Division of Boating and Ocean Recreation

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

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BOARD OF LAND AND NATURAL RESOURCES

Suzanne D. Case
Chairperson

# CONTRACT SPECIFICATIONS AND PLANS

Job No. KA18-02
Port Allen Small Boat Harbor
New Harbor Office
Eleele, Kauai, Hawaii

April 2019

State of Hawaii
DEPARTMENT OF LAND AND NATURAL RESOURCES
DIVISION OF BOATING AND OCEAN RECREATION
Honolulu, Hawaii

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# CONTRACT SPECIFICATIONS AND PLANS

Job No. KA18-02
Port Allen Small Boat Harbor
New Harbor Office
Eleele, Kauai, Hawaii

Approved: _____

EDWARD R. UNDERWOOD
Administrator
Division of Boating and Ocean Recreation

Approved: _____

FINN MCCALL, P.E.
Engineering Branch Head
Division of Boating and Ocean Recreation

April 2019

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DEPARTMENT OF LAND AND NATURAL RESOURCES INTERIM GENERAL CONDITIONS, DATED OCTOBER 1994. (Bound Separately)

# NOTICE TO BIDDERS

(Chapter 103D, HRS)

COMPETITIVE BIDS for **JOB NO. OA18-02 PORT ALLEN SMALL BOAT HARBOR NEW HARBOR OFFICE** shall be submitted to the Department of Land and Natural Resources, Division of Boating and Ocean Recreation, Engineering Branch on the specified date and time through the State of Hawaii e-Procurement System (HIePRO). HIePRO is accessible through the State Procurement Office website at www.hawaii.gov/spo.

The Department of Land and Natural Resources Interim General Conditions dated October 1994, as amended, and the General Conditions – AGS008 latest revision (General Conditions), shall be made a part of the specifications. Electronic copies of the General Conditions are available through the State Procurement Office website.

Plans and specifications may be obtained through the HIePRO system, listed under the Job No. and Project title above.

This project is located at Port Allen Small Boat Harbor, Eleele, Kauai, Hawaii. Tax Map Key (4) 2 - 1-003:10.

The work shall consist of construction of new 14'x44' (616 square foot) wooden office building with concrete footing, including all materials, tools, equipment, labor and other incidental work necessary, as required or called for in this Proposal, Specifications, Plans and Manufacturer's Typical Installation Instructions.

The estimated cost of construction is $245,000.00.

A pre-bid conference will not be held for this project. All interested parties are strongly encouraged to conduct a thorough site visit prior to bidding.

Due to the nature of work contemplated, bidders must possess a valid State Contractor's license, classification "B."

As a condition for award of the contract and final payment, the vendor shall provide proof of compliance with the requirements of HRS 103D-310(c). Proof of compliance/documentation is obtained through Hawaii Compliance Express (HCE) at https://vendors.ehawaii.gov/hce/splash/welcome.html. Vendors shall register in HCE, a program separate from HIePRO. The annual subscription fee to utilize the HCE service is currently $12.00 (subject to change). Allow two (2) weeks to obtain complete compliance status after initial registration. It is highly recommended that vendors subscribe to HCE prior to responding to a solicitation. The vendor is responsible for maintaining compliance. If the vendor does not maintain timely compliance in HCE, an offer otherwise deemed responsive and responsible may be awarded. See HIePRO FAQ on the State Procurement website for more information.

**Vendors are required to be compliant with all of the requirements of HRS 103D-310(c) at the specified response date and time (bid opening). The proof of compliance/documentation will be verified through the HCE. Failure to be fully compliant at the specified response date and time shall deem the vendor's bid to be non-responsive and the vendor's bid will be rejected.**

The Engineering Branch Head of the Department of Land and Natural Resources, Division of Boating and Ocean Recreation is responsible for administering and overseeing the Contract, including monitoring and assessing contractor performance.

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

This project is subject to Hawaii Products Preference and Recycled Products Preference. For bidding purposes only, bid prices may be adjusted in accordance with the applicable preferences.

Should there be any questions, please use the question and answer section of 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**:** Competitive proposals shall be submitted to the Department of Land and Natural Resources, Division of Boating and Ocean Recreation through the State of Hawaii e-Procurement System (HIePRO) on the specified date and time indicated on the solicitation. HIePRO is accessible through the State Procurement Office website at www.hawaii.gov/spo.

C. SPECIFICATIONS: 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. In case of any conflict between the General Conditions, Contract Specifications, and Plans included herein, the Plans shall govern over the Contract Specifications and General Conditions; the Contract Specifications shall govern over 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. RESPONSIBILITY OF BIDDERS TO STUDY SITE: At the time of bid opening, each bidder will be presumed to have conducted a detailed inspection of the project site, to have read and be familiar with the Plans, Specifications and other contract documents including all Addenda. The failure or omission of any bidder to thoroughly inspect the site or to receive or examine any form, instrument, or document shall in no way relieve him from any obligation regarding his bid.

F. INTERPRETATION OF CONTRACT DOCUMENTS AND ADDENDA: If any prospective bidder is in doubt as to the true meaning of any part of the contract documents, a request for information (RFI) shall be submitted to the DLNR Division of Boating and Ocean Recreation no later than 8 days prior to the time established for the opening of bids. All interpretation of the contract documents and applicable responses to RFI will be made only by addendum, which shall be issued via the HIePRO system. All prospective bidders are responsible to regularly check HIePRO for the issuance of any addenda related to the project.

G. 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).

H. 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 standard questionnaire. When required, the completed questionnaire shall be submitted to the Engineering Branch Head 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.

I. 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. **No bid security is required for bids less than $50,000.**

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. For construction contracts less than $250,000, the State reserves the right to contract the work under a purchase order.

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.

J. 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. This project will require a State Contractor's license, classification "B".

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

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

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. **Performance and payment bonds are not required for bids less than $50,000.**

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. **For contracts less than $50,000, the State reserves the right to contract the work under a purchase order.**

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 Contractor shall be responsible to ascertain and obtain any required permits associated with this project 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 LOCAL LABOR: The Contractor shall hire local labor whenever practicable.

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 by the Contractor at the end of the project in both hard copy and electronic copy in Adobe PDF format on CD ROM.

Z1. 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

Z2. 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.

AA. TOILET FACILITIES: The contractor shall be required to provide their own portable toilet facilities throughout the duration of the project. 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.

BB. 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.

**A project sign will not be required for this project.**

CC. FIELD OFFICE AREA FOR DEPARTMENT: **A field office for DLNR will not be required for this project.**

DD. 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.

EE. 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.

FF. 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.

GG. COMPLIANCE WITH §3-122-112 HAR:
As a condition for award of the contract the contactor shall be in compliance with the

following requirements:

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.

**COMPLIANCE, DOCUMENTATION AND HAWAII COMPLIANCE EXPRESS**

As a condition for award of the contract and as proof of compliance with the following requirements of 103D-310(c) HRS:

Vendors are required to be compliant with all appropriate state and federal statutes. Proof of compliance (compliance documentation) is required. See the HIePRO Buyer FAQ on the State Procurement website for more information.

Proof of compliance/documentation is obtained through Hawaii Compliance Express (HCE). Vendors shall register in Hawaii Compliance Express (HCE), a program separate from HIePRO. The annual subscription fee to utilize the HCE service is currently $12.00. Allow 2 weeks to obtain complete compliance status after initial registration. It is highly recommended that vendors subscribe to HCE prior to responding to a solicitation.

The vendor is responsible for maintaining compliance. If the vendor does not maintain timely compliance in HCE, an offer otherwise deemed responsive and responsible may not be awarded.

**Vendors are required to be compliant with all of the requirements of 103D-310(c) HRS at the specified response due date (bid opening). The proof of compliance/documentation will be verified through the Hawaii Compliance Express. Failure to be fully compliant at the specified response date shall deem the vendor's bid to be non-responsive and vendor's bid will be rejected.**

# 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.

**COMPLIANCE, DOCUMENTATION AND HAWAII COMPLIANCE EXPRESS**

Vendors are required to be compliant with all appropriate state and federal statutes. Proof of compliance (compliance documentation) is required. See the HIePRO Buyer FAQ on the State

Procurement website for more information.

Proof of compliance/documentation is obtained through Hawaii Compliance Express (HCE). Vendors shall register in Hawaii Compliance Express (HCE), a program separate from HIePRO. The annual subscription fee to utilize the HCE service is currently $12.00. Allow 2 weeks to obtain complete compliance status after initial registration. It is highly recommended that vendors subscribe to HCE prior to responding to a solicitation.

The vendor is responsible for maintaining compliance. If the vendor does not maintain timely compliance in HCE, an offer otherwise deemed responsive and responsible may not be awarded.

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 in writing to CHIEF ENGINEER, ENGINEERING DIVISION, P.O. BOX 373, HONOLULU, HAWAII, 96809 for interpretation and must be received by the Engineering Division no later than fourteen (14) calendar days prior to the date fixed for bid opening. 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 opening of bids. It shall be the prospective bidder's sole responsibility to verify and obtain any said addenda from the office of the Engineering Division. 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

**AMEND** Section 3.9, Notice to Proceed, by deleting "180 days" and replacing with "one (1) year" in the last paragraph.

## 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. Insurance Requirements

1. Obligation of Contractor

The Contractor shall not commence any work until it obtains, at its own expense, all required 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 law to issue such insurance in the State of Hawaii.

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.

Certificate(s) of Insurance acceptable to the Department shall be filed with the Engineer prior to commencement of the work. These certificates shall contain a provision that coverages afforded under the policies will not be canceled or changed until at least thirty 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.

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.

All insurance described herein shall 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.

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.

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 full worker's compensation insurance coverage 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 Insurance and Automobile Insurance. Contractor's commercial general liability insurance and automobile liability insurance shall both be obtained in a combined, single limit of not less than $1,000,000 per occurrence that 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 a single combined limit of not less than $1,000,000 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.

(c) 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 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 shall use the Hawaii Compliance Express as described on page SP-1 of this Special Provisions.

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Not Included

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Not Included

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Not Included

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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. Construction Lines, Levels and Grades: The Contractor shall verify all lines, levels and elevations indicated on the drawings before any clearing, excavation or construction begins. Any discrepancy shall be immediately brought to the attention of the Engineer, and any change shall be made in accordance with the Engineer's instruction. The Contractor shall not be entitled to extra payment for failing to report the discrepancies before proceeding with any work whether within the area affected or not.

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

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's occupied rooms and other occupied spaces for the user agency personnel and the public at all times.

F. Contractor Use of Premises

1. The Contractor shall review the applicable asbestos survey reports and insure that he fully understands their contents as to whether and where there may be asbestos containing materials (ACM) in the building(s) in which he will be working.

2. The Contractor shall inform its employees, subcontractors and all other persons engaged in the project of the presence (as applicable) of asbestos in the existing buildings at the job site in accordance with the requirements of Chapter 110, Article 12-110-2 (f) (1) (B) of the Occupational Safety and Health Standards, State of Hawaii.

3. In the event the Contractor, its subcontractor(s) and/or other persons engaged in the project must work in any building(s) on the site other than that one(s) designated in the project, the Contractor shall request copies of the asbestos survey report(s) for the building(s) from the Engineer and notify all persons as indicated in Item 2 above.

4. 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).

5. If lead testing was done and the data is appended to this Section, the Contractor shall review the data to insure understanding of lead containing paint identification and location, that the testing was for design purposes only, and that the results do not satisfy any of the requirements of the Chapter 12-148, HAR.

   a. Legend for Asbestos Survey Report

| | |
|---|---|
| ACM | Asbestos containing material |
| USA | Unified Sampling Area. A USA is an area containing suspect ACM which are consistent throughout the entire USA. Consistent means that the material does not look or feel different within the USA. |
| ACBM | Asbestos Containing Building Material. These materials have been proven to contain asbestos through analysis of bulk samples collected during the inspection. |

| | |
|---|---|
| Friable | ACBM Material that may be mechanically broken down by moderate hand pressure to create airborne fibers. These materials have been proven to contain asbestos through analysis of bulk samples. |
| Non-friable | ACBM Materials (other than friable) that have been proven to contain asbestos through analysis of bulk samples. |
| Friable Assumed | Materials that may be mechanically broken down by moderate hand pressure to create airborne fibers. These materials were assumed to contain asbestos and must be treated as such. No bulk samples were collected from these materials. |
| Non-Friable Assumed | Material (other than friable materials) that were assumed to contain asbestos and must be treated as such. No bulk samples were collected from these materials. |
| No Suspect Materials | This category includes those buildings where no suspect ACMs were found and no samples collected; and those buildings where suspect materials were identified and sampled but analysis proved they do not contain asbestos. This classification represents a building that does not contain ACMs covered under the Asbestos Hazard Emergency Response Act (AHERA) regulations. This does not always mean that the building is asbestos-free. |
| US Group | Contains 14 digits of the sample number specific to the Unified Sampling Area.<br>The USA is analogous to the Homogeneous Area state in the regulations.<br>Example: 11-0005-012-001-01<br>11 State Identification<br>0005 School District or Agency Identification<br>012 Campus or Facility Identification<br>001 Building Identification<br>01 USA Identification |

| | |
|---|---|
| SAM# | Contain the two-digit sample number specific to the individual sample vial. |
| CONT | (Consistent) This is a visual determination by the microscopist based on whether the members of the Unified Sampling Area are actually taken from a consistent source material. |
| ASS | States whether the sample is positive (Y) for asbestos content (greater than 1%) or negative (N) for asbestos content (less that or equal to 1%). Samples that contain greater than 1% asbestos will have the quantification in the appropriate column. |
| CHRY | Chrysotile asbestos. |
| AMOS | Amosite asbestos. |
| CROC | Crocidolite asbestos. |
| ANTH | Anthophyllite asbestos. |
| ACT/TREM | Actinolite/Tremolite. |
| % ASB | Total percentage of asbestos in the sample. |

**OTHER MATERIALS:**

| | |
|---|---|
| WOOL | Mineral wool, rock wool or fiber glass. |
| CELL | Cellulose (wood fiber, paper, or plant fiber). |
| MICA | Micaceous minerals (Vermiculite, Biotite, Muscovite and Chlorite). |
| PUMC | Pumice or perlite. |
| BIND | Binders, fillers and cements. |
| OTHER | Other Material. |

| | |
|---|---|
| TOT % | Total % of all constituents of the sample. |
| BS Code | Bulk Sample Code. This BS Code represents the type of material that was sampled. The Bulk Sample descriptions used are as follows: |

| BS Code | Description |
|---|---|
| 0 | Unknown |
| 1 | Accoustical Plaster |
| 2 | Accoust./Therm. Plaster |
| 3 | Hardwall/Ceil. Plaster |
| 4 | Vinyl Floor Tile |
| 5 | Pipe Covering |
| 6 | Corrugated Pipe Covering |
| 7 | Wrapped Paper Pipe Cover |
| 8 | Boiler/Tank Insulation |
| 9 | Breeching/Exhaust Packing |
| 10 | Woven Paper/Tape |
| 11 | Drop or Lay-in Panel |
| 12 | Accoustical Tile (1x1) |
| 13 | Fire or Stage Curtain |
| 14 | MJP on Non-Suspect Pipe |
| 15 | MJP on Pipe Covering |
| 16 | MJP on Corr. Pipe Cover |
| 17 | MJP on Wrapped Pipe Cover |
| 18 | Fireproofing |
| 19 | Vibration Joint Cloth |
| 20 | Interior Duct Insulation |
| 21 | Exterior Duct Insulation |
| 22 | Blown-in Insulation |
| 23 | Stored Insulation |
| 24 | Debris |
| 25 | Gasket |
| 26 | Transite Pipe |
| 27 | Transite Hood |
| 28 | Asbestos Pad |
| 29 | Asbestos Glove |
| 30 | Asbestos Rope |
| 31 | Rab Asbestos |
| 32 | Electrical Wiring |
| 33 | Fire Hose |
| 34 | Fire Door |
| 35 | Fire Suit |
| 36 | Fire Brick |
| 37 | Lab Counter Top |
| 38 | Fiber Pack Kiln |
| 39 | Tongs |
| 40 | Poured in Insulation |
| 41 | Contaminated Soil |
| 42 | Tectum |
| 43 | Floor Underlayment |

| | |
|---|---|
| 44 | Hard Grout |
| 45 | Mortar |
| 46 | Brown/Scratch Coat |
| 47 | Oven/Autoclave Lining |
| 48 | Brake Lining |
| 49 | Theater Curtain |
| 50 | Transite Siding |
| 51 | Linoleum |
| 52 | Wallboard |
| 60 | Chalkboard |
| 99 | Other |

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. In addition, the following requirements of the State Department of Health (DOH) must be strictly adhered to in the Forest Reserve area:

1. Portable covered receptacles for fecal matter and urine, of the design and number specified by the DOH, shall be provided.

2. No employee will be allowed to deposit fecal matter or urine in any place except in these receptacles. Any infringement of this requirement shall result in immediate transfer or discharge of the offender or other disciplinary measures satisfactory to the Engineer.

3. All deposits in these receptacles shall be immediately covered with a chemical solution prescribed by the DOH. These receptacles, with their contents, shall be collected and removed for disposal at the close of each working day. The method of disposal must be satisfactory to the DOH to prevent contamination of any water supply, stream or other bodies of water.

4. The receptacles shall be thoroughly cleaned with water and the required chemical solution and then returned to the required places for service.

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 together with the marked-up field office plans to the Engineer.

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

| Abbreviation | Company |
|---|---|
| AITC | American Institute of Timber Construction<br>333 West Hampden Avenue<br>Englewood, CO 80110 |
| AMCA | Air Moving and Conditioning Association, Inc.<br>30 West University Drive<br>Arlington Heights, IL 60004 |
| ANSI | American National Standards Institute, Inc.<br>1430 Broadway<br>New York, NY 10018 |
| APA | American Plywood Association<br>1119 A Street<br>Tacoma, WA 98401 |
| API | American Petroleum Institute<br>1801 K Street N.W.<br>Washington, DC 20006 |
| ARI | Air-Conditioning and Refrigeration Institute<br>1814 North Fort Myer Drive<br>Arlington, VA 22209 |
| ASCE | American Society of Civil Engineers<br>345 East 47th Street<br>New York, NY 10017 |
| ASCII | American Standard Code for Information Interchange<br>United States of America Standards Institute<br>1430 Broadway<br>New York, NY 10018 |
| ASE Code | American Standard Safety Code for Elevators, Dumbwaiter and Escalators<br>American National Standards Institute<br>1430 Broadway<br>New York, NY 10018 |
| ASHRAE | American Society of Heating, Refrigeration and Air Conditioning Engineers<br>United Engineering Center<br>345 East 47th Street<br>New York, NY 10017 |

| Abbreviation | Company |
|---|---|
| ASME | American Society of Mechanical Engineers<br>345 East 47th Street<br>New York, NY 10017 |
| ASTM | American Society for Testing and Materials<br>1916 Race Street<br>Philadelphia, PA 19103 |
| AWPA | American Wood Preservers Association<br>1625 Eye Street<br>Washington, DC 20006 |
| AWS | American Welding Society<br>2501 N.W. 7th Street<br>Miami, FL 33125 |
| AWWA | American Water Works Association<br>6666 West Quincy Avenue<br>Denver, CO 80235 |
| CBM | Certified Ballast Manufacturers<br>2120 Keith Building<br>Cleveland, OH 44115 |
| CMAA | Crane Manufacturers Association of America, Inc.<br>(Formerly called: Overhead Electrical Crane Institute - OECI)<br>1326 Freeport Road<br>Pittsburgh, PA 15238 |
| CRSI | Concrete Reinforcing Steel Institute<br>180 North La Salle Street<br>Chicago, IL 60601 |
| CSA | Canadian Standards Association<br>178 Rexdale Boulevard<br>Rexdale, Ontario, M9W IR3, Canada |
| DEMA | Diesel Engine Manufacturer's Association<br>122 East 42nd Street<br>New York, NY 10017 |

| Abbreviation | Company |
|---|---|
| DIS | Division of Industrial Safety<br>California Department of Industrial Relations<br>2422 Arden Way<br>Sacramento, CA 95825 |
| EEI | Edison Electric Institute<br>90 Park Avenue<br>New York, NY 10016 |
| EIA | Electronic Industries Association<br>2001 Eye Street N.W.<br>Washington, DC 20006 |
| EJMA | Expansion Joint Manufacturer's Association<br>331 Madison Avenue<br>New York, NY 10017 |
| ESO | Electrical Safety Orders,<br>California Administrative Code, Title 8, Chap. 4, Subarticle 5<br>Office of Procurement, Publications Section<br>P.O. Box 20191<br>8141 Elder Creek Road<br>Sacramento, CA 95820 |
| FEDSPEC | Federal Specifications<br>General Services Administration<br>Specification and Consumer Information<br>Distribution Branch<br>Washington Navy Yard, Bldg. 197<br>Washington, DC 20407 |
| FEDSTDS | Federal Standards<br>(see FEDSPECS) |
| FM | Factory Mutual Research<br>1151 Boston-Providence Turnpike<br>Norwood, MA 02062 |
| HEI | Heat Exchange Institute<br>122 East 42nd Street<br>New York, NY 10017 |

| Abbreviation | Company |
|---|---|
| HI | Hydraulic Institute<br>1230 Keith Building<br>Cleveland, OH 44115 |
| IAPMO | International Association of Plumbing and Mechanical Officials<br>5032 Alhambra Avenue<br>Los Angeles, CA 90032 |
| ICBO | International Conference of Building Officials<br>5360 South Workman Mill Road<br>Whittier, CA 90601 |
| ICEA | Insulated Cable Engineers Association<br>P.O. Box P<br>South Yarmouth, MA 02664 |
| IEEE | Institute of Electrical and Electronics Engineers, Inc.<br>345 East 47th Street<br>New York, NY 10017 |
| IES | Illuminating Engineering Society<br>C/O United Engineering Center<br>345 East 47th Street<br>New York, NY 10017 |
| ISA | Instrument Society of America<br>400 Stanwix Street<br>Pittsburgh, PA 15222 |
| JIC | Joint Industrial Council<br>7901 Westpark Drive<br>McLean, VA 22101 |
| MILSPEC | Military Specifications<br>Naval Publications and Forms Center<br>5801 Tabor Avenue<br>Philadelphia, PA 19120 |
| MSS | Manufacturers Standardization Society of the Valve and Fittings Industry, Inc.<br>127 Park Street, N.E.<br>Vienna, VA 22180 |

| Abbreviation | Company |
|---|---|
| NAAMM | National Association of Architectural Metal Manufacturers<br>100 South Marion Street<br>Oak Park, IL 60302 |
| NACE | National Association of Corrosion Engineers<br>P.O. Box 986<br>Katy, TX 77450 |
| NEC | National Electric Code<br>National Fire Protection Association<br>470 Atlantic Avenue<br>Boston, MA 02210 |
| NEMA | National Electrical Manufacturer's Association<br>155 East 44th Street<br>New York, NY 10017 |
| NESC | National Electric Safety Code<br>American National Standards Institute<br>1430 Broadway<br>New York, NY 10018 |
| NFPA | National Forest Products Association<br>(Formerly called: National Lumber Manufacturer's Association)<br>1619 Massachusetts Avenue, N.W.<br>Washington, DC 20036 |
| OSHA | Occupational Safety and Health Act<br>U.S. Department of Labor<br>San Francisco Regional Office<br>450 Golden Gate Avenue, Box 36017<br>San Francisco, CA 94102 |
| PPIC | The Plumbing & Piping Industry Council, Inc.<br>Suite 402<br>510 Shatto Place<br>Los Angeles, CA 90020 |
| SAE | Society of Automotive Engineers<br>2 Pennsylvania Street<br>New York, NY 10001 |

| Abbreviation | Company |
|---|---|
| SAMA | Scientific Apparatus Makers Association<br>One Thomas Circle<br>Washington, DC 20005 |
| SBCC | Southern Building Code Congress<br>1116 Brown-Marx Building<br>Birmingham, AL 35203 |
| SMACNA | Sheet Metal and Air Conditioning Contractors National Association, Inc.<br>8224 Old Courthouse Road<br>Tysons Corner Vienna, VA 22180 |
| SSPWC | Standard Specifications for Public Works Construction<br>Building News, Inc.<br>3055 Overland Avenue<br>Los Angeles, CA 90034 |
| TEMA | Tubular Exchanger Manufacturer's Association<br>331 Madison Avenue<br>New York, NY 10017 |
| UBC | Uniform Building Code<br>Published by ICBO |
| UL | Underwriters Laboratories Inc.<br>207 East Ohio Street<br>Chicago, IL 60611 |
| UMC | Uniform Mechanical Code<br>Published by ICBO |
| UPC | Uniform Plumbing Code<br>Published by IAPMO |
| USBR | Bureau of Reclamation<br>U.S. Department of Interior<br>Engineering and Research Center<br>Denver Federal Center, Building 67<br>Denver, CO 80225 |
| WWPA | Western Wood Products Association<br>(Formerly called: West Coast Lumberman's Association - WCLA)<br>Yeon Building<br>Portland, CA 97204 |

PART 2 - PRODUCTS (NOT USED)

PART 3 - EXECUTION (NOT USED)

- END OF SECTION -

SECTION 01101

# ARCHAEOLOGICAL PROTECTION AND MONITORING

## PART 1 - GENERAL

### 1.1 GENERAL REQUIREMENTS

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

## PART 2 - PRODUCTS (NOT USED)

## PART 3 - EXECUTION

3.1 In the event that any previously unknown archaeological properties (such as artifacts; subsurface deposits of bone, shell or charcoal; or rock or coral alignments, paving, or walls) or human remains are encountered, the Contractor shall suspend all work in the immediate area of the discovery and notify the Engineer and the State Department of Land and Natural Resources, Historic Preservation Division (SHPD), Honolulu office (808-692-8015) as soon as possible. If human remains are discovered, the Police Department shall be notified in addition to the Engineer and SHPD. No work in the immediate area of the find shall proceed until SHPD has been able to assess the discovery, has made all applicable determinations regarding treatment of the discovery as required under chapters 13-275 and 13-300, HAR, and concurs that work can continue. Subsequently, if the State requires it, the Contractor shall engage the services of a professional archaeologist to assist the State in meeting its historic preservation requirements and in coordinating with SHPD.

### 3.2 ARCHAEOLOGICAL MONITORING PLAN

A. An approved Archaeological Monitoring Plan shall be used to determine which construction activities, methods, and excavation techniques will be monitored by a qualified archaeologist and which project area locations require such monitoring. This plan will also determine where and when on-call monitoring will occur. Requirements are based on the suspected probability of unknown archaeological properties in the project area or the need to protect identified historic properties immediately adjacent to the project from inadvertent damage during construction. A copy of the Archaeological Monitoring Plan titled, "**Archaeological Monitoring Plan for the Kawaihae Small Boat Harbor (SBH) Water Line and Access Road Improvements, Kawaihae 1 and 2 Ahupua'a, South Kohala District, Hawai'i Island, TMKs: [3] 6-1-003:025 (por.) and 026 (por.)**" is attached.

B. The following archaeological procedures shall be undertaken as a minimum:

1. For the Kawaihae SBH Waterline and Road Improvement project, a qualified archaeologist shall be present for on-site monitoring, at the minimum:

   a. During initial clearing and grubbing and any exploratory work in project area locations specified in the monitoring plan as needing monitoring.

   b. During excavation of the waterline trench or associated system components and installation of the new waterline in those project area locations specified in the monitoring plan as needing monitoring.

2. A qualified archaeologist shall be available for on-call monitoring when construction activities are occurring in those project area locations specified in the monitoring plan as needing on-call monitoring.

3. The Contractor shall provide a tentative work schedule to the Engineer no less

than 30 days prior to the start of construction.

## 3.3 SUBMITTALS

A draft Archaeological Monitoring Report shall be submitted within 90 days of completion of monitoring fieldwork to the State Historic Preservation Division (SHPD) for review and approval. A final report shall be submitted within 30 days of any review comments being received.

## 3.4 QUALIFICATIONS

A. An archaeologist is required for this project. The archaeologist conducting or directing archaeological monitoring required for this project shall meet the professional qualifications set forth in HAR section 13-282-3 and shall hold a current annual permit to conduct archaeological work in Hawaii in accordance with HAR chapter 13-282. The required professional qualifications for the project principal investigator are as follows:

1. A graduate degree from an accredited institution in archaeology, or anthropology, with a specialization in archaeology, or an equivalent field;

2. At least one year of cumulative archaeological experience in Hawaii or the Pacific;

3. At least four months of supervised archaeological field and analytic experience in Hawaii;

4. At least one year of archaeological research, administration, or management at a supervisory level with at least four months of field experience;

5. A demonstrated ability to carry research to completion, as shown by completed theses, publications, and manuscripts; and

6. A demonstrated knowledge of historic preservation laws, rules, and guidelines.

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 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 02050

DEMOLITION

PART 1 - GENERAL

1.1 GENERAL REQUIREMENTS: The work includes demolition and removal as indicated in the plans or specified herein. All materials resulting from demolition work, except as indicated or specified otherwise, shall become the property of the Contractor and shall be removed from the limits of Government property. Remove rubbish and debris from the job site daily, unless otherwise directed. Store materials which cannot be removed daily in areas specified by the Engineer. The Contractor shall pay for all necessary permits and certificates that may be required in connection with this work.

1.2 SUBMITTALS: Submit proposed demolition and removal procedures to the Engineer for approval before work is started. Procedures shall provide for coordination with other work in progress and a detailed description of methods and equipment to be used for each operation, and sequence of operations.

1.3 DUST CONTROL: Take appropriate action to check the spread of dust to the surrounding area and to avoid the creation of a nuisance in the surrounding area. Do not use water if it results in hazardous or objectionable conditions, such as flooding or pollution. Comply with all dust regulations imposed by local air pollution agencies.

1.4 PROTECTION

A. Existing Improvements: Protect existing improvements that are to remain in place, that are to be reused, or that is to remain the property of the Engineer by temporary covers, shoring, bracing, and supports. Repair items damaged during performance of the work or replace with new to the satisfaction of the Engineer. Do not overload structural elements. Provide new supports or reinforcement for existing construction weakened by demolition, removal, and relocation work. Construction equipment and vehicles shall neither be permitted on, nor shall be stored on the existing work that is to remain in place.

B. Trees: Protect trees within the project site which might be damaged during the demolition work.

C. Public Safety: Where pedestrian and driver safety is endangered in the work or storage areas, use traffic barricades with flashing lights. Notify the Engineer prior to beginning any such work. The Contractor shall conduct operations with minimum interference to streets, driveways, sidewalks, and passageways, etc..

D. Explosives: Use of explosives will not be permitted.

PART 2 - PRODUCTS (NOT USED)

PART 3 - EXECUTION

3.1 EXISTING FACILITIES

A. Demolish and remove portions of existing building that is above grade and of non-concrete material as indicated on the plans. All glass shall be removed prior to demolition of the building.

B. The existing slab-on-grade and below grade utilities shall be secured (capped) and remain in place. Seal and cap utility lines where necessary as required by regulations of the authority having jurisdiction.

C. The existence of active utility lines transversing the construction area other than those indicated is not definitely known. Should any be encountered, the Contractor shall not disconnect same without authorization of the Engineer, but shall inform the latter immediately of each discovery, and shall follow his instructions.

3.2 SAFETY

A. Work shall be done in accordance with safety provisions of the Manual of Accident Prevention in Construction, published by the Associated General Contractors of America.

3.3 DISPOSITION OF MATERIALS

A. Title to Materials: Title to all materials and equipment to be removed, except as specified otherwise, is vested in the Contractor upon receipt of notice to proceed. The Engineer will not be responsible for the condition or loss of, or damage to, such property after notice to proceed. Materials and equipment shall not be viewed by prospective purchasers or sold on the site. Burning or burying of materials on the site will not be permitted.

B. When removing the materials from the property, truck loads shall be trimmed and loaded as to prevent spillage.

3.4 CLEANUP

A. Debris and Rubbish: Remove and transport debris and rubbish in a manner that will prevent spillage into ocean or adjacent areas. Cleanup spillage from ocean and adjacent areas. The Contractor shall leave the premises clean, neat, and orderly.

B. Regulations: Comply with Federal, State, and Local hauling and disposal regulations.

END OF SECTION

SECTION 02100

SITE PREPARATION

PART 1 - GENERAL

1.1 GENERAL REQUIREMENTS

The work to be performed under this section shall include clearing the premises of all obstacles and obstructions, the removal of which will be necessary for the proper reception, construction, execution and completion of the other work included in this contract.

1.2 COORDINATION WITH OTHER SECTIONS

A. Earthwork is specified in Section 02200 - EARTHWORK.

PART 2 - PRODUCTS (NOT USED)

PART 3 - EXECUTION

3.1 GENERAL

A. Maintenance of Traffic: The Contractor shall conduct operations with minimum interference to streets, driveways, sidewalks, passageways, etc.

When necessary, the Contractor shall provide and erect barriers, etc., with special attention to protection of personnel.

B. Protection: Throughout the progress of the work protection shall be provided for all property and equipment, and temporary barricades shall be provided as necessary. Work shall be done in accordance with the safety provisions of the Manual of Accident Prevention in Construction, published by the Associated General Contractors of America, and the State of Hawaii's Occupational Safety and Health Standards, Rules and Regulations.

C. Fires: No burning of fires of any kind will be allowed.

D. Reference Points: Bench marks, etc., shall be carefully maintained, but if disturbed or destroyed, shall be replaced as directed, at the Contractor's expense.

E. Disposal: All materials resultant from operations under this Section shall become the property of the Contractor and shall be removed from the site. Loads of materials shall be trimmed to prevent droppings.

## 3.2 EXISTING UTILITY LINES

A. The existence of active underground utility lines within the construction area is not definitely known other than those indicated in their approximate locations on the Drawings. Should any unknown line be encountered during excavation, the Contractor shall immediately notify the Engineer of such discovery. The Engineer shall then investigate and issue instructions for the preservation or disposition of the unknown line. Authorization for extra work shall be issued by the Engineer only as he deems necessary.

## 3.3 CLEARING AND GRUBBING

A. The Contractor shall clear the premises of all obstacles and obstructions, the removal of which will be necessary for the proper reception, construction, execution and completion of other work included in this contract.

B. After clearing has been completed, the entire site shall be stripped of the organically contaminated near-surface soils to a minimum depth of 6 inches. Remove trees and roots to a minimum of 3 feet below existing ground level. Remove all large roots in excess of 2 inches in diameter, and backfill and compact the resulting depression. All debris accumulated from this operation shall be completely removed from the premises by the Contractor.

C. The Contractor shall protect from injury and damage all surrounding trees, plants, etc., and shall leave all in as good as condition as at present. Any damage to existing improvement shall be repaired or replaced by the Contractor to the satisfaction of the Engineer.

## 3.4 CLEAN UP OF PREMISES

A. Clean up and remove all debris accumulated from building operations from time-to-time as directed. Upon completion of the construction work and before final acceptance of the contract work, remove all surplus materials, equipment, scaffoldings, etc., and leave entire job site raked clean and neat to the satisfaction of the Engineer.

END OF SECTION

SECTION 02200

EARTHWORK

PART 1 - GENERAL

1.1 GENERAL REQUIREMENTS

This section covers the requirements for earthwork. Earthwork shall include, but not be limited to, clearing, preparing, grading, excavating, filling, backfilling, and compaction of soils and fill material as necessary to accomplish finished construction as indicated on the drawings.

A. It shall be the responsibility of the Contractor to examine the project site and determine the existing conditions.

B. Obvious conditions of the site existing on the date of the bid opening shall 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.

C. All debris of any kind accumulated from clearing shall be disposed of from the site, and the whole area left clean. The Contractor shall be required to make all necessary arrangements relative to the proposed place of disposal.

1.2 REMOVAL AND REPAIR WORK

A. General

The Contractor shall exercise every precaution to preserve and protect all structures, walkways or utility improvements which are to remain or be relocated. Portions of walkway and pavement which are to remain shall be saw cut neat and true to line. Restore all pavement and curbs upon completion of the work.

1.3 SEQUENCE OF WORK

All sequence of work shall be subject to the approval of the Engineer.

1.4 PROTECTION

A. Barricade: Erect temporary barricades to prevent people and vehicles from entering into project area. Such barricade shall be as defined in Section 01530 - BARRICADES. The extent of barricades may be adjusted as necessary with the approval of the Engineer. This work shall be accomplished at no extra cost to the State of Hawaii.

B. Take all precautions and safety measures as required to protect the State of Hawaii free

and harmless from liability of any kind. Conduct operations with minimum interference to streets, driveways, sidewalks passages, etc.

C. Adequate precautions shall be taken before commencing and during the course of the work to ensure the protection of life, limb, and property.

D. The Contractor shall protect from damage all surrounding structures, trees, plants, grass, walks, pavements, etc. Any damage will be repaired or replaced by the Contractor to the satisfaction of the Engineer.

1.5 PERMITS

The Contractor shall obtain and pay for all necessary permits prior to the commencement of work.

1.6 MAINTAINING TRAFFIC

A. The Contractor shall conduct operations with minimum interference to streets, driveways, sidewalks, traffic activities, etc.

B. When necessary, the Contractor shall provide, erect and maintain lights, barriers, etc., as required by traffic and safety regulations with special attention to protection of life.

1.7 CONSTRUCTION LINES, LEVELS AND GRADES

A. The Contractor shall verify all lines, levels and elevations indicated on the drawings before any clearing, excavation or construction begins. Any discrepancy shall be immediately brought to the attention of the Engineer and any changes shall be made in accordance with his instructions. The Contractor shall not be entitled to extra payment if he fails to report the discrepancies before proceeding with any work whether within the area affected or not.

B. The laying out of base lines, establishment of grades and staking out the entire work shall be done by a licensed Surveyor or a licensed Civil Engineer, registered in the State of Hawaii. He shall be solely responsible for their accuracy. Erect and maintain substantial batter boards showing construction lines and levels.

1.8 CLEANUP

Clean up and remove all debris accumulated from construction operations from time to time, when as directed by the Engineer. Upon completion of the construction work and before final acceptance of work, remove all surplus materials, equipment, etc. and leave entire jobsite clean and neat.

PART 2 - PRODUCTS

2.1 MATERIALS

A. Yard Fill: Fill materials shall be soil with expansion value not greater than 3%, free from debris, perishable or combustible materials, sod and stones larger than 6" in maximum dimension. Rock or broken masonry shall be well distributed in earth or other fine material with voids filled and shall be placed within three feet of finished grades.

B. Structural Fill: New structural fill below interior and exterior concrete slabs or paving, shall be well graded, non-expansive granular structural fill material. All soil passing the No. 40 sieve shall have a plasticity index not exceeding 10. The maximum particle size shall not exceed 3 inches with 8 to 20 percent of the soil by weight passing the No. 200 sieve. Imported structural fill shall have a CBR value no greater than 1.0% and a minimum CBR value of 15 when tested in accordance with ASTM D 1883. Certificate of compliance shall be submitted to the Engineer for approval prior to filling.

C. Topsoil: Imported, fertile, friable soil of loamy character having normal amounts of natural humus, free from subsoil, clay, refuse roots, weeds, noxious seeds, nematodes or other deleterious matter, and free from toxic amounts of either acid or alkaline elements and capable of sustaining healthy plant life. Stones and earth lumps shall not be greater than one inch in largest dimension. Red humic latosol soils, or types known as "Palolo clay" or Lualualei clay" are unacceptable. Topsoil is subject to approval by Engineer.

PART 3 - EXECUTION

3.1 EXCAVATION

A. Protective Measures

1. All excavation shall be protected and guarded against danger to life, limb and property.

2. Shoring, cribbing and logging, as required to safely preserve the excavations and earth banks, free from damages resulting from the work shall be provided and installed by the Contractor.

3. All excavations shall be kept free from standing water. The Contractor shall do all pumping and draining that may be necessary to remove water to the extent required in carrying on the work. Grading shall be controlled so that the ground surface is properly sloped to prevent water run-off into structural foundations and open trenching excavations.

4. The underground utilities lines traversing the construction area known to exist by the designer are indicated on the plans. Should any be encountered during

excavation, the Contractor shall not disconnect same without authorization from the Engineer but shall inform the latter immediately of each discovery. The Engineer shall investigate and issue proper authorization for procedure.

B. General

1. Excavation shall be done to the lines and grades indicated. Concrete slabs, concrete curbs, asphaltic concrete pavement, etc., not indicated to remain shall be removed or broken up into pieces of sizes permitted in other paragraphs of this section. When incorporated in fill, broken up pieces shall be well mixed with finer materials filling all spaces between the pieces.

2. Excavation for footings, foundation, etc., shall have level beds on unfilled, undisturbed, firm bearing, with stepped level where necessary. Small soft spots shall be compacted to unyielding firmness.

   If soil conditions are suitable and approved, footing cuts may be made to exact size of footing.

3. Structural excavations carried below specified level shall be filled with concrete to the proper level at the expense of the Contractor.

4. Excavated materials declared unusable by Engineer shall be removed from the site at the Contractor's expense.

3.2 BACKFILL

A. Yard Area

1. Yard fill where no concrete slab occurs shall be in 6" layers (compacted thickness) compacted to 90% of maximum density as determined by ASTM Test, Method D-1557.

2. The areas not covered by asphalt paving or concrete slab shall be graded to conform to finish contours, with allowance for depth of topsoil. Rough grading shall prevent the drainage of water into construction areas.

B. Structural Fill

1. In advance of preparing the subgrade or depositing a specified layer of material, existing material within the area where such materials is to be placed, which in the opinion of the Engineer is unsuitable as a subgrade foundation, shall be removed and the resulting space refilled with approved material and compacted.

2. Backfilling shall progress so that excessive unbalanced load is not introduced against any structure.

3. New structural fill material shall be placed in layers not to exceed 6" per compacted layer and compacted to a compaction of 90% as determined by ASTM Test, Method D-1557.

4. Materials and compaction of all yard and structural fill shall be tested by an independent testing agency approved by the Engineer and all after-compaction test results submitted to the Engineer for approval. All cost of testing shall be borne by the Contractor. Testing shall be made throughout the area for each 8" compacted layer as directed by the Engineer. All test results must be approved before proceeding with placing of topsoil, cushion fill or base course.

5. The ground around the excavated area shown on the plans shall be scarified 6" below existing grade and recompacted to 90% compaction.

6. Under interior and exterior slabs the cushion fill as specified shall be compacted to a level surface to 95% compaction as determined by modified ASTM Test Method, D-1557.

C. Grading

1. Rough Grading: The areas not covered by asphalt paving or concrete slab up to the contract zone limit shall be graded to topsoil. Contractor shall take the necessary precautions to prevent the drainage of water into construction area.

2. Finish Grading: Outdoor areas not covered by buildings shall be graded to finish grade and contours shown on the plans. Grading shall conform with the ordinances of the applicable County issuing the Grading Permit and as amended. Areas to be topsoiled shall be compacted to 85% of maximum density before placing topsoil. Topsoil shall be spread evenly, compacted lightly and raked to a uniform place at required contours and grades.

END OF SECTION

SECTION 02225

TRENCHING, BACKFILLING, AND COMPACTING

## PART 1 - GENERAL

### 1.1 GENERAL REQUIREMENTS

This section covers the requirements for trenching, backfilling, and compacting.

A. Work included: Trench, backfill, and compact as specified herein and as needed for installation of underground utilities associated with the Work.

B. Related Work:

1. Documents affecting work of this Section include, but are not necessarily limited to, General Conditions, Supplementary Conditions, and Sections in Division 1 of these Specifications.

### 1.2 QUALITY ASSURANCE

A. Use adequate numbers of skilled workers who are thoroughly trained and experienced in the necessary crafts and who are completely familiar with the specified requirements and the methods needed for proper performance of the work of this Section.

B. Use equipment adequate in size, capacity, and numbers to accomplish the work in a timely manner.

C. In addition to complying with requirements of governmental agencies having jurisdiction, comply with the directions of the Engineer.

D. Compaction requirements are defined by American Society for Testing and Materials (ASTM) publication D-1557 "Moisture-Density Relations of Soils and Soil-Aggregate Mixtures using 10-lb Rammer and 18-inch Drop."

### 1.3 SUBMITTALS

A. Shoring and sheeting plan: Describe materials of shoring system to be used. Indicate whether or not components will remain after filling or backfilling. Provide plans, sketches, or details along with calculations by a professional engineer registered in Hawaii. Indicate sequence and method of installation and removal.

B. Dewatering plan: Describe methods for removing collected water from open trenches and diverting surface water or piped flow away from work area. Describe equipment and procedures for installing and operating the dewatering system indicate.

1.4 PERMITS

A. Obtain necessary permits required from applicable agencies. All permit fees will be considered incidental to the work and a separate payment shall not be made.

PART 2 - PRODUCTS

2.1 BACKFILL MATERIALS

A. Select Material: Backfill from the bottom of the trench to one foot above the top of the pipe shall be select material. Sand, graded crushed rock (commonly known as "rock sand") or excavated granular or sandy material shall be used for select material provided that all rocks or lumps of material over one inch in its longest dimension have been removed. Select material shall be free from salt, ashes, refuse, organic material or other material which, in the opinion of the Engineer, is unsuitable.

All material to be used as select material backfill shall be approved by the Engineer. If in the opinion of the Engineer the excavated material does not meet the grading requirements of select material, the Contractor shall be required to screen the material prior to its use as select material backfill.

B. Ordinary Material: Material used in the upper portion of the backfill from one foot above the top of the pipe to the surface of the ground or subgrade of the road shall not contain stone, rock or other material larger than six inches in its longest dimensions. No wood, vegetable matter or other material which, in the opinion of the Engineer, is unsuitable, shall be included in the backfill. No "adobe" or other materials determined to be deleterious by the Engineer shall be included in the backfill.

C. The Contractor shall obtain the approval of the Engineer of all backfill material.

2.2 OTHER MATERIALS

A. Provide other materials, not specifically described but required for a complete and proper installation, as selected by the Contractor subject to the approval of the Engineer.

PART 3 - EXECUTION

3.1 SURFACE CONDITIONS

A. Examine the areas and conditions under which work of this Section will be performed. Correct conditions detrimental to timely and proper completion of the Work. Do not proceed until unsatisfactory conditions are corrected.

3.2 FINISH ELEVATIONS AND LINES

A. All material excavated from trenches shall be considered unclassified, whether consisting of earth, lava, soft rock, decomposed rock, solid rock, boulders, or coral. The trench shall be so dug that the pipe can be properly installed to the alignment and grade specified. Excavation shall commence at the point directed by the Engineer and shall be carried on in an orderly manner. No trench shall be opened more than 500 feet in advance of the installed pipe without the approval of the Engineer. No jumps or spaces will be permitted unless approved by the Engineer. Before proceeding with any excavation under asphaltic concrete and concrete pavements, the Contractor shall cut the edges of the excavation with a power saw to insure a neat cut along the pavement.

B. Trench Widths:

1. The widths of trenches for all pipes and appurtenances shall be as shown on the Drawings.

2. Increases in widths over those shown due to sheeting, bracing, or other necessities of construction, may be made by the Contractor with the approval of the Engineer but no additional compensation will be allowed for such extra width.

3. Bell holes shall be provided at each joint to permit the jointing of pipes to be made properly.

C. Trench Depths:

1. In general, trench depths for all pipes and appurtenances shall be as shown on the Drawings.

2. Where necessary, the Engineer reserves the right to raise or lower the grades or to change alignments from those shown on the Drawings.

D. Excavation Below Grades:

1. Any part of the trench excavated below grade by the Contractor shall be corrected with select material, thoroughly compacted in place at no cost to the State.

3.3 PROCEDURES

A. Utilities:

1. All excavated areas shall be toned prior to excavation.

2. Unless shown to be removed, protect lines shown on the drawings or otherwise made known to the Contractor prior to trenching. If damaged, repair or replace at no additional cost to the State.

3. If active utility lines are encountered, and are not shown on the Drawings or otherwise made known to the Contractor, promptly take necessary steps to assure that service is not interrupted.

4. If service is interrupted as a result of work under this Section, immediately restore service by repairing the damaged utility at no additional cost to the State.

5. Expose existing utilities to confirm clearances as initial trenching work. If existing utilities are found to interfere with the permanent facilities being constructed under this Section, immediately notify the Engineer and secure his instructions.

6. Do not proceed with permanent relocation of utilities until written instructions are received from the Engineer.

B. Protection of persons and property:

1. Barricade open holes and depressions occurring as part of the Work, and post warning lights on property adjacent to or with public access.

2. Operate warning lights during hours from dusk to dawn each day and as otherwise required.

3. Protect structures, utilities, sidewalks, pavements, and other facilities from damage caused by settlement, lateral movement, washout, and other hazards created by operations under this Section.

C. Dewatering:

1. Remove water by pumping or other methods to prevent the softening of surfaces exposed by excavation, prevent hydrostatic uplift, and provide a stable trench condition for installation of the utility. Use screens and gravel packs or other filtering systems on the dewatering devices to prevent the removal of fines from soil.

2. Dispose water at an approved location by pumps, drains, and other approved methods.

D. During the period of construction, the Contractor shall protect the public against mud, dust and similar nuisances and shall take steps to abate such nuisances.

E. Convenient access to buildings along the line of work shall be maintained and temporary approaches shall be provided and kept in order. Temporary bridges for pedestrian traffic shall have handrails securely fastened to them. Handrails shall be free from any projecting nails, splinters, and rough edges.

F. Storing of excavated material alongside the trench shall be done in such a manner as not to obstruct traffic. Whenever, in the opinion of the Engineer, proper storage of excavated material cannot be made alongside the pipe trench, the material shall be hauled away from the work site. If the excavated material meets the requirements for backfill material and proper storage cannot be made alongside the pipe trench, the material shall be stockpiled at convenient locations for later use in backfill.

G. Surplus Material:

1. Unless otherwise specified in the Plans or Specifications, or ordered by the Engineer, surplus excavated material shall become the Contractor's property and shall be removed from the work site and disposed of at no cost to the State.

3.4 TRENCHING

A. Comply with pertinent provisions of applicable "Soils Report" as provided for the project and the provisions of this Section.

B. Provide sheeting and shoring necessary for protection of the Work, undermining of existing facilities and for the safety of personnel.

1. Prior to backfilling, remove all sheeting.

2. Do not permit sheeting to remain in the trenches except when, in the opinion of the Engineer, field conditions or the type of sheeting or methods of construction such as use of concrete bedding are such as to make removal of sheeting impracticable. In such cases, the Engineer may permit portions of sheeting to be cut off and remain in the trench.

C. Excavation:

1. Short sections of a trench may be tunneled if, in the opinion of the Engineer, the conduit can be installed safely and backfill can be compacted properly into such tunnel.

2. Where it becomes necessary to excavate beyond the limits of normal excavation lines in order to remove boulders or other interfering objects, backfill the voids remaining after removal of the objects at no additional cost to the State, as directed by the Engineer.

3. When the void is below the subgrade for the utility bedding, use select materials and compact to the relative density directed by the Engineer, but in no case to a relative density less than 90%.

4. When the void is in the side of the utility trench or open cut, use suitable earth or sand compacted or consolidated as approved by the Engineer, but in no case to a relative density less than 80%.

5. Excavating for appurtenances:

   a. Excavate for manholes and similar structures to a distance sufficient to leave at least 12" clear between outer surfaces and the embankment or shoring that may be used to hold and protect the banks.

   b. Overdepth excavation beyond such appurtenances that has not been directed will be considered unauthorized. Fill with sand, gravel, or lean concrete as directed by the Engineer, and at no additional cost to the State.

D. Depressions:

1. Dig bell holes and depressions for joints after the trench has been graded. Provide uniform bearing for the pipe on prepared bottom of the trench.

2. Except where rock is encountered, do not excavate below the depth indicated or specified.

3. Where rock is encountered, excavate rock to a minimum overdepth of 4" below the trench depth indicated or specified.

E. Where trenching occurs in existing lawns, remove turf in sections and keep damp. Replace turf upon completion of the backfilling.

F. Cover:

1. Provide a minimum cover over the top of the pipe as indicated on the drawings.

2. Where the minimum cover is not provided, jacket the pipes in concrete as indicated. Provide concrete with a minimum 28 day compressive strength of 2500 psi.

## 3.5 BEDDING

A. Provide bedding as indicated on the Drawings.

## 3.6 BACKFILLING

A. General

1. All backfill material shall be placed in the trench by hand or by approved mechanical methods. The compaction of backfill material shall be done by tamping with hand tools or approved pneumatic tampers, by using vibratory compactors, by puddling if the backfill material can be suitably drained, or by any combination of the three. The method of compaction shall be approved by the Engineer and all compaction shall be done to the satisfaction of the Engineer.

2. When removal of unsuitable excavated material creates a shortage of backfill material, the Contractor shall, at no cost to the State, furnish material as specified in this section in the amount required to complete the backfill.

3. When backfill material is delivered by trucks, the material shall not be dumped directly into the trench but the fall of the material shall be broken at the edge of the trench. The backfill material shall then be deposited by hand or by approved mechanical methods.

4. Ensure that no damage is done to structures or their protective coatings.

B. Backfilling Around Pipe:

1. Select material shall be used to backfill the trench from its bottom to one foot above the pipe. Prior to the laying of the pipe, the select material cushion shall be deposited in the trench and shall be leveled off, compacted, and shaped to obtain a smooth compacted bed providing firm uniform bearing along the laying length of the pipe.

2. After the pipe is installed, but prior to pressure testing the line, select material shall be deposited in the trench evenly on both sides and along the full length of the pipe in 6-inch maximum loose lifts. If necessary, additional select material can be deposited over the center of each length of pipe to prevent undue movement during testing of the line. Ensure that initially placed material is tamped firmly under pipe haunches. The bell holes at the pipe joints shall not be backfilled at this time.

3. The pipeline shall then be pressure tested. After the pipeline has passed the test, the Contractor shall backfill the bell holes with select material. The select material, which had been previously deposited over the pipe in the trench, shall be leveled and compacted.

C. Backfilling to Grade:

1. From an elevation one foot above the top of the pipe to grade, the backfill material shall be placed in layers not to exceed 12 inches in loose lifts each lift shall be compacted to a relative density not less than 90%.

2. If the trench section is flooded, no further backfill shall be placed for two (2) days. After this period, the backfill shall again be thoroughly compacted to a relative density of not less than 90% by a method and with equipment approved by the Engineer.

3. The Contractor shall reconstruct the base course and pavement of roadway damaged by the construction of the pipeline as covered elsewhere in these Detailed Specifications.

4. Other improvements such as driveways, sidewalks, curbs, gutters, stonewalls, fences and other structures damaged during construction shall be replaced or repaired to their original condition or better as approved by the Engineer.

## 3.10 FIELD QUALITY CONTROL

A. The Engineer will inspect and approve open cuts and trenches before installation of pipeline or structures, and will make the following tests:

1. Assure that trenches are not backfilled until all tests have been completed;

2. Check bedding for proper layer thickness and compaction;

3. Verify that test results conform to the specified requirements, and that sufficient tests are performed;

4. Assure that defective work is removed and properly replaced.

END OF SECTION

SECTION 02230

AGGREGATE BASE COURSE

PART 1 - GENERAL

1.1 GENERAL REQUIREMENTS

A. Description. This work shall consist of furnishing and placing one or more courses of aggregate base on a prepared surface in accordance with the requirements of the contract.

PART 2 - PRODUCTS

2.1 MATERIALS

Materials shall meet the requirements specified in the following Subsections of Division 700 Materials of the "Standard Specifications for Road and Bridge Construction."

| | | |
|---|---|---|
| Aggregate | | 703.06 |
| Aggregate – | Bed Course Material for Crushed Rock Cradle | 703.16 |
| Water | | 712.01 |

PART 3 - EXECUTION

3.1 CONSTRUCTION REQUIREMENTS

A Placing

1. The base material shall be placed on the prepared surface without segregation. Segregated materials shall be remixed until a uniform distribution is obtained. The material shall not be dumped in piles on the prepared surface.

2. Depositing and spreading shall commence at that part of the work farthest from the point of loading the material and shall progress continuously without breaks, unless otherwise directed by the Engineer.

3. If the required compacted depth of the base course exceeds 6 inches, the base shall be constructed on 2 or more layers of approximately equal thickness. The maximum compacted thickness of any one layer shall not exceed 6 inches.

4. If the contractor uses a vibratory roller weighing 9 tons or more, the lift thickness may be increased to 7 inches.

5. Spreading of binder material over the surface of the compacted base will not be permitted. Additional material if required shall be incorporated uniformly throughout the thickness of the compacted material by scarifying and blading. The combined material shall meet all quality requirements as specified.

B. Shaping and compacting

1. The Contractor shall perform such shaping work as necessary and such that the finished base shall conform to the required grade and cross-section. The finished base where not controlled by adjacent structures or features shall not vary more than 0.04 foot above or below the theoretical grade.

2. Compaction of each layer shall continue until a density of not less than 95 percent of the maximum density, determined in accordance with the requirements of Subsection 106.09 - Special Test Methods, of the "Standard Specifications for Road and Bridge Construction, has been achieved. Field density determination will be made in accordance with Hawaii Test Method HWY-TC 1. The surface of each layer shall be maintained during the compaction operations in such a manner that a uniform texture is produced and the aggregates firmly keyed. Water shall be uniformly applied over the base materials during compaction in the quantity necessary for proper consolidation.

3. Should high or low spots develop during rolling operations, such spots shall be smoothed out by blading with a self-propelled and pneumatic-tired motor grader having a wheel base not less than 15 feet long and a blade not less than 10 feet long.

4. Each layer shall be compacted initially by rolling with three-wheel rollers followed by intermediate rolling with pneumatic-tired rollers. Final rolling shall be done with three-wheel rollers.

C. Equipment. Three-wheel rollers and pneumatic-tired rollers shall conform to the requirements specified in Subsection 401.03(B)(4) - Rollers.

END OF SECTION

SECTION 02362

SOIL TREATMENT FOR VEGETATION CONTROL

## PART 1 - GENERAL

### 1.1 GENERAL REQUIREMENTS

The work to be performed under this section shall include spraying weed killer on the prepared roadway subgrade prior to the installation of the base course and where called on the plans and on existing growth prior to application of asphalt in the case of resurfacing jobs.

### 1.2 SUBMITTALS

Prior to the start of work, the contractor shall submit to the Engineer the material product data and Material Safety Data Sheets for the material proposed for use.

## PART 2 - PRODUCTS

### 2.1 MATERIALS

A. Weed killer shall be “Casoron 4G”, “Norosac 4G”, or an approved equal for under asphalt application on new or rebuilt pavement.

B. Weed killer shall be “Hyvar X”, Roundup” or approved equal for application to existing weeds for resurfacing jobs.

## PART 3 - EXECUTION

### 3.1 APPLICATION

A. The under asphalt weed killer shall be mixed and uniformly spread using calibrated application equipment at the maximum rates permitted for “under asphalt” use and in strict accordance with the manufacturer’s label. Base Course material shall be installed as soon as possible after applying the weed killer to preclude loss of germination inhibiting action.

B. In treatment of existing growth on resurfacing jobs, the weed killer shall be mixed and uniformly sprayed in strict accordance with the manufacturer’s label.

C. Nut grass shall be retreated two (2) days after initial application and again if growth still exists.

D. The Contractor shall notify the Engineer 24 hours before application of weed killer.

SECTION 02512

ASPHALTIC CONCRETE PAVING

## PART 1 – GENERAL

### 1.01 GENERAL CONDITIONS

A. As specified in Division 1 – General Requirements.

### 1.02 GENERAL REQUIREMENTS

A. Furnish materials, labor and equipment required to accomplish all asphaltic concrete paving as indicated on the drawings.

## PART 2 – PRODUCTS

### 2.01 MATERIALS

A. No asbestos containing materials shall be under this section. The Contractor shall insure that all materials incorporated in the project are asbestos-free.

B. Materials shall be in accordance with the following sections of the County's "Standard Specifications for Public Works Construction" (SSPWC), dated September 1986 as revised, except as amended in the plans and specifications herewith. (Paragraphs concerning Measurement and Payment in the Sections are not applicable to this project.)

| | |
|---|---|
| 1. Subgrade | Section 29 |
| 2. Select Borrow for Subbase Course | Section 30 |
| 3. Aggregate Base Course | Section 31 |
| 4. Asphalt Surface Treatment | Section 33 |
| 5. Asphalt Concrete Pavement | Section 34 |

C. Mix shall be State Mix No. 4 for all work.

D. Weed killer shall be applied to the subgrade per Specification Section 02362.

## PART 3 – EXECUTION

### 3.01 INSTALLATION

A. The Contractor shall stake out the areas to be paved, using grade stakes on which the final finish elevations, base course and subgrade elevations are clearly marked.
B. Weed killer shall be applied to the subgrade prior to placement of base course. Reference Specification Section 02362.

## 3.02 REPAIR OF EXISTING AC PAVEMENTS

A. Any existing asphaltic concrete pavements including roads and walkways have been damaged by construction activities shall be repaired to the original condition and to the satisfaction of DLNR. Damage done by heavy equipment, especially on roads and yards not stable for such equipment, shall be repaired to the original condition and to the satisfaction of the Engineer.

END OF SECTION

SECTION 02513

PRIME COAT

PART 1 - GENERAL

1.1 GENERAL REQUIREMENTS

This section covers the requirements for furnishing and installing of prime coat.

PART 2 - PRODUCTS

2.1 MATERIALS

A. Bituminous Material: Bituminous material for prime coat shall be a medium curing liquid asphalt, Grade MC-30, conforming to the applicable requirements of Section 702 - Bituminous Materials, State of Hawaii, Department of Transportation "Standard Specifications of Road and Bridge Construction."

The Contractor shall submit a Certificate of Compliance accompanied by test data, conforming to the requirements of ASTM M82-75 Cut-Back Asphalt (Medium Curing Type), for each lot or batch of MC-30. Medium curing liquid asphalt, grade MC-30 will not be accepted without adequate documentation.

The Engineer reserves the right to waive any of the requirements for the MC-30 provided that its performance is not affected.

PART 3 - EXECUTION

3.1 DETAILS

A. Immediately before applying the prime coat, the surface to be treated shall be swept clean of all loose material, dirt, excess dust or other objectionable material.

Prime coat shall not be applied when the surface to be treated is appreciably damp or when weather conditions are unsuitable.

B. The material shall be uniformly applied by a vehicle, mounted, pressure operated, sprayer type distributor at an approximate rate of 0.35 of a gallon per square yard. The exact rate of application shall be determined by the Engineer. After the prime coat has penetrated the surface, deficient areas shall receive additional applications and areas of excess bituminous material shall be blotted with clean sand. Traffic shall be kept off the prime coat until the material has been completely absorbed.

C. Curbs, sidewalks and gutters shall be protected from prime coat. Any material sprayed on adjoining improvements shall be immediately cleaned off. The edges of existing asphalt paving, manholes and catch basin frames, concrete gutters, etc., against which asphaltic concrete pavement is to be placed shall be given a prime coat.

END OF SECTION

SECTION 02514

TACK COAT

PART 1 - GENERAL

1.1 GENERAL REQUIREMENTS

This section covers the requirements for furnishing and installing bituminous tack coat.

PART 2 - PRODUCTS

2.1 All sections or subsections called for in the specifications shall be referred to the State of Hawaii, Department of Transportation, "Hawaii Standard Specifications for Road and Bridge Construction," 1985.

2.2 MATERIALS

Bituminous material for tack coat shall be slow-setting emulsified asphalt, Type SS-1 or Type SS-1H, conforming to the applicable requirements of Section 407 - Bituminous Tack Coat.

Water shall conform to the requirements of Subsection 712.01 - Water.

PART 3 - EXECUTION

3.1 CONSTRUCTION REQUIREMENTS

A. Weather Limitations: Tack coat shall not be applied on a wet surface or when weather conditions otherwise shall prevent proper construction.

B. Equipment: The Contractor shall provide equipment for heating and applying the bituminous material. This equipment shall meet the requirements of Subsection 405.03(B) - Equipment.

C. Preparation of Surface: Immediately before applying the tack coat, the surface to be treated shall be swept clean of all loose material, dirt, excess dust or other objectionable matter. A power broom or power blower, supplemented by hand methods if necessary, shall be used.

D. Application of Bituminous Material: The emulsified asphalt shall be diluted with water at a rate of one part emulsion to one part of water by volume. The quantity, rate of

application, temperature, and areas to be treated will be approved prior to application.

Tack coat shall be placed only so far in advance of the surface course placement as is necessary for it to cure to the proper condition for placement of such surface course.

Unless otherwise specified, tack coat shall be applied at the rate of 0.05 - 0.15 gallon per square yard on surface of base course.

Tack coat will not be measured for payment. Tack coat will be considered as incidental to the various contract items.

END OF SECTION

SECTION 02630

# COPPER PIPE AND FITTINGS

## PART 1 - GENERAL

### 1.1 GENERAL REQUIREMENTS

This section covers the requirements for furnishing and installing copper pipe and fittings. Unless otherwise noted in the plans, all copper pipe and fittings shall be in accordance with the State of Hawaii Water System Standards, dated 2002 as amended.

A. Materials are usually specified in terms of the latest applicable standard specifications of the American Society of Testing Materials (ASTM), American National Standards Institute (ANSI) and American Water Works Association (AWWA). Should the standard specifications noted herein be in conflict with later revisions or amendments thereof, the Engineer shall be consulted for the applicable standard specifications.

B. In addition the "Water System Standards," dated 2002 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.

C. In some instances, materials are specified as acceptable items by means of the manufacturer's catalog designations or reference numbers rather than by detailed specifications. It should be clearly understood that such references are frequently changed by the manufacturer. If any reference number is found to be obsolete, the Engineer should be consulted for the latest designation.

## PART 2 - PRODUCTS

### 2.1 MATERIALS

A. Copper pipe shall be rigid copper type L for buried lines and type K for exposed lines. The nominal pipe sizes are shown on the plans.

B. Fittings shall be corrosion-resistant wrought copper or cast bronze.

C. Solder shall be 1/8-inch diameter and lead-free.

D. Flux shall be non-corrosive and lead-free.

E. Gate Valve shall be bronze, 200 psi maximum pressure rating, FPT inlet/outlet with non-rising stem.

F. Hose Bibb shall be brass, 150 psi maximum pressure rating, 3/4" MPT inlet and garden hose thread outlet.

## PART 3 - EXECUTION

### 3.1 INSTALLATION AND WORKMANSHIP

All piping, fittings and appurtenances specified in this section shall be installed as shown on the plans and/or in accordance with the manufacturer's directions; "Water System Standards," dated 2002 or Uniform Plumbing Code," latest Edition; and "International Association of Plumbing and Mechanical Officials (IAPMO) Installation Standards," latest edition.

### 3.2 FINAL CLEANUP

All debris resulting from the work of this section shall be removed from the site.

END OF SECTION

SECTION 02713

WATER DISTRIBUTION SYSTEMS

PART 1 – GENERAL

1.01 SUMMARY

Furnish labor, materials, services, equipment, and other necessary items required for accompanying the construction of the water systems. This shall include, but not be limited to the following: pipe and fittings for site water line including domestic water line, valves and fire hydrants, set lines, elevations, and grades for water distribution systems work and control system for duration of work including careful maintenance of benchmarks, property corners, monuments, or other reference points.

1.02 GENERAL REQUIREMENTS

A. Whenever the Contractor is required by State or local laws or regulations to make a deposit and/or to pay for a permit before proceeding with any work called for under this part of the Contract, the Contractor shall make the necessary deposit and/or pay for obtaining the required permit for the work.

B. In addition, 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 of Hawaii “Standard Specifications for Public Works Construction” dated September 1986 and “Standard Details for Public Works Construction” dated September 1984 as revised, except as amended on the drawings and/or in the specifications herewith. (Paragraphs concerning Measurements and Payments in the Sections are not applicable to this project.)

2. County of Hawaii Department of Water Supply “Water System Standards”, Volume 1 dated 2002, “Approved Material List and Standard Details for Water System Construction”, Volume 2 dated 2002, "Water System External Corrosion Control Standards", Volume 3 dated 1991, and all subsequent amendments and additions, referred to hereinafter as the Water Standards.

1.03 SUBMITTALS

A. Label Construction Certification: The Contractor shall submit to the Engineer affidavits from the manufacturer’s of pipe, sections, fittings, valves, etc., furnished and installed under this section certifying that such materials delivered to the project conform to requirements of these specifications.

B. As-Built Drawings: The contractor shall submit as-built drawings to the Engineer showing the actual location of the installed water system facilities.

1.04 COORDINATION

A. Coordinate the work with termination of water system service connection outside building, connection to water system and trenching.

1.05 QUALITY ASSURANCE

A. Perform work in accordance with utility company and/or municipality requirements.

B. Valves: Manufacturer's name and pressure rating marked on valve body.

PART 2 – PRODUCTS

2.01 MATERIALS FOR WATER SYSTEM

Materials for water system shall be in accordance with the below listed sections of the City and County of Honolulu Board of Water Supply "Water System Standards Approved Materials List", dated 2002, and the "Approved Material List, Standard Details for Water System Construction", Volume 2 dated 2002, "Water System External Corrosion Control Standards", Volume 3 dated 1991, and all subsequent amendments and additions, except as amended in the plans and/or specifications herewith. (Paragraphs concerning Measurements and Payments in the Sections are not applicable to this project.)

| | | |
|---|---|---|
| A. | Ductile Iron Pipe, Class 52 | Section 1 |
| B. | PVC Class C-900 Pipe | Section 1 |
| C. | Valves and Appurtenances | Section 2 |
| D. | Hydrants and Appurtenances | Section 4 |
| E. | Cast Iron Manhole Covers, Frames, Rungs, Eyebolts, Meter Box Covers and Frames, And Standpipe | Section 2 |
| F. | Service Laterals and Appurtenances | Section 3 |

G. Warning and Identification Tape shall be blue plastic tape, acid and alkali resistant, approximately 6" wide, minimum 4 mil. thick, with warning and identification of service imprinted in bold black lettering continuously over the entire length of the

tape. Warning and identification to read "CAUTION, BURIED WATER LINE BURIED BELOW" or similar wording. The tape color and printing shall be permanent and unaffected by moisture.

## PART 3 – EXECUTION

### 3.01 INSTALLATION

A. Location and Adjustment of Existing Utility Lines:

1. The Contractor shall be responsible for precisely laying out the various exterior utility lines shown on the drawings. The locations shown on the drawings of the various existing utility lines, which the new lines are to cross over or under or connect to, were determined on the basis of the best information available; however, no assurance can be provided that the actual locations will be precisely as shown on the drawings.

2. In performing all work, the Contractor shall exercise due care and caution necessary to avoid any damage to and impairment in the use of any existing utility line. Any damage inflicted on existing lines resulting from the Contractor's operations shall be immediately repaired and restored as directed by the Engineer at the Contractor's expense.

B. Excavation and Backfill:

1. Trench excavation and backfill for the laying and installation of water lines, to the required line, grade, and structural excavation for the construction of appurtenant structures, shall be governed by Section 02225 (Trenching, Backfilling and Compacting).

2. Surplus material resulting from trench and structure excavation shall be used by the Contractor for backfilling, filling and grading to the extent required as specified elsewhere in these specifications.

a. Water Distribution System shall be in accordance with the City and County of Honolulu Board of Water Supply "Water System Standards", dated 2002 as amended. The new lines shall be installed but not connected until pressure testing is completed. Connecting shall be done at the discretion of the Engineer. Pressure testing, flushing of valves and mains, and disinfection of the system shall be carried out in accordance with the County of Honolulu Board of Water Supply "Water System Standards". The Contractor shall submit the results of such tests to the Engineer for approval. Any additional fittings of a temporary nature required for the purpose of working such tests shall be supplied and installed at the Contractor's expense. All charges and

services by the Board of Water Supply shall be paid for by the Contractor.

3. Warning and identification ape shall be buried directly above the centerline of the pipe, approximately 12” below finished grade. Where the utility pipe is under pavements and slabs, the tape shall be buried approximately 6” below the top of the subbase.

4. Corrosion protection for ductile iron pipes and fittings shall comply with the County of Hawaii Department of Water Supply "Water System External Corrosion Control Standards", Volume 3, dated 1991.

## 3.02 CONCRETE FOR WATER SYSTEMS

Unless otherwise noted on plans, all concrete required for construction of manholes, valve boxes, etc., which are required for plumbing installations shall be DWS 2500.

## 3.03 DISINFECTION OF DOMESTIC WATER PIPING SYSTEM

Sterilize distribution system with chlorine before acceptance for domestic operation. Amount of chlorine shall be such as to provide dosage of not less than 50 parts/million. Thoroughly flush lines before introduction of chlorinating materials and after contact period of not less than 24 hours, system shall be flushed with clean water until residual chlorine content is not greater than 1.0 part/million. Open and close valves in lines being sterilized several times during contact period. After sterilization, take water and bacteriologically test in accordance with AWWA specifications. Do not place distribution system in service until approval is obtained from applicable governing authorities.

## 3.04 FIELD QUALITY CONTROL

A. All pipework shall be tested at the pressure and leakage tests equal to the design working pressure of the pipe and maintain said pressure as shown on drawings.

B. Furnish, install, and operate the necessary connections, pump, meter, and gauges. Leakage shall not exceed that permitted by AWWA Specifications C600-64 for mechanical joint and push-on joint pipe. Prior to running any field test, meter shall be tested, sealed, and approved by applicable governing authority at Contractor’s expense.

C. Locate and repair all leaks and repeat tests until test results are satisfactory and in compliance with this section.

D. Furnish copy of results of meter test and hydrostatic pressure test to Owner upon completion of water distribution backfilling operations.

## 3.05 FINAL INSPECTION

At the time of final inspection of the work performed under the Contract, the utilities covered by this section shall be complete in every respect and operating as designed. All surplus materials of every character resulting from the work of this section shall have been removed. Any defects discovered in the utilities subsequent to this inspection shall be corrected prior to the final acceptance.

## PART 4 – MEASUREMENT AND PAYMENT

Pay items for water distribution system shall be measured for payment by the units specified in the proposal.

Payment shall be made at the unit price bid per unit specified in the proposal or lump sum, and shall be full compensation for excavation, backfill, compaction, and furnishing materials, labor, equipment, and all other required incidentals.

END OF SECTION

SECTION 02846

# REGULATORY AND WARNING SIGNS

## PART 1 - GENERAL

### 1.1 GENERAL REQUIREMENTS

This section covers the requirements for furnishing and installing sign panels, regulatory and warning signs and sign structures and performing all incidental work.

### 1.2 STANDARDS

Unless otherwise modified herein, work under this section shall conform to referenced portions of the "Standard Specifications for Road and Bridge Construction," 1985, as amended, of the State Department of Transportation, Highways Division, hereinafter referred to "DOT Standard Specifications." All references to measurement and payment shall be deleted.

## PART 2 - PRODUCTS

### 2.1 MATERIALS

A. Concrete for sign structures shall be of the class specified on the plans.

B. Other materials shall meet the requirements specified on the following subsections of Division 700 - "Materials" of the "DOT Standard Specifications," as amended.

| | | |
|---|---|---|
| 1. | Signs | 712.20 |
| 2. | Sign Post | 713.11 |
| 3. | Fasteners for Signs | 713.12 |

### 2.2 POSTS

A. Sign Posts:
Unless specified otherwise in the plans, 2-inch galvanized standard pipe or 2 x 2 inch 12 gauge square tube post shall be used for Regulatory and Warning Signs.

### 2.3 REGULATORY AND WARNING SIGN SUPPORTS

The Contractor shall submit shop drawings for approval prior to assembling in accordance with the requirements of Section 501 - Steel Structures, of "DOT Standard Specifications."

All welding shall be continuous and shall conform to the requirements of Section 501 of the "DOT Standard Specifications."

The weld metal at transverse joints shall extend to the sleeve, making the sleeve an integral part of the joint. Longitudinal welds shall be made by the submerged arc process. Welds except fillet welds shall be ground flush with the base material.

Unless otherwise specified, all exposed surfaces including the inside of the tubular posts and arms shall be hot-dip galvanized after fabrication. The upper 10 inches of anchor bolts shall be hot-dip galvanized. Galvanizing shall be in accordance with the requirements of Section 501 - Steel Structures, of "DOT Standard Specifications."

All ground mounted sign supports and sign posts, cross-arms and panel frames shall be painted at the work site after proper preparation of the galvanized surfaces in accordance with the provisions of Section 501 - Steel Structure of "DOT Standard Specifications" except the painting shall consist of a prime coat of zinc-dust, zinc-oxide primer followed by 2 coats of dark green enamel paint as specified.

Where aluminum sign supports are used, they shall conform to the requirements of Section 713.14(B) - Aluminum Supports, of "DOT Standard Specifications."

2.4 REGULATORY AND WARNING SIGNS

The Contractor shall be responsible for submitting six (6) sets of shop drawings of all work pertinent to the fabrication of the signs.

Panels shall be assembled in the shop and checked for straightness, alignment and dimensions. Variations shall be corrected to the satisfaction of the Engineer.

Sign panels shall be carefully and securely installed as shown on the plans. Chipped or bent signs shall be replaced at the Contractor's expense.

PART 3 - EXECUTION

3.1 MOUNTING OF SIGNS

Permanent signs shall be erected on posts as shown on the plans or as directed. The posts shall be set plumb at the required locations.

END OF SECTION

SECTION 03210

REINFORCING STEEL

PART 1 - GENERAL

1.1 GENERAL REQUIREMENTS

This section covers the requirements for furnishing and placing of deformed steel bars or welded wire fabric as reinforcement in concrete. The quality, type, size, and dimensions shall be as called for in these specifications and as shown on the plans.

PART 2 - PRODUCTS

2.1 MATERIALS

A. Bar reinforcement shall be of grade 40, billet steel deformed type bars made by the open hearth process and shall conform to the requirements of ASTM Designation A615.

B. Welded wire mesh reinforcement shall be galvanized steel, electric welded type and shall conform to the requirements of ASTM Designation A185. The gauge of the wire and dimensions of the mesh shall be given in these specifications or as shown on the plans.

2.2 EPOXY COATING

Epoxy coating for the reinforcing steel shall be applied by the electrostatic spray method conforming to ASTM A-775.

PART 3 - EXECUTION

3.1 CONSTRUCTION

Unless otherwise specified, the installation of reinforcing steel shall conform to the requirements of "ACI Standard Building Code Requirements for Reinforced Concrete" and "Concrete Reinforcing Steel Institute."

A. Protection of Material: Steel reinforcement shall be protected at all times from damage. When placed in the work, all reinforcing steel shall be new, free from dirt, detrimental scale, paint, oil, or other foreign substances. No material cleaned by sandblasting will be allowed. In the absence of manufacturer's quality mark, the Engineer may require standard ASTM tests be made on representative samples before acceptance. All costs incurred in connection with these tests shall be borne by the Contractor.

B. Bending Diagrams and Order Lists: Two copies of all reinforcing steel order lists and bending diagrams shall be furnished directly to the Engineer and at the site for his use in administering the contract.

Furnishing such lists and diagrams to the Engineer shall not be construed to mean that the lists and diagrams will be reviewed for accuracy. The Contractor shall be wholly and completely responsible for the accuracy of the lists and diagrams and for furnishing and placing all bar reinforcing steel in accordance with the details shown on the plans as specified.

C. Bending: Bends for stirrups and ties shall be made around a pin having a diameter not less than two times the minimum dimensions of the bar. Bends for other bars shall be made around a pin having a diameter not less than six times the minimum dimension of the bar, except that for bars larger than one inch, the pin shall be not less than eight times the bar thickness. All bars shall be bent cold before placing in forms.

D. Placing: Reinforcement shall be accurately placed, supported, aligned, and secured against movement. Bars shall be tied at all intersections except where the spacing is less than one foot in each direction, in which case alternate intersections shall be tied.

Distance from forms and between layers of reinforcing shall be maintained by means of approved commercial chairs, stays, blocks, ties, hangers, or other approved supports. The use of pebbles, pieces of broken stone or brick, metal pipe, or wooden blocks shall not be permitted.

No concrete shall be placed prior to the inspection and approval of the size and placement of all reinforcement by the Engineer.

E. Splicing: End laps of bars at splices shall be a minimum of 30 bar diameters and shall be staggered unless otherwise shown. Bars shall be installed in as long lengths as practicable and splices reduced to a minimum unless otherwise shown on the plans.

F. Wire Mesh: Wire mesh shall be rolled out flat and firmly held in place to the lines and grade as shown on the plans before placing concrete. Splices shall be made by lapping not less than one mesh and securely tied.

G. Coverage: Unless otherwise specified on the plans, the minimum clear thickness of concrete covering reinforcement shall be 2 inches when concrete is placed against form, 3 inches when concrete is placed against ground, and 1-1/2 inches from tops of slabs or unformed surfaces.

END OF SECTION

SECTION 03252

JOINT SEALERS

PART 1 - GENERAL

1.1 GENERAL

This section covers the requirements for sealing the contraction, expansion, and longitudinal joints as shown on the plans or as approved by the Engineer. The joint sealant shall be either a polysulfide or a polyurethane rubber compound as specified herein.

1.2 CERTIFICATION

The Contractor shall furnish to the Engineer a statement certifying that the product conforms to these specifications. If the Contractor desires to use any other brand than those specified herein, a written approval of that brand must be secured from the Engineer.

PART 2 - PRODUCTS

2.1 MATERIALS

A. Redwood Filler: Fillers for contraction joints shall be redwood lumber, kiln dried to an average moisture content between 12-15%. Each piece of redwood filler shall be dip treated for 30 minutes with Water Repellent Penta containing 5% chlorinated phenol solution. A Certificate of Treatment showing compliance with these specifications shall be issued to the Engineer.

The redwood fillers shall be prepared so that when placed, the top surface shall be a regular sanded surface.

B. Preformed Joint Filler: Preformed joint fillers shall conform to ASTM D994.

Approved preformed asphalt expansion joint fillers are by W.R. Meadows, P.O. Box 543, Elgin, IL 60121.

Preformed joint fillers shall be used in expansion and intersection joints as shown on the plans or directed by the Engineer.

C. Joint Sealants: Polyurethane-base, non-sag elastomeric sealant shall conform to ASTM C-920, Type S, Grade NS, Class 25.

Approved joint sealants are Sikaflex-1a and Sikaflex-2c-NS/SL or Bostik Chem-Calk 900.

D. Bond-Breaker Tape: Bond breaker tape shall be heavy duty polyethylene or similar type tape to which elastomeric sealant will not adhere. Bond breaker tape shall be colored and a minimum thickness of 14 mils.

E. Primer: Primer shall be designated by the manufacturer for use on concrete in extreme water-immersion conditions.

## PART 3 - EXECUTION

### 3.1 PREPARATION OF SURFACES

The proper preparation of the construction joints prior to application of the primer and sealants is extremely important and the Engineer's approval will be required before such application will be allowed. However, such approval by the Engineer shall not relieve, waive, or modify the Contractor of his responsibility to meet the provisions and requirements of these specifications.

The surface against which the materials are to be deposited shall be thoroughly cleaned of all grease, oil, wax, mastic compounds, corrosion, dirt, concrete sluff from troweling, protective materials used in curing of concrete, and other foreign material. The joints shall be cleaned by sand blasting or with a wire brush capable of cleaning the sides of the joint. The use of equipment that spalls or damages the concrete will not be permitted.

Alkaline seepage from fresh concrete must be washed away. If the alkaline condition is excessive, the surface must be etched with 5% muriatic acid (commercial hydrochloric acid) by keeping the surface wet with acid for 15 minutes. The etched surface shall be rinsed with clean water and neutralized with household ammonia mixed in a ratio of 1 part ammonia to 8 parts water by wetting with ammonia for about 10 minutes. The neutralized surface shall then be rinsed with clean water.

After brushing or blasting and immediately prior to the application of the bond breaker, primer or sealant, the joints shall be blown clean of all loose material and dust with compressed air free of oil and moisture and a pressure of not less than 50 pounds per square inch. The height and size of nozzle shall be adjusted to secure the desired results. The air compressor shall be of sufficient capacity to carry on the work in a continuous operation. The Contractor shall remove and dispose of all materials occasioned by the cleaning operations.

The bond breaker, such as masking tape or polyethylene film shall be installed after the application of the primer and just prior to applying the sealant and shall completely cover the top of the joint filler to keep the sealant from adhering to the filler or soaking into

porous fillers. PRC 89 Preformed Joint Fillers and others that act as bond breakers do not require a bond breaker.

The concrete must be fully cured and all surfaces must be thoroughly dry prior to the application of the primer and sealant. In the event drying of surfaces is done by mechanical means, care shall be exercised so as not to damage the concrete and the Contractor will be responsible for any damage due to his operations.

## 3.2 APPLICATION OF PRIMER AND SEALANT

Placing of the primer and sealant shall be done only in the presence of the Engineer, after his inspection and acceptance of the prepared joint areas. The instructions of the manufacturer are to be used in the application of the primers and sealants but they will not act to relieve the Contractor of the responsibility for obtaining joints completely filled in accordance with the plans and specifications. The Contractor is to furnish all equipment, labor and material necessary to attain such joints.

The primer shall be applied by brush or spray to the joint sidewalls before installing the bond breaker. After the primer is cured and the bond breaker is installed, the sealant shall be applied by means of a hand or air operated caulking gun, putty knife, or trowel. It is important that the sealant be firmly pressed into the joint to assure complete wetting of the bonding surface to obtain uniform adhesion. Surfaces of the freshly applied sealant may be pointed with a tool; however, tooling should be kept to a minimum to avoid causing slump.

The Contractor is cautioned to prepare only as much material as he can use in the application time corresponding to the ambient temperature. The Engineer reserves the right to establish a minimum temperature below which application will be not permitted. This is the temperature at which cure time becomes excessive for practical application. The Contractor is reminded of the safety and health precautions to be followed in the storage and use of the above products.

## 3.3 TESTING

Prior to acceptance, the Engineer will test various sections of the joint sealant for cohesive resistance and bonding of the material to the concrete in the following manner:

A wire hook, fabricated from 12-gauge steel wire, shall be inserted into the joint and then subjected to a pull of 15 pounds. The work will be considered satisfactory is there is no evidence of tearing of the material, or the material pulling away from the concrete. All such sections tested which fail to meet the test specified shall be repaired to the satisfaction of the Engineer and the test repeated.

END OF SECTION

SECTION 03300

CONCRETE

PART 1 - GENERAL

1.1 GENERAL REQUIREMENTS

This specification covers the requirements for furnishing, hauling, mixing, placing, and curing of concrete.

1.2 SUBMITTALS

The Contractor shall submit concrete mix design for approval.

PART 2 - PRODUCTS

2.1 MATERIALS

A. Portland cement shall conform to the requirements of ASTM C150, Type I, for all concrete work. Concrete shall have 5,000 psi compressive strength (f'c = 5,000 psi).

B. Concrete Aggregates

1. Fine aggregates shall be calcareous or basalt sands, or a combination thereof. They shall meet the grading requirements of ASTM C33 unless the concrete producer can provide past data that show that a proposed non-conforming gradation will produce concrete with the required strength and suitable workability.

   If manufactured sands are used in the concrete mix, the Contractor may select and use a water-reducing and/or an air-entraining admixture as specified hereinafter to provide satisfactory workability in the concrete. The cement content of a mix shall be as specified hereinafter, and the use of an admixture shall in no way result in the reduction of the cement factor.

2. Coarse aggregates shall be crushed close-grained, blue lava rock meeting the grading requirements of sizes 57 or 67 (ASTM D448) or both. The maximum size of aggregate shall not be larger than 1/5 of the narrowest dimensions between sides of the forms of the member for which the concrete is to be used not larger than 3/4 of the minimum clear spacing between individual reinforcing bars or bundles of bars.

C. Concrete Reinforcement

1. Reinforcing steel shall be deformed bars conforming to ASTM A615, grade as shown on plans.

2. Welded wire fabric for concrete reinforcement shall conform to ASTM A185 and shall be galvanized.

3. Metal accessories such as spaces, chairs, ties, and other devices necessary for properly placing, supporting and fastening reinforcement in place shall be provided. Chairs shall be galvanized. Annealed steel wire or not less than 16-gauge shall be used to secure reinforcement.

D. Water used in mixing concrete shall be potable.

E. Non-slip grit shall be an abrasive aggregate of silicon carbide or aluminum oxide.

F. Admixture, if used, shall conform to ASTM C494 or ASTM C260 and shall be mixed in proper amount in accordance with directions of manufacturer.

G. Curing compound shall conform to ASTM C309.

## PART 3 - EXECUTION

### 3.1 DESIGN OF CONCRETE MIXES

A. All concrete throughout shall be either job or plant mixture in an approved type of power operated mixer that will insure uniformity and homogeneity of the concrete produced.

B. Mixing at jobsite shall be done in accordance with ACI 614.

C. Ready-mixed and mixed-in-transit concrete shall be mixed to conform to the provisions of ASTM C94.

D. Concrete shall be mixed only in such quantity as is required for immediate use. No retempering will be permitted and concrete that has started to harden shall be discarded and promptly removed from the job.

E. Admixtures conforming to paragraph 2.1 may be used in the concrete as recommended by the supplier and approved by the Engineer.

## 3.3 PLACING CONCRETE

A. No concrete shall be placed in the absence of the Engineer or his representative who shall be given one day advance notice of starting time of concrete pour.

B. Preparation

1. Concrete shall be placed upon clean, damp surfaces with no free water, or upon properly compacted fills but never upon soft mud or dry, porous earth.

2. Before depositing new concrete on or against concrete which has set, all accumulation or mortar splashed upon reinforcing steel and the surfaces of forms shall be removed and the forms shall be retightened. The surfaces of previously set concrete shall be thoroughly roughened and cleaned of all foreign matter and laitance, saturated with water and slushed with a coat of cement grout. New concrete shall be placed before the grout has attained its initial set.

C. Conveying

1. Concrete shall be conveyed from mixer to forms as rapidly as practicable by methods that will prevent segregation.

2. Concrete shall be deposited as nearly as practicable in its final position. Extensive spading as a means of transportation shall be avoided and in no case shall vibrators be used to transport concrete inside forms.

3. Open troughs and chutes shall have a slope not to exceed 1 vertical to 2 horizontal and not less than 1 vertical to 3 horizontal. Chutes more than 20 feet long and chutes not meeting the slope requirements may be used provided they discharge into a hopper before distribution.

4. The concrete shall not be allowed to drop freely more than six feet except where specifically authorized by the Engineer. When placing operations would involve the dropping of concrete from a height of more than six feet it shall be conveyed through pipes or flexible drop chutes.

5. If any appreciable segregation occurs through the conveying methods employed, their use shall be ordered discontinued by the Engineer and some other satisfactory method of placing concrete shall be used.

6. All chutes, troughs, pipes and other means of conveyance shall kept clean and free from coatings of hardened cement or concrete by thoroughly cleaning with water and chipping after each pour. Water used for flushing shall be discharged away from the vicinity of the concrete or forms already in place.

D. Depositing

1. Unless adequate protection is provided, concrete shall not be placed during rain. Rainwater shall not be allowed to increase the mixing water nor to damage the surface finish. Fresh concrete that has been deposited but has not attained its initial set shall be protected in the event of rain.

2. Placing of the concrete shall be started at the far end of work so that each batch will be dumped against previously placed concrete, not away from it.

E. Compaction

1. All concrete shall be consolidated by vibration so that the concrete is thoroughly worked around the reinforcement, around embedded items, and into corners of forms, eliminating all air or stone pockets which may cause honey-combing, pitting, or planes of weakness. All compaction shall be done by use of high frequency internal vibrators. Where the vibrator cannot be inserted into the concrete, compaction shall be done by spading, rodding, or forking.

2. Frequency of vibrator shall be not less than 7,000 impulses per minute. The Contractor shall provide a sufficient number of vibrators to properly consolidate all concrete immediately after placing. At least one standby vibrator shall be on hand at all times during placement of the concrete.

3.4 REINFORCEMENT

A. Reinforcing steel bars, wire and wire fabric shall be provided in the sizes, length and configurations as indicated on plans and shall be thoroughly cleaned, before placing, of loose mill scale, loose flaky rust, oil, and all coatings that will destroy or reduce bond. If necessary, they shall be cleaned again before placing of concrete. All items shall be fabricated, positioned and secured in place as indicated in the plans and as herein specified. Annealed steel wire of not less than 16-gauge shall be used to secure reinforcement. Unless otherwise noted, cleaning, bending and placing of reinforcement shall be done in accordance with the standard practice of the Concrete Reinforcing Steel Institute.

B. Concrete or metal support and spacers shall be used to secure the proper spacing of reinforcement over formwork. Stirrups shall be accurately and securely wired to the bars at both top and bottom. At slabs, footings and beams in contact with earth, pre-cast concrete blocks (not bricks or hollow tile) shall be used to hold reinforcement at a proper distance above earth.

C. Bars shall be tied at all intersections, and distances from forms shall be maintained by means of pre-cast concrete blocks, ties, hangers or other approved supports.

D. Bars shall be bent cold to the shapes shown on the plans. Bends shall be made around a pin having a diameter not less than 6 times the bar diameter except that for bars of larger than 1-inch diameter the pin diameter shall be 8 times the bar diameter. If required, bars may be bent in the field using a "hickey" bar.

E. All reinforcing steel bars shall be furnished in the lengths indicated on the plans. Splicing of bars, except where shown, will not be permitted without the approval of the Engineer.

3.5 CONCRETE SLABS ON GRADE

A. Concrete slabs on earth shall be placed over a structural fill as specified in another section.

B. All slabs shall be reinforced with 6 x 6 - W1.4 by W1.4 welded wire fabric unless otherwise shown or called for on the plans.

C. Care shall be taken in handling and placing the reinforcement as follows:

1. Reinforcing fabric shall not be rolled over by trucks, buggles or wheelbarrows, nor trampled to the extent that it is bent out of the plans of the fabric. Material which has been so bent that it cannot be laid out flat shall be rejected.

2. Reinforcing fabric shall be positively set, either prior to or during the placement of concrete, to the levels required within the slabs as indicated on the plans or as otherwise called for herein.

D. A bond-break filler shall be provided where edge of slab abuts any vertical surface and where indicated on plans. Width of filler strips shall equal depth of floor slab.

3.6 FINISHING OF SLABS

A. Broom Finish for Slabs: The concrete slabs shall be given a coarse transverse scored texture by drawing a broom across the surface. The operation shall follow immediately after steel trowelling.

3.7 REPAIR OF DEFECTS

A. After forms have been removed, any concrete which is not constructed as shown on the plans or is out of alignment or level beyond required tolerances or which shows a defective surface which in the opinion of the Engineer cannot be properly repaired or patched shall be removed.

B. Where concrete which is exposed to view requires repairing or patching, the texture of the surface of such repair or patch shall closely match that of the surrounding surface.

## 3.8 CURING AND PROTECTION

A. All concrete shall be cured for a period of not less than seven (7) days by one of the methods listed below. During this curing period, the concrete shall be maintained with minimal moisture loss at a relatively constant temperature. Fresh concrete shall be protected from heavy rains, flowing water, mechanical injury, and injurious action of the sun. Curing method selected must be compatible with the finish to be applied to the concrete.

Curing shall immediately follow the finishing operation.

B. Water Curing: If cured with water, concrete shall be kept wet by mechanical sprinklers, by ponding, or by any other method which will keep the surfaces continuously wet.

C. Saturated Sand Curing: Surfaces cured with sand shall be covered with a minimum of one inch thickness of sand which shall be kept uniformly distributed and continuously saturated during the entire curing period.

D. Curing Compounds: Curing compounds shall not be used on concrete surfaces that are to receive paint finish, acid stain or resilient flooring, except those that are recommended by the manufacturer to be compatible with the applied finish. The Contractor shall submit to the Engineer a letter certifying that the curing compound is compatible with the applied finish. Application shall be in accordance with the manufacturer's recommendations. If curing, sealing or other compounds are used which are incompatible with applied finish, such compound shall be thoroughly removed by grinding with a terrazo grinder.

E. Waterproof Paper: Waterproof paper or opaque polyethylene film conforming to ASTM C171 may be used. The paper or film shall be anchored securely and all edges sealed or applied in such a manner as to prevent moisture escaping from the concrete.

## 3.9 SAMPLING AND TESTING

A. Sampling - ASTM C 172: Collect samples of fresh concrete to perform tests specified. ASTM C 31 for making test specimens.

B. Slump Tests - ASTM C 143: Take concrete samples during concrete placement. The maximum slump may be increased as specified with the addition of an approved admixture provided that the water-cement ratio is not exceeded. Perform tests at commencement of concrete placement, when test cylinders are made, and for each batch (minimum) or every 10 cubic yards (maximum) of concrete.

C. Compressive Strength Tests - ASTM C 39: Make four test cylinders for each set of tests in accordance with ASTM C 31. Test one cylinder at 7 days, two cylinders at 28 days, and hold one cylinder in reserve. Provide concrete cylinders for compression tests not less than once a day, nor less than once for each 100 cubic yards of concrete, nor less than once for each 5,000 square feet of surface for slabs or walls. If the average strength of the 28-day test cylinders is less than f'c and a maximum of one single cylinder is less than f'c minus 300 psi, take three ASTM C 42 core samples and test. If the average strength of the 28-day test cylinders is less than f'c and two or more cylinders are less than f'c minus 300 psi, take six core samples and test. Concrete represented by core tests shall be considered structurally adequate if the average of the three cores is equal to at least 85 percent of f'c and if no single core is less than 80 percent of f'c. Locations represented by erratic core strengths shall be retested. Remove concrete not meeting strength criteria and provide new, acceptable concrete at no additional cost to the State. Repair core holes with nonshrink grout. Match color and finish of adjacent concrete.

D. Testing: All sampling and testing shall be performed by an independent testing agency and all test results submitted to the Engineer for approval. All cost of sampling and testing shall be borne by the contractor.

END OF SECTION

SECTION 03603

EPOXY ADHESIVE

PART I - GENERAL

1.1 GENERAL CONDITIONS: This section covers the furnishing and installing of epoxy adhesive as required on the plans and in this specification. The epoxy adhesive shall be for structural bonding of concrete, masonry, metals and rock; grouting of reinforcing steel dowels and steel anchor bolts. Epoxy adhesive shall have a gel consistency ideal for vertical applications.

1.2 COORDINATION WITH OTHER SECTIONS: Coordinate installation of epoxy adhesive with Section 03300: CONCRETE and Section 05500: METAL FABRICATIONS.

1.3 SUBMITTALS: Submit manufacturer's published literature and manufacturer's specifications for physical characteristics and performance data.

1.4 PRODUCT HANDLING: Store unopened containers at 40 to 95 degrees F.

PART 2 - PRODUCTS

2.1 MATERIALS

A. Asbestos Prohibition: No asbestos containing materials shall be used under this section. The Contractor shall insure that all materials incorporated in the project are asbestos-free unless specifically approved in writing by the Engineer.

B. Epoxy adhesive shall be a multipurpose, 2 component, solvent free, moisture insensitive structural epoxy adhesive in accordance with ASTM C 881, Types I and II, Grade 3, Classes B and C for Epoxy Resin Adhesives with a minimum pot life of 30 minutes.

C. Physical Properties of Cured Epoxy Adhesive:

| ASTM TEST | | RESULTS |
|---|---|---|
| D-695 | Compressive Strength | 11,236 psi |
| D-732 | Shear Strength | 3,550 psi |
| D-638 | Tensile Strength | 2,940 psi |
| D-790 | Flexural Strength | 5,582 psi |
| C-882 | Bond Strength | 2,460 psi |
| D-570 | Absorption | 0.63% |
| C-883 | Shrinkage | complies |
| C-884 | Thermal Compatibility | complies |

D. Silica Aggregate shall be "Pro Silica aggregate", from Bonded Materials Company or approved equal.

PART 3 - EXECUTION

3.1 INSTALLATION AND WORKMANSHIP: Work shall be performed by skilled workmen in conformance with approved commercial practices and the manufacturer's specifications.

A. Surface shall be clean and sound. It may be dry or damp, but free of standing water. Remove dust, grease, curing compounds, foreign particles and disintegrated materials.

B. Epoxy adhesive shall be mixed in accordance with the manufacture's specifications. Epoxy adhesives shall not be mixed within 50 feet from the stream bed. Any epoxy adhesive spills shall be properly contained and cleaned up with absorbent material and disposed of outside the project site. The Engineer shall be notified within 24 hours of any spills.

C. Epoxy shall be mixed with silica aggregates in accordance with the manufacture's specifications. Smooth river rocks with a maximum diameter of 1" shall be set in place before the epoxy adhesive mortar sets up.

3.2 CLEAN UP

A. During the process of the work, the premises shall be kept reasonably free of all debris and waste materials resulting from the work under this section. All such debris and rubbish shall be removed from the site.

B. Clean residue from drilling immediately after holes are drilled in CRM.

3.3 MEASUREMENT AND PAYMENT: Payment for epoxy adhesives shall not be paid for directly but shall be considered as incidental to and included in the applicable contract unit price or lump sum price covering construction requiring epoxy adhesives.

END OF SECTION

SECTION 06100

ROUGH CARPENTRY

## PART 1 - GENERAL

### 1.1 GENERAL REQUIREMENTS

This section covers the requirements for furnishing and installing rough carpentry.

### 1.2 COORDINATION WITH OTHER SECTIONS

Coordinate installation of carpentry work with Section 06310, PRESERVATIVE TREATED LUMBER. All lumber shall be treated with termite preservative treatment, unless otherwise noted in the plans or contract specifications.

### 1.3 SUBMITTALS

Certificates of Grade: Attesting that products meet the grade requirements specified in lieu of grade markings where appearance is important and grade marks will deface material.

### 1.4 DELIVERY AND STORAGE

Deliver materials to the site in an undamaged condition. Carefully store materials off the ground to provide proper ventilation, drainage, and protection against dampness. Remove defective and damaged materials and provide new materials.

### 1.5 GRADING AND MARKING

Lumber: Mark each piece of framing and board lumber or each bundle of small pieces of lumber with the grade mark of a recognized association or independent inspection agency. Such association or agency shall be certified by the Board of Review, American Lumber Standards Committee, to grade the species used. All Douglas fir, western hemlock, western red cedar, white fir and sitka spruce shall be graded and dressed in accordance with the latest applicable West Coast Lumber Inspection Bureau or Western Wood Products Association "Standard Grading Rules" and its revisions.

### 1.6 SIZES AND SURFACING

PS 20 for dressed sizes of yard and structural lumber. Lumber shall be surfaced four sides. Size references, unless otherwise specified, are nominal sizes, and actual sizes shall be within manufacturing tolerances allowed by the standard under which the product was produced.

1.7 MOISTURE CONTENT

Air-dry or kiln-dry lumber. Kiln-dry treated lumber after treatment. Maximum moisture content of wood products shall be as follows at the time of delivery to the job site:

1. Framing lumber and boards - 19 percent maximum
2. Timbers five inches and thicker - 25 percent maximum
3. Materials other than lumber - Moisture content shall be in accordance with standard under which the product was produced.

PART 2 - PRODUCTS

2.1 MATERIALS

A. Lumber, New

1. Douglas Fir

a. Concealed lumber shall be "construction" grade, S4S.

b. Exposed lumber shall be "select structural" grade, S4S.

B. Plywood for Siding and Doors

1. Exterior: Shall be APA #303-6 wood patch, T1-11 5/8" thick exterior grade, Douglas Fir with rough sawn face, 3/8" X 1/4" deep grooves spaced at 4" o.c. conforming to U.S. Product Standard P.S. 1-74 of the American Plywood Association Specifications.

2. Interior: Shall be 1/2" thick A/C Panel, interior/exterior glue treated as specified in Section 06310.

C. Nails, Screws, Bolts and Rough Hardware

Commercial standard of sizes indicated or required. For finish work, brass screws (chrome plated, nickel plated or plain brass as required). Otherwise, nails, screws and bolts shall be hot-dip galvanized. Light gauge metal pre-fabricated joist and beam hangers, angle clips, etc., shall be as manufactured by "Silver," "Simpson," "Teco," or equal. All hangers shall be hot-dipped galvanized after fabrication.

D. Damp-proofing

Apply a continuous strip of 40 pound asphalt saturated felt under wood members bearing on concrete or masonry and 15 pounds in other non-bearing concrete areas.

E. Metal Framing Anchors

Construct anchors to the configuration shown using hot dip zinc-coated steel conforming to ASTM A 525, coating designation G90. Steel shall be not lighter than 18 gauge. Special nails supplied by the manufacturer shall be used for all nailing.

PART 3 - EXECUTION

3.1 WORKMANSHIP

All work shall be done by experienced and skilled workers that are familiar with the type of work required to the best practices of this trade.

3.2 INSTALLATION

A. Fit framing lumber and other rough carpentry, set accurately to the required lines and levels, and secure in place in a rigid manner. Do not splice framing members between bearing points. Spiking and nailing not indicated or specified otherwise shall be in accordance with the Nailing Schedule contained in UBC; perform bolting in an approved manner. Spikes, nails, and bolts shall be drawn up tight.

B. Wherever it is necessary to end cut or penetrate into (such as by drilling or notching) treated wood on the job, all such cuts and penetrations shall be treated in accordance with AWPA Standard M4-84 using two heavy brush coats of a treating solution as specified therein or of the same solution used in the initial treatment of the wood.

C. Holes for bolts generally are to be for "drive" fit.

D. Screws driven with a hammer or overly tightened so as to lose tension shall be removed and replaced with next larger size and/or longer.

E. All finish work shall be free from hammer marks, undesirable scratches and/or dents and crushed edges.

F. A continuous strip of 40 lbs. asphalt felt shall be installed under wood members bearing on concrete or masonry, and in other non-bearing contact areas use 15 lbs. asphalt felt.

G. Opening Frames: Wood frames for doors, etc., shall be constructed as per drawings. Head shall be dadoed and housed into jamb with waterproof glue and nailed together securely. Wipe off all excess glue. Frames shall be set plumb and true, solidly blocked and rigidly secured to structural backing at not more than 18" o.c. Coordinate with other trade for anchoring.

H. For Interior and Exterior Running Trims, Including Door Stops: Use long lengths of finish lumber, keeping splice to minimum. All trims shall be installed straight and level and with mitered splices nailed together. Splices will not be permitted in vertical trims.

I. Finish Hardware, shall be carefully fitted and installed in accordance with the manufacturer's directions and shall be adjusted for perfect working order to the satisfaction of the Engineer with further adjustment if necessary within one (1) year after acceptance of the project.

3.3 CLEAN-UP AND PROTECTION

A. Protect all installed finish work, millwork, etc., from being defaced or marred by workmen of other trades. Replace or repair any damaged work as instructed by the Engineer at no cost to the State.

B. At the completion of this work, remove from the premises all rubbish, debris, etc., accumulated during the progress of this work.

END OF SECTION

SECTION 06110

WOOD FRAMING AND SHEATHING

PART 1 - GENERAL

1.1 GENERAL REQUIREMENTS

This section covers the requirements for furnishing and installing wood framing and sheathing and connection hardware.

1.2 REFERENCES

A. ALSC - American Lumber Standards Committee: Softwood Lumber Standards.

B. AITC - American Institute of Timber Construction.

C. ANSI/ASTM A123 - Zinc (Hot Galvanized) Coatings on Products Fabricated from Rolled, Pressed, and Forged Steel Shapes, Plates, Bars, and Strips.

D. AWPA - American Wood Preservers Association.

E. AWPI - American Wood Preservers Institute.

F. NFPA - National Forest Products Association.

G. RIS - Redwood Inspection Service: Standard Specifications for Grades of California Redwood Lumber.

H. SFPA - Southern Forest Products Association.

I. WCLIB - West Coast Lumber Inspection Bureau: Standard Grading Rules for West Coast Lumber.

J. WWPA - Western Wood Products Association.

1.3 SUBMITTALS

A. Certificates of Conformance or Compliance: Submit certificates from the manufacturers attesting that materials meet the specified requirements.

B. Manufacturers' Descriptive Data: Submit complete descriptive data for each type of material. Clearly mark data to indicate the type the Contractor intends to provide. Data shall state conformance to specified requirements.

1.4 QUALIFICATIONS

A. Lumber Grading Agency: Certified by ALSC.

B. Manufacturer: Company specializing in manufacture of framing material certified by AITC with three years minimum experience.

1.5 DELIVERY AND STORAGE

A. Deliver materials to the site in an undamaged condition. Carefully store materials off the ground to provide proper ventilation, drainage, and protection against dampness. Remove defective and damaged materials and provide new materials.

1.6 GRADING AND MARKING

A. Lumber: Mark each piece of framing and board lumber or each bundle of small pieces of lumber with the grade mark of a recognized association or independent inspection agency. Such association or agency shall be certified by the Board of Review, American Lumber Standards Committee, to grade the species used.

B. Preservative-Treated Lumber and Plywood: Mark each piece with a permanent mark indicating conformance with the applicable AWPA standard. The label shall be an approved AWPA quality mark or that of an approved independent inspection agency that maintains continuing control, testing, and inspection over the quality of the product.

C. Hardboard, Gypsum Board, and Fiberboard: Mark each sheet or bundle to identify the standard under which the material is produced and the producer.

1.7 SIZES AND SURFACING

PS 20 for dressed sizes of yard and structural lumber. Lumber shall be surfaced four sides. Size references, unless otherwise specified, are nominal sizes, and actual sizes shall be within manufacturing tolerances allowed by the standard under which the product is produced.

1.8 MOISTURE CONTENT

As follows at the time of delivery to the job site.

A. Framing lumber 2 inches and less in thickness: 19% maximum.

B. Boards: 19% maximum.

C. Framing lumber over 2 inches thick: 25% maximum.

D. Materials other than lumber: Moisture content shall be in accordance with standard under which the product is produced.

## PART 2 - PRODUCTS

### 2.1 MATERIALS

A. Lumber Grading Rules: NFPA.

B. Lumber: Stress Group species, grade, and maximum moisture content of percent, shall be sufficient to meet the structural purpose of the lumber and overall integrity of the building.

C. Structural Lumber: Any of the species and grades listed in NFPA National Design Specification for Wood Construction that have allowable unit stresses in pounds per square inch (psi) not less than allowable unit stresses indicated. Use for joists, rafters, trusses, plates, furring, purlins and all other members indicated to be stress rated.

D. Framing Lumber: Framing lumber such as plates, caps, nailing strips, and nailers and board lumber such as subflooring and wall and roof sheathing shall be of the species as indicated on the drawings.

### 2.2 ACCESSORIES

A. Connectors: Manufactured by a nationally advertised firm with at least five years experience in the manufacturing of required connectors.

B. Bolts, Nuts, Washers, lags, and Screws: Medium carbon steel; galvanized coating; size and type to suit application.

### 2.3 PRESERVATIVES

Treat lumber not over 5 inches thick and plywood in accordance with AWPA LP-33 or AWPA LP-44 when in contact with soil; with AWPA LP-55 when in contact with water; with AWPA LP-2 or AWPA LP-4 when specified to be painted; with AWPA LP-2 when used in built-up roofing systems. Treat lumber not over 5 inches thick and plywood used in other locations or for other purposes in accordance with AWPA LP-2, AWPA LP-3, or AWPA LP-4. Treat lumber over 5 inches thick in accordance with AWPA C-2, except do not creosote or coal-tar solutions. Do not incise surfaces of lumber that will be exposed. Brush coat areas that are cut or drilled after treatment with the preservative used in the treatment or with copper naphthenate solution. The following items shall be preservative treated:

A. Wood Framing, woodwork, and plywood.

B. Exterior wood and all wood framing of open, roofed structures.

C. Wood, plates, furring, sleepers and nailers that are set into or in contact with concrete or masonry. Plates for trusses, joists firecut and framed into masonry, and furring on concrete or masonry walls and partitions.

D. Nailers, edge strips, and cants for roof decks.

2.4 OTHER MATERIALS

A. Building Paper: Fed. Spec. UU-B-790, Type I, Grade D, Style 1.

B. Trussed Rafters: Light metal plate connected trusses in accordance with TPI-78.

2.5 ROUGH HARDWARE

Unless otherwise indicated or specified, rough hardware shall be of the type and size necessary for the project requirements. Sizes, types, and spacing of fastenings of manufactured building materials shall be as recommended by the product manufacturer unless otherwise indicated or specified. Rough hardware exposed to the weather or embedded in or in contact with exterior masonry or concrete walls or slabs shall be zinc-coated.

A. Bolts, Nuts, Studs, and Rivets: ANSI B18.2.1, ANSI B18.5, ANSI B18.2.2, and ASTM A 687.

B. Framing Anchors: Steel or iron, zinc coated, sized to fit the supported member, of sufficient strength to develop the full strength of the supported member in accordance with ICBO Uniform Building Code, and furnished complete with any special nails required.

PART 3 - EXECUTION

3.1 ERECTION

A. Set structural members level and plumb, in correct position.

B. Make provisions for erection loads, and for sufficient temporary bracing to maintain structure safe, plumb, and in true alignment until completion of erection and installation of permanent bracing.

C. Do not alter structural members without approval of the Engineer.

D. After erection, touch-up all sawcuts and untreated surfaces with preservative consistent with requirements.

E. Closely fit framing lumber and other rough carpentry, set accurately to the required lines and levels, and secure in place in a rigid and substantial manner. Do not splice framing members between bearing points. Set furring, plates, and purlins with their crown edge up. Frame members for the passage of pipes, conduits, and ducts. Do not cut or bore structural members for the passage of ducts or pipes without approval. Reinforce all members damaged by such cutting or boring by means of specially formed and approved reinforcement, or remove and provide new, as approved. Provide as necessary for the proper completion of the work all framing members not indicated or specified. Spiking and nailing not indicated or specified otherwise shall be in accordance with the Recommended Nailing Schedule contained in NFPA Manual for House Framing; perform bolting in an approved manner. Spikes, nails, and bolts shall be drawn up tight.

F. Anchors in Masonry: Embed anchor bolts as indicated on the drawings in masonry unit walls and provide each with a nut and a 2-inch-diameter washer at bottom end. Fully grout bolts with mortar.

G. Purlins: Provide purlins of the sizes and spacing indicated, accurately and in alignment, and of uniform width.

3.2 SITE APPLIED WOOD TREATMENT

A. Brush apply one coat of preservative treatment on wood in contact with cementitious materials, roofing and related metal flashings.

B. Apply preservative treatment in accordance with manufacturer's instructions.

C. Treat site-sawn ends.

D. Allow preservative to cure prior to erecting members.

3.3 BUILDING PAPER

Provide building paper where indicated. Apply paper shingle fashion, horizontally, beginning at the bottom of the wall. Lap edges 4 inches, and nail with one-inch, zinc-coated roofing nails, spaced 12 inches on centers and driven through tin discs.

3.4 MANUFACTURED TRUSSES

Size as indicated and set accurately and in alignment. Toe-nail and fasten trusses to all plates as shown on the drawings.

## 3.5 METAL FRAMING ANCHORS

Provide framing anchors at every trussed rafter to fasten trussed rafter to plates and studs against uplift and movement of any kind. Anchors shall be punched and formed for nailing so that nails will be stressed in shear only. Nails shall be zinc-coated; drive a nail in each nail hole provided in the anchor.

## 3.6 WOOD FURRING

Provide where shown and as necessary for facing materials specified. Except as shown otherwise, furring strips shall be one inch by three inches, continuous, and spaced 16 inches on centers. Erect furring vertically or horizontally as necessary. Provide furring strips around openings, behind bases, and at angles and corners. Furring shall be plumb, rigid, and level and shall be shimmed as necessary to provide a true, even plane with surfaces suitable to receive the finish required.

END OF SECTION

SECTION 06200

FINISH CARPENTRY

PART 1 - GENERAL

1.1 GENERAL REQUIREMENTS

This section covers the requirements for furnishing and installing finish carpentry.

1.2 APPLICATION PUBLICATIONS

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

A. Federal Specifications (Fed. Spec.)

B. U. S. Department of Commerce, Product Standards (PS)

C. American National Standards Institute (ANSI) Publications

D. American Society for Testing and Materials (ASTM) Publications

E. American Wood Preservers Bureau (AWPB) Publications

F. National Electrical Manufacturers Association (NEMA) Publications

G. National Woodwork Manufacturers Association, Inc. (NWMA) Industry Standard

H. Western Wood Products Association (WWPA) Publication

1.3 SUBMITTALS

A. Shop Drawings: Show all prefabricated millwork. Include details and erection data associated with the work of other trades; materials and species; arrangements; profiles of moldings; thicknesses; sizes of parts; construction; fastenings; and clearances.

B. Certificates of Compliance: Submit certificates on all materials, except for those materials bearing certification markings or statements.

C. Certificates of Grade: Submit certificates from the grading agency on graded but unmarked lumber or plywood attesting that materials meet the grade requirements specified herein.

D. Samples:

1. Interior trim and moldings: One linear foot of each kind.

2. Laminated Plastic: Two samples of each color, pattern, and texture for approval by the Engineer.

1.4 DELIVERY AND STORAGE

Deliver lumber, plywood, trim, and millwork to the job site in an undamaged condition. Stack materials to ensure ventilation and drainage and protect against dampness before and after delivery. Store materials under cover in a well-ventilated enclosure and protect against extreme changes in temperature and humidity. Do not store products in the building until wet trade materials are dry.

1.5 GRADE AND QUALITY MARKINGS

A. Lumber: Each piece or each bundle of lumber, millwork, and trim shall be identified by the grade mark of a recognized association or independent inspection agency that is certified by the Board of Review, American Lumber Standards Committee, to grade the species.

B. Plywood: Each sheet of plywood shall bear the mark of a recognized association or independent inspection agency that maintains continuing control over the quality of the plywood. The mark shall identify the plywood by species group or span rating, and shall show exposure durability classification, grade, and compliance with PS 1.

1.6 SIZES AND PATTERNS OF WOOD PRODUCTS

Yard and board lumber sizes shall conform to PS 20. Provide shaped lumber and millwork in the patterns indicated and standard patterns of the association covering the species. Size references, unless otherwise specified, are nominal sizes, and actual sizes shall be within manufacturing tolerances allowed by the applicable standard.

1.7 MOISTURE CONTENT OF WOOD PRODUCTS

Air-dry or kiln dry lumber. Kiln-dry treated lumber after treatment. The maximum moisture content of wood products at time of delivery to the job site shall be as follows:

A. Interior paneling: 12 percent.

B. Interior finish lumber, trim, and millwork 1-1/4-inch or less in nominal thickness: 12 percent on 85 percent of the pieces and 15 percent on remainder.

C. Exterior treated or untreated finish lumber and trim 4-inch or less in nominal thickness: 15 percent.

D. Moisture content of other materials shall be in accordance with the applicable standards.

1.8 PRESERVATIVE TREATMENT OF WOOD PRODUCTS

A. Nonpressure Treatment: Treat woodwork and millwork, such as exterior trim, door trim, and window trim, in accordance with NWMA I.S.4. Provide a liberal brushcoat of preservative treatment to field cuts and holes.

B. Pressure Treatment: Treat lumber and plywood used on the exterior of buildings and wood members in contact with masonry or concrete in accordance with AWPB LP-2 or AWPB LP-4.

PART 2 - PRODUCTS

2.1 WOOD

A. Trim, Finish, and Frames: Provide species and grades as shown on the drawings for materials to be paint finished. Materials that are to be stain, natural, or transparent finished shall be one grade higher than that listed. Provide species indicated on drawings for materials to be transparent finished. Run trim, except window stools and aprons, with hollow backs.

B. Shelving: Suitable species of grade equal to or exceeding Boards, 3 Common Hem-Fir under WWPA Standard Grading Rules for Western Lumber.

C. Plywood for Shelving: Interior Type, A-B Grade, any species group.

D. Plywood for Countertops: Exterior Type, A-C grade.

2.2 LAMINATED PLASTIC

NEMA LD 3.

A. Countertops: Grade GP 50 or PF 42, Satin Finish. Color and pattern shall be as indicated, by the Engineer.

2.3 HARDWARE

Provide sizes, types, and spacings of manufactured building materials recommended by the product manufacturer except as otherwise indicated or specified. Provide hot-dipped galvanized steel or aluminum nails and fastenings where used on the exterior or exposed to the weather.

A. Toggle Bolts: Fed. Spec. FF-B-588.

B. Wood Screws: ANSI B18.6.1.

C. Wire Nails and Staples: Fed. Spec. FF-N-105.

D. Bolts, Nuts, lag Screws, and Studs: ANSI B18.2.1, ANSI B18.5, ANSI B18.2.2, and ASTM A 687.

2.4 FABRICATION

A. Countertops: Fabricate with lumber and a core of exterior plywood or particleboard, glued and screwed to form an integral unit. Bond laminated plastic under pressure to exposed surfaces, using type of glue recommended by the plastic manufacturer. The countertop unit shall be either the self-edged type covered with NEMA LD 3, Grade GP 50 plastic, or the post-formed type covered with NEMA LD 3, grade PF 42 plastic, at the option of the Engineer.

B. Cabinets: Fabricate with solid ends and frame fronts, or with frames all around. Frames shall be solid hardwood and, where exposed, of the same species as the plywood veneer. Ends, bottom, back partitions, and doors shall be hardwood plywood. Mortise and tenon, glue and screw joints to produce a rigid unit, and cover exposed edges of plywood with hardwood strips. Doors, frames, and solid exposed ends shall be 3/4-inch thick; bottom, partitions, and framed ends 1/2-inch minimum; back 1/4-inch minimum.

C. Cabinet Hardware: ANSI A156.9. Provide hardware for each door, including two semiconcealed hinges, magnetic catch, and door pull. Provide two side-mounted metal drawer slides and a pull for each drawer. Hardware exposed to view shall be bright chromium plated.

D. Finish: Provide a natural factory finish on all wood surfaces after fabrication. The finish shall be the fabricator's standard natural finish, except that it shall be equivalent to one coat of sealer and one coat of spar varnish on all surfaces and a second coat of spar varnish on all surfaces exposed to view. Sand lightly and wipe clean between coats.

PART 3 - EXECUTION

3.1 GENERAL FINISH WORK

Provide sizes, materials, and designs as indicated and as specified. Apply primer to finish work before installing. Where practicable, shop assemble and finish items of built-up millwork. Joints shall be tight and constructed in a manner that will conceal shrinkage. Miter trim and moldings at exterior angles and cope at interior angles and at returns. Material shall show no warp after installation. Install millwork and trim in the maximum practical lengths. Fasten finish work with finish nails. Provide blind nailing where practicable. Set face nails for putty stopping.

A. Exterior Finish Work: Construct joints to exclude water. Fascias and other flat members, unless otherwise indicated, shall be 3/4-inch thick.

B. Interior Finish Work: After installation, sand exposed surfaces smooth.

3.2 SHELVING

Nominally one-inch thick wood shelf material or 3/4-inch or 23/32-inch thick plywood shelf material supported substantially with end and intermediate supports and arranged to prevent buckling and sagging.

A. Storage Closet: Provide storage closet with shelves 11-1/2-inches wide and spaced 18-inches apart from the floor to the ceiling.

3.3 MISCELLANEOUS

A. Counters: Construct as indicated. Conceal fastenings where practicable, fit the counter neatly, install in a rigid and substantial manner, and scribe to adjoining surfaces. Provide counter sections in the longest lengths practicable; keep joints in tops to a minimum; and where joints are necessary, provide tight hairline joints drawn up with concealed-type heavy pull-up bolts. Glue joints with water-resistant glue and, in addition, make rigid and substantial with screws, bolts, or other approved fastenings.

B. Cabinets: Install level, plumb, and tight against adjacent walls. Secure cabinets to walls with concealed toggle bolts, and secure top to cabinet with concealed screws.

END OF SECTION

SECTION 06310

PRESERVATIVE TREATED LUMBER

## PART I - GENERAL

### 1.1 GENERAL REQUIREMENTS

This section covers the requirements for furnishing and installing of preservative treatment.

### 1.2 SUBMITTALS

A Certificate of Treatment shall be issued to the Engineer showing compliance with these specifications, both as to kiln drying and type of treatment performed, including dip treatment.

### 1.3 GUARANTEE

The Contractor shall submit to the Engineer a written guarantee that he will replace all treated wood which is attacked by subterranean termites during the first two (2) years or is attacked by dry rot during the first two (2) years after project acceptance.

## PART 2 - PRODUCTS

### 2.1 GENERAL

A. All wood treated with oil-borne preservatives shall be kiln-dried before treatment to an average of 12% to 15% moisture content.

B. All wood shall be treated as below except all-heart redwood.

C. Lumber shall be milled to finish size and shape prior to treating, and it shall be treated before assembly. Plywood may be treated in regular panel sizes.

### 2.2 MATERIALS

A. Asbestos Prohibition: No asbestos containing materials shall be used under this section. The Contractor shall insure that all materials incorporated in the project are asbestos-free unless specifically approved in writing by the Engineer.

B. Water-Borne Preservatives shall be Woman, CCA, Osmose CCA or Chemonite ACZA in accordance with American Wood Preservers Association (AWPA) Standard P5.

C. Oil-Borne Preservatives shall be water repellant penta-chlorophenol (Penta) or tri-N-butyltin oxide (TBTO) in accordance with AWPA Standard P8, or chlorpyrifos and 3-iodo-2-propynyl butylcabamate (IPBC) manufactured to the manufacturer's quality control. The solvent used in formulating the preservative solution shall meet the requirements of AWPA hydrocarbon solvent Type C, Standard P9, Paragraph 3.1.

## PART 3 - EXECUTION

### 3.1 WOOD PRESERVATION WITH WATER-BORNE PRESERVATIVES

All lumber and plywood, except as stipulated in Paragraphs 3.02 and 3.03 below, shall be treated by a pressure method with Wolman CCA, Osmose CCA or Chemonite ACZA in accordance with American Wood Preservers Bureau Standards AWPB Approved (Hawaii use only) and AWPB LP-2, respectively. All 1" and 2" lumber and all plywood shall be dried to a moisture content of 19% or less after treatment.

### 3.2 WOOD PRESERVATION BY PRESSURE TREATMENT WITH OIL-BORNE PRESERVATIVES

Exposed lumber 2" nominal thickness and over that will be unpainted or will receive a clear finish shall be unincised and pressure treated with either a 1.2% TBTO solution to a net retention of 0.06 pounds of TBTO per cubic foot of wood or a 0.5% chlorpyrifos/0.75% IPBC solution to a net retention of 500 ppm chlorpyrifos and 1000 ppm IPBC per cubic foot of wood.

### 3.3 WOOD PRESERVATION OF DIP TREATMENT

All finish lumber under 2" nominal thickness; finish plywood; and millwork items that will be exposed to view in the finished work shall be immersion treated for a minimum period of 15 minutes in any preservatives listed in Section 2.02B, above in accordance with the requirements of the National Wood, Window and Door Association (NWWDA) Industry Standard I.S. 4-81.

### 3.4 INSTALLATION

Wherever it is necessary to end cut or penetrate into (such as by drilling or notching) treated wood on the job, all such cuts and penetrations shall be treated in accordance with AWPA Standard M-4-84 using two heavy brush coats of treating solution as specified therein or of the same solution used in the initial treatment of the wood.

END OF SECTION

REVISED SECTION 07416

# STANDING SEAM METAL ROOFING

## PART 1 - GENERAL

### 1.1 GENERAL REQUIREMENTS

This section covers the requirements for furnishing and installing preformed standing seam metal roofing.

### 1.2 SUMMARY

Metal roofing units shall be fabricated and shop finished as specified herein and shall conform to the American Iron and Steel Institute “Light Gage Cold-Formed Steel Design Manual” and requirements of the Steel Deck Institute.

Field Dimensions: The Contractor shall take all measurements in the field as required to verify and supplement dimensions shown on the drawings and assume responsibility therefore.

### 1.3 SUBMITTALS

A. Manufacturer's Data: Catalog cuts, technical data sheets and descriptive literature for the following:

1. Sheets
2. Panels
3. Accessories
4. Fasteners
5. Joint sealing material

B. Shop Drawings: Submit shop drawings indicating the following:

1. Panel and fastener layouts
2. Joint
3. Corners
4. Support details
5. Anchorages
6. Trims
7. Flashings
8. Closures and special

C. Certified Test Reports: Submit reports for the following tests:

1. Formability test: When subjected to a 180-degree bend over a 1/8-inch diameter mandrel (3/8-inch diameter mandrel for coatings 4 mils or greater in thickness) in accordance with ASTM D 1737, finish coating shall show only slight microchecking of the exterior film and there shall be no loss of adhesion.

2. Weathering Test: A sample of the finished coated sheets shall withstand a weathering test for a minimum of 2000 hours in accordance with ASTM G 23 or ASTM D 2565 without cracking, peeling, blistering, loss of adhesion of the protective coating, or corrosion of the base metal. Finished coating system that can be readily removed from the base metal with a penknife blade or similar instrument shall be considered to indicate loss of adhesion.

3. Chalking Resistance: After the 2000-hour weathering test, finish coating system shall not chalk greater than No. 8 rating when measured in accordance with ASTM D 659 test procedures.

4. Specular Gloss: Finished surfaces shall have a specular gloss value of 30 to 70 at an angle of 60 degrees, when measured in accordance with ASTM D 523.

5. Salt Spray Test: A sample of the finished coated sheet shall withstand a salt spray test for a minimum of 1000 hours in accordance with ASTM B 117, including the scribe requirement in the test. Immediately upon removal of the panel from the test, the coating shall receive a rating of few No. 8 blisters, as determined by ASTM D 714; and rating of 7, 1/16 inch failure at scribe, as determined by ASTM D 1654, Rating Schedule No. 1.

6. Humidity Test: When subjected to a humidity cabinet test in accordance with ASTM D 2247 for 1000 hours, factory finish organic coated panel shall receive a rating of few No. 8 blisters as determined by ASTM D 714.

## 1.4 DELIVERY AND STORAGE

Deliver, store, and handle panels and other manufactured products to prevent damage. Stack materials stored on the site on platforms or pallets and cover with tarpaulins or other suitable weather tight covering. Store all panels so that water which might have accumulated during transit or storage will drain off; do not store the panels in contact with materials that might cause staining. Inspect the panels upon arrival to the job site; if wet, remove the moisture and restack and protect the panels until used.

## 1.5 WARRANTY

The contractor shall furnish the State a written guarantee on the roofing, flashing and caulking of the flashing. The guarantee shall provide for repairs of the roofing, flashing and any penetration, where leakage occurs, and for repairs and replacement of damages to the building and its finishes resulting from such leaks in the roofing and flashing system, all at no cost to the State for a period of 2 years after final acceptance.

The Contractor shall provide the State with the Manufacturer's warranty. The warranty shall be for 20 years and cover the degradation of metal roofing. The warranty shall provide for full replacement of the metal roofing and components.

## PART 2 - PRODUCTS

### 2.1 ROOFING

Metal roof: 22-gauge, aluminum-zinc alloy coated steel conforming to ASTM 792, 55 coating, surface treated for maximum coating performance. Profile shall be standing seam metal roofing is based on Shur-Lock 200 12" snap seam panel as manufactured by HPM Building Supply; 22-gauge 12" wide MAC 175 Standing Metal Seam as manufacturer by Kloeckner Metals or 22-gauge 14" wide CB-2000 Titan Standing Seam Panel as manufactured by Custom-Bilt Metals or approved equal.

Metal roofing finish: Roofing shall be factory finished on the top exposed surface with Kynar 500 color and baked on-enamel on the bottom surface to match existing buildings with metal roofing; or 70% PVDF Durapon 70 with Teflon coating by Duracoat Products, Inc. conforming to AAMA 605.2 or approved equal. Provide touch up paint for touch up of chipped/scratched/damaged painted finish and to paint visually exposed aluminum-zinc coating and unfinished roofing accessories.

### 2.2 ACCESSORIES

Except as indicated as work of another specification section, provide components required for a complete roofing system, including sheet metal flashings, trim, moldings, closure strips, caps; stainless steel clips, standoff clips, sidelap clips, and uplift clips; and other similar sheet metal accessories used in conjunction with preformed metal sheets shall be of the same material and finish as used for the sheets. Metal shall be of thickness not less than that used for the sheets. Molded closure strips shall be closed-cell or solid-cell synthetic rubber, neoprene, or polyvinyl chloride premolded to match the configurations of the preformed metal sheets.

### 2.3 FASTENERS AND LOCKING CLIPS

Fasteners shall be Zinc Aluminum Capped (ZAC) steel as recommended by the roofing panel manufacturer. Non-penetrating using concealed system consisting of galvanized clips, with wafer head screw fasteners. Concealed clips shall have design provisions for thermal expansion and contraction of the interlocking metal sheets.

### 2.4 JOINT SEALING MATERIAL

Standing Seam Sealant shall be factory installed non-hardening, nondrying butyl rubber based sealant with the female seam, designed to provide a seal in the standing seam ribs.

Exposed sealant shall be cure to rubberlike consistency and non-hardening. Oil or asphalt-type caulking are not acceptable. The materials shall be non-bleeding up to 160 degrees F and shall withstand temperatures up to 300 degrees F without loss of adhesion or slipping; and shall have properties to allow it to move with the expansion and contraction of the structure.

2.5 Closure Strips shall be 1" wide foam material resistant to water and ultraviolet rays. All closure strips shall have a butyl adhesive/sealant on the top and bottom surfaces.

2.6 Roofing underlayment shall be a synthetic roofing underlayment as manufactured by Feltex Synthetic Roof Underlayment, SDP Synthetic Roofing Underlayment or approved equal.

2.7 Flashing Tape: Self adhering all purpose Polyester Reinforced Heavy Duty Aluminum flashing Tape. Fast Flash H.D. by Protecto Wrap.

2.8 Flashing Vent Tape: Self adhering tape, fleece-lined expanded honey-combed aluminum mesh center. Allows 42 sq. in. of ventilation per linear foot of tape. Tile Flash Vent Tape by Protecto Wrap.

2.9 Pipe Flashing: Flexible weather-resistant EPDM flashing system. One piece construction with flexible aluminum base. Decktile by ITW Buildex.

3.0 Standing Seam Sealant: Provide panels with factory installed non-hardening, nodrying butyl rubber based sealant within the female seam, designed to provide a seal in standing seam ribs.

PART 3 - EXECUTION

3.1 INSTALLATION

Install in accordance with the manufacturer's approved erection instructions and diagrams, except as specified otherwise herein. Panels shall be in full and firm contact with supports and with each other at side and end laps. Where sheets are cut in the field, or where any of the factory-applied coverings or coatings are abraded or damaged in handling or installation, they shall, after the necessary repairs have been made with material of the same type and color as the weather coating, be approved before installation. All cut ends and edges, including those at openings through the sheets, shall be sealed completely. Correct defects or errors in the materials in an approved manner. Remove materials which cannot be corrected in an approved manner and provide non-defective materials. Provide molded closure strips where indicated and whenever sheets terminate with open ends after installation. Use only mechanical or manual shears for cutting of metal roofing. Circular or reciprocating saw blades are prohibited. Rust that is found by the Engineer or State Representative on the rafters, which may be part of the building frame, shall be removed in its entirety. If removal is not possible, removal and replacement is required.

A. Roof Panels: Apply roofing panels with the configurations parallel to the slope of the roof.

Provide roofing panels in the longest lengths obtainable, with end laps occurring only at structural members. Lay all side laps away from the prevailing wind and seal side and end laps with joint sealing material. Flash and seal the roof at the ridge, at eaves and rakes, at projections through the roof, and elsewhere as necessary. Accomplish the placement of closure strips, flashing ("Z" Closure, fixed Ridge and Eave), and sealing material in an approved manner that will assure complete weather tightness.

B. Roofing underlayment shall be installed on the plywood roof sheathing in accordance with the manufacturer's instructions.

C. Flashings: All flashing and related closures and accessories in connection with the preformed metal panels shall be provided as indicated and as necessary to provide a watertight installation. Details of installation which are not indicated shall be in accordance with the panel manufacturer's printed instructions and details or the approved shop drawings. Installation shall allow for expansion and contraction of flashing.

D. Fasteners: Fastener spacings shall be in accordance with the manufacturer's recommendations and as necessary to withstand the design loads indicated. Install fasteners as recommended by the manufacturer of the sheet being used. Install fasteners in straight lines within a tolerance of 1/2 inch in the length of a bay. Torque used in applying fasteners shall not exceed that recommended by the manufacturer. Remove metal shavings and filings from roofs at the end of each working day to prevent rusting and discoloration of the panels.

END OF SECTION

SECTION 07600 - FLASHING AND SHEET METAL

PART 1 - GENERAL

1.01 GENERAL REQUIREMENTS: This section includes the furnishing and installing complete-in-place all flashing and sheet metal materials and its appurtenances as indicated on the plans and specifications.

1.02 DESCRIPTION OF WORK

A. Provide all labor, materials and equipment necessary to fabricate and install flashing, counterflashing, metal edging, gutters and downspouts, and other related work as shown on drawings and as specified herein.

B. Related Work Described Elsewhere: Coordinate installation of sheet metal work with Section 07416 – STANDING SEAM METAL ROOFING.

1.03 SUBMITTALS

1. Manufacturer's Data: Submit manufacturer's product data on all manufactured items.

2. Shop Drawings: Submit shop drawings with reference made to detail numbers on the contract drawings to the Engineer for approval. Shop drawings shall show all fasteners and relationship to adjacent work. No fabrication will be permitted before approval is secured.

1.04 QUALITY ASSURANCE

A. All sheet metal fabrications shall conform to State and local codes, SMACNA (latest edition) and industry standards.

B. All roof penetrations shall be installed weathertight in such a manner to maintain integrity of the roofing.

1.05 STORAGE AND HANDLING

All materials shall be stored in such a manner as to afford adequate protection. Damaged materials shall not be used and shall be removed from the site.

1.06 GUARANTEE

The Contractor shall furnish to the Engineer a written guarantee on the sheet metal for a 2-year period after the Project Acceptance Date. The guarantee shall provide for the

repair of all leaks as well as repair and replacement of damage to the building and/or its finishes at no cost to the Owner.

## PART 2 - PRODUCTS

### 2.01 MATERIALS

A. Exposed Flashing, Counterflashing, Gutters, Downspouts, and Metal Edging: 24 gauge galvanized sheet metal, ATSM A 653/A 653/M, G90 hot-dip galvanized.

B. Solder: 50 percent virgin lead and 50 percent pure block tin, conforming to ASTM B 32.

C. Flux: Non-corrosive resin type.

D. Nails and Fasteners: Use the same metal or a metal compatible with the item. Use stainless steel fasteners to fasten dissimilar metals.

E. Asphaltic Roof Cement: ASTM D 4586, Type I for horizontal surface and Type II for vertical surfaces.

F. Stainless Steel Vent Screen: 8 mesh, minimum 0.017 diameter wire unless indicated otherwise.

G. Stainless Steel Clamp: As indicated for screwdriver adjustment.

## 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. In the absence of such a report, the Contractor shall be held responsible for the finished product.

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.

D. Seams: Straight and uniform in width and height with no sealants showing on the face.

1. Flat-lock Seams: Finish not less than 3/4-inch wide.

2. Lap Seams: Finish soldered seams not less than one-inch wide. Overlap seams not soldered, not less than 3-inches.

3. Loose-lock Expansion Seams: Not less than 3-inches wide, and shall provide minimum one-inch movement within the joint. Joint shall be completely filled with the specified sealant, applied at not less than 1/8-inch thick bed.

4. Flat Seams: Make seams in the direction of the flow.

E. 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.

F. Cleating: Cleats for sheet metal work shall be provided where required, spaced as indicated. Cleats shall be not less than 2-inches wide by 3-inches long of the same material and weight as the metal being installed.

G. Reglets: Type and size as indicated.

H. 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 GUTTERS

The hung type of shape indicated and supported on underside by brackets that permit free thermal movement of the gutter. Provide gutters in sizes indicated complete with mitered corners, end caps, outlets, brackets, and other accessories necessary for installation. The outer edge of gutter shall be beaded or reinforced with a stiffening bar not less than 3/4 by 3/16-inch of material compatible with gutter. Gutters shall be fabricated in sections not less than 8 feet long. The sections shall be lapped a minimum of one inch in the direction of flow. Gutters shall be joined by riveted and soldered joints. Support and fasten gutters on approved type adjustable hangers spaced not more than 30 inches on centers. Gutters shall be adjusted to slope uniformly

to outlets, with high points occurring midway between outlets. Hangers and fastenings shall be fabricated from metals compatible with the gutters.

## 3.03 DOWNSPOUTS

Downspouts shall be provided in approximately 10-foot lengths; end joints shall telescope not less than 1/2-inch, and longitudinal joints shall be locked. Gutter outlets shall be provided with wire ball strainers of a standard type for each outlet. Strainers shall fit tightly into outlets and shall be of the same material used for gutters. Downspouts shall be kept not less than one inch away from walls and shall be fastened to the walls at top, bottom, and at not to exceed 5 foot centers intermediately between, with approved type leader straps or concealed rack-and-pin type fasteners; straps and fasteners shall be formed from metal compatible with the downspouts.

## 3.04 FLASHING AT ROOF PENETRATIONS

Provide metal flashing for all pipes, flue, guy wire anchors and similar items supported by or attached to the roof deck.

Single Pipe Flashing: At Contractor's option, single pipe flashing shall be made of EPDM rubber or Silicone specifically manufactured for flashing pipe which isolates movement of pipe caused by expansion, contraction and vibration. Rubber or silicone shall be resistant to ozone and ultra-violet light. Base shall be provided with stainless steel or aluminum ring which conforms to any panel configuration and roof pitch.

## 3.05 PROTECTION

Protect all sheet metal work until final acceptance of the building.

## 3.06 CLEANING

A. Clean all exposed sheet metal work at completion of installation. Grease and oil films, handling marks, contamination from steel wool, fittings and drilling debris

shall be removed, and the work scrubbed clean. All exposed metal surfaces shall be free of dents, creases, waves, scratch marks, and solder or weld marks.

B. 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 07900

SEALANTS AND CAULKING

PART 1 - GENERAL

1.1 GENERAL REQUIREMENTS

This section covers the requirements for furnishing and installing sealants and caulking.

A. Caulk periphery of openings and other locations where building joints occur outside and/or inside, and crevices requiring sealing to provide weatherproof closures.

1.2 REFERENCES

A. American Society for Testing and Materials (ASTM):

| | |
|---|---|
| C 834-76 (86) | Latex Sealing Compounds. |
| C 920-86 | Elastomeric Joint Sealants. |
| C 962-81 | Guide for Use of Elastomeric Joint sealants. |

B. Federal Specifications (FS):

| | |
|---|---|
| TT-S-00230 C | Sealing Compound, Elastomeric Type, Single Component (for Caulking,Sealing, and Glazing in Buildings). |
| TT-S-01543 A | Sealing Compound, Silicone or Rubber Base (for Caulking, Sealing and Glazing in Building). |

C. International Conference of Building Officials (ICBO):

| | |
|---|---|
| 1985 | Uniform Building Code. |

D. Sealand and Waterproofer's Institute (SWI)

| | |
|---|---|
| 1984 | Sealants: The Professional's Guide. |
| 1977 | Guide to Joint Sealant for Concrete Structures. |
| 1977 | Manual of Good Practice in Sealant Application. |

1.3 QUALITY ASSURANCE

A. Qualification of Installer:

1. Installation personnel shall be skilled and competent. They shall be familiar with materials and nature of work.

2. Contractor shall be authorized by the product manufacturer for work.

B. Codes and Standards:

1. Comply with codes, specifications and standards referred to in this specification, except where provisions in this specification or drawings exceed such requirements.

2. Material and workmanship shall conform to:

a. ASTM C 962.

b. SWI Recommendations.

3. Sealants and caulking shall conform with following ASTM or FS:

Types

Urethanes - Two Part:

| | |
|---|---|
| 2A-Self-Leveling | ASTM C 920, Type M Grade P, Class 25. |
| 2B-Non-Sag | ASTM C 920, Type M Grade NS, Class 25. |

One Part:

| | |
|---|---|
| 2C-Self-Leveling | ASTM C 920, Type S Grade P, Class 25. |
| 2D-Non-Sag | ASTM C 920, Type S Grade NS, Class 25. |

Silicones: ASTM C 920, Type S Grade NS, Class 25.
New Designation now in consideration by ASTM Committee C24.

Acrylics, One Part: ASTM C 834

Acrylic Latex, One Part: ASTM C 834

Triethylene Rubber: FS TT-S-00230, Type 2, Class A.

Ethylene Copolymer: FS TT-S-01543

4. Material shall be ICBO listed.

5. Material shall be non-staining.

1.4 QUALITY CONTROL

A. Service of Manufacturer's Representative: Manufacturer's Representative shall be present at job site as often as he deems necessary to assure that surface preparation and application of the product is in accordance with manufacturer's direction.

1.5 SUBMITTALS

A. Product Data:

1. Manufacturer's product data showing references to industry standards, with application instructions and indicated uses and given limitations.

2. Manufacturer's health and safety data information.

B. Material Samples and Samples for Color Selection:

1. Samples of manufacturer's color range for caulking compound.

2. Caulking compound. Install sample between 2 strips of material representative of typical surfaces where sealant or compound will be used, held apart to represent typical joint widths.

3. Material sample of each component used.

C. Certificates: Manufacturer's certificate indicating that materials comply with requirements of this specification and the named ASTM or FS and are suitable for intended use.

1.6 WARRANTY/GUARANTY

A. Warranty for minimum five (5) years against defects resulting from use of defective or inferior materials, equipment or workmanship on caulking system.

B. Roofing work shall be guarantied jointly with modified bitumen sheet roofing, flashing and sheetmetal work, and sealant and caulking work to be in a watertight condition for a period of minimum two (2) years. Contractor shall agree to repair or replace work which leaks water, deteriorates excessively or otherwise fails to perform as required due to failures of materials or workmanship. Contractor shall further agree to repair and replace damages to building resulting from such leaks, at no cost to State.

1.7 PRODUCT HANDLING

A. Deliver caulking and sealing compounds to job in unbroken, sealed containers bearing manufacturer's directions. Store materials in sealed containers in a dry protected area above ground or floor.

B. Protect caulking materials before, during and after installation.

C. Do not use caulking materials that have been stored for a period of time exceeding the maximum recommended shelf life of materials.

1.8 PROTECTION

A. Protect installed work of other trades during installation.

PART 2 - PRODUCTS

2.1 MANUFACTURERS

A. Products of following manufacturer's or approved equal are acceptable, provided they meet materials specified:

General Electric Company, Standard Drywall Products, Inc., Thorospan, Pecora Corp., Sonneborn-Contech, Thiocol Corp., 3M, Woodmont, Geocel Corp., Sika.

2.2 MATERIALS

A. Asbestos Prohibition: No asbestos containing materials shall be used under this section. The Contractor shall insure that all materials incorporated in the project are asbestos-free unless specifically approved in writing by the Engineer.

B. Caulking compound shall be one (1) or two (2) component, gun grade, color as approved by Engineer, and shall be urethanes, silicone, acrylics, acrylic latex, triethylene rubber or ethylene copolymer or polysulfide rubber sealant compound.

C. Materials of other compositions may be accepted if approved by Engineer.

D. Material shall be as recommended by Sealant and Caulking Manufacturer and the manufacturer which products are to be sealed or caulked for its intended use.

E. Joint Primer: Suitable to substrate surfaces as recommended by sealant manufacturer.

F. Joint Backing: Preformed compressible, resilient, non-waxing, non-extruding, non-staining strips of close cell neoprene as recommended by sealant manufacturer. Backing shall be of sizes and shapes to suit various conditions, minimum twice as wide as joint to be caulked, and shall be compatible with sealant, primers and substrates.

G. Bond Breaker: As recommended by sealant manufacturer.

H. Cleaning Agent: As recommended by sealant manufacturer.

I. One component caulking compound shall be used for typical conditions, two component caulking compound shall be used for continuous water immersed conditions.

J. Silicone compound shall not be used when compound is to be painted.

PART 3 - EXECUTION

3.1 INSPECTION

A. Installer shall examine surfaces and conditions under which sealants and caulking are to be installed. Should any condition be found unsuitable, no work shall be done until unsuitable conditions have been corrected and are acceptable to Installer. Proceeding with work will imply acceptance of conditions by Installer.

3.2 PRE-INSTALLATION MEETING

A. Prior to installation of sealant, and at General Contractor's direction, a meeting shall be held at project site to review material selections, joint preparations, installation

procedures and coordination with other trades.

B. Meeting shall include Sealant Installer, General Contractor, and representatives of other trades or subcontractors affected by sealant installation. Sample installations shall be examined which have been prepared and it shall be determined and recorded whether everyone present is in agreement that the proposed installations are likely to perform as required.

## 3.3 PREPARATION

A. Field Verification: Verify measurements in field as required. Check with related trade's shop drawing details and provide corrective work as may be necessary.

B. Surface Preparation:

1. Primer: Thoroughly clean joints and apply primer, as recommended by sealant manufacturer, to dry surfaces. Apply primer prior to application of joint backing, bond breaker or sealants.

2. Joint Backing: In joints where depth of joint exceed required depth of sealant, install joint backing to provide backing and uniform depth of sealant. Install joint backing with approximately 30% compression. Do not stretch, twist, puncture or tear joint backing. Butt joint backing at intersections.

3. Bond Breaker Tape: Install bond breaker tape smoothly at back of joint where joint backing is not required or cannot be installed. Sealant shall adhere only to sides and not to back of joint so as to eliminate three-sided adhesion.

4. Surface Condition: Joint surfaces to receive a sealant shall be sound, smooth, clean, dry and free of visible contaminants. Applications of non-visible coatings or contaminants to surfaces of rabbet area prior to application of sealant shall be controlled by Contractor in consultation with sealant manufacturer's representative.

## 3.4 PRECAUTION

A. Weather Conditions: Do not proceed with installation of sealants under adverse weather conditions, or when temperatures are below or above manufacturer's recommended limitations for installation. Proceed only when forecasted weather conditions are favorable for proper cure and development of high early bond strength. Do not proceed when heavy wind loads are forecast during period required for initial or nominal cure of elastomeric sealants.

B. Health Precautions: Follow manufacturer's health and safety information and instruct workers accordingly.

## 3.5 INSTALLATION

A. General: Apply sealing compound in strict accordance with manufacturer's printed directions.

B. Sealant Application: Apply sealant in accordance with manufacturer's application manual and instructions, using hand guns or pressure equipment, with proper nozzle size, on clean, dry, properly prepared substrates. Force sealant into joint and against sides of joint to make uniform. Avoid pulling of sealant from sides. Fill sealant space completely with sealant.

C. Tooling: Tooling is required to ensure firm full contact with interfaces of joint. Tool joints to form smooth, uniform beads with slightly concave surfaces. Finish joints shall be straight, uniform, smooth and neatly finished. Remove any excess sealant from adjacent surfaces of joint, leaving work in a neat, clean condition. Use only tooling agents if recommended by sealant manufacturer.

D. Masking Tape: Where an irregular surface or sensitive joint border exists apply masking tape at edge of joint to insure joint neatness and protection. Remove tape after sealant is applied.

## 3.6 CLEANING

A. Clean compound from adjacent surfaces immediately and leave work in neat, clean condition.

## 3.7 REPAIR DURING GUARANTY PERIOD

A. Repair and replace defective work, and work damaged during term of guaranty.

B. Following types of failures will be adjudged defective work: Leakage, hardening, cracking, crumbling, melting, chalking, shrinking, or running of caulking compound, not bonding to adjacent surfaces or staining of adjoining work.

END OF SECTION

SECTION 08210

WOOD DOORS

## PART 1 - GENERAL

### 1.1 GENERAL REQUIREMENTS

This section covers the requirements for furnishing and installing of wood doors.

### 1.2 SUBMITTALS

The Contractor shall submit to the Engineer manufacture's product data specifications, details of core and edge construction, trim for glazed openings, and other pertinent data. Submit shop drawings indicating the location and size of each door.

### 1.3 WARRANTY

All solid core doors shall carry the manufacturer's "Standard Door Warranty" for two (2) years minimum from the product acceptance.

## PART 2 - PRODUCTS

### 2.1 GENERAL

A. Solid Core Flush Doors shall be IC2000 PC Wood Particle Board Core, 1-3/4" thick, wood face veneers, size as specified on the Door Schedule (20 minute rated): IC6000 FD-60, Fire rated mineral core, 1-3/4" thick, wood face veneers, size as specified on the Door Schedule (60 minute rated) manufactured by Lynden Door, Inc. or approved equal.

B. Adhesives: Adhesives shall be in accordance with WDMA 1.S.-1A, requirements for Type I Bond Doors (waterproof) for exterior doors and requirements for Type II Bond Doors (water repellent) for interior doors. Adhesives shall contain no formaldehydes.

C. PRESERVATIVE TREATMENT FOR DOORS: Wood doors shall be treated after manufacture by immersion treatment in accordance with the requirements of Wood and Door Manufactures Association (WDMA) Industry Standard 1.S.4 and Section 06070 Preservative Treatment of Wood Products.

D. Asbestos Prohibition: No asbestos containing materials shall be used under this section. The Contractor shall insure that all materials incorporated in the project are asbestos-free unless specifically approved in writing by the Engineer.

PART 3 - EXECUTION

3.1 Examine doors and installed door frames before hanging doors. Verify that frames comply with the indicated requirements, including size, type, location, and swing characteristics, and have been installed with level heads and plumb jambs. Reject doors and frames with defects.

3.2 INSTALLATION

Doors shall be installed under Section 06200 – Finish Carpentry and in accordance with manufacturer's specifications. Job-Fit Doors: Align and fit doors in frames with uniform clearances and bevels as indicated below; do not trim stiles and rails in excess of limits set by the manufacturer. Seal cuts after fitting and machining.

A. Fitting Clearances for Non-Rated Doors: Provide 1/8-inch at jambs and heads; 1/16-inch per leaf at meeting stiles for pairs of doors; and 1/8-inch from bottom of door to top of finished floor. Where threshold is shown or scheduled, provide ¼-inch clearance from bottom of the door to the top of the threshold.
B. Bevel non-rated doors 1/8-inch in 2-inches at lock and hinge edges.
C. Rehang or replace doors which do not swing or operate freely.

END OF SECTION

DIVISION 8 – DOORS AND WINDOWS

SECTION 08220

# FIBERGLASS REINFORCED PLASTIC DOORS AND FRAMES

## PART I - GENERAL

### 1.1 GENERAL REQUIREMENTS

This section covers the requirements for furnishing all labor, materials and equipment necessary to furnish and install, in place complete, fiberglass reinforced doors and frames as shown on the plans and specified herein. Work includes, but is not limited to, the following:

A. Fire-rated fiberglass reinforced plastic (FRP) doors and frames as indicated on the plans and specified herein, designed to exacting tolerances and specifications eliminating the need for field cutting and trimming. Doors and frames shall have a 20-minute fire rating.

B. Related Work Specified Elsewhere: Finish hardware shall be as specified in Section 08710 – FINISH HARDWARE.

### 1.2 QUALITY ASSURANCE

A. Manufacturer's Qualifications: Manufacturer shall be a company specialized in the manufacture of FRP doors and frames as specified herein with a minimum of 25 years documented experience and a record of satisfactory in-service performance under conditions similar to this project.

B. Installer Qualifications: Installer shall be an experienced installer who has completed fire-rated FRP door and frame installations similar in material, design, and extent to those required for this project and whose work has resulted satisfactory in-service performance.

C. Source Limitations:

1. Obtain FRP doors and frames through one source fabricated from a single manufacturer.

2. Hardware for all FRP doors as specified in Section 08710 – FINISH HARDWARE. Hardware shall be closely coordinated with the fiberglass door and frame manufacturer.

### 1.3 SUBMITTALS

A. Manufacturer's Literature: Submit manufacturer's specifications, details, and installation recommendations for components of fire-rated FRP doors and frames.

B. Manufacturer's Certification: Submit manufacturer's certification that the doors and frames meet fire rating and wind load requirements.

C. Shop Drawings: Submit shop drawings for fabrication of fire-rated FRP doors and frames showing hardware mounting heights, reinforcement, expansion provisions, anchorage to adjacent structures and supports, and interfacing with adjacent materials.

D. Samples: Provide one 12 inch by 18 inch completely assembled (hinged) door and frame corner section with faces and edges representing typical color and finish. One edge shall be exposed for view of interior door and frame composition. Sample shall include standard cutouts for hinges and strike plates. Provide color chart and texture options for selection by the Engineer.

1.4 DELIVERY, STORAGE AND HANDLING

Deliver doors, frames, and accessories undamaged and with protective wrappings and packaging. Store doors and frames vertically on platforms under cover in clean, dry, ventilated and accessible locations with at least 1/4" airspace between doors. Store at least possible angle. Do not stack horizontally. Remove damp or wet packaging immediately and wipe affected surfaces dry. Replace damaged materials with new.

1.5 WARRANTY

Fiberglass reinforced plastic doors and frames shall be guaranteed by the manufacturer for a period of 25 years against failure due to corrosion. Additionally, manufacturer shall guarantee all FRP doors and frames against defects in materials and workmanship including, but not limited to, warping, separation or delamination, and expansion of the core for a period of 10 years.

PART 2 – PRODUCTS

2.1 ACCEPTABLE MANUFACTURERS

The FRP doors and frames shall be manufactured by Chem-Pruf Door Co., Ltd.; Special-Lite, or other prequalified manufacturer. Should a manufacturer other than those listed above be proposed the qualifications of that manufacturer shall be submitted prior to bidding as a request for substitution. If satisfactory, the name of the prequalified manufacturer will be issued to bidders by Addendum.

2.2 Fire Rated FRP DOORS

A. Fire rated FRP doors shall have a 20-minute rating meeting UL 10(c) and UL 10(b) fire door test standards. In addition, all doors and frames shall be capable of withstanding without damage a minimum wind pressure of 30 pounds per square foot.

B. Doors shall be made of fiberglass reinforced plastic using chemically proven fire retardant resins resistant to contaminants typically found in a tropical environment for which these specifications are written. Doors shall be 1 3/4" thick and of flush construction, having no seams or cracks. All doors up to 4'-0" x 8'-0" shall have equal diagonal measurements with a maximum deviation of plus or minus 1/32".

C. Door Plates shall be molded in one continuous piece, starting with a 25 mil gel coat of the color specified, integrally molded with at least 2 layers of 1.5 oz per sq ft fiberglass mat to yield a plate weight ratio of 30/70, glass to resin.

D. Stiles and Rails: Core shall be banded with firestop per manufacturer's drawings.

E. Core material shall be fire resistant mineral core placed within band structure allowing no voids within.

F. Finish of door and frame shall be identical in color and texture. At time of manufacture 25 mils of resin-rich gel coat shall be integrally molded into both the door and frame to attain color. Secondary painting to achieve color is not acceptable.

G. Astragal: 2 1/2 inch wide FRP astragal with seal shall be provided for all pair (double) doors.

2.3 FRAMES

A. Fire-Rated Frames shall be fiberglass and manufactured using the resin transfer method in closed rigid molds to assure uniformity of color and size. Beginning with a minimum 25 mil gel coat and a minimum of 2 layers continuous strand fiberglass mat saturated with fire retardant resin, the frame shall be of one-piece construction with molded stop. All frame profiles shall have a core of firestop and mineral core. Frames must be fiberglass. Metal frames or pultruded fiberglass frames will not be accepted.

B. Finish of frame shall be identical in color and texture to the door. A 25 mil resin rich gel coat shall be integrally molded into the frame to obtain the required color at time of manufacture. Secondary painting to achieve color is not acceptable.

C. Jamb/Header connection shall be coped by manufacturer for tight fit.

D. Internal Reinforcement shall be continuous within the structure to allow for mounting of specified hardware.

E. Mortises for hardware shall be accurately machined by manufacturer to hold dimensions in 3 orthogonal directions.

F. Hinge pockets shall be accurately machined by manufacturer to facilitate heavy duty hinges at all hinge locations, using spacers if standard weight hinges are used.

## 2.4 ACCESSORIES

A. Hardware: All doors and frames shall be machined using templates available from the manufacturer of specified hardware. Doors shall be internally reinforced for specified surface hardware. All doors shall be properly reinforced for hardware before core is foamed in door.

B. Hardware Preparation: Secure templates from the finish hardware supplier. Reinforce all hardware locations as required for long life under hard service.

## 2.5 FINISH HARDWARE

Finish hardware shall be as specified in Section 08710 – Finish Hardware. Due to the specialized nature of the material in this Section it is highly recommended that all finish hardware be furnished and installed by the door and frame manufacturer at the factory and that the doors and frames be delivered to the jobsite as complete assembled units in order to avoid conflicts or incompatibility. FRP doors and frames shall not be field modified. If the contractor elects to furnish and install finish hardware separately and it is determined that the finish hardware supplied cannot be properly installed, adjusted, and made operational in the doors and frames as manufactured, the door and frame, as a unit, will be considered defective and shall be promptly replaced. Furthermore, any delay due to the above shall not be considered for time extension.

# PART 3 – EXECUTION

## 3.1 PREPARATION FOR INSTALLATION

A. Contractor shall verify that openings are "square" and of proper dimensions for the installation of the FRP doors and frames based upon the manufacturer's shop drawings and submittals.

B. Installer shall verify that openings are properly prepared to receive doors and frames. Installer shall examine site conditions to verify dimensions, etc. and inspect the doors, frames, and finish hardware upon delivery to the jobsite.

C. Installer shall report any conditions that are unacceptable to the Contractor who shall immediately inform the Engineer of the unacceptable condition(s) and corrective actions to be taken. Installation of doors and frames shall not commence until unacceptable conditions have been corrected and conditions are acceptable to the installer.

## 3.2 INSTALLATION

A. Install door assemblies in accordance with shop drawings and manufacturer's printed installation instructions. Use installation methods and materials specified in the installation instructions, including any related materials not indicated on the submittals, but recommended by the manufacturer or required to complete the installation. Install frame into the rough opening using the manufacturer's recommended rabetted anchor method.

B. Field alteration of door or frames to accommodate field conditions is strictly prohibited.

C. Site Tolerances: Maintain plumb and level tolerance specified in manufacturer's printed installation instructions.

D. Fire labeled doors and frames must be installed in strict accordance with manufacturer's instructions and the latest revision of NFPA 80.

E. UL 10(c) Category B doors require field-applied seal per manufacturer's instructions.

3.3 ADJUSTING

A. Adjust doors in accordance with door manufacturer's instructions to swing open and shut without binding and to remain in place at any angle without being moved by gravitational influence.

B. Adjust door hardware to operate correctly in accordance with hardware manufacturer's instructions.

3.4 CLEANING

Clean surfaces of door and frame assemblies, including door hardware, in accordance with respective manufacturer's maintenance instructions.

3.5 PROTECTION

Protect door and frame assemblies, including door hardware, from damage and from contamination by other materials such as cement mortar, concrete, and paint. Prior to completion and acceptance of the work, restore damaged doors to original condition, or replace with new ones.

END OF SECTION

SECTION 08210

VINYL WINDOWS

PART 1 - GENERAL

1.01 SUMMARY

A. Section Includes: Tubular extruded poly vinyl chloride (PVC) framed sliding glass windows.

1.02 SUBMITTALS

A. Reference Section 01 33 00 – Submittal Procedures; submit following items:

1. Product Data.

2. Shop Drawings: Include window schedule, elevations, sections and details, and multiple unit assembly details.

3. Samples:

a. Color samples: Minimum 1x4 inch (25x100 mm) samples of PVC with integral color.

b. Glass, showing specified tint color.

4. Quality Assurance/Control Submittals:

a. Qualifications: Proof of manufacturer's qualifications.

b. U-Factor and structural rating charts required for AAMA and NFRC labeling requirements.

c. Manufacturer's Installation Instructions.

B. Closeout Submittals: Closeout Submittals; submit following items:

1. Temporary labels marked to identify doors that labels were applied to.

2. Maintenance instructions.

3. Special Warranties.

1.03 QUALITY ASSURANCE

A. Overall Standards: Comply with ANSI/AAMA/NWWDA 101/I.S.2, except as otherwise noted herein.

B. Qualifications:

1. Manufacturer Qualifications:

a. Minimum five years experience in producing vinyl windows of the type(s) specified.

b. Member AAMA, NFRC, SIGMA.

C. Regulatory Requirements:

D. Certifications for insulated glass doors:

1. AAMA: Doors shall be Gold Label certified with label attached to frame per AAMA requirements.

2. NFRC: Doors shall be NFRC certified with temporary U-factor label applied to glass and an NFRC tab added to permanent AAMA frame label.

1.04 DELIVERY, STORAGE, AND HANDLING

A. Reference Section 01 66 00 – Product Storage and Handling Requirements.

B. Follow manufacturer's instructions on label applied to doors.

1.05 WARRANTY

A. Commercial Special Warranty:

1. 10 year warranty.

2. Warranty windows against defects in materials and workmanship including costs for parts and labor.

PART 2 - PRODUCTS

2.01 MANUFACTURER

A. Milgard Manufacturing, Inc., 1010 54th Avenue East, Tacoma, WA 98424 or approved equal.

B. Window Series: Milgard Style Line™, 6110 Horizontal Sliding Windows.

2.02 MATERIALS

A. Vinyl: Integral color PVC compound containing impact-resistant solid plasticizer, titanium dioxide UV inhibitor, and surface and color stabilizers.

I. Comply with ASTM D 4216 and ANSI/AAMA /NWWDA 101/I.S.2.

2.03 GENERAL PERFORMANCE REQUIREMENTS

A. Thermal Performance: Comply with NFRC 100.

B. Air Leakage, Water Resistance, Structural Test: Comply with ANSI/AAMA /NWWDA 101/I.S.2.

C. Forced-Entry Resistance: Comply with CAWM 301-90.

2.04 SLIDING WINDOW

VERIFY THAT DRAWINGS SHOW PANEL ARRANGEMENT AND OPERATING PANELS FOR EACH DOOR.

A. A. Sliding Window – 6110 Series, 1-1/16 inch nail fin setback:

2.05 GLAZING

A. Insulated Glass Units: ASTM E 774, Class A, 3/4 inch thick overall:

1. Glazing Type: Tempered Clear/SunCoat™ Low-E.

2.06 INSECT SCREENS

A. A. Screen:

1. Frame: Roll-formed aluminum.

2. Screen Cloth: Charcoal colored fiberglass mesh.

2.07 FABRICATION

A. Fabricate frames and panels with mitered and fusion welded corners and joints. Trim and finish corners and welds to match adjacent surfaces.

B. Provide concealed metal reinforcement in sash frame for attaching lock mechanism.

C. Factory inside glaze with snap-on PVC glazing stops matching frame finish. Units shall be reglazeable without dismantling panel framing.

2.08 FINISH

A. Frame and Panel Color: White.

B. Color match screen frame to frame and panel color.

PART 3 - EXECUTION

3.01 EXAMINATION

A. Examine openings in which windows will be installed.

1. Verify that fasteners in framed walls are fully driven and will not interfere with door installation.

2. Verify that sill is flat and level.

B. Coordinate with responsible entity to correct unsatisfactory conditions.

C. Commencement of work by installer is acceptance of substrate conditions.

3.02 INSTALLATION

A. Install windows in framed walls in accordance with manufacturer's installation instructions.

1. Flash head and jambs in accordance with AAMA 2400.

B. Do not remove temporary labels.

C. Install insect screens on operable panels.

3.03 ADJUSTING

A. Adjust operating panels and hardware for smooth operation and tight fit with weatherstripping.

3.04 CLEANING

A. Remove temporary labels and retain for Closeout Submittals.

B. Clean soiled surfaces and glass using a mild detergent and warm water solution with soft, clean cloths.

END OF SECTION

DIVISION 9 – FINISHES

SECTION 09250 - GYPSUM BOARD

PART 1 - GENERAL

1.1 SUMMARY

A. Provide all gypsum board where indicated on the drawings and as specified herein. Work shall include, but not be limited to, the following:

1. Interior gypsum boards.

2. Non-load bearing studs.

3. Ceiling support systems.

B. Related Work Specified Elsewhere:

1. SECTION 09910 - PAINTING: Painting of gypsum board.

1.2 SUBMITTALS

A. Submit in accordance with SECTION 01330 - SUBMITTAL PROCEDURES.

B. Product Data: Submit for each type of product specified. Include manufacturer's recommended installation instructions.

C. Shop Drawings: Submit drawings showing locations, fabrication, and installation of control and expansion joints, including plans, elevations, details of components, and attachments to other units of work.

D. Samples:

1. Submit trim accessories full-size samples in 12-inch lengths.

2. Submit gypsum board finish sample for approval.

1.3 QUALITY ASSURANCE

A. Industry Standard: Comply with applicable requirements of GA-216 "Application and Finishing of Gypsum Board" by the Gypsum Association, except where more detailed or more stringent requirements are indicated, including the recommendations of the manufacturer, and GA-214, "Recommended Specification: Levels of Gypsum Board Finish" by the Gypsum Association.

B. Fire Resistance: For walls and ceiling where indicated or requiring fire resistance-rated gypsum board assemblies, comply with following requirements:

1. Fire-Resistance Ratings: As indicated by GA File Numbers in GA-600 "Fire Resistance Design Manual" or design designations in UL "Fire Resistance Directory" or in the listing of another testing and inspecting agency acceptable to authorities having jurisdiction.

2. Gypsum board assemblies indicated are identical to assemblies tested for fire resistance according to ASTM E 119 by an independent testing and inspec ting agency acceptable to authorities having jurisdiction.

C. Sound Transmission Characteristics: For gypsum board assemblies with STC ratings, provide materials and construction identical to those tested in assembly indicated according to ASTM E 90 and classified according to ASTM E 413 by a qualified independent testing agency.

1.4 PRODUCT HANDLING

Deliver gypsum board materials in sealed containers and bundles, fully identified with manufacturer's name, brand, type and grade; store in a dry well ventilated space, protected from the weather, under cover and off the ground. Stack gypsum panels flat to prevent sagging.

PART 2 - PRODUCTS

2.1 MATERIALS

A. Gypsum Wallboard: ASTM C 1396 /C 1396M, 5/8-inch thick unless indicated otherwise, tapered edges, 48-inches wide, Type "X".

B. Wallboard Fasteners: ASTM C 1002, to wood studs or steel studs, standard bugle head self-drilling, self-tapping corrosive-resistant drywall screws. Screws used in fire-resistive rated construction shall be of type approved for use by governing building code. For cementitious backer units, use screws of type and size recommended by backer unit manufacturer.

C. Non-Load Bearing Studs: ASTM C 645. Studs shall be rolled formed channel of minimum 20 gauge galvanized steel, ASTM A 653/A 653M, G60 coating. Provide holes and notches for conduit or electrical wiring. Adjust stud to a heavier gauge where required by the manufacturer's recommendations for stud wall heights and ceiling supports.

D. Furring Channels: ASTM C 645, hat-shaped, 7/8-inch deep, hot-dip galvanized, 25 gauge.

E. Ceiling Support Materials and Systems:

1. General: Size ceiling support components to comply with ASTM C 754, unless indicated otherwise.

2. Direct Suspension Systems: Provide systems where indicated and / or required. Manufacturer's standard zinc-coated or painted steel system of furring runners, furring tees, furring channels, carrying channels, and accessories designed for concealed support of gypsum drywall ceilings; of proper type for use intended. Provide system from one of the following or approved equal:

a. Armstrong World Industries, Inc.

b. Chicago Metallic Corp.

c. United States Gypsum Co.

3. Wire for Hangers and Ties: ASTM A 64l1A 641M, Class 1 zinc coating, soft temper, 8 gauge for hangers and 18 gauge for ties.

F. PVC Trim Accessories: Provide comerbeads, edge trim, etc. as indicated on the drawings or as required complying with ASTM C 1047, and formed of polyvinyl chloride (PVC) unless otherwise indicated or required.

G. Joint Treatment Materials: ASTM C *475/C* 475M; type recommended by wallboard manufacturer for the application indicated, except as otherwise noted.

1. Interior: Use perforated tape, and joint and topping compound, or "all purpose" compound.

2. Cementitious Backer Units: Use joint treatment as recommended by backer unit manufacturer.

H. Membrane: ASTM 0226, Type I, No. 15, asphalt-saturated roofing felt or 4 mil polyethylene sheet.

## PART 3 - EXECUTION

### 3.1 EXAMINATION

Examine substrates to which drywall construction attaches or abuts, preset hollow metal frames, and structural framing, with Installer present, for compliance with requirements for installation tolerances and other conditions affecting performance of drywall construction. Do not proceed with installation until unsatisfactory conditions have been corrected.

### 3.2 INSTALLATION OF STEEL FRAMING, GENERAL

A. Steel Framing Installation Standard : Install steel framing to comply with ASTM C 754 requirements that apply to framing installation.

B. Install supplementary framing, blocking and bracing at terminations in the work and for support of fixtures, equipment services , heavy trim, grab bars, toilet accessories, furnishings, and similar construction to comply with details indicated and with recommendations of gypsum board manufacturer, or if none available, with "Gypsum Construction Handbook" published by United States Gypsum Co.

### 3.3 INSTALLATION OF STEEL FRAMING FOR WALLS AND PARTITIONS

A. Install runners (tracks) at floors, ceilings, and structural walls and columns where gypsum drywall stud system abuts other construction. Where studs are installed directly against exterior walls, install asphalt felt strips between studs and wall.

B. Install each steel framing and furring member so that fastening surface do not vary more than 1/8-inch from plane of faces of adjacent framing. Align plumb and square.

C. Extend partition framing full height to structural supports, unless otherwise indicated. Continue framing over frames for doors and openings to provide support for gypsum board.

D. Install steel studs and furring in sizes and at spacings indicated but not less than that required by referenced steel framing installation standard. For single layer construction: 16-inches on center, except as otherwise indicated.

E. Install steel studs so that flanges point in the same direction and gypsum boards can be installed in the direction opposite to that of the flange.

F. Frame door openings to comply with details indicated, with GA-219 and with applicable published recommendations of gypsum board manufacturer. Attach vertical studs at jambs with screws either directly to frames or to jamb anchor clips on door frames; install runner track section (for cripple studs) at head and secure to jamb studs.

G. Frame openings other than door openings to comply with details indicated, or if none indicated, in same manner as required for door openings.

3.4 DIRECT-HUNG GRID CEILING SUSPENSION SYSTEM

A. Secure hangers to structural support by connecting directly to structure where possible, otherwise connect to inserts, clips or other anchorage devices or fasteners as indicated. Ensure that structural anchorage provisions have been installed to receive ceiling anchors in a manner that will develop their full strength and at spacing required to support ceiling.

B. Space main runners 4-feet on center and space hangers 4-feet on center along runners, except as otherwise shown.

C. Level main runners to a tolerance of 1/8-inch in 12-feet, measured both lengthwise on each runner and transversely between parallel runners.

D. Wire-tie or clip furring members to main runners and to other structural supports as indicated or as recommended by the manufacturer.

E. Attach perimeter wall track or angle wherever support system meets vertical surfaces. Mechanically join support members to each other and butt-cut to fit into wall track.

F. Space furring member 16-inches on center, except as otherwise indicated.

G. Install auxiliary framing at termination of drywall work, and at openings for light fixtures and similar work, as required for support of both the drywall construction and other work indicated for support thereon.

H. Do not connect or suspend steel framing from ducts, pipes or conduit.
I. Keep hangers and braces 2-inches clear of ducts, pipes and conduits.

J. Sway-brace suspended steel framing with hangers used for support.

3.5 APPLICATION AND FINISHING OF GYPSUM BOARD, GENERAL

A. Gypsum Board Application and Finishing Standards: Install and finish gypsum board to comply with ASTM C 840, GA-216, and GA-214.

B. Locate exposed end-butt joints as far from center of walls and ceilings as possible. And stagger not less than 24-inches in alternate courses of board.

C. Install ceiling boards in the manner which minimizes the number of end-butt joints, and which avoids end joints in the central area of each ceiling. Stagger end joints at least 24-inches.

D. Install wall/partition boards in manner which minimizes the number of end-butt joints or avoids them entirely where possible.

E. Install exposed gypsum board with face side out. Do not install imperfect, damaged or damp boards. Butt boards together for a light contact at edges and ends with not more than 1/16-inch open space between boards. Do not force into place.

F. Locate either edge or end joints over supports, except in horizontal applications where intermediate supports or gypsum board back-blocking is provided behind end joints. Position boards so that like edges abut, tapered edges against tapered edges and mill cut or field-cut ends against mill-cut or field-cut ends. Do not place tapered edges against cut edges or ends. Stagger vertical joints over different studs on opposite sides of partitions.

G. Attach gypsum board to studs so that leading edge or end of each board is attached to open (unsupported) edge of stud flange first.

H. Attach gypsum board to supplementary framing and blocking provided for additional support at openings and cutouts.

I. Space fasteners in gypsum boards in accordance with referenced gypsum board application and finishing standard and manufacturers recommendations.

3.6 METHODS OF GYPSUM BOARD APPLICATION

A. Single-Layer Application:

1. On partitions/walls, apply gypsum board vertically (parallel to framing). Unless otherwise indicated, and provide sheet lengths which will minimize end joints. Fasten with screws at 6-inch centers.

2. On ceilings, apply gypsum board before partition/wall board application to the greatest extent possible and at right angles to framing, unless otherwise indicated.

C. Single-Layer Fastening Method: Apply gypsum boards to supports by fastening with screws.

3.7 TILE BACKING BOARD APPLICATION

A. Install in accordance with ANSI A108.11. Install on partitions/walls, in single layer application, with screws at 6-inch centers, and in accordance with manufacturer's recommendations. Panel surfaces shall be finished/prepared to receive ceramic tile as per manufacturer's recommendations.

3.8 INSTALLATION OF DRYWALL TRIM ACCESSORIES

A. General: Where feasible, use the same fasteners to anchor trim accessory flanges as required to fasten gypsum board to the supports. Otherwise, fasten flanges to comply with manufacturer's recommendations.

B. Install comer beads at external corners.

C. Install edge trim whenever edge of gypsum board would otherwise be exposed or semiexposed. Provide type with face flange to receive joint compound.

1. Install "LC" bead where drywall construction is tightly abutted to other construction and back flange can be attached to framing or supporting substrate.

2. Install "L" bead where edge trim can only be installed after gypsum board is installed.

3.9 FINISHING OF DRYWALL

A. General: Apply joint treatment at gypsum board joints (both directions); flanges of corner bead, edge trim, and control joints; penetrations; fastener heads, surface defects and elsewhere as required to prepare work for decoration.

B. Prefill open joints and rounded or beveled edges, if any, using setting-type joint compound.

C. Apply joint tape at joints between gypsum boards, except where trim accessories are indicated.

D. Finish interior gypsum wallboard by applying the following levels of gypsum board finish in accordance with GA-214:

1. Level 1: For ceiling plenum areas and concealed areas.

2. Level 2: not used.

3. Level 3: Not used.

4. Level 4: Not used.

5. Level 5: For.exposed walls and ceiling surfaces receiving paints.

6. Where Level 1 gypsum board finish is specified, embed tape in joint compound.

7. Where Level 2 gypsum board finish is specified, embed tape in joint compound and apply first coat of joint compound.

8. Where Level 5 gypsum board finish is specified, embed tape in joint compound and apply first, fill (second), and finish (third) coats of joint compound over joints, angles, fastener heads, and accessories; and apply a thin, uniform skim coat of joint compound over entire surface. For skim coat, use joint compound specified for third coat, or a product specially formulated for this purpose and acceptable to gypsum board manufacturer. Touch up and sand between coats and after last coat as needed to produce a surface free of visual defects, tool marks, and ridges and ready for decoration.

## 3.10 PROTECTION

Provide final protection and maintain conditions, in a manner suitable to Installer, which ensures gypsum drywall construction being without damage or deterioration at time of project acceptance.

END OF SECTION

SECTION 09310 - CERAMIC TILE

PART 1 - GENERAL

1.01 GENERAL REQUIREMENTS: This section includes the furnishing and installing complete-in-place all ceramic tiles and its appurtenances as indicated on the plans and specifications.

1.02 REFERENCES: The latest publications listed below form a part of this specification to the extent referenced. The publications are referred to in the text by the basic designation only.

A. American National Standards Institute, Inc. (ANSI)

ANSI A108.1A - Installation of Ceramic Tile: Wet-Set Method with Portland Cement Mortar

ANSI A108.5 - Installation of Ceramic Tile with Dry Set Portland Cement Mortar with Latex-Portland Cement Mortar

ANSI A108.10 - Installation of Grout in Ceramic Tile Installation

ANSI A118.6 - Ceramic Tile Grouts

ANSI A137.1 - Ceramic Tile

B. American Society for Testing and Materials (ASTM)

ASTM A 185 - Steel Welded Wire, Fabric, Plain, for Concrete Reinforcement

ASTM C 144 - Aggregate for Masonry Mortar

ASTM C 150 - Portland Cement, Specification for

ASTM C 171 - Sheet Material for Curing Concrete

ASTM C 206 - Finishing Hydrated Lime

ASTM C 207 - Hydrated lime for Masonry Purposes

ASTM C 373 - Water Absorption, Bulk Density, Apparant Porosity, and Apparant Specific Gravity of Field Whiteware Products

ASTM C 648 - Breaking Strength of Ceramic Tile

ASTM C 1027 - Determinating Visible Abrasion Resistance of Glazed Ceramic Tile

ASTM C 1028 - Determinating the Static Coefficient of Friction of Ceramic Tile and Other Like Surfaces by the Horizontal Dynamometer Pull-Meter Method

ASTM D 412 - Test Methods for Rubber Properties in Tension1

1.03 SUBMITTALS

A. Certificates: Submit a Master Grade Certificate for tile, certifying the grade, type, and quantity of material. Tile covered by Master Grade Certificates shall bear certification marks on cartons or labels. Submit certificates in triplicate made out in the form shown in ANSI A137.1. In lieu of Master Grade Certificate and certification marks, Manufacturers' Certificates of Conformance or Compliance may be submitted in triplicate; the manufacturers' certificates shall show that the tile meets the requirements of ANSI A137.1.

B. Samples: Submit the following samples:

1. Floor Tile: Duplicate of 12-inch square sheet, showing colors, finish pattern, and form of each type

2. Wall Tile: 4 each, showing colors, finish, pattern, and form or each type.

3. Trim Units - duplicate pieces of each unit showing color, finish, and type

1.04 DELIVERY AND STORAGE

Meet requirements of ANSI A108.1A, A-1.3. Deliver and store packaged materials in original containers with labels intact until time of use. Store and handle materials in a manner to prevent damage or contamination by water or foreign matter.

PART 2 - PRODUCTS

2.01 MATERIALS

A. ANSI A108.1A. Materials shall not contain asbestos.

B. Tile: ANSI 137.1, Standard Grade. Containers shall be grade sealed. Seals shall be marked to correspond with the marks on the signed master grade certificate. Tile shall be impact resistant with a minimum breaking strength for wall tile of 90 pounds and 250 pounds for floor tile in accordance with ASTM C 648. Water absorption shall be 0.5 maximum percent in accordance with ASTM C 373. Floor

tile shall have a minimum static coefficient of friction of 0.60 in accordance with ASTM C 1028. Tile shall be Class III as rated by the manufacturer when tested in accordance with ASTM C 1027 for abrasion resistance as related to foot traffic. Provide matching trim units and accessories with tile work. Colors and patterns shall be as indicated. Colors indicated shall be of approved shades. Colors and patterns indicated by reference to manufacturer's name and designations are for color and pattern identification only and are not intended to limit selection of other manufacturer's products with similar colors and patterns.

C. Unglazed Ceramic Mosaic Floor Tile: Porcelain or natural clay, 2 by 2 inches, by 1/4-inch thick with a slightly beveled modified straight edges.

D. Wall Tile: Glazed wall tile, 4 x 4 x 1/4 inch thick, bright finish with a slightly beveled modified straight edges.

E. Trim Units: Provide where indicated or necessary for a complete and neatly finished installation. Provide coved units for tile floors with base units for tile floors where wainscots are not provided. Internal corners shall be squared and external corners rounded using appropriate matching trim units. Provide trim units of material and finish indentical to wall tile, where wall tile is provided, or floor tile where wall tile is not provided.

F. Hydrated Lime: ASTM C 206, Type S; or ASTM C 207, Type S.

G. Sand: ASTM C 144, for mortar setting beds, grouting, and pointing.

H. Water: Clean, potable.

I. Portland Cement: ASTM C 150, Type I.

J. Cleavage Membrane: Polyethylene sheeting, ASTM C 171, nominal thickness 4 mil.

K. Reinforcing Wire Fabric: ASTM A 185, galvanized, 2 by 2 inch mesh, 16/16 wire or 3 by 3 inch mesh, 13/13 wire or 1-1/2 by 2 inch mesh, 16/13 wire, weighing not less than 1.8 pounds per square yard.

L. Marble Thresholds: Hard, sound, domestic marble, thickness as indicated, with rounded edges and sand rubbed finish on exposed surfaces. Color shall be white or gray. Bevel where necessary, and align edges with faces of trim on both sides of openings. Fit thresholds neatly and bed properly in cement mortar flush with adjoining floors.

M. Portland Cement Mortar: ANSI A108.1A, Section A-2.

N. Dry Set Portland Cement Mortar: ANSI A118.1, factory sanded.

O. Latex Portland Cement Mortar: ANSI A118.4.

P. Grout: ANSI A118.6, factory premixed colored grouts. Color shall match shade of tile selected.

Q. Waterproofing Membrane: Composite elastomeric membrane manufactured of chlorinated polyethelene, solvent welded at seams, minimum 30 mils thick membrane with minimum 400 percent elongation, 1,500 psi tensile strength when tested in accordance with ASTM D 412.

R. Grout Sealer: Type which penetrates deep, leaving an invisible shield of protection on grout surface soil, moisture and mildew damage, and type as recommended by the tile manufacturer.

## PART 3 - EXECUTION

### 3.01 MORTAR MIXES

A. Measure mortar materials in approved containers to ensure that proportions of materials will be controlled and accurately maintained during progress of work. Measuring materials with shovels is not permitted. Unless specified otherwise, mix mortar in proportions by volume, in approved mixing machines or mortar boxes. Control the quantity of water accurately and uniformly.

### 3.02 INSTALLATION

A. Do not start tile work until roughing in for plumbing and electrical work has been completed and tested, and membrane waterproofing have been installed and tested. Tile shall be installed over a plastic mortar bed in accordance with A108.1A.

B. Preparation of Structural Floor Slabs: Prepare in accordance with ANSI A108.1A. Before tile is applied with dry-set mortar the structural concrete floor shall be tested for levelness or uniformity of slope by using straightedges. Areas where the floor does not meet the required tolerances shall be filled and leveled in accordance with ANSI A108.1A.

C. Waterproofing Membrane: Apply waterproofing membrane in accordance with manufacturer's printed instructions.

D. Floor Tile in Portland Cement Mortar: Install ceramic mosaic tile in accordance with ANSI A108.1A.

E. Wall Tile in Dry-Set or Latex Mortar: Install wall tile in accordance with ANSI A108.5.

F. Installation of Marble Thresholds: Thresholds shall be installed where indicated in a manner similar to that of the ceramic tile floor. Thresholds shall be full width of the opening. Head joints at ends shall not exceed 1/4 inch in width and shall be grouted full as specified for ceramic tile.

3.03 JOINTS

A. Make parallel, plumb, level, and in alignment. Make end joints in broken-joint work, as far as practicable, on center lines of adjoining tiles. Set square tiles with straight joints.

B. Joint Width: Make joints uniform in width and space to accommodate tile in given spaces with a minimum of cutting, except maintain standard mounting widths between units abutting sheets of mounted ceramic mosaic tile. Make joint widths as follows:

1. Mounted Tile - as determined by the mounted tile spacing

2. Trim Units - match that of adjoining tile units

C. Grouting and Pointing: Install grout in tile work in accordance with ANSI A108.10.

3.04 CURING AND CLEANING

A. Curing: Cover floors with waterproof paper with joints lapped at least 4 inches and the laps tape-sealed or held down with planks or other weights. Allow to damp cure for at least 72 hours before permitting foot traffic on tiled floor. Cure in accordance with ANSI A108.1A.

B. Cleaning: Clean in accordance ANSI A108.1A, except acid cleaning of unglazed tile, when necessary, shall be done no sooner than 14 days after setting tile.

3.05 PROTECTION

A. Meet the requirements of ANSI A108.1A; cover finished tile floors with clean building paper before permitting foot traffic on them. Place board walkways on floors that are to be continuously used as passageways by workmen. Cover marble thresholds with boards. Protect tiled vertical outside corners (external angles) with board corner strips in areas used as passageways by workmen.

B. Grout Sealer: Seal grout lines and tile surface in accordance with manufacturer's recommendations after the grout has cured.

END OF SECTION

SECTION 09512 - ACOUSTICAL TILE CEILINGS

PART 1 - GENERAL

1.1 RELATED DOCUMENTS

A. Drawings and general provisions of the Contract, including General and Supplementary Conditions and Division 1 Specification Sections, apply to this Section.

1.2 SUMMARY

A. This Section includes suspended acoustical tile ceiling systems.

1.3 SUBMITTALS

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

B. Samples: For each exposed finish.

C. Maintenance data.

1.4 QUALITY ASSURANCE

A. Acoustical Testing Agency Qualifications: An independent testing laboratory, or an NVLAP-accredited laboratory.

B. Fire-Test-Response Characteristics:
   1. Fire-Resistance Characteristics: Where indicated, provide acoustical tile ceilings identical to those of assemblies tested for fire resistance per ASTM E 119 by UL or another testing and inspecting agency acceptable to authorities having jurisdiction.
      a. Identify materials with appropriate markings of applicable testing and inspecting agency.
   2. Surface-Burning Characteristics: Acoustical tiles complying with ASTM E 1264 for Class A materials, when tested per ASTM E 84.
      a. Smoke-Developed Index: 50 or less.

C. Seismic Standard: Comply with the following:
   1. Standard for Ceiling Suspension Systems Requiring Seismic Restraint: Comply with ASTM E 580.
   2. CISCA's Recommendations for Acoustical Ceilings: Comply with CISCA's "Recommendations for Direct-Hung Acoustical Tile and Lay-in Panel Ceilings--Seismic Zones 0-2."
   3. ASCE 7, "Minimum Design Loads for Buildings and Other Structures": Section 9, "Earthquake Loads."

1.5 DELIVERY, STORAGE, AND HANDLING

A. Deliver acoustical tiles, suspension system components, and accessories to Project site in original, unopened packages and store them in a fully enclosed, conditioned space where they will be protected against damage from moisture, humidity, temperature extremes, direct sunlight, surface contamination, and other causes.

B. Before installing acoustical tiles, permit them to reach room temperature and a stabilized moisture content.

C. Handle acoustical tiles carefully to avoid chipping edges or damaging units in any way.

1.6 PROJECT CONDITIONS

A. Environmental Limitations: Do not install acoustical tile ceilings until spaces are enclosed and weatherproof, wet work in spaces is complete and dry, work above ceilings is complete, and ambient temperature and humidity conditions are maintained at the levels indicated for Project when occupied for its intended use.
   1. Pressurized Plenums: Operate ventilation system for not less than 48 hours before beginning acoustical tile ceiling installation.

1.7 COORDINATION

A. Coordinate layout and installation of acoustical tiles and suspension system with other construction that penetrates ceilings or is supported by them, including light fixtures, HVAC equipment, fire-suppression system, and partition assemblies.

1.8 EXTRA MATERIALS

A. Furnish extra materials described below that match products installed and that are packaged with protective covering for storage and identified with labels describing contents.
   1. Acoustical Ceiling Units: Full-size tiles equal to 2.0 percent of quantity installed.

PART 2 - PRODUCTS

2.1 ACOUSTICAL TILE CEILINGS, GENERAL

A. Acoustical Tile Standard: Comply with ASTM E 1264.
   1. Recycled Content: Provide acoustical tiles with recycled content such that postconsumer recycled content plus one-half of preconsumer recycled content constitutes a minimum of 50 percent by weight.

B. Metal Suspension System Standard: Comply with ASTM C 635.
   1. Recycled Content: Provide products made from steel sheet with average recycled content such that postconsumer recycled content plus one-half of preconsumer recycled content is not less than 25 percent.

C. Attachment Devices: Size for five times the design load indicated in ASTM C 635, Table 1, "Direct Hung," unless otherwise indicated. Comply with seismic design requirements.

D. Wire Hangers, Braces, and Ties: Zinc-coated carbon-steel wire; ASTM A 641/A 641M, Class 1 zinc coating, soft temper.
   1. Size: Select wire diameter so its stress at 3 times hanger design load (ASTM C 635, Table 1, "Direct Hung") will be less than yield stress of wire, but provide not less than 0.106-inch- diameter wire.

E. Seismic struts and selsmic clips.

F. Metal Edge Moldings and Trim: Type and profile indicated or, if not indicated, manufacturer's standard moldings for edges and penetrations that comply with seismic design requirements;

formed from sheet metal of same material, finish, and color as that used for exposed flanges of suspension system runners.

2.2 SUSPENDED ACOUSTICAL TILE CEILING – SATC-1

A. Ceiling tile and suspension grid as indicated in the drawings.

B. Armstrong World Industries, Inc. Acoustical Tile Panels.
1. School Zone Fine Fissured
2. Square Lay-in
3. Item #466
4. 2' x 4' x 5/8"
5. Color, White

C. Suspension Grid Systems
1. Prelude
2. Hot Dipped Galvanized
3. 15/16" Exposed Tee System
4. Color, White

PART 3 - EXECUTION

3.1 INSTALLATION

A. Comply with ASTM C 636 and seismic design requirements indicated, per manufacturer's written instructions and CISCA's "Ceiling Systems Handbook."

B. Measure each ceiling area and establish layout of acoustical tiles to balance border widths at opposite edges of each ceiling. Avoid using less-than-half-width tiles at borders.

C. Suspend ceiling hangers from building's structural members, plumb and free from contact with insulation or other objects within ceiling plenum. Splay hangers only where required to miss obstructions; offset resulting horizontal forces by bracing, countersplaying, or other equally effective means. Where width of ducts and other construction within ceiling plenum produces hanger spacings that interfere with location of hangers, use trapezes or equivalent devices. When steel framing does not permit installation of hanger wires at spacing required, install carrying channels or other supplemental support for attachment of hanger wires.
1. Do not support ceilings directly from permanent metal forms or floor deck; anchor into concrete slabs.
2. Do not attach hangers to steel deck tabs.

D. Install edge moldings and trim of type indicated at perimeter of acoustical tile ceiling area and where necessary to conceal edges of acoustical tiles. Screw attach moldings to substrate at intervals not more than 16 inches o.c. and not more than 3 inches from ends, leveling with ceiling suspension system to a tolerance of 1/8 inch in 12 feet. Miter corners accurately and connect securely.

E. Install suspension system runners so they are square and securely interlocked with one another. Remove and replace dented, bent, or kinked members.

F. Install acoustical tiles in coordination with suspension system and exposed moldings and trim. Place splines or suspension system flanges into kerfed edges so tile-to-tile joints are closed by double lap of material.

SECTION 09650 – RESILIENT FLOORING

PART 1 - GENERAL

1.01 GENERAL REQUIREMENTS: This section includes the furnishing and installing complete-in-place all resilient flooring and wall base.

1.02 SUBMITTALS

A. Certificates: Submit manufacturers' certificates of Conformance or Compliance; technical data and installation instructions; Material Sadety Data Sheets (MSDS) for adhesives, patching and leveling compounds.

B. Samples: Submit the following samples:

1. Floor Tile: Duplicate of 12-inch square sheet, showing colors, finish pattern, and form of each type

2. Wall Base: 4 each, showing colors, finish, pattern, and form or each type.

1.03 DELIVERY AND STORAGE

Deliver and store packaged materials in original containers with labels intact until time of use. Store and handle materials in a manner to prevent damage or contamination by water or foreign matter.

PART 2 - PRODUCTS

2.01 MATERIALS

A. Vinyl Composition Tile shall conform with ASTM F 1066 "Vinyl Composition Floor Tile", Composition 1 (non-asbestos formulated), smooth surface, factory waxed with a minimum light reflectance of 30%, 1/8" thick, Color and pattern shall be selected by Engineer. Tile quality shall be equal to tile manufactured by Armstrong, Azrock, Congoleum Commercial Floor Tile, Mannington, Tarkett, or approved equal. Materials shall not contain asbestos.

B. Resilient Wall Base shall conform to ASTM F 1861, "Resilient Wall Base:, Type TS or TP, rubber, Group 1 or 2, 4-inch high, topset type, 1/8-inch thick with smooth exposed surface and textured building surface on the unexposed edge. Provide preformed outside corners. The rubber material shall be free from offensive odor and its color shall be uniform throughout the thickness of the base. Basee shall be equal to Burke Mercer Flooring Products Cove Base and Carpet Base, Johnonite, Roppe, Mannington, Azrock, Armstrong, Tarkett, or approved

equal.

C. Adhesives shall be brush-on, roll-on, or trowel-on water-resistant type, as recommended by the manufacturer for the specified materials used. Adhesives shall be solvent free with zero VOC content, low odor, no ammonia and non-flammable in wet state.

D. Base Adhesive shall be acrylic latex water-resistant type, as recommended by the manufacturer for the specified materials used. Adhesives shall be white, solvent free with zero VOC content, low odor, no ammonia and non-flammable in wet state.

E. Patching and Leveling Compounds shall be latex –modified, Portland cement based formulation. Gypsum based compounds shall not be used.

F. Edging shall be beveled vinyl strip, one-inch wide, same thickness as the flooring, color match flooring as selected by the Engineer. Metal edge strips shall not be used.

## PART 3 - EXECUTION

### 3.01 INSTALLATION

A. Flooring installer shall examine substrates where resilient flooring will be installed for compliance with the flooring manufacturer's requirements. The subfloors shall be smooth, free of cracks, holes, ridges and other defects.

B. The substrates to receiving the resilient flooring shall be properly prepared in accordance with the manufacturer's instructions.

C. All work shall be done by experience tradesmen in strict conformance with the manufacturer's instructions.

D. Tiles shall be laid symmetrically about the center lines of the room in both directions, starting at the center of the room and working toward the wall so that the border tiles shall be less than half the width of the field tiles. Edging shall be installed with contact adhesive at all marginal edges of flooring not stopped by a raised threshold or vertical surface. Edge tile shall be cut, fitted and scribed to walls after field flooring has been installed.

E. Resilient Base shall be applied on thoroughly-dried walls with base adhesive only.

### 3.02 CURING AND CLEANING

A. Curing: Prohibit traffic on finished floor for 24 hours after installation.

B. Remove spots of adhesive. The flooring shall be cleaned with a neutral cleaner as recommended by the manufacturer and then damp mop until clean.

END OF SECTION

SECTION 09900

PAINTING

PART 1 - GENERAL

1.1 GENERAL REQUIREMENTS

This section covers the requirements for furnishing and installing of paints.

1.2 RELATED DOCUMENTS

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

1.3 SUBMITTALS

A. Schedule of Finishes

1. 4 sets of proposed painting finish schedules shall be submitted to the Engineer for approval.

B. Color Samples

1. 3 sets of each color Finish sample shall be submitted to the Engineer for approval.

2. After the color finish sample has been approved, one set ofcolor finish samples painted onto 8-1/2"x 11" cardboard shall be submitted to the Engineer. The cardboard shall be divided into 4 horizontal strips and painted as follows:

a. Prime 3 strips starting from the bottom.
b. Ist coat bottom 2 strips.
c. 2nd coat bottom strip.

C. Schedule of Operations

1. Before work on the project is commenced, 4 complete sets of a work schedule showing his sequence of operations and dates shall be submitted by the Contractor to the Engineer.

D. Guarantee

1. 3 copies of a written guarantee shall be submitted to the Engineer.

1.2 ANALYZING AND TESTING

All paints shall be subject to laboratory tests whenever the Engineer deems necessary to determine conformation to the requirements of these specifications. Cost of testing will beborne by the State. All rejected materials shall be removed from the job site immediately. Surfaces painted with rejected material shall be redone at no additional cost to the State.

1.4 GUARANTEE

A. The Contractor shall guarantee that the work performed under this section conforms to the contract requirements and is free of any defect of material or workmanship performed by the Contractor. Such guarantee shall continue for a period of 2 years from the date of project acceptance during which period the Contractor shall remedy at his own expense any such failure to conform or any such defect.

B. The State shall notify the Contractor in writing within a reasonable time after discovery of any failure or defect.

C. Should the Contractor fail to remedy any failure or defect described in Paragraph A above within 10 working days after receipt of notice thereof, the State shall have the right to repair or otherwise remedy such failure or damage at the Contractor's expense.

1.5 SPECIAL REQUIREMENTS

A. Codes

1. The Contractor shall comply with the State OSHL (Occupational Safety and Health Law) and all pollution control regulations of the State Department of Health.

2. Any violations of the above regulations or codes shall be dealt with as mentioned in the Special Provisions Section and the Environmental Protection Section of these specifications.

B. Protection

1. Persons

a. The Contractor shall take all necessary precautions to protect public pedestrians including tenants from injury.

b. The Contractor shall provide, erect and maintain safety barricades around scaffolds, hoists and wherever Contractor's operations create hazardous conditions in order to properly protect the public and tenants.

2. Completed Work: The Contractor shall provide all necessary protection for wet paint surfaces.

3. Protective Covering: The Contractor shall provide and install protective covering over furniture, equipment, floor and other areas that are not scheduled for treatment. Protective covering shall be clean sanitary drop cloth or plastic sheets. Paint applied to surfaces not scheduled for treatment shall be completely removed and surfaces shall be returned to original condition.

4. Safeguarding of Property: The Contractor shall take whatever steps may be necessary to safeguard his work and also the property of the State and other individuals in the vicinity of his work area during the execution of this Contract. He shall be responsible for and make good on any and all damages and for losses to work or property caused by his or his employee's negligence. Also see "Protection of Property" in the Special Provision Section.

5. Fire Safety: The Contractor shall direct his employees not to smoke in the vicinity and exercise precautions against fire at all times. Waste rags, plastic (polyester sheets), empty cans, etc. shall be removed from the site at the end of each day.

C. Storage Area for Materials: No paint material, empty cans and paint brushes and rollers may be stored in buildings, but shall be stored in separate storage facilities away from the buildings.

The Contractor may furnish a job site storage facility. Such facility shall comply with requirements of the local Fire Department. The storage area shall be kept clean and facility shall be locked when not in use or when no visual supervision is possible.

D. Right of Rejection: The Engineer shall have the right to reject all work which is not in compliance with the plans and specifications. Rejected work will be redone at no additional cost to the State.

E. Sequence of Operations: The sequence of operations shall divide the surfaces into work areas and present a schedule for:

1. Surface preparation and spot prime.

2. Prime coat.

3. First finish coat.

4. Second finish coat.

Minimum interior work area shall be the complete inside surfaces of one room. Minimum exterior work area shall be one side of a single story building or one side of one story on multiple story buildings.

F. Inspection and Approvals: The Contractor shall obtain wntten approval from the Engineer upon completion of each phase of work (phases of work are: surface preparation and spot prime, prime, first finish coat, second f'mish coat) before proceeding into the next phase work. The Contractor shall give the Engineer one day (24 hours minimum) advance notice of completion of any phase of work for a area only when he deviates from the previously-submitted work schedule. The Contractor shall provide necessary access to areas to be inspected.

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.

PART 2 - PRODUCTS

2.1 PROHIBITION OF HAZARDOUS MATERIALS

A. Lead Content: Do not use coatings having a lead content over 0.06 percent by weight of nonvolatile content.

B. Chromate Content: Do not use coatings containing zinc-chromate or strontium-chromate.

2.2 PAINTS

A. Materials shall be equal in quality to that specified under the Schedule of Finishes and any given finish shall be as labeled by one manufacturer.

B. All materials shall be delivered to the job site in undamaged original containers beating the manufacturer's label and shall be stored in such a manner as to prevent damage. All rejected materials shall be removed from the job site immediately.

C. Sinclair paint is indicated for standard of quality and color, only. Comparable high quality top line paints manufactured by Devoe, Fuller O'Brien, Benjamin Moore, Sinclair, Spectra-Tone or approved equal.

D. Thinning of paint shall be done using material recommended by the manufacturer. Mix proprietary products according to manufacturer's printed specifications. Compound thinnet, mineral oil, kerosene, refined linseed oil, or gasoline shall not be used for thinning.

E. Except for metal primers, all paint shall contain mildewcide equal in strength to 2 oz. of Super Ad-It per gallon of paint pre-mixed by supplier.

F. The supplier shall submit a signed certification that the paint materials contains mildewcide equal in strength to 2 oz. of Super Ad It.

2.3 SCHEDULE OF FINISHES

A. The Schedule of finishes is made for the convenience of the Contractor and indicates the types and quality of finished to be applied to the surfaces.

B. Any surface not specifically noted in the finish schedule shall be finished to match adjoining work.

2.4 SCHEDULE - EXTERIOR SURFACES

A. Wood - Beams and Columns

1. First Coat - Olympic solid stain
2. Second Coat - Olympic solid stain

B. Wood - Rafters and Purlins

1. First Coat - Olympic solid stain
2. Second Coat - Olympic solid stain

C. Steel - Galvanized (Fuller O'Brien Specifications)

1. Pretreatment - 321-60 Vinyl wash primer
2. First Coat - 221-12 Zinc rich primer
3. Second Coat - 312-XX Heavy duty enamel
4. Third Coat - 312-XX Heavy duty enamel

D. Color of paints shall be as approved by the Engineer.

PART 3 - EXECUTION

3.1 PREPARATION OF SURFACES

A. Wood surfaces: Fill nail holes, cracks, open joints and other imperfections with appropriate compound and allow to set. Caulk all openings which will permit the entrance of water.

B. Ferrous Metal and Galvanized Metal:

1. Remove from surface to be painted all foreign matter such as tape, gum, and burrs.

2. Remove all rust to bare metal. Remove all loose, blistered, scaled, crazed, chalky finish to a tight and firm finish.

## 3.2 PAINT APPLICATION

A. General

1. All work shall be done in a workmanlike manner by skilled and experienced mechanics and shall conform to the best painting practices.

2. All materials shall be applied in accordance with the manufacturer's specifications and the finished surfaces shall be free from runs, sags, drops, ridges, waves, laps, streaks, brush marks and variations in color, texture and finish (glossy or dull). The coverage shall be complete and each coat shall be so applied as to produce a film of uniform thickness. No paint, varmsh or enamel shall be applied until the preceding coat is thoroughly dry and approved.

3. No exterior painting of unprotected surfaces shall be done in rainy, damp weather. Coats shall be applied only to surfaces that are thoroughly dry.

B. Application: Shall be by brush or roller only. Airless spraying may be permitted, but only with the approval of the Engineer for otherwise inaccessible areas.

C. Colors: Each coat shall be tinted a different shade from the preceding coat. Colors shall be as selected by the Engineer.

D. All surfaces adjacent to areas being finished shall be protected and left clean of paints, stains, etc. Clean drop cloths shall be used until completion of job.

E. All mixing shall be done outside the building.

## 3.3 CLEAN-UP

A. During the progress of the work, all debris, empty crates, waste, drippings, etc. shall be removed by the Contractor and the grounds about the areas to be painted shall be left clean and orderly at the end of each work day.

B. Upon completion of the work, staging, scaffolding, containers and all other debris shall be removed from the site. All paint, shellac, oil, or stains splashed or spilled upon adjacent surfaces not requiring treatment (hardware, fixture, floor, glass) shall be removed and the entire job left clean and acceptable.

END OF SECTION

SECTION 10800 - TOILET ACCESSORIES

PART 1 - GENERAL

1.01 GENERAL REQUIREMENTS: This section includes the furnishing and installing complete-in-place all toilet accessories and its appurtenances as indicated on the plans and specifications.

1.02 DESCRIPTION OF WORK

A. Provide all materials, labor, equipment and tools necessary to complete toilet accessory work as indicated on the drawings and as specified herein. Whether or not indicated, provide the minimum as noted under 2.03, B. The type of toilet accessories required include in the following:

1. Toilet Tissue Dispenser.

2. Grab Bar.

3. Soap Dispenser.

4. Paper Towel Dispenser.

5. Framed Mirrors.

6. Sanitary Napkin Disposal.

7. Clothes Hook.

B. Related Work Specified Elsewhere

1. Section 06200 - FINISH CARPENTRY: Toilet accessories installations.

2. Section 10160 - TOILET PARTITIONS: Coordinate installations.

1.03 SUBMITTALS

Submit in accordance with Section 01330 - SUBMITTALS.

1. Product Data: Submit manufacturer's specifications and installation instructions for each toilet accessory.

2. Samples: When requested, submit full-size samples of units for review of finishes.

Acceptable samples will be returned and may be used in the work. Compliance with all other requirements is the exclusive responsibility of the Contractor.

1.04 QUALITY ASSURANCE

A. Inserts and Anchorages: Furnish inserts and anchoring devices for toilet accessories. Provide setting drawings, templates, instructions and directions for installation of anchorage devices. Coordinate delivery with other work to avoid delay.

B. Products

1. Provide products of the same manufacturer for each type of the accessory unit and for units exposed in the same areas, wherever possible.

2. Coordinate for acceptable designs and finishes.

3. Stamped names of labels on exposed faces of units will not be permitted, except where otherwise specified.

4. Provide locks where specified. One key shall fit all locks of one brand.

C. Accessibility: Mount accessories for accessible toilets in accordance with Americans with Disabilities Act Accessibility Guidelines (ADAAG) 213 Toilet Facilities and Bathing Facilities, Chapter 6 - Plumbing Elements and Facilities, Sections 601, 603, 604, 605, 606, & 609, etc., State of Hawaii, Architectural Access Committee where noted.

PART 2 - PRODUCTS

2.01 MANUFACTURERS

Products of the following manufacturers or approved equal are acceptable provided they meet the materials, construction and the standard of quality specified.

1. Bradley Corp., Washroom Accessories Division.

2. Bobrick Washroom Equipment Co.

3. McKinney Co.

2.02 MATERIALS

A. Stainless Steel: AISI, Type 302/304. Provide satin finish, unless otherwise

specified.

B. Fasteners: Screws, bolts and other devices of same material as accessory unit, tamper and theft resistant when exposed, and of galvanized steel when concealed.

2.03 LIST OF TOILET ACCESSORIES (Refer to drawings for locations where indicated)

A. For convenience and to establish standards of quality and design, the following list of toilet accessories are items manufactured by Bradley Corporation, Washroom Accessories Division, where noted.

B. Toilet Accessories

1. Toilet Paper Dispenser (TPD): 5402, surface-mounted multi-roll toilet tissue dispenser shall be Type 304 stainless steel with all-welded construction; exposed surfaces shall have stain finish. Front of toilet tissue dispenser door shall be drawn, one-piece, seamless construction. Door shall be secured to cabinet with two rivets and equipped with a keyed tumbler lock. Unit shall dispense two standard-core toilet tissue rolls up to 5" diameter. Extra roll shall automatically drop in place when bottom roll is depleted. Unit shall be equipped with two theft-resistant, heavy-duty, one-piece, molded polyethylene spindles.

2. Soap Dispenser (SD): 6542, surface-mounted soap dispenser shall be Type 304 stainless steel with satin finish. Corrosion-resistant valve shall dispense viscous to thin, free-flowing soaps, lotions, and synthetic detergents. Valve shall be operable with one hand and with less than 5 pounds of force to comply with ADA Accessibility Guidelines. Container body and back plate shall be epoxy-sealed to prevent warping and leakage. Soap dispenser shall have concealed, vandal-resistant mounting. Locked, hinged stainless steel lid for top filling shall require a special key to open. Capacity shall be 40 fluid ounces. For mounting above lavatory.

3. Grab Bars (GB): 832 Series, with concealed mounting and flange covers, 1-1/4" – 1-1/2" maximum o.d., extra heavy stainless steel grab bar, satin finish surface. Anchor plate with vandal-proof set screws. Provide sizes and arrangements indicated. Provide manufacturer's metal backer plates as applicable and appropriate stainless steel mounting kits of substrate.

4. Paper Towel Dispenser (PTD): 250-15, surface-mounted paper towel dispenser shall be Type 304 stainless steel with all-welded construction; exposed surfaces shall have satin finish. Door shall be equipped with a full-length stainless steel piano-hinge and tumbler lock keyed like other washroom accessories. Unit shall be capable of dispensing 400 C-fold or

525 multifold paper towels without adjustment or use of adapters.

5. Framed Mirror (MR): 780 Series, sizes as indicated. Mirror shall have a one-piece, Type 304 stainless steel angle frame, 3/4-inch x 3/4-inch with continuous integral stiffener on all sides and beveled front to hold frame tightly against mirror; corners shall, be heliarc welded, ground, and polished smooth; all exposed surfaces shall have satin finish with vertical grain. Float/plate glass mirror shall be guaranteed for 15 years against silver spoilage. All edges shall be protected by plastic filler strips and the back shall be protected by full-size, shock-absorbing, water-resistant, non-abrasive, 1/8-inch thick polyethylene padding. Galvanized steel back shall have integral hanging brackets for mounting on concealed rectangular wall hanger. Mirror shall be secured to hanger with concealed Phillips-head locking screws located in bottom of frame.

6. Sanitary Napkin Disposal (SND): 4781-15, surface-mounted sanitary napkin disposal shall be Type 304 stainless steel with all-welded construction, exposed surfaces shall have satin finish. Cover shall be drawn, one-piece, seamless construction and secured to container with a full-length stainless steel piano-hinge. Container shall have integral finger depression for opening cover.

7. Clothes Hook: B-233 (BOBRICK) hook, Type 304, 11 gauge stainless steel with satin finish; all-welded construction, maximum projection 1-1/8 inch.

8. Counter Tops: counter tops shall be Quartz by Viatera or Silestone or approved equal. The exposed edges shall have a bull nose finish. Color to be selected by the Engineer from standard colors.

## PART 3 - EXECUTION

### 3.01 INSPECTION

Installer must examine the areas and conditions under which toilet accessories are to be installed. Notify the Contractor in writing of conditions detrimental to the proper and timely completion of the work. Do not proceed with the work until unsatisfactory conditions have been corrected in a manner acceptable to the Installer.

### 3.02 INSTALLATION

A. Use concealed fastenings wherever possible.

B. Provide anchors, bolts and other necessary fasteners, and attach accessories

securely to walls and partitions in locations as shown or directed.

C. Install concealed mounting devices and fasteners fabricated of the same material as the accessories or of galvanized steel.

D. Install exposed mounting devices and fasteners finished to match the accessories.

E. Provide theft-resistant fasteners for all accessory mountings.

F. Secure toilet room accessories to adjacent walls and partitions complying with the manufacturer's instructions for each item and each type of substrate construction.

END OF SECTION

SECTION 15000

MECHANICAL GENERAL REQUIREMENTS

PART 1 - GENERAL

1.1 GENERAL REQUIREMENTS

A. These general mechanical requirements govern work specified under all sections of Division 15 - MECHANICAL.

B. Furnish labor, materials, tools and equipment and perform work and services necessary for a complete and properly operating mechanical work, equipment and systems, as shown on Drawings and as specified, in accordance with provisions of the Contract Documents and completely coordinated with work of other trades.

C. Completely examine the Contract Documents and shall report to the State any error, inconsistency or omission discovers.

D. Provide supplementary or miscellaneous items, details, appurtenances and devices incidental to or necessary for a sound, secure and complete mechanical system where work required is not specifically indicated.

E. Drawings and Specifications shall be taken together. Provide work specified and not indicated or work indicated and not specified as through mentioned in both.

F. Warrant that materials and equipment furnished under this Contract will be new and that work will be good quality, free from faults and defects and in conformance with Contract Documents for a guaranteed period of one year and as specified in related mechanical specifications - Division 15.

G. Maintain at the Site one copy of Drawings, Specifications, Addenda, approved Shop Drawings, Change Orders and other modifications, in good order and marked to record changes made during construction. These shall be made available to the State.

H. Give the State timely notice of its readiness for testing of any work including the date arranged so the Engineer may observe such testing. Bear all cost of such tests.

I. The Mechanical Contractor shall be responsible for all coordination for their sub-contractors. All issues arising from their sub-contractors shall be addressed through the Mechanical Contractor. The Mechanical Contractor shall provide experienced personnel who has obtained substantial technical and coordination knowledge from recent similar size projects.

1.2 RELATED REQUIREMENTS SPECIFIED UNDER OTHER SECTIONS

Requirements of Division 1 Sections apply to this Section.

1.3 SUBMITTALS

Submit six complete sets of Shop Drawings together with six sets of manufacturers data and certificates for equipment, materials and finish and pertinent details for each system and have them approved before procurement, fabrication or delivery of the items to the job site. Due to space limitations the overall size of the mechanical equipment shall not exceed the physical dimensions of the manufacturer and model indicated on the Drawings. Refer to Drawings for make and model. Partial submittals will not be acceptable and will be returned without review. Partial and/or incomplete submittals shall be defined as causing delay to the project and shall be the Contractors liability. Provide a summary register or log sheets indicating all submittals and related data required. Submittals shall include Shop Drawings, the manufacturer's name, trade name, catalog model or number, size, layout dimensions, project specification and paragraph reference, applicable industry and technical society publication references and other information necessary to establish contract compliance of each item the Contractor proposes to furnish. Provide required items for a complete operational and integral system. Relocate items which are located in the clearance and service space of the equipment at no additional cost to the State. Maintain clearances as indicated on the Drawings or if not indicated use minimum clearances as specified by the approved submittals and shop drawings. Any material orders or work prior to the approval of submittals shall be at the Contractor's own risk. All work done prior to approvals is subject to removal and replacement at no cost to the State.

A. Shop Drawings: Drawings shall be a minimum of 24 inches by 36 inches in size, except as specified otherwise. Drawings shall be a minimum of 1/4-inch scale but not less than indicated on the Drawings. Drawings shall include floor plans, sectional views, piping diagrams and installation details of equipment; and equipment spaces identifying and indicating proposed location, layout and arrangement of items of equipment, piping, locations and sizes of openings penetrating through walls, floors, roofs and structural members, access panels to valves and items requiring maintenance or inspection, and other items that must be shown to assure a coordinated installation. Drawings shall indicate adequate clearance for operation, maintenance and replacement of operating equipment devices. If equipment is disapproved, Drawings shall be revised to show acceptable equipment and be resubmitted. Contractor shall coordinate all flashing requirements with other trades water proofing work to assure a watertight installation.

1. Review, stamp with approval and submit, Shop Drawings required by the Contract Documents or subsequently by the State as covered by modifications. At the time of submission, inform the State in writing of any deviation in the Shop Drawings from the requirements of the Contract Documents. By approving and submitting Shop Drawings, the Contractor certifies that he has determined and verified field measurements, field construction criteria, materials, catalog numbers and similar data and that he has checked and coordinated each Shop Drawing with the requirements of the work and of the Contract Documents and that equipment and related items fits in the allotted space and complete

coordination between Contractors involved. Contractor shall coordinate their Shop Drawings with other trades Shop Drawings to assure a complete coordination has been done.

a. Coordinate all mechanical work with finish work.

b. The Mechanical Contractor shall provide Shop Drawings for all their site work. Prior to submitting the Shop Drawings for review, the key or prime Contractor shall coordinate all sub-contractors' work on the Shop Drawings; certify that all related site work Contractors have reviewed the Shop Drawings. Submit complete (not partial) certified Shop Drawings for Client and A/E review.

2. Submitting reproductions of Bid Documents shall not be construed to be Shop Drawings and will not be acceptable and will be returned without review. Direct tracing of the Bid Drawings shall be construed to be reproduction of the Bid Documents.

3. Certify that this shop drawings equipment and material shown is in compliance with the Drawings and Specifications and can be installed in the allocated spaces without interferences to other related work and access spaces.

4. Additional related work caused by the product changes, installation and operational requirements shall be the Contractor's responsibility at no additional cost to the State.

B. Manufacturer's Data: Submittals for each manufactured item shall be manufacturer's descriptive literature of cataloged products, equipment drawings, diagrams, and catalog cuts.

C. Standards Compliance: When materials or equipment must conform to the standards of organizations such as the American National Standards Institute (ANSI), American Society for Testing and Materials (ASTM), National Electrical Manufacturers Association (NEMA) and Underwriters Laboratories (UL), American Disability Act Access Guidelines (ADAAG), proof of such conformance shall be submitted to the State for approval. If an organization uses a label or listing to indicate compliance with a particular standard, the label or listing will be acceptable evidence, unless otherwise specified in the individual sections. In lieu of the label or listing, submit a certificate from an independent testing organization, which is competent to perform acceptable test and is approved by the State. The certificate shall state that the item has been tested in accordance with the specified organization's test methods and that the item conforms to the specified organization's standard. For materials and equipment whose compliance with organizational standards or specifications is not regulated by an organization using its own listing or label as proof of compliance, a certificate of compliance from the manufacturer shall be submitted for approval. The certificate shall identify the manufacturer, the product and the referenced

standard and shall state that the manufacturer certifies that the product conforms to requirements of the project Specification, Drawings, installation, interface requirements and of the referenced standards listed. Test data shall be provided upon the request of the Engineer.

D. Certified Test Reports: Before delivery of materials and equipment, certified copies of test reports specified in the individual sections shall be submitted for approval.

E. Certificates of Conformance or Compliance: Submit three certificates of compliance from the manufacturer attesting that materials and equipment to be furnished for this project interface and comply with the requirements of this Specification, reference publications and shall be available within the project's total construction schedule. Pre-printed certifications will not be acceptable; certifications shall be in the original. The certification shall not contain statements that could be interpreted to imply that the product does not meet all requirements specified, such as "as good as"; achieve the same end use and result as materials formulated in accordance with the referenced publication", "equal or exceed the service and performance of the specified material". The certification shall state that the product conforms to the requirements specified.

1. Mechanical Contractor shall coordinate all equipment interface requirements prior to submitting certificates.

F. As-Built Drawings: Record changes from the Contract Drawings for material and equipment. A set of prints showing layout as installed shall be kept up to date at the job site. Submit record Drawings for review prior to final inspection. Upon completion of work, a complete set of reproducible record drawings shall be submitted to the State before the project will be accepted as complete.

## 1.4 CODES, REGULATIONS, AND STANDARDS

A. Work shall be in accordance with government laws, ordinances, rules and regulations and orders.

B. The following shall govern where applicable; The Plumbing Code of the County of Kauai, 1997 Uniform Plumbing Code, as amended. The Building Code of the County of Kauai, Uniform Fire Code of the County of Kauai, State of Hawaii Department of Health Regulations, U.S. Department of H.H.S., Applicable National Fire Protection Association Standards, OSHA Rules and Regulations and other codes and standards referenced in these Specifications. Where requirements differ in these codes and standards, the more stringent shall apply.

C. All mechanical work shall conform to the County of Kauai energy codes.

## 1.5 TRADE NAME

Mentioning of a trade name indicates that the manufacturer is acceptable to the State. However, certain specified construction and details may not be regularly included in the manufacturer's cataloged product. Provide the material or equipment complete as specified.

1.6 DISCREPANCIES

A. The Drawings and Specifications are intended to cooperate. Any materials, equipment or system related to this section and exhibited on the Civil, Landscape, Architectural, Structural, Electrical or Mechanical Drawings but not mentioned in the Specifications are to be executed to the intent and meaning as if it were both mentioned in the Specifications and set forth on the Drawings.

B. In case of differences between the Drawings and Specifications, the Specifications shall govern first, and then the Drawings. Large scale details shall take precedence over small scale Drawings as to the shape and details of construction. Specifications shall govern as to materials.

C. Drawings and Specifications are intended to be fully cooperative and to agree, but should any discrepancy or apparent difference occur between Drawings and Specifications or should error occur in the work of others affecting the work, the Contractor shall notify the Engineer at once. If the Contractor proceeds with the work affected without instructions from the Engineer, he shall make good any resultant damage or defect at the Contractor's cost. Interpretations of Drawings and Specifications shall be clarified by the State and the responsible design Architect/Engineer.

1.7 WORKMANSHIP AND MATERIALS

A. Workmanship shall be of the best quality and none but competent mechanics skilled in their trades shall be employed. Furnish the services of an experienced superintendent, who will be constantly in charge of the erection of the work, until completed and accepted.

B. Unless otherwise specified, each article of its kind shall be the standard product of a single manufacturer.

C. Whenever the words "or approved equal" or other words of similar intent or meaning are used, implying that judgment is to be exercised, it is understood that it is the judgment of the Engineer that is referred to.

D. The Engineer shall have the right to accept or reject material, equipment and/or workmanship and determine when the Contractor has complied with the requirements specified.

E. Manufactured materials shall be delivered and stored in their original containers. Equipment shall be clearly marked or stamped with the manufacturer's name and rating. Equipment and materials shall be carefully handled, properly stored and

adequately protected to prevent damage before and during installation, in accordance with the manufacturer's recommendations and as accepted by the Engineer. Damaged or defective items, in the opinion of the Engineer, shall be replaced.

F. Reference to standards are intended to be the latest revision of the standard specified.

1.8 MANUFACTURER'S RECOMMENDATIONS

Equipment installed under this Division of the Specifications shall be installed according to manufacturers' recommendations, unless otherwise shown on the Drawings or specified. Where installation procedures or any part thereof are required to be in accordance with the recommendations of the manufacturer of the material being installed, printed copies of these recommendations shall be furnished to the Engineer, prior to installation. Installation of the item will not be allowed to proceed until the recommendations are received. Failure to furnish these recommendations can be cause for rejection of the material.

1.9 INSPECTION OF SITE

Visit the Site and examine the conditions affecting work before submitting Shop Drawings. The submission of the Shop Drawings shall be considered evidence that the Contractor has visited the Site and no extra payments will be allowed to the Contractor on account of extra work made necessary by his failure to visit the Site.

1.10 CONTINUITY OF SERVICES

A. It is intended that interruption of utilities be kept to a minimum. Notice of service interruptions shall be submitted to the State for approval before intended date of service interruptions. Exact date and time of interruption allowed shall be determined by the State. Provide temporary valves, cross connections, piping, etc., as necessary to assure this continuity of service; they shall be furnished under this section without additional charge to the State and shall be removed when no longer necessary.

B. Interruptions of existing utilities serving occupied or used facilities shall not be disrupted except where authorized in writing by authorities having jurisdiction, except where specified otherwise.

C. Submit to the State a copy of work schedule indicating the date and area to be affected by work.

D. Execute work using such methods, techniques, connections and tie-ins which will cause least interference with, and interruptions of, existing utilities and services. Keep roads clear of materials, debris, etc., to maximum extent possible. Schedule arrangements for work which will cause interferences or interruptions, in advance with the State, other affected trades and authorities having jurisdiction.

E. Examine Site and become familiar with existing local conditions affecting work.

F. Examine Drawings and Specifications, including Architectural, Structural, Landscape, Civil and Electrical, and become familiar with the types and systems of construction to be used. Determine how such types and systems will affect the installation of mechanical work.

G. Investigate, determine and verify locations of any overhead or buried utilities on or near site. Determine such locations in conjunction with public and private utility companies and with authorities having jurisdiction.

1.11 OPENINGS, CUTTING, AND REPAIRING

A. Cooperate with the work to be done under other sections in providing information as to openings required in roof, walls, beams, slabs, and footings for piping and ductwork including sleeves where required.

B. Belowground concrete jackets, drilling or cutting required for the performance of work under this Section shall be responsibility of Contractor and the cost there shall be borne by the Contractor.

C. Holes in Concrete: Mechanical Contractor shall pay costs for cutting of holes. Holes through existing concrete shall be core drilled or saw cut. Holes required shall have the approval of the Engineer prior to cutting and drilling.

D. It shall be the responsibility of this Contractor to ascertain that openings are properly located. Openings shall be coordinated with the structural drawings, Engineers and the Contractor. Provide sleeves and fire rated material through walls, slabs and beams as required by code.

1.12 PAINTING

Contractor shall paint all exposed work specified in Division 15; equipment piping, and supports. Paint shall match adjacent wall or ceiling; verify with Engineer exact type, color, prime and number of coats of paint required

1.13 PIPE SLEEVE, ESCUTCHEONS

Furnish and set sleeves to accommodate pipes passing through foundations, walls, floors, beams, partitions; provide chrome plated escutcheons at exposed finished surfaces pierced by pipes. Provide proper sealants and fire proofing at penetrations; secure escutcheon to structure.

1.14 VALVES

Size valves equal to upstream pipe size of valve location.

PART 2 – PRODUCTS

2.01 MATERIALS

A. As specified in all sections of Division 15 - Mechanical.

B. Materials and equipment shall be cataloged products of manufacturers regularly engaged in production of such materials or equipment and shall be manufacturer's latest design that complies with the specifications requirements. Contractor shall obtain quantities and unit prices for all material and equipment from their suppliers. Materials and equipment shall duplicate items that have been in satisfactory commercial or industrial use at least 2 years prior to bid opening. Where two or more items of the same class of equipment are required, these items shall be products of a single manufacturer; however, the component parts of the items need not be the products of the same manufacturer. Each item of equipment shall have the manufacturer's name, address, model number and serial number on the nameplate. Nameplate of the distributing agent will not be acceptable.

PART 3 – EXECUTION

3.01 PIPE IDENTIFICATION

A. Identification of new pipe lines shall be by means of colored, waterproof, all temperature, self-adhering labels and directional arrows.

B. At Contractor's option, each and every system may be identified by painting with contrasting colors, using 3/4 inch high minimum stencil letters.

C. Exposed pipes, whether insulated or not shall be identified. Labels may be omitted from piping where the use is obvious, due to its connection to equipment and where the appearance would be objectionable in finished rooms, as approved by direction.

D. Identification labels shall be placed as follows:

1. Near each valve and branch connection.
2. Wherever piping merges or disappears from view from the floor of the room in which it is installed.
3. Labels shall not be more than 50 feet apart.
4. Directions of flows labels for all piping.

3.02 VALVE INDEX

Provide brass or plastic tags on valves with letters stamped or engraved thereon designated service of each valve.

3.03 FIELD TEST

Perform tests of the installed work and shall provide services, labor, equipment, materials and instruments needed for the tests. During pressure tests, items in the system to be

tested, not designed for test pressures shall be removed or isolated from the system and shall be reconnected or unblocked after tests are completed. Should operating tests require the presence of manufacturers' representatives, cooperate with them and shall place at their disposal assistance, materials and services required to perform such test. Certify in writing that work have passed required tests.

A. The Contractor shall execute field performance tests and make modifications for design and operational requirements as specified by the Engineer.

3.04 FINAL INSPECTION

Final inspection shall be requested by the Contractor only after submittal of required certificates. No final inspection will be made until all moving parts of equipment are properly guarded, controls and safety devices tested and operative, all painting required done and the Site cleaned up.

3.05 WARRANTY

A. Except as otherwise specified, all work shall be guaranteed by the Contractor against defects resulting from the use of defective or inferior materials, equipment or workmanship for one year or as otherwise noted in the technical specifications from the date of beneficial occupancy or project acceptance of the contract whichever is earlier. All guarantee of work shall be transmitted in writing.

B. Should date of beneficial occupancy be earlier than project acceptance date, the maintenance service contracts and warranty date for equipment in use shall start from the date of beneficial occupancy.

C. If, within any guarantee period, repairs or changes are required in connection within the guaranteed work, which in the opinion of the use of materials, equipment or workmanship which are inferior, defective or not in accordance with the terms of the contract, the Contractor shall within five (5) consecutive working days and without expense to the State commence to:

1. Place in satisfactory condition in every instance all of such guaranteed work and correct all defects therein; and

2. Make good all damages to the building or work or equipment or contents thereof.

A. Whenever a manufacturer's guarantee on any product hereinafter specified exceeds one year, this guarantee shall become part of this contract thereof. The Contractor shall complete the warranty forms in the name of the State and submit such forms to the manufacturer within such time required to validate the warranty. The Contractor shall submit to the State a photocopy of the completed warranty form for the Owner's record as evidence that such warranty form was filed with the manufacturer.

B. If guarantee is specified for greater than two (2) years, two (2) years shall prevail

except for manufacturer's warranties. Manufacturer's warranties shall remain as specified in their respective sections.

However, the number of years specified in the technical specifications shall prevail only if it is stated that the number of years for guarantee supercedes this provision.

END OF SECTION

SECTION 15400

PLUMBING

PART 1 - GENERAL

1.1 GENERAL REQUIREMENTS

The extent of the work is as indicated on the drawings. The work includes providing complete, piping, fixtures, plumbing equipment and accessories. All fixtures and fittings material and installation shall meet the required accessibility standards. Refer to Architectural drawings for mounting heights.

1.2 RELATED REQUIREMENTS SPECIFIED UNDER OTHER SECTIONS

Related requirements include, but are not limited to:

The interim General Conditions of the Contract for Construction shall govern this Section.

1.3 SUBMITTALS

A. Substitution Request: Substitution materials may be used if qualified by written permission from the Engineer. A list of the substitution with qualifying data shall be submitted for approval. Submit substitution request in accordance with Special Provisions and Interim General Conditions.

B. Equipment and Material Submittal: Submit for approval, six (6) sets of submittal data showing characteristics and dimensions.

C. Shop Drawings: After approval of equipment and material submittals, submit for approval six (6) sets of dimensioned shop drawings, as required by the General Conditions, indicating proposed departures from the Contract Documents due to field conditions, requirements for concrete work, openings in structure, piping, hangers, and support details. Coordinate drawings with other trades to avoid interference's. Approval of shop drawings does not relieve the Contractor from responsibility of a complete installation or proper performance. No work shall commence until shop drawings are approved by the Engineer.

1.4 CODES, REGULATIONS, AND STANDARDS

A. The Installation shall be in accordance withal applicable laws, ordinances and regulations, including the local Building Codes, Plumbing Code, Electrical Code, ADAAG, and Public Health Regulations of the State of Hawaii.

B. The installation shall conform to the IAPMO Uniform Plumbing Code, as accepted and revised by the Building Department.

C. Obtain and pay for all costs of permit, fee licenses, tests, and inspection required in connection with the work.

## 1.5 ADDITIONAL WORK

The design is based on equipment, as decribed in the Drawings. Any change in electrical, wiring, conduit, connections, piping, controls and openings required by alternate equipment specified, submitted, and approved shall be paid for by this Contractor.

## 1.6 GUARANTEE AND CERTIFICATE

Guarantee and certify in writing all new work in this section for a period of one year from date of acceptance of the work as a whole by the Engineer. Should any equipment or material fail within this period, replace, or repair that item at no cost to the State if such is due to faulty workmanship or materials. Contractor shall be responsible for all damages to any part of premises caused by equipment furnished under this section.

## 1.7 PRODUCT DELIVERY STORAGE, AND HANDLING

Furnish new fixtures, materials, and accessories bearing the manufacturer identification. Coordinate deliveries to avoid interference's or construction delays. Protect products during delivery, storage, installation, and the remainder of the construction period after installation.

## 1.8 OMISSIONS

It is the intent of the plans and specifications to provide a complete installation. Should there be omissions, the Contractor shall call the attention of the Contracts Engineer to such omissions fourteen (14) days in advance of the date of bid opening inaccordance to the Special Provisions so that the necessary corrections can be made.

## 1.9 INSPECTION OF SITE

The Contractor shall visit the site and examine the conditions affecting his work by submitting his proposal. The submission of the proposal shall be considered evidence that the Contractor has visited the site and no extra work made necessary by his failure to visit the site.

PART 2 - PRODUCTS

2.1 EQUIVALENT EQUIPMENT, FIXTURES, AND MATERIALS

A. Equivalent equipment, fixtures, and material may be used if pre-qualified by written permission from the Engineer. A list of the substitution with qualifying data shall be submitted for approval. Submit subsitution request prior to bidding by date specified in Special Provisions.

B. Acceptable equal products of the following manufacturers are acceptable in lieu of those specified hereinafter by specific manufacturer and model number.

1. Fixtures: American Standard, Kohler, Eljer, Dayton, Elkay, Oasis, Haws, Sloan, Chicago, Acorn, Bradley.

2. Plumbing System Specialities: Josam, Zurn, Smith, Wade.

2.2 FIXTURES

A. Provide connecting fittings and wall support brackets as required. All fixtures and supply faucets shall conform to the latest codes, regulations, and ordinances regarding water conservation.

1. Flush Valve Water Closet: Kohler Highcrest K-4302, vitreous china, 1.6 gpf, elongated bowl with 16-1/2" high rim, elongated, siphon jet action, 1-1/2" top spud. Open front seat less cover. Sloan Royal 111 flushometer valve with ADAAG approved lever handle (Section 4.16.5). Provide handle on wide side of stall.

2. Urinal: Kohler Dexter K-5016-ET, vitreous china, siphon jet action, elongated rim 3/4 –inch top spud with all carrier. Sloan Royal 186-1 flushometer valve with ADAAG approved lever handle (Section 4.18.4). Accessible mounting height in accordance with ADAAG (Section 4.18.2).

3. Wall-Mounted Lavatory: Kohler Greenwich K-2-32, vitreous china 20-3/4" x 18-1/4" overall dimensions, wall-moounted with concealed arm supports, 4-inch center. Chicago 802A-669 metering faucet, ADAAG compliant (Section 4.19.5), connect cold water supply to both cold and hot connections. Perforated grid strainer with offset tailpiece and Handi-Shield cover for tailpiece/trap and supplies (black). Accessible mounting height in accordance with ADAAG (Section 4.19).

4. Sink: Elkay LRAD-2521-65, 18-gauge type 302 stainless steel, 25" X 21-1/4" overall dimensions, 6-1/2" deep, self-rimming, fully undercoated, 8-inch centers. Chicago 786-E3 gooseneck faucet with wrist blade handles, connect cold water supply to both cold and hot connections. Perforated grid strainer with offset

tailpiece and Handi-Shield cover for tailpiece/trap and supplies.

5. Hand Sink: Elkay ELV-2219-CS, stainless steel wall mounted sink, 18-gauge type 302 stainless steel, 22" x 19" overall dimensions, fully undercoated, coved corners, with backsplash, 4-inch centers. Chicago 895-317 gooseneck faucet with wrist blade handles, connect cold water supply to both cold and hot connections. Perforated grid strainer with offset tailpiece and Handi-Shield cover for tailpiece/trap and supplies.

6. Service Sink: Kohler Bannon K-6716, enameled cast iron, 24" x 20-1/4" overall dimensions, back drilled faucet holes 8-inch centers, with K-8937 stainless steel rim guard. Kohler Knoxford K-8907 service sink faucet with lever handles, vacuum breaker and hose thread outlet. K-6672 2" trap standard with perforated grid strainer and cleanout plug.

7. Shower: Acorn Apex 412-ADA, flush mount wall shower with 24" slide bar and soap dish, heavy gauge type 304 stainless steel panels, pressure balancing control valve with lever handle, hand shower with 60" flexible metal hose and vacuum breaker, two-wall stainless steel grab bar and padded vinyl folding seat.

8. Dual Height Water Cooler: Elkay EBFATL-8, dual-height wall mounted water cooler with front push-bar, lead-free construction, 8 gph, stainless steel finish. Provide with LKAPR-188 apron, stainless steel finish. Electrical: 4.8 FLA, 410 watts, 1/5 HP compressor. Accessible mounting height in accordance with ADAAG (Section 4.15).

## 2.03 PIPE FITTINGS

Foreign pipe is strictly disallowed for this project.

A. Drainage and Vent Pipes Below Grade: Service Weight cast-iron soil pipe. Hub and spigot with Ty-seal joint or No-Hub cast-iron with MG couplings or husky series 4000 heavy duty joints.

B. Drainage and Vent Pipes Above Grade: Service weight No-Hub cast-iron pipe and fittings with stainless steel couplings and full circle neoprene gaskets.

C. Water Pipes Below Ground: Copper type "K", annealed with wrought copper fittings brazed joints. Piping shall be corrosion protected with spiral wrap, 20-mil polyethylene tape, lapped one-half the width of tape, double-thickness.

D. Water Pipes Above Ground: Copper type "L", hard-drawn with cast brass or wrought copper fittings and 95-5 tin-antimony soldered joints, lead-free flux.

## 2.04 PLUMBING SPECIALTIES

A. Cleanouts: Cleanouts in traffic areas to be heavy-duty type.

1. Cleanout to Grade: Smith 4233 cast-iron cleanout, adjustable scoriated cast-iron top with vandal-proof screws, threaded bronze plug.

2. Floor Cleanout: Smith 4033 cast-iron cleanout, adjustable scoriated nickel-bronze top with vandal-proof screws, threaded bronze plug.

B. Hose Bibb: Chicago No. 952 interior faucet with vacuum breaker, threaded hose outlet and removable tee handle. Provide straight valve with loose key handle.

C. Floor Drains: Smith Fig. 2005-A cast-iron floor drain with flashing collar, nickel bronze adjustable strainer with vandal-proof screws.

## PART 3 - EXECUTION

### 3.1 PREPARATION

Visit the worksite and become fully aware of all existing conditions. Investigate the Contract Documents and make proper provisions to avoid interferences or construction delays. Determine the exact route of each pipe. Make off-sets and changes in direction required to maintain proper head room and pitch or to accommodate the structure and the work of other trades. Furnish other trades with information to properly locate and size openings in the structure required for this work. Furnish anchor bolts, sleeves, inserts, and supports required for this work.

### 3.02 INSTALLATION

Perform work using personnel skilled in the trade involved. Provide competent supervision. Furnish new equipment, materials, and accessories bearing the manufacturer's identification, and conforming to the recognized commercial standards. Provide access panels for concealed items provided under this section that require maintenance, adjustment, or inspection. Provide extra materials and labor for a complete operable system at no extra cost to the State.

### 3.03 UTILITY CONNECTIONS

Existing utility locations were determined from information available at the design. Verify the exact location and elevation of all existing utilities. Notify the Engineer immediately in writing of all discrepancies. Be fully responsible for any and all damage resulting from failure to exactly locate and preserve existing underground utilities.

### 3.04 FIXTURE INSTALLATION

Set fixtures in an approved, workmanlike manner. Point up all edges against walls and partitions with white gout. Provide adequate supports for wall-mounted fixtures. Provide supplies for allwater lines to fixtures, compression joint-type with chromium-plated brass riser. Provide chromium-plated brass P-trap, waste fittings and escutcheon, as required for fixture. Exposed metal, including pipe, shall be polished chromium-plated. Provide floor/wall carriers for all wall-hung fixtures.

## 3.05 PIPE INSTALLATION

Conform to the requirements of the Uniform Plumbing Code. Inspect all pipes, inside and outside. Remove interior obstructions and ream out pipe ends. Tool markings on polished fittings are not acceptable. Cut pipe accurately so that it can be worked into place without springing or forcing. Install pipes parallel to the wall of the structure and plumb. Make changes in direction with fittings. Bushings are not permitted. Install valves with stems above horizontal. Provide proper support and adequate provisions for expansion, contraction, slope, and anchorage. Provide dielectric union where copper tubing connects to steel pipe. Wrap pipe or tubing with 1/4 inch thick felt, secure with tape, where they contact other materials. Have piping treated, inspected, and approved before it is furred in, buried, or otherwise hidden. Caulk watertight around pipes passing through sleeves. Wrap pipe with polyethylene tape where it passes through sleeves and when it contacts concrete or masonry. Grout with fireproof material around all pipe penetrations. Provide clamping collar or membrane flange where pipe or drains penetrate waterproof membrane. Perform all welding using qualified welders in accordance with American National Standards Institute's Code B31.1 and American Welding Society Standard B3.0.

## 3.06 DRAINAGE, WASTE, AND VENT PIPING SYSTEMS

Slope drain lines at 1/4 inch per foot unless otherwise indicated. Install hubless cast-iron pipe in accordance with CISPI pamphlet 100-1972. MG stainless steel clamps and cast-iron no-hum couplings shall be installed in accordance with the manufacturer's written instruction.

## 3.07 WATER PIPING SYSTEM

Secure each water line where it penetrates partitions to serve fixture. Wrap all lines passing through concrete with polyethylene tape. Install unions or flanges at all valves, equipment and system specialties. Install dielectric unions at connections of copper and ferrous pipes.

## 3.08 FIELD QUALITY CONTROL

A. Test plumbing systems in accordance with the Uniform Plumbing Code. Perform tests in the presence of, and to the satisfaction of, inspectors having jurisdiction over the work.

Ask for final inspection by the Engineer after all tests, adjustments, and balancing has been performed.

1. Test drainage systems in accordance with Section 318 of the Plumbing Code.

2. Hydrostatically test the domestic water piping system at 100 psi. Inspect the entire system while under pressure and correct all deficiencies.

## 3.09 ADJUSTMENT AND CLEANING

A. Clean up work areas and fixtures. Adjust system for proper operation, ready for use. Touch up with matching paint all damaged factory finishes.

B. At the completion of the work, all parts of the installation shall be thoroughly cleaned. Pipe, valves, and fittings shall be cleansed of grease and metal cuttings, and sludge that may have accumulated by operation of the system for testing. Any stoppage or discoloration or other damage to parts of the building, its finish, or furnishing , due to the Contractor failure to properly clean the piping system shall be repaired by the Contractor without cost to the State.

END OF SECTION

## SECTION 16011 - GENERAL ELECTRICAL REQUIREMENTS

## PART 1 - GENERAL

### 1.01 GENERAL REQUIREMENTS:

This specification covers the requirements for furnishing and installing all electrical work.

### 1.02 WORK INCLUDED:

A. The Contractor under this Division shall provide all labor, materials, equipment, supervision and services required for the construction of the electrical systems. The finished installations shall be complete, operable and shall include all work specified herein and shown on the Drawings.

B. The work shall include complete testing of all equipment and wiring at the completion of the work and making any minor connection changes or adjustments necessary for the proper functioning of the system and equipment. All systems shall be properly adjusted and in working order at the time of final acceptance.

C. All painting and other finishing work shall conform to the applicable requirements of the specifications as prescribed in appropriate sections.

D. It is the intent of these Specifications and other Contract Documents to require an installation complete in every detail. Consequently, the Contractor will be responsible for minor details or for any special construction which may be found necessary to properly furnish, install, adjust, test, and place in successful and continuous operation, the entire electrical system, and the cost of same shall be included in the contract price.

### 1.03 DESCRIPTION OF WORK:

Work specified in this Division shall include, but not be limited to the following:

1. Complete disconnecting, removal and disposal of existing service equipment, electrical panel, outlets, wiring, lighting fixtures, safety switches, and feeders in Comfort Station Building.

2. Complete KIUC service drop, service pole, secondary service entrance, metering equipment, and distribution panel.

3. Complete feeders for existing pier, floating dock, exterior site lighting and sewage system.

4. Complete feeders for existing state metal shed and container.

5. Complete new outlets, wiring, lighting fixtures, and wiring devices in Comfort Station Building.

6. Complete new stand alone electrical equipment cabinet.

7. Complete testing.

8. Complete as-built drawings.

1.04 REFERENCES:

Comply with the applicable requirements of the following standards unless otherwise indicated:

1. Comply with local ordinances; National Electrical Code; applicable regulations of the National Board of Fire Underwriters; specifications of ANSI, NEMA, and UL and regulations of the County of Kauai and the State of Hawaii.

2. In the event of conflict between pertinent codes and regulations, and the requirements of the referenced standards, or those indicated in Specifications and on drawings, the provision of the more stringent shall govern.

1.05 RELATED WORK:

Division 1: General Requirements. Section
16100 - ELECTRICAL WORK.

1.06 PERMITS AND INSPECTION:

A. Electrical permit required by local ordinances shall be obtained and paid for by the Electrical Contractor.

B. After completion of the work, the Engineer shall be furnished a certificate of final inspection and approval from the electrical code inspection department, Department of Public Works, and the County of Kauai.

1.07 COORDINATION:

A. Refer to all project Drawings and to all Sections of the project Specifications. Coordinate and fit all work accordingly so that all electrical outlets and equipment will be properly located and readily accessible. The Drawings indicate the relation of wiring and connections and must not be scaled for exact locations. Verify all construction dimensions at the project and make changes necessary to conform to the piers as constructed. Work improperly installed due to lack of construction verification shall be corrected at the Contractor's expense.

B. Work shall be scheduled to avoid delays, interferences, and unnecessary work. If any conflicts occur necessitating departures from the Drawings and Specifications, details of departures and reasons therefore shall be submitted immediately for consideration by the Engineer.

1.08 SUBMITTALS:

Submit shop drawings and catalog cuts of the equipment and products identified in each Division 16 technical section for approval in accordance with SUBMITTALS section of these specifications. Each submittal shall be prepared with a summary sheet attached to each copy identifying all items included in the submittal. Incomplete submittals and those without summary sheets will be returned without review.

1.09 DELIVERY, HANDLING AND STORAGE:

A. Deliver all materials of this Division in manufacturer's original unopened packages or containers with label intact and legible.

B. Use means necessary to protect the materials of this section before, during and after installation; to protect the installed work and materials of all other trades; and to protect the original structure, work and materials of the State of Hawaii.

C. In the event of damage, immediately make all repairs and replacements necessary to the approval of the Engineer and at no additional cost to the State of Hawaii.

1.10 WARRANTY:

A. Installation shall be complete in every detail as specified and ready for use. Any items supplied by Contractor developing defects of design, construction, or quality within one (1) year of final acceptance by Engineer shall be replaced by such new materials, apparatus or parts to make such defective portion of the

complete system conform to the true intent and meaning of the Drawings and Specifications at no additional cost to the State of Hawaii.

B. The warranty shall be countersigned by the General Contractor.

1.11 SITE CONDITIONS:

The Contractor shall visit the project site before any work has started to determine the site conditions and the extent of the removal and new work required.

1.12 CONTINUITY OF SERVICES, PHASING

A. Execute work using such methods, techniques, connections and tie-ins which will cause least interference with, and interruptions of, existing utilities and services. Schedule all arrangement for work which will cause interferences or interruptions, in advance with the Engineer, all other affected trades and authorities having jurisdiction.

B. Examine site and become familiar with existing conditions affecting work.

C. Examine all Drawings and Specifications, including civil, structural and mechanical, and become familiar with the types and systems of construction to be used. Determine how such types and systems will affect the installation of electrical work.

D. Investigate, determine and verify locations of any utilities in or near project area.

PART 2 - PRODUCTS

2.01 MATERIALS AND WORKMANSHIP:

A. All materials shall conform to the latest issue of all applicable standards as established by NEMA, NFPA, ANSI, IEEE, ASTM and Underwriters' Laboratories, and shall bear the manufacturer's name, trade name and when available, the Underwriters' Label.

B. Within twenty (20) days after the contract has been awarded, or as otherwise directed, forward to the Engineer a complete list of all materials and equipment proposed for installation. The intent to use the exact makes specified does not eliminate the responsibility of submitting such a list. List shall include sufficient

information to permit ready and complete identification. After the work is completed, Contractor shall provide drawings showing the as-built conditions.

C. All work not installed and completed in accordance with the latest rules and regulations of the NEC, OSHA, NESC, and all local ordinances shall be removed and reinstalled correctly at the Contractor's expense.

## PART 3 – EXECUTION

### 3.01 GENERAL:

A. Install all electrical materials and equipment in accordance contract drawings, manufacturer's recommendations and as approved by the Engineer.

B. Cut, break, drill and patch as required to install electrical system. Repair any surface damaged or marred by notching, drilling or any other process necessary for installation of electrical work. Patch any damaged surfaces to match the adjacent surface.

C. The Electrical Contractor shall coordinate his work with other trades to avoid conflicts with civil, structural, mechanical, and architectural elements of this project.

### 3.02 JOB CONDITIONS:

A. These specifications are accompanied by construction drawings including plans showing locations of all wiring, outlets, devices, and other electrical equipment. The locations are approximate and before installing, study adjacent structural and architectural details and make installation in most logical manner. Any device and/or wiring may be relocated within 10'-0" before installation at direction of Engineer without additional cost to the State of Hawaii.

B. Before installing, verify all dimensions, sizes, and electrical rating of equipment.

C. Verify that electrical system may be installed in strict accordance with the existing construction, the Drawings and Specifications and the manufacturer's recommendations.

D. In the event of discrepancy, immediately notify the Engineer. Do not proceed

with installation in areas of discrepancy until all such discrepancies have been fully resolved.

3.03 DEMONSTRATION OF COMPLETE ELECTRICAL SYSTEMS:

A. Submit written certification that electrical systems are complete and operational. Submit certification with Contractor's request for final review.

B. At the time of final review of electrical work, demonstrate the operation of electrical systems. Provide labor, apparatus and equipment for systems' demonstration. The various tests shall be under the direction and supervision of the Engineer.

C. The Contractor shall perform start-up and all tests as required to obtain final field acceptance from the State of Hawaii. All tests shall be conducted in the presence of the Engineer or his representative.

D. The Contractor shall be responsible for all tests. Testing shall be performed by and under the immediate supervision of the Contractor.

E. A visual inspection of all electrical equipment, to check for foreign material, tightness of wiring and connection, proper grounding, matching nameplate charts with specification, etc., shall be made prior to actual testing.

3.04 PRELIMINARY TEST

After obtaining permission from the Engineer and before commencing work on any existing electrical system, the Contractor shall perform an operational test on the existing systems to determine if it is in perfect operating condition and free from physical damage. Any malfunctions or physical damage shall be noted and reported in writing, in order that the adjustments and repairs can be made by the State of Hawaii. All reported malfunctions and physical damage shall constitute the as-in condition of the system and the Contractor shall not be responsible for their repairs, adjustment or replacement.
Thereafter, work on those systems, in connection with this project, may be performed. Upon completion of the project, any malfunctions of or physical damage to those systems not identified in a preliminary test report shall be the responsibility of the Contractor to repair, adjust and make operative at no additional cost to the State of Hawaii.

3.05 "AS-BUILT" DRAWINGS

Field set and TWO (2) sets of "As-Built" plans indicating all deviations from the

construction drawings shall be provided FIVE (5) Working Days prior to the scheduled final inspection. Approved "As-Built" plans shall be submitted TEN (10) working days after final inspection on TWO (2) sets of prints.

END OF SECTION

SECTION 16100 - ELECTRICAL WORK

PART 1 - GENERAL

1.01 GENERAL REQUIREMENTS:

A. This specification covers the requirements for furnishing and installing all electrical work.

B. Section 16011, "General Electrical Requirements" applies to this section with additions and modifications specified herein.

1.02 APPLICABLE PUBLICATIONS:

The publications cited within this specification form a part of this specification to the extent referenced. Unless otherwise indicated, most recent edition of the publication with current revisions and amendments will be enforced.

1.03 SUBMITTALS:

Submit shop drawings and catalog cuts of the following equipment for approval in accordance with SUBMITTALS section. Each submittal shall be prepared with a summary sheet attached to each copy identifying all items included in the submittal. **Incomplete submittals and those without summary sheets will be returned without review.**

1. Raceways, conductors, and mounting hardware.
2. Lighting fixtures, lamps and ballasts.
3. Junction boxes/handholes, equipment cabinet.
4. Wiring devices.
5. Electric panelboard, metering equipment.
6. Any built-to-order equipment.

PART 2 - PRODUCTS

2.01 MATERIALS AND EQUIPMENT:

A. Asbestos Prohibition: No asbestos-containing material shall be used in this section. The Contractor shall ensure that all materials incorporated in the project are asbestos-free.

B. Materials and equipment shall be new and equipment satisfying the requirements of NEC Articles 90.7 and 110.3 shall be listed or labeled by a nationally recognized electrical testing laboratory.

C. Brand names and catalog numbers indicate standards of design and quality required. In case of obsolescence, supersedure, or error in catalog number, the associated description and intent implied by the application shall govern.

2.02 WIRING MATERIAL:

A. Conduits: Electrical metallic tubing (EMT) and rigid steel conduit (GRS) shall be 3/4" minimum diameter. Metallic tubing and conduits shall be steel; tubing shall be zinc-coated and conduits shall be hot-dip galvanized.

B. Exterior Underground Raceways: Plastic conduit, polyvinyl chloride, Schedule 40, provide with green equipment grounding conductor.

C. Flexible Conduit: Zinc-coated inside and outside; liquid-tight with factory fitting for, 3/4" minimum diameter.

D. Outlet and Small Junction Boxes: Concealed boxes shall be pressed, zinc-coated steel, 4" sq. minimum nominal size, minimum depth 1-1/2", with raised cover ring for devices set flush in drywall. Exposed boxes shall be smooth cast metal, prime painted and enamel finished with hubs for conduit connection with covers.

E. Junction Boxes: Junction boxes, unless otherwise specified, shall be NEMA 1 for interior locations and NEMA 4X stainless steel for exterior locations. NEMA 1 fabricate from galvanized steel, prime painted and enamel finish according to NEMA specifications. Manufacturer and install according to NEC Article 370.

F. Wires and Cables: Conductors shall be copper, No. 12 AWG minimum; No. 10 and smaller, solid and round; No. 8 and larger, 7 or 19 strands, concentric. All conductors shall be Type THWN or XHHW. Fixture wires shall conform to NEC requirements.

2.03 LIGHTING SYSTEM:

A. Lighting system shall be complete with all necessary mounting hardware and accessories, lamps ballasts, modifications and accessories to provide a complete system in accordance with NEC Article No. 410 and the intent of the contract.

B. Fixtures manufactured from sheet steel shall be die formed, embossed for strength, welded for permanent rigidity, corrosion protected by process bonding phosphate material to metal, finished after fabrication with baked white enamel having minimum of 88 percent reflectivity in all light reflecting surfaces and of baked white enamel for all other surfaces. All unpainted parts and hardware shall be dip zinc plated. When subjected to 300 hours salt spray testing, the fixture shall not show corrosion deterioration. Light-tight construction and sealing gaskets of resilient neoprene seals at openings shall be provided. Ballast and lamp compartments shall be isolated from each other. Provide separate wiring channel for through wiring.

C. Fixtures manufactured from aluminum shall be cast or extruded. Corrosion protection shall be provided by anodizing process. Color of finish shall be dark bronze unless otherwise specified in fixture description.

D. Plastic lens of fluorescent fixtures shall be virgin acrylic, type K12, .125" minimum thickness.

E. Fluorescent Solid-State Ballasts: Provide energy saving, Class "P", sound rating "A", solid-state fluorescent ballast of the full light output type. Ballasts shall be able to withstand voltage transients in accordance with IEEE C62.41, Category A, for normal and common modes. Minimum power factor shall not be less than 0.90. Ballasts shall operate at input frequency of 60 hertz. The ballast shall operate the lamps at a frequency of not less than 20,000 hertz. Ballast current total harmonic content shall be less than 10 percent. Ballasts shall be compatible for use with energy-saving lamps. Maximum ballast factor of 0.78. Ballast shall be programmed rapid start type. Sylvania Quicktronic System 32 QTPXx32T8/PSX-SC; General Electric Ultrastart, Multi-Voltage programmed Start GE X32 MVPS-L; Advance Optanium Multi-Voltage IOPXS32-LW-SC, or approved equal.

F. Fluorescent Lamps: Cool white phosphor coated, 4100$^{o}$K, 48" nominal length rapid start, 3100 lumens initial output, F32T8/841/XPS/ECO. Lamps shall be rated for 36,000 hours life.

G. Compact fluorescent lamps shall be 4100$^{o}$ k rated color temperature, 12,000 hours average life and as follows: T-4 rapid start, 4-pin base, 26 watt, 1700 lumens initial, and 32 watts, 2300 lumens initial.

2.04 WIRING DEVICES:

A. Duplex Receptacle, Specification Grade: Ivory phenolic molded body, duplex NEMA 5-20R, 20A, 125V, 2-pole, 3-wire, grounded, back and side wiring, U-

shaped grounding slot, parallel double wipe phosphor bronze spring tensioned contacts, heavy-duty corrosion resistant wrap-around body bridge strap with grounding screws and automatic grounding clip, back wiring holes for feed through wiring and rating engraved on body. Install in outlet box with appropriate device or cover plate. Manufacture and install according to NEC Articles No. 200 and 410. Hubbell No. HBL 5362-I.

B. Duplex Receptacle, GFI Type: Ivory phenolic molded body, NEMA 5-20R, 20A, 125V, 2-pole, 3-wire, grounded, side wired, U-shaped grounding slot, parallel double wipe phosphor bronze spring tensioned contacts, automatic grounding clip, solid-state ground fault sensing and test circuit designed to trip open when ground current exceed 5.0 milliamperes, resettable, and with rating engraved on body. Install in outlet box with appropriate device or cover plate. Manufacture and install according to NEC Article Nos. 200 and 410. Hubbell No. GF-53621-I.

C. Weatherproof Receptacle: Provide GFI type receptacle in cast metal box with gasketed, cast metal weatherproof cover plate. Cover plates shall be listed for “wet locations” while in use.

D. Light switch shall be non-mercury, number of poles required, quiet operating, rated for 20A, 120-277 volts, one piece heavy-duty ivory nylon toggle handle which makes continuous contact with spring contact arms, two piece heavy-duty body bolted to bridge strap, large binding head screws for terminating conductors silver cadmium oxide contacts, high conductivity and fatigue resistant contact arms, spring loaded cam mechanism, back and side wiring, with ground terminal, heavy-duty bridge strap, premium specification grade, U.L. labeled, and rated for 10,000 cycles of operation. Manufacture and install according to NEC Article Nos. 100 and 380. Device shall be installed in outlet box complete with device plate. Hubbell No. HBL 1221-I series.

E. Device Plates: Provide U.L. listed, one-piece device plates for all outlets and fittings to suit the devices installed. Plates on unfinished walls and on fittings shall be of zinc-coated sheet steel or cast metal having round or beveled edges. Plates on finished walls shall be smooth nylon. Screws shall be machine type with countersunk heads to match the plate. The use of sectional type device plates will not be permitted. Plates installed on weatherproof designated devices shall be gasketed and U.L. listed for “wet locations” with cast aluminum plate and hinged cover/covers.

Equal devices by Arrow Hart, Bryant, Leviton, Pass & Seymour, or General Electric are approved.

2.05 MOTOR OR EQUIPMENT CONNECTION:

A. Power connection to motor or equipment from nearest box, disconnect or controller with watertight flexible conduit and locknut type or threaded connector.

2.06 ELECTRICAL APPARATUS:

A. Equipment Disconnect and Fused Switches: Heavy duty, fusible or non-fusible safety switch. Horsepower rated when used as motor disconnect. Contacts shall be lever operated, spring loaded and enclosed in NEMA 1 enclosures for interior locations in ceiling spaces and NEMA 4X, stainless steel enclosures for all other locations. When for use with fuses of current limiting type, clips shall be rejection type. Manufacture and install according to NEC Articles 240, 380 and 430. Provide three (3) spare fuses of each ampere rating. Siemens, Cutler-Hammer, Square-D and General Electric.

B. Panelboards:

1. General: Furnish and install circuit breaker lighting and appliance panelboards where shown on the drawings and as indicated in the panelboards schedule.

   Panelboards shall comply with the following industry standard:

   a. NEMA Standard PB-1

   b. UL Standards; Cabinets and Boxes-UL 50; Panelboards -UL 67

   c. National Electrical Code

   Panelboards shall be labeled as suitable for use as service equipment in accordance with Article 384 of the National Electrical Code.

2. Box: The panel box shall not be less than 20 inches wide and fabricated from galvanized or galvannealed steel. Box shall have adjustment screws to provide easy alignment. Removable end walls to be blank. Panelboard box is to have separate UL label and minimum wire bending and gutter requirements to meet the NEC and UL standards. Wiring gutters shall be completely free of any part of trim clamp to prevent damaging wire insulation.

3. Interior: All interiors shall be completely factory assembled. The design of the interior shall permit replacement of circuit breakers without disturbing

adjacent units and without machine drilling or tapping. All circuit breaker connections shall be in a hole tapped by the manufacturer. Main bus shall be all copper. Branch bus shall be copper only. Sizing of conductor shall be in accordance with UL 67. Bus bars shall be supported by a VO rated, UL recognized, Polymeric material. Bus sequence shall start at the top left phase bus of the interior for both top and bottom fed panels. Panels shall be rated as shown on plans. Interior shall be convertible from main lug to main breaker with the addition of an appropriate field-installable kit. Interior shall be changeable from top to bottom feed and vice-versa, while maintaining readability of dead-front labeling.

Dead-front shall be provided with a flange for easy attachment of trim. Incoming cable lugs shall be grouped at one end to separate them from the load side cables. Main lugs shall be lay-in construction to facilitate connections. Neutral bussing shall have a lug for each outgoing branch requiring a neutral connection. For easy wiring and shortest cable run possible, load size neutral connection lugs to be split with each side taking 50% of load neutral connections. The interior shall be provided with wing nuts for securing to box without tools.

4. Trim: The panel trim shall be surface or flush as indicated on the drawings. It shall be fabricated from cold-rolled steel, painted with an ANSI-61 light gray finish and equipped with concealed hinges, flush lock and a holder for circuit directory card. Trim shall have two separate supports designed to engage the box flange to stabilize and secure the trim during installation. Trim screws to be located behind the lockable door for tamper resistance.

5. Description: The panelboard shall be for use with the system indicated on panelboard schedule.

   The panelboard enclosures shall be NEMA Type 4X construction for top or bottom cable entrance and suitable for surface mounting unless otherwise noted on panelboard schedules.

   Short circuit rating shall be 10,000 amperes symmetrical based on the smallest rating on any circuit breaker installed in the panelboard.

   Provide main lug only or main circuit breaker panelboards as shown on panelboard schedules. Also provide branch and sub-feed circuit breakers of the quantity, trip rating and number of poles as shown on schedules.

   Molded case circuit breakers shall be thermal-magnetic, quick-make, quick-

break, trip free. Multi-pole breakers shall be common trip. If current limiting circuit breaker mains are indicated on schedules, provide breakers with inverse time delay, instantaneous circuit protection and limit let-through $I^2t$ to a value less than $I^2t$ of one-half cycle wave of the symmetrical prospective current without any fusible elements. All breakers shall be equipped with antiturn solderless, pressure type connectors. All provisions shall be located at the bottom of the panelboard and be fully bussed complete with all necessary mounting hardware less the breaker.

Provide sub-feed lugs, feed though lugs, handle blocking devices, padlocking devices, shunt trips and ground bus bars as shown on schedules.

6. Manufacturer: General Electric A Series (AQF 1422MB), Siemens, Square D, or Cutler Hammer equals.

2.07 HARDWARE SUPPORTS, BACKING, ETC.:

A. Provide all hardware, supports, backing and other accessories necessary to install electrical equipment. Wood materials shall be plastic lumber or composite wood - polymer material, iron or steel materials shall be galvanized for corrosion protection, and non-ferrous materials shall be stainless steel or bronze. Provide Type 316 stainless steel materials where indicated.

B. Bolt, nuts, washers, and screws used for outside shall be high quality stainless steel or brass.

C. Channel shall be heavy duty, fiberglass, glass reinforced polyester or vinyl ester resin, 1-5/8” x 1-5/8” x ¼”, or 1-5/8” x 1-5/8” x 12 gauge stainless steel UNISTRUT and B-Line.

D. Concrete: Ready mix type with 3000 PSI compressive strengths. Concrete material and aggregates shall conform to latest ASTM Specifications. Concrete aggregates for ductlines shall be 3/4" maximum in size.

E. Backfill Material Type A: Black or beach sand, earth or earth and gravel mixture. If earth and gravel mixture, rock size shall be one inch or smaller and shall not contain more than 50% rock particles by volume. This fill shall be used over concrete encased ducts.

2.08 FREE STANDING EQUIPMENT CABINET

A. Minimum size shall be 60” x 60” x 24” deep. Enclosure and door shall be fabricated for 12 gauge 316 stainless. All welds shall be continuous and finished smooth.

B. Doors shall be secured to the housing with heavy-duty concealed lift-off hinge and 3 pt vault handle locking mechanism on each door. Provide removable center post (if applicable). Doors shall have fixed, oil-resistant gasket. Provide with slanted roof.

C. Provide ground stud on doors and housing. Provide lifting eyes attached to sides of housing. Provide mounting channels welded to inside of housing and mounting studs for fixed panels.

D. Standards UL508 listed, Type 4X; NEMA Standard for Type 4X; IEC 60529, IP66.

E. Manufacturer or approved equal. Cooper B-Line ES-727224-4XSS6. Hoffman and Electromate equals.

2.09 Meter/Main Combination Safety Socket Box

A. 200A, overhead service, 7 jaw, with factory installed test-bypass facilities.

B. UL listed, outdoor construction, NEMA 3R with main circuit breaker, 10,000 AIC minimum.

PART 3 – EXECUTION

3.01 RACEWAYS:

A. Use PVC, EMT and rigid steel conduits with approved coupling and connectors. All cuts square, using saw. Ream the ends. Bends made with approved tools. Reject flattened or crushed conduit. No running thread. Bushing and two locknuts at connection to boxes and enclosures.

B. Seal against water during construction. Risers must be closed, except when pulling conductors.

C. Exposed conduit runs shall be parallel and/or perpendicular to structural elements.

D. Provide nylon pull string of 200-pound minimum tensile strength in all empty conduits in excess of 15 feet in length.

E. Use PVC underground. Use rigid steel conduits in locations exposed to weather. Use EMT in interior locations.

3.02 BOXES:

Plumb and securely fasten. Remove all debris from interior.

3.03 CONDUCTORS:

A. Lubricants: Non-wax type, chemically neutral to insulation.

B. Clean all raceways, boxes, and enclosures before pulling wires and cables. Form neatly in enclosures for minimum of crossovers.

3.04 MISCELLANEOUS DETAILS:

A. Provide necessary foundations, supports, backing, etc., for all raceways, junction boxes, light pole, pier power pedestal and equipment. Attach to wood and steel by screws or bolts. Attach to concrete by expansion anchors. Powder charge driven studs and anchors shall not be used.

B. Clean all surfaces of enclosures and equipment.

C. Close all unused knockout holes.

3.05 PAINTING:

A. Wipe clean of dirt, oil, grease, etc., all new electrical equipment and raceways with rag and solvent, prime and finish to match surrounding finish. Do not paint over nameplate.

B. All new surface-mounted boxes and exposed raceways shall be painted to match the color of adjacent surfaces.

3.06 TESTING:

A. Upon completion of this portion of work, and prior to its acceptance by the State of Hawaii, make all required tests and secure all required approval from agencies having jurisdiction. Any deficiencies found shall be rectified and work affected by such deficiencies shall be completely retested at Contractor's expense. Written notification of all proposed tests shall be provided to the Engineer a minimum of 14 days prior to the date of the test.

B. Perform an operational test after completion of the installation in the presence of the Engineer, to assure proper operation of all items of work. Remove all grounds and shorts.

END OF SECTION