. No materials or equipment shall be stored where it will interfere with the safe passage of public

traffic. The Contractor shall provide, install, and maintain in satisfactory condition, all necessary signs, flares and other protective facilities and shall take all necessary precautions for the protection of the work and the convenience and safety of the public. The Engineer shall have the right to suspend the performance of the work in accordance with sub-section 7.20 - Suspension of Work of the General Conditions.

Y. WORK TO BE DONE WITHOUT DIRECT PAYMENT: Whenever the contract that the Contractor is to perform work or furnish materials of any kind for which no price is fixed in the contract, it shall be understood that the Contractor shall perform such work or furnish said materials without extra charge or allowance or direct payment of any sort. The cost of performing such work or furnishing said material is to be included by the Contractor in a unit price for the appropriate item unless it is expressly specified that such work or material is to be paid for as extra work.

Z. AS-BUILT DRAWINGS: As-built drawings, the intent of which is to record the actual in-place construction so that any future renovations or tie-ins can be anticipated accurately, shall be required. All authorizations given by the Engineer to deviate from the plans shall be drawn on the job site plans. All deviations from alignments, elevations and dimensions which are stipulated on the plans shall be recorded on the as-built drawings. Final as-built drawings shall be submitted to the Engineer for review and approval. After the Engineer approves the as-built drawings, the contractor shall submit an electronic copy in Adobe PDF format on CD ROM.

AA. ASBESTOS CONTAINING MATERIALS: The use of asbestos containing materials or equipment is prohibited. The Contractor shall insure that all materials and equipment incorporated in the project are asbestos-free

BB. WORKER SAFETY: The Contractor shall provide, install and maintain in satisfactory condition all necessary protective facilities and shall take all necessary precautions for the protection and safety of its workers in accordance with the Occupational Safety and Health Standards for the State of Hawaii. The Engineer shall have the right to suspend the performance of the work in accordance with sub-section 7.20 - Suspension of Work of the General Conditions.

CC. TOILET FACILITIES: All toilet facilities constructed at the project site shall be in accordance with the Public Health Regulations of the State Department of Health (DOH). All necessary precautions shall be observed at the project site. The use of sanitary facilities shall be strictly enforced and workers violating these provisions shall be promptly discharged.

DD. SIGNS: Whenever the project involves closing or obstructing any public thoroughfare, the Contractor shall provide traffic signs conforming to the applicable provisions of the current edition of the "Manual on Uniform Traffic Control Devices for Streets and Highways", published by the Federal Highway Administration as directed by the Engineer for the purpose of diverting or warning traffic prior to the construction area. All traffic signs shall bear proper wording stating thereon the necessary information as to diverting or warning traffic.

When indicated in the Proposal, the Contractor shall provide a project sign, size 4'-0" x 7'-0" to be placed as directed by the Engineer. The sign shall be constructed in accordance with

Section 01581 - Project Sign of these specifications and approved by the Engineer. All wording, type and size of lettering and color selection shall be as specified in these specifications or as approved by the Engineer.

All signs shall be kept neat and clean, and properly erected at all times.

EE. FIELD OFFICE AREA FOR DEPARTMENT: When indicated in the Proposal, the Contractor shall provide a housed working area of at least 100 square feet adjacent to the Contractor's office for the Department's use. This area will be used by the Engineer to perform tests and to store equipment. As a minimum, the field office shall include the following: standard sized office desk and chair, lighting, ventilation, window-type air conditioning rated at 5,000 BTU, door and window with locking hardware, electrical outlets, and working communications facilities (a cellular telephone is acceptable). The Department will pay for all long distance toll charges made by the Engineer.

FF. QUANTITIES: All bids will be compared on the basis of quantities of work to be done as shown in the Proposal; the quantities shown in the Unit Price items are estimated, being given as a basis for comparison of bids. The Board reserves the right to increase or decrease the quantities given under the items or delete items entirely as may be required during the progress of the work.

GG. OTHER HEALTH MEASURES: Forms of work site exposure or conditions which may be detrimental to the health or welfare of workers or of the general public shall be eliminated or reduced to safe levels as required by the DOH codes, standards, and regulations. Suitable first aid kits and a person qualified to render first aid, as specified in the DOH regulations, shall be provided at all times when work is scheduled.

HH. HAWAII BUSINESS OR COMPLIANT NON-HAWAII BUSINESS REQUIREMENT: Bidders (Contractors) shall be incorporated or organized under the laws of the State or be registered to do business in the State as a separate branch or division that is capable of fully performing under the contract, as stipulated in §3-122-112 HAR.

II. COMPLIANCE WITH §3-122-112 HAR:

As a condition for award of the contract and as proof of compliance with the requirements of 103D-310(c) HRS, the apparent low bidder shall furnish the required documents to the Department. If the valid required certificates are not submitted on a timely basis for award of a contract, a bidder otherwise responsive and responsible may not receive the award. Bidder is responsible to apply for and submit the following documents to the Department.

A. TAX CLEARANCE REQUIREMENTS (HRS Chapter 237): Bidder shall obtain a tax clearance certificate from the Hawaii State Department of Taxation (DOTAX) and the Internal Revenue Service (IRS). The certificate is valid for six months from the most recently approved stamp date on the certificate; the certificate must be valid on the date received by the Department.

B. Department of Labor (DLIR) "**Certificate of Compliance**". (HRS Chapter 383 - Unemployment Insurance, Chapter 386 - Workers' Compensation, Chapter 392 - Temporary Disability Insurance, and 393 – Prepaid Health Care): Bidder shall obtain

a certificate of compliance from the Hawaii State Department of Labor and Industrial relations (DLIR). The certificate is valid for six months from the date of issue; certificates must be valid on the date received by the Department.

C. Department of Commerce and Consumer Affairs (DCCA), Business Registration Division (BREG) "**Certificate of Good Standing**". Bidder shall obtain a certificate of good standing issued by the Department of Commerce and Consumer Affairs (DCCA), Business Registration Division (BREG). The certificate of good standing is valid for six months from the date of issue; certificates must be valid on the date received by the Department.

Alternately, instead of separately applying for these certificates at the various state agencies, bidder may choose to use the Hawaii Compliance Express (HCE), which allows businesses to register online through a simple wizard interface at http://vendors.ehawaii.gov to acquire a "Certificate of Vendor Compliance" indicating the bidder's status is compliant with the requirements of §103D-310(c), HRS, and shall be accepted for contracting and final payment purposes. Bidders that elect to use the new HCE services will be required to pay an annual fee of $12.00 to the Hawaii Information Consortium, LLC (HIC). Bidders choosing not to participate in the HCE program will be required to provide the paper certificates as instructed in the previous paragraphs.

P R O P O S A L

FOR

DEPARTMENT OF LAND AND NATURAL RESOURCES
ENGINEERING DIVISION
State of Hawaii

JOB NO. F70C616H
Sand Island State Recreation Area Improvements Ph IV
Honolulu, Oahu, Hawaii

_____, 2026

Chief Engineer
Engineering Division
Department of Land and Natural Resources
State of Hawaii
Honolulu, Hawaii

The undersigned, having carefully examined the local conditions and all available records and information covering conditions which may affect the cost of the work to be performed, and having carefully examined the Plans and Specifications, and other contract documents, hereby proposes to furnish and pay for all materials, tools, equipment, labor and other incidental work necessary to the rehabilitation and stabilization of existing historic structures at Sand Island, including selective demolition, repair, and preservation treatments. Work also includes modifications to site circulation, including relocation of portions of the existing walkway, and associated site improvements in accordance with project drawings and applicable regulations. , as required or called for in this Proposal, all according to the true intent and meaning of the Notice to Bidders, Information and Instructions to Bidders, Proposal, Detailed Specifications, Interim General Conditions, Plans, and any and all addenda for:

JOB NO. F70C616H
Sand Island SRA Park Improvements Ph IV
Honolulu, Oahu, Hawaii

on file in the office of the Engineering Division for the TOTAL BASE BID (Items 1 to 13) of:

_____

_____Dollars ($_____)
and will fully complete all work under this contract within 360 days (approx.) consecutive calendar days from the date of written notice to proceed, including date of said order, said total sum being itemized on the following pages.

PROPOSAL

Item No.	Quantity	Unit	Description	Unit Price	Total
		BASE BID			
1.		LS	Structure 1: Anti-Aircraft Gun Emplacement Tower		$_____
2.		LS	Structure 2: Harbor Entrance Control Tower		$_____
3.		LS	Structure 3:Cable Hut (Train)		$_____
4.		LS	Structure 4:Air Raid Shelter (Train station)		$_____
5.		LS	Structure 5:Plotting Room		$_____
6.	Unit Cost	Bd Ft..	Structure 1: Replacement of 2x6	$_____	
	Allowance		Field Office		$ 10,000.00
				Subtotal Base Bid (Items 1-6)	$_____
7.		LS	Mobilization and Demobilization (not to exceed 10% of the Subtotal Base Bid)		$_____
				Total Base Bid (Item 1-7)	$_____
	ADDITIVE NO. 1: Structure 1Benches and park elements per drawings				
8.	3	LS	Benches and installation		$_____
9.	2	Ea	Trash receptacles: Outdoorsiness CD-SL45B-BLK	$_____	$_____
				Total Sum Additive No. 1 (Items 8 and 9)	$_____
	ADDITIVE NO. 2: Structure 2 Non-priority structural repairs				
10.		LS	Additional non-priority structural repairs as noted in drawings		$_____
11.		LS	Repainting of metal structure in its entirety		$_____
				Total Sum Additive No. 2 (Items 10 & 11)	$_____

	ADDITIVE NO. 3: Structure 2 Repair rock wall stairs and stair handrails				
12.		LS	Rock Wall Masonry repair		$_____
13.		LS	Slab Hole Repair		$_____
14.		LS	Handrail fabrication and installation		$_____
				Total Sum Additive No. 3 (Items 12 - 14)	$_____

	ADDITIVE NO. 4: Asphalt Beach Walkway				
15.		LS	Existing walkway demo , replacement AC walkway and associated work per drawings, including not limited to landscape stabilization		$_____
				Total Sum Additive No. 15	$_____

RECYCLED PRODUCTS PREFERENCE

This project allows a 10% price preference for recycled products in accordance with HRS 103D-1005. Please indicate your selection of recycled or non-recycled product by indicating its cost FOB jobsite unloaded in the schedule below, including applicable General Excise & Use Taxes.

DESCRIPTION	RECYCLED PRODUCT COST	NONRECYCLED PRODUCT COST
_____	$_____	$_____
_____	$_____	$_____
_____	$_____	$_____
_____	$_____	$_____

The bidder requesting a recycled product preference shall also complete and submit the form "CERTIFICATION OF RECYCLED CONTENT" as shown in the Interim General Conditions and provide all supporting information with this proposal. Additional information may be requested to qualify a product.

The following definitions are applicable to the CERTIFICATION OF RECYCLED CONTENT form:

"Post-consumer recovered material" means any product used by a consumer, including a business that purchases the material, that has served its intended end use, and that has been separated or diverted from the solid waste stream for the purpose of use, reuse, or recycling.

"Product" includes materials, manufactures, supplies, merchandise, goods, wares, and foodstuffs.

"Recovered material" means waste material and by-products that have been separated, diverted, or removed from the solid waste stream after a manufacturing process for the purpose of use, reuse, or recycling. Recovered material does not include those materials and by-products that are generated and normally reused on-site or within original manufacturing processes (such as mill broke, in the case of paper products).

"Recycled content" means the percentage of a product composed of recovered material, or post-consumer recovered material, or both.

"Recycled product" means a product containing recovered material, or post-consumer recovered material, or both.

The bidder agrees that preference for recycled products shall be taken into consideration to determine the low bidder in accordance with said Section and the rules promulgated, however, the award of contract will be in the amount of the bid offered exclusive any preference.

APPRENTICESHIP AGREEMENT PREFERENCE

1. If applicable to this project, any bidder seeking the preference must be a party to an apprenticeship agreement registered with the State Department of Labor and Industrial Relations (DLIR) at the time the bid is submitted for each apprenticeable trade the bidder will employ to construct the project. "Employ" means the employment of a person in an employer-employee relationship.

    a. The apprenticeship agreement shall be registered with the DLIR and conform to the requirements of Hawaii Revised Statutes Chapter 372.

    b. Subcontractors do not have to be a party to an apprenticeship agreement for the bidder to obtain preference.

    c. The bidder is not required to have apprentices in its employ at the time the bid is submitted to qualify for the preference.

2. A bidder seeking the preference must state the apprenticeable trade the bidder will employ for each trade to be employed to perform the work by submitting a completed signed original *Certification Form 1* verifying participation in an apprenticeship program registered with DLIR. "Apprenticeable trade" shall have the same meaning as "apprenticeable occupation" pursuant to Hawaii Administrative Rules (HAR) §12-30-5.

    a. The *Certification Form 1* shall be authorized by an apprenticeship sponsor listed on the DLIR list of registered apprenticeship programs. "Sponsor" means an operator of an apprenticeship program and in whose name the program is approved and registered with the DLIR pursuant to HAR §12-30-1.

    b. The authorization shall be an original signature by an authorized official of the apprenticeship sponsor.

    c. The completed signed original *Certification Form 1* for each trade must be submitted with the bid. Previous certifications shall not apply.

    d. When filling out the *Certification Form 1*, the name of Apprenticeable Trade and Apprenticeship Sponsor must be the same as recorded in the List of Construction Trades in Registered Apprenticeship Programs that is posted on the DLIR website. "Registered apprenticeship program" means a construction trade program approved by the DLIR pursuant to HAR §12-301 and §12-30-4.

    e. The *Certificate Form 1* and the List of Construction Trades in Registered Apprenticeship Programs is available on the DLIR website at: http://hawaii.gov/labor/wdd.

3. Upon receiving the *Certification Form 1*, the Procurement Officer will verify that the apprenticeship program is on the List of Construction Trades in Registered Apprenticeship Programs and that the form is signed by an authorized official of the Apprenticeship Program Sponsor. If the programs and signature are not confirmed by the DLIR, the bidder will not qualify for the preference.

4. If the bidder is certified to participate in an apprenticeship program for each trade which will be

employed by the bidder for the project, a preference will be applied to decrease the bidder's bid amount by five percent (5%) for evaluation purposes.

5. Should the bidder qualify for other preferences, all applicable preferences shall be applied to the bid price.

CONTRIBUTIONS BY STATE AND COUNTY CONTRACTORS PROHIBITED

Contractors are hereby notified of the applicability of Section 11-355, HRS, which states that campaign contributions are prohibited from specified State or county government contractors during the term of the contract if the contractors are paid with funds appropriated by a legislative body.

CONDITION OF AWARD

It is understood that the award of the contract will be made on the basis of the lowest responsible Total Base Bid and Additive bids in accordance with the "Information and Instruction to Bidders", Items K and L, and as selected by the Board of Land and Natural Resources.

It is understood and agreed that the Board of Land and Natural Resources reserves the right to reject any and/or all bids and waive any defects when, in the Board's opinion, such rejection or waiver will be for the best interest of the State of Hawaii.

In the event all bids exceed available funds certified by the appropriate fiscal officer, the head of the purchasing agency responsible for the procurement in question is authorized in situations where time or economic considerations preclude resolicitation of work of a reduced scope to negotiate an adjustment of the bid price, including changes in the bid requirements, with the low responsible and responsive bidder, in order to bring the bid within the amount of available funds. It is understood and agreed upon that the head of the purchasing agency may delete a portion or all of any item(s) in the proposal at the stated unit or lump sum price as necessary to stay within the available funding. The bidder is responsible to make an earnest effort to represent the actual cost of each item, including all materials, labor, equipment, overhead and profit in their bid proposal to preclude claims of anticipated profit or loss of profit because of an unbalanced bid proposal.

It is also understood that if a mutually agreeable cost for the reduced scope of work necessitated by a lack of available funds cannot be agreed upon between the bidder and the head of the purchasing agency within 14 calendar days after the bid opening, then the bid may be rejected in the best interest of the purchasing agency, and the head of the purchasing agency may negotiate in progressive order (lowest to highest) with the next lowest responsible and responsive bidder.

It is also understood and agreed that the award of the contract shall be conditioned upon funds being made available for this project and further upon the right of the Board of Land and Natural Resources to hold all bids received for a period of one hundred eighty (180) days from the date of the opening thereof, unless otherwise required by law, during which time no bid may be withdrawn.

It is also understood that Notice to Proceed may be delayed up to eighteen (18) months after the bid opening date, and that no additional compensation will be provided for any claim for escalation or delay for issuance of Notice to Proceed on or before that date.

It is also understood and agreed that the quantities given herewith are approximate only and are subject to increase or decrease, and that the undersigned will perform all quantities of work as either increased or decreased, in accordance with the provisions of the Contract Specifications.

It is also understood and agreed that the estimated quantities shown for the items for which a UNIT PRICE is asked in this Proposal are only for the purpose of comparing on a uniform basis, bids offered for the work under this contract, and the undersigned agrees that he is satisfied with and will at no time, dispute said estimated quantities as a means of claims for anticipated profit or loss of profit, because of a difference between the quantities of the various classes of work done or the materials and equipment installed, and the said estimated quantities. On UNIT PRICE bids, payment will be made only for the actual number of units incorporated into the finished project at the contract UNIT PRICE.

After the HIePRO bid due date and time, the figures will be extended and/or totaled in accordance with the bid prices of the acceptable proposals and the totals will be compared. In the comparison of bids, words written in the proposal shall govern over figures and unit prices will govern over totals. Until

the award of the contract, however, the right will be reserved to reject any and all proposals and to waive any defects or technicalities as may be deemed best for the interest of the State.

It is also understood and agreed that liquidated damages in the amount of FIVE HUNDRED AND NO/100 DOLLARS ($500.00) for each and every calendar day in excess thereof prior to completion of the contract shall be withheld from payments due to the Contractor.

It is also understood and agreed that if this bid is accepted, the successful bidder must enter into and execute a contract with the Board of Land and Natural Resources and furnish a Performance and Payment Bond, as required by law. These bonds shall conform to provisions of Section 103D-324 and 325, Hawaii Revised Statutes and any law applicable hereto.

It is also understood and agreed that the successful bidder will provide all necessary labor, materials, tools, equipment, and other incidentals necessary to do all the work and furnish all the materials specified in the contract in the manner and time herein prescribed, and according to the requirements of the Engineer as therein set forth.

It is understood that by submitting this proposal, the undersigned is declaring that his firm has not been assisted or represented on this matter by an individual who has, in a State capacity, been involved in the subject matter of this contract in the past two years.

It is understood that by submitting this proposal in accordance with HAR 3-122-192, the undersigned is declaring that the price submitted is independently arrived without collusion.

It is also understood that by submitting this proposal, a Certification for Safety and Health Programs for bids in excess of $100,000 (in accordance with HRS 396-18), the undersigned certifies that his organization will have a written safety and health plan for this project that will be available and implemented by the Notice to Proceed date of this project. Details of the requirements of this plan may be obtained from the Department of Labor and Industrial Relations, Occupational, Safety and Health Division (HIOSH).

It is further understood and agreed that the successful bidder shall comply with paragraph 3.1.a "SUBCONTRACTING" of the General Provisions which requires that the contractor shall perform with his own organization and with the assistance of workmen under his immediate superintendence, work of a value not less than twenty percent (20%) of the value of all work embraced in the Contract, except that certain contract items of work, if specifically referred to in the special provisions, will be exempted from said twenty percent requirement.

Compliance with §103-310 HRS. As a condition of award all bidders shall comply with all laws governing entities doing business in the State, including Chapter 237 HRS (general excise tax); Chapter 383 HRS (employment security – unemployment insurance); Chapter 386 HRS (workers compensation); Chapter 392 HRS (temporary disability insurance); and Chapter 393 HRS (pre-paid health care), and shall produce all documents to the State (DLNR, Engineering Division) required to demonstrate compliance with these subsections. Any bidder making a false affirmation or certification under this subsection shall be suspended and may be debarred from further offerings or awards pursuant to §103D-702 HRS.

RECEIPT OF ADDENDA

The bidder also acknowledges receipt of any and all addenda issued by the Engineering Division, by recording the date of receipt of the respective addenda in the space provided below:

Addendum	Date Received	Addendum	Date Received
No. 1	_____	No. 5	_____
No. 2	_____	No. 6	_____
No. 3	_____	No. 7	_____
No. 4	_____	No. 8	_____

It is understood that failure to receive any such addendum shall not relieve the Contractor from any obligation under this Proposal as submitted.

It is also understood and agreed that if this Proposal is accepted and the undersigned should fail or neglect to contract as aforesaid, the Board may determine that the bidder has abandoned the Contract, and thereupon, forfeiture of the security accompanying his proposal shall operate and the same shall become the property of the Board.

JOINT CONTRACTORS OR SUBCONTRACTORS TO BE ENGAGED ON THIS PROJECT

The Bidder agrees that the following is a complete listing of all joint contractors or subcontractors covered under Chapter 444, Hawaii Revised Statutes (HRS), who will be engaged by the Bidder on this project to perform the required work indicated pursuant to Section 103D-302, HRS. It is the sole responsibility of the contractor to review the requirements of this Project and determine the appropriate licenses that are required to complete the Project. The Bidder certifies that the completed listing of joint contractors or subcontractors fulfills the requirements for the project and the Bidder, together with the listed subcontractors or joint contractors have all the specialty contractor's licenses to complete the work, except as provided for in HRS §103D-302(b). Failure of the Bidder to comply with this requirement may be just cause for rejection of the bid.

"A" General Engineering Contractors and "B" General Building Contractors are reminded that due to the Hawaii Supreme Court's January 28, 2002 decision in Okada Trucking Co., Ltd. v. Board of Water Supply, et al., 97 Haw. 450 (2002), they are prohibited from undertaking any work, solely or as part of a larger project, which would require the general contractor to act as a specialty contractor in any area in which the general contractor has no license. Although the "A" and "B" contractor may still bid on and act as the "prime" contractor on an "A" or "B" project (See, *HRS §*444-7 *for the definitions of an "A" and "B" project*.), respectively, the "A" and "B" contractor may only perform work in the areas in which they have the appropriate contractor's license (*An "A" or "B" contractor obtains "C" specialty contractor's licenses either on its own, or automatically under HAR § 16-77-32*). The remaining work must be performed by appropriately licensed entities.

General Engineering "A" Contractors automatically have these "C" specialty contractor's licenses: C-3, C-9, C-10, C-17, C-24, C-31a, C-32, C-35, C-37a, C-37b, C-38, C-43, C-49, C-56, C-57a, C-57b and C-61.

General Building "B" Contractors automatically have these "C" specialty contractor's licenses: C-5, C-6, C-10, C-12, C-24, C-25, C-31a, C-32a, C-42a and C-42b.

In completing the Joint Contractors or Subcontractors List, describe the specialty contractor's nature and scope of work to be performed for this project and provide the complete firm name of the joint contractor or subcontractor in the respective columns. If the Bidder is a general contractor and providing the work of the required specialty contractor, fill in the Bidder's (general contractor's) name and nature and scope of work to be performed on this project.

List only one joint contractor or subcontractor per required specialty contractor's classification, unless within the same specialty, the work of each joint contractor or subcontractor can be described so that there is no overlap in work descriptions.

If a contractor's license is required by law for the performance of the work which is called for in this bid, the bidder and all subcontractors must have the required license before the submission of the bidder's proposal in the case of a non-federal aid project, and for federal-aid projects, the bidder must have the required license prior to the award of the project and all subcontractors prior to the start of the subcontracted work.

BASE BID

COMPLETE FIRM NAME OF JOINT CONTRACTOR OR SUBCONTRACTOR	NATURE AND SCOPE OF WORK TO BE PERFORMED

JOINT CONTRACTORS OR SUBCONTRACTORS LIST FOR THE ADDITIVE(S):

Bidder agrees that for projects with additives(s), the Bidder, joint contractor or subcontractor listed in the completed "Joint Contractors or Subcontractors List for the Additives(s)" will perform work for the respective additives.

Additive 1

COMPLETE FIRM NAME OF JOINT CONTRACTOR OR SUBCONTRACTOR	NATURE AND SCOPE OF WORK TO BE PERFORMED

Additive 2

COMPLETE FIRM NAME OF JOINT CONTRACTOR OR SUBCONTRACTOR	NATURE AND SCOPE OF WORK TO BE PERFORMED

Additive 3

COMPLETE FIRM NAME OF JOINT CONTRACTOR OR SUBCONTRACTOR	NATURE AND SCOPE OF WORK TO BE PERFORMED

Additive 4

COMPLETE FIRM NAME OF JOINT CONTRACTOR OR SUBCONTRACTOR	NATURE AND SCOPE OF WORK TO BE PERFORMED

Enclosed herewith is a:

1.	Surety Bond (*1)	)	
2.	Legal Tender (*2)	)	
3.	Cashier's Check (*3)	)	
4.	Certificate of Deposit (*3)	)	in the
5.	Certified Check (*3)	)	amount
6.	Official Check (*3)	)	of
7.	Share Certificate (*3)	)	
8.	Teller's Check (*3)	)	
9.	Treasurer's Check (*3)	)	

(Cross Out Those Not Applicable)

_____

_____Dollars ($_____)

as required by law.

Exact Legal Name of Company, Joint Venture or Partnership

Company is:
☐ Sole Proprietor ☐ Partnership ☐ Corporation ☐ Joint Venture ☐ Other _____

Contractor's License No.: _____

Federal I.D. No.: _____

Hawaii General Excise Tax License I.D. No.: _____

Payment address (other than street address below): _____

City, State, Zip Code: _____

Business Address (street address): _____

City, State, Zip Code: _____

Respectfully submitted,

By _____
Authorized (Original) Signature (*4)

Title: _____

Print Name: _____

Date: _____

Telephone No.: _____

E-Mail Address: _____

NOTES:

1. Surety bond underwritten by a company licensed to issue bonds in this State;

2. Legal tender; or

3. A certificate of deposit; share certificate; or cashier's, treasurer's, teller's, or official check drawn by, or a certified check accepted by, and payable on demand to the State by a bank, a savings institution, or credit union insured by the Federal Deposit Insurance Corporation or the National Credit Union Administration.

   A. These instruments may be utilized only to a maximum of $100,000.

   B. If the required security or bond amount totals over $100,000, more than one instrument not exceeding $100,000 each and issued by different financial institutions shall be accepted.

4. Please attach to this page evidence of the authority of this officer to submit bids on behalf of the Company and also the names and residence addresses of all officers of the Company.

5. Fill in all blank spaces with information asked for or bid may be invalidated. PROPOSAL MUST BE INTACT, MISSING PAGES MAY INVALIDATE YOUR BID.

End of Proposal

SPECIAL PROVISIONS

Amend INTERIM GENERAL CONDITIONS, dated October 1994, as follows:

Section 2 – Proposal Requirements and Conditions

1. **AMEND** Section 2.1 Qualification of Bidder with the following:

Written Notice of Intent to Bid or Offer: A written Notice of Intent to Bid is not required for the Solicitation.

Standard Qualification Questionnaire: Bidders may be required to complete a standard qualifications questionnaire. When requested, the information shall be furnished within two working days or longer at the discretion of the Engineer. Failure to furnish the requested information within the time allowed may be grounds for a determination of non-responsibility, in accordance with HRS Section 103D-310 and HAR Section 3-122-108.

Hawaii Business or Compliant Non-Hawaii Business Requirement: Bidders shall be incorporated or organized under the laws of the State or be registered to do business in the State as a separate branch or division that is capable of fully performing under the contract, as stipulated in §3-122-112 HAR. A certified letter is not required prior to bid opening.

Compliance with §3-122-112 HAR: As a condition for award of the contract and as proof of compliance with the requirements of 103D-310(c) HRS, the apparent low bidder shall furnish the required documents to the Department. If the valid required certificates are not submitted on a timely basis for award of a contract, a bidder otherwise responsive and responsible may not receive the award. Bidder is responsible to apply for and submit the following documents to the Department.

A. Tax Clearance (HRS Chapter 237): Bidder shall obtain a tax clearance certificate from the Hawaii State Department of Taxation (DOTAX) and the Internal Revenue Service (IRS). The certificate is valid for six months from the most recently approved stamp date on the certificate; the certificate must be valid on the date received by the Department.

B. Department of Labor (DLIR) "Certificate of Compliance". (HRS Chapter 383 - Unemployment Insurance, Chapter 386 - Workers' Compensation, Chapter 392 - Temporary Disability Insurance, and 393 – Prepaid Health Care): Bidder shall obtain a certificate of compliance from the Hawaii State Department of Labor and Industrial relations (DLIR). The certificate is valid for six months from the date of issue; certificates must be valid on the date received by the Department.

C. Department of Commerce and Consumer Affairs (DCCA), Business Registration Division (BREG) "Certificate of Good Standing". Bidder shall obtain a certificate of good standing issued by the Department of Commerce and Consumer Affairs (DCCA), Business Registration Division (BREG). The certificate of good standing is valid for six months from the date of issue; certificates must be valid on the date received by the Department.

Hawaii Compliance Express. Alternately, instead of separately applying for these certificates at the various state agencies, bidder may choose to use the Hawaii Compliance Express (HCE), which allows businesses to register online through a simple wizard interface at http://vendors.ehawaii.gov to acquire a "Certificate of Vendor compliance" indicating that bidder's status is compliant with requirements of §103D-310(c), HRS, shall be accepted for contracting and final payment purposes.
Bidders that elect to use the new HCE services will be required to pay an annual fee of $15.00 to the Hawaii

Information Consortium, LLC (HIC). Bidders choosing not to participate in the HCE program will be required to provide the paper certificates as instructed in the previous paragraphs.

2. **ADD** Section 2.4a, Pre-Bid Conferences

Required Pre-bid Conferences: For construction and design-build projects with an estimated value of $500,000 or more and solicited under the competitive sealed bid method (103D-302 HRS); and for construction and design-build projects with an estimated value of $100,000 or more and solicited under the competitive sealed proposal method (103D-303 HRS); a pre-bid conference is required.

Other Pre-Bid Conferences: The Department may require a pre-bid conference for construction or design-build projects that are below the dollar threshold listed in above or when projects have special or unusual requirements.

Other Conditions: The Department may require the prospective Bidders to make a physical inspection of the project site and make attendance at the pre-bid conference a condition for submitting an offer.

Nothing stated at the pre-bid conference shall change the solicitation unless a change is made by written addendum.

3. **DELETE** Section 2.5, Addenda and Interpretations, in its entirety and replace with the following:

"Discrepancies, omissions, or doubts as to the meaning of drawings and specifications should be communicated using the question and answer section on the HIePRO solicitation for interpretation and must be received in the time frame set in the HIePRO solicitation. Any interpretation, if made and any supplemental instructions will be in the form of written addenda to the plans and specifications and made available prior to the offer due date. It shall be the prospective bidder's sole responsibility to verify and obtain any said addenda. Failure of any bidder to receive any such addendum or interpretation shall not relieve such bidder from any obligation under his bid as submitted. All addenda so issued shall become part of the contract documents."

Section 3 – Award and Execution of Contract

1. **AMEND** Section 3.3, Award of Contract, by deleting "sixty (60)" and replacing with "one hundred eighty (180)" in the first paragraph.

2. **AMEND** Section 3.3, Award of Contract, by adding the following after the first paragraph:

"If the contract is not awarded within the one hundred eighty (180) days, the Department may request the successful Bidder to extend the time for the acceptance of its bid. The Bidder may reject such a request without penalty; and in such case, the Department may at its sole discretion make a similar offer to the next lowest responsive and responsible bidder and so on until a bid is duly accepted or until the Department elects to stop making such requests."

3. **AMEND** Section 3.9, Notice to Proceed, by replacing the last paragraph with the following:

In the event the Notice to Proceed is not issued within eighteen (18) months after the date of bid opening, the Contractor may submit a claim for increased labor and materials costs (but not overhead costs). The claim shall be for labor and material costs incurred after 18 months and the full duration of the contract time allowed for the performance of the work (as specified on Page P-1 of the [Bid]

PROPOSAL) have elapsed. Such claims shall be accompanied with the necessary documentation to justify the claim. No payments will be made for escalation costs that are not fully justified as determined by the State.

4. **ADD** Section 3.10, Protests:

"**3.10 PROTESTS**—Pursuant to Section 103D-701, Hawaii Revised Statutes, an actual or prospective offeror who is aggrieved in connection with the solicitation or award may submit a protest. Any protest shall be submitting in writing to the Chairperson, Department of Land and Natural Resources, 1151 Punchbowl Street, Honolulu, Hawaii 96813, or designee as specified in the solicitation.

A protest shall be submitted in writing within five (5) working days after the aggrieved person knows or should have known the facts giving rise thereto; provided that a protest based upon the content of the solicitation shall be submitted in writing prior to the date set for receipt of offers. Further provided that a protest of an award or proposed award shall be submitted within five (5) working days after the posting of the award of the contract.

The notice of award, if any, resulting from this solicitation shall be posted on the HIePRO website.

Section 5 – Control of Work

AMEND Section 5.8 Value Engineering Incentive by deleting "$100,000" and replacing with "$250,000" in the first paragraph.

Section 6 – Substitution of Materials and Equipment

ADD the following to Section 6.3 Sub-paragraph b:

4. If the substitution meets all the requirements of the specifications and plans.

Section 7 – Prosecution and Progress

1. **DELETE** Section 7.2d in its entirety and replace with the following:

"d. Proof of Insurance Coverage

A Certificate of Insurance or other documentary evidence, to the satisfaction of the Engineer, that the Contractor has in place all insurance coverage required by the contract. The Certificate of Insurance shall contain wording which identifies the Project number and Project title for which the certificate of insurance is issued. Refer to the following for insurance requirements:

1. Insurance Requirements

(a) Obligation of Contractor - Contractor shall not commence any work until it obtains, at its own expense, all required herein insurance. Such insurance must have the approval of the Department as to limit, form and amount and must be maintained with a company authorized by laws of the State to issue such insurance in the State of Hawaii. Coverage by a "Non-Admitted" carrier is permissible provided the carrier has a AM Best's Rating of "A-VII" or better.

(b) All insurance described herein will be maintained by the Contractor for the full period of the

contract and in no event will be terminated or otherwise allowed to lapse prior to written certification of final acceptance of the work by the Department.

(c) Certificate(s) of Insurance acceptable to the Department shall be filed with the Engineer prior to commencement of the work. Certificates shall identify if the insurance company is a "captive" insurance company or a "Non-Admitted" carrier to the State of Hawaii. The Best's Rating must be stated for the "Non-Admitted" carrier. Certificates shall contain a provision that coverages afforded under the policies will not be canceled or changed until at least thirty (30) days written notice has been given to the Engineer by registered mail. The insurance policies shall name the State of Hawaii, its officers and employees as an additional insured and such coverage shall be noted on the certificate. Should any policy be canceled before final acceptance of the work by the Department, and the Contractor fails to immediately procure replacement insurance as specified, the Department, in addition to all other remedies it may have for such breach, reserves the right to procure such insurance and deduct the cost thereof from any money due to the Contractor.

(d) Nothing contained in these insurance requirements is to be construed as limiting the extent of Contractor's responsibility for payment of damages resulting from its operations under this contract, including the Contractor's obligation to pay liquidated damages, nor shall it affect the Contractor's separate and independent duty to defend, indemnify and hold the Department harmless pursuant to other provisions of this contract. In no instance will the Department's exercise of an option to occupy and use completed portions of the work relieve the Contractor of its obligation to maintain the required insurance until the date of final acceptance of the work.

(e) All insurance described herein shall be primary and cover the insured for all work to be performed under the contract, all work performed incidental thereto or directly or indirectly connected therewith, including traffic detour work or other work performed outside the work area, and all change order work.

(f) The Contractor shall, from time to time, furnish the Engineer, when requested, satisfactory proof of coverage of each type of insurance required or a copy of the actual policies covering the work. Failure to comply with the Engineer's request may result in suspension of the work, and shall be sufficient grounds to withhold future payments due the Contractor and to terminate the contract for Contractor's default.

(g) If the Contractor is self-insured, it shall furnish, upon the request and the satisfaction of the Engineer, any documentation to demonstrate the ability to self-insure itself. The Engineer, from time to time, can conduct an audit to determine the ability of the Contractor to be self-insured. Failure to comply with the Engineer's request will be considered a material breach of the contract, and at the discretion of the Engineer, may be sufficient grounds to terminate the contract, suspend any work or withhold future payments.

(h) It is the responsibility of the Contractor to notify the Department of any changes to its insurance policies or if the Contractor receives a notice of cancellation of any of its insurance policies. The Contractor will immediately provide written notice to the Department should the insurance policies evidenced on its Certificate of Insurance form be cancelled, limited in scope, or not renewed upon expiration.

2. Types of Insurance - The Contractor shall purchase and maintain insurance described below which shall provide coverage against claims arising out of the Contractor's operations under

the contract, whether such operations be by the Contractor itself or by the subcontractor or by anyone directly or indirectly employed by any of them or by anyone for whose acts any of them may be liable.

(a) Worker's Compensation. The Contractor and all subcontractors shall obtain worker's compensation insurance for all persons whom they employ or may employ in carrying out the work under this contact. This insurance shall be in strict conformity with the requirements of the most current and applicable State of Hawaii Worker's Compensation Insurance laws in effect on the date of the execution of this contract and as modified during the duration of the contract.

(b) Commercial General Liability. The Contractor shall obtain General Liability insurance with a limit of not less than $1,000,000 per occurrence and $2,000,000 aggregate. The insurance policy shall contain the following clauses: 1) "The State of Hawaii is added as an additional insured as respects to operations performed for the State of Hawaii."; and 2) "It is agreed that any insurance maintained by the State of Hawaii will apply in excess of, and not contributed with, insurance provided by this policy." The required limit of insurance may be provided by a single policy or with a combination of primary and excess polices."

(c) Comprehensive Automobile Liability. The Contractor shall obtain Auto Liability insurance covering all owned, non-owned and hired autos with a combined single Limit of not less than $1,000,000 per accident for bodily injury and property damage. The insurance policy shall contain the following clauses: 1) "The State of Hawaii is added as an additional insured as respects to operations performed for the State of Hawaii."; and 2) "It is agreed that any insurance maintained by the State of Hawaii will apply in excess of, and not contributed with, insurance provided by this policy." The required limit of insurance may be provided by a single policy or with a combination of primary and excess polices.

Furthermore, the Contractor's commercial general liability insurance and automobile liability insurance shall include coverage for bodily injury, sickness, disease or death of any person, arising directly or indirectly out of, or in connection with, the performance of work under this contract.

The Contractor's property damage liability insurance shall provide for all damages arising out of injury to or destruction of property of others including the Department's, arising directly or indirectly out of or in connection with the performance of the work under this contract including explosion or collapse.

The Contractor shall either:

i. Require each of its subcontractors to procure and to maintain during the life of its subcontract, subcontractors' comprehensive general liability, automobile liability and property damage liability insurance of the type and in the same amounts specified herein; or

ii. Insure the activities of its subcontractors in its own policy.

The Contractor will be permitted, in cooperation with insurers, to maintain a self-insured retention for up to 25% of the per occurrence combined single limits of the commercial general liability and the automobile liability policies. The existence of the self-insured

retention must be noted on the certificate of insurance coverage submitted to the Department or else it will be understood that the insurer is providing first dollar coverage for all claims. For all claims within the self-insured retention amount, the rights, duties and obligations between the Contractor and the Department shall be identical to that between a liability insurer and the Department, as an additional insured, as if there was no self-insured retention.

(d) Builder's Risk Insurance. Unless included in the Specifications of this project, the Contractor shall not be required to provide builder's risk insurance. If required as noted in the Specifications, builder's risk insurance shall be provided during the progress of work and until final acceptance by the Department upon completion of the contract. It shall be "All Risk" (including but not limited to earthquake, windstorm and flood damage) completed value insurance coverage on all completed work and work in progress to the full replacement value thereof. Such insurance shall include the Department as additional name insured. The insurance policy shall contain the following clauses: 1) "The State of Hawaii is added as an additional insured as respects to operations performed for the State of Hawaii."; and 2) "It is agreed that any insurance maintained by the State of Hawaii will apply in excess of, and not contributed with, insurance provided by this policy." The required limit of insurance may be provided by a single policy or with a combination of primary and excess polices.

The Contractor shall submit to the Engineer for its approval all items deemed to be uninsurable. The policy may provide for a deductible in an amount of up to 25% of the amount insured by the policy. With respect to all losses up to any deductible amount, the relationship between the Contractor and the Department shall be that of insurer and additional insured as if no deductible existed".

2. **DELETE** Section 7.16 in its entirety and replace with the following:

"RESPONSIBILITY FOR DAMAGE CLAIMS; INDEMNITY – The Contractor shall indemnify the State and the Department against all loss of or damage to the State's or the Department's existing property and facilities arising out of any act or omission committed in the performance of the work by the Contractor, any subcontractor or their employees and agents. Contractor shall defend, hold harmless and indemnify the Department and the State, their employees, officers and agents against all losses, claims, suits, liability and expense, including but not limited to attorneys' fees, arising out of injury to or death of persons (including employees of the State and the Department, the Contractor or any subcontractor) or damage to property resulting from or in connection with performance of the work and not caused solely by the negligence of the State or the Department, their agents, officers and employees. The State or the Department may participate in the defense of any claim or suit without relieving the Contractor of any obligation hereunder. The purchase of liability insurance shall not relieve the Contractor of the obligations described herein.

The Contractor agrees that it will not attempt to hold the State and its Departments and Agencies and their officers, representatives, employees or agents, liable or responsible for any losses or damages to third parties from the action of the elements, the nature of the work to be done under these specifications or from any unforeseen obstructions, acts of God, vandalism, fires or encumbrances which may be encountered in the prosecution of the work.

The Contractor shall pay all just claims for materials, supplies, tools, labor and other just claims against the Contractor or any subcontractor in connection with this contract and the surety bond will not be released

by final acceptance and payment by the Department unless all such claims are paid or released. The Department may, but is not obligated to, withhold or retain as much of the monies due or to become due the Contractor under this contract considered necessary by the Engineer to cover such just claims until satisfactory proof of payment or the establishment of a payment plan is presented.

The Contractor shall defend, indemnify and hold harmless the State and its Departments and Agencies and their officers, representatives, employees or agents from all suits, actions or claims of any character brought on account of any claims or amounts arising or recovered under the Worker's Compensation Laws or any other law, by-law, ordinance, order or decree.

Section 8 – Measurement and Payment

1. **DELETE** Section 8.7a in its entirety and replace with the following:

a. Tax Clearances from the State of Hawaii Department of Taxation and Internal Revenue Service, subject to section 103D-328, HRS, current within two months of issuance date indicating that all delinquent taxes levied or accrued under State Statutes against the contractor have been paid.

2. **ADD** Section 8.7d, Certificate of Compliance:

d. A Certification from the Contractor affirming that the Contractor has, as applicable, remained in compliance with all laws as required by Section 103D-310, HRS, and Section 3-122-112, HAR. A contractor making a false affirmation shall be suspended and may be debarred pursuant to section 103D-702, HRS.

    1. Certification of Compliance for Final Payment, State Procurement Office Form-22. Must be Signed Original.

3. **ADD** Section 8.7e, Hawaii Compliance Express:

e. In lieu of submitting the tax clearances from Taxation and IRS, and SPO Form -22, the Contractor may choose to use the Hawaii Compliance Express as described on page SP-1 of this Special Provisions.

SECTION 01019

GENERAL SPECIFICATIONS

PART 1 - GENERAL

1.1 GENERAL REQUIREMENTS

Work shall consist of furnishing all labor, tools, materials and equipment necessary and required to construct in place complete all work as indicated on the drawings and as specified herein.

1.2 GENERAL

A. Examination of Premises: The Contractor shall contact the Engineer and obtain permission before visiting the site.

B. All lines and grades shall be established by a licensed surveyor , or licensed Civil Engineer, registered in the State of Hawaii. The Contractor shall submit evidence of current and valid registration.

C. Notices: The Contractor shall notify the Engineer and give at least three (3) working days notice before starting any work.

D. Disruption of Utility Services: All work related to the temporary disconnection of electrical system shall be pre-arranged with the Engineer so that any disruption of such services will be kept to a minimum. In the event temporary power hook-up is required, the Contractor shall provide the necessary services.

E. Contractor's Operations

1. The Contractor must employ, insofar as possible, such methods and means of carrying out the work so as not to cause any interruption or interference to the facility's operations. Where the Contractor's operations would result in interruptions which would hamper the operations of the facilities, the Contractor shall rearrange the schedule of work accordingly.

2. The Contractor shall maintain safe passageway to and from the facility for the user agency personnel and the public at all times.

F. Lead Paint

1. When the project includes paint to be disturbed that was applied prior to 1980, it shall be assumed to contain lead. The Contractor shall inform its employees, subcontractors, and all other persons engaged in the project that lead containing paints are present in the existing buildings at the job site and to follow the requirements of the Department of Labor and Industrial Relations, Division of Occupational Safety and Health, Title 12, Subtitle 8,Chapter 148,

Lead Exposure in Construction, Hawaii Administrative Rules (Chapter 12-148, HAR).

G. Parking Policy for Contractor

1. The Contractor and its employees will not be allowed to park in zones assigned to facility personnel.

2. Areas to be used by the Contractor shall be as designated by the Engineer. Any lawn damaged by the Contractor shall be restored as instructed by the Engineer at no cost to the State.

H. Toilet Accommodations: The Contractor may use the existing toilet facilities if so designated by the Engineer; however, it is the Contractor's responsibility to keep same clean and in a sanitary condition at all times.

I. Protection of Property: The Contractor shall continually maintain adequate protection of all its work from damage and shall protect all property, including but not limited to buildings, equipment, furniture, grounds, vegetation, material, utility systems located at and adjoining the job site. The Contractor shall repair, replace or pay the expense of repair of damages resulting from its operations.

J. Use of Power Driven Equipment: The Contractor is cautioned to take all necessary safety precautions to protect the facility personnel, and the public whenever power driven equipment is used.

K. Safety: The Contractor shall carefully read and strictly comply with the requirements of the Hawaii Occupational Safety and Health Law, Chapter 396, Hawaii Revised Statutes, as amended, is applicable and made a part of the Contract.

L. Clean Up Premises: The Contractor shall clean up and remove from premises all debris accumulated from operations as necessary or as directed. See also Section 7.25 of the General Conditions.

M. Responsibility

1. The State will hold the Contractor liable for all the acts of Subcontractors and shall deal only with the prime Contractor in matters pertaining to other trades employed on the job. The Contractor shall be responsible for coordinating the work of all trades on the job.

2. Should the Contractor discover any discrepancy in the plans or specifications, the Contractor shall immediately notify the Engineer before proceeding any further with the work, otherwise, the Contractor will be held responsible for any cost involved in correction of work placed due to such discrepancy.

N. Cooperation With Other Contractors: The State reserves the right at any time to contract

for or otherwise perform other or additional work within the contract zone limits of this Contract. The Contractor of this project shall, to the extent ordered by the State, conduct its work so as not to interfere with or hinder the progress or completion of the work performed by other contractors.

O. Division of the Work: The Divisions and Sections into which these Specifications are divided shall not be considered an accurate or complete segregation of work by trades. This also applies to all work specified within each Section.

P. Drawings and Specifications

1. The Contractor shall not make alterations in the drawings and specifications. In the event the contractor discovers any errors or discrepancies, the Contractor shall immediately notify the Engineer in accordance with the General Conditions.

2. Where devices, or items, or parts thereof are referred to in the singular, it is intended that such reference shall apply to as many such devices, items or parts as are required to properly complete the work.

3. Specifications and drawings are prepared in abbreviated form and include incomplete sentences. Omission of words or phrases such as "the Contractor shall", "as shown on the drawings", "a", "an", and "the" are intentional. Omitted words and phrases shall be provided by inference to form complete sentences.

Q. Required Submittals

1. Required submittals as specified in the Technical Sections of these specifications include one or more of the following: Shop drawings; color samples; material samples; technical data; schedules of materials; schedules of operations; guarantees; operating and maintenance manuals; and as-built drawings.

2. The Contractor shall make a comprehensive list of the required submittals, by Specification Section, and submit this list to the Engineer within 15 days after notice to proceed.

3. As-Built Drawings: When as-built drawings are required for submittal, the following shall apply:

a. As-built drawings, the intent of which is to record the actual in-place construction so that any future renovations or tie-ins can be anticipated accurately, shall be required.

b. All deviations from alignments, elevations and dimensions which are stipulated on the plans shall be recorded in red on the as-built drawings.

c. The following procedure shall be followed:

1) Immediately after these changes are constructed in place, the Contractor shall record them on the field office plans.

2) Within two weeks after final inspection of the project, the Contractor shall transfer the changes marked on the field office plans onto a clean copy of plans using a red pencil. Any deletions shall be so noted and redrawn as necessary. The Contractor shall stamp or mark the tracings "AS-BUILT", and also sign and date each drawing so marked.

3) The Contractor shall submit the as-built drawings to the Engineer for review and approval. After the Engineer approves the as-built drawings, the Contractor shall submit an electronic copy in Adobe PDF format on CD ROM.

4) Any as-built drawing which the Engineer determines does not accurately record the deviation shall be corrected by the State, and the Contractor shall be charged for the services.

END OF SECTION

SECTION 01090

STANDARD REFERENCES

PART 1 - GENERAL

Wherever used in the project, the following abbreviations will have the meanings listed:

Abbreviation	Company
AA	Aluminum Association Incorporated 818 Connecticut Avenue, N.W. Washington, D.C. 20006
AASHTO	American Association of State Highway and Transportation Officials 444 North Capitol Street, N.W., Suite 225 Washington, D.C. 20001
ACI	American Concrete Institute P.O. Box 19150 Detroit, MI
AEIC	Association of Edison Illuminating Companies 51 East 42nd Street New York, NY 10017
AFBMA	Anti-Friction Bearing Manufacturer's Association 60 East 42nd Street New York, NY 10017
AGA	American Gas Association 8501 East Pleasant Valley Road Cleveland, OH 44131
AGMA	American Gear Manufacturer's Association 1330 Massachusetts Avenue, N.W. Washington, D.C.
AISC	American Institute of Steel Construction 101 Park Avenue New York, NY 10017
AISI	American Iron and Steel Institute 1000 16th Street, N.W. Washington, D.C. 20036
AITC	American Institute of Timber Construction 333 West Hampden Avenue Englewood, CO 80110

Abbreviation	Company
AMCA	Air Moving and Conditioning Association, Inc. 30 West University Drive Arlington Heights, IL 60004
ANSI	American National Standards Institute, Inc. 1430 Broadway New York, NY 10018
APA	American Plywood Association 1119 A Street Tacoma, WA 98401
API	American Petroleum Institute 1801 K Street N.W. Washington, DC 20006
ARI	Air-Conditioning and Refrigeration Institute 1814 North Fort Myer Drive Arlington, VA 22209
ASCE	American Society of Civil Engineers 345 East 47th Street New York, NY 10017
ASCII	American Standard Code for Information Interchange United States of America Standards Institute 1430 Broadway New York, NY 10018
ASE Code	American Standard Safety Code for Elevators, Dumbwaiter and Escalators American National Standards Institute 1430 Broadway New York, NY 10018
ASHRAE	American Society of Heating, Refrigeration and Air Conditioning Engineers United Engineering Center 345 East 47th Street New York, NY 10017
ASME	American Society of Mechanical Engineers 345 East 47th Street New York, NY 10017

Abbreviation	Company
ASTM	American Society for Testing and Materials 1916 Race Street Philadelphia, PA 19103
AWPA	American Wood Preservers Association 1625 Eye Street Washington, DC 20006
AWS	American Welding Society 2501 N.W. 7th Street Miami, FL 33125
AWWA	American Water Works Association 6666 West Quincy Avenue Denver, CO 80235
CBM	Certified Ballast Manufacturers 2120 Keith Building Cleveland, OH 44115
CMAA	Crane Manufacturers Association of America, Inc. (Formerly called: Overhead Electrical Crane Institute - OECI) 1326 Freeport Road Pittsburgh, PA 15238
CRSI	Concrete Reinforcing Steel Institute 180 North La Salle Street Chicago, IL 60601
CSA	Canadian Standards Association 178 Rexdale Boulevard Rexdale, Ontario, M9W IR3, Canada
DEMA	Diesel Engine Manufacturer's Association 122 East 42nd Street New York, NY 10017
DIS	Division of Industrial Safety California Department of Industrial Relations 2422 Arden Way Sacramento, CA 95825
EEI	Edison Electric Institute 90 Park Avenue New York, NY 10016

Abbreviation	Company
EIA	Electronic Industries Association 2001 Eye Street N.W. Washington, DC 20006
EJMA	Expansion Joint Manufacturer's Association 331 Madison Avenue New York, NY 10017
ESO	Electrical Safety Orders, California Administrative Code, Title 8, Chap. 4, Subarticle 5 Office of Procurement, Publications Section P.O. Box 20191 8141 Elder Creek Road Sacramento, CA 95820
FEDSPEC	Federal Specifications General Services Administration Specification and Consumer Information Distribution Branch Washington Navy Yard, Bldg. 197 Washington, DC 20407
FEDSTDS	Federal Standards (see FEDSPECS)
FM	Factory Mutual Research 1151 Boston-Providence Turnpike Norwood, MA 02062
HEI	Heat Exchange Institute 122 East 42nd Street New York, NY 10017
HI	Hydraulic Institute 1230 Keith Building Cleveland, OH 44115
IAPMO	International Association of Plumbing and Mechanical Officials 5032 Alhambra Avenue Los Angeles, CA 90032
ICBO	International Conference of Building Officials 5360 South Workman Mill Road Whittier, CA 90601

Abbreviation	Company
ICEA	Insulated Cable Engineers Association P.O. Box P South Yarmouth, MA 02664
IEEE	Institute of Electrical and Electronics Engineers, Inc. 345 East 47th Street New York, NY 10017
IES	Illuminating Engineering Society C/O United Engineering Center 345 East 47th Street New York, NY 10017
ISA	Instrument Society of America 400 Stanwix Street Pittsburgh, PA 15222
JIC	Joint Industrial Council 7901 Westpark Drive McLean, VA 22101
MILSPEC	Military Specifications Naval Publications and Forms Center 5801 Tabor Avenue Philadelphia, PA 19120
MSS	Manufacturers Standardization Society of the Valve and Fittings Industry, Inc. 127 Park Street, N.E. Vienna, VA 22180
NAAMM	National Association of Architectural Metal Manufacturers 100 South Marion Street Oak Park, IL 60302
NACE	National Association of Corrosion Engineers P.O. Box 986 Katy, TX 77450
NEC	National Electric Code National Fire Protection Association 470 Atlantic Avenue Boston, MA 02210
NEMA	National Electrical Manufacturer's Association 155 East 44th Street New York, NY 10017

Abbreviation	Company
NESC	National Electric Safety Code American National Standards Institute 1430 Broadway New York, NY 10018
NFPA	National Forest Products Association (Formerly called: National Lumber Manufacturer's Association) 1619 Massachusetts Avenue, N.W. Washington, DC 20036
OSHA	Occupational Safety and Health Act U.S. Department of Labor San Francisco Regional Office 450 Golden Gate Avenue, Box 36017 San Francisco, CA 94102
PPIC	The Plumbing & Piping Industry Council, Inc. Suite 402 510 Shatto Place Los Angeles, CA 90020
SAE	Society of Automotive Engineers 2 Pennsylvania Street New York, NY 10001
SAMA	Scientific Apparatus Makers Association One Thomas Circle Washington, DC 20005
SBCC	Southern Building Code Congress 1116 Brown-Marx Building Birmingham, AL 35203
SMACNA	Sheet Metal and Air Conditioning Contractors National Association, Inc. 8224 Old Courthouse Road Tysons Corner Vienna, VA 22180
SSPWC	Standard Specifications for Public Works Construction Building News, Inc. 3055 Overland Avenue Los Angeles, CA 90034
TEMA	Tubular Exchanger Manufacturer's Association 331 Madison Avenue New York, NY 10017

Abbreviation	Company
UBC	Uniform Building Code Published by ICBO
UL	Underwriters Laboratories Inc. 207 East Ohio Street Chicago, IL 60611
UMC	Uniform Mechanical Code Published by ICBO
UPC	Uniform Plumbing Code Published by IAPMO
USBR	Bureau of Reclamation U.S. Department of Interior Engineering and Research Center Denver Federal Center, Building 67 Denver, CO 80225
WWPA	Western Wood Products Association (Formerly called: West Coast Lumberman's Association - WCLA) Yeon Building Portland, CA 97204

PART 2 - PRODUCTS (NOT USED)

PART 3 - EXECUTION (NOT USED)

- END OF SECTION -

SECTION 01100

ARCHAEOLOGICAL PROTECTION

PART 1 - GENERAL

1.1 This section covers the requirements for the protection and preservation of historical sites and values.

PART 2 - PRODUCTS (NOT USED)

PART 3 - EXECUTION

3.1 CONSTRUCTION METHOD: Representatives of the State will from time to time examine the area as work proceeds. If historical values are noted, the State may order a halt to the work in the vicinity of the historical values until the State can examine further. The Contractor shall notify the State if he finds anything he suspects to be of historic significance and shall discontinue further work in the vicinity of the find until the State can examine the area. In either case, further work in the vicinity of such historical or suspected historical values may proceed only upon approval by the State. Such approval can be normally expected within one week and shall in no case require more than one month.

END OF SECTION

SECTION 01110 - SUMMARY OF WORK

PART 1 - GENERAL

1.01 SUMMARY

A. This section is for the convenience of the Contractor only and shall not be construed as a complete accounting of all work to be performed. The extent of the Work is indicated on the drawings and by the requirements of each Specification Section.

B. Drawings, Specification Sections, and general provisions of the Contract, including General and Supplementary Conditions and all other Division Specification Sections apply to this Section.

1.02 LOCATION OF WORK

A. Project Name: Sand Island SRA Park Improvements Ph.VI

Address: 1499 Sand Island Pkwy, Honolulu, HI 96819

Owner: State of Hawaii

Architect: Group 70 International 111 S King St Suite 170

Honolulu, HI 96813

1.03 SITE INVESTIGATION

A. The Contractor shall examine the site and shall be responsible for verifying existing construction and conditions. Any failure by the Contractor to acquaint themselves with all the available information concerning existing conditions will not relieve them from responsibility for properly estimating the difficulty or cost of successfully performing the work. No extra payment will be considered for work additional to that shown or noted, if such work would have been apparent in an inspection of the premises.

1.04 WORK UNDER THIS CONTRACT

A. GENERAL REQUIREMENTS:

1. BASE BID:

a. Structure 1: Anti-Aircraft Gun Emplacement Tower

i Structural stabilization of existing structure including spall repair and reconstruction.

ii Panels removed, anchor bolts and connections to be replaced per structural drawings, panels to be stained and reinstalled.

iii Seal existing roof penetrations, reslope roof to wall scuppers, new roof construction complete to manufacturer specifications

iv Exterior to receive coating

v Railings installed and large aggregate gravel to raise grade on 2 sides

b. Structure 2: Harbor Entrance Control Tower

    i Structural stabilization of the existing structure including replacement of steel members and rust repair

c. Structure 3:Cable Hut (Train)

    i Complete demolition and removal of stairs/railings, wheels, smokestack, train additive elements, paint stripped to original masonry

    ii Added fencing per drawings

d. Structure 4:Air Raid Shelter (Train station)

    i Complete demolition and removal of wood slats and paint stripping down to masonry

    ii New metal door for maintenance access, G90 coating, multicam lockset

    iii Debris removal of the interior

e. Structure 5:Plotting Room

    i Regrade entry and stabilize the slope

    ii Replace door frame, rehab door, add lockset

    iii Cap cover to existing chimney hatch

    iv Debris removal of the interior

f. Structure 6:Asphalt Beach Walkway

g. BID ALTERNATES

    i Bid alt 1: Structure 1 Benches and park elements per drawings

    ii Bid alt 2: Structure 2 Non-priority structural repairs and repaint entire structure.

    iii Bid alt 3: Structure 2 Repair rock wall stairs and stair handrails

    iv Bid alt 4: Re-route asphalt beach walkway 60ft in-board of existing walkway, AC paving on grade.

    Demo portion of existing walkway and stabilize shoreline with landscaping,

2. The work shall include the furnishing of all labor, tools, materials, equipment, transportation, etc., and the performance of all operations required to provide construction as specified herein and shall include the cleanup and removal from site, all debris resulting from the operations performed. It shall also be the Contractor's responsibility to take all necessary safety precautions and to furnish safety measures as required.

3. Take responsibility for all scope items. Contractor is responsible for complying with the requirements of these documents. All work shall conform to the requirements of current building code and as described herein.

4. General requirements and specific recommendations of the material manufacturers are included as part of these specifications. The manufacturers' specifications are the minimum standards required for the completed systems. Specific items listed herein (contract documents) may

improve the standards required by the manufacturer and will take precedence where their compliance will not affect the manufacturers' warranty provisions.

5. No changes involving additional cost may be started without prior approval of the Owner.
6. Any damage including but not limited to landscaping, asphalt, concrete, etc. damaged by the Contractor will be repaired at the Contractor's expense. Contractor must notify the Owner of any damaged areas prior to the start of each project.
7. Staging areas including necessary BMPs as identified by owner's representative, to be fenced and kept secure at all times.
8. Facility rules and policies must be followed by all persons at all times at the project site, including but not limited to drug and alcohol policy, weapon and firearm policy, safety and security policy, cell phone and electronics policy. Contractor and employees shall not interact with patrons in any manner.
9. Contractor shall provide own utilities including water, electricity, Port-O-John, etc. Access to the interior of the facility shall not be provided without an escort.
10. Owner shall provide internal access to the roof for roofing personnel only. Supplies, equipment, and debris shall be loaded/unloaded externally.
11. In the event unanticipated asbestos bearing materials are discovered to be present in the Work, Contractor is to stop all work in the affected area, notify the Owner and provide temporary protection as required. Cost incurred, if any, due to the presence of hidden or unanticipated asbestos containing material will be authorized by the Owner by Change Order to this Contract.

B. SCHEDULE

1. The Contractor will note that time is of the essence. The Contractor shall work closely with the Owner in coordinating and performing the work. Work hours shall be coordinated with the Owner. Unless approved otherwise by the Owner, work hours shall be as follows:
   a. Park Hours., Monday through Friday.
   b. Saturdays, Sundays, and Holidays – Require prior approval of the Owner.
   c. Work may be restricted in certain areas at certain times due to special events and/or testing.

C. CODE COMPLIANCE– State of Hawaii

The completed Work shall comply with the following requirements:

1. Building Code: 2012 International Building Code (IBC).
2. Mechanical Code: 2012 Uniform Mechanical Code (UMC).
3. Plumbing Code: 2012 Uniform Plumbing Code (UPC).
4. Electrical Code: 2011 National Electrical Code (NEC)
5. Fire Code: 2012 International Fire Code (IFC)
   a. NFPA Standards as referenced in the 2012 IFC and IBC.
6. Energy Code: 2012 International Energy Conservation Code (IECC).

7. Existing Building Code: 2012 International Existing Building Code (IBEC).

8. In the event that test methods or standards used to verify or document compliance with specified codes/standards **change** for any reason during the duration of the Work, the newly implemented test methods or standards shall take precedence unless specifically accepted otherwise in writing by Owner or Consultant.

1.05 WORK UNDER SEPARATE CONTRACT

A. Separate Contract: No other work under other contracts is anticipated at the project site during the estimated construction duration. However, the Owner may award a separate contract for performance of certain construction operations at the Project site.

B. Contractor shall fully cooperate with separate contractors so work on those contracts may be carried out smoothly, without interfering or delaying Work under this Contract.

PART 2- PRODUCTS

2.01 NO PRODUCTS ARE REQUIRED IN THIS SECTION

PART 3 - EXECUTION

3.01 SUBMITTAL PROCEDURE

A. Provide complete set of submittals in accordance with Section 01330 Submittal Procedure fully coordinated with the submittal section of each Section.

3.02 WARRANTIES

A. Provide specified warranties in accordance with the warranty section of each Section.

3.03 DEMOLITION AND PREPARATION

A. Coordinate all aspects of demolition work with Owner. Confirm demolition scope and intent prior to beginning work with the Owner.

B. Provide protective measures in and around the building to protect the building and adjacent surfaces from being soiled or damaged and as directed by the Owner.

C. Prior to tear-off, verify that all soil pipes, flues, steel members, and other similar penetrations are secured to the building structure. Coordinate removal or securement of all unsecured penetrations prior to the start of demolition.

D. The bidders shall recognize that existing conditions may not allow for a minimum of 8” base flashing heights at all areas among other existing conditions. These conditions shall not be excluded from the manufacturer’s or installers warranties.

E. Remove existing overburden (to be saved for re-installation as possible) at exterior observation deck, remove existing waterproofing, repair existing deck, install new waterproofing, re-install overburden.

F. Repair exterior wall finish. Install new wall coating over exterior wall.

G. Repair and seal existing door(s) in concert with exterior wall work.

H. Install new exterior sealants.

I. Remove debris from roof area and properly dispose of all materials off site. At the end of each day, clean site.

J. The structures shall be sealed at the end of each work day.

3.04 ROOFING / WATERPROOFING DECK REPAIR & EXTERIOR WALL (A2 Anti-Aircraft Gun Emplacement Tower)

A. Replace/repair deteriorated concrete roof to match existing as required.

B. Properly prepare roof/substrate for installation of new roof / waterproofing system.

C. Repair exterior wall in concert with exterior wall finish / coating system installation.

3.05 NAILERS

A. Install replacement nailers where deteriorated components were removed.

3.06 BUILDING ENVELOPE SYSTEMS

A. Install New Tapered Insulation and TPO Roofing on existing concrete roof decks as shown on plans.

B. Exterior Walls: Repairs as specified

C. Exterior Glazing: Repairs as specified

3.07 SHEET METAL

A. Install roofing / waterproofing related sheet metal components as per drawings and specifications.

B. Provide all necessary sealant primers, sealant, sealant tapes, solder/weld joints, and fasteners to ensure a watertight installation.

3.08 MECHANICAL/ELECTRICAL WORK

A. Disconnect, reconnect and rebalance, units as required for lifting.

B. Extend ducts as required for raising curbs to finished elevations.

C. Raise, move and / or relocate any electrical conduits that do not allow for the proper and recommended installation of related flashings.

3.09 MISCELLANEOUS

A. Coordinate the work throughout the duration of the project as to minimize disruption of facility operations.

B. Contractor shall test all roof drains at beginning and upon completion of roof project. Test for proper functionality including leaks and proper drainage.

C. Upon completion of roof work, Contractor shall clean/wash roof prior to final acceptance.

D. Work includes painting finishes as called for in specifications and plans.

END OF SECTION

SECTION 01210 - ALLOWANCES

PART 1 - GENERAL

1.01 SUMMARY

A. This Section includes administrative and procedural requirements governing allowances.

1. Certain materials, equipment, and services are specified in the Contract Documents by allowances. In some cases, these allowances include installation. Allowances have been established in lieu of additional requirements and to defer selection of actual materials and equipment to a later date when additional information is available for evaluation. If necessary, additional requirements will be issued by Change Order.

B. Types of allowances include the following:

1. Lump-sum allowances.

C. Related Sections include the following:

1. General Conditions - Article 4 SCOPE OF WORK for procedures for submitting and handling Change Orders.

1.02 SELECTION AND PURCHASE

A. At the earliest practical date after award of the Contract, advise the Engineer of the date when final selection and purchase of each product or system described by an allowance must be completed to avoid delaying the Work.

B. Purchase products and systems selected by the Engineer from the designated supplier.

1.03 SUBMITTALS

A. Submit proposals for purchase of products or systems included in allowances.

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

1.04 LUMP SUM ALLOWANCES

A. Use the lump sum allowance only as directed by the Engineer for purpose scheduled in Part 3 below, and only by Change Orders that indicate amounts to be charged to the allowance.

1. Lump sum allowances to cover lump sum payments to another party shall not include Contractor’s overhead, profit, and related costs. These costs include delivery, installation, taxes, insurance, equipment rental, and similar costs. These shall be included in the Total Lump Sum Bid Price.

2. Contractor’s overhead, profit, and related costs for products and equipment ordered by State under the lump sum allowance are included in the allowance and are not part of the Total Lump Sum Bid Price. These costs include delivery, installation, taxes, insurance, equipment rental, and similar costs.

3. At Project closeout, credit unused amounts remaining in the lump sum allowance to State by Change Order.

1.05 UNUSED MATERIALS

A. Return unused materials purchased under an allowance to manufacturer or supplier for credit to the State, after installation has been completed and accepted.

1. If requested by the Engineer, prepare unused material for storage by State when it is not economically practical to return the material for credit. If directed by the Engineer, deliver unused material to State's storage space. Otherwise, disposal of unused material is Contractor's responsibility.

PART 2 - PRODUCTS (Not Used)

PART 3 - EXECUTION

3.01 EXAMINATION

A. Examine products covered by an allowance promptly on delivery for damage or defects. Return damaged or defective products to manufacturer for replacement.

3.02 PREPARATION

A. Coordinate materials and their installation for each allowance with related materials and installations to ensure that each allowance item is completely integrated and interfaced with related work.

3.03 SCHEDULE OF ALLOWANCES

A. Allowance A: Include Cash allowance of $256,000.00 for the repair of damaged or deteriorating existing exterior wood door and wood window units including hardware in accordance with Section 08031 - HISTORIC TREATMENT OF METAL DOORS

1. The cash allowance is an estimate only and is subject to increase or decrease depending on the actual scope of work and costs. Additional charges by the Contractor for overhead, coordination, profit, insurance, and other incidental expenses shall not be allowed or added to this cash allowance.

END OF SECTION

SECTION 01230

ADDITIVE BID ITEMS

PART 1 - GENERAL

1.1 SUMMARY

A. This Section includes administrative and procedural requirements for additive bid items.

B. The description of additive bid items is not intended to give a detailed description of all additional work required by the additive bid item(s), as only the principal features of such additional work are listed.

C. Should anyone or all of the additive bid items become a part of the contract, the cost of all additional work required by the additive bid item(s), even though not specifically mentioned herein, are included in the lump sum bid price.

1.2 DEFINITIONS

A. Additive Bid Item: An amount proposed by Bidders (Offerors) and stated on the Proposal Form for certain work defined in the Bidding Requirements that may be added to the Total Lump Sum Base Bid Price amount if State decides to accept a corresponding change either in the amount of construction to be completed or in the products, materials, equipment, systems, or installation methods described in the Contract Documents.

The cost for each additive bid item is the net addition to the Contract Sum to incorporate additive bid item into the Work. No other adjustments are made to the Total Lump Sum Base Bid Price.

1.3 PROCEDURES

A. Coordination: Modify or adjust affected adjacent work as necessary to completely integrate work of the additive bid item into the Project.

Include as part of each additive bid item, miscellaneous devices, accessory objects, and similar items incidental to or required for a complete installation whether or not indicated as part of additive bid item.

B. Notification: Immediately following award of the Contract, notify each party involved, in writing, of the status of each additive bid item. Indicate if additive bid items have been accepted, rejected, or deferred for later consideration.

C. Execute accepted additive bid items under the same conditions as other work of the Contract.

D. Schedule: A Schedule of Additive Bid Items is included at the end of this Section. Specification Sections referenced in schedule contain requirements for materials necessary to achieve the work described under each additive bid item.

PART 2 – GENERAL (Not Used)

PART 3 – EXECUTION

3.1 SCHEDULE OF ADDITIVE BID ITEMS

A. Additive Bid Item 1: Prefabricated Restroom Unit

END OF SECTION

SECTION 01270 - VARIABLE QUANTITIES UNIT PRICES

PART 1 - GENERAL

1.01 SUMMARY

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

1.02 DEFINITIONS

A. Unit price is an amount proposed by the Bidder (or Offeror), stated on the Bid Form, as a price per unit of measurement for materials or services included in the Total Lump Sum Bid Price.

1.03 RELATED DOCUMENTS

A. Variations in estimated quantities are governed by GENERAL CONDITIONS Section VARIATIONS IN ESTIMATED QUANTITIES.

B. Measurement and payment for unit price items are governed by the General Conditions.

1.04 PROCEDURES

A. Unit prices include all necessary material, plus cost for delivery, installation, insurance, applicable taxes, coordination overhead, and profit.

B. List of Unit Prices: A list of unit prices is included at the end of this Section. Specification Sections referenced in the schedule contain requirements for materials described under each unit price.

1. The description of Variable Quantities Unit Price items is not intended to give a detailed description of all work required, as only principal features of such work are listed.

2. Detailed descriptions are given in the appropriate Specification Sections or Drawings named in the general description below.

C. Include Variable Quantities Unit Price costs on the Bid form.

D. All computations of the Variable Quantities Unit Prices shall use the unit prices noted in the Bid Form. Measurements will be to the nearest estimated unit quantity. Payment will be made for quantities actually installed at the applicable price, measured by the Offeror, concurred by the Engineer, and acceptably completed.

E. The Variable Quantities Unit Prices are estimated quantities. Where the quantity of a pay item vary more than 15 percent above or below the estimated quantity stated in the contract, an adjustment in the contract price may be made upon demand by either the State or Contractor. The adjustment shall be based upon any increase or decrease in costs due solely to the variation above 115 percent or below 85 percent of the estimated quantity.

F. Do not proceed with work exceeding the estimated quantities written in the Bid Form until receipt of written approval by the Engineer.

PART 2 - PRODUCTS (Not Used)

PART 3 - EXECUTION

3.01 LIST OF VARIABLE QUANTITIES

A. Unit Price No. 1:
Description: NEW WOOD TRELLIS MEMBERS: Remove damaged wood trellis members and replace to match existing at Structure 1 Anti-Aircraft Gun Emplacement Tower.

END OF SECTION

SECTION 01300

SUBMITTALS

PART 1 - GENERAL

1.1 SUBMITTALS

A. Shop drawings shall be required for:

1. Division 16 - Electrical Work.

2. Any others as called for in the plans, specifications or by the Engineer.

B. Other required submittals shall include:

1. Piping Layout.

2. Manufacturer's Data.

3. Certificates of Warranty.

4. Any others as called for in the plans, specifications, or by the Engineer.

1.2 BIDDER'S SPECIAL RESPONSIBILITY FOR COORDINATING CONTRACTUAL WORK AND SUBMITTALS:

A. The Contractor is responsible for the coordination of all contractual work and submittals.

B. The Contractor shall have a rubber stamp made up in the following format:

CONTRACTOR NAME

PROJECT: _____

_____

JOB NO: _____

THIS SUBMITTAL HAS BEEN CHECKED BY THIS GENERAL CONTRACTOR. IT IS CERTIFIED CORRECT, COMPLETE, AND IN COMPLIANCE WITH CONTRACT DRAWINGS AND SPECIFICATIONS. ALL AFFECTED CONTRACTORS AND SUPPLIERS ARE AWARE OF, AND WILL INTEGRATE THIS SUBMITTAL INTO THEIR OWN WORK.

DATE RECEIVED _____
SPECIFICATION SECTION _____

SPECIFICATION PARAGRAPH _____
DRAWING NUMBER _____
SUBCONTRACTOR NAME _____
SUPPLIER NAME _____
MANUFACTURER NAME _____

CERTIFIED BY: _____

C. This stamp, "filled in", should appear on the title sheet of each shop drawing, on a cover sheet of submittals in an 8-1/2" x 11" format, or on one face of a cardstock tag (min. 3" x 6") tied to each sample. The tag on the samples should state what the sample is so that, if the tag is accidentally separated from the sample, it can be matched up again. The back of this tag will be used by the Engineer for his receipt, review, and log stamp and for any comments that relate to the sample.

D. All submittals for material, equipment, and shop drawings listed in the contract documents, including dimensioned plumbing shop drawings, shall be required and shall be reviewed by the Engineer, prior to any ordering of materials and equipment.

E. Unless otherwise noted, the Contractor shall submit to the Engineer for his review eight copies of all shop drawings, piping layout, and/or catalog cuts for fabricated items and manufactured items (including mechanical and electrical equipment) required for the construction. Drawings shall be submitted in sufficient time to allow the Engineer not less than twenty regular working days for examining the drawings.

F. The drawing shall be accurate, distinct, and complete and shall contain all required information, including satisfactory identification of items, units and assemblies in relation to the contract drawings and specifications.

G. Unless otherwise approved by the Engineer, shop drawings shall be submitted only by the Contractor, who shall indicate by a signed stamp on the drawings or other approved means that the Contractor has checked the shop drawings and that the work or equipment shown is in accordance with contract requirements and has been checked for dimensions and relationship with work of all other trades involved. All deviations from the plans and specifications shall be listed. The practice of submitting incomplete or unchecked shop drawings for the Engineer to correct or finish will not be acceptable, and shop drawings which, in the opinion of the Engineer, clearly indicate that they have not been checked by the Contractor will be considered as not complying with the intent of the contract documents and will be returned to the Contractor for resubmission in the proper form.

H. When the shop drawings have been reviewed by the Engineer, two sets of submittals will be returned to the Contractor appropriately stamped. If major changes or corrections are necessary, the drawing may be rejected and one set will be returned to the Contractor with such changes or corrections indicated, and the Contractor shall correct and resubmit eight copies of the drawings, unless otherwise directed by the Engineer. No changes shall be made by the Contractor to the resubmitted shop drawings other than those changes indicated by the Engineer.

The resubmittal shall be so indicated on the shop drawing.

I. The review of such drawings and catalog cuts by the Engineer shall not relieve the Contractor from responsibility for correctness of the dimensions, fabrication details, and space requirements or for deviations from the contract drawings and specifications, unless the Contractor has called attention to such deviations, in writing, by a letter accompanying the drawings and the Engineer approved the change or deviations, in writing, at the time of submission; nor shall review by the Engineer relieve the Contractor from the responsibility for errors in the shop drawings. When the Contractor does call such deviations to the attention of the Engineer, he shall state in his letter whether or not such deviations involve any deduction or extra cost adjustment.

J. The approval of the above drawings, lists, prints, specifications, or other data shall in no way release the Contractor from his responsibility for the proper fulfillment of the requirements of this contract nor for fulfilling the purpose of the installation nor from his liability to replace the same should it prove defective or fail to meet the specified requirements.

PART 2 - PRODUCTS (NOT USED)

PART 3 - EXECUTION (NOT USED)

END OF SECTION

SECTION 01359 – HISTORIC TREATMENT PROCEDURES

PART 1 - GENERAL

1.01 SUMMARY

A. The five structures define in the drawings are Historic Buildings from the Work war II era:
   1. . Anti-Aircraft Gun Emplacement Tower,
   2. Air Raid Shelter (Train Station),
   3. Cable Hut (Train),
   4. Harbor Entrance Control Post Tower,
   5. Underground Plotting Room

B. Work Includes:
   1. Repairing, replacing, and refurbishing historic material and components.
   2. Using historically accurate materials and techniques wherever possible.
   3. Coordinating all aspects of historical preservation.

C. Related Sections:
   1. SECTION 02070 – SELECTIVE DEMOLITION.
   2. SECTION 02429 – REMOVAL AND SALVAGE OF HISTORIC CONSTRUCTION MATERIAL.
   3. SECTION 08031 – HISTORIC TREATMENT OF METAL DOORS.

1.02 REFERENCES

The Publications listed below form a part of this specification to the extent referenced. The publications are referred to within the text by the basic designations only.

A. U.S. National Archives and Records Administration (NARA)

29 CFR 1926	Safety and Health Regulations for Construction
36 CFR Part 65	The Secretary of Interior's Standards for the Treatment of Historic Properties

B. National Parks Services (NPS)

NPS-28	Cultural Resource Management Guidelines

1.03 DEFINITIONS

A. Consolidate: To strengthen loose or deteriorated materials in place.

B. Dismantle: To disassemble and detach items by hand from existing construction to the limits indicated, using small hand tools and small one-hand power tools, to protect nearby historic surfaces; and legally dispose of dismantled items off-site, unless indicated to be salvaged or reinstalled.

C. Existing to Remain: Existing Items that are not to be removed or dismantled.

D. Historic: Spaces, areas, rooms, surfaces, materials, finishes, character-defining features and overall appearance that are important to the successful preservation, and which are noted in the National Register of Historic Places Historic Nomination Form.

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

F. Preservation: The act or process of applying measures necessary to sustain the existing form, integrity, and materials of an historic property. Work, including preliminary measures to protect and stabilize the property, generally focuses upon the ongoing maintenance and repair of historic materials and features rather than extensive replacement and new construction.

G. Reconstruct: To remove the existing item, replicate damaged or missing components, and reinstall in original position. The act or process of applying measures necessary to sustain the existing form, integrity, and materials of an historic property. Work, including preliminary measures to protect and stabilize the property, generally focuses upon the ongoing maintenance and repair of historic materials, and features rather than extensive replacement and new construction.

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

I. Refurbish: Clean, repair, lubricate and make other adjustments to components to ensure working operation.

J. Reinstall: To protect removed or dismantled item, repair and clean it as indicated for reuse, and reinstall it in original position, or where indicated.

K. Remove: Detach an item from existing construction to the limits indicated, using hand tools and hand operated power equipment, and legally dispose of it off-site, unless indicated otherwise.

L. Repair: To correct damage and defects, retain existing materials, features, and finishes while employing as little new material as possible. Includes patching, piecing-in, splicing, consolidating, or otherwise reinforcing or upgrading materials.

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

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

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

P. Restoration: The act or process of accurately depicting the form, features, and character of a property as it appeared at a particular period of time by means of the removal of features from other periods of its history and reconstruction of missing features from the restoration period.

Q. Restore: To consolidate, replicate, reproduce, repair, and refinish as required to achieve the indicated results.

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

S. Reversible: New construction work, treatments, or processes that can be removed

or undone in the future without damaging historic materials unless otherwise indicated.

T. Salvage: To protect removed or dismantled items and return to State. Salvaged items shall be stored on premise as determined by the State.

U. Stabilize: To provide structural reinforcement of unsafe or deteriorated items while maintaining the essential form as it exists at present; also, to reestablish a weather resistant enclosure.

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

1.04 SUBMITTALS

A. Submit the following:

1. Qualifications: Resume of all qualified personnel working on this project with a minimum of 5 years of experience with historic structures, and conservation work for wood doors and windows, paint and wall coverings. Provide applicable projects completed or in construction within the last 10 years and a current point-of-contact for identified references.

    a. Historic Steel Structure and Door Treatment Specialist: A qualified historic door specialist, with 5 years of experience in repairing steel structures and doors. Experience only in fabricating Steel structures and installing doors is insufficient.

    b. Historic-Painting: Provide qualified workers experienced in the preparation for painting of concrete and metal surfaces in historic structures. Submit documentation of 5 years of work of this type and a statement certified by the Contractor attesting that the experience and qualifications of the workers (journeymen) comply with the specifications.

1.05 QUALITY ASSURANCE

Qualified personnel are required to work on historical structures with essential competencies for Historical Craftsperson (Mason, Carpenter, Painter, etc.) of the Full Performance Level as outlined in the documents from the National Park Service, Training and Development Division.

A. Work Procedures:

Contractor and personnel performing work are to be familiar with and perform work in accordance with 36 CFR Part 68 and NPS-28, Cultural Resource Management Guidelines.

B. Regulatory Requirements:

Comply with notification regulations of authorities having jurisdiction before beginning removal and dismantling work. Comply with hauling and disposal regulations of authorities having jurisdiction.

C. Pre-Construction Conference:

Conduct conference on-site to review and coordinate all aspects of historical preservation.

D. Removal and Dismantling:

Inspect and discuss the condition of construction to be removed or dismantled. Review requirements of other work that relies on substrates exposed by removal and dismantling.

E. General:

Review methods and procedures related to historic restoration including, but not limited to, the following:

1. Review construction schedule: verify availability of materials, equipment, and facilities needed to make progress and avoid delays.
2. Review the qualifications of personnel assigned to the work and assign duties.
3. Review areas where existing construction is to remain and require protection.
4. Review areas where existing historic artifacts and furnishings are to remain and require protection.

1.06 DELIVERY, STORAGE AND HANDLING

A. Existing Conditions:

Do not proceed with removal or dismantling work if there are discrepancies between existing conditions and Drawings. Notify Engineer.

B. Hazardous Materials:

1. Hazardous materials may be present in construction affected by work.
2. Comply with 29 CFR 1926 and state and local regulations.

PART 2 – PRODUCTS

Not Used.

PART 3 – EXECUTION

3.01 PROTECTION

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

A. Temporary Protection of Historic Materials:

1. Protect existing historical materials with temporary protection and construction. Do not deface or remove existing materials.
2. Do not attach temporary protection to historic surfaces except as approved by the Engineer.

B. Fire Protection:

1. General: Follow fire-prevention plan and the following.

c. Remove and keep areas free of combustibles including rubbish, paper, waste, rags, and chemicals, except to the degree necessary for the

immediate work.

d. Prohibit smoking by all personnel within the project area.

C. Protection During application of Chemicals:

1. Protect motor vehicles, surrounding surfaces of building being restored, building site, plants, and surrounding buildings from harm or damage resulting from applications of chemicals cleaners and paint remover.
2. Do not apply chemicals during winds of sufficient force to spread them to unprotected surfaces.
3. Neutralize and collect alkaline and acid waste and legally dispose of off State's property.
4. Collect and dispose of runoff from chemical operations by legal means and in a manner that prevents soil contamination, soil erosion, undermining of paving and foundations, damage to landscaping, or water penetration into building interior.

3.02 HISTORIC TREATMENT

A. Historic Treatment Objectives:

1. Halt the process of deterioration and stabilize conditions unless otherwise indicated.
2. Retain as much existing material as possible; repair and consolidate rather than replace.
3. Use historically accurate repair and replacement materials and techniques unless otherwise indicated.
4. Use reversible processes wherever possible.
5. New work should be distinguishable to the trained eye, on close inspection, from the old.

B. Historic Treatment Procedures:

Follow the procedures in subparagraphs below in historic treatment program:

1. Contractor shall ensure coordination of all aspects of historical preservation with the Engineer.
2. Record existing work before each procedure (preconstruction) and progress during the work with digital documentation photographs.
3. Notify Engineer to consult with the Architectural Historian on physical changes in the integrity of materials or components whether due to environmental causes including biological attack, UV degradation, or due to structural defects including cracks, movement, or distortion. Do not proceed with the work in question until directed.
4. Use the least abrasive cleaning method to remove dirt, paint buildup and corrosion. Do not use high-pressure abrasive techniques, including sandblasting, other media blasting, or high-pressure power-washing.
5. Where missing features are indicated to be repaired or replaced, provide

features whose designs are based on accurate duplications rather than on conjectural designs, subject to approval.

6. Where work requires existing features to be removed or dismantled and reinstalled, perform these operations without damage to the material itself, to adjacent materials, or to the substrates.
7. Identify new and replacement materials and features with permanent mark hidden in the completed work to distinguish them from original materials. Record a legend of identification marks and the locations of the items on record Drawings.
8. Do not proceed with the use of products, under conditions which do not comply with the manufacturer's requirements without approval.

END OF SECTION

SECTION 01505

MOBILIZATION AND DEMOBILIZATION

PART 1 - GENERAL

1.1 GENERAL REQUIREMENTS

A. Description: This section covers the requirements for mobilization and demobilization.

1.2 MOBILIZATION: Mobilization shall consist of the transporting, assembling, constructing, installing, and making ready for use at the job site, all the equipment, machinery, structures, utilities, materials, labor, and incidentals necessary to do the work covered by this contract.

1.3 DEMOBILIZATION: Demobilization shall consist of the dismantling and removal of the above-mentioned equipment, machinery, structures, utilities, materials, and incidentals, and the cleaning up of the site.

PART 2 - PRODUCTS (NOT USED)

PART 3 - EXECUTION

3.1 GUIDELINES: If the Contractor utilizes private lands other than the sites provided by the Department for mobilization purposes, the provisions of this section shall apply, and the mobilization and demobilization work on said private lands shall be in accordance with the agreement between the Contractor and the land owner.

Any and all additional mobilization or demobilization costs in excess of the maximum amounts specified in the Proposal shall be included in the appropriate unit prices bid in the Proposal. The Contractor shall not receive any compensation for mobilization and demobilization in addition to those specified in the Proposal.

All equipment, machinery, buildings, utilities and incidentals mobilized and demobilized under this section shall remain the property of the Contractor.

END OF SECTION

SECTION 01530

BARRICADES

PART 1 - GENERAL

1.1 GENERAL REQUIREMENTS

A. Description. This work shall consist of furnishing, installing and maintaining barricades in accordance with the requirements of the contract.

Barricade application shall be provided for in the latest edition of the FHWA publication, Manual on Uniform Traffic Control Devices for Streets and Highways (MUTCD), and as amended.

PART 2 - PRODUCTS

2.1 MATERIALS

A. Lumber: Lumber for rails, frames and braces shall be dry, sound, undamaged, well seasoned, and free from any defect which may impair their strength and durability.

B. Hardware: Nails shall be galvanized wire nails. As many and as large a size as is practicable shall be used.

C. Paints: Paints shall be exterior enamel paint of the best grade or first line as made by approved manufacturers.

D. Sheet Reflecting Material: Sheet reflecting material shall conform to the applicable requirements of Subsection 712.20(C) of the "Standard Specifications for Road and Bridge Construction".

E. Alternate Designs: Alternate barricade designs such as plastic molded barricades may be used subject to the Engineer's approval. The Contractor shall submit shop drawings or catalog cuts for approval.

PART 3 - EXECUTION

3.1 CONSTRUCTION REQUIREMENTS

A. General: Barricades shall be constructed in a first class, workmanlike manner in accordance with details shown on the plans and as specified herein.

Barricades shall be in good condition and approved by the Engineer for use within the project limits. Barricade application and installation shall be as shown on the plans and as directed by the Engineer in accordance with the guidelines provided in the latest edition of the FHWA publication,

Manual on Uniform Traffic Control Devices for Streets and Highways (MUTCD), and any amendments or revisions thereof as may be made from time to time.

Sand bags or other approved weights shall be provided where required or as directed by the Engineer. Sand bags or other approved weights shall not be placed on any striped barricade rail.

Steady burn and/or flashing lamps shall be required on selected barricades used during hours of darkness. Locations shall be as shown on the plans and as directed by the Engineer. Lamps shall be attached on the barricade ends closest to the traveled way and shall be visible to the motorist.

Barricades furnished and paid for as provided for as provided herein may be used for temporary detours, construction phasing, or other temporary traffic control work.

Barricades furnished and paid for use in temporary detours or construction phasing may be used for permanent location called for on the plans.

Upon completion of the construction work, barricades shall be left in place, relocated, or removed and disposed of as shown on the plans or as directed by the Engineer. Barricades left in place, or relocated to new permanent locations shall become the property of the State. Barricades directed to be removed and disposed of shall become the property of the Contractor.

B. Painting: Wooden rails, frames and braces shall be given a prime coat and 2 finish coats of new white exterior enamel paint. Rail faces to be reflectorized may be left unpainted unless otherwise specified or directed.

C. Reflectorization: Reflectorization of barricade rails shall be done in a first class, workmanlike manner and the attachment of reflective sheeting shall be as shown on the plans, specified herein, or as directed and approved by the Engineer.

Both vertical faces of each barricade rail shall be reflectorized as shown on the plans.

Wooden rails shall be reflectorized with one of the following:

1. Reflective sheeting specified in Subsection 712.20(C)(4) of the "Standard Specifications for Road and Bridge Construction" and backed with a 26 gage galvanized steel sheet, or

2. a hardened aluminum backed reflective sheeting as specified in Subsection 712.20(C)(5) of the "Standard Specifications for Road and Bridge Construction."

D. Color: Rails, frames and braces shall be white.

The front and back faces of barricade rails shall have 6-inch wide alternative colored and white striped sloping downward toward the traveled way at an angle of 45 degrees with the vertical. The colored stripes shall be either orange or red in accordance with the following requirements:

1. Orange and white stripes shall be used in the following conditions:

   a. Construction work.

   b Detours.

   c. Maintenance work.

2. Red and white stripes shall be used in the following conditions:

   a. On roadways with no outlet (ie. dead-ends, cul-de-sacs).

   b. Ramps or lanes closed for operational purposes.

   c Permanent or semipermanent closure or termination of a roadway.

E. Maintenance: Barricades shall be kept in good condition throughout their usage during construction until the end of the contract.

F. The Contractor shall repair, repaint, clean or replace the barricades as required and as directed by the Engineer to maintain their effectiveness and appearance.

The Constructor shall immediately replace all lost, stolen or damaged barricades, lamps, sand bags and other approved weights.

Barricades used during construction phasing, temporary detours or other temporary traffic control work shall be cleaned and repaired as necessary, prior to being relocated to a permanent location shown on the plans or as directed.

No extra payment will be made for any repair work, repainting, or cleaning of barricades. The Engineer shall determine the suitable condition of each barricade and shall determine when each barricade shall be repaired, repainted or cleaned.

END OF SECTION

SECTION 01567

POLLUTION CONTROL

PART 1 - GENERAL

1.1 GENERAL REQUIREMENTS

A. Rubbish Disposal

1. No burning of debris and/or waste materials shall be permitted on the project site.

2. No burying of debris and/or waste material except for materials which are specifically indicated elsewhere in these specifications as suitable for backfill shall be permitted on the project site.

3. All unusable debris and waste material shall be hauled away to an appropriate off-site dump area. During loading operations, debris and waste materials shall be watered down to allay dust.

4. No dry sweeping shall be permitted in cleaning rubbish and fines which can become airborne from floors or other paved areas. Vacuuming, wet mopping or wet or damp sweeping is permissible.

5. Enclosed chutes and/or containers shall be used for conveying debris from above to ground floor level.

6. Clean-up shall include the collection of all waste paper and wrapping materials, cans, bottles, construction waste materials and other objectionable materials, and removal as required. Frequency of clean-up shall coincide with rubbish producing events.

B. Dust

1. The Contractor shall prevent dust from becoming airborne at all times including non-working hours, weekends and holidays in conformance with the State Department of Health, Administrative Rules, Title 11, Chapter 60 - Air Pollution Control.

2. The method of dust control and costs shall be the responsibility of the Contractor. Methods of dust control shall include the use of water, chemicals or asphalt over surfaces which may create airborne dust.

3. The Contractor shall be responsible for all damage claims in accordance with Section 7.16 - "Responsibility for Damage Claims" of the GENERAL CONDITIONS.

C. Noise

1. Noise shall be kept within acceptable levels at all times in conformance with the State Department of Health, Administrative Rules, Title 11, Chapter 46 - Community Noise Control for Oahu. The Contractor shall obtain and pay for the Community Noise Permit from the State Department of Health when the construction equipment or other devices emit noise at levels exceeding the allowable limits.

2. All internal combustion engine-powered equipment shall have mufflers to minimize noise and shall be properly maintained to reduce noise to acceptable levels.

3. Pile driving operations shall be confined to the period between 9:00 a.m. and 5:30 p.m., Monday through Friday. Pile driving will not be permitted on weekends and legal State and Federal holidays.

4. Starting-up of construction equipment meeting allowable noise limits shall not be done prior to 6:45 a.m. without prior approval of the Engineer. Equipment exceeding allowable noise levels shall not be started-up prior to 7:00 a.m.

D. Erosion

1. During interim grading operations, the grade shall be maintained so as to preclude any damage to adjoining property from water and eroding soil.

2. Temporary berms, cut-off ditches and other provisions which may be required because of the Contractor's method of operations shall be installed at no cost to the State.

3. Drainage outlets and silting basing shall be constructed and maintained as shown on the plans to minimize erosion and pollution of waterways during construction.

E. Others

1. Wherever trucks and/or vehicles leave the site and enter surrounding paved streets, the Contractor shall prevent any material from being carried onto the pavement. Waste water shall not be discharged into existing streams, waterways, or drainage systems such as gutters and catch basins unless treated to comply with the State Department of Health water pollution regulations.

2. Trucks hauling debris shall be covered as required by PUC Regulation. Trucks hauling fine materials shall be covered.

3. No dumping of waste concrete will be permitted at the job-site.

4. Except for rinsing of the hopper and delivery chute, and for wheel washing where required, concrete trucks shall not be cleaned on the job-site.

5. Except in an emergency, such as a mechanical breakdown, all vehicle fueling and maintenance shall be done in a designated area. A temporary berm shall be constructed around the area when runoff can cause a problem.

6. When spray painting is allowed such spray painting shall be done by the "airless spray" process. Other types of spray painting will not be allowed.

F. Suspension of Work

1. Violations of any of the above requirements or any other pollution control requirements which may be specified in the Technical Specifications herein shall be cause for suspension of the work creating such violation. No additional compensation shall be due the Contractor for remedial measures to correct the offense. Also, no extension of time will be granted for delays caused by such suspensions.

2. If no corrective action is taken by the Contractor within 72 hours after a suspension is ordered by the Engineer, the State reserves the right to take whatever action is necessary to correct the situation and to deduct all costs incurred by the State in taking such action from monies due the Contractor.

3. The Engineer may also suspend any operations which he feels are creating pollution problems although they may not be in violation of the above-mentioned requirements. In this instance, the work shall be done by force account as described in Subsection 4.2b -"Additional Work" of the GENERAL CONDITIONS and paid for in accordance with Subsection 8.4b - "Force - Account Work" therein. The count of elapsed working days to be charged against the contract in this situation shall be computed in accordance with Subsection 7.18 - "Contract Time" of the GENERAL CONDITIONS.

PART 2 - PRODUCTS (NOT USED)

PART 3 - EXECUTION (NOT USED)

END OF SECTION

SECTION 01570 – SOIL EROSION CONTROL

PART 1 - GENERAL

2.01 RELATED DOCUMENTS

A. Related Work Described Elsewhere:

1. Erosion Control Plan

2.02 DESCRIPTION

A. Work under this section consists of furnishing all labor, materials and equipment required to complete the approved Erosion Control Plan per Federal, State and County Code requirements and as shown in the Drawings, the temporary control measures as required by these Specifications, or as ordered by the Project Manager during the life of the Contract to control dust and water pollution. Control of dust and water pollution shall be accomplished using silt fences, stabilized construction entrance/exit, dust fences, watering, filter socks, and/or other erosion control devices or methods.

B. Temporary erosion and sedimentation control measures as described herein shall be applied to any erodible material within this project, including local material sources, stockpiles and work areas.

C. The Contractor shall be responsible for removing all silt and debris resulting from his work and deposited in drainage facilities, roadways, neighboring lands, and other areas.

D. All costs incurred in complying with the provisions of this Section shall be borne by the Contractor.

2.03 SUBMITTALS

A. Best Management Practice (BMP) Plan: The Contractor shall provide a letter indicating conformance to the Erosion Control Plan as shown in the Drawings or provide a written, site-specific BMP describing activities to minimize water pollution and soil erosion into City and State waters and/or drainage systems. The BMP shall conform to the requirements of the State's and County's Specification.

PART 2 - PRODUCTS

2.01 MATERIALS

A. The following are standard, traditional approaches; contractor to provide these at a minimum along with additional facilities to comply with standards and codes. Runoff to adjacent properties shall be strictly prohibited and controlled.

1. Silt fences shall be constructed with an ultraviolet (UV) resistant geotechnical filter fabric, stapled or secured to wood or metal posts embedded into the ground.

2. Snake bags shall be constructed with a UV resistant geotechnical filter fabric filled with gravel.

3. Filter socks shall be constructed with a UV resistant geotechnical filter fabric, filled with an Environmental Protection Agency (EPA) or State Department of Health (DOH) acceptable compost material.

4. Dust fence shall be 8-feet high with galvanized pipe posts and tension wires. The dust fence cloth shall be a UV resistant fabric, hunter green in color.

5. Stabilized construction entrance/exit shall be constructed with 1-inch to 3-inch course aggregate, 8-inches minimum thickness over a geotechnical filter fabric.

6. Mulches may be bagasse, hay, straw, fiber mats, netting, wood cellulose, bark, wood chips, or other suitable material acceptable to the Project Manager and shall be reasonably clean and free of noxious weed and deleterious materials.

7. Mulch shall be specially processed fiber containing no growth or germination inhibiting factors. It shall be such that after addition and agitation in the hydraulic equipment with seed, fertilizer, water and other additives not detrimental to plant growth, the fibers will form a homogeneous slurry. When hydraulically sprayed on the soil, the fibers shall form a blotter-like ground cover which readily absorbs water and allows infiltration to the underlying soil. In every application, complete coverage of the soil shall be attained. Mulch shall be applied at the minimum rate of 1,500 pounds per acre.

B. Slope drains may be constructed of pipe, fiber mats, rubble, Portland cement concrete, bituminous concrete, plastic sheets, or other material acceptable to the Project Manager.

C. Grass shall be a quick growing species (such as rye grass, Italian rye grass, or cereal grasses) suitable to the area and which provide a temporary cover that does not later compete with the permanent cover.

1. The grass shall be obtained by digging up luxuriant growths from areas that are free of seeds, roots, plants, and grasses that are foreign to the specified grass. The grass will not be acceptable unless it is planted and watered within 24 hours after being dug out from its original growing position.

2. Seed for hydro-mulching, unless otherwise specified, shall be Bermuda (Cynodon Dactylon) except giant varieties, certified, meeting the following requirements:

Pure Seed	95% minimum
Crop Seed	1% maximum
Weed	0.5% maximum
Inert Material	5% maximum
Germination	85% minimum

1. The seeds shall be applied at the rate of 100 pounds per acre (minimum) and within twelve (12) months of the date of the certified germination test.

D. Fertilizer

1. Fertilizer and soil conditioners shall be a standard commercial grade acceptable to the Project Manager.

2. The Contractor shall be responsible to determine the proper fertilizer required in the hydro-mulch mix for the existing soil condition. He shall be responsible to decide the quantity and the analysis and ratio to insure sufficient nutrients for the sustained growth of the grass.

PART 3 -EXECUTION

3.01 INSTALLATION

A. The Contractor shall install all erosion control measures shown in the Drawings, including stabilized construction entrance/exit, silt fences and dust fences, before any clearing, grubbing or earth moving work is initiated. The erosion control measures may be modified as necessary to adjust to field conditions that develop as the construction work progresses.

B. Except for specified erosion control measures shown in the Drawings, the Contractor shall determine additional erosion control measures to use as the construction work progresses. Such measures may involve scheduling of the construction activities to minimize the erosion potential, the construction of temporary berms, dikes, dams, sediment basins, and slope drains, and the use of temporary mulches, mats, and grassing, or the construction and use of other control devices or methods as necessary to control erosion.

3.02 MAINTENANCE AND INSPECTION

All erosion control measures shall be checked, maintained, cleaned and repaired throughout the duration of the construction period. As a minimum, erosion control measures should be checked weekly in dry periods and within twenty-four hours after any rainfall of 0.5 inches or greater within a 24-hour period. During prolonged rainfall, the erosion control measures should be checked daily. If heavy rains are projected, all erosion control measures should be inspected immediately and reinforced as necessary.

3.03 OPERATIONS

A. The maximum surface area of earth material exposed by clearing, grubbing, borrow and fill operations at any time is 15 acres. The Engineer has the authority to limit the surface area exposed by clearing and grubbing and to limit the surface area exposed by excavation, borrow and fill operations. The Engineer may also direct the Contractor to provide immediate, permanent, or temporary pollution control measures to prevent contamination of drainage channels and pipes, roads, neighboring lands, and other areas.

B. The Contractor shall limit the surface area exposed by grubbing, stripping of topsoil, and grading to that which is necessary for to perform the next operation and which is within his capability and progress in keeping the finish grading, mulching, grassing, and other such pollution control measures current.

C. The Contractor shall conduct his operations so that excavation, embankment and imported materials shall be dampened with water on a continual basis to prevent dust problems. The Contractor shall limit the amount of water sprayed for dust control to ensure that the water evaporates or infiltrates with no runoff.

D. The Contractor shall, at the end of each work operation in any one day, shape the earthwork in such a manner as to control and direct the runoff of rainwater to minimize the erosion of soils. He shall construct earth berms along the top edges of embankments or along any critical area within the project, such as along the property line with adjacent properties, streams, and water channels, to intercept any runoff. Temporary slope drains shall be provided to carry runoff from the top of cuts and fills. Temporary facilities for controlled discharges shall be provided for runoff

impounded, directed, or controlled by project activities or by any erosion control measure employed.

E. Cut and fill slopes shall be shaped, covered with topsoil and planted, if necessary or shown on the Drawings, as the work progresses. Whenever major earthwork is suspended or halted and the slope is bared, the exposed surfaces shall be hydro-mulch seeded or protected as directed by the Project Manager at the Contractor's expense without cost to the State.

3.04 MATERIALS

Construction of berms, cofferdams, or other such construction in or near the vicinity of waterways, or other bodies of water shall be of approved materials.

3.05 DAMAGES

Damages caused by the erosion of soils and the pollution of downstream areas shall be the responsibility of the Contractor and all costs for repairing, correcting, replacing, and cleaning such damaged or polluted facilities shall be borne by the Contractor.

3.06 GRASSING

Grassing for erosion control of erodible areas can be undertaken by sprigging, matting or hydro-mulch seeding.

A. Sprigging or Matting

1. Ground Preparation: Prior to planting, the areas to be grassed shall be cleared of all unwanted plants (including their root systems), stones over three (3) inches in diameter, papers, trash and debris.

2. If the existing soil in the areas to be grassed is suitable for use as topsoil, the soil shall be scarified to a depth of six (6) inches from the finished surface, and worked until it is of a uniform and loose texture.

3. Areas unsuitable for planting shall be finished with a 4-inch layer of topsoil, spread and graded to conform to the finish grade shown on the Drawings.

4. Planting: Planting shall be by sprigging, matting, or other methods at the option of the Contractor. If planting is by sprigging or matting, the surface shall be rolled with a suitable lawn roller after planting has been completed.

5. Water shall be applied within the same day of planting in such quantities as to moisten the soil to the depth of the planted grass. Additional application shall be made so that the planted areas are continually kept damp to the grass depth and until the commencement of plant establishment work.

6. Fertilizer shall be applied at not less than the rate of 300 pounds per acre, 23 to 30 days after the grass has been planted.

F. Hydro-Mulch Seeding

1. The Contractor shall begin hydro-mulch seeding operations after the areas prepared or designated for seeding have been approved by the Project Manager. Approval shall include inspection of slopes to insure provision has been made for the collection and disposal of surface water to protect planted areas from erosion. Approval shall not relieve the Contractor of his

responsibility to restore any damage to the slope or planted areas not yet accepted by the State.

2. The hydro-mulch equipment shall be capable of mixing all the necessary ingredients to a uniform mixture and of applying the slurry to provide uniform coverage. Seed, fertilizer, and mulch mix shall be applied in one operation by approved hydraulic equipment.

3. Areas inaccessible to hydro-mulching application shall be seeded, fertilized and mulched by hand methods.

4. Water shall be applied immediately following mulching in such quantities as to moisten the soil and mulch. Watering shall be continued in such manner, quantity, and frequency to insure proper germination and growth and shall be done in a way that will prevent erosion and will not cause damage to the planted areas.

END OF SECTION

SECTION 01581

PROJECT SIGN

PART 1 - GENERAL

1.1 GENERAL REQUIREMENTS

Furnish all labor, materials and equipment necessary to construct and install all project sign as specified hereinafter.

1.2 SUBMITTAL

The contractor shall provide the Engineer with six (6) shop drawings of the project sign for review and approval by the Engineer prior to ordering the sign.

1.3 LETTER STYLE

Copy is centered and set in Adobe Type Futura Heavy. If this specific type is not available, Futura Demi Bold may be substituted. Copy should be set and spaced by a professional typesetter and enlarged photographically for photo stencil screen process.

1.4 ART WORK

Constant elements of the sign layout - frame, outline, stripe, and official state information - may be duplicated following drawing measurements, or be reproduced and enlarged photographically using a layout template if provided. The "STATE OF HAWAII" masthead should be reproduced and enlarged as specified, using the artwork provided.

1.5 TITLES

The specific major work of the project under construction is emphasized by using 3-3/4" type, all capitals. Secondary information such as location or buildings uses 2-1/4" type, all capitals. Other related information of lesser importance uses letter heights as indicated on 01581-3, upper / lower case letters.

Design should follow the example on page 01581-3.

PART 2 - PRODUCTS

2.1 MATERIALS

A. LUMBER

1. Panel is 3/4" exterior grade high density overlaid plywood, with resin-bonded surfaces on both sides.
2. 4"x4" sign posts shall be Douglas Fir No. 1 or better.

B. PAINTS & INKS

Screen print inks are matte finish. Paints are satin finish, exterior grade. References to Ameritone Color Key Paint are for color match only.

COLOR:	1.	1BL10A	Bohemian Blue
	2.	2H16P	Softly (White)
	3.	2VR2A	Hot Tango (Red)
	4.	1M52E	Tokay (Gray)

C. CONCRETE

Concrete shall be class B with a 2,500 psi 28-day compressive strength.

PART 3 - EXECUTION

3.1 GENERAL

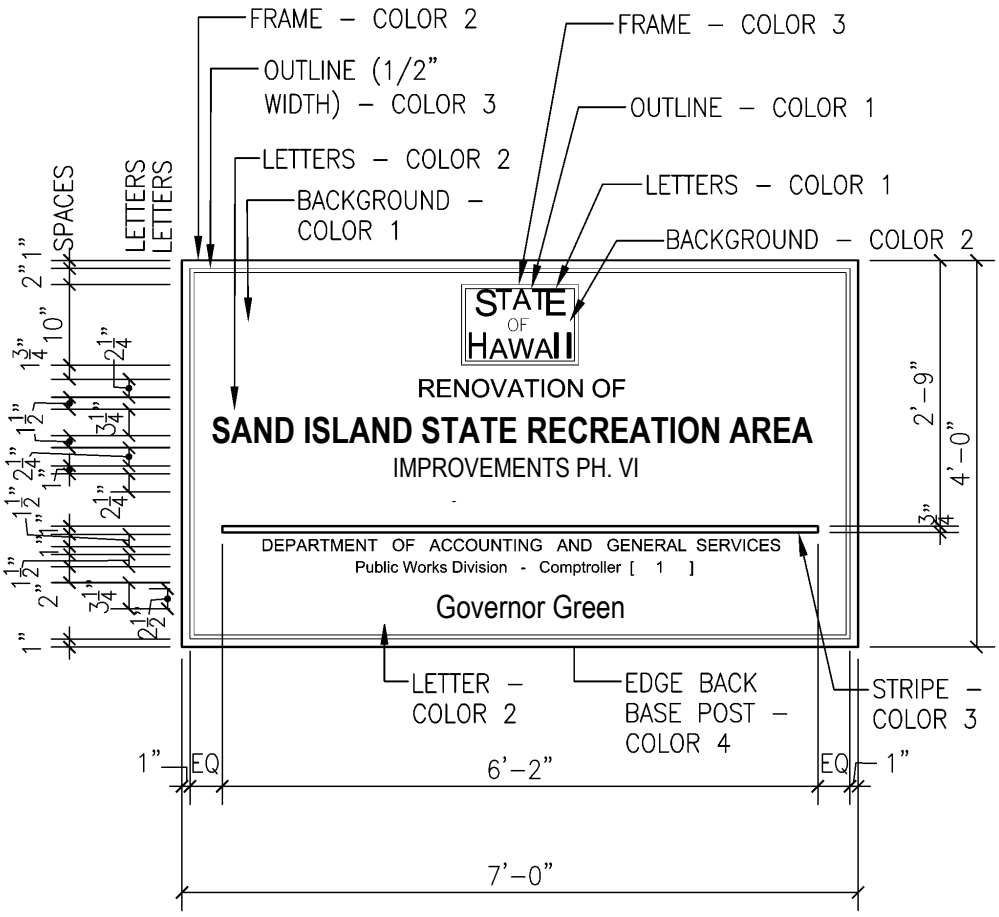
A. The Project Sign shall be constructed with new materials as specified above.

B. The Project sign shall be installed at the location indicated on the drawings or as designated by the Engineer. The project sign shall be erected upon commencement of work.

3.2 MEASUREMENTS AND PAYMENT

The construction of the project sign, including all equipment, labor and material necessary to furnish and install the project sign will be paid for under the "Project Sign" proposal item.

END OF SECTION



[1] Comptroller's First, Middle Initial and Last Name
[2] Governor's First, Middle Initial and Last Name

A
TG 01500

PROJECT SIGN LAYOUT

SCALE: NTS

SECTION 01715 - EXISTING CONDITIONS - ASBESTOS / LEAD / HAZARDOUS MATERIAL SURVEY

PART 1 - GENERAL

1.01 SUMMARY

A. This section includes the results of the State's survey for Asbestos, Lead and/or other hazardous materials and is provided for the Contractor's information.

B. Related Sections include the following: SECTION 13282 - LEAD PAINT CONTROL MEASURES for all work which disturbs lead.

1.02 ASBESTOS

A. The structure or structures to be renovated or modified under this contract were surveyed for the presence of asbestos containing building materials (ACBM), using AHERA requirements. A copy of the initial survey report, as well as any subsequent supplemental survey report(s) if performed, are 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(s) for the basis on which the negative ACBM finding was made. Contractor may perform further surveys at its own expense, if ACBM not shown in the report(s) is suspected in the areas of the building(s) 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 of the presence of asbestos in the existing buildings in accordance with the State of Hawaii: Occupational Safety and Health Administration and 29 CFR 1926.1101, Asbestos.

C. In the event that work is required in any building or buildings on the site other than the one(s) 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.

1.03 LEAD

A. Inform employees, Subcontractors and all other persons engaged in the project that lead containing material is present in the existing building(s) and at the job site. Follow the requirements of 29 CFR 1926.62 Lead.

B. Review the attached lead testing data which identify locations of lead containing material was found. Lead testing was for design purposes only, and the results do not satisfy any of the requirements of 29 CFR 1926.62 Lead.

1.04 POLYCHLORINATED BIPHENYLS (PCBs)

A. The suspect materials were tested for the presence of PCBs. None of the samples had detectable levels of PCBs.

B. Review the attached PCB testing data where negative determination was made.

PART 2 - PRODUCTS (Not Used)

PART 3 - EXECUTION

3.01 SURVEY attached

A. Limited Hazardous Material Survey, Sand Island State Recreation Area, Various Historic Structures, Honolulu, Hawaii, 53 pages, dated October 2025, prepared by EnviroQuest, Inc.

END OF SECTION

EnviroQuest

SERVICES

HAZMAT Inspections

Remediation Design

Asbestos Management

Lead Management

Lead Risk Assessment

Industrial Hygiene

Indoor Air Quality

Mold Assessment

Environmental Site Assessments

Subsurface Investigation

Water Sampling

Asbestos Training

Lead Training

OSHA Training

OSHA Compliance

LIMITED HAZARDOUS MATERIAL SURVEY

SAND ISLAND STATE RECREATION AREA
VARIOUS HISTORIC STRUCTURES
HONOLULU, HAWAII

EnviroQuest Project: 304626

October 2025

Prepared for:

Group 70 International
111 S. King Street, Suite 170
Honolulu, HI 96813

Prepared by:

EnviroQuest, Inc.
98-029 Hekaha Street, Suite 21
Aiea, Hawaii 96701

Daniel Lewis Jr.
Asbestos and Lead Inspector

David Leigh
PM/CIH

TABLE OF CONTENTS

TABLES

APPENDICES

1 INTRODUCTION

A limited hazardous building material survey (HBMS) was conducted on October 6, 2025, at the Sand Island State Recreation area, Honolulu, Hawaii.

The purpose of the activities under this project was to perform an inspection to identify hazardous materials including asbestos containing materials (ACMs); paint containing lead; and polychlorinated biphenyls (PCBs) that may be encountered during the various repair/renovation work.

1.1 SITE LOCATION

The inspection was limited to the structures listed below.

- Anti-Aircraft Gun Emplacement Tower
- Harbor Entrance Control Post Tower
- Cable Hut (Train)
- Air Raid Shelter (Train Station)
- Bunkers
- Asphalt walkway

2 ASBESTOS

Thirty samples were collected from suspect asbestos-containing materials.

2.1 METHODOLOGY

A visual inspection for suspect ACM and homogeneous areas (areas that have uniform color, texture, and appearance) was conducted. Suspect materials were divided into three Environmental Protection Agency (EPA) categories:

- Surfacing Materials (sprayed or troweled-on materials)
- Thermal Systems Insulations (materials generally applied to various mechanical systems)
- Miscellaneous Materials (any materials which do not fit in the above categories)

Sampling methodology generally followed the procedures presented in EPA 40 CFR 763 *Asbestos* Subpart E *Asbestos Containing Materials in Schools* and Hawaii Department of Health (HDOH), Hawaii Administrative Rules (HAR) Titles 11-501 *Asbestos Requirements* and 11-502 *Asbestos Containing Materials in Schools*.

While sampling locations were selected randomly to represent homogenous materials, sampling was confined to materials which were readily accessible and did not involve the destruction of physical barriers.

2.2 RESULTS

Samples were submitted to Hawaii Analytical Laboratory (HAL), LLC, in Honolulu, Hawaii, a National Voluntary Laboratory Accreditation Program (NVLAP) accredited laboratory. The samples were analyzed by polarized-light microscopy (PLM), following EPA Method 40 CFR 763, Appendix E to Subpart E *Interim Method of the Determination of Asbestos in Bulk Insulation Samples and EPA 600/R-93-116 Method for Determination of Asbestos in Bulk Building Materials.* HAL is also registered to provide asbestos laboratory services in Hawaii under HDOH 11-504 *Asbestos Abatement Certification Program*.

Based on the laboratory analytical results, asbestos was not identified in the samples. The National Emission Standard for Hazardous Air Pollutants (NESHAP), 40 CFR 61 Part M, defines ACM as those which contain greater than 1% asbestos. In accordance with NESHAP requirements, samples consisting of distinct layers of materials were analyzed and reported separately by the laboratory. A summary of the data is presented in Table 1.

Refer to the accompanying appendices for the laboratory analytical report and photographs.

3 LEAD

Twenty paint film samples were collected from painted or coated materials.

3.1 METHODOLOGY

A visual inspection for painted or coated building surfaces was conducted. Sampling methodology generally followed the procedures presented in the U.S. Department of Housing and Urban Development's document *Guidelines for the Evaluation and Control of Lead-Based Paint Hazards in Housing*, EPA 40 CFR 745 *Lead-Based Paint Poisoning Prevention in Certain Residential Structures,* and ASTM E1729 *Standard Practice for Field Collection of Dried Paint Samples for Subsequent Lead Determination.*

3.2 RESULTS

Samples were submitted to HAL, an American Industrial Hygiene Association (AIHA) accredited laboratory with a specific accreditation for lead analysis under the AIHA Environmental Lead Laboratory Accreditation Program. The paint film samples were analyzed by NIOSH Method 7082m, *Flame Atomic Absorption Spectroscopy*.

Based on the laboratory analytical results, two of the 20 samples exceeded the EPA guidelines for lead in paint. The EPA defines lead-based paint as paint or other coatings containing lead equal to or in excess of 0.5% lead by weight. Lead at concentrations below the EPA guidelines were also detected in various other paints/coatings. For the purpose of this report, these paints are identified as paint with lead (PWL), paint having lead concentration greater than the laboratory detection limit but less than 0.5% lead by weight. A summary of the data is presented in Table 2.

Refer to the accompanying appendices for the laboratory analytical report and photographs.

4 POLYCHLORINATED BIPHENYLS IN BULK MATERIALS

Nine samples were collected from suspect PCB-containing materials.

4.1 METHODOLOGY

The various paints were located and sampled in general accordance with lead paint sampling techniques.

4.2 RESULTS

The samples were submitted to Enthalpy Analytical laboratory in Orange, California for preparation by EPA Method 3546, *Microwave Extraction.* The samples were then analyzed by EPA Method 8082, *Polychlorinated Biphenyls by Gas Chromatography.*

PCBs were not detected in the samples. A summary of the data is presented in Table 3.

Refer to the accompanying appendices for the laboratory analytical report and photographs.

5 SUMMARY

The materials sampled and the areas inspected were specific to this project.

5.1 ASBESTOS

Asbestos was not identified in the samples collected.

5.2 LEAD

The listed components were coated with lead.

Location	Building Component	Color	LBP_1	PWL_2
Harbor Entrance control post Tower	Structural metal frame	Lime green/orange and brown	Y	-
Bunkers	Metal door and frame	Brown/orange	Y	-
	Concrete and CMU enclosure wall	Brown/maroon	N	Y
	Concrete entrance and steps	Green	N	Y
Cable hut (train)	Concrete wall	Yellow/red	N	Y
	Concrete wheel	Green/yellow	N	Y
Air raid shelter (train station)	Wood wall lattice	Red	N	Y
	Wall base concrete platform	Black/yellow/red	N	Y
	Wood beam/frame	Yellow/green	N	Y
Anti-aircraft gun emplacement tower	Concrete column	Green	N	Y
	Concrete ceiling and floor	Brown	N	Y
	Wood railing	Brown	N	Y

1. LBP = >0.5% lead by weight
2. PWL = >laboratory detection limits but <0.5% lead by weight

Prior to the disturbance to any paint with lead, the contractor's employees disturbing the paint must be informed that it contains lead. Any work disturbing this paint must be conducted in accordance with 29 CFR 1926.62 *Lead*.

If lead paint chip or waste is generated during the renovation work, composite samples of the generated waste must be collected for *Toxicity Characteristic Leaching Procedure* (TCLP) analysis for waste disposal characterization. EPA 40 CFR Part 261, *Identification and Listing of Hazardous Waste* allows a maximum concentration of lead contaminant by TCLP at 5.0 mg/L. TCLP results exceeding the 5.0 mg/L threshold requires the material to be disposed of as hazardous waste. Results below this threshold allow for the lead waste to be disposed of as construction debris.

5.3 POLYCHLORINATED BIPHENYLS IN BULK MATERIALS

PCBs were not identified in the samples collected.

6 LIMITATIONS

The information set forth is based solely on the agreed upon scope of services, on personal observation, laboratory data, and information provided by G70 International.

Although this inspection provides information on the relative presence or absence of asbestos-containing materials, lead in paints and polychlorinated biphenyls, it should not be construed as a final statement that all hazardous materials have been identified.

Given the often obscure and elusive nature of hazardous materials, it is never possible to absolutely dismiss the possibility of additional hazardous materials. EnviroQuest, Inc. expressly disclaims any and all liability, representations, expressed or implied, contained in, or for omission from this report, or any other written or oral communication which might be interpreted as establishing the total extent of all liability present at the subject property.

Our services have been performed with usual thoroughness and competence of the consulting profession, in accordance with the standard of professional services at this time. No other warranty or representation, either expressed or implied is included or intended.

Any question regarding our work and this report, the presentation of the information, and the interpretation of the data are welcome and should be referred to the undersigned. EQI greatly appreciates this opportunity to assist you with your industrial hygiene needs. We look forward to working with you again in the future.

TABLE 1: ASBESTOS SAMPLE SUMMARY

Homogeneous Material	% Asbestos[2]	ACM (Y/N)[1]	Sampling Location	Sample ID	Friable (Y/N)	Condition[3]	Photo No.
Concrete	ND	N	Harbor entrance control post tower, stair	304626-01A	N	D	4
	ND	N		304626-02A			
	ND	N		304626-03A			
Rock/grout	ND	N	Harbor entrance control post tower, stair, wall	304626-04A	N	D	4
	ND	N		304626-05A			
	ND	N		304626-06A			
Concrete	ND	N	Bunkers, entrance	304626-07A	N	D	7, 8
	ND	N		304626-08A			
	ND	N		304626-09A			
Brown painted CMU and concrete	ND	N	Bunker, enclosure wall	304626-10A	N	SD	10
	ND	N		304626-11A			
	ND	N		304626-12A			
Asphalt/concrete	ND	N	Walkway	304626-13A	N	SD	12
	ND	N		304626-14A			
	ND	N		304626-15A			
Red/yellow painted concrete	ND	N	Cable hut (train), wall	304626-16A	N	G	13
	ND	N		304626-17A			
	ND	N		304626-18A			
Yellow/black painted concrete	ND	N	Air raid shelter (train station), platform	304626-19A	N	G	19
	ND	N		304626-20A			
	ND	N		304626-21A			
Brown painted concrete	ND	N	Anti-aircraft gun emplacement tower, floor	304626-22A	N	D	24
	ND	N		304626-23A			
	ND	N		304626-24A			
Green painted concrete	ND	N	Anti-aircraft gun emplacement tower, column2	304626-25A	N	D	24
	ND	N		304626-26A			
	ND	N		304626-27A			
Brown painted concrete	ND	N	Anti-aircraft gun emplacement tower, ceiling	304626-28A	N	D	25
	ND	N		304626-29A			
	ND	N		304626-30A			

1. *ACM= >1.0% asbestos content*
2. *ND = Not Detected; C=Chrysotile; A=Amosite; Cr=Crocidolite; An=Anthophyllite; T=Tremolite; Ac=Actinolite*
3. *Good (G); Damaged (D) <10% distributed or 25% localized; Significant Damage (SD) >10% distributed or 25% localized*

TABLE 2: LEAD SAMPLE SUMMARY

Paint Color	LBP[1] (Y/N)	PWL[2] (Y/N)	Paint Sample Location	Sample ID	Results (% weight)	Condition[3,4]	Photo No.
Lime green/orange/brown	Y	-	Harbor entrance control post tower, structural metal frame	304626-01L	5.3	Poor	2, 3
Green	N	Y	Bunker, concrete entrance wall	304626-02L	0.0073	Poor	7
Brown/maroon	N	Y	Bunker, concrete and CMU wall	304626-03L	0.006	Poor	10
Purple	N	N	Bunker, concrete enclosure wall	304626-04L	<0.004	Intact	11
Brown/orange	Y	-	Bunker, side entrance metal door	304626-05L	1.8	Poor	9
Green	N	Y	Bunker, concrete steps	304626-06L	0.028	Poor	7
Yellow/red	N	Y	Cable hut (train), concrete wall	304626-07L	0.022	Fair	13
Green/yellow	N	Y	Cable hut (train), concrete wheel	304626-08L	0.02	Fair	14
Brown/yellow	N	N	Cable hut (train), wood stairs	304626-09L	<0.004	Poor	15
Black	N	N	Cable hut (train), metal railing	304626-10L	<0.004	Poor	15
Black/green	N	N	Cable hut (train), steam stack	304626-11L	<0.004	Poor	17
Green	N	N	Cable hut (train), wood post and beam	304626-12L	<0.004	Fair	18
Brown	N	N	Cable hut (train), concrete floor	304626-13L	<0.004	Poor	16
Red	N	Y	Air raid shelter (train station), wood wall lattice	304626-14L	0.0063	Poor	20
Black/yellow/red	N	Y	Air raid shelter (train station), base concrete platform	304626-15L	0.006	Poor	21
Yellow	N	N	Air raid shelter (train station), concrete wall.	304626-16L	<0.004	Poor	20
Yellow	N	Y	Air raid shelter (train station), wood beam	304626-17L	0.0071	Fair	22
Green	N	Y	Anti-aircraft gun emplacement tower, concrete column.	304626-18L	0.047	Poor	24
Brown	N	Y	Anti-aircraft gun emplacement tower, wood wall/railing	304626-19L	0.03	Poor	25
Brown	N	Y	Anti-aircraft gun emplacement tower, concrete floor and ceiling	304626-20L	0.094	Poor	24, 25

1. LBP = >0.5% lead by weight
2. PWL = >laboratory analytical detection limit but <0.5%
3. Exterior: Intact – Entire surface is intact; Fair - $\leq$ 10ft^2; Poor - >10 ft^2
4. Interior: Intact – Entire surface is intact; Fair - $\leq$ 2ft^2 or $\leq$ 10%; Poor - >2 ft^2 or >10%

TABLE 3: POLYCHLORINATED BIPHENYLS SAMPLE SUMMARY

Material	Int/Ext	PCB[1] (Y/N)	Sample Location	Sample ID	Results[2] (mg/kg)	Photo No.
Lime green/orange/brown paint	Ext	N	Harbor entrance control post tower, structural metal frame	304626-01P	ND	2, 3
Green paint	Ext	N	Bunkers, entrance concrete wall	304626-02P	ND	7
Brown/maroon paint	Ext	N	Bunkers, concrete and CMU wall	304626-03P	ND	10
Purple paint	Ext	N	Bunkers, enclosure concrete wall	304626-04P	ND	11
Brown paint	Ext	N	Bunkers, metal entrance door	304626-05P	ND	9
Green Paint	Ext	N	Bunkers, concrete steps	304626-06P	ND	7
Yellow/red/green/black/brown paints	Ext	N	Cable Hut (train), concrete, metal and wood painted components	304626-07P	ND	13, 14, 15, 16, 17, 18
Red/black/green/yellow paints	Ext	N	Air raid shelter (train station), concrete and wood painted components	304626-08P	ND	20, 21, 22
Green and brown paints	Ext	N	Anti-aircraft gun emplacement tower, concrete and wood painted components	304626-09P	ND	24, 25

1. PCB = >laboratory detection limit
2. ND = None Detect

EnviroQuest

APPENDIX A

REFERENCE PHOTOGRAPHS

Photo 1: Sand Island State Recreation Area, Various Historic Structures

Harbor entrance control post tower.

Photo 2: Sand Island State Recreation Area, Various Historic Structures

Harbor entrance control post tower.

Lime green over orange and brown lead-based paint on the structural frame.

PCBs were not detected in the paint/coating.

Photo 3: Sand Island State Recreation Area, Various Historic Structures

Harbor entrance control post tower.

Lime green over orange and brown lead-based paint on the structural frame.

PCBs were not detected in the paint/coating.

Photo 4: Sand Island State Recreation Area, Various Historic Structures

Harbor entrance control post tower.

Asbestos was not detected in the concrete steps and rock wall grout.

Photo 5: Sand Island State Recreation Area, Various Historic Structures

Various bunkers.

Photo 6: Sand Island State Recreation Area, Various Historic Structures

Various bunkers.

Photo 7: Sand Island State Recreation Area, Various Historic Structures

Bunkers.

Asbestos was not detected in the concrete entrance.

Green paint with lead on the concrete entrance and concrete steps.

PCBs were not detected in the paint/coating.

Photo 8: Sand Island State Recreation Area, Various Historic Structures

Bunkers.

Asbestos was not detected in the concrete entrance.

Photo 9: Sand Island State Recreation Area, Various Historic Structures

Bunkers.

Brown over orange lead-based paint on the metal door entrance.

PCBs were not detected in the paint/coating.

Photo 10: Sand Island State Recreation Area, Various Historic Structures

Bunkers.

Asbestos was not detected in the brown/maroon painted concrete and CMU enclosure wall.

Brown/maroon paint with lead on the concrete and CMU enclosure wall.

PCBs were not detected in the paint/coating.

Photo 11: Sand Island State Recreation Area, Various Historic Structures

Bunkers.

Lead was not detected in the purple paint on the perimeter concrete wall.

PCBs were not detected in the paint/coating.

Photo 12: Sand Island State Recreation Area, Various Historic Structures

Walkway.

Asbestos was not detected in the asphalt and concrete walkway.

Photo 13: Sand Island State Recreation Area, Various Historic Structures

Cable hut (train).

Asbestos was not detected in the yellow/red painted concrete wall.

Yellow/red paint with lead on the concrete wall.

PCBs were not detected in the paint/coating.

Photo 14: Sand Island State Recreation Area, Various Historic Structures

Cable hut (train).

Green/yellow paint with lead on the concrete wheels.

PCBs were not detected in the paint/coating.

Photo 15: Sand Island State Recreation Area, Various Historic Structures

Cable hut (train).

Lead was not detected in the brown/yellow paint on the wood stairs.

Lead was not detected in the black paint on the metal railing.

PCBs were not detected in the paint/coating.

Photo 16: Sand Island State Recreation Area, Various Historic Structures

Cable hut (train).

Lead was not detected in the brown paint on the concrete floor.

PCBs were not detected in the paint/coating.

Photo 17: Sand Island State Recreation Area, Various Historic Structures

Cable hut (train).

Lead was not detected in the black/green paint on the concrete steam stack.

PCBs were not detected in the paint/coating.

Photo 18: Sand Island State Recreation Area, Various Historic Structures

Cable hut (train).

Lead was not detected in the green paint on the wood post, frame and ceiling.

PCBs were not detected in the paint/coating.

Photo 19: Sand Island State Recreation Area, Various Historic Structures

Air raid shelter (train station).

Asbestos was not detected in the painted concrete components.

Photo 20: Sand Island State Recreation Area, Various Historic Structures

Air raid shelter (train station).

Red paint with lead on the wood wall lattice and bench.

Lead was not detected in the yellow paint on the concrete wall.

PCBs were not detected in the paint/coating.

Photo 21: Sand Island State Recreation Area, Various Historic Structures

Air raid shelter (train station).

Black/yellow/red paint with lead on the base wall concrete platform.

PCBs were not detected in the paint/coating.

Photo 22: Sand Island State Recreation Area, Various Historic Structures

Air raid shelter (train station).

Yellow/green paint with lead on the wood beam/frame.

PCBs were not detected in the paint/coating.

Photo 23: Sand Island State Recreation Area, Various Historic Structures

Anti-aircraft gun emplacement tower.

Photo 24: Sand Island State Recreation Area, Various Historic Structures

Anti-aircraft gun emplacement tower.

Asbestos was not detected in the brown painted concrete floor and green painted concrete column.

Green paint with lead on the concrete column.

Brown paint with lead on the concrete floor.

PCBs were not detected in the paint/coating.

Photo 25: Sand Island State Recreation Area, Various Historic Structures

Anti-aircraft gun emplacement tower.

Asbestos was not detected in the brown painted concrete ceiling.

Brown paint with lead on the concrete ceiling and wood railing.

PCBs were not detected in the paint/coating.

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APPENDIX B

ASBESTOS
LABORATORY ANALYTICAL REPORT

Hawaii Analytical Laboratory
ANALYTICAL REPORT

Friday, October 10, 2025

EnviroQuest, Inc.
98-029 Hekaha Street, Suite 21
Aiea HI 96701

Phone Number: (808)486-5881
Facsimile: (808) 486-5889
Email: eqi@enviroquestinc.com

Lab Job No: 202508927
Date Submitted: 10/7/2025
Your Project: 304626, Sand Island Historical Structures, 10/6/25

Bulk Asbestos Determination

Lab Sple No.	Sample ID / Description	Asbestos Present?	Type	%v/v	Other Fibrous	%v/v	Matrix	Date Analyzed
202566195	**304626-01A**		NONE DETECTED		None detected		Calcite + aggregate + other	10/7/2025
Layer	Gray concrete							
Comments								
202566196	**304626-02A**		NONE DETECTED		None detected		Calcite + aggregate + other	10/7/2025
Layer	Gray concrete							
Comments								
202566197	**304626-03A**		NONE DETECTED		None detected		Calcite + aggregate + other	10/7/2025
Layer	Gray concrete							
Comments								
202566197	**304626-03A**		NONE DETECTED		None detected		Calcite + aggregate + other	10/7/2025
Layer	Gray grout like material							
Comments								
202566198	**304626-04A**		NONE DETECTED		None detected		Calcite + aggregate + other	10/7/2025
Layer	Gray grout like material							
Comments								
202566199	**304626-05A**		NONE DETECTED		None detected		Calcite + aggregate + other	10/7/2025
Layer	Gray grout like material							
Comments								

EnviroQuest, Inc.
98-029 Hekaha Street, Suite 21
Aiea HI 96701

Phone Number: (808)486-5881
Facsimile: (808) 486-5889
Email: eqi@enviroquestinc.com

Lab Job No: 202508927
Date Submitted: 10/7/2025
Your Project: 304626, Sand Island Historical Structures, 10/6/25

Bulk Asbestos Determination

Lab Sple No.	Sample ID / Description	Asbestos Present?	Type	%v/v	Other Fibrous	%v/v	Matrix	Date Analyzed
202566200	**304626-06A**		NONE DETECTED		None detected		Calcite + aggregate + other	10/7/2025
Layer	Gray grout like material							
Comments								
202566201	**304626-07A**		NONE DETECTED		None detected		Calcite + aggregate + other	10/8/2025
Layer	Gray concrete							
Comments								
202566202	**304626-08A**		NONE DETECTED		None detected		Calcite + aggregate + other	10/8/2025
Layer	Gray concrete							
Comments								
202566203	**304626-09A**		NONE DETECTED		None detected		Calcite + aggregate + other	10/8/2025
Layer	Gray concrete							
Comments								
202566204	**304626-10A**		NONE DETECTED		None detected		Calcite + aggregate + other + paint	10/8/2025
Layer	Gray concrete / brown paint							
Comments								
202566205	**304626-11A**		NONE DETECTED		None detected		Calcite + aggregate + other + paint	10/8/2025
Layer	Gray concrete / brown paint							
Comments								
202566206	**304626-12A**		NONE DETECTED		None detected		Calcite + aggregate + other + paint	10/8/2025
Layer	Gray concrete / brown paint							
Comments								
202566207	**304626-13A**		NONE DETECTED		None detected		Tar + calcite + aggregate + other	10/8/2025
Layer	Black asphalt							
Comments								

Hawaii Analytical Laboratory is a NIST NVLAP accredited laboratory (NVLAP Lab Code 200655-0) and is accredited in accordance with the recognized ISO/ IEC 17025:2017. Controlled doc.: Asbestos Report, rev. 5 - 20241127

EnviroQuest, Inc.
98-029 Hekaha Street, Suite 21
Aiea HI 96701

Phone Number: (808)486-5881
Facsimile: (808) 486-5889
Email: eqi@enviroquestinc.com

Lab Job No: 202508927
Date Submitted: 10/7/2025
Your Project: 304626, Sand Island Historical Structures, 10/6/25

Bulk Asbestos Determination

Lab Sple No.	Sample ID / Description	Asbestos Present?	Type	%v/v	Other Fibrous	%v/v	Matrix	Date Analyzed
202566207	**304626-13A**		NONE DETECTED		None detected		Calcite + aggregate + other	10/8/2025
Layer	Gray concrete							
Comments								
202566208	**304626-14A**		NONE DETECTED		None detected		Tar + calcite + aggregate + other	10/8/2025
Layer	Black asphalt							
Comments								
202566208	**304626-14A**		NONE DETECTED		None detected		Calcite + aggregate + other	10/8/2025
Layer	Gray concrete							
Comments								
202566209	**304626-15A**		NONE DETECTED		None detected		Tar + calcite + aggregate + other	10/8/2025
Layer	Black asphalt							
Comments								
202566209	**304626-15A**		NONE DETECTED		None detected		Calcite + aggregate + other	10/8/2025
Layer	Gray concrete							
Comments								
202566210	**304626-16A**		NONE DETECTED		None detected		Calcite + aggregate + other + paint	10/8/2025
Layer	Gray concrete / red paint							
Comments								
202566211	**304626-17A**		NONE DETECTED		None detected		Calcite + aggregate + other + paint	10/8/2025
Layer	Gray concrete / yellow paint							
Comments								
202566212	**304626-18A**		NONE DETECTED		None detected		Calcite + aggregate + other + paint	10/8/2025
Layer	Gray concrete / red paint							
Comments								

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EnviroQuest, Inc.
98-029 Hekaha Street, Suite 21
Aiea HI 96701

Phone Number: (808)486-5881
Facsimile: (808) 486-5889
Email: eqi@enviroquestinc.com

Lab Job No: 202508927
Date Submitted: 10/7/2025
Your Project: 304626, Sand Island Historical Structures, 10/6/25

Bulk Asbestos Determination

Lab Sple No.	Sample ID / Description	Asbestos Present?	Type	%v/v	Other Fibrous	%v/v	Matrix	Date Analyzed
202566213	**304626-19A**		NONE DETECTED		None detected		Calcite + aggregate + other + paint	10/8/2025
Layer	Gray concrete / yellow paint							
Comments								
202566214	**304626-20A**		NONE DETECTED		None detected		Calcite + aggregate + other + paint	10/8/2025
Layer	Gray concrete / yellow paint							
Comments								
202566215	**304626-21A**		NONE DETECTED		None detected		Calcite + aggregate + other + paint	10/8/2025
Layer	Gray concrete / yellow paint							
Comments								
202566216	**304626-22A**		NONE DETECTED		None detected		Calcite + aggregate + other + paint	10/8/2025
Layer	Gray concrete / brown paint							
Comments								
202566217	**304626-23A**		NONE DETECTED		None detected		Calcite + aggregate + other + paint	10/8/2025
Layer	Gray concrete / brown paint							
Comments								
202566218	**304626-24A**		NONE DETECTED		None detected		Calcite + aggregate + other + paint	10/8/2025
Layer	Gray concrete / brown paint							
Comments								
202566219	**304626-25A**		NONE DETECTED		None detected		Calcite + aggregate + other + paint	10/8/2025
Layer	Gray concrete / green paint							
Comments								
202566220	**304626-26A**		NONE DETECTED		None detected		Calcite + aggregate + other + paint	10/8/2025
Layer	Gray concrete / green paint							
Comments								

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EnviroQuest, Inc.
98-029 Hekaha Street, Suite 21
Aiea HI 96701

Phone Number: (808)486-5881
Facsimile: (808) 486-5889
Email: eqi@enviroquestinc.com

Lab Job No: 202508927
Date Submitted: 10/7/2025
Your Project: 304626, Sand Island Historical Structures, 10/6/25

Bulk Asbestos Determination

Lab Sple No.	Sample ID / Description	Asbestos Present?	Type	%v/v	Other Fibrous	%v/v	Matrix	Date Analyzed
202566221	**304626-27A**		NONE DETECTED		None detected		Calcite + aggregate + other + paint	10/8/2025
Layer	Gray concrete / green paint							
Comments								
202566222	**304626-28A**		NONE DETECTED		None detected		Calcite + aggregate + other + paint	10/8/2025
Layer	Gray concrete / brown paint							
Comments								
202566223	**304626-29A**		NONE DETECTED		None detected		Calcite + aggregate + other + paint	10/8/2025
Layer	Gray concrete / brown paint							
Comments								
202566224	**304626-30A**		NONE DETECTED		None detected		Calcite + aggregate + other + paint	10/8/2025
Layer	Gray concrete / brown paint							
Comments								

EnviroQuest, Inc.
98-029 Hekaha Street, Suite 21
Aiea HI 96701

Phone Number: (808)486-5881
Facsimile: (808) 486-5889
Email: eqi@enviroquestinc.com

Lab Job No: 202508927
Date Submitted: 10/7/2025
Your Project: 304626, Sand Island Historical Structures, 10/6/25

General Comments
The bulk sample[s] analysis subject of this analytical report were conducted in general accordance with the procedures outlined in the United States Environmental Protection Agency's "Interim Method for the Determination of Asbestos in Bulk Insulation Samples" (EPA-600/M4-82-020, Dec. 1982) and / or "Method for Determination of Asbestos in bulk Building Materials" (EPA-600/R-93-116, July 1993). The analysis of each bulk sample relates only to the material examined, and may or may not represent the overall composition of its original source. Floor tile and other resinously bound materials, when analyzed by the EPA methods referenced above may yield false negative results because of limitations in separating closely bound fibers and in detecting fibers of small length and diameter. Gravimetric treatment, which HAL does not offer, may also be appropriate for certain NOB (non-friable organically bound) materials. Unless specifically requested by clients, NOB samples can be subcontracted to a NVLAP accredited lab, or else, they will be analyzed by HAL using regular PLM technique. In addition, alternative methods of identification, including Transmission Electron Microscopy (TEM) may or may not be applicable. We utilize calibrated visual area estimation on a routine basis and do not conduct point counting unless specifically requested to do so. Estimated error for the visual determinations presented are 75% relative (<1 to 10%), 65% relative (11 to 19%), 50% relative (20 to 34%); 40% relative (35 to 50%), 35% relative (51 to 60%), and 25% relative (>60% v/v). We will not separate layers which in our opinion are not readily discernable. This report is not to be duplicated except in full without the expressed written permission of Hawaii Analytical Laboratory. This report must not be used by the client to claim product certification, approval or endorsement by NVLAP, NIST or any agency of Federal Government. 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.
None Detected = asbestos was not observed in the sample. If trace amount of asbestos was detected below our quantifiable limits of 1.0%, <1% (trace) would be indicated and the asbestos type listed. Point counting, where applicable, are recommended to improve accuracy.

Eva Skogsberg
Laboratory Manager

EnviroQuest

202508927 **PLM DATA SHEET**

Project No. 304626 Project Name: Sand Island Historical Structures Date: 10/6/25

Page: 1 of 4

Material Description: Concrete — Friable / Non-friable

Sample No.	Location	
304626-01A	Harbor entrance control post tower, stairs	202566195
02A	" " " "	202566196
03A	" " " "	202566197

CONDITION: % Damaged: % Localized: % Distributed: Total Material Quantity:

Surfacing Material		TSI		Misc.	
☐ Sig. Damage	% Crumbling -	☐ Sig. Damage	% Gouge/Punct -	☐ Sig. Damage	% Crumbling -
☐ Damaged	% Delaminating -	☐ Damaged	% Crushed -	☑ Damaged	% Delaminating -
☐ Good Cond.	% H_2O/Gouges -	☐ Good Cond.	% H_2O Stains -	☐ Good Cond.	% H_2O/Gouges-

Contact Potential	☐ High	☑ Moderate	☐ Low
Vibration Potential	☐ High	☑ Moderate	☐ Low
Air Erosion	☐ High	☑ Moderate	☐ Low
OVERALL POTENTIAL RATING	☐ Significant Damage	☑ Damage	☐ Minimal Damage

Material Description: Rock / grout — Friable / Non-friable

Sample No.	Location	
304626-04A	Harbor entrance control post tower, stairs wall	202566198
05A	" " " "	202566199
06A	" " " "	202566200

CONDITION: % Damaged: % Localized: % Distributed: Total Material Quantity:

Surfacing Material		TSI		Misc.	
☐ Sig. Damage	% Crumbling -	☐ Sig. Damage	% Gouge/Punct -	☐ Sig. Damage	% Crumbling -
☐ Damaged	% Delaminating -	☐ Damaged	% Crushed -	☐ Damaged	% Delaminating -
☐ Good Cond.	% H_2O/Gouges -	☐ Good Cond.	% H_2O Stains -	☐ Good Cond.	% H_2O/Gouges-

Contact Potential	☐ High	☐ Moderate	☐ Low
Vibration Potential	☐ High	☑ Moderate	☐ Low
Air Erosion	☐ High	☑ Moderate	☐ Low
OVERALL POTENTIAL RATING	☐ Significant Damage	☑ Damage	☐ Minimal Damage

Sampled By: EN/DL/DSL

DOH Cert No:

Deliver/Ship to Lab By: Samples picked up at EQI office by Hawaii Analytical Laboratory

Relinquished By/Date/Time: DL 10/7/25

Received By/Date/Time: Savannah Newman Savannah Newman

Relinquished By/Date/Time:

Received By/Date/Time: 10-07-25A09:26 RCVD

TURNAROUND TIME: ☐ < 12 Hours ☐ 24 Hours ☑ 3 Days ☐ 5 Days ☐ _____

Surfacing	<1,000 ft^2 = 3 Samples	1,000 – 5,000 ft^2 = 5 Samples	>5,000 ft^2 = 7 Samples
TSI	Minimum of 3 Samples (Run) UNLESS	<6 In. or ft^2 = 1 Sample	Minimum of 3 Samples (Elbow & 'T')
Misc.	Minimum of 3 Samples (*Hawaii*)		

Surfacing	Sig. Damage = *> 10% Dist. or 25% Local*	Damaged = *< 10% Dist. or 25% Local*	*Good = Very Limited Damage*
TSI	Sig. Damage = *10% Missing Jacket OR > 10% Dist. or 25% Local*	Damaged = *< 10% Missing Jacket OR < 10% Dist. or 25% Local*	Good = *Very Limited Damage*
Misc	Sig. Damage = *> 10% Dist. or 25% Local*	Damaged = *< 10% Dist. or 25% Local*	*Good = Very Limited Damage*

98-029 Hekaha Street, Suite 21, Aiea, HI 96701 Phone: (808) 486-5881 Fax: (808) 486-5889 E-mail: eqi@enviroquestinc.com
8-10-4-201 Sagamiono, Minami-ku, Sagamihara-shi, Kanagawa-ken 252-0303 Phone: (042) 851-5675

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202508927

PLM DATA SHEET

Project No.: 1c Project Name: 1c Date: 1c

Page: 2 of 4

Material Description: concrete — Friable / ~~Non-friable~~

Sample No.	Location	% Asb.	Asb. Type
304626-07A	bunker, entrance		202566201
08A	" 2		202566202
09A	" 3 " "		202566203

CONDITION: % Damaged: % Localized: % Distributed: Total Material Quantity:

Surfacing Material		TSI		Misc.	
☐ Sig. Damage	% Crumbling -	☐ Sig. Damage	% Gouge/Punct -	☐ Sig. Damage	% Crumbling -
☐ Damaged	% Delaminating -	☐ Damaged	% Crushed -	☑ Damaged	% Delaminating -
☐ Good Cond.	% H_2O/Gouges -	☐ Good Cond.	% H_2O Stains -	☐ Good Cond.	% H_2O/Gouges-

Contact Potential	☐ High	☐ Moderate	☑ Low
Vibration Potential	☐ High	☐ Moderate	☑ Low
Air Erosion	☐ High	☐ Moderate	☐ Low
OVERALL POTENTIAL RATING	☐ Significant Damage	☐ Damage	☐ Minimal Damage

Material Description: CMU — Friable / ~~Non-friable~~

Sample No.	Location	% Asb.	Asb. Type
304626-10A	bunker, enclosure wall		202566204
11A	" " "		202566205
12A	" " " "		202566206

CONDITION: % Damaged: % Localized: % Distributed: Total Material Quantity:

Surfacing Material		TSI		Misc.	
☐ Sig. Damage	% Crumbling -	☐ Sig. Damage	% Gouge/Punct -	☐ Sig. Damage	% Crumbling -
☐ Damaged	% Delaminating -	☐ Damaged	% Crushed -	☑ Damaged	% Delaminating -
☐ Good Cond.	% H_2O/Gouges -	☐ Good Cond.	% H_2O Stains -	☐ Good Cond.	% H_2O/Gouges-

Contact Potential	☐ High	☑ Moderate	☐ Low
Vibration Potential	☐ High	☑ Moderate	☐ Low
Air Erosion	☐ High	☑ Moderate	☐ Low
OVERALL POTENTIAL RATING	☐ Significant Damage	☑ Damage	☐ Minimal Damage

Material Description: asphalt / concrete — Friable / ~~Non-friable~~

Sample No.	Location	% Asb.	Asb. Type
304626-13A	walkway		202566207
14A	" "		202566208
15A	" " "		202566209

CONDITION: % Damaged: % Localized: % Distributed: Total Material Quantity:

Surfacing Material		TSI		Misc.	
☐ Sig. Damage	% Crumbling -	☐ Sig. Damage	% Gouge/Punct -	☑ Sig. Damage	% Crumbling -
☐ Damaged	% Delaminating -	☐ Damaged	% Crushed -	☑ Damaged	% Delaminating -
☐ Good Cond.	% H_2O/Gouges -	☐ Good Cond.	% H_2O Stains -	☐ Good Cond.	% H_2O/Gouges-

Contact Potential	☐ High	☑ Moderate	☐ Low
Vibration Potential	☐ High	☑ Moderate	☐ Low
Air Erosion	☐ High	☐ Moderate	☐ Low
OVERALL POTENTIAL RATING	☐ Significant Damage	☐ Damage	☐ Minimal Damage

Samples picked up at EQI office by Hawaii Analytical Laboratory

1122 Kekaha Street, Suite 21 Aiea, Hawaii 96701 Phone: (808) 486-5881
6-15-17 Kamitsuruma, Minami-ku, Sagamihara-shi, Kanagawa-ken 252-0302 Phone: (042) 851-5675

EnviroQuest

202508927

PLM DATA SHEET

Project No.: fc Project Name: fc Date: "

Page: 3 of 4

Material Description: concrete — Friable / Non-friable

Sample No.	Location	% Asb.	Asb. Type
304626-16A	bunker entrance Cable hut, wall	202566210	
17A	" " " "	202566211	
18A	" " " "	202566212	

CONDITION: % Damaged: % Localized: % Distributed: Total Material Quantity:

Surfacing Material	TSI	Misc.
☐ Sig. Damage % Crumbling -	☐ Sig. Damage % Gouge/Punct -	☐ Sig. Damage % Crumbling -
☐ Damaged % Delaminating -	☐ Damaged % Crushed -	☐ Damaged % Delaminating -
☐ Good Cond. % H_2O/Gouges -	☐ Good Cond. % H_2O Stains -	☐ Good Cond. % H_2O/Gouges-

Contact Potential	☐ High	☐ Moderate	☑ Low
Vibration Potential	☐ High	☐ Moderate	☑ Low
Air Erosion	☐ High	☐ Moderate	☑ Low
OVERALL POTENTIAL RATING	☐ Significant Damage	☐ Damage	☐ Minimal Damage

Material Description: concrete — ~~Friable~~ / Non-friable

Sample No.	Location	% Asb.	Asb. Type
304626-19A	air raid shelter, wall	202566213	
20A	" " "	202566214	
21A	" " "	202566215	

CONDITION: % Damaged: % Localized: % Distributed: Total Material Quantity:

Surfacing Material	TSI	Misc.
☐ Sig. Damage % Crumbling -	☐ Sig. Damage % Gouge/Punct -	☐ Sig. Damage % Crumbling -
☐ Damaged % Delaminating -	☐ Damaged % Crushed -	☐ Damaged % Delaminating -
☐ Good Cond. % H_2O/Gouges -	☐ Good Cond. % H_2O Stains -	☐ Good Cond. % H_2O/Gouges-

Contact Potential	☐ High	☐ Moderate	☑ Low
Vibration Potential	☐ High	☐ Moderate	☑ Low
Air Erosion	☐ High	☐ Moderate	☐ Low
OVERALL POTENTIAL RATING	☐ Significant Damage	☐ Damage	☑ Minimal Damage

Material Description: concrete — Friable / Non-friable

Sample No.	Location	% Asb.	Asb. Type
304626-22A	anti-aircraft gun emplacement tower, ~~floor~~ floor	202566216	
23A	" " " " " "	202566217	
24A	" " " " " "	202566218	

CONDITION: % Damaged: % Localized: % Distributed: Total Material Quantity:

Surfacing Material	TSI	Misc.
☐ Sig. Damage % Crumbling -	☐ Sig. Damage % Gouge/Punct -	☐ Sig. Damage % Crumbling -
☐ Damaged % Delaminating -	☐ Damaged % Crushed -	☐ Damaged % Delaminating -
☐ Good Cond. % H_2O/Gouges -	☐ Good Cond. % H_2O Stains -	☐ Good Cond. % H_2O/Gouges-

Contact Potential	☐ High	☐ Moderate	☐ Low
Vibration Potential	☐ High	☐ Moderate	☐ Low
Air Erosion	☐ High	☐ Moderate	☐ Low
OVERALL POTENTIAL RATING	☐ Significant Damage	☐ Damage	☐ Minimal Damage

98-029 HEKAHA STREET, SUITE 21 AIEA, HAWAII 96701 PHONE: (808) 486-5881
5-25-12 KAMIMIZOBE, MINAMI-KU, SAGAMIHARA-SHI, KANAGAWA-KEN 252-0302 PHONE: (042) 851-5675

Samples picked up at EQI office
by Hawaii Analytical Laboratory

EnviroQuest

202508927

PLM DATA SHEET

Project No.: 11 Project Name: 11 Date: 11

Page: 4 of 4

Material Description: concrete — Friable / ~~Non-friable~~

Sample No.	Location	% Asb.	Asb. Type
30426-25A	anti-aircraft Gun emplacement tower, post	202566219	
26A	" " " " "	202566220	
27A	" " " " "	202566221	

CONDITION: % Damaged: % Localized: % Distributed: Total Material Quantity:

Surfacing Material		TSI		Misc.	
☐ Sig. Damage	% Crumbling -	☐ Sig. Damage	% Gouge/Punct -	☐ Sig. Damage	% Crumbling -
☐ Damaged	% Delaminating -	☐ Damaged	% Crushed -	☐ Damaged	% Delaminating -
☐ Good Cond.	% H_2O/Gouges -	☐ Good Cond.	% H_2O Stains -	☑ Good Cond.	% H_2O/Gouges-

Contact Potential	☐ High	☐ Moderate	☑ Low
Vibration Potential	☐ High	☐ Moderate	☑ Low
Air Erosion	☐ High	☐ Moderate	☐ Low
OVERALL POTENTIAL RATING	☐ Significant Damage	☐ Damage	☑ Minimal Damage

Material Description: concrete — Friable / ~~Non-friable~~

Sample No.	Location	% Asb.	Asb. Type
30426-28A	anti-aircraft gunemplacement tower, ceiling	202566222	
29A	" " " " "	202566223	
30A	" " " " "	202566224	

CONDITION: % Damaged: % Localized: % Distributed: Total Material Quantity:

Surfacing Material		TSI		Misc.	
☐ Sig. Damage	% Crumbling -	☐ Sig. Damage	% Gouge/Punct -	☑ Sig. Damage	% Crumbling -
☐ Damaged	% Delaminating -	☐ Damaged	% Crushed -	☐ Damaged	% Delaminating -
☐ Good Cond.	% H_2O/Gouges -	☐ Good Cond.	% H_2O Stains -	☐ Good Cond.	% H_2O/Gouges-

Contact Potential	☐ High	☑ Moderate	☐ Low
Vibration Potential	☐ High	☑ Moderate	☐ Low
Air Erosion	☐ High	☐ Moderate	☐ Low
OVERALL POTENTIAL RATING	☐ Significant Damage	☐ Damage	☐ Minimal Damage

Material Description: Friable / Non-friable

Sample No.	Location	% Asb.	Asb. Type

CONDITION: % Damaged: % Localized: % Distributed: Total Material Quantity:

Surfacing Material		TSI		Misc.	
☐ Sig. Damage	% Crumbling -	☐ Sig. Damage	% Gouge/Punct -	☐ Sig. Damage	% Crumbling -
☐ Damaged	% Delaminating -	☐ Damaged	% Crushed -	☐ Damaged	% Delaminating -
☐ Good Cond.	% H_2O/Gouges -	☐ Good Cond.	% H_2O Stains -	☐ Good Cond.	% H_2O/Gouges-

Contact Potential	☐ High	☐ Moderate	☐ Low
Vibration Potential	☐ High	☐ Moderate	☐ Low
Air Erosion	☐ High	☐ Moderate	☐ Low
OVERALL POTENTIAL RATING	☐ Significant Damage	☐ Damage	☐ Minimal Damage

Samples picked up at EQI office by Hawaii Analytical Laboratory

98-939 Hekaha Street, Suite 21 Aiea, Hawaii 96701 Phone: (808) 486-5881
6-15-17 Kamitsuruma, Minami-ku, Sagamihara-shi, Kanagawa-ken 252-0302 Phone: (042) 851-5675

EnviroQuest

APPENDIX C

LEAD
LABORATORY ANALYTICAL REPORT

Hawaii Analytical Laboratory
ANALYTICAL REPORT

Thursday, October 9, 2025

EnviroQuest, Inc.
98-029 Hekaha Street, Suite 21
Aiea HI 96701

Phone Number: (808)486-5881
Email: eqi@enviroquestinc.com

Lab Job No: 202508936
Total Analyzed: 20
Date Collected: 10/6/2025
Date Submitted: 10/7/2025
Project Name: 304626, Sand Island Historical Structures

Total Lead (paint chips)

NIOSH Method: 7082m LEAD by FAAS

Lab Sple No.	Sample ID / Description	Results	Units	Date Analyzed
202566269	304626-01L	5.3	wt %	10/7/2025
202566270	304626-02L	0.0073	wt %	10/7/2025
202566271	304626-03L	0.006	wt %	10/7/2025
202566272	304626-04L	< 0.004	wt %	10/7/2025
202566273	304626-05L	1.8	wt %	10/7/2025
202566274	304626-06L	0.028	wt %	10/7/2025
202566275	304626-07L	0.022	wt %	10/7/2025
202566276	304626-08L	0.02	wt %	10/7/2025
202566277	304626-09L	< 0.004	wt %	10/7/2025

EnviroQuest, Inc.
98-029 Hekaha Street, Suite 21
Aiea HI 96701

Phone Number: (808)486-5881
Email: eqi@enviroquestinc.com

Lab Job No: 202508936
Total Analyzed: 20
Date Collected: 10/6/2025
Date Submitted: 10/7/2025
Project Name: 304626, Sand Island Historical Structures

Total Lead (paint chips)

NIOSH Method: 7082m LEAD by FAAS

Lab Sple No.	Sample ID / Description	Results	Units	Date Analyzed
202566278	304626-10L	< 0.004	wt %	10/7/2025
202566279	304626-11L	< 0.004	wt %	10/7/2025
202566280	304626-12L	< 0.004	wt %	10/7/2025
202566281	304626-13L	< 0.004	wt %	10/7/2025
202566282	304626-14L	0.0063	wt %	10/7/2025
202566283	304626-15L	0.006	wt %	10/7/2025
202566284	304626-16L	< 0.004	wt %	10/7/2025
202566285	304626-17L	0.0071	wt %	10/7/2025
202566286	304626-18L	0.047	wt %	10/7/2025
202566287	304626-19L	0.03	wt %	10/7/2025
202566288	304626-20L	0.094	wt %	10/7/2025

All Quality Control data are acceptable unless otherwise noted.

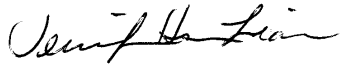
EnviroQuest, Inc.
98-029 Hekaha Street, Suite 21
Aiea HI 96701

Phone Number: (808)486-5881
Email: eqi@enviroquestinc.com

Lab Job No: 202508936
Total Analyzed: 20
Date Collected: 10/6/2025
Date Submitted: 10/7/2025
Project Name: 304626, Sand Island Historical Structures

General Comments
The sample[s] analysis subject of this analytical report were conducted in general accordance with the procedures associated with the "analytical method" referenced above. 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. All analysts participate in interlaboratory quality control testing to continuously document profiency. 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 LAP, LLC or any affiliated organizations. Sample and associated sampling / collection data (e.g. air volume or surface area) is reported as provided by client. TWA values have been calculated based on information supplied by the client that the laboratory has not independently verified. 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. Measurement of uncertainty for lead in paint, dust, airborne particulates, and soil taken from and around buildings and related structures is available upon request. MRL for lead air is 5ug; MRL for lead wipe is 5ug; MRL for lead paint or soil is 40 mg/kg for a 0.25g

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 LAP, LLC Scope of Accreditation.
MRL = Method Reporting Limit



Jennifer Hsu Liao
Laboratory Manager

EnviroQuest

202508936

MISCELLANEOUS BULK DATA SHEET

Project Name: Sand Island Historical Structures

Location:

Page: 1 of 3
Date: 10/6/23
Project No.: 30426

Turnaround Time: ☐<12 Hrs ☐24 Hrs ☐48 Hrs ☑3 Days ☐5 Days ☐Other:

Analysis:
☐TCLP Lead
☐TCLP RCRA 8
☑Total Lead
☐Micro ID (spore)
☐ _____
☐ _____

Sampling Media:
☐Bulk ☐Tape ☐Wipe
☐Soil ☐Vacuum ☐ _____
☐Swab ☐Water ☐ _____

	Sample #	Building	Int/ Ext	Flr.	Room	Component	Substrate	Color	% of Waste Stream	Area / Vol	Result
1	30426-01L	Harbor entrance post Control tower, lime green/orange/brown stead metal frames									202566269
2	02L	Bunkers, green paint & entrance concrete wall									202566270
3	03L	" brown/maroon concrete and CMU wall									202566271
4	04L	", purple concrete enclosure wall									202566272
5	05L	" metal brown entrance door									202566273
6	06L	", green concrete steps									202566274
7	07L	Cable hut (train) yellow/red conc wall									202566275

Sampled By:	Relinquished By/Date/Time	Relinquished By/Date/Time	Analyzed By
EN/PSL/NL	10/7/23		
Delivered to Lab By:	Received By/Date/Time: Savannah Newman	Received By/Date/Time: 10-07-25A09:27 RCVD	Date Analyzed

Samples picked up at EQI office by ~~Hawaii Analytical Laboratory~~

SEND ALL CORRESPONDENCE TO: _____ ☐*FAX: 808.486.5889* ☐*E-mail: eqi@enviroquestinc.com*

EnviroQuest

202508936 **MISCELLANEOUS BULK DATA SHEET**

Project Name: //

Location:

Page: 2 of 3

Date:

Project No.:

Turnaround Time: ☐<12 Hrs ☐24 Hrs ☐48 Hrs ☐3 Days ☐5 Days ☐Other:

Analysis:
☐TCLP Lead ☐Micro ID (spore)
☐TCLP RCRA 8 ☐ _____
☐Total Lead ☐ _____

Sampling Media:
☐Bulk ☐Tape ☐Wipe
☐Soil ☐Vacuum ☐ _____
☐Swab ☐Water ☐ _____

	Sample #	Building	Int/ Ext	Flr.	Room	Component	Substrate	Color	% of Waste Stream	Area / Vol	Result
1	30426-02L	cable hut (train)				~~re~~ green/yellow conc wall					202566276
2	09L	"				brown/yellow wood stairs					202566277
3	10L	"				black metal railing					202566278
4	11L	"				black/green steam stain					202566279
5	12L	"				green wood post/beam					202566280
6	13L	"				brown conc stair					202566281
7	14L	air-raid shelter (train station)				red wood wall					202566282

Sampled By:	Relinquished By/Date/Time
Delivered to Lab By:	Received By/Date/Time: Savannah Newman Savannah Newman
Relinquished By/Date/Time	Analyzed By
Received By/Date/Time: 10-07-25A09:27 RCVD	Date Analyzed

Samples picked up at EQI office
by Hawaii Analytical Laboratory

SEND ALL CORRESPONDENCE TO: _____ ☐*FAX: 808.486.5889* ☐*E-mail: eqi@enviroquestinc.com*

EnviroQuest

202508936 **MISCELLANEOUS BULK DATA SHEET**

Project Name: _____ Page: 3 of 3

Location: / Date: _____

Project No.: _____

Turnaround Time: ☐<12 Hrs ☐24 Hrs ☐48 Hrs ☐3 Days ☐5 Days ☐Other: _____

Analysis:
☐TCLP Lead ☐Micro ID (spore)
☐TCLP RCRA 8 ☐ _____
☐Total Lead ☐ _____

Sampling Media:
☐Bulk ☐Tape ☐Wipe
☐Soil ☐Vacuum ☐ _____
☐Swab ☐Water ☐ _____

	Sample #	Building	Int/ Ext	Flr.	Room	Component	Substrate	Color	% of Waste Stream	Area / Vol	Result
1	304626-15L	air raid shelter (train station)				black/green wood, base concrete wall					202566283
2	16L	"			"	yellow base concrete wall					202566284
3	17L	"			"	Yellow ~~wood~~ wood beam					202566285
4	18L	anti-aircrost Gun emplacement tower, green conc post									202566286
5	19L	"			"	brown wood wall panel					202566287
6	20L	"			"	brown conc ceiling					202566288
7											

Sampled By:	Relinquished By/Date/Time	Relinquished By/Date/Time	Analyzed By
Delivered to Lab By:	Received By/Date/Time Savannah Newman Savannah Newman	Received By/Date/Time 10-07-25A09:27 RCVD	Date Analyzed

Samples picked up at EQI office by Hawaii Analytical Laboratory

SEND ALL CORRESPONDENCE TO: _____ ☐*FAX: 808.486.5889* ☐*E-mail: eqi@enviroquestinc.com*

98-029 Hekaha Street, Suite 21, Aiea, HI 96701 Phone: (808) 486-5881 Fax: (808) 486-5889 E-mail: eqi@enviroquestinc.com

EnviroQuest

APPENDIX D

PCBs

LABORATORY ANALYTICAL REPORT

Enthalpy Analytical
931 West Barkley Ave
Orange, CA 92868
(714) 771-6900

enthalpy.com

Lab Job Number : 543853
Report Level : II
Report Date : 10/15/2025

Analytical Report *prepared for:*

?
Enviroquest
98-029 Hekaha St.
Suite 21
Aiea, HI 96701

Location: Sand Island Historical Structure / 304626

Authorized for release by:

Sophia Baughman, Project Manager
sophia.baughman@enthalpy.com

This data package has been reviewed for technical correctness and completeness. Release of this data has been authorized by the Laboratory Manager or the Manager's designee, as verified by the above signature which applies to this PDF file as well as any associated electronic data deliverable files. The results contained in this report meet all requirements of NELAP and pertain only to those samples which were submitted for analysis. This report may be reproduced only in its entirety.

CA ELAP# 1338, CA ELAP #1338-S1, NELAP# 4038, SCAQMD LAP# 18LA0518, LACSD ID# 10105, ORELAP# 4197

ENTHALPY ANALYTICAL

Sample Summary

? Enviroquest 98-029 Hekaha St. Suite 21 Aiea, HI 96701	Lab Job #: Location: Date Received:	543853 Sand Island Historical Structure / 304626 10/08/25

Sample ID	Lab ID	Collected	Matrix
304626-01P	543853-001	10/06/25 00:00	Miscell.
304626-02P	543853-002	10/06/25 00:00	Miscell.
304626-03P	543853-003	10/06/25 00:00	Miscell.
304626-04P	543853-004	10/06/25 00:00	Miscell.
304626-05P	543853-005	10/06/25 00:00	Miscell.
304626-06P	543853-006	10/06/25 00:00	Miscell.
304626-07P	543853-007	10/06/25 00:00	Miscell.
304626-08P	543853-008	10/06/25 00:00	Miscell.
304626-09P	543853-009	10/06/25 00:00	Miscell.

ENTHALPY ANALYTICAL

Case Narrative

Enviroquest 98-029 Hekaha St. Suite 21 Aiea, HI 96701 ?	Lab Job Number: Location: Date Received:	543853 Sand Island Historical Structure / 304626 10/08/25

This data package contains sample and QC results for nine miscell. samples, requested for the above referenced project on 10/08/25. The samples were received in good condition.

PCBs (EPA 8082):

- Many samples were treated with sulfuric acid to reduce analytical interferences or due to the presence of color.
- Many samples were diluted due to the color of the sample extracts.
- No other analytical problems were encountered.

IR14 20.3/19.9
no ice/no cooler

EnviroQuest

543853

MISCELLANEOUS BULK DATA SHEET

Project Name: Sand Island historical structure

Location:

Page: 1 of 2
Date: 10/6/25
Project No.: 304626

Turnaround Time: ☐<12 Hrs ☐24 Hrs ☐48 Hrs ☐3 Days ☑5 Days ☐Other:

Analysis:
☐TCLP Lead
☐TCLP RCRA 8
☐Total Lead
☐Micro ID (spore)
☑ total PCBs
☐

Sampling Media:
☐Bulk ☐Tape ☐Wipe
☐Soil ☐Vacuum ☐
☐Swab ☐Water ☐

	Sample #	Building	Int/ Ext	Flr.	Room	Component	Substrate	Color	% of Waste Stream	Area / Vol	Result
1	304626-01P	Harbor entrance control post tower, lime green/orange/brown structural frame									
2	02P	Bunker, green paint @ entrance conc wall									
3	03P	" brown/maroon conc/cmu wall									
4	04P	" purple concrete enclosure wall									
5	05P	" metal brown entrance door									
6	06P	" green concrete steps									
7	07P	Cable hut, yellow/red/green/black/brown paints									

Login 543853

Sampled By: ENI DL / DSL	Relinquished By/Date/Time 10/7/25	Relinquished By/Date/Time	Analyzed By
Delivered to Lab By:	Received By/Date/Time 10-2-25 0922	Received By/Date/Time	Date Analyzed

SEND ALL CORRESPONDENCE TO: ☐FAX: 808.486.5889 ☐E-mail: eqi@enviroquestinc.com

EnviroQuest

MISCELLANEOUS BULK DATA SHEET

Project Name: _____ Page: 2 of 2

Location: // Date: _____

Project No.: _____

Turnaround Time: ☐<12 Hrs ☐24 Hrs ☐48 Hrs ☐3 Days ☐5 Days ☐Other: _____

Analysis:
- ☐TCLP Lead
- ☐TCLP RCRA 8
- ☐Total Lead
- ☐Micro ID (spore)
- ☐ _____
- ☐ _____

Sampling Media:
- ☐Bulk ☐Tape ☐Wipe
- ☐Soil ☐Vacuum ☐ _____
- ☐Swab ☐Water ☐ _____

	Sample #	Building	Int/ Ext	Flr.	Room	Component	Substrate	Color	% of Waste Stream	Area / Vol	Result
1	304626-088	air raid shelter, red / black / green / yellow paint									
2	089	anti aircraft gun emplacement tower, green / brown paint									
3											
4											
5											
6											
7											

Sampled By:	Relinquished By/Date/Time	Relinquished By/Date/Time	Analyzed By
Delivered to Lab By:	Received By/Date/Time 10-2-25 0852	Received By/Date/Time	Date Analyzed

SEND ALL CORRESPONDENCE TO: _____ ☐FAX: 808.486.5889 ☐E-mail: eqi@enviroquestinc.com

SAMPLE RECEIPT CHECKLIST

Section 1: General Info

Date Received: 10/8/25 WO# 543853 Client: ENVIROQUEST

Section 2: Shipping / Custody **Are custody seals present?** ☐ Yes ☒ No

Custody seals intact on arrival? ■ N/A ☐ Yes ☐ No ☐ On cooler / box ☐ On samples

☐ Courier ☐ Walk-In ☐ Field Sampling ■ Shipping Info: FED EX

Section 3a: Condition / Packaging ☐ **Outside 0.0 - 6.0°C (0.0 - 10.0°C for microbiology) (PM notified)**

Date Opened 10/8/25 By (initials) JXR Type of ice used: ☐ Wet ☐ Blue/Gel ■ None

☐ Samples received on ice directly from the field; cooling process had begun. (if checked, skip temperatures)

☐ Sample matrix doesn't require cooling (e.g. air, bulk PCB). (if checked, skip temperatures)

If no cooler: Observed/Adjusted Temp (°C): 20.3 / 19.9 Thermometer/IR Gun: IR14 CF: -0.4

Cooler Temp (°C) #1:____/____ #2:____/____ #3:____/____ #4:____/____ #5:____/____ #6:____/____

Section 3b: Microbiology Samples ■ **No microbiology samples submitted (skip 3b)**

☐ Within temp range 0.0 - 10.0°C or received on ice directly from field.

☐ Adequate headspace for microbiology analysis.

Section 3c: Air Samples ■ **No air samples submitted (skip 3c)**

☐ 1.4L Canisters ☐ 6L Canisters ☐ Tedlar Bags ☐ MCE Cassettes ☐ Sorbent Tubes ☐ Other_____

Section 4: Containers / Labels / Samples	YES	NO	N/A
1) Were custody papers present, filled properly, and legible?	~~A~~X		
2) Is the sampler's name present on the CoC?	X		
3) Were containers received in good condition (unbroken / unopened / uncompromised)?	X		
4) Were the samples bagged? (required for microbiology samples; recommended for soil samples)	X		
5) Were all of, and only, the correct samples received?	X		
6) Are sample labels present, legible, and in agreement with the CoC?		X	
7) Does the container count match the CoC?	X		
8) Was sufficient sample volume / mass received for the analyses requested?	X		
9) Were samples received in proper containers for the analyses requested?	X		
10) Were samples received with > 1/2 holding time remaining?	X		
11) Are samples properly preserved as indicated by CoC / labels?	X		
12) Unpreserved VOAs received - If necessary, was the hold time changed in LIMS?			X
13) Are VOA vials free from headspace/bubbles > 6mm?			X

Section 5: Explanations / Comments

(If no comments are made, then no discrepancies noted.)

4.1: No sample time on CoC or containers

4.6A: No sample date on containers

☐ **No additional discrepancies**

Date Logged 10/8/25 **By (print)** NCM **(sign)**

Date Labeled 10/8/25 **By (print)** NCM **(sign)**

ORIGIN ID:HNLA (808) 486-5881
DAVID LEIGH
ENVIROQUEST, INC.
98-029 HEKAHA ST STE 21

AIEA, HI 96701
UNITED STATES US

SHIP DATE: 07OCT25
ACTWGT: 0.50 LB
CAD: 3076890/INET4535

BILL SENDER

TO **SOPHIA BAUGHMAN**
ENTHALPY ANALYTICAL
931 WEST BARKLEY AVENUE

ORANGE CA 92868

(910) 204-2233
INV:
PO: 304626

REF: SAND ISLAND STATE REC AREA

DEPT:

58HJ3/2422/59F2

FedEx Express

J254025082401uv

THU - 09 OCT 10:30A
MORNING 2DAY

TRK# 8849 5064 2691
0201

92868

VZ APVA

CA-US SNA

After printing this label:
CONSIGNEE COPY - PLEASE PLACE IN FRONT OF POUCH
1. Fold the printed page along the horizontal line.
2. Place label in shipping pouch and affix it to your shipment.

Use of this system constitutes your agreement to the service conditions in the current FedEx Service Guide, available on fedex.com. FedEx will not be responsible for any claim in excess of $100 per package, whether the result of loss, damage, delay, non-delivery, misdelivery, or misinformation, unless you declare a higher value, pay an additional charge, document your actual loss and file a timely claim. Limitations found in the current FedEx Service Guide apply. Your right to recover from FedEx for any loss, including intrinsic value of the package, loss of sales, income interest, profit, attorney's fees, costs, and other forms of damage whether direct, incidental, consequential, or special is limited to the greater of $100 or the authorized declared value. Recovery cannot exceed actual documented loss. Maximum for items of extraordinary value is $1,000, e.g. jewelry, precious metals, negotiable instruments and other items listed in our Service Guide. Written claims must be filed within strict time limits, see current FedEx Service Guide.

ENTHALPY ANALYTICAL

Analysis Results for 543853

?
Enviroquest
98-029 Hekaha St.
Suite 21
Aiea, HI 96701

Lab Job #: 543853
Location: Sand Island Historical Structure / 304626
Date Received: 10/08/25

Sample ID: 304626-01P **Lab ID: 543853-001** **Collected: 10/06/25**
Matrix: Miscell.

543853-001 Analyte	Result	Qual	Units	RL	DF	Batch	Prepared	Analyzed	Chemist
Method: EPA 8082 Prep Method: EPA 3546									
Aroclor-1016	ND		ug/Kg	3,100	63	384444	10/14/25	10/14/25	XLY
Aroclor-1221	ND		ug/Kg	3,100	63	384444	10/14/25	10/14/25	XLY
Aroclor-1232	ND		ug/Kg	3,100	63	384444	10/14/25	10/14/25	XLY
Aroclor-1242	ND		ug/Kg	3,100	63	384444	10/14/25	10/14/25	XLY
Aroclor-1248	ND		ug/Kg	3,100	63	384444	10/14/25	10/14/25	XLY
Aroclor-1254	ND		ug/Kg	3,100	63	384444	10/14/25	10/14/25	XLY
Aroclor-1260	ND		ug/Kg	3,100	63	384444	10/14/25	10/14/25	XLY
Aroclor-1262	ND		ug/Kg	3,100	63	384444	10/14/25	10/14/25	XLY
Aroclor-1268	ND		ug/Kg	3,100	63	384444	10/14/25	10/14/25	XLY
Surrogates				**Limits**					
Decachlorobiphenyl (PCB)	83%		%REC	50-127	63	384444	10/14/25	10/14/25	XLY

Sample ID: 304626-02P **Lab ID: 543853-002** **Collected: 10/06/25**
Matrix: Miscell.

543853-002 Analyte	Result	Qual	Units	RL	DF	Batch	Prepared	Analyzed	Chemist
Method: EPA 8082 Prep Method: EPA 3546									
Aroclor-1016	ND		ug/Kg	2,800	56	384444	10/14/25	10/14/25	XLY
Aroclor-1221	ND		ug/Kg	2,800	56	384444	10/14/25	10/14/25	XLY
Aroclor-1232	ND		ug/Kg	2,800	56	384444	10/14/25	10/14/25	XLY
Aroclor-1242	ND		ug/Kg	2,800	56	384444	10/14/25	10/14/25	XLY
Aroclor-1248	ND		ug/Kg	2,800	56	384444	10/14/25	10/14/25	XLY
Aroclor-1254	ND		ug/Kg	2,800	56	384444	10/14/25	10/14/25	XLY
Aroclor-1260	ND		ug/Kg	2,800	56	384444	10/14/25	10/14/25	XLY
Aroclor-1262	ND		ug/Kg	2,800	56	384444	10/14/25	10/14/25	XLY
Aroclor-1268	ND		ug/Kg	2,800	56	384444	10/14/25	10/14/25	XLY
Surrogates				**Limits**					
Decachlorobiphenyl (PCB)	84%		%REC	50-127	56	384444	10/14/25	10/14/25	XLY

Results for any subcontracted analyses are not included in this section.

ENTHALPY ANALYTICAL

Analysis Results for 543853

Sample ID: 304626-03P	Lab ID: 543853-003	Collected: 10/06/25
	Matrix: Miscell.	

543853-003 Analyte	Result	Qual	Units	RL	DF	Batch	Prepared	Analyzed	Chemist
Method: EPA 8082 Prep Method: EPA 3546									
Aroclor-1016	ND		ug/Kg	2,500	50	384444	10/14/25	10/15/25	XLY
Aroclor-1221	ND		ug/Kg	2,500	50	384444	10/14/25	10/15/25	XLY
Aroclor-1232	ND		ug/Kg	2,500	50	384444	10/14/25	10/15/25	XLY
Aroclor-1242	ND		ug/Kg	2,500	50	384444	10/14/25	10/15/25	XLY
Aroclor-1248	ND		ug/Kg	2,500	50	384444	10/14/25	10/15/25	XLY
Aroclor-1254	ND		ug/Kg	2,500	50	384444	10/14/25	10/15/25	XLY
Aroclor-1260	ND		ug/Kg	2,500	50	384444	10/14/25	10/15/25	XLY
Aroclor-1262	ND		ug/Kg	2,500	50	384444	10/14/25	10/15/25	XLY
Aroclor-1268	ND		ug/Kg	2,500	50	384444	10/14/25	10/15/25	XLY
Surrogates				**Limits**					
Decachlorobiphenyl (PCB)	79%		%REC	50-127	50	384444	10/14/25	10/15/25	XLY

Sample ID: 304626-04P	Lab ID: 543853-004	Collected: 10/06/25
	Matrix: Miscell.	

543853-004 Analyte	Result	Qual	Units	RL	DF	Batch	Prepared	Analyzed	Chemist
Method: EPA 8082 Prep Method: EPA 3546									
Aroclor-1016	ND		ug/Kg	2,800	56	384444	10/14/25	10/15/25	XLY
Aroclor-1221	ND		ug/Kg	2,800	56	384444	10/14/25	10/15/25	XLY
Aroclor-1232	ND		ug/Kg	2,800	56	384444	10/14/25	10/15/25	XLY
Aroclor-1242	ND		ug/Kg	2,800	56	384444	10/14/25	10/15/25	XLY
Aroclor-1248	ND		ug/Kg	2,800	56	384444	10/14/25	10/15/25	XLY
Aroclor-1254	ND		ug/Kg	2,800	56	384444	10/14/25	10/15/25	XLY
Aroclor-1260	ND		ug/Kg	2,800	56	384444	10/14/25	10/15/25	XLY
Aroclor-1262	ND		ug/Kg	2,800	56	384444	10/14/25	10/15/25	XLY
Aroclor-1268	ND		ug/Kg	2,800	56	384444	10/14/25	10/15/25	XLY
Surrogates				**Limits**					
Decachlorobiphenyl (PCB)	77%		%REC	50-127	56	384444	10/14/25	10/15/25	XLY

Results for any subcontracted analyses are not included in this section.

ENTHALPY ANALYTICAL

Analysis Results for 543853

Sample ID: 304626-05P	Lab ID: 543853-005	Collected: 10/06/25
	Matrix: Miscell.	

543853-005 Analyte	Result	Qual	Units	RL	DF	Batch	Prepared	Analyzed	Chemist
Method: EPA 8082 Prep Method: EPA 3546									
Aroclor-1016	ND		ug/Kg	2,500	50	384444	10/14/25	10/15/25	XLY
Aroclor-1221	ND		ug/Kg	2,500	50	384444	10/14/25	10/15/25	XLY
Aroclor-1232	ND		ug/Kg	2,500	50	384444	10/14/25	10/15/25	XLY
Aroclor-1242	ND		ug/Kg	2,500	50	384444	10/14/25	10/15/25	XLY
Aroclor-1248	ND		ug/Kg	2,500	50	384444	10/14/25	10/15/25	XLY
Aroclor-1254	ND		ug/Kg	2,500	50	384444	10/14/25	10/15/25	XLY
Aroclor-1260	ND		ug/Kg	2,500	50	384444	10/14/25	10/15/25	XLY
Aroclor-1262	ND		ug/Kg	2,500	50	384444	10/14/25	10/15/25	XLY
Aroclor-1268	ND		ug/Kg	2,500	50	384444	10/14/25	10/15/25	XLY
Surrogates				**Limits**					
Decachlorobiphenyl (PCB)	71%		%REC	50-127	50	384444	10/14/25	10/15/25	XLY

Sample ID: 304626-06P	Lab ID: 543853-006	Collected: 10/06/25
	Matrix: Miscell.	

543853-006 Analyte	Result	Qual	Units	RL	DF	Batch	Prepared	Analyzed	Chemist
Method: EPA 8082 Prep Method: EPA 3546									
Aroclor-1016	ND		ug/Kg	2,800	56	384444	10/14/25	10/15/25	XLY
Aroclor-1221	ND		ug/Kg	2,800	56	384444	10/14/25	10/15/25	XLY
Aroclor-1232	ND		ug/Kg	2,800	56	384444	10/14/25	10/15/25	XLY
Aroclor-1242	ND		ug/Kg	2,800	56	384444	10/14/25	10/15/25	XLY
Aroclor-1248	ND		ug/Kg	2,800	56	384444	10/14/25	10/15/25	XLY
Aroclor-1254	ND		ug/Kg	2,800	56	384444	10/14/25	10/15/25	XLY
Aroclor-1260	ND		ug/Kg	2,800	56	384444	10/14/25	10/15/25	XLY
Aroclor-1262	ND		ug/Kg	2,800	56	384444	10/14/25	10/15/25	XLY
Aroclor-1268	ND		ug/Kg	2,800	56	384444	10/14/25	10/15/25	XLY
Surrogates				**Limits**					
Decachlorobiphenyl (PCB)	71%		%REC	50-127	56	384444	10/14/25	10/15/25	XLY

Results for any subcontracted analyses are not included in this section.

ENTHALPY ANALYTICAL

Analysis Results for 543853

Sample ID: 304626-07P	Lab ID: 543853-007	Collected: 10/06/25
	Matrix: Miscell.	

543853-007 Analyte	Result	Qual	Units	RL	DF	Batch	Prepared	Analyzed	Chemist
Method: EPA 8082 Prep Method: EPA 3546									
Aroclor-1016	ND		ug/Kg	2,500	50	384444	10/14/25	10/14/25	XLY
Aroclor-1221	ND		ug/Kg	2,500	50	384444	10/14/25	10/14/25	XLY
Aroclor-1232	ND		ug/Kg	2,500	50	384444	10/14/25	10/14/25	XLY
Aroclor-1242	ND		ug/Kg	2,500	50	384444	10/14/25	10/14/25	XLY
Aroclor-1248	ND		ug/Kg	2,500	50	384444	10/14/25	10/14/25	XLY
Aroclor-1254	ND		ug/Kg	2,500	50	384444	10/14/25	10/14/25	XLY
Aroclor-1260	ND		ug/Kg	2,500	50	384444	10/14/25	10/14/25	XLY
Aroclor-1262	ND		ug/Kg	2,500	50	384444	10/14/25	10/14/25	XLY
Aroclor-1268	ND		ug/Kg	2,500	50	384444	10/14/25	10/14/25	XLY
Surrogates				**Limits**					
Decachlorobiphenyl (PCB)	108%		%REC	50-127	50	384444	10/14/25	10/14/25	XLY

Sample ID: 304626-08P	Lab ID: 543853-008	Collected: 10/06/25
	Matrix: Miscell.	

543853-008 Analyte	Result	Qual	Units	RL	DF	Batch	Prepared	Analyzed	Chemist
Method: EPA 8082 Prep Method: EPA 3546									
Aroclor-1016	ND		ug/Kg	2,500	50	384444	10/14/25	10/15/25	XLY
Aroclor-1221	ND		ug/Kg	2,500	50	384444	10/14/25	10/15/25	XLY
Aroclor-1232	ND		ug/Kg	2,500	50	384444	10/14/25	10/15/25	XLY
Aroclor-1242	ND		ug/Kg	2,500	50	384444	10/14/25	10/15/25	XLY
Aroclor-1248	ND		ug/Kg	2,500	50	384444	10/14/25	10/15/25	XLY
Aroclor-1254	ND		ug/Kg	2,500	50	384444	10/14/25	10/15/25	XLY
Aroclor-1260	ND		ug/Kg	2,500	50	384444	10/14/25	10/15/25	XLY
Aroclor-1262	ND		ug/Kg	2,500	50	384444	10/14/25	10/15/25	XLY
Aroclor-1268	ND		ug/Kg	2,500	50	384444	10/14/25	10/15/25	XLY
Surrogates				**Limits**					
Decachlorobiphenyl (PCB)	77%		%REC	50-127	50	384444	10/14/25	10/15/25	XLY

Results for any subcontracted analyses are not included in this section.

ENTHALPY ANALYTICAL

Analysis Results for 543853

Sample ID: 304626-09P	Lab ID: 543853-009	Collected: 10/06/25
	Matrix: Miscell.	

543853-009 Analyte	Result	Qual	Units	RL	DF	Batch	Prepared	Analyzed	Chemist
Method: EPA 8082 Prep Method: EPA 3546									
Aroclor-1016	ND		ug/Kg	3,100	63	384444	10/14/25	10/15/25	XLY
Aroclor-1221	ND		ug/Kg	3,100	63	384444	10/14/25	10/15/25	XLY
Aroclor-1232	ND		ug/Kg	3,100	63	384444	10/14/25	10/15/25	XLY
Aroclor-1242	ND		ug/Kg	3,100	63	384444	10/14/25	10/15/25	XLY
Aroclor-1248	ND		ug/Kg	3,100	63	384444	10/14/25	10/15/25	XLY
Aroclor-1254	ND		ug/Kg	3,100	63	384444	10/14/25	10/15/25	XLY
Aroclor-1260	ND		ug/Kg	3,100	63	384444	10/14/25	10/15/25	XLY
Aroclor-1262	ND		ug/Kg	3,100	63	384444	10/14/25	10/15/25	XLY
Aroclor-1268	ND		ug/Kg	3,100	63	384444	10/14/25	10/15/25	XLY
Surrogates				**Limits**					
Decachlorobiphenyl (PCB)	74%		%REC	50-127	63	384444	10/14/25	10/15/25	XLY

ND Not Detected

Results for any subcontracted analyses are not included in this section.

ENTHALPY ANALYTICAL

Batch QC

Type:	**Blank**	**Lab ID:**	**QC1302849**	**Batch:**	**384444**
Matrix:	**Soil**	**Method:**	**EPA 8082**	**Prep Method:**	**EPA 3546**

QC1302849 Analyte	Result	Qual	Units	RL	Prepared	Analyzed
Aroclor-1016	ND		ug/Kg	51	10/14/25	10/14/25
Aroclor-1221	ND		ug/Kg	51	10/14/25	10/14/25
Aroclor-1232	ND		ug/Kg	51	10/14/25	10/14/25
Aroclor-1242	ND		ug/Kg	51	10/14/25	10/14/25
Aroclor-1248	ND		ug/Kg	51	10/14/25	10/14/25
Aroclor-1254	ND		ug/Kg	51	10/14/25	10/14/25
Aroclor-1260	ND		ug/Kg	51	10/14/25	10/14/25
Aroclor-1262	ND		ug/Kg	51	10/14/25	10/14/25
Aroclor-1268	ND		ug/Kg	51	10/14/25	10/14/25
Surrogates				**Limits**		
Decachlorobiphenyl (PCB)	76%		%REC	50-127	10/14/25	10/14/25

Type:	**Lab Control Sample**	**Lab ID:**	**QC1302853**	**Batch:**	**384444**
Matrix:	**Soil**	**Method:**	**EPA 8082**	**Prep Method:**	**EPA 3546**

QC1302853 Analyte	Result	Spiked	Units	Recovery	Qual	Limits
Aroclor-1016	451.1	505.1	ug/Kg	89%		66-120
Aroclor-1260	429.3	505.1	ug/Kg	85%		63-126
Surrogates						
Decachlorobiphenyl (PCB)	39.26	50.51	ug/Kg	78%		50-127

Type:	**Matrix Spike**	**Lab ID:**	**QC1302854**	**Batch:**	**384444**
Matrix (Source ID):	**Miscell. (543853-007)**	**Method:**	**EPA 8082**	**Prep Method:**	**EPA 3546**

QC1302854 Analyte	Result	Source Sample Result	Spiked	Units	Recovery	Qual	Limits	DF
Aroclor-1016	5,437	ND	5000	ug/Kg	109%		60-123	50
Aroclor-1260	5,838	ND	5000	ug/Kg	117%		55-136	50
Surrogates								
Decachlorobiphenyl (PCB)	381.1		500.0	ug/Kg	76%		50-127	50

Type:	**Matrix Spike Duplicate**	**Lab ID:**	**QC1302855**	**Batch:**	**384444**
Matrix (Source ID):	**Miscell. (543853-007)**	**Method:**	**EPA 8082**	**Prep Method:**	**EPA 3546**

QC1302855 Analyte	Result	Source Sample Result	Spiked	Units	Recovery	Qual	Limits	RPD	RPD Lim	DF
Aroclor-1016	5,155	ND	4545	ug/Kg	113%		60-123	4	37	45
Aroclor-1260	4,345	ND	4545	ug/Kg	96%		55-136	20	41	45
Surrogates										
Decachlorobiphenyl (PCB)	397.5		454.5	ug/Kg	87%		50-127			45

ND Not Detected

DIVISION 2 – SITE CONSTRUCTION

SECTION 02070 – SELECTIVE DEMOLITION

PART 1 - GENERAL

1.01 SUMMARY

A. Work Includes but is not limited to:

1. Demolition and removal of portion of designated historic structures, Anti-Aircraft Gun Emplacement Tower, Air Raid Shelter (Train Station), Cable Hut (Train), Harbor Entrance Control Post Tower, Underground Plotting Room, to include but not limited to roofing, non-historic additions,, flooring, ceilings, soffits, , and finishes as indicated on the Drawings
2. Salvage designated items, to include but not limited to . Aircraft Gun Emplacement Tower – Wood Panel Trellis, access panel at Air Raid Shelter and Historic Doors at Plotting Room

B. Related Work Described Elsewhere

1. Section 01100 – ARCHAEOLOGICAL PROTECTION
2. Section 01359 – HISTORIC TREATMENT PROCEDURES
3. Section 01715 – EXISTING CONDITIONS – ASBESTOS/LEAD/HAZARDOUS MATERIAL SURVEY
4. Section 08031 HISTORIC TREATMENT OF METAL DOORS
5. Section 13282 – LEAD-PAINT CONTROL MEASURES

C. The extent of selective demolition work is indicated on the demolition plan and other drawings.

D. It is the responsibility of the Contractor to examine the project site and determine the existing conditions for themselves.

E. Selective demolition work includes but is not limited to removal and subsequent disposal of all non-hazardous materials indicated or required to be removed.

F. Execute all work in an orderly and careful manner with due consideration for all items or work to remain.

G. Clearly obvious conditions requiring selective demolition, which exist at the site, will be accepted as part of the work, even though they may not be clearly indicated on the Drawings and/or described herein, or may vary therefrom.

H. All debris of any kind accumulated from the work of this Section must be disposed of off the site, unless noted otherwise.

I. Permits, Notice, Etc.:

1. The Contractor must procure and pay for all necessary permits or certificates that may be required in connection of this work.
2. The Contractor must serve proper notice and consult with Engineer regarding any temporary barricades that are required, or for disconnections of electrical or other utility lines in the area which may interfere with the removal work. All

such lines, where necessary, must be properly disconnected or relocated prior to commencing with demolition work.

1.02 SUBMITTALS

A. Meet requirements of Section 01330 – SUBMITTAL PROCEDURES

B. Proposed Protection Measures: Submit informational report, including drawings, that indicates the measures proposed for protecting individuals and property, for dust control and for noise control. Indicate proposed locations and construction of barriers.

1. Adjacent Portions of Structure: Portions of the structure adjacent to the areas to be demolished are considered to have historical significance as determined by the State Historic Preservation Division of the State of Hawaii Department of Land and Natural Resources. The demolition to take place in these areas is to be performed with the utmost care to avoid damage to the adjacent portions of the building. Submit detailed special measures proposed to protect adjacent portions of the building to remain.

C. Schedule of Demolition Activities: Indicate the following:

1. Detailed sequence of demolition work, with starting and ending dates for each activity.
2. Temporary interruption of utility services.
3. Shutoff of utility services.

D. Demolition Plans: Drawings indicating the following:

1. General site, building(s) and structures and other features to be removed and disposed of.

E. Pre-demolition Photographs: Show existing conditions of adjoining construction, including finish surfaces that might be misconstrued as damage caused by demolition operations. Submit before the Work begins.

1.03 QUALITY ASSURANCE

A. Use adequate numbers of skilled tradespeople who are thoroughly trained and experienced in the necessary crafts.

B. Regulatory Requirements: Comply with governing EPA notification regulations before beginning demolition. Comply with hauling and disposal regulations of authorities having jurisdiction.

C. Pre-demolition Conference: Conduct conference at Project site to comply with requirements in Section 01310 – PROJECT MANAGEMENT AND COORDINATION. Review methods and procedures related to building demolition including, but not limited to, the following:

1. Inspect and discuss condition of construction to be demolished.
2. Review and finalize demolition schedule and verify availability of demolition personnel, equipment, and facilities needed to make progress and avoid delays.
3. Review and finalize protection requirements.
4. Review procedures for noise control, and dust control.

5. Review items to be salvaged and returned to the State.
6. Review procedures for protection of adjacent, occupied structures or buildings.
7. Review schedule of work hours and facility rules.

1.04 PROJECT CONDITIONS

A. Existing conditions: The State assumes no responsibility for actual condition of items to be demolished.

B. Conditions existing at time of commencement of contract will be maintained by the State insofar as practical.

C. Occupancy: Building areas subject to demolition will be vacated and temporarily discontinued in use by the State prior to start of work.

D. Do not interfere with use of adjacent building areas. Maintain free and safe passage to and from occupied spaces.

E. Provide accessibility around temporary structures conforming to ADAAG Section 4.1.1(4).

F. Prevent movement or settlement of structures. Provide and place bracing or shoring and be responsible for safety and support of adjacent structures. Assume liability for such movement, settlement, damage, or injury. Cease operations and notify the Engineer immediately, if safety of structure appears to be endangered. Take precautions to properly support structure. Do not resume operations until safety is restored.

G. Traffic: Conduct selective demolition operations and debris removal in a manner to ensure minimum interference with roads, streets, walks, and other adjacent occupied or used facilities. Do not close, block, or otherwise obstruct streets, walks or other occupied or used facilities without written permission from the Engineer. Provide alternate routes around closed or obstructed traffic ways if required by governing regulations, as directed by the Project Manager.

H. Dust Control:

1. Keep dust within acceptable levels at all times, including non-working hours, weekends and holidays as specified in Section 01567 POLLUTION CONTROL.
2. Mechanical dry sweeping is not permitted. Vacuuming, wet mopping, approved limited dry hand, wet or damp sweeping is acceptable.
3. During loading operations, water down debris and waste materials to allay dust.
4. The method of dust control and all costs incurred thereof will be the responsibility of the Contractor.

I. Fire Safety: Fire safety during demolition must comply with Section 16 of the 2012 NFPA 1 - Fire Code, as amended and NFPA 241.

1.05 SCOPE VERIFICATION:

A. The demolition drawings and specifications indicate the general limits, scope, and conditions of the selective demolition work. As a requirement of the bid proposal

submission, the Contractor shall visit the site and verify existing conditions and the extent of demolition required. The Contractor shall include in the bid proposal all labor, materials, equipment, and incidental work necessary to complete the demolition required to achieve the finished work and design intent indicated in the Contract Documents, regardless of whether every element of demolition is explicitly shown or described.

1.06 EXISTING UTILITY SERVICES

A. Only the Harbor Entrance Control Post Tower was observed to have an existing aircraft warning light, which may not be operational; however, this observation is not intended to limit the potential presence of other existing utilities. Out of an abundance of caution, the following requirements shall apply in the event any utility is discovered during the demolition process, including electrical, plumbing, communication, or other concealed service lines.

B. Do not abandon or otherwise alter utility services or drainage lines which would impair service to existing building areas.

C. Maintain utilities in service, protect, and reconstruct if damaged, all in-service utility pipes or conduits, except services to the structures to be dismantled. Reconstruct in-service utility pipes or conduits if damaged at no additional cost to the State.

D. Report damage, however slight, immediately. Do not repair or reconstruct any utility pipe, conduit, or installation without authorization; however, except perform emergency repairs immediately.

1.07 HAZARDOUS MATERIALS

A. Comply with the requirements specified in Sections:

1. Section 01715 – EXISTING CONDITIONS – ASBESTOS/LEAD/HAZARDOUS MATERIAL SURVEY
2. Section 13282 – LEAD PAINT CONTROL MEASURES

1.08 COORDINATION

A. Arrange demolition schedule so as not to interfere with the user’s on-site operations and operations of adjacent occupied buildings and areas.

1. At the end of each work period areas are required to be cleaned and readied for occupants. The condition of the areas must be such that there is no interference with the typical work activities performed by the occupants and that the occupant’s safety is not compromised.

PART 2 - PRODUCTS

2.01 SALVAGE MATERIALS

A. Removed materials not indicated for reuse or salvage for the State will become Contractor's property. Remove from site and dispose of at Contractor's option.

1. Items to be salvaged are included in a list at the end of this Section.

B. Items of salvageable value not indicated for reuse may be removed from structure as work progresses. Salvaged items must be transported from site as they are removed. Storage or sale of removed items on site will not be permitted.

C. Removal and salvage of historic items, antiques, and similar objects shall comply with the requirements of Section 02429 – REMOVAL AND SALVAGE OF HISTORIC CONSTRUCTION MATERIAL.

PART 3 - EXECUTION

3.01 EXAMINATION

A. Examine the conditions under which work of this section will be performed. Do not proceed until unsatisfactory conditions detrimental to timely and proper completion of the work have been corrected.

B. Verify that utilities have been disconnected and capped before starting demolition operations.

C. Inventory and record the condition of items to be removed and salvaged. Photograph existing conditions of structure surfaces, equipment or to surrounding properties which could be misconstrued as damage resulting from selective demolition work. File with Engineer prior to starting work.

D. If hazardous materials are found to exist, beyond those identified in Section 01715 Existing Conditions - Asbestos / Lead / Hazardous Material Survey, notify government representative that hazardous materials have been discovered before proceeding with building demolition operations.

3.02 PREPARATION

A. Maintain exit requirements throughout construction period.

B. Erect and maintain temporary barricades complying with the requirements of Section 01530 BARRICADES. On completion, remove barricades and repair damaged surfaces to match adjacent surfaces.

C. Existing Utilities: Locate, identify, disconnect, and remove indicated utilities serving portions of the building to be demolished.

1. If removal, relocation, or abandonment of utility services will affect adjacent occupied areas and buildings, then provide temporary utilities that bypass the portions of the building to be demolished and that maintain continuity of service to other buildings and adjacent areas.

2. Cut off pipe or conduit and cap, valve, or plug and seal remaining portion of pipe or conduit after bypassing according to requirements of authorities having jurisdiction.

D. Temporary Shoring: Provide and maintain interior and exterior shoring, bracing, or structural support to preserve stability and prevent unexpected movement or collapse of construction being demolished.

1. Strengthen or add new supports when required during progress of demolition.

3.03 DEMOLITION

A. Demolition Work: Conform to State of Hawaii, Occupational Safety and Health Standards; Subtitle 8, Division of Occupational Safety and Health; Part 3, Construction Standards; Chapter 131.1, Demolition.

B. Pollution controls: Provide temporary enclosures and use suitable methods to limit dust and dirt to the lowest practical level. Comply with governing regulations pertaining to environmental protection.

C. Explosives: Use of explosives will not be permitted.

D. Selective Demolition

1. Extent of demolition and removal as shown are minimum requirements. Contractor will be responsible for the extent of work required to properly accommodate the methods of construction required for the new work. Additional work required to accommodate construction will be considered incidental to the new work and must be done at no additional cost to the State. Contractor, as part of the bid proposal to review the demolition scope along with the new work and conduct site visit(s) to understand the extent of the scope and provide as part of its bid proposal, to include all work to accomplish the final work.
2. Conduct demolition of designated items and components as indicated on the Drawings and site investigation(s) in an orderly and careful manner as required to accommodate new work, including that required for connection to the existing building. Protect existing supporting structural members.
3. Neatly cut openings and holes plumb, square, and true to dimensions required. Use cutting methods least likely to damage construction to remain or adjoining construction. Use hand tools or small power tools designed for sawing or grinding, not hammering and chopping, to minimize disturbance of adjacent surfaces. Temporarily cover openings to remain.
4. Use the utmost care to avoid damage to the items being removed and designated for reuse.
5. Disconnect, remove, cap and seal designated utilities as indicated on the Drawings.
6. Use methods required to complete the Work within limitations of governing regulations.
7. Locate demolition equipment and remove debris and materials so as not to impose excessive loads on supporting walls, floors, or framing.
8. Cease operations and notify Engineer immediately if safety of adjacent structure appears to be endangered. Do not resume operations until safety is restored.
9. Remove contaminated, vermin infested, or dangerous materials encountered and dispose of by safe means.
10. Do not demolish, chip or penetrate any portion of existing structural members not designated for such without the expressed approval of the Engineer and Engineer.
11. Repair excess demolition to match adjacent surfaces.

E. Removed and Reinstalled Items:

1. Clean and repair items to functional condition adequate for intended reuse. Paint equipment to match new equipment.
2. Pack or crate items after cleaning and repairing. Identify contents of containers.
3. Protect items from damage during transport and storage.
4. Reinstall items in locations indicated. Comply with installation requirements for new materials and equipment. Provide connections, supports, and miscellaneous materials necessary to make item functional for use indicated.

3.04 DISPOSAL OF DEMOLISHED AND DESIGNATED MATERIALS

A. Remove debris, rubbish, and other materials resulting from demolition operations from the site. Transport materials removed from demolished structures and legally dispose of offsite.

B. Do not allow demolished materials to accumulate on-site.

C. Remove and transport debris in a manner that will prevent spillage on adjacent surfaces and areas.

D. Burning of removed materials from demolished structures will not be permitted on site.

3.05 CLEANUP AND REPAIR

A. Repair damage to adjacent structure and improvements resulting from this work at no cost to the State.

B. Clean adjacent areas, structures and improvements of dust, dirt, and debris caused by demolition operations, as directed by Engineer or governing authorities. Return adjacent areas to condition existing prior to start of work.

END OF SECTION

SECTION 02370 – EROSION CONTROL

PART 1 - GENERAL

1.01 SUMMARY

A. The Contractor shall prepare detailed plans, diagrams, and written site-specific best management practices (BMPs). The Contractor shall construct, maintain, and repair temporary water pollution, dust, and erosion control measures at the project site. The Contractor shall remove and dispose of hazardous wastes, control fugitive dust, and comply with all applicable County, State, and Federal permit conditions.

1.02 RELATED WORK

A. SECTION 02070 SELECTIVE DEMOLITION

1.03 REFERENCE SPECIFICATIONS AND STANDARDS

A. The following construction standards, with certain modifications as hereinafter specified, are hereby incorporated into and made a part of these specifications by reference and shall be applicable to all work performed by the Contractor under this section.

1. Specific sections of the County's Standard Specifications for Public Works Construction of the Department of Public Works, dated September 1986, as amended hereafter referred to as the County's Specifications.

All references to measurement and payment shall be deleted.

1.04 ENVIRONMENTAL REQUIREMENTS

A. The contractor shall protect adjacent properties and water resources from erosion and sediment damage throughout the life of the contract.

B. The contractor shall be responsible for stormwater runoff control and best management practices.

PART 2 - PRODUCTS

2.01 MATERIALS

A. Topsoil from trench activities shall be retained and reapplied to trench backfilled areas to restore existing grass. Grass established shall match the existing conditions.

B. Compost Filter Socks. Filter socks shall be tubular mesh sleeves containing compost, mulch, drain rock or other material. Size of filter socks and filter sock material shall be as indicated on the plans and shall be installed per manufacturer recommendations.

C. Tire Wash Down: Provide a designated tire wash-down area at construction egress points to prevent tracking of soil and debris onto public roadways. The wash-down area shall consist of a stabilized rock bed of sufficient length, width, and depth to remove soil from vehicle tires, underlain by filter fabric to prevent migration of fines into the subgrade. Provide a potable or non-potable water supply with hose and spray nozzle capable of delivering adequate pressure for manual cleaning of tires, wheel wells, and undercarriages as needed. The

system shall be configured to contain and infiltrate or otherwise control runoff within the site, preventing discharge of sediment-laden water onto adjacent paved surfaces or into storm drainage systems.

D. Tree Protection: Provide temporary tree protection barriers at all trees designated to remain, consisting of high-visibility orange polyethylene safety fencing securely supported by metal rebar stakes. Install fencing in a continuous perimeter around each tree or group of trees at the drip line or as indicated, with rebar stakes driven firmly into the ground at regular intervals to maintain an upright and stable barrier. The installation shall prevent equipment access, material storage, and soil disturbance within the protected area, preserving root zones and preventing damage to trunks, branches, and surrounding soil during construction activities.

PART 3 - EXECUTION

3.01 PREPARATION

A. Review site erosion control plan.

B. Deficiencies or changes in the erosion control plan as it is applied to current conditions will be brought to the attention of the Engineer for remedial action.

3.02 PRECONSTRUCTION REQUIREMENTS

A. Submit the following in accordance with SECTION 01330 – SUBMITTAL PROCEDURES:

1. Written site-specific BMP describing activities to minimize pollution and soil erosion into State waters, drainage or sewer systems. BMP's shall include the following:

    a. Details of the procedures used for the maintenance and subsequent removal of any erosion or siltation control devices.

    b. Methods of removing and disposing concrete and asphalt pavement cutting slurry, concrete curing water, and hydrodemolition water.

    c. Fugitive dust control, including dust from grinding, sweeping, or brooming off operations or combination thereof.

    d. Material storage and handling areas, and other staging areas.

    e. Concrete waste control.

    f. Tracking of sediment offsite from project entries and exits.

2. Provide plans indicating location of water pollution, dust and erosion control devices; provide plans and details of BMPs to be installed or utilized; indicate areas used for storage of aggregate, asphalt cold mix, soil or waste.

3. Construction schedule.

4. Name(s) of individual(s) designated responsible for water pollution, dust, and erosion controls on the project site. Include telephone number and e-mail contact information.

5. Description of fill material to be used.

6. Date and sign BMP. Keep accepted copy on site throughout duration of the project. Revisions to the BMP shall be included with original BMP. Modify

contract documents to conform to revisions. Include actual date of installation and removal of BMP. Obtain written acceptance by Engineer before revising BMP.

3.03 EROSION CONTROL IMPLEMENTATION

A. Place erosion control systems in accordance with the erosion control plan and applicable details prior to clearing, grubbing and earthwork in construction areas.

B. The Engineer has the authority to limit the surface area of erodible earth material exposed by clearing and grubbing, excavation, borrow and embankment operations and to direct the Contractor to provide immediate permanent or temporary pollution control measures. The Contractor will be required to incorporate all permanent erosion control features into the project at the earliest practical time to minimize the need for temporary controls.

C. The temporary erosion control systems installed by the Contractor shall be maintained as directed by the Engineer to control siltation at all times during the life of the contract. The Contractor must respond to any maintenance or additional work ordered by the Engineer within a 24 hour period.

D. Place permanent erosion control features in accordance with the construction plans and details, and recommended manufacturer guidelines.

3.04 CONSTRUCTION REQUIREMENTS

A. Install, maintain, monitor, repair and replace site-specific BMP measures, such as for water pollution, dust and erosion control; installation, monitoring, and operation of hydrotesting activities; removal and disposal of hazardous waste indicated on plans, concrete cutting slurry, concrete curing water; or hydrodemolition water.

B. Modify and resubmit plans and construction schedules to correct conditions that develop during construction which were unforeseen during the design and pre-construction stages. Coordinate temporary control provisions with permanent control features throughout the construction and post-construction period.

C. Limit the maximum surface area of earth material exposed at any time as required by the permit conditions and as shown on the Construction Plans. Do not expose or disturb surface area or earth material (including clearing and grubbing) until BMP measures are installed and accepted in writing by Engineer. Protect temporarily or permanently disturbed soil surface from rainfall impact, runoff and wind before end of workday.

D. BMP measures shall be in place and operational at the end of workday.

E. Minimize tracking of dirt and mud onto roadways. Clean dirt, mud, or other material tracked on the road immediately.

F. Cover exposed surface of materials completely with tarpaulin or similar device when transporting aggregate, soil, excavated material or material that may be source of fugitive dust.

G. Clean-up and remove any pollutant that can be attributed to Contractor's operations.

H. Install or modify BMP measures due to change in Contractor's means and methods, or for field revisions or omitted conditions to the accepted site-specific

BMP. Contractor shall ensure the satisfactory performance of the BMP at all times.

3.05 BMP REPORT SUBMITTALS

A. Properly maintain all BMP features. Inspect, prepare a written report and make repairs to BMP measures at following intervals:
   1. Weekly during dry periods.
   2. Within 24-hours of any rainfall of 0.5-inch or greater which occurs in a 24-hour period.
   3. Daily during periods of prolonged rainfall.
   4. When existing erosion control measures are damaged or not operating properly as required by site specific BMP.

B. Remove, destroy, replace or relocate any BMP that must be removed, destroyed, replaced or relocated due to potential or actual flooding, or potential danger or damage to project or public.

3.06 HYDROTESTING ACTIVITIES

A. If work includes removing, relocating or installing waterlines, and Contractor elects to flush waterline or discharge hydrotesting effluent into State waters or County drainage systems, obtain an NPDES Hydrotesting Waters Permit from the State Department of Health, Clean Water Branch (DOH-CWB). Do not begin hydrotesting activities until the DOH-CWB has issued a Notice of General Permit Coverage (NGPC). Hydrotesting operations shall be in accordance with conditions in NGPC. Submit a copy of the NPDES Hydrotesting Waters Application and Permit to the Engineer.

END OF SECTION

SECTION 02740 – ASPHALT CONCRETE PAVING

PART 1 – GENERAL

1.01 SUMMARY
A. Furnishing of all labor, materials, equipment and incidentals necessary to install new asphalt concrete paving with surface preparation and base course.

1.02 REFERENCE SPECIFICATIONS AND STANDARDS
A. The following construction standards, with certain modifications as hereinafter specified, are hereby incorporated into and made a part of these specifications by reference and shall be applicable to all work performed by the Contractor under this section.
   1. Specific sections of the County's Standard Specifications for Public Works Construction of the Department of Public Works, dated September 1986, as amended hereafter referred to as the County's Specifications.

   All references to measurement and payment shall be deleted.

1.03 DESCRIPTION
A. Work under this section consists of furnishing all labor, materials and equipment to complete the asphalt concrete paving as shown on the Drawings and as specified herein.

1.04 SUBMITTALS
A. Submit manufacturer's certificates of conformance for each type of bituminous material and for the job mix formula.

B. Submit certification that the specified herbicides were applied at the specified application rate over the entire subgrade to be paved.

PART 2 – PRODUCTS

2.01 ASPHALT CONCRETE PAVEMENT MATERIALS
A. Materials for asphalt concrete pavements shall conform to the requirements of the sections of the DPW Standard Specifications listed below, except as modified by these plans and/or specifications:

1.	Base Course, 1½-inch Maximum	Section 31
2.	Prime Coat for Pavement, MC30 or SS-1H	Section 33
3.	Tack Coat for Pavement, SS-1 or SS-1H	Section 33
4.	Asphalt Concrete Pavement, Mix #4	Section 34

2.02 ALUMINUM ASPHALT EDGE RESTRAINT
A. Manufacturer: Permaloc Corporation, Barrington, Illinois; or approved equal.

B. Product: Permaloc Aluminum Asphalt Edge Restraint, nominal 2 inch x 2.25 inch profile, designed for permanent restraint of asphalt paving edges.
   1. Material: Extruded aluminum alloy meeting ASTM B221, Alloy 6063-T6.
   2. Profile Dimensions: Vertical face: 2 inches.

3. Horizontal anchoring leg: 2.25 inches minimum.
4. Edge profile designed to provide a clean, straight finished asphalt edge.

C. Finish: Mill finish aluminum unless otherwise indicated.

D. Lengths: Standard manufactured lengths with interlocking or alignment tabs to maintain straight alignment during installation.

E. Anchorage: Manufacturer's recommended stainless steel spikes or stakes, minimum 10 inches long, spaced as recommended by manufacturer.

F. Accessories:

1. Factory or field-cut corner sections as required.
2. Splice plates or alignment tabs as required for continuous installation.

2.03 HERBICIDES

A. Pre-Paving Vegetation Destruction: Herbicide shall be Avenger Weed Killers, Scythe Herbicide, or Burnout II, or approved equal.

B. Pre-Emergence Control: Herbicide shall be "Casoron 4G" or Norosac 4G" or approved equal.

PART 3 – EXECUTION

3.01 SURFACE PREPARATION

A. The subgrade shall be prepared and compacted in accordance with the requirements of the DPW Standard Specifications. Soil tests shall be made at the subgrade level and the final pavement structure verified or modified as necessary.

B. Apply pre-paving herbicide to all new pavement areas. Application shall not be made immediately after heavy rains or when rain is forecasted within the next 48 hours. The herbicide shall be applied in accordance with the manufacturer's recommended procedures and rates. Perform two herbicide applications at least three days apart.

3.02 AGGREGATE BASE COURSE

A. The base course shall be constructed in accordance with Section 31 of the DPW Standard Specifications. Field density tests shall be made by the Owner's Geotechnical Engineer to verify that the compaction obtained meets the Specifications.

B. Apply pre-emergence herbicide on the prepared base for new asphalt concrete pavements in accordance with the manufacturer's recommendations.

3.03 ASPHALT CONCRETE PAVEMENT

A. The asphalt concrete pavement shall be constructed in accordance with Section 34 of the DPW Standard Specifications.

B. Smoothness. The finished surface of the pavement shall be true to grade and cross section, free from depressions and grainy spots, and of uniform texture. It shall not vary more than 1/8 of an inch over 10 feet.

C. Surface Tolerance. The finished surface of the asphalt concrete pavement shall be within 0.02 feet above or below the theoretical grade.

3.04 INSTALLATION

A. Install aluminum asphalt edge restraint in accordance with manufacturer's written instructions and approved shop drawings.

B. Set edge restraint true to line and grade to produce a clean, uniform edge for asphalt paving.

C. Secure edge restraint with manufacturer-recommended spikes or stakes driven through anchoring holes at spacing recommended by the manufacturer, but not exceeding 24 inches on center.

D. Join sections using manufacturer's alignment tabs, splice plates, or interlocking ends to maintain continuous alignment and prevent separation.

E. Install corner sections or field-cut sections as required to maintain smooth transitions and continuous restraint.

F. Where curved alignments are required, flex or segment the restraint in accordance with manufacturer recommendations to maintain smooth curves without distortion.

G. Place asphalt pavement tightly against the vertical face of the restraint to produce a clean finished edge.

3.05 FIELD QUALITY CONTROL

A. Inspect installed edge restraint for alignment, secure anchorage, and continuous support prior to placement of asphalt paving.

B. Reset or replace any sections that are misaligned, loose, or damaged prior to paving operations.

3.06 CLEANING AND PROTECTION

A. Remove debris resulting from installation.

B. Protect installed edge restraint from displacement or damage until asphalt paving operations are complete.

END OF SECTION

SECTION 02770 – CONCRETE CURBS, WALKWAYS AND DRIVEWAYS

PART 1 - GENERAL

1.01 SUMMARY

A. Section Includes: Furnishing of all materials, equipment, tools, labor and any incidental work necessary to construct the walkways as indicated on the Plans and specified herein in place and complete.

1.02 REFERENCES

A. Construction Standards: The following construction standards, with certain modifications as hereinafter specified, are hereby incorporated into and made a part of these specifications by reference and shall be applicable to all work performed by the Contractor under this section.

1. Specific sections of the County's Standard Specifications for Public Works Construction of the Department of Public Works, dated September 1986, as amended hereafter referred to as the County's Specifications.

All references to measurement and payment shall be deleted.

PART 2 - PRODUCTS

2.01 MATERIALS

A. Materials for concrete pavements shall be in accordance with the below-listed sections of the County's Specifications, except as amended in the plans and/or specifications herewith.

1. Portland Cement Concrete	Section 39
2. Reinforcing Steel	Section 48

PART 3 - EXECUTION

3.01 EXAMINATION

A. Before placement of concrete, carefully inspect the forms and the work of all other trades and verify that all work is complete.

B. Verify that all reinforcing steel construction, expansion joints and other embedded items in concrete are in place.

C. Verify that concrete forms are placed to the lines and elevations indicated on the Drawings, and check clearance from reinforcement.

3.02 INSTALLATION

A. All work shall be done as shown on the plans and as detailed in the Standard Details.

B. All work shall be done conforming to the applicable State or County Specifications, with the applicable sections noted herein before.

END OF SECTION

DIVISION 3 - CONCRETE

SECTION 03300 - CAST-IN-PLACE CONCRETE

PART 1 - GENERAL

1.01 SUMMARY

A. Section includes cast-in-place concrete, including formwork, reinforcement, concrete materials, mix design, placement procedures, and finishes.

1.02 DEFINITIONS

A. Cementitious Materials: Portland cement alone or in combination with one or more of blended hydraulic cement, fly ash and other pozzolans, ground granulated blast-furnace slag, and silica fume.

1.03 SUBMITTALS

A. Submit in accordance with SECTION 01300 – SUBMITTAL PROCEDURES.

B. Product Data:
   1. Reinforcing steel - Certified mill test results or laboratory test results. Indicate bar size, yield strength, ultimate tensile strength, elongation and bend test. Provide chemical composition for rebars that are to be welded.

C. Design Mixes: For each concrete mix. Include alternate mix designs when characteristics of materials, project conditions, weather, test results, or other circumstances warrant adjustments.
   1. Indicate amounts of mix water to be withheld for later addition at Project site.

D. Steel Reinforcement Shop Drawings: Details of fabrication, bending, and placement, prepared according to ACI 315, “Details and Detailing of Concrete Reinforcement.” Include material, grade, bar schedules, stirrup spacing, bent bar diagrams, arrangement, and supports of concrete reinforcement. Include special reinforcement required for openings through concrete structures. Shop drawings shall not be reproductions of the construction documents.

E. Formwork Shop Drawings: Prepared by or under the supervision of a qualified licensed professional engineer detailing fabrication, assembly, and support of formwork. Design and engineering of formwork are Contractor’s responsibility.

F. Welding Certificates: Copies of certificates for welding procedures and personnel.

G. Material Test Reports: From a qualified testing agency indicating and interpreting test results for compliance with the requirements indicated, based on comprehensive testing of current materials.

H. Material Certificates: Signed by manufacturers certifying that each of the following items complies with requirements:
   1. Form materials and form-release agents.
   2. Steel reinforcement and reinforcement accessories.
   3. Curing materials.

4. Floor and slab treatments.

5. Bonding agents.

6. Adhesives.

7. Epoxy joint filler.

8. Joint-filler strips.

9. Repair materials.

I. Minutes of pre-installation conference.

1.04 QUALITY ASSURANCE

A. Manufacturer Qualifications: A firm experienced in manufacturing ready-mixed concrete products complying with ASTM C 94 requirements for production facilities and equipment.

B. Testing Agency Qualifications: An independent testing agency, acceptable to authorities having jurisdiction, qualified according to ASTM C 1077 and ASTM E 329 to conduct the testing indicated, as documented according to ASTM E 548.
   1. Personnel conducting field tests shall be qualified as ACI Concrete Field Testing Technician, Grade 1, according to ACI CP-1 or an equivalent certification program.

C. Source Limitations: Obtain each type or class of cementitious material of the same brand from the same manufacturer's plant, each aggregate from one source, and each admixture from the same manufacturer.

D ACI Publications: Comply with the following, unless more stringent provisions are indicated and maintain a copy at the field office.
   1. ACI 301, “Specification for Structural Concrete.”

   2. ACI 117, “Specifications for Tolerances for Concrete Construction and Materials.”

   3. ACI 347R “Guide to Formwork for Concrete”

1.05 DELIVERY, STORAGE, AND HANDLING

A. Deliver, store, and handle steel reinforcement to prevent bending and damage.

PART 2 - PRODUCTS

2.01 FORM-FACING MATERIALS

A. Smooth-Formed Finished Concrete: Comply with ACI 347R. Provide new or good finish form-facing panels that will provide continuous, true, and smooth concrete surfaces. Furnish in largest practicable sizes to minimize number of joints.
   1. Plywood, metal, or other ACI 347R approved panel materials.

2. Exterior-grade plywood panels, suitable for concrete forms, complying with DOC PS 1, and as follows:
   a. High-density overlay, Class 1, or better.

   b. B-B (Concrete Form), Class 1, or better, mill oiled and edge sealed.

B. Rough-Formed Finished Concrete: Plywood, lumber, metal, or another approved material. Provide lumber dressed on at least two edges and one side for tight fit.

C. Chamfer Strips: Wood, metal, PVC, or rubber strips, 3/4 by 3/4-inch, minimum.

D. Form-Release Agent: Commercially formulated form-release agent that will not bond with, stain, or adversely affect concrete surfaces and will not impair subsequent treatments of concrete surfaces. Form oils or waxes shall not be used for concrete surfaces intended to be painted.
   1. Formulate form-release agent with rust inhibitor for steel form-facing materials.

E. Form Ties: Factory-fabricated, removable or snap-off metal or glass-fiber-reinforced plastic form ties designed to resist lateral pressure of fresh concrete on forms and to prevent spalling of concrete on removal.
   1. Furnish units that will leave no corrodible metal closer than 1-inch to the plane of the exposed concrete surface.

   2. Furnish ties that, when removed, will leave holes not larger than 1-1/2 inches in diameter in concrete surface.

   3. Furnish ties with integral water-barrier plates to walls indicated to receive dampproofing or waterproofing.

2.02 STEEL REINFORCEMENT

A. Reinforcing Bars: All reinforcing steel shall be ASTM A1035 CHROMX 4100 (Type CS or approved equal, deformed) corrosion-resistant reinforcing steel,

B. Tie Wire: Provide epoxy-coated or polymer-coated tie wire compatible with ChromX 4100 reinforcing steel.

C. Plain-Steel Welded Wire Fabric: ASTM A 185, fabricated from as-drawn steel wire into flat sheets.

D. Low-Alloy-Steel Reinforcing Bars: ASTM A 706/A 706M, deformed, for reinforcement that is welded and reinforcement resisting earthquake-induced flexure, axial force, or both in special structural walls as indicated on drawings

2.03 REINFORCEMENT ACCESSORIES

A. Bar Supports: Bolsters, chairs, spacers, and other devices for spacing, supporting, and fastening reinforcing bars and welded wire fabric in place that will not puncture the vapor retarder. Use plastic straps or brightly colored tie wires to secure reinforcing. Manufacture bar supports according to CRSI's "Manual of Standard Practice" from steel wire, plastic, or precast concrete or fiber-reinforced concrete of greater compressive strength than concrete, and as follows:

1. For concrete surfaces exposed to view where legs of wire bar supports contact forms, use CRSI Class 1 plastic-protected or CRSI Class 2 stainless-steel bar supports. Refer to paragraph entitled “STEEL REINFORCEMENT” for chair support spacing.

B. Joint Dowel Bars: Plain-steel bars, ASTM A 615/A 615M, Grade 60. Cut bars true to length with ends square and free of burrs.

C. Mechanical Reinforcing Bar Connectors: ACI/MCP-2 Type 2 in accordance with ACI 318. Mechanical splice shall develop both 125 percent of the minimum yield strength and the specified tensile strength of the spliced bar.

2.04 CONCRETE MATERIALS

A. Portland Cement: ASTM C 150, Type I or Type II.

B. Pozzolans
1. Fly Ash: ASTM C 618, Class C or F.

2. Blended Hydraulic Cement: ASTM C595M.

3. Ground Granulated Blast-Furnace Slag: ASTM C 989, Grade 100 or 120.

C. Blended Hydraulic Cement: ASTM C 595M; Type IS - portland blast-furnace slag cement, Type IP - portland/pozzolan cement, Type I (PM) - pozzolan-modified portland cement, or Type I (SM) - slag-modified portland cement.

D. Silica Fume: ASTM C 1240, amorphous silica.

E. Normal-Weight Aggregate: ASTM C 33, uniformly graded, and as follows:
1. Class: Moderate weathering region, but not less than 3M.

2. Size of Coarse Aggregate: Except when otherwise specified or permitted, maximum size of coarse aggregate shall not exceed three-fourths of the minimum clear spacing between reinforcing bars (or bundled bars), one-fifth of the narrowest dimension between the sides of forms, or one-third of the thickness of slabs or toppings.

F. Water: Potable and complying with ASTM C 94 or non potable meeting ASTM C-94 Acceptance Criteria for Questionable Water Supply. Use only potable water for job site mixing.

2.05 ADMIXTURES

A. General: Admixtures certified by manufacturer to contain not more than 0.1 percent water-soluble chloride ions by mass of cementitious material and to be compatible with other admixtures and cementitious materials. Do not use admixtures containing calcium chloride.

B. Air-Entraining Admixture: ASTM C 260.

C. Water-Reducing Admixture: ASTM C 494, Type A.

D. High-Range, Water-Reducing Admixture: ASTM C 494, Type F.

E. Water-Reducing and Accelerating Admixture: ASTM C 494, Type E.

F. Water-Reducing and Retarding Admixture: ASTM C 494, Type D.

2.06 FLOOR AND SLAB TREATMENTS

A. Slip-Resistive Aggregate Finish: Factory-graded, packaged, rustproof, nonglazing, abrasive aggregate of silicon carbide, or fused aluminum-oxide granules or crushed emery with emery aggregate containing not less than 50 percent aluminum oxide and not less than 25 percent ferric oxide; unaffected by moisture, and cleaning materials.

B. Unpigmented Mineral Dry-Shake Floor Hardener: Factory-packaged dry combination of portland cement, graded quartz aggregate, and plasticizing admixture.

C. Pigmented Mineral Dry-Shake Floor Hardener: Factory-packaged dry combination of portland cement, graded quartz aggregate, coloring pigments, and plasticizing admixture. Use coloring pigments that are finely ground, nonfading mineral oxides interground with cement.
   1. Colors: Match Project's samples.
   2. Colors: As indicated by referencing manufacturer's designations.
   3. Colors: As selected by Engineer from manufacturer's full range for these characteristics.

D. Penetrating Liquid Floor Treatment: Chemically reactive, waterborne solutions of inorganic silicate or siliconate or polymerized polyester polymer or other materials and proprietary components; odorless; colorless; that penetrates, hardens, waterproofs or densifies concrete surfaces.

2.07 CURING MATERIALS AND EVAPORATION RETARDERS

A. Evaporation Retarder: Waterborne, monomolecular film forming, manufactured for application to fresh concrete.

B. Absorptive Cover: AASHTO M 182, Class 2, burlap cloth made from jute or kenaf, weighing approximately 9 oz. per square yard dry.

C. Moisture-Retaining Cover: ASTM C 171, polyethylene film or white burlap-polyethylene sheet.

D. Water: Potable.

E. Clear, Waterborne, Membrane-Forming Curing Compound: ASTM C 309, Type 1, Class B, 22 percent solids.

F. Clear, Waterborne, Membrane-Forming Curing and Sealing Compound: ASTM C 1315, Type 1, Class A.

2.08 RELATED MATERIALS

A. Joint-Filler Strips: ASTM D 1751, asphalt-saturated cellulosic fiber.

B. Epoxy Joint Filler: Two-component, semirigid, 100 percent solids, epoxy resin with a Shore A hardness of 80 per ASTM D 2240.

C. Bonding Agent: ASTM C 1059, Type II, non-redispersible, acrylic emulsion or styrene butadiene.

D. Epoxy-Bonding Adhesive: ASTM C 881, two-component epoxy resin, capable of humid curing and bonding to damp surfaces, of class and grade to suit requirements, and as follows:
   1. Type II, non-load bearing, for bonding freshly mixed concrete to hardened concrete.

   2. Types I and II, non-load bearing, for bonding hardened or freshly mixed concrete to hardened concrete.

   3. Types IV and V, load bearing, for bonding hardened or freshly mixed concrete to hardened concrete.

E. Cementitious Coatings: Cement based polymer modified concrete finishing materials. Available Products subject to compliance with requirements, products that may be incorporated into the Work include, but are not limited to, the following:
   1. ProFinish by Bonded Materials, or accepted equivalent.

   2. Polycoat by Tremcrete Systems Incorporated, or accepted equivalent.

   3. Durus by Durus High Tech Cement, or accepted equivalent.

   4. MBT RS-1150 by Master Builders Technologies, or accepted equivalent.

F. Sleeves:
   1. Schedule 40 pipe, galvanized per ASTM A53.

   2. Schedule 40 PVC Pipe.

G. Reglets: Fabricate reglets of not less than (0.0217-inch) thick galvanized steel sheet. Temporarily fill or cover face opening of reglet to prevent intrusion of concrete or debris.

H. Dovetail Anchor Slots: Hot-dip galvanized steel sheet, not less than (0.0336 inch) thick, with bent tab anchors. Temporarily fill or cover face opening of slots to prevent intrusion of concrete or debris.

2.09 REPAIR MATERIALS

A. Repair Underlayment: Cement-based, polymer-modified, self-leveling product that can be applied in thicknesses from 1/8 inch and that can be feathered at edges to match adjacent floor elevations. Products shall contain no added gypsum.
   1. Cement Binder: ASTM C 150, portland cement or hydraulic or blended hydraulic cement as defined in ASTM C 219.

2. Primer: Product of underlayment manufacturer recommended for substrate, conditions, and application.

3. Aggregate: Well-graded, washed gravel, 1/8 to 1/4-inch or coarse sand as recommended by underlayment manufacturer.

4. Compressive Strength: Not less than 4000 psi (27.6 MPa) at 28 days when tested according to ASTM C 109/C 109M.

B. Repair Topping: Traffic-bearing, cement-based, polymer-modified, self-leveling product that can be applied in thicknesses from 1/4-inch. Products shall contain no added gypsum.
1. Cement Binder: ASTM C 150, portland cement or hydraulic or blended hydraulic cement as defined in ASTM C 219.

2. Primer: Product of topping manufacturer recommended for substrate, conditions, and application.

3. Aggregate: Well-graded, washed gravel, 1/8 to 1/4-inch or coarse sand as recommended by topping manufacturer.

4. Compressive Strength: Not less than 5500 psi (39 MPa) at 28 days when tested according to ASTM C 109/C 109M.

2.10 CONCRETE MIXES

A. Prepare design mixes for each type and strength of concrete determined by either laboratory trial mix or field test data bases, as follows:
1. Proportion normal-weight concrete according to ACI 211.1 and ACI 301.

B. Concrete Properties: See structural drawings.

C. Slab Vapor Emissions Rates: At the time of finished flooring installation, vapor emissions shall not exceed a maximum of 5 pounds per 1000 square feet per 24 hours or the maximum emission established by the flooring manufacturer whichever is less. If the vapor emission rate exceeds the limit specified, take measures specified in accordance with item entitled “DRYING CONCRETE SLABS TO LIMIT MOISTURE VAPOR EMISSIONS AND ALKALINITY” to reduce the emissions to an acceptable level without delaying the project.

D. Cementitious Materials: Limit percentage, by weight, of cementitious materials other than portland cement in concrete as follows:
1. Fly Ash: 25 percent.

2. Combined Fly Ash and Pozzolan: 25 percent.

3. Ground Granulated Blast-Furnace Slag: 50 percent.

4. Combined Fly Ash or Pozzolan and Ground Granulated Blast-Furnace Slag: 50 percent portland cement minimum, with fly ash or pozzolan not exceeding 25 percent.

5. Silica Fume: 10 percent.

6. Combined Fly Ash, Pozzolans, and Silica Fume: 35 percent with fly ash or pozzolans not exceeding 25 percent and silica fume not exceeding 10 percent.

7. Combined Fly Ash or Pozzolans, Ground Granulated Blast-Furnace Slag, and Silica Fume: 50 percent portland cement minimum, with fly ash or pozzolans not exceeding 25 percent and silica fume not exceeding 10 percent.

E. Maximum Water-Cementitious Materials Ratio:
   1. 0.40 for exterior concrete columns, beams and other concrete exposed to weather.

   2. 0.45 for concrete required to have low permeability, interior slabs with vapor sensitive floor coverings.

F. Do not add air entrainment to concrete of trowel-finished interior floors and suspended slabs. Do not allow entrapped air content to exceed 3 percent.

G. Limit water-soluble, chloride-ion content in hardened concrete per ACI 318 Chapter 19 for corrosion protection of reinforcing steel.

H. Admixtures: Use admixtures according to manufacturer's written instructions.
   1. Use water-reducing admixture or high-range water-reducing admixture (superplasticizer) in concrete, as required, for placement and workability.

   2. Use water-reducing and retarding admixture when required by high temperatures, low humidity, or other adverse placement conditions.

   3. Use water-reducing admixture in pumped concrete, concrete for heavy-use industrial slabs and parking structure slabs, concrete required to be watertight, and concrete with a water-cementitious materials ratio below 0.50.

2.11 FABRICATING REINFORCEMENT

A. Fabricate steel reinforcement according to CRSI's "Manual of Standard Practice."

2.12 CONCRETE MIXING

A. Ready-Mixed Concrete: Measure, batch, mix, and deliver concrete according to ASTM C 94, and ASTM C 1116 and furnish batch ticket information. Batch ticket information shall include design mix reference, water that can be added at the jobsite, and admixtures. For transit mixing, complete not less than 70 revolutions of the drum at the manufacturer's rated mixing speed. Discharge concrete into its final position within 90 minutes after introduction of batch water to the cement. If a retarder admixture is used, the discharge time limit of 90 minutes may be increased by the time specified for retardation by the admixture manufacturer or the concrete supplier. Mix concrete a minimum of one minute at mixing speed immediately prior to discharge.

B. Project-Site Mixing: Measure, batch, and mix concrete materials according to ASTM C 94. Mix concrete materials in appropriate drum-type batch machine mixer.

1. For mixer capacity of one cubic yard (0.76 cubic meter) or less, continue mixing at least one and one-half minutes, but not more than five minutes after all ingredients are in mixer, before any part of batch is released.

2. For mixer capacity larger than one cubic yard (0.76 cubic meter), increase mixing time by 15 seconds for each additional one cubic yard (0.76 cubic meter).

3. Provide batch ticket for each batch discharged and used in the Work, indicating Project identification name and number, date, mix type, mix time, quantity, and amount of water added. Record approximate location of concrete placement in structure.

4. Hand mixed concrete will not be allowed, except to make up shortages for fence post footing, thresholds, curbs and gutters, thrust block and utility trench encasements.

PART 3 - EXECUTION

3.01 FORMWORK

A. Design, erect, shore, brace, and maintain formwork, according to ACI 301, to support vertical, lateral, static, and dynamic loads, and construction loads that might be applied, until concrete structure can support such loads.

B. Construct formwork so concrete members and structures are of size, shape, alignment, elevation, and position indicated, within tolerance limits of ACI 117.

C. Limit concrete surface irregularities, designated by ACI 347R as abrupt or gradual, as follows:
   1. Class A, 1/8 inch for surfaces exposed to public view.

   2. Class C, 1/2 inch.

D. Construct forms to prevent loss of concrete mortar.

E. Fabricate forms for easy removal without hammering or prying against concrete surfaces. Provide crush or wrecking plates where stripping may damage cast concrete surfaces. Provide top forms for inclined surfaces steeper than 1.5 horizontal to 1 vertical. Kerf wood inserts for forming keyways, reglets, recesses, and the like, for easy removal.
   1. Do not use rust-stained steel form-facing material.

F. Set edge forms, bulkheads, and intermediate screed strips for slabs to achieve required elevations and slopes in finished concrete surfaces. Provide and secure units to support screed strips; use strike-off templates or compacting-type screeds. Maintain the integrity of the vapor retarder membrane.

G. Provide temporary openings for cleanouts and inspection ports where interior area of formwork is inaccessible. Close openings with panels tightly fitted to forms and securely braced to prevent loss of concrete mortar. Locate temporary openings in forms at inconspicuous locations.

H. Chamfer exterior corners and edges of permanently exposed concrete.

I. Form openings, chases, offsets, sinkages, keyways, reglets, blocking, screeds, and bulkheads required in the Work. Determine sizes and locations from trades providing such items.

J. Clean forms and adjacent surfaces to receive concrete. Remove chips, wood, sawdust, dirt, and other debris just before placing concrete.

K. Retighten forms and bracing before placing concrete, as required, to prevent mortar leaks and maintain proper alignment.

L. Coat contact surfaces of forms with form-release agent, according to manufacturer's written instructions, before placing reinforcement.

3.02 EMBEDDED ITEMS

A. Place and secure anchorage devices and other embedded items required for adjoining work that is attached to or supported by cast-in-place concrete. Use Setting Drawings, templates, diagrams, instructions, and directions furnished with items to be embedded.
   1. Install anchor bolts, accurately located, to elevations required.

   2. Install reglets to receive top edge of foundation sheet waterproofing and to receive through-wall flashings in outer face of concrete frame at exterior walls, where flashing is shown at lintels, shelf angles, and other conditions.

   3. Install dovetail anchor slots in concrete structures as indicated.

   4. Install inserts, hangers, metal ties, nailing strips, blocking, grounds and other fastening devices needed for attachment of other work.

B. Obtain DAGS Representative’s approval to install conduit or pipe penetrations that may unduly impair the strength of the structural member (for example, multiple pipe penetrations near the face of a column).

3.03 REMOVING AND REUSING FORMS

A. General: Formwork, for sides of beams, walls, columns, and similar parts of the Work, that does not support weight of concrete may be removed after cumulatively curing at not less than 50 degrees F (10 degrees C) for 24 hours after placing concrete provided concrete is hard enough to not be damaged by form-removal operations and provided curing and protection operations are maintained. The 24-hour period may be reduced to 12 hours in compliance with ACI 347R with prior approval from the Engineer.

B. Leave formwork, for beam soffits, joists, slabs, and other structural elements, that supports weight of concrete in place until concrete has achieved the following:
   1. 28-day design compressive strength.

   2. Determine compressive strength of in-place concrete by testing representative field or laboratory-cured test specimens according to ACI 301.

3. Remove forms only if shores have been arranged to permit removal of forms without loosening or disturbing shores.

C. Clean and repair surfaces of forms to be reused in the Work. Split, frayed, delaminated, or otherwise damaged form-facing material will not be acceptable for exposed surfaces. Apply new form-release agent.

D. When forms are reused, clean surfaces, remove fins and laitance, and tighten to close joints. Align and secure joints to avoid offsets. Do not use patched forms for exposed concrete surfaces unless approved by Engineer.

3.04 STEEL REINFORCEMENT

A. General: Comply with CRSI's "Manual of Standard Practice" for placing reinforcement.

B. Clean reinforcement of loose rust and mill scale, earth, and other foreign materials.

C. Accurately position, support, and secure reinforcement against displacement. Locate and support reinforcement with bar supports to maintain minimum concrete cover. Do not tack weld crossing reinforcing bars.
1. Shop or field-weld reinforcement according to AWS D1.4, where indicated.

2. Support slab reinforcing bars and welded wire fabric (WWF) as follows:

BAR SIZE	MAXIMUM DISTANCE BETWEEN SUPPORTS
#3	2 feet
#4	3 feet
#5	4 feet
#3 at 15 inches E.W.	4 feet 6 inches o.c. each
WIRE FABRIC SHEETS	MAXIMUM DISTANCE BETWEEN SUPPORTS
6 x 6 - W2.9/w2.9	2 feet 0 inches o.c. each
6 x 6 - W6/W6	3 feet 0 inches o.c. each

D. Set wire ties with ends directed into concrete, not toward exposed concrete surfaces.

E. Install welded wire fabric in longest practicable lengths on bar supports spaced to minimize sagging. Lap edges and ends of adjoining sheets at least one mesh spacing. Offset laps of adjoining sheet widths to prevent continuous laps in either direction. Lace overlaps with wire.

3.05 JOINTS

A. General: Construct joints true to line with faces perpendicular to surface plane of concrete.

B. Construction Joints: Install so strength and appearance of concrete are not impaired, at locations indicated or as approved by Engineer.
   1. Place joints perpendicular to main reinforcement. Continue reinforcement across construction joints, unless otherwise indicated. Do not continue reinforcement through sides of strip placements of floors and slabs.

   2. Locate horizontal joints in walls and columns at underside of floors, slabs, beams, and girders and at the top of footings or floor slabs.

   3. Space vertical joints in walls as indicated. Locate joints beside piers integral with walls, near corners, and in concealed locations where possible.

   4. Use epoxy-bonding adhesive at locations where fresh concrete is placed against hardened or partially hardened concrete surfaces.

C. Contraction Joints in Slabs-on-Grade: Form weakened-plane contraction joints, sectioning concrete into areas as indicated. Construct contraction joints for a depth equal to at least one-fourth of concrete thickness, as follows:
   1. Grooved Joints: Form contraction joints after initial floating by grooving and finishing each edge of joint to a radius of 1/8-inch. Repeat grooving of contraction joints after applying surface finishes. Eliminate groover tool marks on concrete surfaces.

   2. Sawed Joints: Form contraction joints with power saws equipped with shatterproof abrasive or diamond-rimmed blades. Cut 1/8-inch wide joints into concrete when cutting action will not tear, abrade, or otherwise damage surface and before concrete develops random contraction cracks.

D. Isolation Joints in Slabs-on-Grade: After removing formwork, install joint-filler strips at slab junctions with vertical surfaces, such as column pedestals, foundation walls, grade beams, and other locations, as indicated.
   1. Extend joint-filler strips full width and depth of joint, terminating flush with finished concrete surface, unless otherwise indicated.

   2. Install joint-filler strips in lengths as long as practicable. Where more than one length is required, lace or clip sections together.

E. Dowel Joints: Install dowel sleeves and dowels or dowel bar and support assemblies at joints where indicated.
   1. Use dowel sleeves or lubricate or asphalt-coat one-half of dowel length to prevent concrete bonding to one side of joint.

3.06 CONCRETE PLACEMENT

A. Before placing concrete, verify that installation of formwork, reinforcement, and embedded items is complete and that required inspections have been performed. Provide one day notification to Engineer for each scheduled pour.

B. Before placing concrete, water may be added at Project site, subject to limitations of ACI 301. Up to 2 gallons of water per cubic yard of concrete may be added at the jobsite provided the approved design mix accommodates the additional water.

1. Do not add water to concrete after adding high-range water-reducing admixtures to mix.

C. Convey concrete from mixer to the place of final deposit rapidly by methods that prevent segregation or loss of ingredients and will insure the required quality of concrete. Use conveying equipment, conveyors, hoppers, baffles, chutes, pumps that are sized and designed to prevent cold joints from occurring and prevent segregation in discharged concrete. Clean conveying equipment before each placement.

D. Deposit concrete continuously or in layers of such thickness that no new concrete will be placed on concrete that has hardened enough to cause seams or planes of weakness. If a section cannot be placed continuously, provide construction joints as specified. Deposit concrete to avoid segregation.

E. Deposit concrete in forms in horizontal layers with proper consolidation into previous layers and in a manner to avoid inclined construction joints. Place each layer while preceding layer is still plastic, to avoid cold joints. For high wall pours (above 12 feet), Contractor must show its experience and demonstrate its proficiency before the State will permit pours in excess of 12 feet.
   1. Consolidate placed concrete with mechanical vibrating equipment. Use equipment and procedures for consolidating concrete recommended by ACI 309R.

   2. Do not use vibrators to transport concrete inside forms. Insert and withdraw vibrators vertically at uniformly spaced locations no farther than the visible effectiveness of the vibrator. Place vibrators to rapidly penetrate placed layer and at least 6 inches into preceding layer. Do not insert vibrators into lower layers of concrete that have begun to lose plasticity. At each insertion, limit duration of vibration to time necessary to consolidate concrete and complete embedment of reinforcement and other embedded items without causing mix constituents to segregate.

   3. Make construction joints only where located on Drawings unless otherwise approved by the State. Plan pours to continuously place concrete from one construction joint to another.

F. Deposit and consolidate concrete for floors and slabs in a continuous operation, within limits of construction joints, until placement of a panel or section is complete.
   1. Consolidate concrete during placement operations so concrete is thoroughly worked around reinforcement and other embedded items and into corners.

   2. Maintain reinforcement in position on chairs during concrete placement.

   3. Screed slab surfaces with a straightedge and strike off to correct elevations.

   4. Slope surfaces uniformly to drains where required.

   5. Begin initial floating using bull floats or darbies to form a uniform and open-textured surface plane, free of humps or hollows, before excess moisture or

bleed-water appears on the surface. Do not further disturb slab surfaces before starting finishing operations.

G. Hot-Weather Placement: Place concrete according to recommendations in ACI 305R and as follows, when hot-weather conditions exist:
   1. Cool ingredients before mixing to maintain concrete temperature below 90 degrees F at time of placement. Chilled mixing water or chopped ice may be used to control temperature, provided water equivalent of ice is calculated to total amount of mixing water. Using liquid nitrogen to cool concrete is Contractor's option.

   2. Cover steel reinforcement with water-soaked burlap so steel temperature will not exceed ambient air temperature immediately before embedding in concrete.

   3. Fog-spray forms, steel reinforcement, and subgrade just before placing concrete. Keep subgrade moisture uniform without standing water, soft spots, or dry areas.

3.07 CONCRETE SLABS ON GRADE

A. For interior areas, unless specified elsewhere, place concrete floor slabs directly over vapor retarder overlain atop basaltic termite barrier (or granular fill-capillary barrier if BTB is not used in the Project) and reinforce slabs as indicated on the drawings.
   1. Place floor slabs in alternate panels, long strip pattern, and following construction or contraction joints. "Keyed Kold Joint" may be used in lieu of placement in alternate panels in areas where floor covering is specified provided all shrinkage cracks are sealed prior to installation of floor covering.

   2. Provide a bond-break filler strip, between concrete slab and abutting vertical surfaces and as detailed.

B. For exterior areas, unless specified elsewhere, place concrete floor slabs directly over granular fill or compacted fill and reinforce slabs with synthetic fibers. Provide isolation and contraction joints where detailed and, at intersections, corners and at abutments. Place contraction joints not more than 40 feet apart, unless detailed otherwise.
   1. Finish concrete true to grade, section and cross slope for sloped or crowned walks at 1.5% (1% minimum and 2% maximum). Round edges to 1/8" radius except saw-cut joints. Finish steps in connection with walks with same finish as walks.

3.08 FINISHING FORMED SURFACES

A. Rough-Formed Finish: As-cast concrete texture imparted by form-facing material with tie holes and defective areas repaired and patched. Remove fins and other projections exceeding ACI 347R limits for class of surface specified.

B. Smooth-Formed Finish: As-cast concrete texture imparted by form-facing material, arranged in an orderly and symmetrical manner with a minimum of seams. Repair and patch tie holes and defective areas. Remove fins and other projections exceeding 1/8 inch in height.

1. Apply to concrete surfaces exposed to public view or to be covered with a coating or covering material applied directly to concrete, such as waterproofing, dampproofing, veneer plaster, or painting.

2. Do not apply rubbed finish to smooth-formed finish.

C. Rubbed Finish: Apply the following to smooth-formed finished concrete:
   1. Smooth-Rubbed Finish: Not later than one day after form removal, moisten concrete surfaces and rub with carborundum brick or another abrasive until producing a uniform color and texture. Do not apply cement grout other than that created by the rubbing process.

   2. Cementitious Coating (Cement Wash): Prepare, apply and cure the coating per manufacturer's requirements. Apply in 1/16-inch thick coats not to exceed 1/8-inch.
      a. Cementitious coatings are finished coatings and not to be used as patching or repair materials. Cement-sand-water mix are not cementitious coatings as defined under paragraph 2.11.E. Under no circumstances will products containing gypsum plaster be allowed as a cementitious coating.

D. Related Unformed Surfaces: At tops of walls, horizontal offsets, and similar unformed surfaces adjacent to formed surfaces, strike off smooth and finish with a texture matching adjacent formed surfaces. Continue final surface treatment of formed surfaces uniformly across adjacent unformed surfaces, unless otherwise indicated.

3.09 FINISHING FLOORS AND SLABS

A. General: Comply with recommendations in ACI 302.1R for screeding, restraightening, and finishing operations for concrete surfaces. Do not wet concrete surfaces.

B. Scratch Finish: While still plastic, texture concrete surface that has been screeded and bull-floated or darbied. Use stiff brushes, brooms, or rakes.
   1. Apply scratch finish to surfaces indicated and to surfaces to receive concrete floor topping or mortar setting beds for ceramic or quarry tile, portland cement terrazzo, and other bonded cementitious floor finishes.

C. Float Finish: Consolidate surface with power-driven floats or by hand floating if area is small or inaccessible to power driven floats. Restraighten, cut down high spots, and fill low spots. Repeat float passes and restraightening until surface is left with a uniform, smooth, granular texture.
   1. Apply float finish to surfaces indicated, to surfaces to receive trowel finish, and to floor and slab surfaces to be covered with fluid-applied or sheet waterproofing, built-up or membrane roofing, or sand-bed terrazzo.

D. Trowel Finish: After applying float finish, apply first trowel finish and consolidate concrete by hand or power-driven trowel. Continue troweling passes and restraighten until surface is free of trowel marks and uniform in texture and appearance. Grind smooth any surface defects that would telegraph through applied coatings or floor coverings.

1. Apply a trowel finish to surfaces indicated and to floor and slab surfaces exposed to view or to be covered with resilient flooring, carpet, ceramic or quarry tile set over a cleavage membrane, paint, or another thin film-finish coating system.

2. Finish surfaces to the following tolerances, measured within 24 hours according to ASTM E 1155/E 1155M for a randomly trafficked floor surface:
   a. Specified overall values of flatness, F(F) 35; and levelness, F(L) 25; with minimum local values of flatness, F(F) 24; and levelness, F(L) 17; for slabs-on-grade.

   a. Specified overall values of flatness, F(F) 30; and levelness, F(L) 20; with minimum local values of flatness, F(F) 24; and levelness, F(L) 15; for suspended slabs.

3. Finish and measure surface so gap at any point between concrete surface and an unleveled freestanding 10-foot-long straightedge, resting on two high spots and placed anywhere on the surface, does not exceed the following:
   a. 1/4 inch

E. Trowel and Fine-Broom Finish: Apply a partial trowel finish, stopping after second troweling, to surfaces indicated and to surfaces where ceramic or quarry tile is to be installed by either thickset or thin-set method. Immediately after second troweling, and when concrete is still plastic, slightly scarify surface with a fine broom.

F. Broom Finish: Apply a broom finish to exterior concrete platforms, steps, and ramps, and elsewhere as indicated.
   1. Immediately after float finishing, slightly roughen trafficked surface by brooming with fiber-bristle broom perpendicular to main traffic route. Coordinate required final finish with Engineer before application.

G. Slip-Resistive Aggregate Finish: Before final floating, apply slip-resistive aggregate finish where indicated and to concrete stair treads, platforms, and ramps. Apply according to manufacturer's written instructions and as follows:
   1. Uniformly spread 25 lb/100 sq. ft. of dampened slip-resistive aggregate over surface in one or two applications. Tamp aggregate flush with surface, but do not force below surface.

   2. After broadcasting and tamping, apply float finish.

   3. After curing, lightly work surface with a steel wire brush or an abrasive stone, and water to expose slip-resistive aggregate.

I. Unpigmented Mineral Dry-Shake Floor Hardener Finish: After initial floating, apply mineral dry-shake materials to surfaces according to manufacturer's written instructions and as follows:

   1. Uniformly apply mineral dry-shake materials at a rate of 100 lb/100 sq. ft., unless greater amount is recommended by manufacturer.

2. Uniformly distribute approximately two-thirds of mineral dry-shake materials over surface by hand or with mechanical spreader, and embed by power floating. Follow power floating with a second mineral dry-shake application, uniformly distributing remainder of material, and embed by power floating.

3. After final floating, apply a trowel finish. Cure concrete with curing compound recommended by dry-shake material manufacturer and apply immediately after final finishing.

J. Color Finish (Pigmented Mineral Dry-Shake Floor Hardener): Prior to color application, manufacturer's representative shall instruct finisher on application and curing requirements of Color Floor Hardener and be present during application. After initial floating, apply mineral dry-shake materials to surfaces according to manufacturer's written instructions and as follows:
1. Uniformly apply mineral dry-shake materials at a rate of 100 lb/100 sq. ft., unless greater amount is recommended by manufacturer. Do not cast material into standing water.

2. Uniformly distribute approximately two-thirds of mineral dry-shake materials over surface by hand or with mechanical spreader, and embed by power floating. Follow power floating with a second mineral dry-shake application at right angles to first application, uniformly distributing remainder of material, and embed by power floating.

3. After final floating, apply a trowel finish. Take care not to over trowel and "burn" the surface. Cure concrete with curing compound recommended by dry-shake material manufacturer and apply immediately after final finishing.

3.10 MISCELLANEOUS CONCRETE ITEMS

A. Filling In: Fill in holes and openings left in concrete structures, unless otherwise indicated, after work of other trades is in place. Mix, place, and cure concrete, as specified, to blend with in-place construction. Provide other miscellaneous concrete filling indicated or required to complete Work.

B. Curbs: Provide monolithic finish to interior curbs by stripping forms while concrete is still green and by steel-troweling surfaces to a hard, dense finish with corners, intersections, and terminations slightly rounded.

C. Equipment Bases and Foundations: Provide machine and equipment bases and foundations as shown on Drawings. Set anchor bolts for machines and equipment at correct elevations, complying with diagrams or templates of manufacturer furnishing machines and equipment.

D. Steel Pan Stairs: Provide concrete fill for steel pan stair treads, landings, and associated items. Cast-in inserts and accessories as shown on Drawings. Screed, tamp, and trowel-finish concrete surfaces.

3.11 CONCRETE PROTECTION AND CURING

A. General: Protect freshly placed concrete from premature drying and excessive cold or hot temperatures. Comply with recommendations in ACI 305R for hot-weather protection during curing.

B. Evaporation Retarder: Apply evaporation retarder to unformed concrete surfaces before and during finishing operations. Apply according to manufacturer's written instructions after placing, screeding, and bull floating or darbying concrete, but before float finishing.

C. Formed Surfaces: Cure formed concrete surfaces, including underside of beams, supported slabs, and other similar surfaces. If forms remain during curing period, moist cure after loosening forms. If removing forms before end of curing period, continue curing by one or a combination of the curing methods listed in paragraph entitled "Unformed Surfaces."

D. Unformed Surfaces: Begin curing immediately after finishing concrete. Cure unformed surfaces, including floors and slabs, concrete floor toppings, and other surfaces, by one or a combination of the following methods:
   1. Moisture Curing: Keep surfaces continuously moist for not less than seven days with the following materials:
      a. Water.
      b. Continuous water-fog spray.
      c. Absorptive cover, water saturated, and kept continuously wet. Cover concrete surfaces and edges with 12-inch lap over adjacent absorptive covers.

   2. Moisture-Retaining-Cover Curing: Cover concrete surfaces with moisture-retaining cover for curing concrete, placed in widest practicable width, with sides and ends lapped at least 12 inches, and sealed by waterproof tape or adhesive. Cure for not less than 7 days. Immediately repair any holes or tears during curing period using cover material and waterproof tape.
      a. Moist cure or use moisture-retaining covers to cure concrete surfaces to receive floor coverings.

      b. Moist cure or use moisture-retaining covers to cure concrete surfaces to receive penetrating liquid floor treatments.

      c. Cure concrete surfaces to receive floor coverings with either a moisture-retaining cover or a curing compound that the manufacturer recommends for use with floor coverings.

   3. Curing Compound: Apply uniformly in continuous operation by spray or roller according to manufacturer's written instructions. Recoat areas subjected to heavy rainfall within three hours after initial application. Maintain continuity of coating and repair damage during curing period.

   4. Curing and Sealing Compound: Apply uniformly to floors and slabs indicated in a continuous operation by spray or roller according to manufacturer's written instructions. Recoat areas subjected to heavy rainfall within three hours after initial application where recommended by the manufacturer. Repeat process 24 hours later and apply a second coat. Maintain continuity of coating and repair damage during curing period.

3.12 JOINT FILLING

A. Prepare, clean, and install joint filler according to manufacturer's written instructions. Defer joint filling as long as possible. Do not fill joints until construction traffic has permanently ceased.

B. Remove dirt, debris, saw cuttings, curing compounds, and sealers from joints; leave contact faces of joint clean and dry.

C. Install semirigid epoxy joint filler full depth in saw-cut joints and at least 2 inches deep in formed joints. Overfill joint and trim joint filler flush with top of joint after hardening.

3.13 CONCRETE SURFACE REPAIRS

A. Defective Concrete: Repair and patch defective areas. Remove and replace concrete that cannot be repaired and patched to Engineer's approval.

B. Patching Mortar: Mix dry-pack patching mortar, consisting of one-part portland cement to two and one-half parts fine aggregate passing a No. 16(1.2-mm) sieve, using only enough water for handling and placing.

C. Repairing Formed Surfaces: Surface defects include color and texture irregularities, cracks, spalls, air bubbles, honeycombs, rock pockets, fins and other projections on the surface, and stains and other discolorations that cannot be removed by cleaning.
   1. Immediately after form removal, cut out honeycombs, rock pockets, and voids more than 1/2-inch in any dimension in solid concrete but not less than 1-inch in depth. Make edges of cuts perpendicular to concrete surface. Clean, dampen with water, and brush-coat holes and voids with bonding agent. Fill and compact with patching mortar before bonding agent has dried. Fill form-tie voids with patching mortar or cone plugs secured in place with bonding agent.

   2. Repair defects on surfaces exposed to view by blending white portland cement and standard portland cement so that, when dry, patching mortar will match surrounding color. Patch a test area at inconspicuous locations to verify mixture and color match before proceeding with patching. Compact mortar in place and strike off slightly higher than surrounding surface.

   3. Repair defects on concealed formed surfaces that affect concrete's durability and structural performance as determined by Engineer.

D. Repairing Unformed Surfaces: Test unformed surfaces, such as floors and slabs, for finish and verify surface tolerances specified for each surface. Correct low and high areas. Test surfaces sloped to drain for trueness of slope and smoothness; use a sloped template.
   1. Repair finished surfaces containing defects. Surface defects include spalls, popouts, honeycombs, rock pockets, crazing and cracks in excess of 0.01-inch wide or that penetrate to reinforcement or completely through unreinforced sections regardless of width, and other objectionable conditions.

   2. After concrete has cured at least 14 days, correct high areas by grinding.

3. Correct localized low areas during or immediately after completing surface finishing operations by cutting out low areas and replacing with patching mortar. Finish repaired areas to blend into adjacent concrete.

4. Correct other low areas scheduled to receive floor coverings with a repair underlayment. Prepare, mix, and apply repair underlayment and primer according to manufacturer's written instructions to produce a smooth, uniform, plane, and level surface. Feather edges to match adjacent floor elevations.

5. Correct other low areas scheduled to remain exposed with a repair topping. Cut out low areas to ensure a minimum repair topping depth of 1/4-inch to match adjacent floor elevations. Prepare, mix, and apply repair topping and primer according to manufacturer's written instructions to produce a smooth, uniform, plane, and level surface.

6. Repair defective areas, except random cracks and single holes 1-inch or less in diameter, by cutting out and replacing with fresh concrete. Remove defective areas with clean, square cuts and expose steel reinforcement with at least 3/4-inch clearance all around. Dampen concrete surfaces in contact with patching concrete and apply bonding agent. Mix patching concrete of same materials and mix as original concrete except without coarse aggregate. Place, compact, and finish to blend with adjacent finished concrete. Cure in same manner as adjacent concrete.

7. Repair random cracks and single holes 1-inch or less in diameter with patching mortar. Groove top of cracks and cut out holes to sound concrete and clean off dust, dirt, and loose particles. Dampen cleaned concrete surfaces and apply bonding agent. Place patching mortar before bonding agent has dried. Compact patching mortar and finish to match adjacent concrete. Keep patched area continuously moist for at least 72 hours.

E. Perform structural repairs of concrete, subject to Engineer's approval, using epoxy adhesive and patching mortar.

F. Repair materials and installation not specified above may be used, subject to Engineer's approval.

3.14 FIELD QUALITY CONTROL

A. Testing Agency: Engage a qualified independent testing and inspecting agency to sample materials, perform tests, and submit test reports during concrete placement according to requirements specified in this Article.

B. Testing Services: Testing of composite samples of fresh concrete obtained according to ASTM C 172 shall be performed according to the following requirements:
   1. Testing Frequency: Obtain at least one composite sample for each 100 cubic yard or fraction thereof of each concrete mix placed each day.
      a. When frequency of testing will provide fewer than five compressive strength tests for each concrete mix, testing shall be conducted from at least five randomly selected batches or from each batch if fewer than five are used.

2. Slump: ASTM C 143; one test at point of placement for each composite sample, but not less than one test for each day's pour of each concrete mix. Perform additional tests when concrete consistency appears to change.

3. Air Content: ASTM C 231, pressure method, for normal-weight concrete; ASTM C 173, volumetric method, for structural lightweight concrete; one test for each composite sample, but not less than one test for each day's pour of each concrete mix.

4. Concrete Temperature: ASTM C 1064; one test hourly when air temperature is 40 degrees F (4.4 degrees C) and below and when 80 degrees F (27 degrees C) and above, and one test for each composite sample.

5. Compression Test Specimens: ASTM C 31/C 31M; cast and laboratory cure one set of four 6 x 12 inch standard cylinder specimens for each composite sample.
   a. Cast and field cure one set of four standard cylinder specimens for each composite sample.

6. Compressive-Strength Tests: ASTM C 39; test two laboratory-cured specimens at 7 days and two at 28 days.
   a. Test two field-cured specimens at 7 days and two at 28 days.

   b. A compressive-strength test shall be the average compressive strength from two specimens obtained from same composite sample and tested at age indicated.

C. When strength of field-cured cylinders is less than 85 percent of companion laboratory-cured cylinders, Contractor shall evaluate operations and provide corrective procedures for protecting and curing in-place concrete.

D. Strength of each concrete mix will be satisfactory if every average of any three consecutive compressive-strength tests equals or exceeds specified compressive strength and no compressive-strength test value falls below specified compressive strength by more than 500 psi.

E. Test results shall be reported in writing to Engineer, concrete manufacturer, and Contractor within 48 hours of testing. Reports of compressive-strength tests shall contain Project identification name and number, date of concrete placement, name of concrete testing and inspecting agency, location of concrete batch in Work, design compressive strength at 28 days, concrete mix proportions and materials, compressive breaking strength, and type of break for both 7-and 28-day tests.

F. Nondestructive Testing: Impact hammer, sonoscope, or other nondestructive device may be permitted by Engineer but will not be used as sole basis for approval or rejection of concrete.

G. Moisture Vapor Emission Test: Standard test method meeting ASTM F-1869.

H. Alkalinity (pH Level) Testing: Standard test required for floor slabs and all wall and ceiling surfaces to receive painted finishes. Testing of concrete to receive paint finish may be conducted under Painting Section.

I. Additional Tests: Testing and inspecting agency shall make additional tests of concrete when test results indicate that slump, air entrainment, compressive strengths, or other requirements have not been met, as directed by Engineer. Testing and inspecting agency may conduct tests to determine adequacy of concrete by cored cylinders complying with ASTM C 42 or by other methods as directed by Engineer.

END OF SECTION

SECTION 03930 – CONCRETE REHABILITATION

PART 1 - GENERAL

1.01 SUMMARY

A. Provide all concrete repairs, patching, and cleaning work as a result of alteration and reconfiguration of plumbing, ducts and finishes as noted on contract documents.

B. This Section includes but is not limited to:

1. Removal of loose and deteriorated concrete at all areas indicated on the drawings.
2. Cleaning of exposed metal reinforcing and anchors and the application of an anti-corrosion protective coating for reinforcing.
3. Application of structural bonding agent.
4. Application, finishing and curing of concrete patching materials.

1.02 GENERAL REQUIREMENTS

A. Reference Specifications: Comply with the provisions of the following specifications and standards, except as otherwise shown or specified.

1. ACI 301, “Specifications for Structural Concrete for Buildings”.
2. ACI 311, “Recommended Practice for Concrete Inspection”.
3. ACI 318, “Building Code Requirement for Reinforced Concrete”.
4. ACI Concrete Repair Guide ACI 546R-96 (Reapproved 2001), Concrete Removal, Preparation and Repair Techniques
5. Concrete Reinforcing Steel Institution, (CRSI) “Manual of Standard Practice”.
6. ICRI Guideline No. 03730 Guide for Surface Preparation for the Repair of Deteriorated Concrete Resulting from Reinforcing Steel Corrosion.

B. Local Codes and Standards shall govern wherever provisions of the above standards are in conflict with same.

C. Workmanship: Assume responsibility for concrete repair work which does not conform to the specified requirements, including strength, tolerances and finishes. Correct deficient concrete as directed.

D. Protect all finished work against damage from whatever cause during the work and until final acceptance.

E. Warranty all work in writing for a period of two years from date of acceptance.

1.03 SUBMITTALS

A. Submit under the provisions of Section 01330 – SUBMITTAL PROCEDURES.

B. Manufacturers Application Instructions and Product Technical Literature: Submit two (2) copies, for the record, of the manufacturer’s instructions for application of bonding agents, concrete repair materials, and corrosion inhibiting coating.

1.04 QUALITY ASSURANCE

A. Applicator Qualifications: Licensed Contractor with minimum two (2) years experience in applying cementitious patching materials.

B. Arrange for manufacturer's technical representative to be on project site to advise installer of proper procedures and precautions for the use of materials and to check installation.

1.05 PRODUCT DELIVERY, STORAGE AND HANDLING

A. Delivery materials in original, tightly sealed containers or unopened packages with manufacturer's name, labels, product identification, and lot number where appropriate.

B. Store materials out of weather in original containers or unopened packages as recommended by manufacturer.

PART 2 - PRODUCTS

2.01 CONCRETE MATERIALS

A. Mixing Water: Clean, free from oil, acid, and injurious amount of vegetable matter, alkalis and other impurities; portable.

B. Structural Bonding Adhesive: Two component, epoxy resin system conforming with ASTM C881 Type II, Grade 2, Class C, such as:

1. "Armatec 110" by Sika Corporation.
2. "Pro-poxy 200" by Bonded Materials Company.
3. "TSI-122 High Mod MV" by Tremcrete Systems.

C. Cement/ Acrylic/ Latex Base Patching Mortars:

1. Type C-1 Patching Mortar:
   a. "Verticoat" by Euclid Chemical Company
   b. "Thorite 400 Architectural" or "Emaco Rite" or "Emaco R300 CI" or "Emaco R350Ci" or "Emaco S88 CI" or Emaco HBA Repair Mortar" by Master Builders/ BASF Building Systems
   c. "TPM 722" or "TPM 723" by General Polymers Corp.
   d. "HB2 Repair Mortar or HBA Repair Mortar" by Thoroc/ BASF Building Systems
   e. "Patchwell" by Kaufman Products, Inc.
   f. "Masco Latex Cement" by Silpro Masonry Systems Inc.
2. Type C-2 Patching Mortar:
   a. "SikaTop 121Plus", "SikaTop 122 Plus", or SikaTop 111 Plus" by Sika Corp.
   b. "Emaco 10-60", Emaco R300CI", Emaco 310 CI" or "Emaco T415/T430" by Master Builders/ BASF Building Systems
   c. "Super Can-Crete" by Anti Hydro Co.
   d. "TPM 711" or "TPM 721" by General Polymers Corp.

e. “SD2Repair mortar” by Thoroc/ BASF Building Systems

f. “Patchwell Kit”, “Patchwell Kit D” or “K Tex 042” by Kaufman Products, Inc.

g. “Thincoat”, “Concrete Coat” or “Thintop 100” by Euclid Chemical Company

h. “Masco Latex Cement” by Silpro Masonry Systems Inc.

3. Type C-3 Patching Mortar:

a. “Patchwell HB”, “Hicap” or “Dressup” by Kaufman Products Inc.

b. “Emaco S88” by Master Builders/ BASF Building Systems

c. SikaTop 123 Plus” or SikaTop 144” by Sika Corp.

d. “Verticoat Supreme” by Euclid Chemical Company.

D. Epoxy base Patching Mortars:

1. Type E-1 Patching Mortar: 100 percent solids, low modulus, low viscosity, moisture insensitive, epoxy resin and aggregate system;

a. “Sikadur 21 Lo-Mod LV” by Sika Corp

b. “Concresive 1420”, “Concresive NC Adhesive Gel” or Materflow MP” by Master Builders / BASF Building Systems

c. “Flexocrete” by Dural International Corp

d. “Surepoxy LMLV” or “Surepoxy LMLV, Class “B” by Kaufman Products, Inc.

e. SRC 3577 GEL by General Polymers Corp.

2. Type E-2 Patching Mortar: 100 percent solids, low modulus, low viscosity, moisture insensitive, epoxy resin and aggregate system;

a. “Sikadur 23 Lo-Mod Gel” by Sika Corporation

b. “Concresive Paste LPL”, “Concresive NC Adhesive Gel” or “Concresive 1420” by Master Builders/ BASF Building Systems

c. “Flexocrete Gel” by Dural International Corp.

d. “A-H Epoxy Patch No. 122” by Anti Hydro Co.

e. “SurePoxy LM Gel” by Kaufman Products, Inc.

f. “SRC 3577 Gel” by General Polymers Corp.

3. Type E-3 Patching Mortar: High modulus/ low viscosity, moisture Insensitive , epoxy resin and aggregate system;

a. “Sikadur 35” or “Sikadur 62” by Sika Corporation

b. “Concresive LiquidLPL” by Master Builders/BASF Building Systems

c. “Duralcrete” by Dural International Corp

d. “Surepoxy HMLV, Class B” or ”SRC 3575 LV” by General Polymers Corp.

4. Type E-4 Patching Mortar; High modulus, high viscosity, moisture insensitive, epoxy resin and aggregate system;

a. “Sikadur 31 Hi-Mod Gel” or Sikadur Hi- Mod Gel SBA Slow Set” by Sika Corporation

b. “Concresive Paste LPL” or “Concresive 1490” by Master Builders / BASF Building Systems

c. “Duralcrete Gel” by Dural International Corp.; “Surepoxy HM Gel”, “Surepoxy 117”, “Surepoxy 116” or “Surepoxy HM Gel EPL” by Kaufman Products, Inc.; or “SRC 2575 Gel” by General Polymers Corp.

5. Aggregate: As recommended by the patching mortar manufacturer for the binder and application.

E. Rapid-Hardening Cementitious Patching Mortar:

1. Type R-1 Patching Mortar:

a. “Roadpatch DOT” by Thoro/ BASF Building Systems

b. “10-60 Rapid Mortar” by ThoRoc/ BASF Building Systems

c. “Durapatch” by LM Construction Chemicals, Inc.

d. “SikaSet Roadway Patch” by Sika Corp.

e. “Durcrete” by Kaufman Products, Inc.

f. “Emaco T415”, “Emaco T430” or “Set 45” by Master Builders/BASF Building Systems

2.02 OTHER MATERIALS

A. Cleaning Materials:

1. Detergent Cleaner: A commercially produced concrete cleaning detergent as approved by Engineer.

B. Anti-Corrosion Protective Coating for Steel Reinforcing: Two component, epoxy resin system conforming with ASTM C881 Type II, Grade 2, Class C, such as:

1. “Armatec 110” by Sika Corporation.

2. “Pro-Proxy 200” by Bonded Materials Company

3. “TSI-122 High Mod MV” by Tremcrete Systems.

C. Anti-Corrosive Protective Coating for Reinforcing: Coat exposed reinforcing bars with an anti-corrosion protective coating and cure according to the manufacturer’s instructions prior to priming and placing patching materials.

D. Priming: Thoroughly coat the work surfaces to be patched, including steel reinforcement, with structural bonding agent applied, in strict accordance with the manufacturer’s written instructions.

E. Install galvanic anodes as noted on the structural drawings.

2.03 MIXING, CONVEYING AND PLACING

A. Mixing: Mixing of all materials shall be in strict accordance with the manufacturer’s mixing instructions.

B. Pre-Placement Inspection: Before placing material inspect and complete formwork, reinforcing steel, and items to be embedded or cast in.

C. Material Placement

1. Deposit material continuously or in layers of thickness as recommended by the manufacturer. Ensure that the placement is such as to not cause seams or planes of weakness.

PART 3 - EXECUTION

3.01 PREPARATION

A. Cover or otherwise protect adjacent surfaces not being repaired.

B. Cleaning: Concrete to be patched must be structurally sound, clean and free of dirt, loose mortar particles, paint, films, protective coatings, efflorescence, laitance, and other matter detrimental to proper adhesion.

1. Check suspect areas around cracks, blisters, spalls, honeycomb, rock pockets, and rust sports by tapping surface with a hammer or other blunt instrument. Mark loose or hollow areas for removal of unsound material in indicated areas and as directed by Engineer.

2. Remove unsound material sand films by means of water jetting, sandblasting, bush hammering, needle gunning, or other approved method leaving a sound, fractured aggregate surface.

3. If steel reinforcing bars are exposed, chip concrete out from behind exposed length of bars as required for a minimum clearance around circumference of bar of 3/4”. In addition, cut a minimum 1 inch of sound concrete away from each end of exposed length of reinforcing bars. Clean away loose material from around rusted reinforcing steel to expose sound metal. Remove rust from steel by water jetting, sandblasting, needle gunning, or other approved method to a clean metal finish. Replace destroyed steel reinforcement as directed by Engineer.

4. Wash debris from work surfaces with portable water. Clean exposed surface of concrete using detergent cleaner, scrubbed well with a scrub brush, and thoroughly rinsed with clean water.

C. Spalled and Deteriorated Concrete: Cut edges of region to be repaired at a right angle to surrounding surface or undercut, if possible. Follow the patching product manufacturer’s recommendation for the depth o the edge cut, but edge cut shall be a minimum of 1/4-inch. Clean and prepare surface as indicated.

1. Consolidate during placing so that material is thoroughly worked around reinforcement and other embedded items and into corners.

2. Maintain reinforcing steel in proper position continuously during concrete placement operations.

3.02 COATING REBAR

A. Coat reinforcing as soon as possible after completion of surface preparation.

B. Place reinforcement coating complying with manufacturer’s instructions.

3.03 CONCRETE PATCHING

A. Patch concrete as soon as possible after completion of surface preparation.

B. Mixing Patching Mortar: Comply with mortar manufacturer's printed instructions. Proportion components and sizes of aggregate as recommended by mortar manufacturer for the particular job conditions.

C. Patch concrete in accordance with the product manufacturer's printed instructions.

   1. Coat contact surfaces of existing concrete and steel reinforcement with a bonding agent/ primer as recommended by the product manufacturer's instructions.

D. Finish the patches to match the adjacent concrete finish surfaces. Patches shall be flush with adjacent surfaces such that, after application of finishes specified by the owner, or in other sections of these specifications, the patch blends with the adjacent surfaces and does not show lines at the edges of the patch.

E. Repair methods not specified above may be used, subject to Engineer's acceptance.

3.04 CURING AND PROTECTION

A. Curing shall be in strict accordance with the patching material manufacturer's recommendations, including curing materials used, method of application, and period of cure.

3.05 CLEANING

A. Remove all debris, dust, materials, cartons, and waste resulting from this work daily, and as directed by Engineer, from the premises.

B. Keep premises in a neat and clean condition.

C. Leave finished work in neat, clean condition with no evidence of spillovers onto adjacent areas.

END OF SECTION

DIVISION 05 – METALS

SECTION 05120 – STRUCTURAL STEEL

PART 1 – GENERAL

1.01 GENERAL REQUIREMENTS

A. Provide all structural steel as indicated on the drawings and as specified herein.

B. Work of this Section, as shown or specified herein.

1.02 SUMMARY

A. Work this Section includes all labor, materials, equipment and services necessary to complete the structural steel as shown on the drawings and specified herein, including but not limited, to the following:

1. Structural steel
2. All shop and field connections

1.03 QUALITY ASSURANCE

A. Perform work in accordance with all governing codes, laws, regulations, and directions of all governing bodies, however, where in these Specifications reference is made to performance conforming to other standards, the most stringent shall apply.

B. Comply with the provisions of the following specifications and standards.

1. AWS D1.1, Structural Welding Code - Steel.
2. International Building Code, 2018 edition.

C. The Contractor shall secure all field measurements necessary for the completion of this work. The Contractor shall be responsible for all errors of detailing and fabrication and for the correct fitting of the structural members to each other and to their supports.

D. Employ an Independent Testing Laboratory to perform inspection and testing specified herein. Inspectors shall be AWS Certified Welding Inspectors. Testing shall be performed by ASNT Level II or III Technicians.

E. Use only certified welders for all welding performed under this section. Perform work in accordance with AWS D1.1. Qualify welders in accordance with AWS D1.1 for each process. Evidence of previous qualifications of welders, welding operators and tackers shall be submitted. The Engineer may require new qualification tests at Contractor's expense should the quality of welds be deficient.

F. Testing of Mill Order Steel

1. Where structural steel member are identifiable by heat or melt numbers and are accompanied by mill analysis test reports, they may be used without further tests.
2. Where material cannot be identified as specified above, make tension and

bend tests of the materials in accordance with ASTM standards (one for each 5 tons), either locally or at the mill, as specified hereafter for unidentified local stock. Costs for such testing shall be the Contractor's responsibility.

G. Testing of Local Stock Steel

1. In the event local stock structural steel can be identified by heat or melt numbers and is accompanied by mill analysis test reports, it may be used without testing.

2. Where material cannot be identified, or its source is questionable, make one tension and one bend test for each 5 tons or fraction thereof, of each shape, heat, or melt of stock used.

3. Arrange to have test specimens made by the Independent Testing Laboratory.

H. Welding Electrodes: Check electrodes for conditions, suitability, and compliance with the specifications.

I. Fabrication Inspection:

1. Visually inspect steel shapes and plates for defects such as laminations and non-metallic inclusions. Use ultrasonic equipment to determine extent of defects.

2. Confirm that sections used conform to specified dimensional standards.

3. The Engineer reserves the right, any time before final acceptance, to reject material not in compliance with the specified requirements.

4. Perform welding inspection as specified in Article 3.08, below.

J. Defective Work:

1. Work found to be defective, missing or damaged shall immediately be replaced with proper work. Such replaced work and the inspection for same shall be at the expense of the Contractor.

2. Straightening of any material, if necessary, shall be done by a process and in a manner that will not injure the materials, and which is pre-approved by the Engineer. Sharp kinks or bends shall be cause for rejection. Heating will not be allowed.

3. Delamination and other rolling defects in structural shapes and plates shall be cause for rejection when, in the judgment of the Engineer, repairs are not feasible or acceptable.

4. If defects or damaged work cannot be corrected in the field, the material shall be returned to the shop or new parts furnished. The Contractor shall replace all work at his own expense.

1.04 SUBMITTALS

A. Submit in accordance with SECTION 013300 - SUBMITTALS.

B. Shop Drawings:

1. Submit complete shop drawings of all structural steel work to the Engineer for review and approval before fabrication. Detail all members and connections not specifically shown but which are required to complete the work. Include

complete information necessary for the fabrication and erection of the component parts of the structure, including the location, type, and size of all bolts and welds. Include all welds by standard welding symbols of the AWS.

2. Review of shop drawings is only for review of general conformance with the design concept of the project and Contract Documents, but not the checking of dimensions. Corrections or comments made on shop drawings do not relieve the contractor from compliance with the requirements of the drawings and specifications. Should more than one submittal be required, clearly identify on subsequent submittals materials added or revised after previous submittal.

C. Submit mill analysis test reports or tension and bend tests as specified in Article 1.03 F and G.

D. Certificates of Conformance: Submit certificates of conformance for the following:

1. Welding Electrodes and Rods
2. Non-Shrink Grout
3. Structural Steel
4. Bolts

1.05 DELIVERY, STORAGE AND HANDLING

A. Handle, ship, and store materials in a manner that will prevent distortion or other damage.

B. Store material in a clean, properly drained location out of contact with the ground.

C. Replace all damaged material with new material or repair the damaged material in a pre-approved manner.

PART 2 – PRODUCTS

2.01 STEEL

A. Materials not otherwise specified herein shall conform to the AISC "Manual of Steel Construction."

1. High-Strength Low-Alloy Steel: ASTM A 992, Grade 50 as indicated.
2. Steel for Rolled Shapes, Channels and Angles: ASTM A572 50.

2.02 BOLTS, NUTS, AND WASHERS

A. Machine Bolts and Nuts: ASTM A 307.

B. Circular Washers for Common Bolts: ASTM F 436.

C. High Strength Bolts: ASTM F3125 Gr A325. For all steel connections unless otherwise noted.

D. High Strength Nuts: ASTM A194. For use with A325 bolts.

E. High Strength Washers: ASTM F436. For use with A325 bolts.

2.03 ACCESSORIES

A. Welding Electrodes and Rods: AWS Code D1.1, E70 5/16-inch maximum diameter.

B. Non-Shrink Grout: As specified in Section 03300, 2.01 for grout.

C. Primer Paint: Tnemec Series 10 Modified Alkyd or pre-approved equal.

PART 3 – EXECUTION

3.01 EXAMINATION

A. Examine the areas and conditions where structural steel is to be installed and notify the Engineer of conditions detrimental to the proper and timely completion of the work. Do not proceed with the work until unsatisfactory conditions have been corrected by the Contractor in a manner acceptable to the Engineer.

3.02 FABRICATION

A. Fabricate in accordance with the applicable provisions of the Specification for the Design, Fabrication, and Erection of Structural Steel for Buildings as set forth in Part 5 of the AISC Manual of Steel Construction for Structural Steel and Pipes.

B. Welding of Structural Steelwork: General: AWS D1.1 for structural steel and pipes and AWS D1.3 for sheet steel. Weld only in accordance with pre-approved WPSs, which are to be available to welders and inspectors during the production process.

C. Thermal and Air-Arc Cutting: Provide positive preheat of 150 degrees F minimum when thermal cutting beam copes, weld access holes, or other surface. Grind smooth with the removal of a minimum of 1/32-inch of material.

D. After punching or working component parts of a member, remove twists or bends prior to assembly. Make all holes by punching or drilling. Burned holes are not permitted. Make holes, cuts, and sheared edges free of kinks, burrs, and warped edges.

E. Keep assembled structural steel member free from twists, bends, nicks, scars, dents, and defective workmanship.

F. Fastening Holes:

1. Make unfinished bolt holes 1/16-inch larger than the nominal bolt diameter with full bearing on the unthreaded shank.

2. Make holes for anchor bolts no greater than 5/16-inch larger than the anchor bolt nominal diameter.

3. Holes may be punched if the material thickness is not greater than the nominal bolt diameter plus 1/8-inch. Drill holes in thicker material from solid or sub-punched elements and ream. Remove burrs from holes for high-strength bolts by grinding.

3.03 SHOP PAINTING

A. Paint: Deliver paint to shop in original, sealed containers marked with manufacturer's name and brand identification.

B. Surfaces Not to be Painted: Do not paint steel contact surfaces to be field welded, surfaces to be sprayed with fireproofing, and surfaces supporting metal decking to be field welded.

C. Prime Painting: After inspection and approval of structural steel, apply shop coats as follows:

1. Thoroughly clean surfaces of rust, mill scale, and foreign matter. Clean by brushing, blasting, or solvents in accordance with the SSPC's Painting Manual for solvent and hand or power tool cleaning. Allow to dry before painting.

2. Apply paint thoroughly and evenly and well into joints and open spaces.

3. Apply one prime coat to all steel to provide a uniform dry film thickness of 3.0 mils.

4. Apply two coats of primer to surfaces which will be inaccessible after assembly or erection. Change color of second coat to distinguish it from the first coat.

3.04 ERECTION

A. Except as modified herein, erect steel in accordance with the AISC Manual of Steel Construction.

B. Where parts cannot be assembled or fitted properly as a result of errors in fabrication or of deformation due to handling or transportation, report such condition immediately to the Engineer and obtain approval therefrom for the methods of correction before proceeding with making any corrections. Drain steelwork properly; fill pockets in structures exposed to the weather with a pre-approved waterproof material. Provide safety belts and lines for workmen and inspectors aloft on high structures unless safe working platforms or safety nets are provided. Do not use impact torque wrenches to tighten anchor bolts set in concrete.

C. Connections: Provide bolts and other connections between the structural steel and foundations properly and build them into connecting work. Use metal templates to establish bolt group spacing to avoid conflict with existing reinforcing. The Contractor shall furnish instructions for the setting of bolts and shall ascertain that the items are properly set during the progress of the work.

D. Notification: Notify the Engineer at least 5 working days in advance of steel erection.

E. Gas Cutting: Do not use gas cutting torches in the field for correcting fabrication errors on structural framing members without prior written approval of the Engineer.

F. Bolt Holes

1. Locate bolt holes accurately to ensure passage of bolts through assembled materials without drifting.

2. Drifting to enlarge holes will not be permitted.

3. Mismatching of holes greater than 1/8-inch will be cause for rejection of the work. For mismatched holes less than 1/8-inch, ream the hole for the next larger size bolt.

G. Welding

1. Preparation: Clean all surfaces so that they are free of rust, scale, paint, and foreign matter. Remove paint and scale by wire brushing, chipping, or hammering, as required. Chip clean and wire brush burned or flame-cut edges before welding. Clamp member as required, space and alternate welds as necessary to avoid warping and misalignment. Preheat materials.

2. Weld Quality: Welds shall present a uniform surface, free of imperfections, and without undercutting or over-lapping and free of excessive oxides, gas pockets and non-metallic inclusions. Welds shall be made with the proper number of beads or passes to secure sound, thoroughly fused joints. For manual welding, each deposit shall not exceed 5/16 inch of weld for each pass or bead. Preceding layers shall be cleaned by wire brushing or peening to remove scale and slag, before placing any new weld metal.

3. Sequence of Welding: When welds enclose or partially enclose the perimeter or portion of the surface of a member, the weld bead shall be made in sequence, or staggered, so as to minimize internal stresses.

4. Faulty and Defective Welding: Chip out and replace any welding showing cracks, slag inclusion, lack of fusion, bad undercut, or other defects, as ascertained by visual or other means of inspection.

H. Remove temporary welds and run-off plates and backing strips.

I. File or grind corners, edges, welds and other rough portions and make smooth. Repair damaged zinc and prime coats. Apply prime coat to connections, previously unprimed areas and abraded areas.

J. Tolerances: In accordance with the AISC Code of Standard Practice.

3.05 FIELD COATING

A. Remove weld splatters, loose weld slag and other deleterious material.

B. Touch up abraded, burned or otherwise damaged shop coats and welded joints and refinish with the applicable shop coating noted above.

C. Apply paint with a hand brush, thoroughly worked into all joints, corners and open spaces and well brushed over the surfaces. Do not apply paint to wet or damp surfaces. Make sure paint is dry when the material is loaded for delivery to the work.

3.06 TESTS AND INSPECTIONS

A. Visual Inspection:

1. Visually inspect steel shapes and plates for existence of defects such as laminations and non-metallic inclusions. Use ultrasonic equipment to determine extent of defects. Confirm that sections used conform to dimensional standards specified.

2. Welding shall be inspected by a qualified inspector employed by the Testing

Laboratory. This inspector shall confirm the qualifications of welders, the use of AWS qualified procedures, the manufacturer's recommended use of automatic equipment and the proper use of preheat, and will verify that welds are made in accordance with pre-approved WPSs.

3. Visually inspect welding while the operators are making the welds and again after the work is completed. After the welding is completed, hand or power wire brush welds, and thoroughly clean them before inspecting again. Inspect welds with magnifiers under strong, adequate light for surface cracking, porosity, and slag inclusions; excessive roughness; unfilled craters; gas pockets; undercuts; overlaps; size; and insufficient throat and concavity.
4. Inspect the preparation of groove welds for adequate throat opening and for snug positioning of back-up bars.
5. Field quality assurance:
   a. Inspect this work in a timely manner in accordance with Building Code requirements. The Inspector will have both AWS Certified Welding Inspector and ASNT Level II certifications.
   b. All field welding shall be inspected. Butt and complete penetration welds shall be ultrasonically tested as per provisions under "Tests and Inspections".
   c. Promptly correct defective work at no additional cost to the Engineer.

3.07 CLEANING

A. After erection, clean surfaces and leave free of mud, dirt, oil, and grease. Remove unused materials, tools, scaffolding, and debris from the premises.

END SECTION

SECTION 05720 - GUARDRAILS AND HANDRAILS

PART 1 - GENERAL

1.01 SUMMARY

A. Section Includes:

1. Aluminum handrails
2. Aluminum picket guardrails.
3. Miscellaneous attachments, anchors, and fasteners as indicated on the drawings or as required to conform to **2018** IBC as amended.

1.02 CODES AND STANDARDS

A. In addition to referenced codes and standards within this specification, the work shall comply with the latest edition of the following standards. When conflicts arise between standards, the more stringent shall apply:

B. Aluminum Association:

1. Aluminum Design Manual

C. American Society for Testing and Materials (ASTM) Publications:

1. ASTM B 209 Standard Specification for Aluminum and Aluminum-Alloy Sheet and Plate
2. ASTM B 221 Standard Specification for Aluminum and Aluminum-Alloy Extruded Bar, Rods, Wire, Profiles, and Tubes.
3. ASTM B 429 Standard Specification for Aluminum-Alloy Extruded Structural Pipe and Tube
4. ASTM C 1048 Standard Specification for Heat Treated Flat Glass – Kind HS, Kind FT Coated and Uncoated Glass
5. ASTM C 1172 Standard Specification for Laminated Architectural Flat Glass
6. ASTM E 2358 Standard Specifications for the Performance of Glass in Permanent Glass Railing Systems, Guards and Balustrades

D. American Welding Society

1. AWS D1.2 - Structural Welding Code, Aluminum

E. NAAMM Metal Finishes Manual; National Association of Architectural Metal Manufacturers

1.03 QUALITY ASSURANCE

A. Product Options: Information on Drawings and in Specifications establishes requirements for system's aesthetic effects and performance characteristics. Aesthetic effects are indicated by dimensions, arrangements, alignment, and profiles of components and assemblies as they relate to sightlines, to one another, and to adjoining construction. Performance characteristics are indicated by criteria subject to verification

by one or more methods including structural analysis, preconstruction testing, field testing, and in-service performance.

1. Do not modify intended aesthetic effects, as judged solely by Architect, except with Architect's approval. If modifications are proposed, submit comprehensive explanatory data to Architect for review.

B. Field Measurements: Take field measurements prior to preparation of shop drawings and fabrication, where possible. Do not delay job progress; allow for trimming and fitting where taking field measurements before fabrication might delay work.

C. For each type of guardrail and handrail system, all component and fittings for that system shall be furnished by the same manufacturer.

D. Shop Assembly: Pre-assemble items in shop to greatest extent possible to minimize field splicing and assembly. Disassemble units only as necessary for shipping and handling limitations. Clearly mark units for reassembly and coordinated installation.

E. Qualifications of Welders: Only welders certified in the arc welding process shall perform work in connection with the work in this Section.

1.04 SUBMITTALS

A. Submit under the provisions of Section 01330 - SUBMITTAL PROCEDURES.

B. Manufacturer's Data: Submit manufacturers product data for all manufactured products. Include color charts for all materials exposed and requiring selection of finish color.

C. Shop Drawings: Submit complete shop drawings of all railing and handrail work to the Architect for review and approval before fabrication. Detail all members, connections, and anchorage not specifically shown but which are required to complete the work.

D. Structural Analysis: For each type of guardrail system, submit structural calculations showing that the guardrails meet the performance requirements set forth in this section. Calculation shall be stamped and signed by an practicing engineer licensed in the State of Hawaii.

E. Samples: Submit samples of the following in the quantity indicated:

1. Three (3) 3-inch by 5-inch finish color

2. One assembled sample of each type of railing systems, made from full-size components, including top rail, post, handrail, and infill. Show method of finishing members at intersections. Sample need not be full height.

1.05 SYSTEM PERFORMANCES

A. Delegated Design: Design railings, including comprehensive engineering analysis by a qualified professional engineer, using performance requirements and design criteria indicated.

B. General: In engineering railings to withstand structural loads indicated, determine allowable design working stresses of railing materials based on the following:

1. Aluminum: The lesser of minimum yield strength divided by 1.65 or minimum ultimate tensile strength divided by 1.95.

C. Structural Performance of Guardrails and Railings: Provide handrails and railings capable of withstanding structural loads required by the 2018 International Building Code as amended and ASTM E 985 but not less than the following structural loads without exceeding allowable design working stress of materials for handrails, railings, anchors, and connections based on testing performed in accordance with ASTM E 894 and ASTM E 935:

1. Top Rail of Guards: Capable of withstanding the following loads applied as indicated:
   a. Concentrated load of 200 pounds applied at any point and in any direction.
   b. Uniform load of 50 pounds per linear foot applied in any direction..
   c. Concentrated and uniform loads above need not be assumed to act concurrently.
2. Handrails Not Serving as Top Rails: Capable of withstanding the following loads applied as indicated:
   a. Concentrated load of 200 pounds applied at any point and in any direction.
   b. Uniform load of 50 pounds per linear foot applied in any direction.
   c. Concentrated and uniform loads above need not be assumed to act concurrently.
3. Infill Area of Guards: Capable of withstanding a horizontal concentrated load of 50 pounds applied to 1 square foot at any point in system, including panels, intermediate rails, balusters, or other elements composing infill area.
   a. Load above need not be assumed to act concurrently with loads on top rails in determining stress on guard.
4. Wind Loads: Design guardrails to withstand wind load design pressures, as indicated in the Cladding Wind Load Study written by RWDI, dated 04/30/2020 and as determined by Chapter 6 of ASCE/SEI 7 “Minimum Design Loads for Buildings and Other Structures.”
   a. Exposure Category: Exposure C
   b. Ultimate Design Wind Speed: 140 mph
   c. Importance Factor: 1.0

D. Thermal Movements: Provide handrails and railings that allow for thermal movements resulting form the following maximum change (range) in ambient and surface temperatures by preventing buckling, opening of joints, overstressing of components, failure of connections, and other detrimental effects. Base engineering calculation on surface temperatures of materials due to both solar heat gain and nighttime-sky heat loss.

1. Temperature Change (Range): 40 degrees F, ambient; 120 degrees F, material surfaces.

E. Seismic Design Criteria: As determined by 2018 IBC.

1.06 PRODUCT HANDLING

A. Protection: The Contractor shall use all means necessary to protect metal handrail and railing work before, during and after installation and to protect the installed work and materials of all other trades.

B. Replacement: In the event of damage, the Contractor shall immediately make all repairs and replacements necessary to the satisfaction of the Architect and at no additional cost to the Owner.

PART 2 - PRODUCTS

2.01 MATERIALS

A. Aluminum Bar and Tube: ASTM B 221, Alloy 6063-T5, 6063-T6, and 6063-T52.

B. Aluminum Extruded Structural Pipe and Tube: ASTM B 429, Alloy 6063-T5, 6063-T6 and 6063-T52.

C. Aluminum Plate and Sheet: ASTM B 209, Alloy 6061-T6.

D. Aluminum Castings: ASTM B 26, A356-T6.

2.02 WELDING MATERIALS, FASTENERS, AND ANCHORS

A. Welding Electrodes and Filler Metal: Provide type and alloy of filler metal and electrodes as recommended by producer of metal to be welded, complying with applicable AWS specifications, and as required for color match, strength, and compatibility in fabricated items.

B. Fasteners for Anchoring Railings to Other Construction: Select fasteners of the type, grade, and class required to produce connections that are suitable for anchoring railings to other types of construction indicated and capable of withstanding design loadings.

C. Fasteners for Interconnecting Railing Components: Use fasteners of same basic metal as the fastened metal, unless otherwise indicated. Do not use metals which are corrosive or incompatible with materials joined.

1. Provide concealed fasteners for interconnection of handrail and railing components and for their attachment to other work, except where otherwise indicated.

D. Anchors and Inserts: Provide anchors of type, size as indicated in the Drawings, fabricated from corrosion-resistant materials, capable of sustaining without failure, a load equal to 6 times the load imposed when installed in unit masonry and equal 4 times the load imposed when installed in concrete, as determined by testing per ASTM E 488, conducted by a qualified, independent testing agency. Use expansion bolt devices for drilled-in-place anchors.

2.03 FABRICATION

A. General: Fabricate handrails and railing systems to design, dimensions and details shown. Provide handrail and railing members in sizes and profiles indicated, with supporting posts and brackets of size and spacing shown, but not less than required to comply with requirements indicated for structural performance.

1. The materials shall be fabricated as indicated on the contract drawings and as specified herein unless indicated otherwise by ADAAG Section 505 requirements, Where there is a discrepancy between the contract documents and ADAAG requirements, the Contractor shall immediately notify the Architect for direction, clarification and/or corrective measures. Standard products of manufacturers specializing in similar work will be considered insofar as they fulfill the requirements

and do not violate governing codes for building and standards of good construction work.

B. Machine joint edges smooth and plane to produce hairline seams when site assembled; supply concealed sleeve connectors for joints.

C. Shop Assembly: Preassemble items in shop to greatest extent possible to minimize field splicing and assembly. Disassemble units only as necessary for shipping and handling limitations. Clearly mark units for reassembly and coordinated installation.

D. Form simple and compound curves by bending members in jigs to produce uniform curvature for each repetitive configuration required; maintain profile of member throughout entire bend without buckling, twisting, or otherwise deforming exposed surfaces of handrail and railing components..

E. Welded Connections for Aluminum Pipe: Fabricate aluminum pipe handrails and railing systems for interconnection of members by concealed internal welds, which eliminate surface grinding, using manufacturer's standard system of sleeve and socket fittings.

F. Nonwelded Connections: Fabricate railing systems and handrails for interconnection of members by means of railing manufacturer's standard concealed mechanical fasteners and fittings unless otherwise indicated. Fabricate members and fittings to produce flush, smooth, rigid, hairline joints.

1. Fabricate splice joints for field connection using epoxy structural adhesive where this represents manufacturer's standard splicing method.

2. Fabricate joints that will be exposed to weather in a manner to exclude water.

G. Brackets, Flanges, Fittings, and Anchors: Provide manufacturer's standard wall brackets, flanges, miscellaneous fittings, and anchors for interconnection of handrail and railing members to other work, unless otherwise indicated.

H. Furnish inserts and other anchorage devices for connecting handrails and railing systems to concrete or masonry work. Fabricate anchorage devices which are capable of withstanding loadings imposed by handrails and railing systems. Coordinate anchorage devices with supporting structure.

I. Cut, reinforce, drill, and tap as indicated to receive finish hardware, screws, and similar items

J. Provide wall returns at ends of wall-mounted handrails, unless otherwise indicated. Close ends of returns, unless clearance between end of rail and wall is 1/4 inch or less.

K. Provide weep holes, or another means to evacuate entrapped water in hollow sections of railing members that are exposed to exterior or to moisture from condensation or other sources. Fill voids below weep level with self-leveling sealant or other appropriate fill material to assure no water penetration in the cored concrete and utility of weep holes.

L. Use materials of size and thickness shown or, if not shown, of required size and thickness to produce strength and durability in finished product. Work to dimensions shown or accepted on shop drawings, using proven details of fabrication and support. Use type of materials shown or specified for various components of work.

M. Miscellaneous Framing and Supports:

1. Provide miscellaneous framing and supports as required to complete railing and handrail work.

2. Fabricate miscellaneous units to sizes, shapes and profiles shown or, if not shown, of required dimensions to receive adjacent other work to be retained by framing. Cut, drill and tap units to receive hardware and similar items.

2.04 ALUMINUM FINISH

A. Aluminum Finish: All exposed aluminum surfaces shall be free of scratches and other blemishes. Pre-clean surfaces and provide a conversion coating and provide exposed surfaces of aluminum with a three coat, Flouropolymer (70 percent PVDF) Coating System, factory-applied, oven baked conforming to AAMA 2605, “Superior Performance Organic Coatings on Aluminum Extrusions and Panels”, with a total dry film thickness of not less than 2.0 mils.

1. Colors: Medium-Dark Metallic Bronze finish, To be selected by Architect from extended color range.

PART 3 - EXECUTION

3.01 PREPARATION

A. Coordinate setting drawings, diagrams, templates, instructions, and directions for installation of anchorages, such as sleeves, concrete inserts, anchor bolts, and miscellaneous items having integral anchors, which are to be embedded in concrete as masonry construction. Coordinate delivery of such items to project site.

B. Prior to all work of this Section, the Contractor shall carefully inspect the installed work of all other trades and verify that all such work is complete to the point where fabrication and installation of the work of this Section may properly commence.

C. The Contractors shall make all required measurements in the field to ensure proper and adequate fit of all metal handrail and railing items.

D. Examine the areas and conditions under which metal handrail and railing items will be installed and correct conditions detrimental to the proper and timely completion of the work. Do not proceed until unsatisfactory conditions have been corrected and approved by the Architect.

3.02 INSTALLATION, GENERAL

A. Install guardrail systems in accordance with manufacturer’s recommended installation instructions and approved shop drawings.

B. Fastening to In-Place Construction: Provide anchorage devices and fasteners where necessary for securing railings and handrails to in-place construction; which will develop anchorage meeting or exceeding all system performance requirements.

C. Fit exposed connections accurately together to form tight, hairline joints.

D. Cutting, Fitting and Placement: Perform cutting, drilling, and fitting required for installation of railings and handrails. Set work accurately in location, alignment and elevation, plumb, level, true and free of rack, measured from established lines and levels.

1. Do not weld or abrade surfaces of handrails and railing components that have been coated or finished after fabrication and are intended for field connection by mechanical or other means without further cutting or fitting.
2. Set posts plumb within a tolerance of 1/4" inch in 12 feet.
3. Align rails so that variations from level for horizontal members, parallel for aligned members, and rake for steps, ramps, and sloped members shall not exceed 1/4-inch in 12-feet.

E. Field Welding: Comply with the following requirements:

1. Use materials and methods that minimize distortion and develop strength and corrosion resistance of base metals.
2. Obtain fusion without undercut or overlap.
3. Remove welding flux immediately.
4. At exposed connections, finish exposed welds and surfaces smooth and blended so that no roughness shows after finishing, and welded surface match contours of adjoining surfaces.

F. Corrosion Protection: Coat concealed surfaces of aluminum, which will be in contact with grout, concrete, masonry, wood, or dissimilar metals, with a heavy coat of bituminous paint or zinc chromate primer.

G. Adjust handrails and railing systems prior to anchoring to ensure matching alignment at abutting joints. Space posts at interval indicated but not less than that required by design loadings.

3.03 RAILING CONNECTIONS

A. Non-welded Connections: Use manufacturer's standard mechanical or adhesive joints for permanently connecting railing components. Use wood blocks and padding to prevent damage to railing members and fittings. Seal recessed holes of exposed locking screws using plastic filler cement colored to match finish of handrails and railing systems.

B. Welded Connections: Use fully welded joints for permanently connecting railing components by welding. Cope or butt components to provide 100 percent contact or use manufacturer's standard fittings designed for this purpose.

C. Expansion Joints: Install expansion joints at locations indicated but not further apart than required to accommodate thermal movement. Provide slip joint internal sleeve extending 2 inches beyond joint on either side; fasten internal sleeve securely to one side; locate joint within 6 inches of post.

3.04 ANCHORING POSTS

A. Concrete-Anchored Posts in Core-Drilled Holes: Core-drill concrete to produce holes with diameter at least 3/4" larger than outside dimensions of post and not less than the depths indicated required by the structural analysis and on the drawing for each type of railing. Clean holes of all loose material, insert posts, and fill annular space between post and concrete with non-shrink, nonmetallic grout, mixed and placed to comply with grout manufacturer's directions.

B. Leave anchorage joint exposed; wipe off excess grout and leave 1/8" build-up, sloped away from post. For installation exposed on exterior or to flow of water, seal grout to comply with grout manufacturer's directions.

3.05 ATTACHING HANDRAILS TO WALLS

A. Attach handrail to walls with wall brackets and end fittings. Provide bracket with 1-1/2-inch clearance from inside face of handrail to finished wall.

B. Locate brackets as indicated or, if not indicated, at spacing required to support structural loads.

C. Secure wall brackets an wall return fittings to building construction as follows:

1. For wood stud partitions, use hanger or lag bolts set into wood backing between studs. Coordinate with carpentry work to locate backing members.

3.06 ADJUSTING AND CLEANUP

A. Touch-Up Painting: Cleaning and touch-up painting of field welds, bolted connections, and abraded areas of shop paint is specified in Division 9 of these specifications.

B. For galvanized surfaces: Clean field welds, bolted connections, and abraded areas and apply galvanizing repair paint to comply with ASTM A 780.

3.07 PROTECTION

A. Protect finishes of railing systems and handrails from damage during construction period by use of temporary protective coverings approved by railing manufacturer. Remove protective covering at time of Substantial Completion.

B. Restore finishes damaged during installation and construction period so that no evidence remains of correction work. Return items which cannot be refinished in the field to the shop; make required alterations and refinish entire unit, or provide new units as required.

3.08 CLEAN UP

A. After installation, all surfaces shall be cleaned and ready to receive final treatment. All unused materials, tools and equipment shall be removed from the project site.

B. From time to time, and as directed by the Architect and at the completion of the work, all rubbish, debris, fines, etc., accumulated from the work of this Section shall be removed from the project site and the area left neat and clean to the satisfaction of the Architect.

END OF SECTION

DIVISION 7 – THERMAL AND MOISTURE PROTECTION

SECTION 07541 – TPO MEMBRANE ROOFING

PART 1 - GENERAL

1.01 SUMMARY

A. This Section includes the following:

1. Fully Adhered TPO membrane roofing system at low slope roofs unless otherwise indicated, including base flashing, roofing membrane, membrane expansion joints and all accessories needed for complete installation.

    a. All edge flashing and copings specified in Section 07600 – FLASHING AND SHEET METAL (where TPO membrane roofing is installed under coping or terminated with edge flashing) shall be provided by the TPO membrane roofing manufacturer, installed by the roofing contractor performing the work of this section and included in the TPO membrane roofing system warranty.

2. Roof Insulation, underlayment and cover boards.

B. Related Sections include the following:

1. Section 02070 – SELECTIVE DEMOLITION

2. Section 07600 – FLASHING AND SHEET METAL for sheet metal roof penetration flashings, flashings, counter-flashings and pre-manufactured coping and edge flashing systems.

3. Section 07910 – EXTERIOR WALL JOINT SEALANTS

1.02 PERFORMANCE REQUIREMENTS

A. Except as otherwise indicated, Thermoplastic Roof Membrane system is required to establish and maintain a waterproof continuous seal on a permanent basis, with recognized limitations of wear and aging as indicated for each application. Failures of installed roofing materials to comply with this requirement will be recognized as failures of materials and workmanship.

B. As roofing manufacturer's system installation requirements and tested assemblies vary, this specification is to provide an intent of the type of membrane and overall roofing system. The noted performance requirements shall be met by the installed system. The installer shall provide the manufacturer of their choice with all applicable project documents for review before the installer shall develop and submit final costs. Whether specifically noted by the project documents or not, the installer shall include all manufacturer requirements and recommendations (and including all project document related requirements when more stringent) in the final submitted costs.

C. Material Compatibility: Provide roofing materials that are compatible with one another under conditions of service and application required, as demonstrated by roofing membrane manufacturer based on testing and field experience.

D. Fire-Test-Response Characteristics: Provide membrane roofing materials with the fire-test-response characteristics indicated as determined by testing identical products per test method below by UL, FMG, or another testing and inspecting

agency acceptable to authorities having jurisdiction. Materials shall be identified with appropriate markings of applicable testing and inspecting agency.

1. Exterior Fire-Test Exposure: Class A; ASTM E 108, for application and roof slopes indicated.
2. Fire-Resistance Ratings: ASTM E 119, for fire-resistance-rated roof assemblies of which roofing system is a part

E. Wind Uplift Design: Provide roofing system that complies with the following:

1. Roofing System Design: Provide a membrane roofing system that is identical to systems that have been successfully tested by a qualified testing and inspection agency to resist uplift pressures as indicated below and with a safety factor of two applied.
2. Wind Loading Criteria: As indicated on the Structural Engineer Drawings.
3. Wind uplift pressures as determined by the following:
    a. ASCE/SEI 7 “Minimum Design Loads for Buildings and Other Structures”.

1.03 SUBMITTALS

A. Submit copy of statement, in an approved form, signed by the Roofing Installer and Manufacturer, certifying that the products comply with these specifications, are the proper selections for the applications made, and that the installation methods complied with the manufacturer's printed instructions and their field representatives' verbal instructions.

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

C. Installation Instructions: Complete instructions for handling, storage, priming, installation and protection of the Thermoplastic Membrane Roof System.

D. Shop Drawings: For roofing system. Include plans, elevations, sections, details, and attachments to other Work that have been reviewed and approved by the roof membrane manufacturer prior to submission to the Engineer. Clearly show all adjacent materials for proper coordination. The manufacturer’s standard details are not sufficient and not acceptable for shop drawings submission. Drawings shall indicate the following:

1. Base flashings and membrane terminations.
2. Tapered insulation noting all slopes and elevations shall be incorporated into the overall shop drawings. R-values, materials and attachments shall be clearly noted.
3. Details of vent pipes and all other project specific detail items shall be included.
4. Associated sheet metal flashing and fluid-applied flashing systems shall be included in shop drawings and clearly detailed in coordination with adjacent exterior finish materials. Sheet metal items shall be clearly noted regarding gauge, profile, fastening and compliance with applicable anticipated project specific wind uplift forces.
5. Wind uplift analysis signed and stamped by a qualified structural engineer licensed in the State of Hawaii including drawings showing size and types

of fasteners, insulation fastening patterns for corners, perimeter and field-of-roof locations.

E. Samples

1. 12-inch square field membrane and base flashing.

F. Installer Certificates: Signed by roofing system manufacturer certifying that Installer is approved, authorized, or licensed by manufacturer to install roofing system.

G. Manufacturer Certificates: Signed by roofing manufacturer certifying that roofing system complies with requirements specified in "Performance Requirements" Article.

1. Submit evidence of meeting performance requirements.

2. Statement that each product to be furnished is recommended for the application shown for this project.

H. Qualification Data: For Installer and manufacturer.

I. Product Test Reports: Based on evaluation of comprehensive tests performed by manufacturer and witnessed by a qualified testing agency, for components of roofing system.

J. Research/Evaluation Reports: For components of membrane roofing system.

K. Maintenance Data: For roofing system to include in maintenance manuals.

L. Warranties: Special warranties specified in this Section.

M. Inspection Report: Copy of roofing system manufacturer's inspection report of completed roofing installation.

N. Warranty Certification: Submit a signed certificate from the Manufacturer or its Technical Representative stating that the plans and specifications for the project have been reviewed and fully comply with the Manufacturer’s standards and meet the requirements for the General and Special Warranties of the Complete Roofing System for the specified project.

1.04 QUALITY ASSURANCE

A. Coordinate as required and be totally responsible for the full and satisfactory compatibility and performance between all Thermoplastic Membrane Roofing materials used under this section with all other applicable and related sections which may be in direct contact with work of this section.

B. A project specific QA / QC manual shall be submitted by the Installer before any work has begun. This manual shall be reviewed at the pre-installation meeting and copies shall be kept at roof level in the possession of the Installer’s supervisory personnel. Approved shop drawings and all other pertinent submittal materials shall be kept at roof level in the possession of the Installer’s supervisory personnel.

C. Take required steps and precautions to properly isolate and prevent of incompatibility between this system and adjacent work, in accordance with manufacturer's specifications, recommendations and instructions.

D. Installer Qualifications: A qualified firm that is approved, authorized, or licensed by roofing system manufacturer to install manufacturer's product, with 5 years documented experience and that is eligible to receive manufacturer's warranty.

1. Installer must acquire two (2) inspection service days utilizing manufacturer's technical representative. The manufacturer's technical representative must be present for roof removal, deck preparation, membrane installation.

E. Manufacturer Qualifications: A qualified manufacturer that has a minimum 20 years' experience in manufacturing the TPO membrane roofing system identical to that specified for this Project. Membrane manufacturers shall submit the following certification for review when making substitution requests or submittals.

1. Manufacturer's Technical Representative Qualifications: A technical representative of manufacturer not engaged in the sale of products and experienced in the installation and maintenance of the specified roofing system, qualified to perform roofing observation and inspection specified in Field Quality Control Article, to determine Installer's compliance with the requirements of this Project, and approved by the manufacturer to issue warranty certification. The Roofing Inspector shall be an authorized full-time technical employee of the manufacturer.

F. Testing Agency Qualifications: An independent testing agency with the experience and capability to conduct the testing indicated, as documented according to ASTM E 329.

G. Source Limitations: Obtain components for membrane roofing system from roofing membrane manufacturer or materials and components certified by the roofing manufacturer as compatible with other system components.

H. Preinstallation Conference: Prior to installation of roofing and associated work conduct conference at Project site. Review methods and procedures related to roofing system including, but not limited to, the following:

1. Contractor to meet with Engineer, Architect, testing and inspecting agency representative, roofing Installer, roofing system manufacturer's representative, plywood roof deck Installer, and installers whose work interfaces with or affects roofing including installers of roof accessories and roof-mounted equipment.

2. Review methods and procedures related to roofing installation, including manufacturer's written instructions.

3. Review and finalize construction schedule and verify availability of materials, Installer's personnel, equipment, and facilities needed to make progress and avoid delays.

4. Examine deck substrate conditions and finishes for compliance with requirements, including flatness and fastening.

5. Review structural loading limitations of roof deck during and after roofing.

6. Review base flashings, special roofing details, roof drainage, roof penetrations, equipment curbs, and condition of other construction that will affect roofing system.

7. Review governing regulations and requirements for insurance and certificates if applicable.

8. Review temporary protection requirements for roofing system during and after installation.

9. Review roof observation and repair procedures after roofing installation.

I. Manufacturer's technical representative shall make periodic site visits and complete inspection reports that are submitted to the State. At least one visit per roof area not including final inspections. Final inspections by the roofing membrane manufacturer shall be coordinated at least two weeks in advance with the Contractor and Engineer so that their attendance can be properly coordinated. Final inspection reports and signed / completed punch list reports by the roofing membrane manufacturer shall be submitted to the Engineer. Submittal of the roofing warranty alone shall not be acceptable.

J. The installation of pitch pockets is not acceptable. With proper coordination and planning they shall be avoided. Roof penetrations shall be properly coordinated and installed to meet the roofing manufacturer's requirements and NRCA guidelines. Conduit, vent pipe, supports, davits or similar penetrations shall be round or square tube. Whenever possible, a pre-manufactured flashing shall be installed over such items before "connections" are made. If "split" flashings are required then they shall be manufacturer's pre-manufactured type, installed, if possible, before field fabricated flashings are installed.

K. All TPO membrane roofing related sheet metal flashings specified in Section 07600 – FLASHING AND SHEET METAL shall be supplied by the roof system manufacturer as applicable and installed by the roofing contractor. Pre-manufactured coping and edge systems specified in Section 07600 – FLASHING AND SHEET METAL shall be included per the roofing manufacturer in the roofing systems warranty.

1.05 DELIVERY, STORAGE, AND HANDLING

A. Deliver roofing materials to Project site in original containers with seals unbroken and labeled with manufacturer's name, product brand name and type, date of manufacture, and directions for storing and mixing with other components.

B. Outside storage of insulation in manufacturing packaging is not acceptable. Roofing insulation, along with all other roofing materials, shall be properly protected including, but not limited to, the use of water resistant tarps.

C. Store liquid materials in their original undamaged containers in a clean, dry, protected location and within the temperature range required by roofing system manufacturer. Protect stored liquid material from direct sunlight.

1. Discard and legally dispose of liquid material that cannot be applied within its stated shelf life.

D. During installation, protect the roof deck and membranes with appropriate material such as plywood sheeting. Never scrape or puncture slip sheet or membranes. Keep roof surfaces free of soil, grit, or debris at all times with broom. Never set roof modules on top of soil, dirt or grit.

E. Transport conveyors to be run parallel to the line of installation.

F. Transport carts to have pneumatic tires, to be wheeled about only upon protective plywood sheeting, and to be loaded so as not to exceed weight capacity of roof deck.

G. Handle and store roofing materials and place equipment in a manner to avoid permanent deflection of deck.

1.06 PROJECT CONDITIONS

A. Weather Limitations: Proceed with installation only when existing and forecasted weather conditions permit roofing system to be installed according to manufacturer's written instructions and warranty requirements.

B. Do not apply roofing membrane to damp deck surface.

C. All new and temporary construction, including equipment and accessories, shall be secured in such a manner as to preclude wind blow-off and subsequent roof or equipment damage.

D. Arrange work sequence to avoid use of newly constructed roofing as a walking surface or for equipment movement and storage. Where such access is absolutely required, the Installer shall provide all necessary protection and barriers to segregate the work area and to prevent damage to adjacent areas. A substantial protection layer consisting of plywood over membrane or plywood over insulation board shall be provided for all new and existing roof areas that receive rooftop traffic during construction.

E. Install only as much insulation and other roofing system materials that are vulnerable to sun and water damage, as can be made waterproof during the same day.

1.07 WARRANTY

A. Installer's Warranty: The Contractor shall submit a written warranty on the roofing membrane system and sheet membrane flashing for a 2-year period after the Project Acceptance date. The warranty shall provide the following at no cost to the State:

1. Repair of roofing and flashings as necessary to seal leaks, which are attributable to faulty materials and/or workmanship.

2. Repair or replacement of damage to the building and/or its finishes, equipment and/or furniture when occasioned by such leaks.

3. Inspection of the roofing and flashings together with the State or their designated representative, on or about the 1st and 2nd anniversaries of the Project Acceptance date and repair or replacement of roofing and/or flashing as necessary to correct any deficiencies in workmanship or materials, such as by eliminating blisters exceeding 12 inches in any dimension or re-adhering open seams.

   Such repair or replacement of roofing and/or flashings shall be done in a manner which will preserve the integrity of the roofing membrane.

B. Special Warranty: Submit a written warranty, without monetary limitation, signed by roofing system manufacturer agreeing to repair or replace components of membrane roofing system that fail in materials or workmanship within specified warranty period. Failure includes roof leaks.

1. Special warranty includes roofing membrane, base flashings, liquid flashing, roofing membrane accessories, roof insulation, fasteners, TPO roofing edge securement related sheet metal flashings specified in Section 07600 – FLASHING AND SHEET METAL and other components of membrane roofing system.

2. Warranty Period: 20 years from date of Project Acceptance.

3. Wind Speed: Project Wind Speed as indicated in Article 1.02 of this Section. Note: All manufacturer material and installation requirements to obtain wind speed warranty shall be included by the installer.

4. The Surety and the Contractor shall not be held liable beyond two years from the Project Acceptance date.

PART 2 - PRODUCTS

2.01 MANFACTURERS

A. Roofing Manufacturers: Subject to compliance with requirements, provide products by one of the following:

1. Holcim Elevate; Ultraply Platinum TPO Fully Adhered Roofing System.
2. Carlisle-Syntec; Sure-Weld Reinforced TPO 80-mil (Basis-of-Design).
3. GAF; EverGuard TPO 80 Membrane
4. or Approved Equal.

2.02 ROOFING MEMBRANE

A. Fabric-Reinforced Thermoplastic Polyolefin Roofing Membrane: ASTM D 6878, fabric or scrim internally reinforced uniform, flexible sheet.

1. Thickness: 80 mils, nominal
2. Exposed Face Color: White

B. Non-reinforced Flashing Membrane: Manufacturer's standard non-reinforced thermoplastic polyolefin sheet flashing 60-mil-thick of same color as sheet membrane.

C. Cover Strip: ASTM D 6878; Reinforced 8-inch-wide thermoplastic polyolefin strip, 60-mil thick.

D. Liquid Flashing System: Single or multiple component polyurethane-based resin used with reinforcing fabric to form a cold-applied liquid flashing that is compatible with the roofing manufacturer’s TPO single-ply membranes and is UV and color stable, solvent-free, low-VOC, and virtually odorless.

1. Acceptable Products:
    a. Carlisle Syntec, LIQUISEAL (Basis-of Design)
    b. Holcim Elevate, White One-Part Pourable Sealer
    c. GAF, Majorseal Liquid Flashing
    d. Or Approved Equal.

2.03 AUXILLARY MATERIALS

A. Membrane Bonding Adhesive: A solvent-based contact-type adhesive used to attach the membrane to the substrate. Consult Product Data Sheets for additional information and as recommended by the insulation manufacturer.

B. Fasteners: Factory-coated steel fasteners and metal or plastic plates meeting corrosion-resistance provisions in FMG 4470, designed for fastening membrane to substrate and acceptable to membrane roofing system manufacturer.

C. Seaming Material: Manufacturer's standard thermoplastic polyolefin 5-1/2-inch-wide minimum, 30 mil seaming tape.

D. Lap Sealant: Manufacturer's standard single-component sealant**,** color to match roofing membrane.

E. Cut Edge Sealant: Manufacturer's standard polymer-based sealant.

F. Metal Termination Bars: Manufacturer's standard predrilled stainless-steel or aluminum bars, approximately 1-inch by 1/8-inch-thick; with anchors.

G. Metal Battens: Manufacturer's standard aluminum-zinc-alloy-coated or zinc-coated steel sheet, approximately 1 inch wide by 0.05 inch thick, prepunched.

H. Miscellaneous Accessories: Provide pourable sealers, preformed cone and vent sheet flashings, preformed inside and outside corner sheet flashings, T-joint covers, in-seam sealants, termination reglets, cover strips, and other accessories.

I. Thinner and Cleaner: As recommended by adhesive manufacturer, compatible with membrane.

2.04 ROOF INSUALTION AND COVER BOARD

A. Polyisocyanurate Board Insulation: ASTM C 1289-13, Type II, Class 1, Grade 3, 25 psi compressive strength, glass-fiber mat facer on both major surfaces, meeting membrane manufacturer's requirements.

1. Minimum R-Value: As indicated on the Drawings

B. Tapered Insulation: Polyisocyanurate, 25 psi compressive strength at areas to receive ISO insulation, fabricated to slope of 1/2-inch per ft. (unless otherwise noted). Positive drainage shall be provided for at all roof areas even if tapered insulation or crickets are not indicated on drawings. Provide for prefabricated drain sump panels per roofing manufacturer's recommendations. Crickets shall be fabricated and installed in coordination with deck slope and / or tapered insulation slope so that the "valley or flow line" is maximized based on 1/4-inch per ft deck or tapered insulation slope (one-to-one ratio architecture).

1. Size for insulation board: Maximum 4 feet by 4 feet.

C. Insulation Cover Board: ASTM C 1177/C 1177M, glass-mat, water-resistant gypsum substrate, Type X, 5/8 - inch thick.

1. DensDeck Fireguard Prime as manufactured by Georgia-Pacific Corporation or approved equal.

D. Substrate Joint Tape: 6- or 8-inch wide, coated, glass-fiber joint tape.

E. Insulation Fasteners and Plates: Provide manufacturers heavy duty pre-assembled fastener and insulation plate design specifically to be used with manufacturer's roof insulation system.

1. Metal Plate: Fabricated from Galvalume sheet steel; ASTM A 792, Class AZ50 coating designation, Grade 40.

a. Diameter: 3-inches.

b. Thickness: 0.17inch – 0.23 inch.

2. Fastener: SAE 1022 heat treated steel with red epoxy coating of length to be able to penetrate wood roof deck at the length require to withstand uplift forces.

F. Insulation manufacturers recommended, low-rise, one-component or multi-component urethane adhesive formulated to attach roof insulation to substrate or to another insulation layer and that that has been tested as part of an assembly per requirements of 1.02 and 1.07 of this Section and allowed by roofing manufacturer to meet specified warranty and wind speed warranty.

2.05 ACCESSORIES

A. Sealants: As recommended by the membrane manufacturer.

2.06 FLASHINGS

A. Flexible Flashing: Same material as membrane.

B. Sheet Metal Flashing: Roof related sheet metal flashing as specified in Section 07600 - FLASHING AND SHEET METAL.

2.07 TRAFFIC PROTECTION

A. Traffic Protection: Non-reinforced, thermoplastic, slip-resisting, surface-textured walkway pads or rolls, approximately 5/32-inch thick, and acceptable to membrane roofing system manufacturer.

B. Color to match roof membrane color

PART 3 - EXECUTION

3.01 REMOVAL AND EXAMINATION

A. Remove and properly dispose of existing roofing, insulation, related roofing materials, flashings, abandon curbs and pipes, and any State identified equipment to leave all portions of the building decks in a fit condition to have new roof system installed.

B. All rotted or deteriorated wood shall be removed and replaced with new. Deck type and attachment shall conform to local code requirements. Fastener heads shall be recessed into the wood surface.

1. Wood deck repairs:

a. Remove loose nails and pound down all high nails.

b. Reattach loose panels at 6 inches o.c. at edges; 12 inches o.c. at intermediate supports.

c. Remove deteriorated deck panels. Examine joists for rot. If unsound, contact the Engineer immediately for additional action.

d. Attach new plywood roof decking 6 inches o.c. at edges; 12 inches o.c. at intermediate supports.

e. Provide 1/8-inch gap between panels at panel edges.

C. Examine substrates, areas, and conditions, with Installer present, for compliance with the following requirements and other conditions affecting performance of roofing system:

1. Verify that roof openings and penetrations are in place and set and braced and that roof drains are securely clamped in place.
2. Verify that wood blocking, curbs, and nailers are securely anchored to roof deck at penetrations and terminations and that nailers match thicknesses of insulation.
3. Contractor shall engage a qualified independent testing and inspecting agency or the manufacturer's technical personnel to perform fastener pullout tests in accordance with the latest version of the SPRI/ANSI FX-1 “Standard Field Test Procedure for Determining the Withdrawal Resistance of Roofing Fasteners” to verify condition of the deck/substrate and to confirm required pullout values. Perform pullout test in various areas of the roof to include corner, perimeters, field and drain areas.
    a. Number of pullout tests required: Minimum of 5
        1) 50 percent of the tests shall be performed in the corner and perimeter areas
    b. Immediately inform the Engineer if any of the pull-out tests reveal that the deck does not meet the minimum required pull values.
4. Proceed with installation only after unsatisfactory conditions have been corrected.

3.02 PREPARATION

A. Clean substrate of dust, debris, moisture, and other substances detrimental to roofing installation according to roofing system manufacturer's written instructions. Remove sharp projections.

B. Mask off adjoining surfaces not receiving roofing membrane material to prevent spillage or over spray affecting other construction.

C. Prevent materials from entering and clogging roof drains and conductors and from spilling or migrating onto surfaces of other construction. Remove roof-drain plugs when no work is taking place or when rain is forecast.

D. Complete terminations and base flashings and provide temporary seals to prevent water from entering completed sections of roofing system at the end of the workday or when rain is forecast. Remove and discard temporary seals before beginning work on adjoining roofing.

3.03 INSULATION AND COVER BOARD INSTALLATION

A. Coordinate installing membrane roofing system components, so insulation is not exposed to precipitation or left exposed at the end of the workday.

B. Comply with membrane roofing system manufacturer's written instructions for installing roof insulation.

C. Install tapered insulation under area of roofing to conform to slopes indicated.

D. Trim surface of insulation where necessary at roof drains so completed surface is flush and does not restrict flow of water.

E. Mechanically Fastened and Adhered Insulation: Install first layer of insulation to deck using mechanical fasteners specifically designed and sized for fastening specified board-type roof insulation to deck type.

1. Mechanically fasten the first layer of insulation to resist uplift pressure at corners, perimeter, and field of roof.
2. Set each subsequent layer of insulation in adhesive, firmly pressing and maintaining insulation in place.

F. Install cover boards over insulation with long joints in continuous straight lines with end joints staggered between rows. Offset joints of insulation below a minimum of 6 inches in each direction. Loosely butt cover boards together and adhere to insulation.

G. Adhere cover boards to resist uplift pressure at corners, perimeter, and field of roof.

3.04 ADHERED ROOFING MEMBRANE INSTALLATION

A. Install roofing membrane over area to receive roofing according to membrane roofing system manufacturer's written instructions.

B. Unroll roofing membrane, without stretching, over the acceptable substrate and allow to relax for a minimum of 30 minutes prior to adhesion

C. Accurately align roofing membrane and maintain uniform side and end laps of minimum dimensions required by manufacturer. Stagger end laps.

D. Apply roofing membrane with side laps shingled with slope of roof deck where possible.

E. Extend membrane up a minimum of 8 inches onto vertical surfaces.

F. Bonding Adhesive: Apply bonding adhesive to substrate and underside of roofing membrane at rate required by manufacturer and allow to partially dry before installing roofing membrane. Do not apply bonding adhesive to splice area of roofing membrane. Roofing membrane shall be fully bonded to cover board. The use of low-rise or similar adhesives, and ribbon adhesive installation methods are not acceptable.

G. Mechanically or adhesively fasten roofing membrane securely at terminations, penetrations, and perimeter of roofing.

H. Adhesive Seam Installation: Clean both faces of splice areas, apply splicing cement, and firmly roll side and end laps of overlapping roofing membranes according to manufacturer's written instructions to ensure a watertight seam installation. Apply lap sealant and seal exposed edges of roofing membrane terminations.

I. Strip in the seams for added protection in accordance to the manufacturer’s instructions.

J. Seal membrane around roof penetrations.

3.05 BASE FLASHING INSTALLATION

A. Install sheet flashings and preformed flashing accessories and adhere to substrates according to membrane roofing system manufacturer's written instructions.

B. Apply solvent-based bonding adhesive to substrate and underside of sheet flashing at required rate and allow to partially dry. Do not apply bonding adhesive to seam area of flashing.

C. Flash penetrations and field-formed inside and outside corners with sheet flashing.

D. Clean seam areas and overlap and firmly roll sheet flashings into the adhesive. Weld side and end laps to ensure a watertight seam installation.

E. Liquid Flashing System: Install the specified liquid-applied flashing system in accordance with the membrane system manufacturer's printed installation guidelines and other applicable written recommendations as provided by the manufacturer.

1. Prepare all substrates by removing any irregularities and any loose or foreign materials such as dirt, water, grease, oil, lacquers, or release agents. Ensure that all metal surfaces are ground down to expose bare metal. Use mechanical abrasion where appropriate to ensure a clean substrate.

2. Apply the appropriate primer to membrane and allow to flash off. Apply appropriate primer to all other surfaces to which flashing will be applied.

3. Cut the reinforcing fabric before mixing resin.

4. For multi-component systems, mix components together in accordance with the manufacturers' instructions.

5. Using a nap roller, brush or trowel as recommended by the manufacturer, apply the liquid flashing evenly onto the substrate using even strokes at the rate to achieve the manufacturer recommend wet mil thickness.

6. Embed the reinforcing fabric into the wet resin and smooth out avoiding folds, wrinkles and air pockets.

7. Apply a second coat of resin over the reinforcing fabric and work he resin into the fabric saturating it from the bottom up. All areas of the fabric should be completely saturated. Ensure that the reinforcing fabric is covered with resin 1/4-inch to 1/2-inch beyond the fabrics edge.

8. Roof Perimeter Terminations: Apply liquid flashing onto the field membrane a minimum of 6-inches beyond the edge of the edge metal flashing and minimum of 2-inches passed flashing fastener head.

9. Roof to Deck Transitions: As directed by Manufacturer for tie-ins.

10. Roof Equipment Curbs: Apply liquid flashing onto the field membrane a minimum of 8-inches beyond the roof to curb transition and extend up and over terminating on the top of the curb.

3.06 ROOF DRAINS

A. Install new roof drain in accordance with the drain manufacturer's installation instructions.

B. Provide surrounding sumps in tapered insulation at new drains.

C. Provide a smooth transition from drain flange to deck surface.

1. Prime all metal surfaces.

2. Using a trowel, set a layer of mastic water cut-off around the drain bowl edge.

3. Extend roof membrane over the drain and provide a round cut in the membrane extended 1-inch past the clamping ring. The hole in the membrane must be larger than the drainpipe diameter.

4. Membrane seams shall not intersect with drain clamping ring. Seams that fall within the drain sump should be stripped in.

5. Install clamping ring with all bolts or clamps in place to provide constant, even compression on water cutoff mastic.

3.07 FIELD QUALITY CONTROL

A. Testing Agency: The Contractor shall engage a qualified independent testing and inspecting agency to perform roof tests and inspections and to prepare test reports.

B. The Contractor shall perform the work to patch a maximum of 5 “membrane” samples that may be taken by the testing / observation firm at any given roof area.

C. Final Roof Inspection: Arrange for roofing system manufacturer's technical personnel to inspect roofing installation on completion of all areas and submit report to Engineer. The Engineer shall be notified of this inspection two weeks in advance.

D. Provide periodic site observation by roofing, adhesive and insulation materials manufacturer’s representatives at the commencement, midpoint and at completion of each stage of the roofing system work or at more frequent intervals if so required by the manufacturer’s extended warranty require by this section

E. Repair or remove and replace components of membrane roofing system where test results or inspections indicate that they do not comply with specified requirements.

F. Additional testing and inspecting, at Contractor's expense, will be performed to determine compliance of replaced or additional work with specified requirements.

G. Water Testing: All roof areas shall be water tested. Water testing shall consist of “sprinklers” or “soaker hoses” and does not imply flood testing. Water shall be allowed to run across all roof areas to drainage units for at least 24 hours at all areas. The Engineer shall be notified 72 hours in advance of such testing. The Installer shall be responsible for interior observations of on-going testing to identify any water intrusion and to stop testing to minimize any interior damage.

1. At time of water testing, if lack of positive drainage is noted, the Engineer reserves the right to not accept the roofing membrane installation until such time that drainage issues are resolved.

3.08 PROTECTING AND CLEANING

A. Protect membrane roofing system from damage and wear during remainder of construction period. When remaining construction will not affect or endanger roofing, inspect roofing for deterioration and damage, describing its nature and extent in a written report, with copies to Engineer.

B. Correct deficiencies in or remove membrane roofing system that does not comply with requirements, repair substrates, and repair or reinstall membrane roofing system to a condition free of damage and deterioration at time of Project Acceptance and according to warranty requirements. The Engineer reserves the

right to accept “patches” at damaged or repair areas and / or require the installation of fully width “sheets” of new membrane.

C. Final cleaning shall be provided by the Roofing Installer. The Engineer reserve the right to not fully accept the roofing membrane system if the membrane is “dirty” and has not been cleaned.

END OF SECTION

SECTION 07600 - FLASHING AND SHEET METAL

PART 1 - GENERAL

1.01 SUMMARY

A. Provide all labor, materials and equipment necessary to install replacement and new, edge flashing, counterflashing, gutters, and downspouts, and wall flashing, and other related work as shown on drawings and as specified herein.

B. Related Work Described Elsewhere:

1. Section 07541 – TPO ROOFING MEMBRANE
2. Section 07910 – EXTERIOR WALL JOINT SEALANTS

1.02 REFERENCES

A. The work of this section shall comply with the latest edition of the following standards. When conflicts arise between standards, the more stringent applies.

1. SMACNA – Sheet Metal and Air Conditioning Contractors' National Association - Architectural Sheet Metal Manual
2. NRCA – National Roofing Contractors Association - Roofing and Waterproofing Manual
3. 2018 International Building Code
4. ASCE 7 – American Society of Civil Engineers
5. American Society of Testing and Materials - ASTM
    a. ASTM A 240 – Standard Specification for Chromium and Chromium-Nickel Stainless Steel Plate, Sheet, and Strip for Pressure Vessels and for General Applications
    b. ASTM A 480 - Standard Specification for General Requirements for Flat-Rolled Stainless and Heat-Resisting Steel Plate, Sheet, and Strip
    c. ASTM A 621 - Standard Specification for Steel, Sheet and Strip, Carbon, Hot-Rolled, -Drawing Quality
    d. ASTM B 32 - Standard Specification for Solder Metal
    e. ASTM B 75 - Standard Specification for Seamless Copper Tube
    f. ASTM B 209 - Standard Specification for Aluminum and Aluminum-Alloy Sheet and Plate
    g. ASTM B 370 - Standard Specification for Copper Sheet and Strip for Building Construction
    h. ASTM C 920 - Standard Specification for Elastomeric Joint Sealants
    i. ASTM C 1311 - Standard Specification for Solvent Release Sealants
    j. ASTM D 226 - Standard Specification for Asphalt-Saturated Organic Felt Used in Roofing and Waterproofing
    k. ASTM D 2244 - Standard Practice for Calculation of Color Tolerances and Color Differences from Instrumentally Measured Color Coordinates

l. ASTM D 4214 - Standard Test Methods for Evaluating the Degree of Chalking of Exterior Paint Films

m. ASTM D 4586 - Standard Specification for Asphalt Roof Cement, Asbestos-Free

1.03 PERFORMANCE REQUIREMENTS

A. General: Install sheet metal flashing and trim to withstand wind loads, structural movement, thermally induced movement, and exposure to weather without failing, rattling, leaking, and fastener disengagement.

B. Wind Uplift Design: Provide metal flashing and counter-flashing that complies with the following:

1. 2018 IBC Chapter 16 and ASCE 7 Chapter 6 for required wind forces.

2. Wind Loading Criteria as indicated on the Structural Engineers Drawings.

C. Thermal Movements: Provide sheet metal flashing and trim that allow for thermal movements resulting from the following maximum change (range) in ambient and surface temperatures by preventing buckling, opening of joints, hole elongation, overstressing of components, failure of joint sealants, failure of connections, and other detrimental effects. Provide clips that resist rotation and avoid shear stress as a result of sheet metal and trim thermal movements. Base engineering calculation on surface temperatures of materials due to both solar heat gain and nighttime-sky heat loss.

1. Temperature Change (Range): 120 deg F, ambient; 180 deg F, material surfaces.

D. Water Infiltration: Provide sheet metal flashing and trim that do not allow water infiltration to building interior.

1.04 SUBMITTALS

A. General: Submit under provisions of Section 01330 – SUBMTTAL PROCEDURES.

B. Product Data: For each type of product indicated. Include construction details, material descriptions, dimensions of individual components and profiles, and finishes

C. Shop Drawings: Submit shop drawings to the Engineer for approval, showing layouts of sheet metal flashing and trim, including plans, elevations and details. Distinguish between shop and field assembly works. No fabrication will be permitted before approval is secured. Include the following:

1. Identify material, thickness, weight, and finish for each item and location in Project.

2. Details for forming sheet metal flashing and trim, including profiles, shapes, seams, and dimensions.

3. Details for fastening, joining, supporting, and anchoring sheet metal flashing and trim, including fasteners, clips, cleats, and attachments to adjoining work.

4. Details of expansion-joint covers, including showing direction of expansion and contraction.

1.05 QUALITY ASSURANCE

A. Sheet Metal Flashing and Trim Standard: Comply with SMACNA's "Architectural Sheet Metal Manual" and the NRCA's Roofing and Waterproofing Manual in coordination with requirements of roofing and waterproofing systems (the more stringent shall apply). Conform to dimensions and profiles shown unless more stringent requirements are indicated.

B. Preinstallation Conference: Conduct conference at Project site to comply with requirements in Division 1 Section.

1. Meet with Engineer, Architect, Engineer, Installer, and installers whose work interfaces with or affects sheet metal flashing and trim including installers of roofing materials and roof-mounted equipment.
2. Review methods and procedures related to sheet metal flashing and trim.
3. Examine substrate conditions for compliance with requirements, including flatness and attachment to structural members.
4. Document proceedings, including corrective measures and actions required, and furnish copy of record to each participant.

1.06 DELIVERY, STORAGE AND HANDLING

A. Deliver sheet metal flashing materials and fabrications undamaged. Protect sheet metal flashing and trim materials and fabrications during transportation and handling.

B. Unload, store, and install sheet metal flashing materials and fabrications in a manner to prevent bending, warping, twisting, and surface damage.

C. Stack materials on platforms or pallets, covered with suitable weathertight and ventilated covering. Do not store sheet metal flashing and trim materials in contact with other materials that might cause staining, denting, or other surface damage.

1.07 COORDINATION

A. Coordinate installation of sheet metal flashing and trim with interfacing and adjoining construction to provide a leakproof, secure, and noncorrosive installation.

B. Fabricate flashings from materials noted below as most appropriate in regards to the system that the flashing is being integrated with and / or adjacent to and in coordination with the drawings and finish schedules. Concealed flashings may be mill finish.

1.08 WARRANTY

A. The Contractor shall provide to the State a 5-year written warranty that the installation will be watertight and that any leaks which develop during that period which are not due to improper use or willful damage will be repaired at no cost to the State.

1. New flashing for roofing to be performed by roofing contractor and be included in roofing warranty.

B. Special Warranty on Finishes: Manufacturer's standard form in which manufacturer agrees to repair finish or replace sheet metal flashing and trim that

shows evidence of deterioration of factory-applied finishes within specified warranty period.

1. Exposed Sheet Metal Finish: Deterioration includes, but is not limited to, the following:
    a. Color fading more than 5 Hunter units when tested according to ASTM D 2244.
    b. Chalking in excess of a No. 8 rating when tested according to ASTM D 4214.
    c. Cracking, checking, peeling, or failure of paint to adhere to bare metal.
2. Finish Warranty Period: 20 years from the Project Acceptance date.

C. The Surety and the Contractor shall not be held liable beyond two years from the Project Acceptance date.

PART 2 - PRODUCTS

2.01 MATERIALS

A. Asbestos Prohibition: No asbestos containing materials or equipment shall be used in this section. The Contractor shall ensure that all materials and equipment incorporated in the project are asbestos-free.

B. Aluminum Sheet: ASTM B 209, alloy as standard with manufacturer for finish required, with temper as required to suit forming operations and performance required.

C. Stainless Steel Sheet: ASTM A240, Type 304, dead soft, fully annealed.
1. Surface: Smooth
2. Exterior Finish: ASTM A 480, No. 2D (dull, cold rolled)

D. Copper Tube: ASTM B75, Alloy UNS C12200 (phosphorous deoxidized, high residual phosphorous copper).

E. Copper Sheet: ASTM B 370, cold-rolled copper sheet, H00 or H01 temper.
1. Nonpatinated, Exposed Finish: Mill

F. Solder: For Copper; ASTM B 32, Grade Sn50, 50 percent tin and 50 percent lead.

G. Fasteners: Same material as flashing/sheet metal, or other noncorrosive metal as recommended by sheet manufacturer. Match finish of exposed heads with material being fastened.
1. For attachment to wood substrates and blocking, provide 18-8/Type 304 stainless steel nails not less than 1-1/4-inch long, barbed with large head.
2. For attachment to concrete or masonry provide 1/4-inch by 2-inches long, 18-8/Type 304 stainless steel drive pins with neoprene bonded stainless steel washers

H. Isolation Membrane: ASTM D 226, Type II (No. 30), asphalt-saturated organic felt, non-perforated. To be used to isolate flashing metal from dissimilar metals or corrosive substrates.

I. Sealants and Sealant Tape: Comply with the requirements of Section 07910 – EXTERIOR WALL JOINT SEALANTS.

1. Elastomeric Sealant: ASTM C 920, elastomeric silicone polymer sealant; of type, grade, class, and use classifications required to seal joints in sheet metal flashing and trim and remain watertight.

2. Sealing Tape: Pressure-sensitive, 100 percent solids, polyisobutylene compound sealing tape with release-paper backing. Provide permanently elastic, nonsag, nontoxic, nonstaining tape.

3. Butyl Sealant: ASTM C 1311, single-component, solvent-release butyl rubber sealant, polyisobutylene plasticized, heavy bodied for hooked-type expansion joints with limited movement.

J. Bituminous Coating: Cold-applied asphalt mastic, SSPC-Paint 12, compounded for 15-mil dry film thickness per coat. Provide inert-type noncorrosive compound free of asbestos fibers, sulfur components, and other deleterious impurities.

K. Asphalt Roofing Cement: ASTM D 4586, asbestos free, of consistency required for application.

2.02 FABRICATION

A. General: Fabricate sheet metal flashing and trim to comply with recommendations in SMACNA's "Architectural Sheet Metal Manual" that apply to design, dimensions, metal, and other characteristics of item indicated. Shop fabricate items where practicable. Obtain field measurements for accurate fit before shop fabrication.

B. Fabricate sheet metal flashing and trim in thickness or weight to match existing or as needed to comply with performance requirements for new flashing, but not less than that specified for each application and metal.

C. Fabricate sheet metal flashing and trim without excessive oil canning, buckling, and tool marks and true to line and levels indicated, with exposed edges folded back to form hems.

1. Seams: Fabricate nonmoving seams with flat-lock seams. Tin edges to be seamed, form seams, and solder.

D. Reglets: Units of type, material, and profile indicated, formed to provide secure interlocking of separate reglet and counter-flashing pieces, and compatible with flashing indicated with factory-mitered and -welded corners and junctions and interlocking counter-flashing on exterior face, of same metal as reglet.

1. Manufacturers: Subject to compliance with requirements, provide products by one of the following:

a. Fry Reglet Corporation.

b. Heckmann Building Products Inc.

c. Hickman, W. P. Company

d. Or Approved Equal.

2. Material: 0.024-inch aluminum sheet.

3. Siding Type: Provide with upturned fastening flange and extension leg of length to match thickness of applied finish materials.

4. Surface-Mounted Type: Provide with slotted holes for fastening to substrate, with neoprene or other suitable weatherproofing washers, and with channel for sealant at top edge.

5. Finished to match flashings.

E. Sealed Joints: Form non-expansion but movable joints in metal to accommodate elastomeric sealant to comply with SMACNA recommendations.

F. Expansion Provisions: Where lapped or bayonet-type expansion provisions in the Work cannot be used, form expansion joints of intermeshing hooked flanges, not less than 1 inch deep, filled with elastomeric sealant concealed within joints.

G. Conceal fasteners and expansion provisions where possible on exposed-to-view sheet metal flashing and trim, unless otherwise indicated.

H. Fabricate cleats and attachment devices from same material as accessory being anchored or from compatible, noncorrosive metal.

1. Thickness: As recommended by SMACNA's "Architectural Sheet Metal Manual" for application but not less than thickness of metal being secured.

2.03 EDGE FLASHING AND COPING SYSTEMS

A. Roof-Edge Flashing: Fabricate in edge flashing in lengths require for single piece replacement but no larger than 12-foot- long sections. Joints shall be a butt type with concealed splice plates.

1. Fabricate flashing from same material and thickness as existing in standard. Vertical face length match existing.

2. Concealed Splice Plates: Fabricate concealed splice plates in 12-inch widths of same thickness as fascia.

3. Fasteners: 1-1/4-inch ring shank roofing nails of material matching or compatible with the flashing material.

2.04 LOW SLOPE ROOF FLASHING

A. Base and Counter Flashings: to be fabricated from Aluminum sheet of the following thicknesses:

1. Base Flashing – 0.040-inch.

2. Counter Flashing – 0.032-inch.

B. Roof Penetration Flashing: Fabricate from 0.040-inch. aluminum sheet.

2.05 WALL FLASHING

A. Openings Flashing in Frame Construction: Fabricate head, sill and similar flashings to extend a minimum of 4 inches beyond wall openings. Form head and sill flashing with 2-inch high end dams.

1. At Windows and Doors:

a. Fabricate from 0.062-inch aluminum sheet.

2. Color to match color of window or door trim.

2.06 FINISHES

A. Aluminum Finishes: Three-Coat Fluoropolymer: AAMA 621. Fluoropolymer finish containing not less than 70 percent PVDF resin by weight in both color coat and clear topcoat. Prepare, pretreat, and apply coating to exposed metal surfaces to comply with coating and resin manufacturers' written instructions.

1. Humidity Resistance: 2000 hours.
2. Salt-Spray Resistance: 2000 hours.
3. Color: As selected by Engineer.
    a. Wall opening flashings at windows and doors
        1) Color to match door and window frame color.

B. Stainless Steel and Copper Finishes: Field Painted as specified in Section 09902 – REPAINTING.

PART 3 - EXECUTION

3.01 INSTALLATION AND WORKMANSHIP

A. Surface to which sheet metal is to be applied shall be even, smooth, sound, thoroughly clean and dry, and free from defects that might affect the application. Report any unsatisfactory surfaces to the Engineer and fix any unsatisfactory work at no additional cost to the State.

B. All accessories or other items essential for the completeness of the sheet metal installation, though not specifically indicated on the drawings or specified, shall be provided. All such items unless otherwise indicated on the drawings or specified, shall be of the same kind of materials as the item to be applied. Nails, screws, rivets, and bolts shall be of the type best suited for the purpose intended and shall be of a composition that is compatible with the metal to which it will contact.

C. Except as otherwise indicated on the drawings or specified, the workmanship of sheet metal work, method of forming joints, anchoring, cleating, provisions for expansion, etc., shall conform to the standards details and recommendations of the Sheet Metal and Air Conditioning Contractors National Association's "Architectural Sheet Metal Manual" and shall be subject to the approval of the Engineer.

1. Torch cutting of sheet metal flashing and trim is not permitted.

D. All sheet metal work shall be watertight and wind-tight in compliance with the purpose intended for the items indicated on the drawings or specified herein.

E. Install sheet metal flashing and trim true to line and levels indicated without excessive oil canning, buckling and tool marks. Provide uniform, neat seams with minimum exposure of solder, welds, and elastomeric sealant.

F. Cleating: Cleats for sheet metal work shall be provided continuous, unless otherwise indicated on the drawings. Cleats shall be of the same material and weight as the metal being installed.

G. Expansion Provisions: Provide for thermal expansion of exposed flashing and trim. Space movement joints at a maximum of 10 feet with no joints allowed within 24 inches of corner or intersection. Where lapped or bayonet-type expansion provisions cannot be used or would not be sufficiently watertight, form

expansion joints of intermeshing hooked flanges, not less than 1-inch deep, filled with elastomeric sealant concealed within joints.

H. Fasteners: Use fasteners of types and sizes indicated that will penetrate substrate not less than 1-1/4 inches.

I. Where sealant-filled joints are used, embed hooked flanges of joint members not less than 1 inch into sealant. Form joints to completely conceal sealant. When ambient temperature at time of installation is moderate, between 40 and 70 deg F, set joint members for 50 percent movement either way. Adjust setting proportionately for installation at higher ambient temperatures.

   1. Prepare joints and apply sealants to comply with requirements in Section 07910 – EXTERIOR WALL JOINT SEALANTS.

J. Reglets: Type and size as indicated.

K. Protection from Contact of Dissimilar Materials: Surfaces in contact with dissimilar metal shall be painted with heavy-bodied bituminous paint or shall be separated by means of moisture-proof building felts.

3.02 GUTTER INSTALLATION

A. Hanging Gutters: Replace sections of existing gutters that are indicated on the Drawings as being damaged.

   1. Join sections with riveted and soldered joints. Replacement sections shall be lapped in a “shingle” manner in the down slope direction.

   2. Provide for thermal expansion.

   3. Attach gutters at eave or fascia to firmly anchor them in position.

   4. Provide end closures and seal watertight with sealant.

   5. Replacement section to follow the slope of the existing gutter sections.

3.03 DOWNSPOUT INSTALLATION

A. Downspouts: Join sections with 1-1/2-inch telescoping joints. Provide fasteners and hangers designed to hold downspouts securely 1-inch away from walls; locate hangers at top and bottom.

B. Downspout indicated to empty on to splash blocks, provide elbows at base of downspout to direct water away from the wall.

3.04 ROOF FLASHING INSTALLATION

A. General: Install sheet metal flashing and trim to comply with performance requirements, sheet metal manufacturer's written installation instructions, and SMACNA's "Architectural Sheet Metal Manual." Provide concealed fasteners where possible, set units true to line, and level as indicated. Install work with laps, joints, and seams that will be permanently watertight and weather resistant.

B. Edge Flashing: Anchor to resist uplift and outward forces according to recommendations in SMACNA's "Architectural Sheet Metal Manual" and as indicated. Interlock bottom edge of roof edge flashing with continuous cleat anchored to substrate at staggered 3-inch centers.

C. Counterflashing: Coordinate installation of counterflashing with installation of base flashing. Insert counterflashing in reglets or receivers and fit tightly to base

flashing. Extend counterflashing 4 inches over base flashing. Lap counterflashing joints a minimum of 4 inches and bed with sealant. Secure in a waterproof manner by means of anchor and washer at 36-inch centers unless otherwise indicated.

3.05 WALL FLASHING INSTALLATION

A. General: Install sheet metal wall flashing to intercept and exclude penetrating moisture according to SMACNA recommendations and as indicated. Coordinate installation of wall flashing with installation of wall-opening components such as windows, doors, and louvers.

B. Opening Flashings in Frame Construction: Install continuous head, sill, and similar flashings to extend 4 inches beyond wall openings.

1. Form end dams in sill flashing at each where flashing meets jamb. Turn metal up jamb a minimum of 2-inches.

3.06 MISCELLANEOUS FLASHING INSTALLATION

A. Equipment Support Flashing: Coordinate installation of equipment support flashing with installation of roofing and equipment. Weld or seal flashing with elastomeric sealant to equipment support member

3.07 CLEANING AND PROTECTION

A. Clean exposed metal surfaces of substances that interfere with uniform oxidation and weathering.

B. Clean and neutralize flux materials. Clean off excess solder and sealants.

C. Remove temporary protective coverings and strippable films as sheet metal flashing and trim are installed. On completion of installation, clean finished surfaces, including removing unused fasteners, metal filings, pop rivet stems, and pieces of flashing. Maintain in a clean condition during construction.

D. Replace sheet metal flashing and trim that have been damaged or that have deteriorated beyond successful repair by finish touchup or similar minor repair procedures.

E. Protect all sheet metal work until final acceptance of the building.

F. At completion of the work, clean up and remove all rubbish and debris from the premises which resulted from this work.

END OF SECTION

SECTION 07910 – EXTERIOR WALL JOINT SEALANTS

PART 1 - GENERAL

1.01 SUMMARY

A. This section includes joint preparation, joint packing, priming, caulking and sealing indicated by the Contract Documents and furnish all supplementary items necessary to completely seal the joints in the facade such as those joints in the wood windows and doors, wood siding, and other exterior joints as required, indicated or specified in the Contract Documents using approved sealant technique, with weeps or vents as required. Furnishing and installing of sealants and backer rods for visual mockup specimens are also included as part of this work.

B. Related Work:

1. Section 07600 – FLASHING AND SHEET METAL

1.02 REFERENCES

A. The work of this section shall comply with the latest edition of the following standards. When conflicts arise between standards, the more stringent applies.

1. AAMA – Architectural Aluminum Manufacturers Association
    a. AAMA 800, Test Methods for Sealants
2. American Society for Testing and Materials.
    a. ASTM C509, Specification for Elastomeric Cellular Preformed Gasket and Sealing Material
    b. ASTM C718, Test Method for Ultraviolet (UV) Cold Box Exposure of One-Part Elastomeric, Solvent-Release Type Sealants
    c. ASTM C719, Test Method for Adhesion and Cohesion of Elastomeric Joint Sealants Under Cyclic Movement (Hockman Cycle)
    d. ASTM C793, Test Method for Effects of Accelerated Weathering on Elastomeric Joint Sealants
    e. ASTM C 1184 – Standard Specification for Structural Silicone Sealants.
    f. ASTM D2203, Test Method for Staining from Sealants
3. Federal Specification TT-S - 00230C and TT-S-001543A.
4. The 2018 International Building Code.

1.03 QUALITY ASSURANCE

A. The character of these requirements is intended to provide a performance type specification for the design selection and installation of the exterior wall sealants. The exterior sealant installer is responsible for the design selection and installation of the sealants, as well as the performance of the sealant system.

B. Except as otherwise indicated, joint sealants are required to establish and maintain airtight and waterproof continuous seals on a permanent basis, with

recognized limitations of wear and aging as indicated for each application. Failures of installed sealants to comply with these requirements will be recognized as failures of materials and workmanship.

C. To the greatest extent possible, engage a single firm to assume undivided responsibility for sealing all components of the exterior facade. This firm must demonstrate not less than 10 years successful experience in installation of work similar to the work of this Project. Credentials and data must be submitted to Engineer for review and approval.

   1. If a single firm cannot be engaged to assume undivided responsibility for sealing all components of the exterior façade, coordinate between the different installers and their work to provide sealant from the same manufacturer and of the same type to assure continuity and compatibility for sealed joints throughout the entire exterior façade.

D. The manufacturer of sealants used for exterior sealants shall provide additional on-site testing by authorized personnel, in addition to the sealant tests specified in herein, to assure that materials are suitable for the application, have not suffered detrimental loss of shelf life, and will be fully covered by the warranty in event of failure or staining of the sealed components including stone.

   1. Method(s) of testing is at manufacturer's option.

   2. Provide testing as follows to demonstrate curing properties:

      a. Between 24 and 72 hours prior to initial application.

      b. Prior to use of each new shipment of materials.

      c. Not less than twice a month for existing stored materials.

   3. Manufacturer and installer shall submit log of testing, on company letterhead for each test performed indicating, but not limited to the following:

      a. Date.

      b. Project identification.

      c. Sealant identification including name, type and batch number.

      d. Test performance, i.e., acceptable, marginal, not acceptable.

      e. Storage conditions.

      f. Signature of person conducting test.

E. If tests indicate that sealant materials are marginal or not acceptable, the sealant material identified as unacceptable shall not be used. The testing entity is to immediately notify Engineer and Contractor. The contractor shall immediately remove materials from site and replace with new sealant in kind and retest new sealant at no additional expense to the State.

F. Manufacturer of sealants for exterior building enclosure shall provide instruction to the exterior sealant installer, on proper installation techniques required to achieve maximum life and weather tightness from the sealant installation. Special emphasis shall be directed to practices required to avoid staining or other changes in appearance of sealed components such as stone in the completed work.

G. Materials and workmanship are subject to review by the Engineer at all times. Such review inspections do not relieve the facade sealants installer from obligations to provide a watertight and weather tight seal at all facade systems, surfaces, and related materials.

1.04 SUBMITTALS

A. Submit under the provisions of Section 01330 – SUBMITTAL PROCEDURES.

B. Submit the following information from the manufacturer:

1. Certification in the form of standard data sheet or letter that each type of compound and sealant to be furnished complies with these specifications.

2. Statement that each product to be furnished is recommended for the application shown for this project.

3. Complete instructions for handling, storage, mixing, priming, installation, curing and protection of each type of sealant.

4. Certification in writing that sealant will not cause staining nor change appearance of adjacent substrate materials.

C. Submit 5 samples of specified products, 12 in. long and installed between samples of the materials to be sealed for the Project. Engineer's acceptance will be for color only. Compliance with other requirements is the sealant Installer's responsibility.

D. Submit copy of statement, in an approved form, signed by the Installer and manufacturer, certifying that the products comply with these specifications and were the proper selections for the applications made, and that the installation methods complied with the manufacturer's printed instructions and their field representatives' verbal instructions and were proper and adequate for the condition of installation and use.

E. For each type exterior substrate used provide test reports per ASTM E 575 on materials and methods proposed for this project which will demonstrate successful behavior of sealant systems under limiting design stresses with respect to adhesion, compatibility, migration, stability, cohesion, staining, recovering and any other deleterious effects. Provide a procedure detailing the cleaning, priming, taping, tooling and other steps recommended to ensure satisfactory function and appearance.

1. Submit documentation of product performance as required per ASTM C 920. Also, perform the same testing but substitute actual job substrate materials in lieu of standard test materials. Long-term behavior, under compression shall be tested.

2. Submit, for record only, sealant manufacturer’s test report for staining of all relevant substrates. Test samples shall approximate sealant joint sizes and configurations intended for production materials.

F. Provide a procedure detailing the cleaning, priming, taping, tooling and other steps recommended to ensure satisfactory function and appearance.

G. Submit copy of pigtail type field adhesion tests results.

1.05 JOB CONDITIONS

A. Examine joint surfaces and backing, and their anchorage to the structure, and conditions under which joint sealer work is to be performed and notify Contractor in writing of conditions detrimental to proper completion of the work and performance of sealers. Do not proceed with joint sealer work until unsatisfactory conditions have been corrected in a manner acceptable to Installer.

B. Weather Conditions: Do not proceed with installation of sealants under adverse weather conditions. Proceed with the work only when weather conditions are favorable for proper cure and development of high early bond strength.

1.06 INSPECTIONS

A. Coordinate as required and be totally responsible for the full and satisfactory compatibility and performance between all sealants used under this Section with all other applicable and related Sections using sealants which may be in direct contact with work of this Section or adjacent to other work.

B. Take required steps and precautions to properly isolate and prevent incompatibility between said sealants in accordance with manufacturer's specifications, recommendations and instructions.

C. Periodically test sealants in place in addition to the manufacturer's field testing, for adhesion, using methods recommended by sealant manufacturer. Promptly replace sealant, which does not adhere or fails to cure.

D. Contractor shall arrange to meet the sealant manufacturer at the jobsite and witness initial installation of sealant on the project wall with the Contractor, Installer and Engineer.

1.07 PRODUCT HANDLING

A. Delivery: Deliver sealants to the jobsite in sealed containers labeled to show the designated name, formula, or specification number, lot number, color, date of manufacture, shelf life, curing time, manufacturer’s directions, and name of manufacturer.

B. Storage: Carefully handle and store all materials to prevent inclusion of foreign materials. Remove from project site all damaged and deteriorated materials and materials exceeding shelf life.

C. All sealant materials shall be installed prior to expiration of shelf life. Remove all sealant materials that have exceeded their maximum shelf-life from the jobsite.

1.08 SEALANT TESTING

A. Provide to sealant manufacturer samples of all relevant substrates, including but not limited to finished aluminum, wood, concrete, stainless steel, vision glass, gaskets, spacers, setting blocks and backers as well as any other material which will contact the sealant either during installation or normal wall movements.

   1. For each type of substrate provide test reports per ASTM E575.

   2. Submit documentation of product performance as required per ASTM C920. Also, perform the same testing but substitute actual job substrate materials in lieu of standard test materials. Long-term behavior, under compression shall be tested.

B. Tests on substrate materials must include the use of the same sealants on the project, including the project color.

C. Test samples shall approximate sealant joint sizes and configurations intended for production materials.

D. Sealant manufacturer shall perform the following tests on weather seal sealant against all substrates to verify:

1. ASTM C794 – Adhesion

a. Test must include 7-day water immersion after which silicone must have excellent adhesion to substrates.

b. Report adhesion strength in terms of shear stress and tensile stress.

2. ASTM C1087 – Compatibility

3. ASTM C1248 – Staining or migration on porous substrates

a. Tests must be performed both wet and dry. Substrate must not experience waterproofing of the substrate surface beyond the sealant joint.

1.09 WARRANTY

A. Special Warranty:

1. Submit a written warranty agreeing to repair or replace sealant compounds which have failed to provide airtight and watertight joints for any reason, or which appear to have failed in adhesion, cohesion, abrasion-resistance, migration-resistance, stain-resistance, general durability or any other form of apparent deterioration (excluding inherent qualities and limitations clearly specified in the manufacturer's data which was submitted).

2. The warranty to be provided shall be for full replacement for a period of 5 years from the date of Project Acceptance.

3. A warranty that is to be provided by the sealant manufacturer shall consist of a 20-year labor and material warranty matching that provided by Dow Corning Corporation or GE Silicones. Warranty shall be signed by both the Installer and the Sealant Manufacturer.

a. The surety and the Installer shall not be liable beyond two years of the Project Acceptance date.

b. Warranty period to commence on date of Project Acceptance.

PART 2 - PRODUCTS

2.01 MATERIALS

A. Asbestos Prohibition: No asbestos containing materials or equipment shall be used in this section. The Contractor shall ensure that all materials and equipment incorporated in the project are asbestos-free.

B. Foam Backer Rods:

1. Preformed joint filler, non-staining. Diameter approximately 25 percent larger than joint width, unless otherwise directed by manufacturer.

2. Bi-cellular Structure with Surface Skin: ASTM C 1330, Type B, non-gassing, extruded polyolefin; acceptable to joint sealant manufacturer.
    a. Available Manufacturers and Products:
        1) Nomaco Inc.; SOF-Rod (Dual-Rod) Backer Rod
        2) BASF; Sonneborn, Sonolastic Soft Backer Rod: Degussa
        3) Industrial Thermo Polymers LTD.; Soft-Type Insulating Backer Rod
        4) Or approved equal.
3. Closed Cell Structure: ASTM C 1330, Type C, non-gassing, extruded polyethylene; acceptable to joint sealant manufacturer.
    a. Available Manufacturers and Products:
        1) Backer Rod Manufacturing, Inc.; Mile High Foam Backer Rod.
        2) BASF; Sonneborn, Closed-Cell Backer Rod.
        3) Industrial Thermo Polymers LTD.; ITP Std. Insulating Backer Rod.
        4) Nomaco Inc.; Green Rod or HBR Backer Rod
        5) Or approved equal.
4. Open Cell Structure: ASTM C 1330, Type O, extruded polyurethane, acceptable to joint sealant manufacturer.
    a. Available Manufacturers and Products:
        1) Backer Rod Manufacturing, Inc.; Denver Foam Backer Rod.
        2) Industrial Thermo Polymers LTD.; Tundra Open Cell Foam Backer Rod.
        3) Nomaco Inc.; Foam-Pak II Backer Rod.
        4) Or approved equal.

C. Bond-Breaker Tape: Polyethylene tape or other plastic tape as recommended by sealant manufacturer in writing to the Engineer.

D. Masking Tape: Non-staining, nonabsorbent type compatible with joint sealants and to surfaces adjacent to joints.

E. Primer as recommended by manufacturer of sealant in writing to the Engineer, having been tested for staining and durability on samples of actual surfaces to be sealed. In the case of structural silicone use with fluoropolymer coatings, primer must be used

F. Sealants:
    1. At Exterior Vertical And Overhead Moving Joints, including interior and exterior perimeter seals around windows and louvers (**JS-01**): Medium Modulus Silicone Sealant, one-part, non acidic, neutral curing, Type S, Grade NS, Class 50, Use NT, capable of withstanding movements from plus 50% to minus 50% based on original joint design. All sealants that are used must be SWRI certified and comply with ASTM C920. Provide one of the following:

a. GE Silpruf SC 2000

b. Dow Corning 795

c. Or approved equal.

G. Accessories:

1. Cleaners for Non-Porous Surfaces: Chemical cleaners recommended by sealant manufacturer in writing, free of harming residues, non-staining, and formulated to promote optimum adhesion.

2. MEK, Toluene or Xylene are not acceptable except in cases of extreme cleaning conditions as determined by the Engineer at their discretion.

PART 3 - EXECUTION

3.01 MANUFACTURER'S INSTRUCTIONS

A. Comply with manufacturer's printed instructions except where more stringent requirements are shown or specified, and except where manufacturer's technical representative directs otherwise.

3.02 EXAMINATION

A. Prior to installation of sealant, and at the Contractor's direction, meet at the Project site to review the material selections, joint preparations, installation procedures, weather conditions and coordination with other trades.

1. Meeting shall include the sealants installer, Contractor, Engineer, Architect, manufacturer's representative, and representatives of other trades or installers affected by the sealant installation.

2. Examine sample installations, which have been prepared and determine and record whether everyone present is in agreement that the proposed installations are likely to perform as required.

3. Accepted control section shall be standard to which all other sealant work must conform.

B. Examine the substrates, adjoining construction and the conditions under which the work is to be installed. Correct unsatisfactory conditions before proceeding with work.

3.03 JOINT PREPARATION

A. Surface Cleaning of Joints: Clean out joints immediately before installing joint sealers to comply with recommendations of joint sealant manufacturers and the following requirements:

1. Remove all foreign material from joint substrates which could interfere with adhesion of joint sealant, including dust; paints, except for permanent, protective coatings tested and approved for sealant adhesion and compatibility by sealant manufacturer; oil; grease; waterproofing; water repellants; water; and surface dirt.

2. Remove protective coatings on metal surfaces with a solvent that leaves no residue. Use clean white cloths or lintless paper towels for cleaning with

solvent and drying. Clean joint areas protected with masking tape or strippable film with solvent after removal of tape or film. Do not allow solvent to air dry without wiping.

3. Remove laitance by acid washing, grinding or mechanical abrading. Remove form oils by sand or water-blast cleaning. Remove loose particles present or resulting from grinding, abrading or blast cleaning by blowing out joints with oil free compressed air or by vacuuming joint prior to application of primer or sealant.

4. Steel Surfaces in Contact with Sealant: Scrape and wirebrush to remove loose mill scale. Remove dirt, oil, or grease by solvent cleaning, and wipe surfaces with clean cloths.

5. Clean metal, glass, glazed surfaces of ceramic tile, and other nonporous surfaces by chemical cleaners or other means which are not harmful to substrates or leave residues capable of interfering with adhesion of joint sealers.

6. Joint widths, depths, and conditions detailed on shop drawings by related trades shall be considered as minimum allowable requirements except where they may conflict with sealant manufacturer's recommendations. In all cases, joints must be uniform in width. Do not seal joints until they are in compliance with Drawings, or meet the control section standard.

7. Clean out and rake to full width and depth, joints to receive sealant, backup material or preformed joint filler. Make joints of sufficient width and depth to accommodate specified back-up material or preformed joint filler and sealant.

B. Joint Priming: Prime joint substrates where indicated or where recommended by joint sealant manufacturer based on preconstruction joint sealant-substrate tests or prior experience. Apply primer to comply with joint sealant manufacturer’s recommendations. Confine primers to areas of joint sealant bond, do not allow spillage or migration onto adjoining surfaces.

C. Masking Tape: Use masking tape where required to prevent contact of sealant with adjoining surfaces which otherwise would be permanently stained or damaged by such contact or by cleaning methods required to remove sealant smears. Remove tape immediately after tooling without disturbing joint sealant.

3.04 INSTALLATION OF JOINT SEALANTS

A. General: Follow sealant manufacturer's instruction regarding surface preparation, priming, application life, and application procedure. Consult sealant manufacturer for recommendation for application procedure. Consult sealant manufacturer for recommendation for application of sealant when air temperature is below 40 degrees F., or surface temperatures of sealant contact surfaces are above 120 degrees F.

B. Sealant Installation Standard: Comply with recommendations of ASTM C 1193 for use of joint sealants as applicable to materials, applications and conditions indicated.

C. Installation of Sealant Backings: Install sealant backings to comply with the following requirements:

1. Install back-up material or joint filler at proper depth in joint to provide specified sealant dimensions. Compress back-up material 25% to 50% into

the joints as required. Do not apply sealant without back-up materials. Install bond breaker strip between sealant and non-release type backup material. 3-side adhesion is acceptable only for the sealing at joinery of members that are to be rigidly attached to each other by means of screws or welding restricting movement.

a. Do not leave gaps between ends of joint fillers.

b. Do not stretch, twist, puncture, or tear joint fillers.

c. Remove absorbent joint fillers which have become wet prior to sealant application and replace with dry material.

2. Install bond breaker tape between sealants and joint fillers, compression seats, or back of joints where adhesion of sealant to surfaces at back of joints would result in sealant failure.

3. Install compressible seals serving as sealant backings to comply with requirements indicated above for joint fillers.

D. Installation of Sealants: Install sealants by proven techniques that result in sealants directly contacting and fully wetting joint substrates, completely filling recesses provided for each joint configuration, and providing uniform, cross-sectional shapes and depths relative to joint widths which allow optimum sealant movement capability.

E. Tooling of Nonsag Sealants: Immediately after sealant application and prior to time skinning or curing begins, tool sealants to form smooth, uniform beads of configuration indicated, to eliminate air pockets, and to ensure contact and adhesion of sealant with sides of joint. Remove excess sealants from surfaces adjacent to joint. Do not use tooling agents which discolor sealants or adjacent surfaces or are not approved by sealant manufacturer.

1. Provide concave joint configuration per Figure 8A in ASTM C 1193, unless otherwise indicated.

2. Provide flush joint configuration per Figure 8B in ASTM C 1193, where indicated.

3.05 FIELD QUALITY CONTROL

A. Test facade sealant work in the field during the testing of the other exterior building facade elements. Area and time of test shall be in accordance with Engineer's recommendation. Perform out of sequence or scheduled sealant installation at test areas as necessary and as directed so that the testing of the facade elements can be performed at the specified intervals of erection.

B. Refer to related Sections for criteria pertaining to field testing.

C. Perform and record results of pig-tail type adhesion tests on at least 2 different elevations per floor as the work progresses.

D. Field Adhesion and Cohesion Testing: Sealant manufacturer representative will perform a minimum of 20 field tests to determine if installed work complies with specified requirements. Tests to be witnessed by Engineer and Architect. Test sealant after it has fully cured (7-21 days).

1. Provide testing as follows to demonstrate curing properties:

2. Between 24 and 72 hours prior to initial application.

3. Prior to use of each new shipment of materials.

4. Not less than twice a month for existing stored materials

E. Reports: Record test results and prepare reports according to ASTM E 575 and ASTM C 1521 formats.

F. Re-testing and Re-inspections Due to Failures:

1. Perform further testing to ascertain the extent of the problem. All failed sealants are to be replaced promptly and the resulting weather tightness must be verified.

2. Remove from site marginal or defective material.

3. Contractor responsible for expenses incurred, without additional cost to State, due to failure of work to pass testing and inspections.

G. Repairs for Destructive Testing:

1. Repair sealants pulled from test area by applying new sealants following same procedures used originally to seal joints.

2. Ensure original sealant surfaces are clean and new sealant properly contacts original sealant.

3.06 CLEAN UP

A. Clean off excess sealants or sealant smears adjacent to joints as work progresses by methods and with cleaning materials approved by manufacturers of joint sealers and of products in which joints occur.

3.07 PROTECTION

A. Protect joint sealant during and after curing period from contact with contaminating substances or from damage resulting from construction operations or other causes so that they are without deterioration or damage at time of Project Acceptance. If, despite such protection, damage or deterioration occurs, cut out and remove damaged or deteriorated joint sealers immediately and reseal joints with new materials to produce joint sealer installations with repaired areas indistinguishable from original work.

END OF SECTION

SECTION 08031 – HISTORIC TREATMENT OF METAL DOORS

PART 1 - GENERAL

1.01 SUMMARY

A. Work Includes:

1. Repairing steel doors, frame & leaf components, and trim.
2. Installing weatherstripping where indicated on drawings.

B. Related Sections:

1. SECTION 01359 – HISTORIC TREATMENT PROCEDURES.
2. SECTION 13282 – LEAD PAINT CONTROL MEASURES.

1.02 REFERENCES

A. The Publications listed below form a part of this specification to the extent referenced. The publications are referred to within the text by the basic designations only.

1. American Steel Protection Association (AWPA)
   AWPA P5 (2015) Standard for Waterborne Preservatives
2. Architectural Steelwork Institute (AWI)
   AWI AWS (2nd Edition) Architectural Steelwork Standards
3. ASTM International (ASTM)
   ASTM B633 (2019) Standard Specification for Electrodeposited Coatings of Zinc on Iron and steel.
4. U.S. National Archives and Records Administration (NARA)
   29 CFR 1926.62 Lead

1.03 DEFINITIONS

A. Door: Generally, this term includes door frame, leaves, hardware, unless otherwise indicated by context.

B. Steel Door Component Terminology: Steel door components for historical treatment work include the following classifications:

1. Frame Components: Head, jambs, stop, and threshold or sill.
2. Leaf Components: Stiles, rails, and muntins.
3. Exterior Trim: Exterior casing.
4. Interior Trim: Casing

1.04 SUBMITTALS

A. Submit the following:

1. Preconstruction Submittals: Steel Door Historic Treatment Program.

2. Shop Drawings: Shop Drawings
3. Product Data: Steel Consolidant, Steel Patching Compound, and Accessory Materials.
4. Samples: Steel, Finish/ Color chart.
5. Certificates: Historic Treatment Specialist Qualifications (Submit resume documenting experience and extent of steel repair, types of repairs, and a minimum of three projects for which the repairs were made).

1.05 PREINSTALLATION MEETINGS

A. Conduct conference at project site with Engineer, Architect, Historic Architect, and Contractor's Historic Treatment Specialist to review methods and procedures related to historic treatment of steel doors, including but not limited to the following:

1. Historic treatment specialist's personnel, equipment, and facilities needed to make progress and avoid delays.
2. Materials, material applications, sequencing, tolerances, and required clearances.
3. Steel historic treatment program.

1.06 SEQUENCING AND SCHEDULING

A. Perform historic treatment of steel doors in the following sequence, which includes work specified in this and other Sections.

1. Examine all doors and windows as noted on drawings.
2. Identify proposed location and extent of repairs for each door, to be compiled in a written list with photographic documentation for review at Pre-Installation meeting.
3. Submit list for review by Engineer prior to starting repair work.
4. Label each door frame with permanent opening-identification number in inconspicuous location.
5. Tag existing door leaves, storm doors, and storm-vestibule panels with opening-identification numbers and remove for on-site or off-site repair. Indicate on tags the locations on door of each component, such as "left-hand door leaf" or "right-hand reverse door leaf".
6. Remove door, dismantle hardware and tag with opening-identification numbers.
7. In the shop, label each leaf, door unit with permanent opening-identification number in inconspicuous location and remove site applied tags.
8. Sort units by condition, separating those that need extensive repair.
9. Clean surfaces.
10. General Steel Repair Sequence
    a. Gently remove all loose, flaky, deteriorated paint to allow for repainting. All disturbances to lead paint shall be conducted in accordance with 29 CFR 1926.62.

b. Replacement glass, if necessary, should match original glass as closely as possible in dimension, thickness, clarity, and color, so no routing of rabbets is required for reinstallation.

c. Repair steel by consolidation, member replacement, partial member replacement, and patching.

d. Sand, prime, fill, sand again, and prime surfaces again for refinishing.

11. Repair, refinish, and replace hardware if required.
12. Where necessary, back bed rabbets with glazing compound and reinstall glass panes.
13. Reinstall glazing compound.
14. Allow appropriate time for curing of glazing compound prior to painting.
15. Paint doors and lap paint 1/8 inch onto glass to seal glazing compound.
16. Reinstall hardware.
17. Reinstall units.
18. Apply finish coats.
19. Install remaining hardware.

1.07 QUALITY ASSURANCE

A. Steel Door Historic Treatment Program: Prepare a written, detailed description of materials, methods, equipment, and sequence of operations to be used for historic treatment work, including protection of surrounding materials and project site.

B. Shop Drawings:

Prepare shop drawings for locations and extent of steel-door repair and replacement work. Include plans, elevations, sections, and details of replacement parts including materials, profiles, joinery, reinforcing, methods of spicing into or attaching to existing steel door, accessary items, and finishes. Include field-verified dimensions and the following:

1. Full-size shapes and profiles with complete dimensions for replacement components and their jointing, showing relation of existing to new components.
2. Templates and directions for installing hardware and anchorage.
3. Identification of each new unit and its corresponding door locations in the building on annotated plans and elevations.

1.08 DELIVERY, STORAGE AND HANDLING

A. Pack, deliver, and store products in suitable packs, heavy-duty cartons, or steelen crates; surround with sufficient packing material to ensure that products will not be deformed, broken, or otherwise damaged.

B. Store products inside a well-ventilated area and protect from weather, moisture, soiling, abrasion, extreme temperatures, humidity, and where environmental conditions comply with manufacturer’s requirements.

PART 2 - PRODUCTS

2.01 GENERAL

Comply with applicable requirements in Section 12, “Historic Restoration Work”, and related requirements in AWI AWS “Architectural Steelwork Standards” for construction, finishes, steel grades, and other requirements unless otherwise indicated. Industry practices cited in the “Architectural Steelwork Standards”, Section 12, Article 1.5, “Industry Practices”, do not apply to the work in this section.

2.02 REPLICATED STEEL DOOR UNITS

A. Replicated Steel Door Frames and Leaves: Custom fabricated replacement steel units and trim, with operating and latching hardware.

1. Joint Construction: Joints matching existing.
2. Steel Species: Match existing.
3. Steel Cut. Quarter cut/quarter sawn.
4. Steel Door Members and Trim: Match profiles and detail of existing door members and trim.
5. Exposed Hardware: Reuse existing exposed door hardware or replace as indicated on Drawings.

2.03 STEEL-REPLACEMENT MATERIALS

A. Steel: Provide steel for door repairs that matches the type, thickness, and surface finish of the existing historic door construction. Steel shall be hot-rolled mild steel plate or sheet, ASTM A36 or ASTM A1011, as required to match the original door material.. Thickness:

1. Provide steel of the same gauge or plate thickness as the existing door skin and structural components, unless otherwise directed by the Architect.
2. Fabrication: Steel repair pieces shall be shop fabricated to match the existing profiles, edges, and panel configuration of the historic door.
3. Welding Materials: Provide welding electrodes and filler metals compatible with the base steel and suitable for producing full-penetration or continuous fillet welds as required for permanent repair.

2.04 HARDWARE

A. Primary Door Hardware: Retain and repair existing historic door hardware to the maximum extent practicable, including hinges, pulls, locks, latches, and accessories indicated for each door. Clean, adjust, lubricate, refasten, and restore existing hardware to proper operating condition. Reinstall repaired hardware as part of a complete hardware set so that doors operate smoothly, close tightly, and securely latch and lock. Hardware shall be sized and adjusted to accommodate door weight, dimensions, and anticipated use.

B. Replacement Hardware: Where existing hardware is missing, damaged beyond repair, or nonfunctional as determined by the Architect, provide new hardware fabricated as a facsimile reproduction of the original historic hardware, matching the original design, profile, dimensions, material, and finish to the greatest extent

practicable.

C. Hardware Finishes: Clean and refinish existing hardware where required to restore uniform appearance and functionality. Finish of replacement hardware shall match the existing historic hardware unless otherwise indicated. Refer to Hardware Schedule for finish requirements.

2.05 ACCESSORY MATERIALS

A. Cleaning Materials: Cleaning compounds suitable for removal of grease, oils, dirt, corrosion products, and deteriorated coatings from steel surfaces without damaging the base metal. Cleaning materials shall be compatible with subsequent surface preparation and coating systems.

B. Detergent Solutions: Non-ammoniated detergent solutions suitable for removal of general surface contaminants prior to surface preparation.

C. Corrosion Removal: Non-acidic rust removers, mechanical cleaning methods, or approved corrosion inhibitors suitable for preparation of historic steel surfaces for repair and refinishing.

D. Surface Preparation Materials: Abrasives, rust converters, or corrosion-inhibiting treatments recommended by the coating manufacturer for preparation of steel surfaces where corrosion is present. Materials shall be compatible with the specified primer and finish system.

E. Welding Materials: Electrodes and filler metals compatible with the base metal and suitable for repair welding of mild steel components. Provide welding materials capable of producing sound welds appropriate for restoration of historic steel assemblies.

F. Metal Patching Materials: Steel plate or sheet matching the type, thickness, and profile of the existing historic door construction for patching or replacement of deteriorated sections.

G. Grinding and Finishing: Following welding or patch installation, grind and finish repaired areas smooth and feathered to adjacent surfaces so that repairs are visually continuous with the original historic steel surface and indistinguishable after application of primer and finish coatings.

H. Fasteners: Provide fasteners of Type 316 stainless steel or other corrosion-resistant material compatible with adjoining metals.

I. Match existing fasteners in material and type unless otherwise indicated.

J. Use concealed fasteners where possible for interconnecting steel components.

K. Use concealed fasteners for attaching items to adjacent work unless exposed fasteners replicate the historic fastening method.

L. Finish exposed fasteners to match adjacent metal surfaces.

M. Anchors, Clips, and Accessories: Provide anchors, clips, shims, and accessory

components fabricated from stainless steel or hot-dip galvanized steel suitable for exterior and marine environments. Materials shall be compatible with adjoining metals and coatings.

N. Primers and Protective Coatings: Provide corrosion-inhibitive metal primer and compatible finish coating system suitable for exterior exposure and compatible with existing door finishes and repair procedures.

2.06 STEEL DOOR FINISHES

A. Provide exposed exterior steel surfaces of replacement units unfinished; smooth, filled, suitably prepared for on-site priming, and finishing.

PART 3 – EXECUTION

3.01 PREPARATION

A. Protect adjacent materials from damage by historic treatment of steel doors.

B. Clean Steel of mildew, algae, moss, plant material, loose paint, grease, dirt, and other debris by scrubbing with bristle brush or sponge and detergent solution. Scrub mildewed areas with mildewcide. After cleaning, rinse thoroughly with fresh water. Allow to dry before repairing or painting.

C. Condition replacement steel members and replacement units to prevailing conditions at installation areas before installing.

3.02 HISTORIC TREATMENT OF STEEL DOORS, GENERAL

A. Historic Treatment Appearance Standard:

Completed work is to have a uniform appearance as viewed 5 feet away from door interior and from door exterior.

B. Procedures:

General: In treating historic items, disturb them as minimally as possible and as follows:

1. Stabilize and repair steel doors to reestablish structural integrity and weather resistance while maintaining the existing form of each item.
2. Remove coatings and apply borate preservative treatment before repair. Remove coatings.
3. Repair items in place where possible.
4. Install temporary protective measures to protect steel door work that is indicated to be completed later.

C. Mechanical Abrasion: Where mechanical abrasion is needed for the work, use only the gentlest mechanical methods, such as scraping and natural-fiber bristle brushing, that will not abrade steel substrate, reducing clarity to detail. Do not use abrasive methods, such as sanding, wire brushing, or power tools, or power washing except as indicated as part of the approved historic treatment program.

D. Repair and Refinish Existing Hardware: Dismantle hardware; strip paint; repair and

refinish it to match finish samples; and lubricate moving parts just enough to function smoothly.

E. Repair Steel Doors: Match existing materials and features, retaining as much original material as possible to perform repairs. Unless otherwise indicated, repair steel doors by consolidating, patching, splicing, or otherwise reinforcing steel with new steel matching existing steel or salvaged, sound, original steel. Where indicated, repair steel by limited replacement matching existing material.

F. Protection of Openings: Where doors are indicated for removal, cover resultant openings with temporary enclosures so that openings are weathertight during repair period.

G. Identification: Identify removed doors, frames, leaves, and members with numbering system corresponding to door locations to ensure reinstallation in same location. Key doors, leaves, and members to Drawing showing location of each removed unit. Permanently label units in a location that will be concealed after reinstallation.

3.03 STEEL DOOR PATCH-TYPE REPAIR

A. General:

Patch steel members that exhibit depressions, holes, or similar voids, and that have limited amounts of rotted or decayed steel.

1. Verify that the surfaces are sufficiently clean and free of paint residue prior to patching.
2. Treat steel members with steel consolidant before applying patching compound. Coat steel surfaces by brushing, applying multiple coats until steel is saturated and unable to absorb more. Allow treatment to harden before filling void with patching compound.

B. Patching:

Apply steel-patching compounds to fill depressions, nicks, cracks, and other voids created by removed or missing steel.

1. Prime patch area with application of steel consolidant or manufacturer’s recommended primer.
2. Mix only as much patching compound as can be applied according to manufacturer’s written instructions.
3. Apply patching compound in layers as recommended in writing by manufacturer until the void is filled completely.
4. Sand patch surface smooth and flush with adjacent steel, without voids in patch material, and matching contour of steel member.
5. Clean spilled compound from adjacent materials immediately.

3.04 STEEL DOOR MEMBER-REPLACEMENT REPAIR

A. General:

Replace parts of, or entire, steel door members at locations where damage is too

extensive to patch. Consult with Engineer prior to determination of damage assessment.

1. Verify that surfaces are sufficiently clean and free of paint residue prior to repair.
2. Custom fabricate new steel to replace missing steel, if needed; either replace the entire steel member or splice new part into existing member.
3. Remove deteriorated steel and weld in new steel sections to match the existing door construction, profiles, and thickness. Fabricate replacement pieces to fit tightly within the limits of removal and install using continuous welds or intermittent welds as required to restore structural integrity. Use concealed attachment methods only unless the existing historic construction used exposed fastening. Grind welds smooth and feather repaired surfaces to match adjacent sound steel and prepare patched areas to receive primer and finish coatings.

B. Repair remaining depressions, holes, or similar voids with patch-type repairs.

C. Reinstall units removed for repair into original openings.

3.05 ADJUSTING

Adjust existing and replacement operating leaves, screens, hardware, weather stripping for smooth operation and weathertight closure. Lubricate any hardware and moving parts.

3.06 CLEANING AND PROTECTION

A. Protect steel surfaces from contact with contaminating substances resulting from construction operations. Monitor door and glazing surfaces adjacent to exterior concrete and masonry during construction for presence of dirt, scum, alkaline deposits, stains, or other contaminants. If contaminating substances contact steel surfaces, remove contaminants immediately.

B. Clean exposed surfaces immediately after historic treatment of steel doors. Avoid damage to coatings and finishes. Remove excess sealants, patching materials, dirt, and other substances.

C. Remove and replace glass that has been broken, chipped, cracked, abraded, or damaged during construction period.

END OF SECTION

DIVISION 08- DOORS AND WINDOWS

SECTION 08110 - STEEL DOORS AND FRAMES

PART 1 - GENERAL

1.01 SUMMARY

A. Section Includes:

1. Standard steel frames and steel doors as indicated and scheduled on drawings as access panels.

B. Related Work Described Elsewhere:

1. Finish hardware is specified in Section 08710 - FINISH HARDWARE.
2. Field applied painting is specified in Section 09900 - PAINTING.

1.02 QUALITY ASSURANCE

A. Provide doors and frames complying with ANSI/SDI 100 “Recommended Specifications for Standard Steel Doors and Frames” and as herein specified.

1.03 SUBMITTALS

A. Submit under the provisions of Section 01330 – SUBMITTAL PROCEDURES.

B. Manufacturer’s Data: Submit manufacturer’s technical product data substantiating that products comply with requirements.

C. Shop Drawings: Submit for fabrication and installation of steel doors and frames. Include details of each frame type, conditions at openings, details of construction, location and installation requirements of finish hardware and reinforcements, and details of joints and connections, gauges, and finishes. Show anchorage and accessory items.

D. Manufacturer’s recommended installation procedures which, when approved by the Engineer, will become the basis for accepting orrejecting actual installation procedures used on the work.

E. Schedule: Provide schedule of doors and frames using same reference numbers for details and openings as those on contract drawings.

F. Label Construction Certification: For assemblies required to be and exceeding sizes of tested assemblies, submit manufacturer’s certification for that each frame assembly has been constructed to conform to design, materials and construction equivalent to requirements for labeled construction.

1.04 DELIVERY, STORAGE AND HANDLING

A. Deliver hollow metal work cartoned or crated to provide protection during transit and job storage. Strap knock-down frames in bundles. Provide temporary steel spreaders securely fastened to the bottom of each welded frame.

B. Inspect hollow metal work upon delivery for damage. Minor damages may be repaired provided refinished items are equal in all respects to new work and ac-

ceptable to the Engineer; otherwise, remove and replace damaged items as directed.

C. Store doors and frames at building site under cover in a dry, secure place. Place units on minimum 4-inch high wood blocking. Avoid use of non-vented plastic or canvas shelters which could create humidity chambers.

1.05 COORDINATION

A. Coordinate Work with other directly affected sections involving manufacture or fabrication of internal cutouts and reinforcement for door hardware, electric devices and recessed items.

B. Coordinate work with frame opening construction, door and hardware installation.

C. Sequence installation to accommodate required door hardware.

D. Hardware Mounting Heights: The Contractor shall be responsible to coordinate all mounting heights of various finish hardware with all project requirements.

E. Coordinate door hardware with frames.

F. Verify field dimensions for factory assembled frames prior to fabrication.

PART 2 - PRODUCTS

2.01 MATERIALS

A. Galvanized Steel Sheets: Zinc coated commercial quality carbon steel. Comply with ASTM A 653 coating designation G90 at all doors and frames.

B. Sheet Steel:

1. Cold-rolled, commercial quality carbon steel, Type B; suitable for exposed applications, complying with ASTM A 1008.

2. Hot-rolled, commercial quality carbon steel, Type B; free of scale, pitting, or surface defects, pickled and oiled, complying with ASTM A 1011.

C. Supports and Anchors: Fabricate of not less than 18-gauge galvanized sheet steel.

D. Frame Anchors:

1. Concrete/Masonry Type: Adjustable strap-and-stirrup or T-shaped anchors to suit frame size, not less than 0.042 inch thick, with corrugated or perforated straps not less than 2 inches wide by 10 inches long; or wire anchors not less than 0.177 inch thick.

2. Locate anchors not more than 18 inches from top and bottom of frame. Space anchors not more than 32 inches o.c. and as follows:

a. Stud Wall Type: Provide three anchors per jamb up to 60-inches in height and four anchors for jambs 60 to 90 inches in height.

b. Compression Type: Not less than two anchor for each jamb.

c. Masonry Type: Provide two anchors per jamb up to 60-inches in height and three anchors for jambs 60 to 90 inches in height.

3. Floor Anchors: Angle clip type:

a. 16 gauge minimum.

b. To receive 2 fasteners per anchor.

c. Welded to the bottom of each jamb.

E. Inserts, Bolts and Fasteners: Manufacturer's standard units, except hot-dip galvanize, complying with ASTM A 153/A 153M "Specification for Zinc Coating (Hot-Dip) on Iron and Steel Hardware", Class C or D as applicable.

F. Factory Applied Primer Paint: Rust-inhibitive enamel paint, either air-drying or baking, suitable as a base for specified finish paints conforming to ANSI A250.10 "Test Procedures and Acceptance Criteria for Prime Painted Steel Surfaces for Steel Doors and Frames". Primers shall be free from asbestos, lead, mercury, chromate, and cadmium.

2.02 MANUFACTURERS

A. Standard Steel Door and Frame Manufacturers: Subject to compliance with requirements of this section, provide products from one of the following:

1. Amweld Building Products, Inc.
2. Ceco Door, Assa Abloy
3. Curries Co.
4. Steelcraft
5. Or approved equal.

2.03 FABRICATION, GENERAL

A. Fabricate steel doors and frame units to be rigid, neat in appearance and free from defects, warp or buckle.

B. Fabricate frames, concealed stiffeners, reinforcement, edge channels, and moldings from either cold-rolled or hot-rolled steel (at fabricator's option).

C. Fabricate all doors and frames from galvanized sheet steel.

D. Tolerances: Comply with SDI 117, "Manufacturing Tolerances for Standard Steel Doors and Frames.

E. Exposed Fasteners: Unless otherwise indicated, provide countersunk flat Phillips heads for exposed screws and bolts.

F. Finish Hardware Preparation: Prepare doors and frames to receive mortised and concealed finish hardware in accordance with final Finish Hardware Schedule and templates provided by hardware supplier. Comply with applicable requirements of ANSI/SDI A250.6 series specifications for frame preparation for hardware.

1. Reinforce doors and frames to receive surface-applied hardware. Drilling and tapping for surface-applied finish hardware may be done at project site. Provide minimum gauge hardware reinforcing for mortise or surface applied hardware as follows:

a. Mortised Hinges: 10 gauge.

b. Surface Closers: 14 gauge.

2. Locate finish hardware as indicated on final shop drawings or, if not indicated, in accordance with DHI-05 “Recommended Locations for Builder’s Hardware for Standard Steel Doors and Frames” and the 2010 ADA Standards for Accessible Design Section 404.2.7.

G. Factory Painting:

1. Clean, phosphatize, and prime paint exposed surfaces of steel doors and frame units, including galvanized surfaces.

2. Clean steel surfaces of mill scale, rust, oil, grease, dirt, and other foreign materials before application of paint.

3. Apply factory coat of prime paint to an even consistency to provide a uniformly finished surface ready to receive finish paint.

2.04 STEEL DOORS

A. Flush Steel Doors:

1. Provide doors complying with the requirements indicated below by referencing ANSI 250.8 for level and model and ANSI A250.4 for physical-endurance level:

2. Exterior Doors: Level 4 (14 gauge), Physical Performance Level A (Extra Heavy Duty), Model 2 (Seamless)

3. Construction: Doors shall be of the types and sizes indicated on the approved shop drawings and shall be 1-3/4 inches thick, fabricated with flush, smooth cold-rolled steel face sheets over an internal stiffened core, with continuous vertical edge channels and internal reinforcement as required by the door manufacturer.Glazed Lites: Factory cut openings in doors.

4. Factory Finish: Clean, phosphatize, and apply manufacturer's stain absorbing prime coat, stain and clear UV inhibiting top coat.

a. Custom Color: As scheduled

2.05 STANDARD STEEL FRAMES

A. Provide metal frames for doors of type and style as shown on drawings and schedules. Conceal fastenings, unless otherwise indicated. Fabricate frames of minimum 16 gauge cold-rolled furniture steel.

1. Fabricate frames with mitered corners in the following type construction:

a. Exterior Door Frames: Welded construction.

b. Interior Door Frames: Knock-down (mechanical interlock joint) construction with hairline seam.

2. Form all frames of hot dip galvanized steel.

3. Frames shall comply with ANSI A250.4 “Performance Test Procedures for Steel Door Frames and Frame Anchors”, Level A, one million cycle swing test performance for a 4070-door frame.

4. Welded Frames: Weld flush face joints continuously; grind, fill, dress, and make smooth, flush, and invisible.

5. Transom Frames: Provide closed tubular members with no visible face seams or joints, fabricated from same material as door frame. Fasten members at crossings and to jambs by butt welding.

B. Door Silencers: Except on weather-stripped frames, drill stops to receive 3 silencers on strike jambs of single-swing frames and 2 silencers on heads of double-swing frames.

C. Plaster Guards: Provide 26-gauge steel plaster guards or mortar boxes, welded to frame, at back of finish hardware cutouts where mortar or other materials might obstruct hardware operation and to close off interior of openings.

D. Template Hardware: Factory cut doors and frames for all template hardware including hinges, bolts, etc.

E. Factory Finish: Clean, phosphatize, and apply manufacturer's standard two-coat, baked-on finish consisting of prime coat and thermosetting topcoat, complying with SDI A250.3.

1. Color and Gloss: As scheduled.

2.06 ASSEMBLIES

A. Assemblies shall bear the listing identification label of the Underwriters Laboratories, Inc. (UL), Factory Mutual Engineering Corp. (FM), Warnock Hersey International (WHI), or a nationally recognized testing laboratory qualified to perform tests of fire assemblies in accordance with ANSI/UL 10C and NFPA 252 and having a listing for the tested assemblies. Listing identification labels shall be constructed and permanently applied by a method which results in their destruction should they be removed. Labels shall be metal with raised letters and shall bear the name and file number of the frame manufacturer. Labels shall not be painted.

2.07 DOOR HARDWARE

A. Provide door hardware for exterior steel doors as part of this Section. All exposed hardware shall be Type 316 stainless steel, suitable for exterior and marine environments.

B. Provide the following hardware at each exterior door:

1. Hinges: Three (3) heavy-duty hinges per door with non-removable security pins.

2. Deadbolt: Heavy-duty deadbolt lockset with keyed cylinder on exterior and thumb-turn on interior.

3. Pull: Stainless steel loop pull handle at exterior face of door.

4. Threshold: Extruded aluminum threshold with integral weather dam. Install with continuous silicone sealant at floor interface.

5. Weather Seals: Continuous weather seals at head and jambs mounted with aluminum retainers.

6. Rain Drip: Polymer drip cap installed at door head to shed water away from door opening.

7. Fasteners: Provide stainless steel fasteners for all hardware and accessory installation, compatible with the hardware and substrates. Fasteners shall be corrosion-resistant and suitable for exterior and marine environments.

PART 3 - EXECUTION

3.01 INSTALLATION

A. General: Install standard steel doors and frames and fixed acoustical windows in accordance with final shop drawings, manufacturer's data, and as herein specified.

B. Placing Frames: Comply with provisions of SDI-105 "Recommended Erection Instructions for Steel Frames", unless otherwise indicated.

1. Anchors: Provide sufficient anchorage to attach to wall in accordance with ANSI A250.4 Test compliance Level A of one million cycles, or anchorage as detailed on drawings to specific wall conditions.

2. Except for frames located at in-place concrete and masonry installations, place frames prior to construction of enclosing walls and ceilings. Set frames accurately in position, plumbed, aligned, and braced securely until permanent anchors are set. After wall construction is completed, remove temporary braces and spreaders leaving surfaces smooth and undamaged.

3. Install frames in accordance with NFPA 80.

4. Where frames are fabricated in sections because of shipping or handling limitations, field splice at approved locations by welding face joint continuously; grind, fill, dress, and make splice smooth, flush, and invisible on exposed faces.

5. Door and frames in acoustic rated walls: Pack frames with mineral wool fiber.

C. Door Installation: Fit hollow-metal accurately in frames, with clearances specified in ANSI/SDI 100.

1. Doors: Install doors with clearances according to NFPA 80.

3.02 TOLERANCES

A. Installation Tolerances: Adjust hollow-metal door frames for squareness, alignment, twist, and plumb to the following tolerances:

1. Squareness: Plus or minus 1/16 inch, measured at door rabbet on a line 90 degrees from jamb perpendicular to frame head.

2. Alignment: Plus or minus 1/16 inch, measured at jambs on a horizontal line parallel to plane of wall.

3. Twist: Plus or minus 1/16 inch, measured at opposite face corners of jambs on parallel lines, and perpendicular to plane of wall.

4. Plumbness: Plus or minus 1/16 inch, measured at jambs at floor.

3.03 ADJUST AND CLEAN

A. Factory Coat Touch-up: Immediately after erection, sand smooth any rusted or damaged areas of factory coating and apply touch-up of matching air-drying coating.

B. Final Adjustments: Check and readjust operating finish hardware items, leaving steel frames undamaged and in complete and proper operating conditions.

END OF SECTION

SECTION 09900 - PAINTING

PART 1 - GENERAL

1.01 SUMMARY

A. This Section includes surface preparation and field painting of exposed exterior and interior items and surfaces.

1. Surface preparation, priming, and finish coats specified in this Section are in addition to shop priming and surface treatment specified in other Sections.

B. Paint exposed surfaces, except where these Specifications indicate that the surface or material is not to be painted or is to remain natural. If an item or a surface is not specifically mentioned, paint the item or surface the same as similar adjacent materials or surfaces. If a color of finish is not indicated, DLNR representative will select from standard colors and finishes available.

1. Interior and Exterior surfaces scheduled to be finished.

2. Non Ferrous metals, plated or factory finished items specifically noted to be painted or when such items occur as accessories and appurtenance to surfaces required to be painted.

3. Pipes, conduit, ducts, support apparatus and other exposed mechanical and electrical items in areas to be painted. Exterior mechanical and electrical equipment and items on the roof or building exterior.

C. Surfaces not to be finished, unless otherwise indicated.

1. Concrete floors, paving walks stairs and textured concrete. Other concrete surfaces scheduled not to be painted.

2. Structural steel and metal elements designated to receive sprayed fireproofing unless such finishes have been UL tested with the designated assembly and are approved by the fireproofing manufacturer.

3. Finish hardware, unless prime coated.

D. Do not paint prefinished items, concealed surfaces, finished metal surfaces, operating parts, and labels.

1. Prefinished item

2. Concealed surfaces include walls or ceilings in the following generally inaccessible spaces

3. Finished metal surfaces include the following:

4. Labels: Do not paint over UL, FMG, or other code-required labels or equipment name, identification, performance rating, or nomenclature plates.

1.02 RELATED SECTIONS

A. Section 01359 Historic Treatment Procedures
B. Section 13282 Lead Paint Control Measures
C Section 05120 Structural Steel
D. Section 08031 Historic Treatment of Metal Doors
E. Section 08110 Steel Doors and Frames

1.03 REFERENCES

A. ASTM D16 - Definition of terms relating to Paint, Varnish, Lacquer and Related Products.

B. ASTM D2016 - Test Method for Moisture Content of Wood.

C MPI (Master Painter's Institute) - Approved Product List.

D. PCDA (Painting and Decorating Contractors of America - Painting - Architectural Specification Manual.

E. PCA (Portland Cement Association) - Painting Concrete.

F. SSPC (Steel Structures Painting Council - Steel Structures Painting Manual)

1.04 DEFINITIONS

A. General: Standard coating terms defined in ASTM D 16 apply to this Section.

1.05 SUBMITTALS

A. Product Data:

1. Materials List: Provide an inclusive list of required patching and coating materials. Indicate each material and cross-reference specific coating, finish system, and application. Identify each material by manufacturer's catalog number and general classification.

   a. For products with premixed colors, provide manufacturer's standard color chips for selection by Engineer.

2. Manufacturer's Information: Provide data on all listed materials, including:

   a. Thinning and mixing instructions

   b. Application instructions and required mil film thicknesses.

   c. Manufacturer's Material Safety Data Sheets.

B. Certifications: Provide a letter certifying paints and coatings are free of asbestos, lead, zinc-chromate, strontium chromate, cadmium, and mercury and mercury compounds. Provide a letter certifying the amounts of mildewcide added by both the paint manufacturer and paint supplier. Provide a letter certifying that abrasive blast media are free of crystalline silica.

C. Schedule of Finishes: Provide finish schedule including paint spread rates required to achieve final dry film thickness indicated in the schedule.

D. Schedule of Operations: Provide a work schedule showing sequence of operation and installation dates.

E. Samples:

1. Submit paint finish samples, 8.5" x 11" in size illustrating selected colors and textures for each selection. Divide sample in horizontal strips showing prime and overlapping second and finish coats. Show coat tinting. .

F. Manufacturer's Instructions: Indicate special surface preparation procedures, and substrate conditions requiring special attention. Refer to Section 3.01.

G. Provide a Comprehensive Spray Plan when airless spraying is proposed.

H Qualification Data: For Applicator.

I. Delivery Receipts: Provide 3 copies of the delivery receipt, signed by the user's representative, attesting to delivery of extra paint as required under 1.09.

1.06 QUALITY ASSURANCE

A. Applicator Qualifications: A firm or individual experienced in applying paints and coatings similar in material, design, and extent to those indicated for this Project, whose work has resulted in applications with a record of successful in-service performance.

B. Source Limitations: Obtain block fillers and primers for each coating system from the same manufacturer as the finish coats.

1. Exception: Alkali resistant primers if compatible with the intermediate coat paint products.

D. Provide a Comprehensive Spray Plan when airless spraying is proposed. to include:

1. Documentation that the individual spray applicator(s) on the project have completed an approved "Spray Applicator Certification Program" conducted by the Painting Industry of Hawaii. The certification program shall include material and equipment selection, use and maintenance, hands-on application and safety training.

2. Proposed overspray protection methods.

3. Paint Manufacturer's spray application instructions and recommendations for products to be used.

1.07 REGULATORY REQUIREMENTS

A. Comply with State OSHL (Occupational Safety and Health Law) and pollution control regulations of the State Department of Health and EPA.

1.08 DELIVERY, STORAGE, AND HANDLING

A. Deliver materials to Project site in manufacturer's original, unopened packages and containers bearing manufacturer's name and label and the following information:

1. Product name or title of material.

2. Product description (generic classification or binder type).

3. Manufacturer's brand name and lot number and date of manufacture.

4. Contents by volume, for pigment and vehicle constituents.

5. Thinning instructions.

6. Application instructions and coverage.

7. Color name and number.

8. VOC content.

B. Storage

1. Non-flammable Materials: Store materials not in use in tightly covered containers in a well-ventilated area. Maintain storage containers in a clean condition, free of foreign materials and residue.

2. Flammable Materials:
   a. Store in such a manner as to prevent damage. No paint material, empty cans, paint brushes and rollers may be stored in the building(s). Store these items in separate storage facilities away from the building(s). Contractor may furnish a separate job site storage structure, if the structure complies with the requirements of the local Fire Department. Keep the storage area clean. Lock any storage structures when not in use or when no visual supervision is possible.

   b. All rejected materials shall be removed from the job site immediately.

1.09 PROJECT CONDITIONS

A. Do not apply materials when surfaces and ambient temperatures are outside the ranges required by the paint product manufacturer. Do not apply exterior coatings during rain or when relative humidity is outside the humidity ranges required by the paint product manufacturer.

B. Protect public, pedestrians and tenants from injury. Provided, erect and maintain safety barricades around scaffolds, hoists and where constriction operations create hazardous conditions.

C. Completed Work: Provide necessary protection for wet paint surfaces.

D. Protective Covering and Enclosures: Provide and install clean sanitary drop cloth or plastic sheets to protect furniture, equipment, floor and other areas that are not scheduled for treatment. Remove any paint applied to surfaces not scheduled for treatment.

F. Where airless spraying is used, ensure that protective enclosures are erected to prevent the escape of overspray from the work area.

G. Safeguarding Property: Safeguard the work and also the property of the State and other individuals in the vicinity of Contractor's work. Make good on any damages and for losses to work or property caused by Contractor or its employee's negligence. Where damaged property cannot be cleaned and restored to its original condition (i.e. prior to being damaged) replace it with a new product of equal quality. No prorating or use of "used" products will be permitted.

   1. For painting and spray painting operation, assume that cars will not be temporarily relocated from parking areas during the painting operations.

   2. Paint overspray shall not carry more than 5 lineal feet beyond the building eave line nor within 10 lineal feet of pedestrians or property and surfaces not scheduled to be painted. Immediately cease spray painting when overspray carries beyond these specified limits. Do not continue until protective barriers are erected to properly contain the overspray and damages caused by the overspray have been corrected.

3. The Contractor shall be assessed $300.00 for each incidence of property or personal damage caused by overspray until such time that a satisfactory settlement has been agreed upon by the damaged party and corrective action has been completed. All corrective action shall be settled within 24 hours from the time the damage is discovered. Should the Contractor fail to take corrective action in a timely and expeditious manner, the Engineer shall contact the Contractor's Insurance company to seek resolution on the matter.

1.10 EXTRA MATERIALS

A. Provide extra paint in each of the different colors, types and surface textures of exterior and interior paint to the user / school upon completion of the project. Paint shall be in unopened one-gallon containers and labeled with color, type, texture, room locations, and date in addition to manufacturer's label.

1. Provide 1 gallon of each color for all other areas.

1.11 WARRANTY

A. Provide a two-year warranty that the work performed under this section conforms to the contract requirements and is free of any defect of material or workmanship.

B. Warranty period to commence upon date of Project Acceptance.

PART 2 - PRODUCTS

2.01 PAINT MATERIALS, GENERAL

A. Material Compatibility: Provide block fillers, primers, and finish-coat materials that are compatible with one another and with the substrates indicated under conditions of service and application, as demonstrated by manufacturer based on testing and field experience.

B. Mildew and Mold Resistance:

1. Mildew Treatment: All paints specified in this section shall be factory formulated to be mold and mildew resistant.

a. The supplier shall submit aa signed certificate indicating that the primers and paints supplied for this Project are manufactured and factory formulated to be mold and mildew resistant

2. In the event a specified primer or finish paint is not formulated with mold and mildew resistant properties, provide each primer and finish paint with the maximum amount of mildewcide per gallon of paint permitted by the mildewcide manufacturer without adversely affecting the quality of the paint.

a. Mildewcide Additive: Zinser Add2 Prevent Mildew Mildewcide Additive, or approved equal.

b. The supplier shall submit a signed certificate indicating the amounts of mildewcide added by both the paint manufacturer and the paint supplier. Mercurial fungicide shall not be used

C. Material Quality: Provide manufacturer's best-quality paint material of the various coating types specified that are factory formulated and recommended by manufacturer for application indicated. Paint-material containers not displaying manufacturer's product identification will not be acceptable.

1. Proprietary Names: Use of manufacturer's proprietary product names in the Paint Systems Schedule in Part 3 below to designate colors or materials, is not intended to imply that products named are required to be used to the exclusion of equivalent products of other manufacturers. Furnish manufacturer's material data and certificates of performance for proposed products to be used.
2. Equivalency: Equivalent products to the specified products are listed in the Master Painter's Institute's "Architectural Painting Specification Manual."
3. Substitution: Requests for substitution of a product or product if a manufacturer is not on the "Approved Product List" will be evaluated for equivalency based on product test results per the test criteria of the Master Painter's Institute.

D. Colors: As scheduled by Drawings or selected by Engineer from manufacturer's full range.

E. Hazard Materials: Do not use paint or paint products containing asbestos, lead, mercury and mercury compounds, zinc chromates, strontium-chromate, and cadmium. Do not use abrasive blast media that contain crystalline silica.

2.02 MISCELLANEOUS MATERIALS

A. Provide patching and repair materials. Compatible with paint finishes and substrates. Use weather resistant materials for exterior surfaces and surfaces exposed to moisture.

B. Accessories

1. General: Provide other materials not specifically indicated but required to achieve the finishes specified, of commercial quality.
2. Thinners: Thinning of paint shall be done using material recommended by the manufacturer. Mix proprietary products according to manufacturer's requirements. Do not use compound thinner, mineral oil, kerosene, refined linseed oil, or gasoline for thinning.

PART 3 - EXECUTION

3.01 EXAMINATION

A. Examine substrates, areas, and conditions, with Applicator present, for compliance with requirements for paint application. Comply with procedures specified in PDCA P4.

1. Proceed with paint application only after unsatisfactory conditions have been corrected and surfaces receiving paint are thoroughly dry.
    a) Ensure that concrete and masonry surfaces are cured and dried pt meet paint manufacturer's recommendations.
2. Start of painting will be construed as Applicator's acceptance of surfaces and conditions within a particular area.

B. Coordination of Work: Review other Sections in which primers are provided to ensure compatibility of the total system for various substrates. On request, furnish information on characteristics of finish materials to ensure use of compatible primers.

1. Notify Engineer about anticipated problems when using the materials specified over substrates primed by others.

3.02 PREPARATION

A. General: Remove hardware and hardware accessories, plates, machined surfaces, lighting fixtures, and similar items already installed that are not to be painted. If removal is impractical or impossible because of size or weight of the item, provide surface-applied protection before surface preparation and painting.

   1. After completing painting operations in each space or area, reinstall items removed using workers skilled in the trades involved.

B. Cleaning: Before applying paint or other surface treatments, clean substrates of substances that could impair bond of the various coatings. Remove dust, oil and grease before cleaning.

   1. Schedule cleaning and painting so dust and other contaminants from the cleaning process will not fall on wet, newly painted surfaces.

C. Surface Preparation: Clean and prepare surfaces to be painted according to manufacturer's written instructions for each particular substrate condition and as specified.

   1. Provide barrier coats over incompatible primers or remove and reprime.

D. Surface Preparation Cementitious Materials: Prepare concrete, concrete unit masonry, cement plaster, and mineral-fiber-reinforced cement panel surfaces to be painted. Remove efflorescence, chalk, dust, dirt, grease, oils, and release agents. Roughen as required to remove glaze. If hardeners or sealers have been used to improve curing, use mechanical methods of surface preparation.

   1. Use abrasive blast-cleaning methods if recommended by paint manufacturer.
   2. Determine alkalinity and moisture content of surfaces by performing appropriate tests. Submit test results to Engineer.
      a. Prior to painting, concrete and masonry surfaces shall be allowed to cure and dry in accordance with the paint manufacturer's instructions and recommendations.
      b. Efflorescence and laitance shall be removed from the surface.
      c. Prior to paint application, interior and exterior concrete and masonry (including grout joints) scheduled to receive paint shall be tested to determine the alkalinity level of the surface. Testing shall be performed in strict accordance with the test kit manufacturer's instructions. Submit test results to the Engineer.
      d. Where the alkalinity level exceeds the pH level limit of the primer take one of the following three remedies at no additional cost to the State:
         1) If new concrete or masonry, wait until alkaline level has dropped below the limit.
         2) Substitute a primer that is able to resist the measured alkalinity and that is compatible with the paint finish. Alkyd based primers and top-coats or epoxy ester primers shall not be used. Submit the substitute primer to the Engineer for review.
         3) Neutralize the surface in accordance with the primer manufacturer's instructions to reduce the alkaline level. However, acid washing is not

permitted where the surface has been finished with a cementitious coating.

3. Clean concrete floors to be painted with a 5 percent solution of muriatic acid or other etching cleaner. Flush the floor with clean water to remove acid, neutralize with ammonia, rinse, allow to dry, and vacuum before painting.

F. Surface Preparation Ferrous Metals: Clean ungalvanized ferrous-metal surfaces that have not been shop coated; remove oil, grease, dirt, loose mill scale, and other foreign substances. Use solvent or mechanical cleaning methods that comply with SSPC's recommendations.

1. Blast steel surfaces clean as recommended by paint system manufacturer and according to SSPC-SP 10/NACE No. 2.

2. Treat bare and sandblasted or pickled clean metal with a metal treatment wash coat before priming.

3. Touch up bare areas and shop-applied prime coats that have been damaged. Wire-brush, clean with solvents recommended by paint manufacturer, and touch up with same primer as the shop coat. Spot priming specified here shall be in addition to full prime painting scheduled in Part 3 below.

G. Surface Preparation Galvanized Surfaces: Clean galvanized surfaces with concentrated, water reducible phosphoric acid detergent blend so surface is free of oil and surface contaminants and surface is lightly etched to enhance paint adhesion; MPI# 25.

1. Remove pretreatment from galvanized sheet metal fabricated from coil stock by mechanical methods.

H. Material Preparation: Mix and prepare paint materials according to manufacturer's written instructions.

1. Maintain containers used in mixing and applying paint in a clean condition, free of foreign materials and residue.

2. Stir material before application to produce a mixture of uniform density. Stir as required during application. Do not stir surface film into material. If necessary, remove surface film and strain material before using.

3. Use only thinners approved by paint manufacturer and only within recommended limits.

I. Tinting: Tint each undercoat a lighter shade to simplify identification of each coat when multiple coats of same material are applied. Tint undercoats to match the color of the finish coat but provide sufficient differences in shade of undercoats to distinguish each separate coat.

3.03 APPLICATION

A. General: Apply paint according to manufacturer's written instructions. Use applicators and techniques best suited for substrate and type of material being applied.

1. Paint colors, surface treatments, and finishes are indicated in the paint schedules.

2. Do not paint over dirt, rust, scale, grease, moisture, scuffed surfaces, or conditions detrimental to formation of a durable paint film.
3. Provide finish coats that are compatible with primers used.
4. The term “exposed surfaces” includes areas visible when permanent or built-in fixtures, grilles, and similar components are in place. Extend coatings in these areas, as required, to maintain system integrity and provide desired protection.
5. Paint back sides of access panels and removable or hinged covers to match exposed surfaces.
6. Finish exterior doors on tops, bottoms, and side edges the same as exterior faces.
7. Sand lightly between each succeeding enamel or varnish coat.
8. Ensure primers are top coated within the times required by the paint manufacturers. Top coats not applied within the recoating window may be rejected.

B. Scheduling Painting: Apply first coat to surfaces that have been cleaned, pretreated, or otherwise prepared for painting as soon as practicable after preparation and before subsequent surface deterioration.
1. The number of coats and film thickness required are the same regardless of application method. Do not apply succeeding coats until previous coat has cured as recommended by manufacturer. If sanding is required to produce a smooth, even surface according to manufacturer’s written instructions, sand between applications.
2. If undercoats, stains, or other conditions show through final coat of paint, apply additional coats until paint film is of uniform finish, color, and appearance. Give special attention to ensure that edges, corners, crevices, welds, and exposed fasteners receive a dry film thickness equivalent to that of flat surfaces.
3. Allow sufficient time between successive coats to permit proper drying. Do not recoat surfaces until paint has dried to where it feels firm and does not deform or feel sticky under moderate thumb pressure, and until application of another coat of paint does not cause undercoat to lift or lose adhesion.
4. Be aware of the requirements for, and restrictions on, spray painting contained in PROJECT CONDITIONS Paragraph.

C. Application Procedures: Apply paints and coatings by brush, roller, spray, or other applicators according to manufacturer’s written instructions.
1. Brushes: Use brushes best suited for type of material applied. Use brush of appropriate size for surface or item being painted.
2. Rollers: Use rollers of carpet, velvet-back, or high-pile sheep’s wool as recommended by manufacturer for material and texture required.
3. Spray Equipment: Use airless spray equipment with orifice size as recommended by manufacturer for material and texture required.

D. Minimum Coating Thickness: Apply paint materials no thinner than manufacturer’s recommended spreading rate to achieve dry film thickness

indicated. Provide total dry film thickness of the entire system as recommended by manufacturer.

E. For historic structures provide comprehensive cement wash over entire structure for smooth finish prior to application of paint or coating.

H. Block Fillers: Apply block fillers to concrete masonry block at a rate to ensure complete coverage with pores filled.

I. Prime Coats: Before applying finish coats, apply a prime coat, as recommended by manufacturer, to material that is required to be painted or finished and that has not been prime coated by others. Recoat primed and sealed surfaces where evidence of suction spots or unsealed areas in first coat appears, to ensure a finish coat with no burn-through or other defects due to insufficient sealing.

J. Pigmented (Opaque) Finishes: Completely cover surfaces as necessary to provide a smooth, opaque surface of uniform finish, color, appearance, and coverage. Cloudiness, spotting, holidays, laps, brush marks, runs, sags, ropiness, or other surface imperfections will not be acceptable..

L Anti-Graffiti Coatings: Apply coating in accordance with manufacturer's published instructions.

1. Apply a minimum of 2-coats of graffiti resistant coating to all exterior exposed building surfaces visible for first 8 feet.

N. Completed Work: Match approved samples for color, texture, and coverage. Remove, refinish, or repaint work not complying with requirements.

3.04 FIELD QUALITY CONTROL TESTING

A. Inspection and Approvals: Obtain written approval upon completion of each phase of work (phases of work are: surface preparation and spot prime, prime, first finish coat, second finish coat) before proceeding into the next phase or work. For any particular area of work that deviates from the submitted work schedule, notify the Engineer one day (24 hours minimum) in advance when completing any phase of work. Provide access to areas to be inspected.

1. Failure to obtain approval of any phase of work for a work area may result in redoing the operation at no cost to the State.

2. Right of Rejection: Non conforming work will be rejected by the Engineer. Remove rejected material from the job site immediately. Redo rejected work at no cost to the State.

B. Thickness Testing: The Engineer will require all paints and their applied thickness tested determine compliance with the Contract Documents. The State will select a laboratory, and the cost of testing shall be borne by the Contractor.

1. Where the required paint thickness is deficient, provide additional coats to the affected surface(s) to meet the required paint thickness.

2. Test schedule: Two tests per various types of substrate material and locations to be defined in the field.

3. Tests shall be paid by Contractor and shall be performed by General Contractor for quality assurance.

C. Moisture Testing: Measure moisture content of surfaces using an electronic moisture meter. Do not apply finishes unless moisture content of surfaces are below the following maximums:

1. Masonry, Concrete, and Concrete Unit Masonry: 12 percent.

D. Alkalinity Testing: Measure pH Level of surface to be painted. Notify Engineer if alkalinity level is below the maximum permitted by the paint or primer manufacturer.

1. Test schedule: Two tests per various types of substrate material and locations to be defined in the field.

2. Tests shall be paid by Contractor and shall be performed by qualified sub-contractor of Contractors selection.

E. Adhesion Testing:

1. Provide adhesion testing per ASTM D3759 Test B (x scratch peel test):

a. Test after each scheduled paint coat.

b. Should test fail, remove paint, prepare surface, then recoat and test again.

2. Testing shall be performed by a NACE certified inspector selected by the State. The cost of testing shall be borne by the Contractor.

3. Test schedule: Two tests per various types of substrate material and locations to be defined in the field.

4. Tests shall be paid by Contractor.

F. Manufacturer's Field Services: The Painting Contractor shall be responsible to assure the presence of a qualified Technical Representative (approved by a responsible officer of the Material Manufacturer) at the job site prior to starting of the work and as require while the work is in progress. The Technical Representative shall provide assistance to the Painting Contractor in physical demonstrations on the use of the materials and methods or techniques required to accomplish all of the work as specified herein.

1. A minimum two (2) visits will be required. The Technical Representative shall submit a detailed report simultaneously to the Engineer and a Responsible Officer of the Painting Contractor and not to the on-site project manager or foremen. This report shall contain in detail the findings, conclusions and recommendations and shall be submitted during each visit. It is the intent of this provision to ensure that the on-site project manager or foreman does not have supervisory rights over the Technical Representative.

3.05 CLEANING

A. Cleanup: At the end of each workday, remove empty cans, rags, rubbish, and other discarded paint materials from Project site.

1. After completing painting, clean glass and paint-spattered surfaces. Remove spattered paint by washing and scraping without scratching or damaging adjacent finished surfaces.

3.06 PROTECTION

A. Protect work of other trades, whether being painted or not, against damage from painting. Correct damage by cleaning, repairing or replacing, and repainting, as approved by Engineer.

B. Provide “Wet Paint” signs to protect newly painted finishes. After completing painting operations, remove temporary protective wrappings provided by others to protect their work.
   1. After work of other trades is complete, touch up and restore damaged or defaced painted surfaces. Comply with procedures specified in PDCA P1.

3.07 EXTERIOR PAINT SCHEDULE

A. Cast-in-Place Concrete: Coating system as specified in Section 09905 – HIGH PERFORMANCE WALL COATINGS

B. Ferrous and Galvanized Metal: Provide the following finish systems over exterior ferrous and zinc-coated metal. Primer is not required on shop primed items.

   1. Epoxy/Urethane Finish: One finish and intermediate coat over a rust inhibitive primer.

      a. Primer **: Exterior galvanized metal primer. MPI #20, 3.0 mils DFT.

      b. Intermediate Coat: Fast Cure Epoxy paint. MPI #108, 3.0 mils DFT

      c. Finish Coat: Polyurethane Topcoat. MPI # 174, 3.0 mils DFT.

      d. Finish Coat Gloss Level: Semi-Gloss.

      ** Not required for shop primed or galvanized steel.

C. Wood Panels at Anti-Aircraft Gun Emplacement Tower

      a. Clear Penetrating Wood Sealer: Messmer's UV Plus, or equal

D. Exterior Wood Paneling (New): Provide the following stain finish system over new or repaired exterior wood surfaces intended to match existing historic wood paneling:

      a. Semi-Transparent Penetrating Exterior Wood Stain: Apply stain finish in accordance with manufacturer’s instructions.

      b. Wood Conditioner/Sealer (if recommended by manufacturer): Penetrating wood conditioner compatible with stain system to promote uniform absorption.

      c. Stain Finish: Semi-transparent penetrating exterior wood stain formulated for exterior siding applications; PPG ProLuxe Cetol SRD Wood Finish, Penofin Penetrating Oil Finish for Exterior Wood, Messmer’s UV Plus Exterior Wood Finish, or approved equal; apply to achieve manufacturer’s recommended coverage.

      d. Color: Field match existing historic wood paneling. Submit stain samples for Architect review and approval prior to application.

END OF SECTION

SECTION 09905 – HIGH-PERFORMANCE WALL COATINGS

PART 1 - GENERAL

1.01 SUMMARY

A. This section includes:

1. All materials, equipment, services, insurance, and labor necessary to apply water-based silicone emulsion/coating waterproofing where indicated or scheduled.
2. Masking and protection of adjacent surfaces.

B. Related Sections:

1. Section 07910 – EXTERIOR WALL SEALANTS
2. Section 09900 - PAINTING

1.02 SCOPE OF WORK

A. General description

1. This work includes proper preparation of and coating of exterior vertical concrete substrates.
2. Apply primer and a minimum of two coats of elastomeric coating.

1.03 REFERENCES

A. In addition to referenced codes and standards within this specification, the work shall comply with the latest edition of the following standards. When conflicts arise between standards, the more stringent shall apply:

1. American Society for Testing and Materials (ASTM)
   a. ASTM D 412 - Standard Test Method for Vulcanized Rubber and Thermoplastic Rubbers and Thermoplastic Elastomers - Tension.
   b. ASTM D 522 - Standard Test Methods for Mandrel Bend Test of Attached Organic Coatings.
   c. ASTM D 711 - Standard Test Method for No-Pick-Up Time of Traffic Paint.
   d. ASTM D 1653 - Standard Test Method for Water Vapor Transmission of Organic Coatings.
   e. ASTM D 1737 - Method of Test for Elongation of Attached Organic Coatings with Cylindrical Mandrel Apparatus.
   f. ASTM D 2240 - Rubber Property Durometer Hardness.
   g. ASTM D 2369 - Standard Test Method for Volatile Content of Coatings.
   h. ASTM D 3273 - Standard Test Method for Resistance to Growth of Mold on the Surface of Interior Coatings in an Environmental Chamber.
   i. ASTM D 3274 - Standard Test Method for Evaluating Degree of Surface Disfigurement of Paint Films by Microbial (Fungal or Algal) Growth of Soil and Dirt.

2. Sealant, Waterproofing, and Restoration Institute (SWRI):
    a. SWRI Validation Program.

1.04 SUBMITTALS

A. Provide complete product data including all test data. Submit manufacturer's technical information including basic materials analysis and installation instructions specified material.

B. Elastomeric Coatings Contractor shall submit a detailed description of the work to be performed, materials to be used, sequencing of work, schedule of time required for each phase of work, and special protection required during the remaining construction.

C. Elastomeric Coatings Contractor shall submit documentation of total square footage of area to receive elastomeric coatings and quantity of materials required prior to ordering material.

D. Submit manufacturer's standard instructions for delivery, storage, surface preparation, installation, field quality control testing and adjusting.

E. Submit sample of written warranty for Engineers review prior to commencement of work.

F. Samples: For each color and textured scheduled or specified submit coating finish samples, 8.5 inches x 11 inches in size illustrating specified colors and textures for each selection. Step each sample in horizontal strips showing primer and overlapping second and finish coats. Show coat tinting. Identify each sample.

G. In each different area to receive coating at the project site, apply a representative sample (approximately 20' wide x (2) floors tall) to exhibit color, texture, joint treatment, and appearance. Consultant and Owner shall approve these samples prior to proceeding with work. If samples are rejected, new samples shall be installed.

H. Final acceptance of colors will be from samples applied to the job.

I. Field quality control adhesion test reports.

J. Submit Material Safety Data Sheets (MSDS) for all materials and products used in conjunction with this project.

1.05 QUALITY ASSURANCE

A. Qualifications:

1. Materials shall be applied by a contractor previously certified or approved by the material manufacturer and listed as a pre-qualified contractor.
    a. A letter from the manufacturer's representative shall be submitted prior to application of any materials stating that the firm designated to install the specified materials is approved for the level of warranty required by this Contract.
2. Work must be performed by a firm having successful experience in comparable projects and employing personnel skilled in the processes and operations indicated.

3. Elastomeric Coatings Contractor's site foreman for this work shall have a minimum of three years successful experience in comparable projects and shall have been in the employment of this firm for a minimum of one year.

B. Manufacturer's Technical Representative

1. Manufacturer's technical representative shall inspect site prior to installation and provide the Engineer with notification of acceptance of the surfaces to receive the specified products.

2. Manufacture’s technical representative shall outline, in writing, the cleaning method and primer requirements of each substrate to be coated prior to work beginning.

3. Manufacturer's technical representative shall inspect installation during construction and at completion of the installation and verify to the Engineer that installation has been completed in accordance with the specifications and manufacturer's requirements and that work complies with warranty requirements.

   a. Provide site visits at intervals not exceeding fourteen (14) days by manufacturer’s technical representative. Provide Engineer with written report including job conditions, quality of work, conformance of work with specifications and warranty requirements.

   b. Inspections shall include cutting samples to check millage thickness of coatings.

4. Single Source Responsibility: Provide primers and other undercoat materials produced by same manufacturer as finish coats. All materials used within the coating system, including sealants, shall be approved by coating manufacturer prior to application and used within the recommended limits

1.06 DELIVERY AND STORAGE

A. Deliver materials in original, new and unopened packages and containers bearing manufacturer’s name and label, and following information:

1. Name or title of material.

2. Expiration date, if applicable.

3. Manufacturer’s stock number and date of manufacture.

4. Manufacturer’s name.

5. Contents by volume, for major pigment and vehicle constituents.

6. Thinning and mixing instructions.

7. Application instructions.

8. Color name and number.

9. Batch number.

B. Take precautions to ensure that workmen and work areas are adequately protected from fire and health hazards resulting from handling, mixing and application of special coatings.

C. Store materials not in actual use in tightly covered containers. Maintain containers used in storage of coatings in a clean condition, free of foreign materials and residue.

D. Protect form over heating by storage in air-conditioned storage area. Keep storage area neat and orderly. Remove oily rags and waste daily. Take all precautions required to prevent fires.

1.07 JOB CONDITIONS

A. Do not apply coatings when the temperature of surfaces to be coated and the surrounding air temperature exceed the limits established with the material manufacturer.

B. Do not apply coating when the ambient temperature is above 100 degrees F unless written approval from the manufacturer can be obtained.

C. Do not apply coatings in rain, fog, or mist; or when relative humidity exceeds 85%; or to damp or wet surfaces; unless otherwise permitted by coating manufacturer's printed instructions.

D. Do not apply to surfaces with condensation, or surface moisture.

E. Coating work may be continued during inclement weather only if areas and surfaces to be coated are enclosed and within temperature limits established by coating manufacturer during application and curing periods.

F. Measurements

1. It shall be Elastomeric Coatings Contractor's responsibility to obtain and verify any necessary dimensions by visiting the job site, and the Contractor shall be responsible for the correctness of same.

2. Elastomeric Coatings Contractors shall make a physical inspection of the facilities and include all work required for the elastomeric coatings in the bid costs.

1.08 SPECIAL WARRANTY

A. Warranty: Submit a written warranty agreeing to repair or replace elastomeric coating compounds which have failed to provide watertight surfaces for any reason, or which appear to have failed in adhesion, cohesion, abrasion-resistance, migration-resistance, stain-resistance, general durability or any other form of apparent deterioration (excluding inherent qualities and limitations clearly specified in the manufacturer's data which was submitted).

B. Warranty Period: Period of warranty shall be Ten (10) years, from date of Project Acceptance.

1. The Surety and the Contractor shall not be held liable beyond two years from the Project Acceptance date.

C. Comply with these specifications for repair or replacement of work.

PART 2 - PRODUCTS

2.01 MANUFACTURERS

A. Basis of Design Product: Wall coating indicated in these specifications and drawings are based on DowSil AllGuard Silicone Elastomeric Coating as manufactured by Dow Chemical Company

B. Subject to compliance with requirements the following products are acceptable:

1. GE Momentive – SEC2400 SilShield Silicone Architectural Coating

2.02 MATERIALS

A. Silicone Elastomeric Coating: Single-component, fluid-applied, water-based, pigmented silicone elastomer meeting or exceeding the following properties:

1. Coating shall be vapor permeable when cured.
2. Resistance to Wind Driven Rain: SWRI Validation Program, ASTM D 6904; Passed
3. Tensile Strength: ASTM D 412; 145 psi
4. Elongation: ASTM D 412; not less than 320 percent
5. Solids Content: Not less than 55 percent by weight.
6. Color: Provide a custom historic color formulated to replicate the appearance of unfinished concrete. Color shall be field matched to the existing historic concrete surfaces as directed by the Architect. Submit manufacturer's color samples and drawdowns for review and approval prior to application., .
7. Finish Sheen: Low sheen / matte (eggshell appearance). Coating shall cure to a uniform, non-gloss reflective surface suitable for exterior architectural concrete/masonry.

B. Accessory Materials

1. Crack and Hole Fillers: Elastomeric coating manufacturer's recommended, factory-formulated crack fillers or sealants compatible with substrate and other materials.
2. Primer: Elastomeric coating manufacturer's recommended, factory-formulated, alkali-resistant primer compatible with substrate and other materials indicated.
3. Concrete Unit Masonry Block Filler: Factory-formulated, high-performance latex block filler compatible with substrate and other materials indicated
4. Existing concrete: Provide cement wash/repair per Section 03930 – Concrete Rehabilitation

PART 3 - EXECUTION

3.01 EXAMINATION

A. Examine substrates to determine if work is ready to receive elastomeric coatings. Verity that surfaces are clean, dry, and free of dust, dirt, grease, oil, curing compounds, form release agents, laitance, efflorescence, mildew, excess alkalinity, and other conditions affecting performance of work.

1. Verify that new concrete and mortar to receive coating application has cured adequately in accordance with substrate and coating manufacturer's instructions.

B. Preinstallation Testing: Prior to application of elastomeric coatings, perform the following tests to verify condition of substrate in accordance with manufacturer's instructions:

1. Adhesion: Perform substrate field adhesion tests on each substrate to determine if primer is required to satisfactorily adhere elastomeric coatings to substrates.
2. Alkalinity: Verify substrate is within alkalinity range acceptable to manufacturer.
3. Moisture Level: Verify substrate moisture content is acceptable to manufacturer

3.02 PREPARATION

A. Protection

1. The Elastomeric Coatings Contractor shall protect all new surfaces and be responsible for correction, or payment for correction, of any damage due to his operations.
2. Provide and maintain at all times any OSHA required danger signs, guards, and obstructions necessary to protect the public and workmen from any dangers inherent with or created by the work. All federal, state, and city rules and requirements pertaining to safety and all EPA standards and OSHA standards pertaining to safety shall be fulfilled as part of this Contract.

B. Surface Preparation

1. Clean surfaces
    a. Clean building by pressure washing to remove all dust, dirt, oil, grease, loose particles, and foreign materials. Adjust pressure of spray rinse as required to clean, but not damage substrate. Allow surface to dry.
        i) The intensity of the pressure used in power washing shall be a minimum of 2100 psi.
2. Cracks1/16-inch or smaller do not require patching by the two listed manufactures, the contractor shall verify this when submitting manufacturer's installation procedures.
3. Chip or grind out cracks larger than 1/16" to 1/8" minimum width and depth and clean surface and inside of crack with IPA and install silicone sealant into cracks and tool smooth. Silicone sealant must be from the same manufacturer as the elastomeric coating and must be approved by the elastomeric coating manufacturer for this purpose.

3.03 APPLICATION OF ELASTOMERIC COATING

A. General: Apply special coatings by brush, roller, or spray in accordance with manufacturer's directions. Use brushes best suited for type of material being applied. Use rollers, synthetic nap as recommended by manufacturer, for material and texture required.

1. Brush: nylon or synthetic bristle brushes only.
2. Roller: 3/4" to 1-1/2", medium synthetic nap roller for smooth surface.

B. Use brush application only at small inaccessible areas and limited areas such as pre-striping of cracks.

C. Use roller for majority of application. Completely saturate roller and keep it loaded with coating to build the required coating millage thickness. Never dry roll ex-

cept for touch up. Roll the coating in a fan like pattern to achieve uniform millage.

D. Before using, stir coating materials in accordance with manufacturer recommendations to achieve a smooth, uniform consistency.

E. Application of primer.

1. Consult manufacture technical representative prior to the start of work to verify primer requirements. Manufacture's technical representative to submit written procedure for cleaning and priming each substrate that is to receive a new coating.

2. Primer shall be applied at full strength without thinner unless otherwise recommended by manufacturer and approved by Engineer. When use of thinner is recommended, thin with materials as recommended by manufacturer.

3. Allow primer to dry approximately two to four hours.

F. Use two (2)-coat method to apply elastomeric with a total thickness of 10 dry mils to obtain a ten (10) year warranty as outline below. Consult Technical Services for appropriate primer recommendation and application method. Notify architect in writing of recommendations.

1. Apply primer coats as recommended by the manufacturer.

G. Apply additional coats as required to achieve minimum ten mils dry film thickness in all areas.

H. The number of coats and coating film thickness required is the same regardless of application method. Do not apply succeeding coats until previous coat has cured as recommended by coating manufacturer.

I. Apply additional coats when topcoat or other conditions show through final coat. Final cured film shall be of uniform finish, color and appearance.

J. Minimum Coating Thickness: Provide a total dry film thickness of entire coating system as recommended by manufacturer but not less than ten mils (10).

3.04 FIELD QUALITY CONTROL

A. The right is reserved by Engineer to invoke the following material testing procedures at any time, and any number of times during period of field application of coating:

1. The State may engage service of an independent testing laboratory to sample materials being used. Samples of materials delivered to project site will be taken, identified, sealed, and certified in the presence of Elastomeric Coatings Contractor.

2. Testing laboratory will perform appropriate tests for any of the following characteristics: Abrasion resistance, apparent reflectivity, flexibility, washability, absorption, accelerated weathering, dry opacity, accelerated yellowness, recoating, skinning, color retention, alkali resistance, and quantative materials analysis.

3. If test results show materials being used don't comply with specified requirements, Elastomeric Coatings Contractor may be directed to stop work, and remove noncomplying materials; pay for tests; rework repairs and/or recoat surfaces repaired or coated with rejected materials; remove rejected materi-

als from previously coated surfaces if, upon recoating with specified materials, two coatings are incompatible.

B. Manufacturer shall provide a field technical representative on the jobsite to inspect material quality and application procedures. Technical Representative shall at the minimum:

1. Inspect site prior to application and provide Engineer with notification of acceptance of surface to receive materials.

2. Inspect installation at sufficient intervals during application, not exceeding fourteen days and at completion and verify to Engineer that installation is in accordance with specifications, manufacturer requirements, and warranty requirements.

C. Engineer, Consultant and Manufacturing Field Representative shall require contractor to cite sample areas on coating system to verify millage thickness and number of coats. Contractor shall repair sample cut areas.

1. If millage is found to be inadequate, contractor shall be required to achieve specified millage. When additional coating is required, it shall be applied to entire wall in question, to expansion or control joints surrounding the recoated area.

D. Elastomeric Coatings Contractor shall submit a certificate indicating the number of gallons of elastomeric coating required to cover the entire work as preconstruction submittal. Indicate the square foot coverage expected per gallon and the total square footage involved. At the completion of the work, submit a certificate indicating the total number of gallons applied. Do not destroy used containers until the number has been properly verified and recorded. Store used containers in a place designated by the Engineer for audit purposes.

1. Should more material be required to achieve millage than was anticipated by the Elastomeric Coatings Contractor, additional material shall be provided at no additional cost to the State.

E. Elastomeric Coatings Contractor shall record times of application, ambient temperatures, substrate temperatures, and procedures followed to address heat conditions on the Daily Completion Checklist Form and submit daily form to the Engineer.

3.05 ADJUSTING

A. A final inspection shall be conducted by the Elastomeric Coatings Contractor, Manufacturer, Consultant, General Contractor and Engineer.

B. The Elastomeric Coatings Contractor shall promptly remove any work which is found unacceptable and correct any items of work listed during the final inspection.

3.06 CLEAN-UP AND PROTECTION

A. Clean-up: During progress of work, remove from project site discarded materials, rubbish, and rags resulting from work.

B. Upon completion of work, clean all coating-spattered surfaces. Remove spattered materials by proper methods of washing and scraping, using care not to damage finished surfaces.

C. Protection: Protect all work against damage. Correct damage by cleaning, repairing, or replacing, and recoating as directed by Engineer. Leave work in undamaged condition.

D. Provide “Wet Paint” Signs as required to protect finished. After coating application, remove temporary protective materials installed for protection of other work during coatings operation.

END OF SECTION

SECTION 13282 - LEAD PAINT CONTROL MEASURES

PART 1 - GENERAL

1.01 SUMMARY

A. In performing the handling of building components with lead, all possible safeguards, precautions and protective measures shall be utilized to prevent exposure of any individual to lead particulates.

1.02 DESCRIPTION OF WORK

A. Various structures were tested for lead. The listed materials were coated with lead paint.
   1. Lead-Based Paint (containing lead at/or greater than 0.5% lead by weight)
      a. Harbor Entrance Control Post Tower: lime green over orange and brown paint on the structural metal frame.

      b. Bunkers: Brown over orange paint on the metal door and frame.

   2. Lead-Containing Paint (containing lead at/or greater than the laboratory detection limits but less than 0.5% lead by weight)
      a. Bunkers: Brown and maroon paint on the concrete and CMU enclosure walls; green paint on the concrete entrance and steps.

      b. Cable Hut (train): Yellow and red paint on the concrete wall; green and yellow paint on the concrete wheel.

      c. Air Raid Shelter (train station): Red paint on the wood lattice; black, red and yellow paint on the concrete wall base and platform; yellow and green paint on the wood beam and frame.

      d. Anti-Aircraft Gun Emplacement Tower: Green paint on the concrete columns; brown paint on the concrete ceiling and floor; brown paint on the wood railing.

B. Furnish all labor, materials and equipment necessary to carry out the safe removal, clean-up, proper handling, transportation and disposal of lead paint debris in compliance with all applicable laws and regulations concerning lead, including all incidental and pertinent operations. The lead work shall generally include:
   1. Removal and disposal of loose and flaking or otherwise deteriorated paint to allow for the safe surface preparation and repainting.

   2. Removal and disposal of intact paint to allow for safe new work and/or renovation work.

   3. Incidental disturbance of lead paint during the renovation activities.

   4. The Contractor shall assume any untested paint to contain lead.

C. The Contractor shall be responsible for ensuring that all work generating lead debris conforms to the following applicable federal, state and local laws, codes, rules and regulations.
   1. Occupational Safety and Health Administration (OSHA); Hawaii Occupational Safety and Health (HIOSH) standards and rules.

   2. Environmental Protection Agency (EPA), Toxic Substance Control Act (TSCA), 40 CFR Part 745, Lead, Requirements for Lead Based Paint Activities in Target Housing and Child Occupied Facilities.

   3. Environmental Protection Agency (EPA), Resource Conservation and Recovery Act (RCRA) of 1976, amended in 1980 and 1984.

1.03 COORDINATION WITH OTHER SECTIONS

A. The Contractor shall coordinate all of his lead paint removal and demolition of lead components with the Engineer and the General Contractor.

1.04 CONTRACTOR RESPONSIBILITIES

A. The Contractor acknowledges that he alone is responsible for the instruction and for enforcing personnel protection requirements and that these specifications provide only a minimum acceptable standard. Contractor shall comply with all requirements of 29 CFR 1926.62. The Contractor shall also be responsible for complying with all applicable EPA regulations in regards to lead containing materials.

B. Respirators: Use appropriate respirators and filters which meet all requirements of OSHA 29 CFR 1926.62.

C. Protective Clothing: Use appropriate personal protective clothing (disposable suits, eye protection, gloves, etc.) as required by OSHA 29 CFR 1926.62.

1.05 GENERAL REQUIREMENTS

A. The work specified herein shall include the handling of lead flashing or plumbing, transportation and disposal procedures as required of lead containing materials by persons with at least OSHA Lead Training. This work must be performed in compliance with all applicable federal, state, and local regulations and be performed by workers who are capable of and willing to perform the work of this contract.

B. Applicable Standards and Guidelines: All work under this contract, and any other trade work conducted with the project, shall be done in strict accordance with all applicable federal, state and local regulations, standards and codes governing lead demolition, transportation and disposal of lead materials.
   1. The most recent edition of any relevant regulation, standard, document or code shall be in effect.

C. Specific Statutory and Regulatory Requirements:
   1. Title 29, Code of Federal Regulations, Section 1926.62, entitled "Lead Exposure in Construction; Interim Final Rule".

   2. Title 29 Code of Federal Regulations Part 1910.134, Respiratory Protection.

3. Federal Register: Vol. 54, No. 131; Tuesday, July 11, 1989. Department of Labor, Occupational Safety and Health Administration; 29 CFR Parts 1910, 1915, 1917, and 1918; Occupational Exposure to Lead; Statement of Reasons; Final Rule.

4. Title 40 Code of Federal Regulations Part 61, National Emissions Standards for Hazardous Air Pollutants.

5. Title 40 Code of Federal Regulations Part 745, Lead; Requirements for Lead Based Paint Activities in Target Housing and Child Occupied Facilities; Final Rule.

6. Guidelines for the Evaluation and Control of Lead Based Paint Hazards in Housing.

1.06 DEFINITIONS

A. Action Level (AL): Employee exposure averaged over an 8-hour period, without regard to the use of respirators, to a particular airborne concentration. OSHA requirements become effective at this level. Lead: 30 micrograms per cubic meter of air.

B. Air Monitoring: The process of measuring the content of a specific, known, volume of air in a stated period of time. For this project, NIOSH 7082 method for lead monitoring.

C. Authorized Visitor: The Engineer, their representatives, air monitoring personnel, or a representative of any regulatory or other agency having jurisdiction over the project.

D. Competent Person: Person employeed or hired by the Contractor, who is educated and trained in recognizing and evaluating work place hazards and stress (in this instance, lead demolition and related work in accordance with 29 CFR 1926.62) and providing guidance on the methods and means of removing or correcting such hazards and stresses within the work environment.

E. Contaminated Area: An area where unwanted toxic or harmful substances exists.

F. HEPA Filter: A High Efficiency Particulate Absolute filter capable of trapping and retaining 99.97 percent of particulates greater than 0.3 micron in length.

G. Lead: Metallic lead, all inorganic lead compounds, and inorganic lead soaps. Excluded are all other organic lead compounds.

H. Monitoring Specialist: A person under the supervision of the Lead Superviosr who is trained in health and safety requirements for lead exposure and air-monitoring in accordance with 40 CFR 745, 29 CFR 1926.62.

I. Permissible Exposure Limit (PEL): The employer shall ensure that no employee is exposed to concentrations greater than the PEL as determined from an 8-hour time weighted average. Lead: 50 micrograms per cubic meter.

J. Personal Monitoring: Contractor's sampling of lead in air concentrations within the breathing zone of an employee to determine the 8-hour time weighted average. The samples shall be representative of the employee's work tasks. The breathing zone shall be considered an area within 12-inches of the nose or mouth of an employee.

K. Qualified Consultant: Consultant hired by the General Contractor who will perform air monitoring and inspection during lead disturbance work and shall have the authority to initiate engineering controls.

1.07 ABBREVIATIONS

A. CFR: Code of Federal Regulations.

B. HIOSH: Department of Occupational Safety and Health, Department of Labor and Industrial Relations, State of Hawaii.

C. EPA: U.S. Environmental Protection Agency.

D. NIOSH: National Institute for Occupational Safety and Health.

E. OSHA: Occupational Safety and Health Administration.

F. NESHAP: National Emissions Standards for Hazardous Air Pollutants.

G. LP: Lead Paint.

H. TCLP: Toxicity Characteristic Leaching Procedure.

1.08 SUBMITTALS PRIOR TO WORK

A. Payment: Final payment will not be made until copies of all submittals have been furnished to and accepted by the Engineer. Submit 6 copies of the submittal package no later than 10 work days from the notice of award unless otherwise specified in this Section. The submittal package will include the items listed below.

B. Detailed Work Plan: The Contractor shall submit a project work plan for the lead disturbance work. The Plan shall be prepared by the Certified Industrial Hygienist. The Contractor shall also provide detailed information concerning:

1. Preparation of the work area.

2. Personal protective equipment including respiratory protection and protective clothing.

3. Employees who will participate in the project: include documentation of experience, documented proof of lead removal training based on 29 CFR 1926.62 and/or the proposed EPA Model Accreditation for Lead Based Paint Removal Work Training, in addition to any current EPA regulatory requirements, and assigned responsibilities during the project.

4. Decontamination procedures for the personnel who may be exposed to lead.

5. Lead handling and disposal methods and procedures to be used.

6. Required air monitoring procedures and sampling protocols.

7. Procedures for final cleanup.

8. A sequence of work and performance schedule in coordination with other trades.

9. Emergency procedures.

C. Shop Drawings: Submit shop drawings for the following items as a minimum:
   1. Descriptions of any equipment to be employed not discussed in this Section.

   2. Security provisions, if any, in and around the project area.

   3. Outline of work procedures to be employed.

   4. Location of the waste storage area.

   5. Staging of the work, the sequence.

   6. Entrances and exits to the work place.

   7. Location and construction of worker decontamination units.

D. Competent Person: Qualification of the Contractor's Competent Person.

E. Notices: The Contractor shall obtain a Generator's EPA Identification number (if necessary) for the lead containing waste material generated from the project that is determined to be hazardous.

F. Insurance: Proof of insurance for Workman's Compensation and General Liability which covers asbestos, lead, and pollution.

G. Manufacturer's Data: Copies of manufacturer's specifications, installation instructions and field test procedures for each material and all equipment related to lead handling and abatement and include other data as may be required to show compliance with these specifications and proposed uses.

H. Documentation for Instructions:
   1. Submit documentation satisfactory to the Engineer that the Contractor's employees, including foremen, supervisors, and any other company personnel or agents who will be exposed to airborne lead dust or who shall be responsible for any aspects of the lead removal work activities, have received training in accordance with this specification, 29 CFR 1926.62, (OSHA Lead Awareness or the EPA Model Accreditation for Lead Based Paint Removal Work Training) and any current EPA regulatory requirements.

   2. Submit to the Engineer a written respiratory protection program meeting the requirements of 29 CFR 1910.134(b)(d)(e) and (f), documentation that all employees using respirators have received training, and documentation of respirator fit-testing for all Contractor employees and agents who will enter

the work area wearing negative pressure respirators. The Contractor shall be solely responsible for his employee's personal protection.

I. Documentation from Physician: Before exposure to lead dust or fumes, the Contractor shall provide workers with a comprehensive medical examination as required by 29 CFR 1926.62, or whichever is stricter. This examination will not be required if adequate records show the employees have been examined as required by the aforementioned regulations within the last year.

J. Respirators: Submit document NIOSH approvals for all respiratory protective devices used on site. Include manufacturer certification of HEPA filtration capabilities for all cartridges and filters.

K. Emergency Planning Procedures:
   1. The Contractor shall submit an emergency evacuation plan for the Engineer's acceptance prior to the commencement of work. This plan shall include consideration of fire explosion, toxic atmospheres, electrical hazards, slips, trips and falls, confined spaces and heat related injury. In non-life threatening situations, the injured or incapacitated employee shall decontaminate following normal procedures, with assistance from co-workers if necessary, before exiting the work area to obtain proper medical treatment. In life threatening situations, worker decontamination shall take least priority after measures to stabilize the injured worker, remove the injured worker from the work area, and secure proper medical treatment.

   2. Emergency Response and Evacuation: The Contractor shall provide and document training in emergency response and evacuation procedures to all workers entering the work area.

L. Weekly Submittals During the Lead Disturbance Work: Copies of the following:
   1. Contractor's weekly job progress reports detailing lead disturbance, handling, transportation, and disposal activities. In the job progress reports, the Contractor shall include information on the review of progress concerning previously established milestones and schedules, major problems and action taken, injury reports, equipment breakdown, and bulk material and air sampling results.

   2. Work site entry logbooks with information on worker and visitor access.

   3. Daily logs documenting filter changes on respirators, HEPA vacuums, and other engineering controls.

   4. Waste disposal manifest forms for all lead containing waste material removed from the lead removal site and transported to the disposal site. The papers will include a chain-of-custody form with the names and addresses of the facility, the Contractor, the landfill operator, as well as the estimated quantity of lead containing waste material, and the number and type of containers used. The form shall be signed and dated by the Engineer, the Contractor, and the landfill operator as the material changes custody. If a separate hauler is employed, their name, address, telephone number, and signature also shall appear on the form.

M. Waste Disposal and Landfill Requirements: Contractor shall separate lead chips and debris from non-hazardous waste materials such as used plastics, disposable tools, etc. Contractor shall clean all bulk lead containing debris and waste from non-hazardous plastic, tools, suits, etc. prior to disposal.
   1. If Toxic Characteristic Leaching Procedure (TCLP) test results of the containers of waste material are below the EPA limit the lead containing waste materials shall be disposed of at a landfill approved for such purposes. The Contractor shall submit to the Engineer, documentation that the lead containing waste material removed from the work area has been accepted by the landfill Owner.

   2. If the TCLP test results are above the EPA limit or if materials are identified as hazardous waste, the lead containing waste materials shall be disposed of at an EPA approved facility capable of accepting such hazardous waste.

   3. The Contractor shall submit to the Engineer, documentation that disposal of the lead containing waste material at the selected landfill is approved by the State of Hawaii, or the EPA approved mainland facility for hazardous lead containing waste material.

1.09 SUBMITTAL AFTER WORK IS COMPLETED

A. Report: At the completion of the work, a final report shall be prepared by the Contractor for acceptance by the Engineer. The report shall be submitted and shall include the items listed below.
   1. The project name, Abatement Contractor, Abatement Contractor license number, EPA waste generator nimber, work duration, material removed, respiratory protection employed, waste manifest signed by the Contractor, waste transporter, and ladnfill operator, and total quantity of waste, TCLP lead reports, employee exposure air sample results, and results of the most current PAT round results for the laboratory conducting the employee exposure air sample analysis.

   2. Certification of the Abatement Contractor's employees.

   3. Visitor/Worker Entry Log: The daily log of all personnel including the Contractor's employees and agents who enter the work area while lead abatement operations are in progress, until final clearance is received from the Qualified Consultant. The log shall contain the listed information as a minimum and shall be certified by the Qualified Consultant.
      a. Date of visit/worker entry.

      b. Visitor/Worker's name, employer, business address and telephone number.

      c. Time of entry and exit from work area.

      d. Purpose of visit.
      e. Type of protective clothing and respirator worn.

      f. Certificate of release signed and filed with the Contractor.

   4. Clearance: Clearance certifications received from the Qualified Consultant.

5. Certification Statement: A statement signed by the Lead Abatement Contractor that all lead abatement and disposal was completed in compliance with this specification, Federal and State regulations, and the approved Work Plan.

PART 2 - PRODUCTS

2.01 TOOLS AND EQUIPMENT

A. General: Provide and fabricate suitable tools for the lead disturbance procedures.

B. Other tools and equipment as necessary.

2.02 PERSONNEL PROTECTION REQUIREMENTS

A. The Contractor acknowledges he alone is responsible for instruction and for enforcing personnel protection requirements and that these specifications provide only a minimum acceptable standard.

B. Provide workers with sufficient sets of disposable protective full body clothing consisting of material impenetrable by lead and of the proper size for each individual to accommodate movement without tearing. Such clothing shall consist of full body coveralls, footwear, gloves and headgear. Provide hard hats as required by applicable safety regulations. Disposable clothing shall not be allowed to accumulate and shall be disposed of as lead contaminated waste. Protective clothing shall be worn by all personnel within the work area from the start of the removal to final visual clearance.

C. Insulated non-skid rubber boots or accepted equivalent shall be required for all individuals entering the work area. Protective full body clothing without elastic at sleeves and legs shall require separate elastic or taped protection to seal the opening. Visitors shall be provided with full body protective clothing.

D. Additional safety equipment (e.g. hardhats meeting the requirements of ANSI Z-89.1, eye protection meeting the requirements of ANSI Z87.1, safety shoes meeting the requirements of ANSI F2413, disposable PVC gloves), as necessary, shall be provided to all workers and authorized visitors.

PART 3 - EXECUTION

3.01 POTENTIAL LEAD HAZARD

A. The disturbance or dislocation of lead paint may cause lead containing dust to be released into the atmosphere, thereby creating a potential health hazard to the workers and the general public. Apprise all workers, supervisory personnel, subcontractors, consultants, authorized visitors, occupants and neighbors who will be at or near the job site of the seriousness of the hazard and of proper work and protective procedures which must be followed.

B. Where in the performance of the work, workers, supervisory personnel, subcontractors, or consultants who may encounter, disturb, or otherwise function in the immediate vicinity of any identified lead containing materials, take appropriate continuous measures as necessary to protect all workers and the

general public from the potential hazard of exposure to respirable airborne lead dust. Such measures shall include the procedures and methods described in the regulations of applicable federal, state and local agencies.

3.02 WORK AREA PREPARATION

A. Protect surrounding area from possible contamination.

B. Treatment of Surfaces: During disturbance work, acceptable industry standard dust control methods shall be used to control dust (such as wetting items to be disturbed, by misting; provide dust screens; remove items in large, whole pieces; avoid crushing and pulverizing removal methods; encapsulate material prior to disturbance; use amended water; and containerize wet waste material). Prevent contamination spreading to the surrounding public and residential area.

C. Barriers: Standard barriers such as construction warning tape, fencing, etc. shall be used to prevent the general public access on to the work site. Seal any penetrations to the affected work area with 6 mil polyethylene plastic sheeting and duct tape.

D. NESHAP Compliance: Compliance with the requirements of EPA's NESHAP regulation is required for this project. Proper notification of the renovation of the building to the Department of Health shall be the Contractor's responsibility.

E. Ensure that all personnel working on site during the demolition work are properly trained and protected as required by law.

3.03 CLEANUP AND TESTING

A. Post-abatement visual clearance will be conducted by the Qualified Consultant along with the the Contractor’s Competent Person.

B. All non-hazardous waste shall be removed from the site by the completion of the project. The Contractor, in the presence of the Qualified Consultant, shall collect representative samples of the waste stream for TCLP lead analysis. All hazardous waste shall be removed from the site to an EPA approved disposal facility within 90 days of the removal work.

C. Clean Up and Testing: Wet clean and HEPA vacuum clean surfaces and surrounding ground within the lead control area daily. Do not allow lead debris to accumulate. Restrict the spread of dust and debris. Keep waste from being distributed over the general area. Do not dry sweep or use compressed air to clean the area. When the removal operation has been completed, the area will be cleaned of all visible lead debris contamination by vacuuming with a High Efficiency Particulate Absolute (HEPA) filtered vacuum cleaner followed by wet mopping where applicable. The Qualified Consultant will visually inspect the affected surfaces for residual lead debris and accumulated dust before the eventual removal of the lead controlled area. The Contractor shall reclean areas showing dust or residual lead debris or if he fails visual clearance. If recleaning is required, the process will be repeated until the visual clearance is given by the Qualified Consultant. Do not remove the lead control area or roped-off perimeter and warning signs prior to the receipt of the Qualified Consultant's lead clearance certification.

3.04 TRANSPORTATION AND DISPOSAL

A. Disposal of Hazardous Waste and Non-Hazardous Waste: Contractor shall separate potentially non-hazardous waste material (i.e. plastic sheeting, disposable protective suits, etc.) from hazardous waste material prior to testing. All other debris, scraps, waste materials, rubbish and trash contaminated with lead and contaminated dust from the immediate work area and place in UN approved (49 CFR 178) and appropriately labeled containers and store on site for TCLP lead testing. The Contractor shall be responsible for collecting and paying of all TCLP testing.
   1. Local waste landfill facilities do not accept any RCRA hazardous waste. All hazardous waste must be disposed of at an EPA approved mainland U.S. hazardous waste disposal facility. Hazardous waste must be disposed of within 90 days of the waste being created.

   2. Non-hazardous lead waste and debris may be disposed of at the local waste landfill facility that is State approved to accept such waste.
      a. Notify Non-hazardous Waste Landfill Operator. The Contractor shall advise the Non-hazardous Waste landfill operator, at least 24 hours prior to transportation, of the material to be delivered.

      b. Provide the Non-hazardous Waste Landfill Operator with applicable TCLP results which indicate that the waste material is non-hazardous.

B. Disposal of Non-Hazardous Construction Debris (TCLP for Lead Not Exceeding EPA Limits): Remove non-hazardous lead waste including, debris, scraps, waste materials, rubbish, and trash from the site and disposed of at a landfill approved for disposal.

C. The Contractor shall submit disposal manifest and receipts showing acceptance of all waste material by the approved waste disposal site to the Engineer. The shipping papers shall include a chain-of-custody form and include names and addresses of the Facility Owner, the Contractor, and the Landfill Operator and information on the type and number of waste containers.

3.05 CLEARANCE CRITERIA

A. Post-abatement visual clearance will be conducted by the Qualified Consultant. Any additional clearance inspection initiated by the Contractor or required due to failure of the first set of clearance inspection shall be at the Contractor's expense.

3.06 TESTING AND AIR MONITORING

A. The Qualified Consultant shall have the authority to instigate engineering controls during the project.

B. Testing, daily area (environmental) air monitoring and final clearance inspections shall be provided by the Qualified Consultant, for the purpose of:
   1. Verifying compliance with this Section and the applicable regulations listed in this Section.

   2. Ensuring that the documentation required by this Section and by law is collected and reported to the Engineer.

   3. Instigating engineering control during the project.

3.07 CONTRACTOR RESPONSIBILITIES

A. The Contractor shall be responsible for all TCLP lead testing and analysis.

B. The Contractor shall be responsible for his employees' personnel protection, personal air monitoring and necessary records as required by OSHA, Hawaii State Law and all other applicable laws and as required in these specifications. The Contractor shall provide all required documentation to the Engineer. Contractor shall collect daily personal air samples on at least 25 percent of the personnel performing removal work with the most exposure for the duration of the project.

3.08 MONITORING RESULTS

A. Airborne lead levels in areas adjacent to the work area or in any part of the work site impacted by the removal activities shall not exceed 30 micrograms per cubic meter of air.

B. If the ambient concentrations exceed 30 micrograms per cubic meter of air, the Contractor shall cease all work immediately in any work area causing or contributing to such a condition. The Contractor shall take remedial action (e.g. misting with more water, encapsulation, provide dust screens, etc.) to reduce concentrations to acceptable levels.

C. The Contractor is solely responsible for monitoring his personnel in compliance with all OSHA and HIOSH requirements.

END OF SECTION