Invitation for Bids

IFB 20M-0030
Walk-In Freezer Replacement for Maluhia

The Hawaii Health Systems Corporation (HHSC) Oahu Region is requesting bids from qualified companies for the demolition and replacement of the walk-in freezer at Maluhia located at 1027 Hala Dr., Honolulu, HI 96817.

The IFB may be obtained electronically from the following website:
http://maluhia.hhsc.org/procurement/notices/

Due to the recent events of the COVID-19 outbreak, a pre-bid orientation site visit will not be scheduled. The deadline for submission of written/emailed questions pertaining to the IFB is April 28, 2020.

All bids must be received by May 12, 2020, 2:00 p.m. Hawaii Standard Time. Bids may be mailed to the Purchasing Office of **Maluhia**, at 1027 Hala Dr., Honolulu, Hawaii 96817. Bids via e-mail are acceptable and shall be sent to skawai@hhsc.org. E-mail bids not received by deadline will be disqualified for consideration. No exceptions will be made even if network provider or software (MS Outlook) delays delivery.

Addenda to the IFB will be posted on the website listed above.

For any inquiries, please contact Scott Kawai, Oahu Region Contracts Department, at (808) 832-3025 or by email at skawai@hhsc.org.

Purchasing Office
Maluhia
1027 Hala Dr.
Honolulu, Hawaii 96817

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SECTION 1
ADMINISTRATION

1.0 INTRODUCTION

This Invitation for Bid (hereinafter "IFB") is issued by the Hawaii Health Systems Corporation (hereinafter "HHSC"), a public body corporate and politic and an instrumentality and agency of the State of Hawaii. All procedures and processes will be in accordance with HHSC Oahu Region policy and procedures.

In order for HHSC to accept Bidder's response in a timely manner, please thoroughly read this IFB and follow instructions as presented.

1.1 IFB TIMETABLE AS FOLLOWS

The timetable as presented represents HHSC's best estimated schedule. If an activity of the timetable, such as "Closing Date for Receipt of Bids" is delayed, the rest of the timetable dates may be modified. BIDDER will be advised, by addendum to the IFB, of any such modifications to the timetable. Contract start date will be subject to the issuance of a Notice to Proceed.

ACTIVITY		SCHEDULED DATES
1.	IFB Public Announcement	April 16, 2020
2.	No Pre-Bid Orientation due to COVID-19	
3.	Closing Date for Receipt of Questions	April 28, 2020
4.	Closing Date for Receipt of Bids 2:00 p.m. at **Maluhia**	**May 12, 2020**
5.	Contractor Selection/Award Notification (on/about)	May 13, 2020
6.	Contract Start Date (on/about/pending COVID-19 updates)	June 15, 2020

1.2 AUTHORITY

This IFB is issued following the provisions of Chapter 323F, Hawaii Revised Statutes (HRS), and its administrative rules. All BIDDERS are charged with presumptive knowledge of all requirements of the cited authorities. Submission of a valid executed bid by any BIDDER shall constitute admission of such knowledge on the part of such BIDDER.

1.2.1 IFB ORGANIZATION

This IFB is organized into four sections:

SECTION 1: ADMINISTRATIVE
Provides information regarding administrative requirements.

SECTION 2: SCOPE OF SERVICES
Provides a detailed description of goods and/or services to be provided and delineates HHSC and CONTRACTOR responsibilities.

SECTION 3: BID FORMS AND GENERAL CONDITIONS
Describes the required format and content for submission of the bid.

SECTION 4: BID EVALUATION AND AWARD
Describes how bids will be evaluation and procedures for selection and award of contract.

1.3 HEAD OF PURCHASING AGENCY (HOPA)

The HOPA for HHSC, or designee, is authorized to execute any and all Agreements (Contracts), resulting from this IFB.

The HOPA for this IFB is:

Derek Akiyoshi
Regional Chief Executive Officer
Hawaii Health Systems Corporation

1.4 DESIGNATED OFFICIALS

The officials identified in the following paragraphs have been designated by the HOPA as HHSC's procurement officials responsible for execution of this IFB, award of Agreement and coordination of CONTRACTOR's satisfactory completion of contract requirements.

1.4.1 ISSUING OFFICER

The Issuing Officer is responsible for administrating/facilitating all requirements of the IFB solicitation process and is the **sole point of contact** for BIDDER from date of public announcement of the IFB until the selection of the successful BIDDER. The Issuing Officer will also be responsible for contractual actions throughout the term of the contract. For purposes of this IFB, the designated Issuing Officer is:

Scott Kawai
Maluhia, Purchasing Office
1027 Hala Drive
Honolulu, Hawaii 96817
e-mail: skawai@hhsc.org
phone: (808) 832-3025

1.5.1 CHARTER

HHSC is a public body corporate and politic and an instrumentality and agency of the State of Hawaii. HHSC is administratively attached to the Department of Health, State of Hawaii and was created by the legislature with passage of Act 262, Session Laws of the State of Hawaii 1996. Act 262 affirms the State's commitment to provide quality health care for the people in the State of Hawaii, including those served by small rural facilities.

1.5.2 STRUCTURE AND SERVICES

HHSC is organized into four operational regions and provides a broad range of healthcare services including acute, long term, rural and ambulatory health care services. As the fourth largest public health system in the country, HHSC is the largest provider of healthcare in the Islands, other than on Oahu. This solicitation is for the Oahu Region.

1.5.3 MISSION

The mission of HHSC is to provide and enhance accessible, comprehensive health care services that are quality-driven, customer-focused and cost-effective.

1.6 FACILITY INFORMATION

Detailed information pertaining to HHSC facilities is located at http://www.hhsc.org.

1.7 SUBMISSION OF QUESTIONS

Questions must be submitted in writing via electronic mail, facsimile or post mail to the Issuing Officer no later than the "Closing Date for Receipt of Questions", identified in paragraph 1.1 in order to generate an official answer. All written questions will receive an official written response from HHSC and become addenda to the IFB.

IMPORTANT

BIDDER may request changes and/or propose alternate language to the attached HHSC General and Special Terms and Conditions during this phase only. All requests will be presented to the HHSC Legal Department for review. No requests to change the HHSC General or Special Terms and Conditions will be entertained after the bids have been submitted or during the contracting process. All written questions and/or approved changes will receive an official written response from HHSC and shall be recorded as addenda to the IFB.

HHSC reserves the right to reject or deny any request(s) made by BIDDER.

Responses by HHSC shall be due to the BIDDER prior to notice of award.

Impromptu, un-written questions are permitted and verbal answers will be provided during pre-bid conferences and other occasions, but are only intended as general direction and will not represent the official HHSC position. The only official position of HHSC is that which is stated in writing and issued in the IFB as addenda thereto.

No other means of communication, whether oral or written, shall be construed as a formal or official response/statement and may not be relied upon.

SEND QUESTIONS TO:

Scott Kawai, Issuing Officer
e-mail: skawai@hhsc.org

1.8 SOLICITATION REVIEW

BIDDER should carefully review this solicitation for defects and questionable or objectionable matter. Comments concerning defects and questionable or objectionable matter, **excluding requests to revise the General or Special Conditions**, must be made in writing and should be received by the Issuing Officer, Scott Kawai, no later than the "Closing Date for Receipt of Bids" as identified in Section 1.1. This will allow issuance of any necessary amendments to the IFB. It will also assist in preventing the opening of bids upon which award may not be made due to a defective solicitation package.

1.9 IFB AMENDMENTS

HHSC reserves the right to amend the IFB any time prior to the deadline date of the IFB. IFB Amendments will be in the form of addenda.

1.10 CANCELLATION OF IFB

The IFB may be canceled when it is determined to be in the best interests of HHSC.

1.11 PROTESTS

Any protest shall be submitted in writing to the HOPA as noted below.

A protest based upon the content of the solicitation shall be submitted in writing within five (5) working days **after** the aggrieved individual/business knows or should have known of the facts giving rise thereto; provided further that the protest shall not be considered unless it is submitted in writing prior to and not later than the "Closing Date for Receipt of Bid" identified in section 1.1.

A protest of an award or proposed award shall be submitted within five (5) working days after the posting of award of the contract. The notice of award, if any, resulting from this solicitation shall be posted at the following website: http://maluhia.hhsc.org/procurement/notices/

Any and all protests shall be submitted in writing to the HOPA, as follows:

Derek Akiyoshi
Hawaii Health Systems Corporation
Oahu Region
3675 Kilauea Avenue
Honolulu, Hawaii 96816

1.12 PERFORMANCE AND PAYMENT BOND

Performance and payment bonds shall be required for contracts $25,000 and higher. At the time of the execution of the contract, the successful Bidder shall file good and sufficient performance and payment bonds, each in an amount equal to one hundred percent (100%) of the amount of the contract price unless otherwise stated in the solicitation of bids.

1.13 SPECIALTY CONTRACTOR'S LICENSE

A. Contractor shall be solely responsible to ensure that all specialty licenses required to perform the Work are covered by the Contractor and/or its subcontractor(s).

1.14 WORKING HOURS

A. Regular working hours for this project shall take place between the hours of 8:00 AM to 4:30 PM Monday through Friday, excluding State Holidays, unless otherwise noted or restricted.

B. The Contractor may be given approval to work beyond the regular hours including Saturdays, Sundays, State Holidays, night work, or after hours under the provisions of the GENERAL CONDITIONS.

1.15 SPECIAL PROCEDURES DURING BIDDING

A. Bid documents will be available upon request from the office of the Chief Executive Officer, at Leahi Hospital, 3675 Kilauea Avenue, Honolulu, HI, 96816.

B. All bids shall be submitted to the Issuing Officer.

C. All questions regarding the IFB shall be submitted, in writing, to the Issuing Officer, who shall review the questions and issue any responses via Addendum. Only information received by Addendum shall be binding.

E. Any visitation to the site to examine the scope of work shall be requested through the HHSC Representative. Disruption of facility operations shall not be permitted.

SECTION 2
SCOPE OF SERVICES

2.0 INTRODUCTION

WALK-IN FREEZER REPLACEMENT FOR MALUHIA

Work for this project shall include, but is not limited to demolition, replacement of walk-in freezer, refrigeration work, electrical work drywall work, painting, and miscellaneous associated work.

2.1 CONTRACT PERIOD

The work shall be completed within 200 consecutive calendar days.

2.2 SCOPE OF SERVICES

A. The CONTRACTOR shall complete the work specified in the specifications and drawings in APPENDIX C.

B. Qualifications. The CONTRACTOR shall have:

1. A current and valid license to perform the scope of work.
2. Have been in business for the past three (3) consecutive years.
3. A permanent, on-island office location in conducting business which is accessible to telephone calls. An answering service is not acceptable.

C. HOSPITAL shall provide:

Technical Representatives who shall have the authority to oversee the successful completion of contract requirements, including monitoring, coordinating and assessing CONTRACTOR performance; placing requests for services; and, approving completed work/services with verification of same for CONTRACTOR's invoices. Technical Representatives will also serve as points of contact for "technical" matters throughout the term of the contract.

SECTION 3
Bid Forms and General Conditions

General Instructions for Completing Forms

- *Bids shall be submitted in the prescribed format outlined in this IFB*
- *No supplemental literature, brochures or other unsolicited information should be included in the bid packet.*
- *A written response is required for each item unless indicated otherwise.*

3.0 Bid Form

The bid form must be completed and submitted to HHSC by the required due date and time, and in the form prescribed by the HHSC. Facsimile transmissions shall not be accepted.

Interested bidders shall submit their bid under the interested bidder's exact legal name that is registered with the Department of Commerce and Consumer Affairs and shall indicate this exact legal name in the appropriate space on page 1 of the bid form. Failure to do so may delay proper execution of the Contract.

Interested bidders shall certify its ability to provide services on June 15, 2020 or upon execution of the Contract agreement by both parties. The Hospital reserves the right to apply liquidated damages for the delay in Contract execution on the part of the Contractor.

The interested bidder's authorized signature shall be an original signature in ink. If the Bid Form on Appendix A is unsigned or the affixed signature is a facsimile or a photocopy, the bid shall be automatically rejected.

The option to extend the Contract shall be at the sole discretion of the Hospital and determined to be in the best interests of the State.

3.1 Bid Security

All lump sum bids of $25,000 and higher, or lump sum base bids including alternates of $25,000 and higher, that are not accompanied by bid security are non –responsive.

a. The bid security shall be in an amount equal to at least five percent (5%) of the lump sum bid or lump sum base bid including alternates or in an amount required by the terms of the federal funding, where applicable.

3.2 General Conditions

The State of Hawaii INTERIM GENERAL CONDITIONS, dated August 1999, and AMENDMENTS shall be read by the Contractor as they form a part of the Agreement to be entered into between the Contractor and HHSC. The Interim General Conditions are not physically included in these specifications, but are included by reference. Copies of the INTERIM GENERAL CONDITIONS may be obtained from the Division of Public works, Department of Accounting and General Services, State of Hawaii at the following website: http://hawaii.gov/pwd/construction_bids/Members/qc/gen_cond_constr

The General Conditions are hereby amended as follows:

a. The following terms specified in Section 1 are hereby defined:

i) Bidder shall have the same definition as Contractor.

ii) Comptroller shall be the Chief Financial Officer at HHSC or his authorized representative.

iii) Department shall be HHSC or its designee.

iv) Engineer shall be the person so designated by HHSC.

v) State shall be HHSC or its designee.

b. Section 1.20 and 1.25 replace "State of Hawaii" with "State".

c. The last two sentences of the third paragraph of Section 2.1.1.2, in the Interim General Conditions is deleted and is replaced with the following:

" If the notice is faxed, the time of receipt by the CEO's fax machine shall be official. The submittal of intention to bid via fax is acceptable only to this office."

d. Section 2.1.2.1: second sentence is hereby deleted in its entirety.

e. Last sentence of paragraph 2.1.2.3 of the Interim General Conditions is amended to read as follows:

"Failure to submit either the required tax clearance certificate or Bid Form will be sufficient grounds for HHSC to refuse to receive or consider the prospective bidder's proposal."

f. The addresses specified in Section 2.6.1 of the Interim General Conditions shall be changed to HHSC Oahu Region, 3675 Kilauea Avenue Honolulu Hawaii 96816.

g. Sections 2.10 through 2.11 are hereby deleted in their entirety.

h. Paragraph 3.8.1 of the Interim General Conditions is amended to read as follows:

“The contract shall be signed and forwarded to HHSC (Contracts Office), by the successful bidder all within three (3) days of receipt of the contract. The performance and payment bonds shall be received by HHSC (Contracts Office) within ten (10) calendar days after the bidders is awarded the contract. No proposal or contract shall be considered binding until the contract has been fully and properly executed by all parties thereto.”

i. In paragraph 3.9.2 of the Interim General Conditions, “ten (10) calendar days after such award or within such further time as the Comptroller may allow” shall be replaced with, “the time allowed in the previous section.”

j. Section 4.1: the words “accepted bid” is deleted from the first sentence.

k. Section 4.9.3: the words “submission of bids” is replaced with the words “execution of this contract”.

l. Section 5.5: the last sentence is hereby deleted in its entirety and replaced with the following:

"In the event of conflict among the Contract Documents, the order of precedence is listed in paragraph 5 of this contract and is further detailed in the following subparagraphs:"

m. Sections 5.5.1 and 5.5.2 are hereby deleted in their entirety.

n. Section 5.8.1: "twenty-four (24)" is hereby changed to "three (3)".

o. Section 5.11 is hereby deleted in its entirety.

p. Section 5.12.4 is hereby deleted in its entirety.

q. Section 7.3.7.4, subparagraphs a and b: Replace "If the project falls within the State University System, The University of Hawaii" with "HHSC."

r. Section 7.4.1 is hereby deleted in its entirety and replaced with the following:

"The Contractor shall prepare, process, obtain, and pay for all permits necessary for the proper execution of the work."

s. Section 7.7.2 is amended to read as follows: "The wage rate schedule is attached to this contract."

t. Sections 7.14.2, 7.19.2, and 7.19.4: delete "Departments and Agencies and their" and insert "directors" between "officers" and "representatives".

u. Section 7.14.4 is hereby added and reads as follows:

"Contractor warrants that it and none of its employees, agents or subcontractors performing services or providing goods pursuant to this Agreement are excluded from participation in federal health care programs, as defined in the Social Security Act (section 1128 and 1128A), and other federal laws and regulations relating to health care. HHSC reserves the right to verify that the above warranty is true and to immediately cancel this Agreement in the event it is violated."

v. Section 7.15 delete "and its Departments and Agencies".

w. Section 7.21.8.6 — Delete the word "bad" before the words "weather day conditions."

x. Section 7.35.1: the last word "earlier" is changed to "later".

3. CORPORATE COMPLIANCE PROGRAM. A description of the Corporate Compliance Program of HHSC is posted on the HHSC Internet (www.hhsc.org). The CONTRACTOR, by signing this contract, acknowledges that it has read said description, and that the CONTRACTOR knows of the fact and substance of the Corporate Compliance Program, which governs operations at all facilities of the HHSC. The CONTRACTOR understands and agrees that employees, agents, and contractors performing any services at any of the HHSC facilities shall be fully subject to such Corporate Compliance Program, as may be amended from time to time, as well as all federal program requirements and applicable policies and procedures of HHSC and its facilities. The Corporate Compliance Program requires periodic training, including an orientation program, of all people who provide financial, business office, personnel, coding, medical records information systems and clinical services in the facility. The CONTRACTOR agrees to cause its employees, agents, and contractors who provide any services at any financial, business office, personnel, coding, medical records information systems and clinical services at any of the HHSC facilities to participate in the orientation and training programs.

4. CONFIDENTIAL INFORMATION. It is acknowledged and agreed that all of the trade secrets, business plans, marketing plans, know how, data, contracts, documents, scientific and medical concepts, billing records, personnel records, medical records of any kind, and referral resources for existing or future services, products, operations, management, business, pricing, financial status, valuations, business plans, goals, strategies, objectives and agreements of HHSC and any of its facilities, affiliates or subsidiaries, and all patient information, in any form, whether written, verbal, or electronic, are confidential ("Confidential Information"); provided, however, that Confidential Information, with the exception of patient information, shall not include information that is in the public domain.

5. CONTRACTOR EXCLUSION FROM FEDERAL PROGRAMS. CONTRACTOR warrants that it and none of its employees, agents or subcontractors performing services or providing goods pursuant to this Agreement are excluded from participation in federal health care programs, as defined in the Social Security Act (section 1128 and 1128A), and other federal laws and regulations relating to health care. HHSC reserves the right to verify that the above warranty is true and to immediately cancel this Agreement in the event it is violated.

6. CAMPAIGN CONTRIBUTIONS BY STATE AND COUNTY CONTRACTORS.
CONTRACTORs are hereby notified of the applicability of Section 11-205.5, HRS, which states that campaign contributions are prohibited from specified State or county government contractors during the term of the contract if the contractors are paid with funds appropriated by a legislative body. For more information, please consult with the Campaign Spending Commission, or visit its website, www.hawaii.govicampaign.

(END OF SECTION)

SECTION 4
BID EVALUATION AND AWARD

4.0 Bid Evaluation

Each bid offer will be reviewed for exact conformity of the requirements in the IFB, known as a responsible bid. Information provided in/with the bid offer will be used to determine whether the interested bidder has the technical and financial capacity to deliver the goods or services, known as a responsive bid.

4.1 Method of Award

A. The contract will be awarded to the lowest responsive and responsible Bidder whose bid (including any alternates which may be selected) meets the requirements and criteria set forth in the solicitation documents.

B. In the event the total lump sum bid of all bidders exceeds the project control budget, HHSC reserves the right to make an award to the apparent Low Bidder if additional funds are available or by reducing the scope of work through negotiation.

4.2 Contract Execution

Upon receipt of the Contract document, the CONTRACTOR shall have ten (10) business days to execute and return the Contract to the Issuing Officer. Explicit execution instructions will accompany the Contract. A copy of the fully executed Contract will be provided the CONTRACTOR within seven (7) business days of Contract execution.

Award of Contract may be withdrawn if the CONTRACTOR is unable to meet Contract execution requirements.

(END OF SECTION)

APPENDIX A

SAMPLE
BID TRANSMITTAL COVER LETTER

Dear Mr. Kawai,

(Name of Business) proposes to provide any and all goods and services as set forth in the "Invitation for Bid" for Walk-In Freezer Replacement for Maluhia IFB No. 20M-0030, for which fees/costs have been set. The fees/costs offered herein shall apply from XXX, 2020 to XXX, 2022.

It is understood and agreed that (Name of Business) have read HHSC's Scope of Services described in the IFB and that this bid is made in accordance with the provisions of such Scope of Services. By signing this bid, (Name of Business) guarantee and certify that all items included in this bid meet or exceed any and all such Scope of Services. (Name of Business) agree, if awarded the contract, to provide the goods and services set forth in the IFB; and comply with all terms and conditions indicated in the IFB; and at the fees/costs set forth in this bid. The following individual(s) may be contacted regarding this bid:_____

_____

Other information:

Address:		Federal Tax ID #:	
Phone No.:		Hawaii GET ID #:	
E-mail address:			

(Name of Business) is a: ☐ Sole Proprietor ☐ Partnership ☐ Corporation ☐ Joint Venture Other (Specify)_____

State of Incorporation is: (Specify)_____

Year of Business started: _____

The exact legal name of the business under which the contract, if awarded, shall be executed is:_____

_____

(Authorized Bidder's Signature, Printed Name/Title; Corporate Seal or Notarized)

APPENDIX B

IFB No. 20M-0030
Walk-In Freezer Replacement for Maluhia

BID FORM

After carefully examining the bid documents, drawings and specifications identified above, the Bidder proposes to furnish at its own expense all necessary labor, materials, tools and equipment to complete the work according to the true intent and meaning of the drawings and specifications, all for the Lump Sum Base Bid of:

_____DOLLARS ($_____)

(Schedule of Values must be submitted with the Bid).

Respectfully Submitted:

_____ _____
Signature / Printed Name Date

_____
Title

OTHER CONDITIONS

1. Bidder agrees to pay liquidated damages to the HHSC to be specified.

2. By submitting this proposal, the Bidder is declaring that its firm has not been assisted or represented on this matter by an individual who has, in a County capacity, been involved in the subject matter of this contract in the past two years;

3. Anti-collusion certification. In accordance with HAR 3-122-192, by submitting this proposal, the Bidder is declaring that the price submitted is independently arrived at without collusion.

4. Certification for Safety and Health Program for bids in excess of $100,000. In accordance with HRS 396-18, the Bidder certifies that its organization will have a written safety and health plan for this project that will be available and implemented by the Notice to Proceed date of this project. Details of the requirements of this plan may be obtained from the Department of Labor and Industrial Relations, Occupational Safety and Health Division (HIOSH); and

5. Upon the acceptance of the proposal by the HHSC, the Bidder must enter into and execute a contract for the same and furnish a Performance and Payment bond, as required by law.

RECEIPT OF ADDENDA
Receipt of the following addenda issued by HHSC is acknowledged by the date (s) of receipt indicated below:

Addendum No. 1 _____ Addendum No. 3 _____
Date
Addendum No. 2 _____ Addendum No. 4_____

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

ALL JOINT CONTRACTORS OR SUBCONTRACTORS TO BE ENGAGED ON THIS PROJECT

The Bidder certifies that the following is a complete listing of all joint contractors or subcontractors covered under Chapter 444, Hawaii Revised Statutes, who will be engaged by the Bidder on this project to perform the nature and scope of work indicated and understands that failure to comply with this requirement may be just cause for rejection of the bid.

The Bidder further understands that only those joint contractors or subcontractors listed shall be allowed to perform work on this project and that all other work necessary shall be performed by the Bidder with his own employees. If no joint contractor or subcontractor is listed, it shall be construed that all of the work shall be performed by the Bidder with its own employees.

The Bidder must be sure that it has and that the subcontractor(s) listed in the proposal have all the necessary specialty licenses needed to perform the work for this project. The Bidder shall be solely responsible for assuring that all the specialty licenses required to perform the work are covered in its bid.

The Bidder shall include the license number of the joint contractors or subcontractors listed below. Failure to provide the correct names and license numbers as registered with the Contractor's Licensing Board may cause rejection of the bid submitted.

Complete Firm Name Joint Contractor or Subcontractor for Lump Sum Base Bid	License Number	Nature and Scope of Work to be Performed

Enclosed herewith:

1. Surety Bond (*1))
2. Legal Tender (*2))
3. Cashier's Check (*3))
4. Certified Check (*3))

(Cross Out Those Not Applicable)

in the amount of:

_____ DOLLARS ($_____).

as required by law.

Respectfully submitted,

_____
Name of Company, Joint Venture or Partnership

_____
License

By _____
Signature (*4)

Title _____

Date: _____

(CORPORATE SEAL)
(*5)

NOTES:

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

2. Legal tender; or

3. A cashier's or a certified check accepted by, and payable on demand to the HHSC by a bank, a savings institution, or credit union insured by the Federal Deposit Insurance Corporation.

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

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

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

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

END OF BID FORM

APPENDIX C

S P E C I F I C A T I O N S

FOR

FURNISHING LABOR AND MATERIALS

REQUIRED FOR

WALK-IN FREEZER REPLACEMENT FOR MALUHIA

1027 HALA DRIVE
HONOLULU, HAWAII 96817

TAX MAP KEY: 01-06-009: 004

FOR THE

HAWAII HEALTH SYSTEMS CORPORATION (HHSC)

STATE OF HAWAII

APRIL 2020

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SECTION 00210 - INSTRUCTIONS TO BIDDERS

PART 1 - GENERAL

1.01 GENERAL

A. Only Bidders with the required contractor's license(s) are eligible to submit a Bid.

B. 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. The following definitions are used in the solicitation documents.
   1. Hawaii Business §3-1222-112 HAR: A bidder who is registered and incorporated or organized under the laws of the State is a "Hawaii Business" and eligible for an award.
   2. Compliant non-Hawaii Business §3-122-112 HAR: A bidder not incorporated or organized under the laws of the State, but is registered to do business in the State and complies with or is exempt from the requirements of §3-122-112 HAR, is a "Compliant Non-Hawaii Business" and eligible for an award.
   3. Non-compliant Bidder: If a bidder is a non-Hawaii business and is not registered with the DCCA Business Registration Division (BREG) or cannot comply with §3-122-112 HAR, then the bidder in non-compliant and is ineligible for an award.

C. Prospective Bidders shall submit their "Intention to Bid".

D. Bidders shall submit the "Sealed Bid Form", bid bond (if required), tax clearances, Hawaii business certificates, and any other documents required by the bidding documents.

E. The GENERAL CONDITIONS set forth additional terms and conditions for the bid and award process. The GENERAL CONDITIONS will be part of the contract documents by which HHSC and the bidder (prospective contractor) will be bound. Bidders are directed to the GENERAL CONDITIONS for contract and statutory requirements and for Bidding and Execution of the Contract Requirements. Bidders are also directed to "Section 00800 – Special Conditions" of these specifications for definitions and modifications to the GENERAL CONDITIONS.

1.02 OFFEROR(S) OR BIDDER(S)

A. The terms "Offeror" and "Bidder" are synonymous when used in this Section 00210 and other solicitation documents.

1.03 ADDENDA, CLARIFICATIONS

A. Addenda: The HHSC may periodically issue an addendum that may increase or decrease the scope of work or contract time, provisions or conditions. The HHSC will make the addenda available online on the facility website. Bidders are responsible for the information contained in the addenda or bid clarification whether or not the Bidder receives the addenda or clarification.

B. Bidders discovering an ambiguity, inconsistency or error when examining the bidding documents or the site and local conditions or bidders with questions or clarification requests shall send their written requests (email or fax notification are acceptable) to the Contract Manager. Bidders shall comply with the following procedures:
   1. Identify each request with the Project Name and HHSC Project Number.
   2. Indicate the appropriate section number, paragraph, drawing and detail number, schedule or other identifier.
   3. The request should be brief, concise, but complete enough to properly evaluate and determine the merits or non-merits of the question or request.

C. Bidders shall make any requests for clarifications no later than fourteen (14) calendar days prior to the submission date for sealed bids. Refer to the "Notice to Bidders" for submission date.

D. HHSC will respond to important requests or clarifications by way of addenda. HHSC may not address or respond to all bidders inquiries, if the HHSC determines the request is unimportant or not required to disseminate to all Bidders.

1.04 SEALED BID FORM (BID FORM)

A. Bidder shall fill out the "Sealed Bid Form" completely. Write in ink or type. Besides the following paragraphs with instructions, there are supplemental Bidder's Instructions within the text of the

"Sealed Bid Form" and bidders shall comply with the instructions. Do not alter the "Sealed Bid Form", and maintain the form intact.

B. RECYCLED PRODUCT PREFERENCE is not applicable to this project.

C. OTHER CONDITIONS: Bidder acknowledges and agrees to the provisions and certifications stated in this article.

D. RECEIPT OF ADDENDA: Bidder shall fill in the appropriate dates any addenda were received.

E. LISTING JOINT CONTRACTORS OR SUBCONTRACTORS:
   1. Bidder shall complete the "Joint Contractors or Subcontractors List." It is the sole responsibility of the bidder to review the requirements of this project and determine the appropriate specialty contractor's licenses that are required to complete the project. Failure of the bidder to provide the correct names, license numbers, specialty class number, classification description and to indicate that the specialty contractor is required for this project, may cause the bid to be rejected.
   2. Bidder agrees the completed listing of joint contractors or subcontractors is required for the project and that the bidder, together with the listed joint contractors and subcontractors, have all the specialty contractor's licenses to complete the work.
   3. Based on the Hawaii Supreme Court's January 28, 2002 decision in Okada Trucking Co., Ltd. v. Board of Water Supply, et al., 97 Hawaii 450 (2002), the bidder as a general contractor ('A' or 'B' license) is prohibited from undertaking any work solely or as part of a larger project, which would require the bidder ('A' or 'B' general contractor) to act as a specialty ('C' license) contractor in any area in which the bidder ('A' or 'B' general contractor) has no specialty contractor's license. Although the 'A' and 'B' contractor may still bid on and act as the "Prime Contractor" on an 'A' or 'B' project (See, HRS §444-7 for the definitions of an "A" and "B" project), respectively, the 'A' and 'B' contractor may only perform work in the areas in which they have the appropriate contractor's license. The bidder ('A' or 'B' general contractor) must have the appropriate 'C' specialty contractor's licenses either obtained on its own, or obtained automatically under HAR §16-77-32.
   4. General Engineering 'A' Contractors automatically have these 'C' specialty contractor's licenses: C-3, C-9, C-10, C-17, C-24, C-31a, C-32, C-35, C-37a, C-37b, C-38, C-43, C-56, C-57a, C-57b, and C-61.
   5. General Building 'B' Contractors automatically have these 'C' specialty contractor's licenses: C-5, C-6, C-10, C-12, C-24, C-25, C-31a, C-42a, and C-42b.
   6. The table that lists the specialty contractor' classifications in the bid form is from the Department of Commerce and Consumer Affairs' (DCCA) website www.state.hi.us/dcca/har/index.html. Bidders shall provide the appropriate classifications numbers and descriptions for any specialty contractors that are not included in the bid form and bidders are directed to the DCCA web site for the latest updated list.
   7. Instructions to complete the Joint Contractors or Subcontractors List:
      a. Determine the specialty contractor classification(s) required for this project and provide the complete firm name and license number of the joint contractor or subcontractor in the respective columns. If the bidder is a general contractor and providing the work of the required specialty contractor classification, fill in the bidder's (general contractor's) license number and name.
      b. List only one joint contractor or subcontractor per required specialty contractor's classification.
      c. For projects with alternate(s), fill out the respective "Joint Contractors or Subcontractors List for the Alternate(s)." Bidder shall determine the specialty contractor's classification and description required for the respective alternate. Bidders shall fill in the complete class number, class description, firm name and license number of the respective joint contractor or subcontractor. The bidder shall not include any joint contractor or subcontractor previously listed for the base bid.

F. COST AND TIME: Bidder shall completely fill out the article and enter the cost for the Project Bid Price, and Alternates when provided. Bidder shall tabulate the Project Bid Price, and Alternates when provided, and the Bidders shall then enter the Total Lump Sum Bid Price. BE

SURE TO ENTER THE TOTAL LUMP SUM BID PRICE IN WORDS AND NUMERALS. Refer to Bidder's Instructions located within the article.

1. If provided, bidder shall fill in total costs for each alternate.
2. The bidder is directed to the construction time information paragraph "B" for the list of contract times and dates which may include: contract duration, project start date, jobsite start date, jobsite completion, contract completion date and construction time for alternates. Bidder shall refer to "Section 01100" of these specifications for additional construction time information, as applicable.

G. SIGNATORY PAGE: Bidder shall completely fill out article (page). Bidder shall indicate if it is a "Hawaii Business" or a "Compliant Non-Hawaii Business." Also, bidder shall refer to Bidder's Instructions located within the article.

1.05 EVALUATION CRITERIA

A. EVALUTATING BIDS: The lowest responsive, responsible bid is determined by the following procedures:
   1. The total lump sum bid price is adjusted to reflect the applicable preferences.
      a. For projects with alternates, the total lump sum base bid price and alternates will be adjusted to reflect the applicable preferences.
   2. Project control budget is established prior to the submission of bids.

1.06 METHOD OF AWARD

A. The contract will be awarded to the lowest responsive and responsible Bidder whose bid (including any alternates which may be selected) meets the requirements and criteria set forth in the solicitation documents.

B. In the event the total lump sum bid of all bidders exceeds the project control budget, HHSC reserves the right to make an award to the apparent Low Bidder if additional funds are available or by reducing the scope of work through negotiation.

1.07 OTHER CONDITIONS FOR AWARD

A. The Chief Procurement Officer may reject any or all bids and waive any defects if the Chief Procurement Officer believes the rejection or waiver is in the best interest of HHSC.

B. The Chief Procurement Officer may hold all bids up to 60 calendar days from the date bids were opened. Unless otherwise required by law, bids may not be withdrawn without penalty.

C. The award of the contract is conditioned upon funds made available for the project (or projects if applicable)

1.08 COMPLIANCE WITH §3-122-112 HAR:

A. As a condition for award of the contract and as proof of compliance with the requirements of 103D-310(c) HRS, the bidder shall meet the "Hawaii Business" or "Compliant non-Hawaii Business" requirements and shall provide the following documents:
   1. Department of Taxation (DOTAX) and the IRS tax clearance certificates.
   2. Department of Labor (DLIR) certificate of compliance.
   3. Department of Commerce and Consumer Affairs (DCCA), Business Registration Division (BREG) certificate of good standing.
      a. A Hawaii business that is a sole proprietorship is not required to register with the BREG and therefore not required to submit the DCCA, BREG "Certificate of Good Standing."

B. The apparent three low bidders shall furnish the required documents to HHSC within seven calendar days from the bid opening date. If a valid certificate is 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 documents by the required deadlines.

PART 2 - PRODUCTS (NOT USED)

PART 3 - EXECUTION

3.01 REQUIRED DOCUMENTATION FOR HAWAII BUSINESS OR COMPLIANT NON-HAWAII BUSINESS (§3-122-112 HAR)

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 are valid for six months from the most recently approved stamp date on the certificate; the certificate must be valid on the date received by HHSC.

1. DOTAX Tax clearance application Form A-6 (Rev 2003) is available at DOTAX and IRS (State of Hawaii) offices or DOTAX website, and by mail or fax.
   a. DOTAX website: <http://www.state.hi.us/tax/alphalist.html#a>
   b. DOTAX forms by fax/mail: (808) 587-7572 or 1-800-222-7572
2. Mail, fax or submit in person completed tax clearance application forms to the Department of Taxation, Taxpayer Services Branch or to the address listed on the application. Facsimile numbers are:
   a. DOTAX: (808) 587-1488
   b. IRS: (808) 539-1573
3. DOTAX will return the form to the bidder. The bidder is reminded that it is responsible to submit the applications for the tax clearance directly to DOTAX or IRS and not to HHSC.

B. 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 HHSC.

1. DLIR APPLICATION FOR CERTIFICATE OF COMPLIANCE WITH SECTION 3-122-112 HAR, Form LIR#27 is available at DLIR website or at the neighbor island DLIR District Office.
   a. DLIR website: <http://www.dlir.state.hi.us/LIR#27>
2. Mail, fax or submit in person completed application form to the Department of Labor and Industrial Relations, Administrative Services Office at the address listed on the application.
3. DLIR will return the form to the bidder. The bidder is reminded that it is responsible to submit the application for the certificate directly to DLIR and not to HHSC.

C. DCCA 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 HHSC.

1. DCCA CERTIFICATE OF GOOD STANDING is available from the business registrations website or by telephone. Bidders are advised there are costs associated with registering and obtaining the certificate.
   a. DCCA form website: http//www.BusinessRegistrations.com
   b. DCCA telephone: (808) 586-2727, M - F 7:45 to 4:30 HST
2. Submit the application per DCCA's requirements.
3. DCCA will return the form to the bidder. The bidder is reminded that it is responsible to submit the application for the certificate directly to DCCA and not to HHSC.

END OF SECTION

SECTION 00800 - SPECIAL PROVISIONS

PART 1 - GENERAL

1.01 SUBSTITUTION REQUESTS

A. Written substitution requests must be submitted with your Invitation for Bid (IFB) in accordance with IFG Section 3. All substitutions will be reviewed and approved in accordance with the GTC.

B. Substitution requests by FAX are not acceptable.

1.02 PROJECT CONTACT PERSON

A. HHSC Representative - For access to the site.
   1. Mr. Ron Kurasaki
      a. POSITION OR TITLE: Project Manager
      b. TELEPHONE NUMBER: (808) 497-9350
      c. Email: rkurasaki@hhsc.org

B. Project Coordinator - For questions and clarifications during bidding and Requests for Substitutions.
   1. Mr. Scott Sato
      a. POSITION OR TITLE: Project Engineer
      b. TELEPHONE NUMBER: (808) 628-3340
      c. Email: ScottS@interfaceeng.com

C. Procurement Agency - For questions regarding proposal and contract requirements.
   1. Mr. Scott Kawai
      a. POSITION OR TITLE: Contracts Manager
      b. TELEPHONE NUMBER: (808) 832-3025
      c. Email: SKawai@hhsc.org

1.03 OFFEROR'S RESPONSIBILITY FOR EXAMINING PLANS, SPECIFICATIONS AND SITE OF WORK

A. Offerors herewith refers to sub-contractors, suppliers, manufacturer's representatives as well as contractors.

1.04 LIQUIDATED DAMAGES

A. The time of completion for the Work shall be within 200 consecutive calendar days from the official commencement date of the Notice to Proceed (NTP).

B. In accordance with the General Conditions, upon failure to complete Work or any portion of the Work within the time or times fixed in the contract or extension thereof, the Contractor shall pay liquidated damages to the Department in the amount of $250.00 per calendar day of delay.

C. In accordance with the General Conditions, PROJECT ACCEPTANCE DATE, for failure to correct punch list deficiencies, within the time or times fixed in the contract or extension thereof, the Contractor shall pay liquidated damages to the HHSC, in the amount equal to ten percent (10%) of the liquidated damages per calendar day of delay.

D. In accordance with the General Conditions FINAL SETTLEMENT OF THE CONTRACT, for failure to submit closing documents within the time or times fixed in the contract or extension thereof, it is agreed that the Bidder shall pay liquidated damages to HHSC in the amount equal to five percent (5%) of the liquidated damages per calendar day of delay.

1.05 SPECIALTY CONTRACTOR’S LICENSE

A. Contractor shall be solely responsible to assure that all the specialty licenses required to perform the Work are covered by the Contractor or its subcontractor(s).

1.06 WORKING HOURS

A. The regular working hours for this project is from 6:30 PM to 4:00 AM Monday through Friday, excluding State Holidays, unless otherwise noted or restricted under “Section 01100”. The Working Hours provisions of specification “Section 01100” shall govern over this article 1.06.

B. The Contractor may be given approval to work beyond the regular hours including Saturdays, Sundays, State Holidays, night work, or after hours under the provisions of the GENERAL CONDITIONS, “Overtime And Night Work Section” and under specification “Section 01100”.

1.07 SPECIAL PROCEDURES DURING BIDDING

A. Bid documents will be available online and from the Contracts Manager’s office, at Maluhia, 1027 Hala Drive, Honolulu, HI, 96817.

B. All bids shall be submitted to the Contracts Manager.

C. All questions regarding the plans and specifications shall be submitted, in writing, to the Engineer. The Engineer will review the questions and issue any responses via Addendum. Only information received by Addendum shall be binding.

D. All questions regarding the proposal or contractual requirements shall be submitted, in writing to the Contracts Manager. The Contracts Manager will review the questions and issue any responses via Addendum. Only information received by Addendum shall be binding.

E. Any visitation to the site to examine the scope of work shall be requested through the HHSC Representative. Disruption of facility operations shall not be permitted.

1.08 PROCEDURES DURING CONSTRUCTION

A. Upon issuance of the Notice to Proceed, the Contractor shall submit a work schedule for review and discussion. The work schedule shall be up-dated on a weekly or bi-weekly basis as directed by the Architect.

B. On a weekly or bi-weekly basis, the Contractor shall conduct a progress meeting with the Hospital and Architect. The meeting will discuss the progress of the construction, discussion of problems, and review of outstanding issues. The Contractor shall conduct the meeting and prepare the meeting notes and minutes and distribute to all parties.

C. During the construction, submittals and RFIs shall be submitted to the Engineer for review and action. To expedite the review, the Contractor may make submittals via email.

D. Periodic requests for payment shall be submitted to the Engineer for review and confirmation. Approved requests for payment will be forwarded to the Contracts Officer for processing of payment.

E. Upon substantial completion of the project, the Contractor shall submit in writing to the Architect a request for a pre-final inspection. The Contractor shall have completed their own inspection and completed all noted discrepancies. Include with the request for the pre-final inspection a list of all outstanding work not completed or corrected.

F. Upon conducting a pre-final inspection, the Engineer shall prepare a punchlist of noted discrepancies for the Contractor’s remedial action. A final inspection will be performed upon completion of all punchlist items.

1.09 PROJECT RESTRICTIONS

A. The Contractor is informed that the facilities will be fully occupied and work shall be performed in close coordination with the HHSC representative. Work shall be phased and may be limited to one area at a time. If work will require the relocation of clients from the work area, time shall be allocated for the Hospital to conduct this relocation. Scheduling of the work shall be closely monitored and work performed to minimize the disruption to the remaining areas of the facility. All work schedules shall be approved by HHSC prior to starting.

B. Staging and storage of materials on-site is limited and shall not be allowed unless coordinated and approved with the HHSC representative. Contractor may be required to store materials off-site at his own expense.

C. Parking on-site is limited and may be restricted to only active delivery of materials and equipment. Coordinate with the HHSC representative. If on-site parking will not be available, the Contractor shall park off-site.

D. The above restrictions shall be considered in the work of this project and shall be included in the Contractor's cost. No additional compensation shall be made for not considering these restrictions.

PART 2 - MATERIALS (NOT USED)

PART 3 - EXECUTION

3.01 FINAL PAYMENT REQUIREMENTS

A. In addition to the requirements in the GENERAL CONDITIONS "Final Payment" section, the contractor shall submit"

1. Tax clearance certificate from DOTAX and IRS, current within two months of the issuance date; and
2. An originally signed Certificate of Compliance for Final Payment (SPO Form - 22, modified), affirming that the contractor remained in compliance with all laws as required by (§3-122-112 HAR). A contractor making a false affirmation shall be suspended and may be debarred pursuant to section 103D-702 HRS.

END OF SECTION

SECTION 01019 - GENERAL PROJECT REQUIREMENTS

PART 1 - GENERAL

1.01 SUMMARY

A. Perform operations and furnish equipment, tools, materials, related items and labor necessary to execute, complete and deliver the Work as required by the Contract Documents.

1.02 DIVISION OF WORK

A. The Division 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 work specified within each section

B. 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.

C. 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

D. Specifying of interface and coordination in the various Specification Sections is provided for information and convenience only. Such requirements in the various Sections shall complement the requirements of this Section.

1.03 NOTIFICATION

A. Contact the Engineer and HHSC Representative at least five (5) working days prior to starting any onsite work.

1.04 SAFETY REQUIREMENTS

A. The Hawaii Occupational Safety and Health Law, Chapter 396, Hawaii Revised Statutes, effective May 16, 1972, as amended, is applicable and made a part of the Contract. Carefully read and strictly comply with its requirements.

B. Protect the facility personnel, students, and the public whenever power driven equipment is used. Ensure adequate safety precautions are used when operating any power driven equipment.

1.05 PERFORMANCE AND COORDINATION

A. Contractor shall be in charge of the Work and the Project Contract Limits, as well as the directing and scheduling of all work. Contractor shall include general supervision, management and control of the Work of this project, and in addition to other areas more specifically noted throughout the Specifications. Final responsibility for performance, interface, and completion of the Work and the Project shall be the Contractor’s.

B. Jobsite Administration shall be the responsibility of the Contractor. Provide a competent superintendent on the job and provide an adequate staff to execute the Work. In addition, all workers shall dress neatly and conduct themselves properly at all times. Loud abusive behavior, sexual harassment and misconduct will not be tolerated. Workers found in violation of the above shall be removed from the job site as directed by the HHSC Technical Representative.

C. The HHSC and/or Hospital 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.

D. Coordination: Provide project interface and coordination to properly and accurately bring together the several parts, components, systems, and assemblies as required to complete the Work.

1. Provide interface and coordination of all trades, crafts and subcontracts. Ensure and make correct and accurate connections of abutting, adjoining, overlapping, and related

work. Provide anchors, fasteners, accessories, appurtenances, and incidental items needed to complete the Work, fully, and correctly in accordance with the Contract Documents.

2. Provide additional structural components, bracing, blocking, miscellaneous metal, backing, anchors, fasteners, and installation accessories required to properly anchor, fasten, or attach material, equipment, hardware, systems and assemblies to the structure.
3. Provide caulking, sealing, and flashing as required to waterproof the building complete and as required to insulate the building thermally and acoustically. Include sealing, flashing, and related work as required to prevent moisture intrusion, air infiltration, and light leakage.
4. Materials, equipment, component parts, accessories, incidental items, connections, and services required to complete the Work which is not provided by subcontractors shall be provided by the Contractor.

1.06 COOPERATION WITH OTHER CONTRACTORS

A. The Hospital reserves the right at any time to contract for or otherwise perform other or additional work within the Project Contract Limits. The Contractor of this project shall to the extent ordered by the HHSC Representative, conduct its work so as not to interfere with or hinder the progress or completion of the work performed by the Hospital or other contractors.

1.07 SUBMITTALS

A. Furnish required submittals specified in this Section and in the Technical Sections. Submittals include one or more of the following: shop drawings, color samples, material samples, technical data, material safety data information, schedules of materials, schedules of operations, guarantees, certifications, operating and maintenance manuals, and field posted as-built drawings.

B. Record Drawings: Field Posted 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 prepared and submitted by the Contractor. To accomplish this, the following procedure shall be followed by the Contractor:

1. A full-size set of field posted as-built drawings shall be maintained at the job site. All deviations from alignments, elevations and dimensions which are stipulated on the drawings and authorizations given by the HHSC Technical Representative to deviate from the drawings shall be clearly and accurately recorded by the Contractor on this set of record drawings.
2. Changes shall be recorded immediately after they are constructed in place to assure they are not forgotten. Record the changes in red pencil and where applicable, refer to the authorizing document or Change Order. The field posted as-built drawings shall be made available to the Engineer and HHSC Technical Representative at any time so that its clarity and accuracy can be monitored.
3. The words “FIELD POSTED AS-BUILT” shall be labeled on the title sheet and certified by the Contractor as to accuracy and completeness as shown below:
   a. FIELD POSTED AS-BUILT
   b. Certified By: Date:_____
   c. Contractor (Include name and company)
4. The words “FIELD POSTED AS-BUILT” shall be labeled on all sheets in the margin space to the right of the sheet number written from the bottom upward.
5. The Index to Drawings shall be revised with the label “FIELD POSTED AS-BUILT” for each sheet. The index shall conclude with the following note: “A COMPLETE SET CONTAINS ____ SHEETS” with the total number of sheets comprising the set to be placed in the blank.
6. Any “FIELD POSTED AS-BUILT” drawing which the Engineer determines does not accurately record the deviation may be corrected by the Architect and the Contractor shall be charged for the services.

7. Submit the set of “FIELD POSTED AS-BUILT” drawings to the Engineer and notify the HHSC Technical Representative no later than five (5) calendar days prior to the date of final inspection.
8. “AS-BUILT” drawings will be prepared by the design consultant using the “FIELD POSTED AS-BUILT”. Both sets of drawings will be sent to the Contractor for review and approval. The Contractor shall retain the “FIELD POSTED AS-BUILT” drawings for records, sign the “AS-BUILT” set of drawings, indicating approval, and return the drawings in a timely manner to the Engineer and notify the HHSC Representative.

1.08 CONSTRUCTION SCHEDULE:

A. The Construction Schedule completion date will be approved prior to award. The daily activities of the Construction Schedule will be reviewed within fifteen (15) calendar days after the Notice to Proceed or upon earlier written instruction by HHSC.

B. The schedule shall be related to the entire project to the extent required by the Contract Documents, and shall provide for expeditious and practicable execution of the work. If requested by the Engineer or HHSC Representative, the Contractor shall participate in a preliminary meeting to discuss the proposed schedule and requirements prior to submission of the schedule.

C. Contractor shall prosecute the work according to the Schedule. The Engineer and HHSC Representative shall rely on the reviewed Contractor’s Schedule and regular updates for planning and coordination. The HHSC Representative’s review of the Contractor’s Construction Schedule does not relieve the Contractor of its obligation to complete the work within the allotted contract time. Nor does the review grant, reject or in any other way act on the Contractor’s request for adjustment(s)to complete remaining contract work, or for claims of additional compensation. Such requests shall be processed in accordance with other relevant provisions of the contract.

D. If the Engineer issues a Field Order or Change Order or requires Force Account Work that affects the sequence or duration of work activities noted on the construction progress schedule, the Contractor shall promptly update the schedule. This shall be accomplished by adding, deleting or revising the work activities noted, or changing the logic in the schedule to show the Contractor’s plan for incorporating the change into the flow of work. All Change Orders and Time Extension requests that affect the construction schedule shall be evaluated based on their impact on the approved Construction Schedule.

1.09 MEETINGS

A. Contractor shall meet with the hospital’s representative, weekly or other interval as determined, to discuss the progress of the Work.

B. For each meeting, Contractor shall take meeting minutes and provide a list stating all items, work or material, which may cause a delay or have an impact on the project’s contractual dates. The list shall be inclusive of items requiring action from all responsible parties such as outstanding submittal status, request for information (clarification), force account work, change order, and change proposals. The format of this list shall be at the Contractor’s discretion, subject to the Engineer’s approval. Submit the list to all parties for discussions as a meeting agenda. Contractor shall provide a plan of corrective action for any item, which is delayed or expected to be delayed, where that item impacts the contractual dates.

1.10 PROJECT AND SITE CONDITIONS

A. Project Contract Limits (Contract Zone Limits) shown on the drawings indicate only in general the limits of the work involved. Perform necessary and incidental work, which may fall outside of these demarcation lines. Confine construction activities within the Project Contract Limits and do not spread equipment and materials indiscriminately about the area.

1.11 SANITARY FACILITIES

A. The Contractor shall be allowed to utilize on-site restrooms as directed by the Architect and/or HHSC Representative. The Contractor shall maintain the facility in clean and sanitary condition

at all time. Failure to do so, may require the Contractor to provide portable temporary toilet facilities for the contractor's use.

1.12 CONSTRUCTION AIDS

A. Provide construction aids and equipment required by construction personnel and to facilitate execution of the Work including: scaffolds, ladders, ramps, platforms, railings, and other such facilities and equipment.

PART 2 - MATERIALS

2.01 QUALITY

A. Materials, items, equipment and fixtures specified in the various Divisions and Sections shall be new unless otherwise specified.

2.02 STORAGE AND HANDLING

A. Contractor shall supervise jobsite delivery and handling, and assign storage space for materials, items, equipment and fixtures of all trades. Contractor and installer are responsible for delivery, unloading, unpacking, handling, storage, distribution, installation and protection of its materials at the jobsite.

B. Except as otherwise required by these specifications or by the Hospital, determine and comply with manufacturer(s) recommendation(s) on product handling, storage and protection.

C. Deliver products to the jobsite in manufacturer's original containers, with labels intact and legible. Maintain packaged material with seals unbroken and labels intact until time of use. Promptly remove damaged materials and unusable items from the jobsite, and promptly replace with material meeting the specified requirements, at no additional cost to the Hospital.

D. The Architect may reject as non-complying such material and products that do not bear identification satisfactory to the Architect as to manufacturer, grade, quality, and other pertinent information.

PART 3 - EXECUTION

3.01 EXAMINING THE SITE

A. Contractor and Subcontractors are expected to visit the site and make due allowances for difficulties and contingencies to be encountered. Compare contract documents with work in place. Become familiar, with existing conditions, the conditions to be encountered in performing the Work, and the requirements of the drawings and specifications.

B. Verify construction dimensions and elevations indicated on the drawings before any construction begins. Any discrepancy shall be immediately brought to the attention of the Engineer, and any change shall be made in accordance with the Architect's instruction. Contractor shall not be entitled to extra payment if it fails to report the discrepancies before proceeding with any work whether within the area affected or not.

C. Obtain all field measurements required for the accurate fabrication and installation of the Work included in this Contract. Exact measurements are the Contractor's responsibility.

D. Furnish or obtain templates, patterns, and setting instructions as required for the installation of all Work. All dimensions shall be verified in the field.

E. The Contractor shall accept the site in the condition which exists at the time access is granted to begin the Work.
   1. Verify existing conditions and dimensions shown and other dimensions not indicated but necessary to accomplish the Work.
   2. Locate general reference points and take action to prevent their destruction. Lay out work and be responsible for lines, elevations and measurements and the work executed. Exercise precautions to verify figures and conditions shown on drawings before layout of work.
   3. Before starting the Work, the Contractor and each Subcontractor, shall verify governing dimensions and shall examine adjoining work on which the Contractor's work is in any way dependent. No additional compensation will be allowed on account of differences

between actual measurements and dimensions shown. Submit differences discovered during the verification work to the Engineer for interpretations before proceeding with the associated work.

3.02 UTILITY SERVICE

A. Electricity - Make arrangements with the facilities for temporary use of electricity for construction use.

B. Telephone - Make arrangements with the utility companies for temporary telephone service for construction use or utilize cellular phone service.

C. Water - Make arrangements for temporary water use with the facilities.

3.03 ENVIRONMENTAL

A. General Contractor shall oversee that proper environmental conditions are met regarding temperature, humidity, lighting and ventilation.

3.04 PREPARATION AND PROTECTION

A. Protection of Property: Continually maintain adequate protection of the Work from damage and protect all property, including but not limited to buildings, equipment, furniture, grounds, vegetation, material, utility systems located at and adjoining the job site. Repair, replace or pay the expense to repair damages resulting from Contractor's fault or negligence.

B. Before starting work to be applied to previously erected constructions, make a thorough and complete investigation of such recipient surfaces and determine their suitability to receive required additional construction and finishes. Contractor, at its expense, shall make whatever repairs and conditioning required to properly prepare such surfaces. Contractor shall coordinate the work to provide a suitable surfaces to receive following work.

C. Commencement of work by any trade will be construed as acceptance of existing conditions and surfaces as being satisfactory for application of subsequent work, and full responsibility for finished results and assumption of warranty obligations under the Contract.

D. Repairs and Replacements: In event of damage, promptly make replacements and repairs to the approval of the Engineer and/or HHSC Representative and at no additional cost to the Hospital. Additional time required to secure replacements and to make repairs will not be considered to justify an extension in the Contract Time or completion.

3.05 BARRICADE

A. Erect temporary construction barricade(s) to prevent unauthorized persons from entering the project area and to the extent required by the Engineer and/or HHSC Representative.

B. Maintain temporary construction barricade(s) throughout the duration of the Work. During the course of the project, the Engineer and/or HHSC Representative may require additional barricades be provided for the safety of the public. Contractor shall erect the additional barricade(s) at its own expense.

3.06 INSTALLATION

A. Materials, items, fixtures required by the various Divisions and Sections of the Specifications shall be installed in accordance with Contract Documents, by workers specially trained and skilled in performance of the particular type of work, to meet guarantee and regulatory agency requirements. Should the drawings or specifications be void of installation requirements, install the materials, items, fixtures in accordance with the manufacturer's current specifications, recommendations, instructions and directions, and/or best construction industry standards.

3.07 CUTTING AND PATCHING

A. General Contractor shall oversee cutting and patching of concrete, masonry, structural members and other materials where indicated on drawings and as job conditions require. Unless noted elsewhere in the Drawings and Specifications, no cutting or patching of existing or new structural members will be permitted without previously notifying the HHSC Technical Representative.

B. Patching materials and workmanship shall be of equal quality to that indicated on the drawings, specified for new work, and/or to match the construction of item to be patched.

3.08 CLEAN-UP

A. Rubbish and debris resulting from work of the various Divisions and Sections of the specifications shall be collected and disposed of by the Contractor at legal disposal areas away from the project site. Clean up and remove from premises all debris accumulated from operations from time to time and as directed by the Engineer and/or HHSC Representative. Permission to provide on-site trash containers shall be granted by the Hospital and shall be placed where directed by the Architect and/or HHSC Representative.

END OF SECTION

SECTION 01100 - SUMMARY

PART 1 - GENERAL

1.01 WORK COVERED BY CONTRACT DOCUMENTS

A. Project Identification: The work shall generally consist of demolition, replacement of walk-in freezer, refrigeration work, electrical work, drywall work, and painting as indicated on the drawings and specified herein.
   1. Project Location: Maluhia, 1027 Hala Drive., Honolulu, Hawaii.

B. Perform operations and furnish equipment, tools, materials, related items and labor necessary to execute, complete and deliver the Work as required by the Contract Documents.

C. The Division 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 work specified within each section

D. Contractor shall not alter the Drawings and Specification. If an error or discrepancy is found, notify the Architect.

E. Specifying of interface and coordination in the various specification sections is provided for information and convenience only. These requirements in the various sections shall complement the requirements of this Section.

1.02 SPECIFICATION FORMATS AND CONVENTIONS

A. Specification Content: The Specifications use certain conventions for the style of language and the intended meaning of certain terms, words, and phrases when used in particular situations. These conventions are as follows:
   1. Abbreviated Language: Language used in the Specifications and other Contract Documents is abbreviated 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. Words and meanings shall be interpreted as appropriate. Words implied, but not stated, shall be inferred, as the sense requires. Singular words shall be interpreted as plural, and plural words shall be interpreted as singular where applicable as the context of the Contract Documents indicates. 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.
   2. Imperative mood and streamlined language are generally used in the Specifications. Requirements expressed in the imperative mood are to be performed by Contractor. Occasionally, the indicative or subjunctive mood may be used in the Section Text for clarity to describe responsibilities that must be fulfilled indirectly by Contractor or by others when so noted.
      a. The words “shall,” “shall be,” or “shall comply with,” depending on the context, are implied where a colon (:) is used within a sentence or phrase.
   3. Abbreviations and Acronyms for Industry Organizations: Where abbreviations and acronyms are used in Specifications or other Contract Documents, they shall mean the recognized name of the entities indicated in Gale Research’s “Encyclopedia of Associations” or in Columbia Books’ “National Trade & Professional Associations of the U.S.”

B. Definitions
   1. Directed: Terms such as “directed,” “requested,” “authorized,” “selected,” “approved,” “required,” and “permitted” mean directed by Contracting Officer, requested by Contracting Officer, and similar phrases.
   2. Indicated: The term “indicated” refers to graphic representations, notes, or schedules on drawings or to other paragraphs or schedules in specifications and similar requirements in the Contract Documents. Terms such as “shown,” “noted,” “scheduled,” and “specified” are used to help the user locate the reference.

3. Furnish: The term “furnish” means to supply and deliver to project site, ready for unloading, unpacking, assembly, installation, and similar operations.
4. Install: The term “install” describes operations at project site including unloading, temporarily storing, unpacking, assembling, erecting, placing, anchoring, applying, working to dimension, finishing, curing, protecting, cleaning, and similar operations.
5. Provide: The terms “provide” or “provides” means to furnish and install, complete and ready for the intended use.
6. Installer: An installer is the contractor or another entity engaged by contractor as an employee, subcontractor, or sub-subcontractor, to perform a particular construction operation, including installation, erection, application, and similar operations.
7. Submit: Terms such as “submit,” “furnish,” “provide,” and “prepare” and similar phrases in the context of a submittal, means to submit to the Contracting Officer.

C. Industry Standards
1. Applicability of Standards: Unless the Contract Documents include more stringent requirements, applicable construction industry standards have the same force and effect as if bound or copied directly into the Contract Documents to the extent referenced. Such standards are made a part of the Contract Documents by reference.
2. Publication Dates: Comply with standards in effect as of date of the Contract Documents, unless otherwise indicated.
3. Conflicting Requirements: If compliance with two or more standards is specified and the standards establish different or conflicting requirements for minimum quantities or quality levels, comply with the most stringent requirement. Refer uncertainties and requirements that are different, but apparently equal, to Contracting Officer for a decision before proceeding.

1.03 WORK SEQUENCE

A. The Work will be conducted in a single construction phase.

1.04 USE OF PREMISES AND WORK RESTRICTIONS

A. General: Contractor shall have full use of construction zone for construction operations, including restricted use of project site, during construction period. Contractor’s use of premises is limited only by State’s right to perform work or to retain other contractors on portions of the project site.

B. Contractor’s use of premises is restricted as follows:
1. Construction Times and Schedule:
a. The Contractor shall coordinate the work schedule with the Engineer and/or HHSC Representative. An advanced notice of 15 calendar days shall be provided prior to the start of work. Work shall be scheduled for weekdays (6:30 PM to 4:00 AM) with advanced notice by the Contractor.
b. The normal operational hours of the hospital are 8:00 AM to 4:30 PM, Monday through Friday.
c. Work performed during normal operating hours shall not impede public traffic or office personnel. An alternate route around the work areas may be required.
2. Site Access and Parking:
a. Arrange all on-site parking and access with the Engineer and/or HHSC Representative.
b. Subject to availability, the Engineer and/or HHSC Representative will designate other on-site areas that may be used by the Contractor other than assigned stalls. Restore any property damaged by construction activities at the completion of the project.
3. Sanitation and Utilities:
a. Contractor may use designated restrooms, however, shall maintain the facilities in clean condition at all times. Coordinate with the HHSC Representative.
b. Arrange all temporary electricity and water service with the HHSC Representative. There will be no charges for reasonable electricity and water service.

c. Should interruption of any utility services be required, outages shall be coordinated with the HHSC Representative. A minimum five (5) working days notice shall be provided. Contractor is forewarned that the HHSC Representative may require outages to be done at specific times to minimize disruptions to the facility operations.

4. Other Conditions:
   a. Noise and other disrupting activities normally resulting from construction operations are detrimental to the conduct of normal activities in adjacent locations surrounding the project area. Accordingly, exercise every precaution to keep noise levels to a minimum. Internal combustion engines and compressors shall be equipped with mufflers to reduce noise to a minimum.
   b. Use or application of materials with offensive odors should be avoided and may be restricted from use on this project.

1.05 WORK UNDER OTHER CONTRACTS

A. Separate Contract: The HHSC may execute a separate contract for certain construction at the facility that was not known at the time Offers were submitted.

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

PART 2 - PRODUCTS (NOT USED)

PART 3 - EXECUTION (NOT USED)

END OF SECTION

SECTION 01140 - WORK RESTRICTIONS

PART 1 - GENERAL

1.01 SUMMARY

A. This section includes work restrictions on the Contractor's operations, and construction as required to maintain the facility's operation during the construction period.

1.02 CONSTRUCTION PROVISIONS

A. Rules and Regulations: Consult with the Engineer and HHSC Representative at the pre-construction conference and become familiar with the rules and regulations of the facility.

B. Contractor's Operations: Confine all construction operations to the immediate vicinity of the construction activity. Store building materials, equipment, tools and incidentals in an enclosed area as directed by the HHSC Representative. Take precautions and prevent access to power equipment, tools, etc., by other than authorized construction personnel. Perform operations to insure the safety of the occupants of the buildings at all times.

C. Perform operations to minimize inconvenience or disturbance upon the personnel and residents.

D. Protection of occupants: Special consideration must be made by the Contractor at all times to safely protect the occupants and facility personnel from any and all injuries that may be caused as a result of the work performed under this contract.

E. Caution: The Contractor shall caution his personnel on the job that any association with the occupants be avoided as much as possible, that when spoken to by occupants, normal courtesy shall be maintained at all times.

F. None of the foregoing regulations shall be construed as a restriction on the legal prosecution of the work.

1.03 SEQUENCING OF WORK

A. The Contractor shall schedule his work in general consideration for the on-going operation of the hospital. All work shall be coordinated with the HHSC Representative.

B. Stoppage of work for the duration of CMS and State Survey audits shall not incur additional costs to the HHSC.

C. All work shall be coordinated and scheduled with the hospital and/or HHSC Representative. In general, the Contractor will be restricted to work areas as coordinated with the HHSC Representative.

PART 2 - PRODUCTS (NOT USED)

PART 3 - EXECUTION (NOT USED)

END OF SECTION

SECTION 01300 - SUBMITTALS

PART 1 - GENERAL

1.01 GENERAL REQUIREMENTS

A. Where indicated in these specifications, provide submittals to the Engineer for review.

1.02 PROCEDURES

A. Unless otherwise specified, deliver submittals to the Engineer with copy of transmittal to the Contracts Manager.

B. Transmit all items using form which identifies Project, Contractor, Subcontractor, and major supplier. Identify pertinent drawing sheet, detail number, and specification section number, as appropriate. Identify deviations from Contract Documents. Provide space for the Architect or his Consultant's review stamp.

C. Upon completion of review by the Engineer, the Engineer will return submittals to the Contractor with copy to the Contracts Manager and HHSC Representative.

1.03 SCHEDULE OF WORK

A. Coordinate Schedule with Work Sequence specified in Section 01014.

1.04 SHOP DRAWINGS AND SAMPLE SUBMITTALS

A. All submittals shall be made in accordance with the following unless otherwise specified. Minimum sheet size is 8-1/2" x 11". Maximum sheet size is same size as the Contract Drawings. Drawings shall be presented in a clear and thorough manner. Details shall be identified by reference to sheet, schedule, and detail shown on Contract Drawings.

B. Mark each copy to identify applicable products, and other data. Supplement manufacturer's standard data to provide information unique to the work. Include manufacturer's installation instructions when required by the specification.

1. The Contractor shall review, stamp with his approval and submit with reasonable promptness and in orderly sequence so as to cause no delay in work of any other Subcontractor, all shop drawings, and product data required by these specifications.
2. Properly identify shop drawings and samples as specified. At the time of submission, the Contractor shall inform the HHSC Technical Representative in writing of any deviation in the shop drawings or submittals from requirements of the Contract Documents.
3. By approving and submitting the shop drawings and submittals the Contractor thereby represents that he has determined and verified all field measurements, field criteria, materials, catalog numbers and similar data, or will do so, and that he has checked and coordinated each shop drawing and sample with the requirements of these specifications.
4. Six (6) copies of the Shop Drawings and submittals shall be submitted for review. Upon review, the Engineer will retain three (3) copies and return the balance to the Contractor.
5. The Engineer will review the shop drawings and submittals with reasonable promptness so as to cause no delay but only for conformance with the design concept of the Project and with the information given in the Contract Documents. The Engineer's review of a separate item shall not indicate approval of an assembly in which the item functions.
6. The Contractor shall make any corrections required by the Engineer and shall resubmit the required number of corrected copies of shop drawings or submittals for review. The Contractor shall direct specific attention in writing or on resubmitted shop drawings to revisions other than the corrections requested by the Engineer on previous submissions.
7. The Engineer's review of shop drawings or submittals shall not relieve the Contractor of responsibilities for any deviation from the requirements of the Contract Documents unless the Contractor has informed the Hospital in writing of such deviation, at time of submission, and the HHSC Representative has given written approval to the specific deviation; nor shall the Engineer's review relieve the Contractor from responsibility for errors or omissions in the shop drawings or samples.

8. No portion of the work requiring a shop drawing or sample submission shall be commenced until the submission has been reviewed by the Engineer. All such portions of the work shall be in accordance with reviewed shop drawings and samples.

C. Samples: Submit full range of manufacturer's standard textures, colors, and patterns for the Hospital's selection. Submit samples as specified in the respective Specification sections and as noted above. Samples shall illustrate functional characteristics of the Product, with integral parts and attachment devices. Coordinate submittal of different categories for interfacing work. Include identification on each sample, giving full information.

1.05 BIDDER'S SPECIAL RESPONSIBILITY FOR COORDINATING CONTRACTURAL WORK AND SUBMITTALS:

A. The General Contractor shall be responsible for the coordination of all contractual work and submittals.

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

C. Contractor's Name

1. PROJECT:
2. PROJECT NO.:
3. 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.
4. DATE RECEIVED
5. SPECIFICATION SECTION #
6. SPECIFICATION PARAGRAPH #
7. DRAWING
8. SUBCONTRACTOR
9. SUPPLIER
10. MANUFACTURER
11. CERTIFIED BY:

D. 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, they 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.

E. All submittals for material and shop drawings listed in the contract documents, shall be required and shall be first reviewed and certified by the General Contractor, then reviewed and approved by the Engineer prior to any ordering of materials and equipment. Submittals that have not been reviewed by the General Contractor shall be returned for review.

1.06 MANUFACTURER'S CERTIFICATES

A. Submit certificates, warranties, operating and maintenance instructions in accordance with requirements of each specification section. Submit in triplicate.

1.07 MSDS

A. MSDS shall be submitted prior to the pre-construction meeting. The Contractor shall submit MSDS log and reference each MSDS to its specification Section number and product system.

PART 2 - PRODUCTS (NOT USED)

PART 3 - EXECUTION (NOT USED)

END OF SECTION

SECTION 01577 - POLLUTION CONTROL

PART 1 - GENERAL

1.01 SUMMARY

A. Includes site and environmental control requirements.

1.02 TRASH, REFUSE DISPOSAL

A. Burning of debris and/or waste materials on the project site is prohibited.

B. Do not bury debris and/or waste material on the project site, unless specifically allowed elsewhere in these specifications as backfill material.

C. Haul unusable debris and waste material to an appropriate off-site dump area. During loading operations, water down or provide other measures to prevent dust or other airborne contaminants.

D. Vacuum, wet mop, or damp sweep when cleaning rubbish and fines which can become airborne from floors or other paved areas. Do not dry sweep.

E. Use enclosed chutes and/or containers to conveying debris from above the ground floor level.

F. Clean-up shall include the collection of all waste paper and wrapping materials, cans, bottles, construction waste materials and other objectionable materials, and removal as required. Frequency of clean-up shall coincide with rubbish producing events. The Contractor shall be responsible for all clean-up cost.

1.03 DUST

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

B. Contractor is responsible for and shall determine the method of dust control. Subject to the Contractor’s choice, the use of water or “environmentally friendly chemicals” may be used over surfaces which create airborne dust.

C. Construct or erect dust control barriers as required to retain dust within the project site area.

D. Contractor is responsible for all damage claims resulting from failure to control airborne dust during all times that the site is under the Contractor's control.

1.04 NOISE

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

B. To reduce loud disruptive noise levels, ensure mufflers and other devises are provided on equipment, internal combustion engines and compressors. Maintain equipment to reduce noise to acceptable levels.

C. Starting-up of construction equipment meeting allowable noise limits shall not be done prior to 8:00 a.m. without prior approval of the HHSC Representative. Equipment exceeding allowable noise levels shall not be started-up prior to 8:00 a.m.

1.05 EROSION

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

B. Install temporary berms, cut-off ditches and other provisions as required construction methods and operations. Should there be a question if the temporary measures are insufficient to prevent erosion, the HHSC Representative shall make the final determination.

C. Construct and maintain drainage outlets and silting basins as required to minimize erosion and pollution of waterways during construction.

1.06 OTHERS

A. Wherever trucks and/or vehicles leave the site and enter surrounding paved streets, Contractor shall prevent any material from being carried onto the pavement. Waste water shall not be discharged into existing streams, waterways, or drainage systems such as gutters and catch basins unless treated to comply with the State Department of Health water pollution regulations. The Contractor shall construct a vehicle wash-down area, within the project site, to remove all mud, gravel, etc., before leaving the site.

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

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

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

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

F. If allowed in this Contract, spray painting shall be done by the “airless spray” process only. All other types of spray painting shall not be permitted.

1.07 SUSPENSION OF WORK

A. Violations of any of the above requirements or any other pollution control requirements which may be specified in the Specifications shall be cause for suspension of the work creating such violation.

B. Reference the General Conditions Construction, dated 3/17/06 for the suspension procedures.

C. The Engineer and/or HHSC Representative may also suspend any operations which creates a pollution problems even if the problem does not violate the provisions of this Section. In this instance, the work is considered a Change and subject to the provisions of the contract.

PART 2 - PRODUCTS (NOT USED)

PART 3 - EXECUTION (NOT USED)

END OF SECTION

SECTION 01715 - EXISTING CONDITIONS ASBESTOS_HAZARDOUS MATERIAL SURVEY

PART 1 - GENERAL

1.01 SUMMARY

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

B. Related Sections include the following:
   1. SECTION 13281 - REMOVAL AND DISPOSAL OF ASBESTOS CONTAINING MATERIALS for requirements of all work which disturbs ACM.
   2. SECTION 13283 - DISTURBANCE OF LEAD CONTAINING MATERIALS for all work which disturbs lead.
   3. SECTION 13288 - ASBESTOS TESTING AND MONITORING for asbestos air testing requirements.
   4. SECTION 13289 - LEAD TESTING AND MONITORING for lead air testing requirements.

1.02 ASBESTOS

A. The structure or structures to be renovated or modified under this contract were surveyed for the presence of asbestos containing building materials (ACBM), using AHERA requirements. A copy of the initial survey report, as well as any subsequent supplemental survey report(s) if performed, are included in this Section.
   1. A "User's Guide" for the asbestos survey report(s) is available for review from Contracting Officer. The "User's Guide" contains information on how to interpret the asbestos reports.
   2. The report(s) are included, even when no ACBM was found, for the Contractor's information. Review the attached report(s) for the basis on which the negative ACBM finding was made. Contractor may perform further surveys at its own expense, if ACBM not shown in the report(s) is suspected in the areas of the building(s) in which work will be performed. If ACBM is found, notify the Contracting Officer immediately. The State will reimburse the Contractor for the testing cost if ACBM is found.
   3. If there is ACBM outside of the areas in which work will be performed, this ACBM shall not be disturbed in any way.

B. If applicable, notify employees, subcontractors, and all other persons engaged on the project of the presence of asbestos in the existing buildings in accordance with the State of Hawaii: Occupational Safety and Health Administration and 29 CFR 1926.1101, Asbestos.

C. In the event that work is required in any building or buildings on the site other than the one(s) designated within this project scope, request copies of the asbestos survey report(s) for such building(s) from the Contracting Officer. Based on the information contained in the additional survey(s), notify affected personnel.

1.03 LEAD

A. Inform employees, Subcontractors and all other persons engaged in the project that lead containing paints (LCP) is present in the existing building(s) and at the job site. Conduct work in accordance with the requirements of Occupational Safety and Health Administration 29 CFR 1926.62, Lead.

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

PART 2 - PRODUCTS (NOT USED)

PART 3 - EXECUTION

3.01 SURVEY ATTACHED

A. Inspection Report for Asbestos and Lead-Based Paint, Maluhia Nursing Home, 25 pages, dated March 2020, prepared by EnviroQuest, Inc.

END OF SECTION

SECTION 07560 - HYDROSTOP® PREMIUMCOAT® SYSTEM OVER NON-METAL SUBSTRATE

PART 1 - GENERAL

1.01 SECTION INCLUDES

A. This specification is intended to outline the requirements for application of the HydroStop® PremiumCoat® System, in conjunction with the appropriate product technical data sheets, over approved roof substrates in acceptable condition. Specific addenda address each surface at the end of this guide specification.

1.02 REFERENCES

A. Factory Mutual (FM Global) - Approval Guide.
   1. Factory Mutual Standard 4470 - Approval Standard for Class 1 Roof Covers.

B. Underwriters Laboratories (UL) - Roofing Systems and Materials Guide (TGFU R1306).

C. ASTM International (ASTM) - Annual Book of ASTM Standards.
   1. ASTM D 1079 - Standard Terminology Relating to Roofing, Waterproofing, and Bituminous Materials.
   2. ASTM D 1653 - Standard Test Methods for Water Vapor Transmission of Organic Coating Films.
   3. ASTM D 4263 - Standard Test Method for Indicating Moisture in Concrete by the Plastic Sheet Method.
   4. ASTM D 4798 / D4798M - 1- Standard Practice for Accelerated Weathering Test Conditions and Procedures for Bituminous Materials (Xenon-Arc Method).
   5. ASTM D 6083 - Standard Specification for Liquid Applied Acrylic Coating Used in Roofing
   6. ASTM E 96 - Standard Test Methods for Water Vapor Transmission of Materials.
   7. ASTM E 108 - Standard Test Methods for Fire Tests of Roof Coverings.
   8. ASTM G 26 - Practice for Operating Light-Exposure Apparatus (Xenon-Arc Type) With and Without Water for Exposure of Nonmetallic Materials.
   9. ASTM G 53 - Practice for Operating Light- and Water-Exposure Apparatus (Fluorescent UV-Condensation Type) for Exposure of Nonmetallic Materials.

D. Sheet Metal and Air Conditioning Contractors National Association, 1nc. (SMACNA) - Architectural Sheet Metal Manual.

E. National Roofing Contractors Association (NRCA).

F. American Society of Civil Engineers (ASCE).
   1. ASCE 7 - Minimum Design Loads for Buildings and Other Structures.

1.03 DEFINITIONS

A. Roofing Terminology: Refer to ASTM D1079 and the glossary of the National Roofing Contractors Association (NRCA) Roofing and Waterproofing Manual for definitions of roofing terms related to this section.

1.04 SYSTEM DESCRIPTIONS

A. The HydroStop® PremiumCoat® System roofing work includes roofing, flashing and reinforcing of joints and junctions, and roof accessories integrally related to roof installation.

B. Final determination of the fitness of the system, or its components, for any given roof may not be made by any representative of GAF/HydroStop® other than a member of GAF’s Field Services Department.

C. Provide an installed roofing membrane and base flashing system that does not permit the passage of water, and will withstand the design pressures calculated in accordance with the current revision of ASCE 7.

D. GAF shall provide all primary roofing materials that are physically and chemically compatible when installed in accordance with manufacturers current application requirements.

1.05 SUBMITTALS

A. Submit under provisions of Section 01300.

B. Product Data:
   1. Provide product data sheets for each type of product indicated in this section.

C. Shop Drawings:
   1. Provide manufacturers standard details and approved shop drawings for the system specified.

1.06 QUALITY ASSURANCE

A. Manufacturer Qualifications: GAF shall provide a roofing system that meets or exceeds the criteria listed in this section.

B. Installer Minimum Qualifications:
   1. Installer shall be classified as a Premium Contractor as defined and certified by GAF.
   2. Installer shall be classified as a Master Select Contractor as defined and certified by GAF.
   3. Installer shall be classified as a Master Contractor as defined and certified by GAF.

C. Source Limitations: Components listed shall be provided by a single manufacturer or approved by the primary roofing manufacturer.

1.07 PRE-INSTALLATION CONFERENCE

A. Prior to scheduled commencement of the roofing installation and associated work, conduct a meeting at the project site with the installer, architect, owner, GAF representative and any other persons directly involved with the performance of the work. The installer shall record conference discussions to include decisions, agreements, and open issues and furnish copies of recorded discussions to each attending party. The primary purpose of the meeting is to review foreseeable methods and procedures related to roofing work.
   1. Tour representative areas of roofing substrates to inspect and discuss conditions of substrate, penetrations and other preparatory work to be performed.
   2. Review HydroStop® PremiumCoat® System requirements (HydroStop® PremiumCoat® System specifications, detail drawings and the Contract Documents).
   3. Review required submittals, both completed and in progress.
   4. Review and finalize the construction schedule related to roofing work, and verify availability of materials, installer's personnel, equipment and facilities needed to consistently make progress and avoid delays.
   5. Review required inspection(s), testing, and certifying, and material usage accounting procedures. Review forecasted weather conditions.
   6. Establish procedures for coping with unfavorable conditions, including the possibility of temporary roofing work.

1.08 REGULATORY REQUIREMENTS

A. Work shall be performed in a safe, professional manner, conforming to federal, state and local codes.

B. UL Listing: Provide HydroStop® PremiumCoat® Roofing System and component materials which have been evaluated by Underwriters Laboratories for flame-spread, and are listed in the "Underwriters Laboratory Roofing Materials and Systems Directory" for Class A construction over existing metal or other non-combustible roofing (Flame-spread shall pass ASTM E-108 and/or UL 790). Provide roof covering materials bearing UL approval marking on the container. This indicates that the material has been subjected to UL's examination, test procedures and follow-up inspection service.

1.09 DELIVERY, STORAGE, & HANDLING

A. Store and handle HydroStop® PremiumCoat® materials in a manner that will ensure there is no possibility of contamination.

B. Store in a dry, well ventilated, weather tight location at temperatures between 50°F (10°C) and 90°F (32°C) until the products are ready to be applied (keep from freezing). Do not stack material pallets more than two (2) high.

C. Do not subject existing roof to unnecessary loading of stockpiled materials.

D. Store and dispose of solvent-based materials, and materials used with solvent-based materials, in accordance with requirements of local authorities having jurisdiction.

1.10 PROJECT CONDITIONS

A. Weather:
   1. Proceed with roofing only when existing and forecasted weather conditions permit.
   2. Ambient temperatures shall be above 50°F (10°C) and rising when applying water based coatings.

B. Proceed with roofing work only when existing and forecasted weather conditions will permit work to be performed in accordance with HydroStop® PremiumCoat® recommendations and guarantee requirements as follows:
   1. Do not begin work if precipitation is expected within twenty-four hours of application, or if temperatures are expected to fall below 42°F (6°C) during the duration of the job.
      a. FlexSeal™ Sealant may be used in temperatures lower than 42°F (6°C).
   2. Upper temperature restriction (both air and substrate) for application of HydroStop® PremiumCoat® products is 110°F (43°C). If substrate temperatures exceed 110°F (43°C), HydroStop® PremiumCoat® products shall be applied during cooler periods of the day. If this is not practical, the substrate shall be cooled with water, and then HydroStop® PremiumCoat® products applied just after the water has flashed-off.
   3. No moisture may be present when applying HydroStop® PremiumCoat® products. Taking into consideration the UV curing properties of HydroStop® PremiumCoat® allow for sufficient daylight hours necessary for curing of materials.

1.11 WARRANTY

A. Liquid Applied Diamond Pledge™ NDL Roof Guarantee: Manufacturers standard form, without money limitation, in which GAF agrees to repair leaks through the United Coatings™ products on the roof caused by manufacturing defects, natural deterioration of, or workmanship in applying, the United Coatings™ roofing system.
   1. Warranty Duration:
      a. Ten (10) Years Labor and Material
      b. Fifteen (15) Years Labor and Material
      c. Twenty (20) Years Labor and Material

B. Liquid Applied Emerald Pledge™ Limited Warranty: Manufacturers standard form, in which United Coatings™ agrees to repair leaks through the United Coatings™ products on the roof caused by manufacturing defects or natural deterioration of the United Coatings™ roofing system.
   1. Warranty Duration:
      a. Ten (10) Years Labor and Material
      b. Fifteen (15) Years Labor and Material
      c. Twenty (20) Years Labor and Material

C. Limited Product Warranty: Manufacturers standard form, in which GAF agrees to replace or reimburse the owner the portion of the products that leaks in the event of a manufacturing defect.

PART 2 - PRODUCTS

2.01 MANUFACTURER

A. Acceptable Manufacturer: GAF, Commercial Roofing Products Division, which is located at: 1 Campus Drive; Parsippany, NJ 07054; Toll Free Tel: 800-ROOF-411; Tel: 973-628-3000; Fax: 973-628-3451; Email: technicalquestions@gaf.com; Web: www.gaf.com

B. Requests for substitutions will be considered in accordance with provisions of Section 01600.

2.02 COATINGS

A. HydroStop® PremiumCoat® Finish Coat: An acrylic, permanently flexible, highly UV-resistant, chemical-resistant elastomeric compound fully reinforced with a tough stitch-bonded polyester fabric designed for roofing and flashing applications of all types.
   1. Application Rate: 0.75 - 1.00 gal per 100 ft2 (3.05 - 4.07 L/10 m2) per coat.
   2. Application Method: Roof brush or 1” (25.4 mm) nap roller.
   3. Application Temperature (air, surface): 50°F (10°C) - 110°F (43°C).
   4. Dry time: (touch dry) 1 - 4 hours at 77°F (25°C), 40% relative humidity (full cure): 7 days.

B. HydroStop® PremiumCoat® Foundation Coat: An acrylic, permanently flexible, highly UV-resistant, chemical-resistant elastomeric compound fully reinforced with a tough stitch-bonded polyester fabric designed for roofing and flashing applications of all types.
   1. Application Rate: 1.00 - 1.50 gal per 100 ft2 (4.07 - 6.11 L/10 m2) per coat.
   2. Application Method: Roof brush.
   3. Application Temperature (air, surface): 50°F (10°C) - 110°F (43°C).
   4. Dry time: (touch dry) 1-4 hours at 77°F (25°C), 40% relative humidity (full cure): 7 days.

2.03 FLASHINGS, FABRIC, AND BULKING AGENTS

A. HydroStop® PremiumCoat® Butter Grade Flashing: A high volume solids for low shrinkage providing increased tensile strength and elongation on problem roof areas. It is ideally suited for sealing mechanical fasteners and horizontal seams on metal roofs, as well as around flashings, drains and protrusions.
   1. Application Rate: Application Rate: 2.0 gal per 200 linear feet with a 6 inch width (7.6 L per 61 linear meters with a 152 mm width); 2 coats typically required.
   2. Application Method: Putty knife, spatula and stiff bristle brush.
   3. Application Temperature (ambient): minimum 50°F (10°C).
   4. Dry Time: 1-4 hours depending on application thickness
   5. Clean-up: Water before curing.

B. HydroStop® Hydrofiber Bulking Agent: This product is comprised of glass fibers that, when mixed with one of the above listed products, will create a thick, workable compound used to fill voids, level surfaces, and create cants. Also used for flashing details, metal roof seams, inside and outside flashing details, round stacks, pipe legs, pitch pockets, conduit pipes, expansion joints, etc.
   1. Application Rate: 0.50 gal per 100 ft2 (2.03 L/10 m2) per 1 gal of HydroStop® PremiumCoat® Foundation or Finish Coat.
   2. Application Method: Brush.
   3. Application Temperature (air, surface): 50°F (10°C) - 110°F (43°C).
   4. Dry Time: Minimum 24 hours.
   5. Clean up: Water.

C. HydroStop® PremiumCoat® Fabric: tough, non-woven, stitch-bonded, heat-set polyester designed for roofing and flashing applications of all types. Available in 300ft rolls and varying widths.
   1. Length: 300ft (91.5 m); Width: 4” (102 mm), 6” (152 mm), 8” (203 mm), 12” (305 mm), 16” (406 mm), 20” (508 mm), 24” (610 mm).
   2. Length: 336ft. (102 m), Width: 40” (1016 mm).

D. United Coatings™ UniTape Seam Tape: A polymer-backed woven polyester reinforcing fabric designed for application to a wide range of substrates where additional strength is required over seams, splits, transitions, protrusions, etc.
   1. Temperature Limits for Service -30°F - 180°F (-35°C - 82°C).
   2. Bond Time: Initial bond is immediate; full bond requires approximately 24 hours.

2.04 PRIMERS AND SEALANTS

A. HydroStop® Barrierguard® Waterproofing: Designed for waterproofing several types of surfaces such as masonry, foundation walls, concrete panels, exterior basement walls,

retaining walls, and moisture-retaining structures such as cisterns and concrete shrubbery boxes.

1. Application Rate: 0.50 - 0.83 gal per 100 ft2 (2.04 - 3.38 L/10 m2).
2. Application Method: Brush, roller or trowel.
3. Application Temperature (air, surface): 50°F (10°C) - 110°F (43°C).
4. Dry Time: 3 days at 75 °F (24 °C), 50% relative humidity.

B. Adhere-it® II: Is specifically developed for dramatically increasing the bond to new or weathered black EPDM surfaces. It is a low viscosity, pinkish liquid that chemically alters the black EPDM surface to which it is applied, creating a “lock and key” effect with the subsequent topcoat.

1. Application Rate: 0.20 gal per 100 ft2 (0.81 L/10 m2).
2. Application Method: pump-up sprayer.
3. Application Temperature (air, surface): 50°F (10°C) - 110°F (43°C)
4. Dry Time: 20 minutes. Should be power-washed after a minimum of 20 minutes and maximum of 2 hours.

C. Epoxy Primer: A clear, single-component epoxy primer/sealer incorporating state of the art water-based technology to produce an extremely versatile product that penetrates and seals porous substrates. It is effective at increasing the bond of acrylic, polyurethane, butyl and epoxy topcoats to a variety of surfaces. It will also help to “solidify” chalky surfaces. It is safe to use, has very little odor, and is easy to clean up.

1. Application Rate: 0.25 - 1.0 gal per 100 ft2 (1.01- 4.07 L/10 m2) depending on substrate, surface and porosity.
2. Application Method: Brush, roller or sprayer.
3. Application Temperature (air, surface): 50°F (10°C) - 110°F (43°C).
4. Dry Time: 75°F (24°C): 30 minutes

D. Clean Act Primer is specifically developed for dramatically increasing the bond to new or weathered black EPDM surfaces. It is a low viscosity, pinkish liquid that chemically alters the black EPDM surface to which it is applied, creating a “lock and key” effect with the subsequent topcoat.

1. Application Rate: 0.20 gal per 100 ft2 (0.81 L/ 10 m2)
2. Application Method: pump-up sprayer.
3. Application Temperature (air, surface): 50°F (10°C) - 110°F (43°C)
4. Dry Time: 20 minutes. Should be power-washed after a minimum of 20 minutes and maximum of 2 hours.

E. UniBase Primer: A low viscosity, highly penetrating, advanced acrylic polymer adhesive and primer designed to act as a bonding primer to enhance the adhesion over built-up, granulated cap sheets, modified bitumen roofing, concrete or previously coated surfaces, also acting as an excellent asphalt bleed blocker.

1. Application Rate: 0.50 - 1.0 gal per 100 ft2 (2.03 - 4.08 L/10 m2) per gallon on properly prepared surfaces.
2. Application Method: Brush, roller or sprayer.
3. Application Temperature (air, surface): 50°F (10°C) - 110°F (43°C)
4. Dry Time: 1 - 2 hours at 70°F (21°C), 50% relative humidity.

F. FlexSeal™ Sealant: White, solvent-based synthetic elastomeric compound designed to line and waterproof interior and exterior gutters typically found in metal buildings. FlexSeal™ Sealant is capable of withstanding ponding water. This product is easiest to apply at temperatures over 42°F.

1. Application Rate: 2.0 gal per 200 linear feet with a 6 inch width (7.6 L per 61 linear meters with a 152 mm width); 2 coats typically required.
2. Application Method: Roller or airless sprayer.
3. Application Temperature (air, surface): 20°F (-6.6°C) - 120°F (49°C).
4. Dry Time: 75°F (24°C), 50% relative humidity: Approximately 24 hours.

G. TPO Red Primer: A VOC-compliant solvent-based thermoplastic liquid designed to be applied over new or aged TPO where adhesion of water-based coatings is desired.
   1. Application Rate: 0.25 - 0.50 gal per 100 ft2 (2.03 L/10 m2) per gallon on properly prepared surfaces.
   2. Application Method: Brush, roller or sprayer.
   3. Application Temperature (air, surface): 50°F (10°C) - 110°F (43°C).
   4. Dry Time: 75°F (21.1°C), 50% relative humidity: Approximately 15 minutes.

2.05 EQUIPMENT

A. Airless Sprayer and Accessories: As recommended by GAF's Technical Services.

PART 3 - EXECUTION

3.01 SUBSTRATE CONDITIONS

A. Installer shall verify adhesion. Questionable substrates shall be directed to GAF's Field Services Department for resolution.

B. Follow GAF's Substrate Preparation Guidelines at gaf.com.

3.02 SYSTEM APPLICATION

A. Refer to individual addenda at the end of this guide specification for preparation and application requirements for specific substrates.
   1. Addendum 1 - Resurfacing PVC & Hypalon Substrates
   2. Addendum 2 - Resurfacing Asphaltic Substrates
   3. Addendum 3 - Resurfacing TPO Substrate
   4. Addendum 4 - Resurfacing EPDM Substrate
   5. Addendum 5 - Resurfacing Structural Concrete
   6. Addendum 6 - Corrugated Structural Transite Panel Substrates
   7. Addendum 7 - Resurfacing Polyisocyanurate (ISO) Substrate
   8. Addendum 8 - Resurfacing Gypsum (DensDeck® Prime or Unprime & SecuRock) Roof Board Substrate
   9. Addendum 9 - Resurfacing For a Warranty Extension/Renewal
   10. Addendum 10 - Resurfacing Non-Metal Substrates with HydroStop® and Kymax

3.03 INSPECTION INFORMATION

A. Inspect Preliminary Work / Flashing Details for problem areas (e.g., gaps, cracks, fishmouths, air pockets, etc.) to ensure that work is complete and satisfactory.

B. Inform Project Architect and GAF's Field Services Department when all preliminary work and flashing details will be complete and the Installer is ready to proceed with application of United Coatings™ Roofing Membrane. Allow a minimum of two (2) weeks for the interim inspection to be made by the GAF's Field Services Department.

C. Any final roofing installation prior to this interim inspection is subject to rejection by the Project Architect and/or the GAF's Field Services Department. Please be advised that Technical On-Site Support for instructing Certified Contractors in the proper application of the United Coatings™ Roofing System is available. The first day of instruction is at no-charge to the Certified Contractor. Any additional days or return trips for instruction will be at a cost of $600.00 per day, plus all incurred travel expenses. The two (2) required inspections (interim and final) for the Liquid Applied Roofing System Guarantees are free of charge. Additional inspections will be billed at a rate of $600.00 per day plus all incurred travel costs.

3.04 OTHER ITEMS

A. Installer shall take photographs of representative roof areas, including detail work, before work commences, after the surface has been properly prepared, after all flashing and detail work has been performed, and after the spray application of the HydroStop® PremiumCoat® membrane.

B. Installer shall provide the following support for on-site inspections by a representative from GAF's Field Services Department (list is not comprehensive):
   1. Representative from the installer's company who has authority to make binding decisions

2. Required means to access all areas of the treated roof.
3. Previous photographs of the roof, including test patch results, as applicable
4. HydroStop® PremiumCoat® products and application equipment required to repair roof areas where destructive tests are to be performed by GAF's Field Services Department.

C. Special care shall be taken to avoid shading when spraying dark HydroStop® PremiumCoat® Roofing Membrane colors. When applying HydroStop® PremiumCoat® Foundation Coat, Installer shall always spray wet material onto wet material to ensure that spray lines do not appear. HydroStop® strongly recommends the installation of any dark-colored finish coat by spraying two lighter coats (instead of one heavy coat) using a smaller tip size. Installer should also use the roof ribs or standing seams to terminate each spray pass.

D. Installer shall take special care when moving spray hoses and other equipment on the roof so that flashing work and encapsulated fastener heads are not damaged. Also, all spray equipment shall remain on the ground for the duration of the job.

E. If there will be an extended period of time (6 months or greater) between application of base and finish coats, the base coat shall be thoroughly cleaned before applying the finish coat.

F. It is strongly recommended that walkways designed for metal roofing systems be installed in all high traffic areas. Contact the GAF's Technical Services Department for recommendations.

3.05 REPAIRS

A. In the event that the HydroStop® PremiumCoat® membrane is damaged or punctured, repairs are to be performed using HydroStop® PremiumCoat® Finish Coat or HydroStop® PremiumCoat® Butter Grade and HydroStop® PremiumCoat® Fabric (where necessary) as follows:
   1. Damaged areas are to be cut, cleaned and dried.
   2. Apply HydroStop® PremiumCoat® Butter Grade Flashing or HydroStop® PremiumCoat® Finish Coat with HydroStop® Hydrofiber Bulking Agent, and feather out onto the existing HydroStop® PremiumCoat® membrane.
   3. If a new penetration area has been cut, embed HydroStop® PremiumCoat® Fabric into the HydroStop® PremiumCoat® Butter Grade Flashing or HydroStop® PremiumCoat® Finish Coat with HydroStop® Hydrofiber Bulking Agent according to standard HydroStop® PremiumCoat® specifications.
   4. Once the HydroStop® PremiumCoat® Butter Grade Flashing has cured, HydroStop® PremiumCoat® Finish Coat may be applied for aesthetic uniformity.

PART 4 - ADDENDUMS

4.01 ADDENDUM 1 - RESURFACING PVC & HYPALON SUBSTATES

A. Preparation of Substrate
   1. Moisture Survey: A moisture survey shall be performed on the roof system to determine the suitability of the existing roof for application of the HydroStop® PremiumCoat® System. Any wet or deteriorated areas shall be removed and replaced.
   2. Preparation of the roof substrate is the responsibility of the installer who shall address and correct all of the conditions listed in this section. Do not proceed with the installation of the HydroStop® PremiumCoat® System until unsatisfactory conditions have been corrected in a manner acceptable to the manufacturer (GAF).
   3. Treatment of damaged/deteriorated membrane: Any areas where the membrane has torn, cracked and/or buckled must be repaired using similar or compatible products manufactured by GAF. Any wet insulation must be replaced as part of the roofing repair. Allow 24 hours drying time before application of other HydroStop® PremiumCoat® products.
   4. Treatment of ponding water areas: Installer shall make every effort to mechanically eliminate all ponding water areas on the roof prior to application of HydroStop® PremiumCoat® products. Ponding water is defined as water that does not properly drain and remains on the roof for more than 48 hours after precipitations stops.

5. Deteriorated Seams: Repair all delaminated or open seams using method acceptable to the manufacturer.
6. Pitch Pans: Pitch Pans shall be capped with sheet metal so they may be sealed with HydroStop® PremiumCoat® products.
7. Condensate Lines: Condensate lines shall be installed from HVAC units to gutters as part of the overall drainage system. The type of piping used for condensate lines may vary depending on local building codes.
8. Membrane Cleaning: Roof substrate must be carefully pressure washed with water. Use an approximate working pressure of 2,000 psi (depending on condition of roof) to remove all dirt, dust, chalking, loose materials, etc. Take care not to damage the roof surface or force water into the roof system. Use hot water and mild detergent to remove grease and/or oils from the roof substrate. If mildew or algae are present, use bleach to treat these areas, then pressure wash surface.

B. FLASHING APPLICATION
1. Preliminary work consists of substrate preparation and all flashing details. After completion of substrate preparation, all flashing details, penetrations and curbs shall be flashed with either 6 inches (152 mm) or 12 inches (305 mm) HydroStop® PremiumCoat® Fabric and HydroStop® PremiumCoat® Butter Grade Flashing in accordance with HydroStop® PremiumCoat® Detail Drawings. HydroStop® PremiumCoat® Butter Grade Flashing shall be feathered at the edges (see current HydroStop® PremiumCoat® Detail Drawings) so that water may flow over the various flashing details.
2. Parapet Walls: All parapet wall details within the roof system shall be secured and sealed with a 12 inches (305 mm) minimum width of HydroStop® PremiumCoat® Fabric and HydroStop® PremiumCoat® Butter Grade Flashing.
3. Curb Flashings: All curb flashings, including cricket details, shall be flashed with at least a 12 inches (305 mm) width of HydroStop® PremiumCoat® Fabric and HydroStop® PremiumCoat® Butter Grade Flashing. Encapsulate all fasteners using HydroStop® PremiumCoat® Butter Grade Flashing. Do not bridge fasteners. HydroStop® PremiumCoat® Fabric shall be cut around all fasteners so fabric lies flat.
4. Penetrations: HydroStop® PremiumCoat® Butter Grade Flashing shall be applied around the base of the penetration extending at least 6 inches (152 mm) onto the vertical and 6 inches (152 mm) onto the base. Embed a 12 inches (305 mm) width of HydroStop® PremiumCoat® Fabric using additional HydroStop® PremiumCoat® Butter Grade Flashing as necessary. Cut the HydroStop® PremiumCoat® fabric to accommodate the shape of the penetration. Both the top and bottom of neoprene pipe boots shall be flashed using HydroStop® PremiumCoat® Butter Grade and HydroStop® PremiumCoat® Fabric as describes above.
5. Skylights: Curb skylights shall be treated in the same fashion as curb flashings. After flashing work has been completed and the coating has cured, treat deteriorated fiberglass skylight panels with United Coatings™ Acrysheen Sealer.
6. Gutters: Trowel or brush apply FlexSeal™ Sealant to the interior or exterior gutter incorporating 12 inches (305 mm) HydroStop® PremiumCoat® fabric at all gutter seams. Gutter shall be completely clean and dry before applying FlexSeal™ Sealant
7. Ponding Water Areas: The severity of the ponding water condition will determine the requirements for additional preparation. Contact the GAF's Technical Service Department for information.
8. Inspect Preliminary Work/Flashing Details for problem areas (e.g., gaps, cracks, fishmouths, air pockets, etc.) to ensure that work is complete and satisfactory.

C. FIELD OF ROOF APPLICATION RATES
1. Resurfacing PVC & Hypalon® Substrates 10 year System:
    a. Before applying the HydroStop® PremiumCoat® System, an adhesion test is required to ensure an adhesion minimum of 2.0 PLI. Test patches to be applied with the rates listed below.
    b. Conduct moisture survey and remove/replace all wet areas.

c. Repair membrane including seams, penetrations, flashings, curbs, and terminations with like materials.
d. Power wash roof to ensure it is free of dirt, debris, oil and other contaminants that could negatively affect adhesion. United Cleaning Concentrate is recommended to clean the roof. Allow the roof to completely dry.
e. All loose seams are to be 3-coursed with HydroStop® PremiumCoat® Butter Grade at a rate of 2.0 gal per 100 ft2 (8.15 L/10 m2), embed fabric, and apply HydroStop® PremiumCoat® Butter Grade at a rate of 2.0 gal per 100 ft2 (8.15 L/10 m2).
f. Treat all penetrations, drains, curbs, and scuppers.
g. Apply HydroStop® PremiumCoat® Foundation Coat at a rate of 1.5 gal per 100 ft2 embed fabric and apply HydroStop® PremiumCoat® Foundation Coat at a rate of 1.0 gal per 100 ft2. Allow at least 24 hours drying time, and then inspect for defects, flaws or areas of insufficient coverage. Correct any unsatisfactory conditions.
h. Apply HydroStop® PremiumCoat® Finish Coat at the rate of 0.75 gal per 100 ft2. Allow at least 24 hours drying time, and then inspect for defects, flaws or areas of insufficient coverage. Correct any unsatisfactory condition.
i. Apply HydroStop® PremiumCoat® Finish Coat at the rate of 0.75 gal per 100 ft2. Allow at least 24 hours drying time, and then inspect for defects, flaws or areas of insufficient coverage. Correct any unsatisfactory condition.
j. After a minimum of 24 hours has elapsed, inspect the final roof surface for flaws, areas of insufficient coverage, insufficient thickness, etc. The HydroStop® PremiumCoat® System dry film thickness is approximately 40 mils in the field of the roof. All unsatisfactory areas must be repaired.

2. Resurfacing PVC & Hypalon® Substrates 15 year System:
a. Before applying the HydroStop® PremiumCoat® System, an adhesion test is required to ensure an adhesion minimum of 2.0 PLI. Test patches to be applied with the rates listed below.
b. Conduct moisture survey and remove/replace all wet areas.
c. Repair membrane including seams, penetrations, flashings, curbs, and terminations with like materials.
d. Power wash roof to ensure it is free of dirt, debris, oil and other contaminants that could negatively affect adhesion. United Cleaning Concentrate is recommended to clean the roof. Allow the roof to completely dry.
e. All loose seams are to be 3-coursed with HydroStop® PremiumCoat® Butter Grade at a rate of 2.0 gal per 100 ft2 (8.15 L/10 m2), embed fabric, and apply HydroStop® PremiumCoat® Butter Grade at a rate of 2.0 gal per 100 ft2 (8.15 L/10 m2).
f. Treat all penetrations, drains, curbs, and scuppers.
g. Apply HydroStop® PremiumCoat® Foundation Coat at a rate of 1.5 gal per 100 ft2 embed fabric and apply HydroStop® PremiumCoat® Foundation Coat at the rate of 1.0 gal per 100 ft2. Allow at least 24 hours drying time, and then inspect for defects, flaws or areas of insufficient coverage. Correct any unsatisfactory conditions.
h. Apply HydroStop® PremiumCoat® Finish Coat at the rate of 1.0 gal per 100 ft2. Allow at least 24 hours drying time, and then inspect for defects, flaws or areas of insufficient coverage. Correct any unsatisfactory condition.
i. Apply HydroStop® PremiumCoat® Finish Coat at the rate of 1.0 gal per 100 ft2. Allow at least 24 hours drying time, and then inspect for defects, flaws or areas of insufficient coverage. Correct any unsatisfactory condition.
j. After a minimum of 24 hours has elapsed, inspect the final roof surface for flaws, areas of insufficient coverage, insufficient thickness, etc. The HydroStop® PremiumCoat® dry film thickness is approximately 44 mils in the field of the roof. All unsatisfactory areas must be repaired.

3. Resurfacing PVC & Hypalon® Substrates 20 year System:
a. Before applying the HydroStop® PremiumCoat® System, an adhesion test is required to ensure an adhesion minimum of 2.0 PLI. Test patches to be applied with the rates listed below.

b. Conduct moisture survey and remove/replace all wet areas.
c. Repair membrane including seams, penetrations, flashings, curbs, and terminations with like materials.
d. Power wash roof to ensure it is free of dirt, debris, oil and other contaminants that could negatively affect adhesion. United Cleaning Concentrate is recommended to clean the roof. Allow the roof to completely dry.
e. All loose seams are to be 3-coursed with HydroStop® PremiumCoat® Butter Grade at a rate of 2.0 gal per 100 ft2 (8.15 L/10 m2), embed fabric, and apply HydroStop® PremiumCoat® Butter Grade at a rate of 2.0 gal per 100 ft2 (8.15 L/10 m2).
f. Treat all penetrations, drains, curbs, and scuppers.
g. Apply HydroStop® PremiumCoat® Foundation Coat at a rate of 1.5 gal per 100 ft2 embed fabric and apply HydroStop® PremiumCoat® Foundation Coat at the rate of 1.0 gal per 100 ft2. Allow at least 24 hours drying time, and then inspect for defects, flaws or areas of insufficient coverage. Correct any unsatisfactory conditions.
h. Apply HydroStop® PremiumCoat® Finish Coat at the rate of 1.0 gal per 100 ft2. Allow at least 24 hours drying time, and then inspect for defects, flaws or areas of insufficient coverage. Correct any unsatisfactory condition.
i. Apply HydroStop® PremiumCoat® Finish Coat at the rate of 1.0 gal per 100 ft2. Allow at least 24 hours drying time, and then inspect for defects, flaws or areas of insufficient coverage. Correct any unsatisfactory condition.
j. Apply HydroStop® PremiumCoat® Finish Coat at the rate of 1.0 gal per 100 ft2. Allow at least 24 hours drying time, and then inspect for defects, flaws or areas of insufficient coverage. Correct any unsatisfactory condition.
k. After a minimum of 24 hours has elapsed, inspect the final roof surface for flaws, areas of insufficient coverage, insufficient thickness, etc. The HydroStop® PremiumCoat® dry film thickness is approximately 52 mils in the field of the roof. All unsatisfactory areas must be repaired.

4.02 ADDENDUM 2 - RESURFACING ASPHALTIC SUBSTRATES

A. PREPERATION OF SUBSTRATE

1. Moisture Survey: A moisture survey shall be performed on the roof system to determine the suitability of the existing roof for application of the HydroStop® PremiumCoat® System. Any wet or deteriorated areas shall be removed and replaced.
2. Preparation of the roof substrate is the responsibility of the installer who shall address and correct all of the conditions listed in this section. Do not proceed with the installation of the HydroStop® PremiumCoat® System until unsatisfactory conditions have been corrected in a manner acceptable to the manufacturer (GAF).
3. Treatment of damaged/deteriorated membrane: Any areas where the membrane has torn, cracked and/or buckled must be repaired using similar or compatible products manufactured by GAF. Any wet insulation must be replaced as part of the roofing repair. Allow 24 hours drying time before application of other HydroStop® PremiumCoat® products.
4. Treatment of ponding water areas: Installer shall make every effort to mechanically eliminate all ponding water areas on the roof prior to application of HydroStop® PremiumCoat® products. Ponding water is defined as water that does not properly drain and remains on the roof for more than 48 hours after precipitations stops.
5. Deteriorated Seams: Repair all delaminated or open seams using method acceptable to the manufacturer.
6. Pitch Pans: Pitch Pans shall be capped with sheet metal so they may be sealed with HydroStop® PremiumCoat® products.
7. Condensate Lines: Condensate lines shall be installed from HVAC units to gutters as part of the overall drainage system. The type of piping used for condensate lines may vary depending on local building codes.
8. Membrane Cleaning: If it is a new asphaltic substrate (less than 5 years) the surface may be cleaned using pressured air and dry broom. NOTE: If there is excessive dirt

accumulation on new asphaltic membranes that cannot be removed by the dry cleaning method, it must be power-washed and cleaned with UCC (United Cleaning Concentrate). For aged substrates (5 or more years) the roof substrate must be carefully pressure washed with water. Use an approximate working pressure of 2,000 psi (depending on condition of roof) to remove all dirt, dust, chalking, loose materials, etc. Take care not to damage the roof surface or force water into the roof system. Use hot water and mild detergent to remove grease and/or oils from the roof substrate. If mildew or algae are present, use bleach to treat these areas, then pressure wash surface.

9. Application of primer: Smooth and granular-surfaced BUR and APP substrates must be primed using Unibase primer at the rate of 0.5 - 1.0 gal per 100 ft2 (2.04 - 4.07 L/10 m2).

B. FLASHING APPLICATION

1. Preliminary work consists of substrate preparation and all flashing details. After completion of substrate preparation, all flashing details, penetrations and curbs shall be flashed with either 6 inches (152 mm) or 12 inches (305 mm) HydroStop® PremiumCoat® Fabric and HydroStop® PremiumCoat® Butter Grade Flashing in accordance with HydroStop® PremiumCoat® Detail Drawings. HydroStop® PremiumCoat® Butter Grade Flashing shall be feathered at the edges (see current HydroStop® PremiumCoat® Detail Drawings) so that water may flow over the various flashing details.
2. Parapet Walls: All parapet wall details within the roof system shall be secured and sealed with a 12 inches (305 mm) minimum width of HydroStop® PremiumCoat® Fabric and HydroStop® PremiumCoat® Butter Grade Flashing. All voids and open areas shall be filled with polyurethane foam prior to application of HydroStop® PremiumCoat® Fabric and HydroStop® PremiumCoat® Butter Grade Flashing.
3. Curb Flashings: All curb flashings, including cricket details, shall be flashed with at least a 12 inches (305 mm) width of HydroStop® PremiumCoat® Fabric and HydroStop® PremiumCoat® Butter Grade Flashing. Encapsulate all fasteners using HydroStop® PremiumCoat® Butter Grade Flashing. Do not bridge fasteners. HydroStop® PremiumCoat® Fabric shall be cut around all fasteners so fabric lies flat.
4. Penetrations: HydroStop® PremiumCoat® Butter Grade Flashing shall be applied around the base of the penetration extending at least 6 inches (152 mm) onto the vertical and 6 inches (152 mm) onto the base. Embed a 12 inches (305 mm) width of HydroStop® PremiumCoat® Fabric using additional HydroStop® PremiumCoat® Butter Grade Flashing as necessary. Cut the HydroStop® PremiumCoat® fabric to accommodate the shape of the penetration. Both the top and bottom of neoprene pipe boots shall be flashed using HydroStop® PremiumCoat® Butter Grade and HydroStop® PremiumCoat® Fabric as describes above.
5. Skylights: Curb skylights shall be treated in the same fashion as curb flashings. After flashing work has been completed and the coating has cured, treat deteriorated fiberglass skylight panels with United Coatings™ Acrysheen Sealer.
6. Gutters: Trowel or brush apply FlexSeal™ Sealant to the interior or exterior gutter incorporating 12 inches (305 mm) HydroStop® PremiumCoat® fabric at all gutter seams. Gutter shall be completely clean and dry before applying FlexSeal™ Sealant
7. Ponding Water Areas: The severity of the ponding water condition will determine the requirements for additional preparation. Contact the GAF's Technical Service Department for information.
8. Inspect Preliminary Work/Flashing Details for problem areas (e.g., gaps, cracks, fishmouths, air pockets, etc.) to ensure that work is complete and satisfactory.

C. FIELD OF ROOF APPLICATION AND RATES

1. Resurfacing Asphaltic Substrates 10 year System:
    a. Before applying the HydroStop® PremiumCoat® System, an adhesion test is required to ensure an adhesion minimum of 2.0 PLI. Test patches to be applied with the rates listed below.
    b. Conduct moisture survey and remove/replace all wet areas.
    c. Repair membrane including seams, penetrations, flashings, curbs, and terminations with like materials.

d. If it is a new asphaltic substrate (less than 5 years), the surface may be cleaned using pressured air and dry brooms. NOTE: If there is excessive dirt accumulation on new asphaltic membranes that cannot be removed by the dry cleaning method, it must be power-washed and cleaned with UCC (United Cleaning Concentrate). For aged substrates (5 or more years) the roof substrate must be power washed to ensure it is free of dirt, debris, oil and other contaminants that could negatively affect adhesion. United Cleaning Concentrate is recommended to clean the roof. Allow the roof to completely dry.
e. All loose seams are to be 3-coursed with HydroStop® PremiumCoat® Butter Grade at a rate of 2.0 gal per 100 ft2 (8.15 L/10 m2), embed fabric, and apply HydroStop® PremiumCoat® Butter Grade at a rate of 2.0 gal per 100 ft2 (8.15 L/10 m2).
f. Smooth and granular-surfaced BUR and APP substrates must be primed using Unibase primer at the rate of 0.5 - 1.0 gal per 100 ft2 (2.04 - 4.07 L/10 m2).
g. Treat all penetrations, drains, curbs, and scuppers.
h. Apply HydroStop® PremiumCoat® Foundation Coat at a rate of 1.5 gal per 100 ft2 (6.11 L/10 m2) embed fabric and apply HydroStop® PremiumCoat® Foundation Coat at the rate of 1.0 gal per 100 ft2 (4.07 L/10 m2). Allow at least 24 hours drying time, and then inspect for defects, flaws or areas of insufficient coverage. Correct any unsatisfactory conditions.
i. Apply HydroStop® PremiumCoat® Finish Coat at the rate of 0.75 gal per 100 ft2 (3.06 L/10 m2). Allow at least 24 hours drying time, and then inspect for defects, flaws or areas of insufficient coverage. Correct any unsatisfactory condition.
j. Apply HydroStop® PremiumCoat® Finish Coat at the rate of 0.75 gal per 100 ft2 (3.06 L/10 m2). Allow at least 24 hours drying time, and then inspect for defects, flaws or areas of insufficient coverage. Correct any unsatisfactory condition.
k. After a minimum of 24 hours has elapsed, inspect the final roof surface for flaws, areas of insufficient coverage, insufficient thickness, etc. The HydroStop® PremiumCoat® dry film thickness is approximately 40 mils in the field of the roof. All unsatisfactory areas must be repaired.

2. Resurfacing Asphaltic Substrates 15 year System:
a. Before applying the HydroStop® PremiumCoat® System, an adhesion test is required to ensure an adhesion minimum of 2.0 PLI. Test patches to be applied with the rates listed below.
b. Conduct moisture survey and remove/replace all wet areas.
c. Repair membrane including seams, penetrations, flashings, curbs, and terminations with like materials.
d. If it is a new asphaltic substrate (less than 5 years), the surface may be cleaned using pressured air and dry brooms. NOTE: If there is excessive dirt accumulation on new asphaltic membranes that cannot be removed by the dry cleaning method, it must be power-washed and cleaned with UCC (United Cleaning Concentrate). For aged substrates (5 or more years) the roof substrate must be power washed to ensure it is free of dirt, debris, oil and other contaminants that could negatively affect adhesion. United Cleaning Concentrate is recommended to clean the roof. Allow the roof to completely dry.
e. All loose seams are to be 3-coursed with HydroStop® PremiumCoat® Butter Grade at a rate of 2.0 gal per 100 ft2 (8.15 L/10 m2), embed fabric, and apply HydroStop® PremiumCoat® Butter Grade at a rate of 2.0 gal per 100 ft2 (8.15 L/10 m2).
f. Smooth and granular-surfaced BUR and APP substrates must be primed using Unibase primer at the rate of 0.5 - 1.0 gal per 100 ft2 (2.04 - 4.07 L/10 m2).
g. Treat all penetrations, drains, curbs, and scuppers.
h. Apply HydroStop® PremiumCoat® Foundation Coat at a rate of 1.5 gal per 100 ft2 (6.11 L/10 m2) embed fabric and apply HydroStop® PremiumCoat® Foundation Coat at the rate of 1.0 gal per 100 ft2 (4.07 L/10 m2). Allow at least 24 hours drying time, and then inspect for defects, flaws or areas of insufficient coverage. Correct any unsatisfactory conditions.

i. Apply HydroStop® PremiumCoat® Finish Coat at the rate of 1.0 gal per 100 ft2 (4.07 L/10 m2). Allow at least 24 hours drying time, and then inspect for defects, flaws or areas of insufficient coverage. Correct any unsatisfactory condition.
j. Apply HydroStop® PremiumCoat® Finish Coat at the rate of 1.0 gal per 100 ft2 (4.07 L/10 m2). Allow at least 24 hours drying time, and then inspect for defects, flaws or areas of insufficient coverage. Correct any unsatisfactory condition.
k. After a minimum of 24 hours has elapsed, inspect the final roof surface for flaws, areas of insufficient coverage, insufficient thickness, etc. The HydroStop® PremiumCoat® dry film thickness is approximately 44 mils in the field of the roof. All unsatisfactory areas must be repaired.

3. Resurfacing Asphaltic Substrates 20 year System:
   a. Before applying the HydroStop® PremiumCoat® System, an adhesion test is required to ensure an adhesion minimum of 2.0 PLI. Test patches to be applied with the rates listed below.
   b. Conduct moisture survey and remove/replace all wet areas.
   c. Repair membrane including seams, penetrations, flashings, curbs, and terminations with like materials.
   d. If it is a new asphaltic substrate (less than 5 years), the surface may be cleaned using pressured air and dry brooms. NOTE: If there is excessive dirt accumulation on new asphaltic membranes that cannot be removed by the dry cleaning method, it must be power-washed and cleaned with UCC (United Cleaning Concentrate). For aged substrates (5 or more years) the roof substrate must be power washed to ensure it is free of dirt, debris, oil and other contaminants that could negatively affect adhesion. United Cleaning Concentrate is recommended to clean the roof. Allow the roof to completely dry.
   e. All loose seams are to be 3-coursed with HydroStop® PremiumCoat® Butter Grade at a rate of 2.0 gal per 100 ft2 (8.15 L/10 m2), embed fabric, and apply HydroStop® PremiumCoat® Butter Grade at a rate of 2.0 gal per 100 ft2 (8.15 L/10 m2).
   f. Smooth and granular-surfaced BUR and APP substrates must be primed using Unibase primer at the rate of 0.5 - 1.0 gal per 100 ft2 (2.04 - 4.07 L/10 m2).
   g. Treat all penetrations, drains, curbs, and scuppers.
   h. Treat all seams.
   i. Apply HydroStop® PremiumCoat® Foundation Coat at a rate of 1.5 gal per 100 ft2 (6.11 L/10 m2) embed fabric and apply HydroStop® PremiumCoat® Foundation Coat at the rate of 1.0 gal per 100 ft2 (4.07 L/10 m2). Allow at least 24 hours drying time, and then inspect for defects, flaws or areas of insufficient coverage. Correct any unsatisfactory conditions.
   j. Apply HydroStop® PremiumCoat® Finish Coat at the rate of 1.0 gal per 100 ft2 (4.07 L/10 m2). Allow at least 24 hours drying time, and then inspect for defects, flaws or areas of insufficient coverage. Correct any unsatisfactory condition.
   k. Apply HydroStop® PremiumCoat® Finish Coat at the rate of 1.0 gal per 100 ft2 (4.07 L/10 m2). Allow at least 24 hours drying time, and then inspect for defects, flaws or areas of insufficient coverage. Correct any unsatisfactory condition.
   l. Apply HydroStop® PremiumCoat® Finish Coat at the rate of 1.0 gal per 100 ft2 (4.07 L/10 m2). Allow at least 24 hours drying time, and then inspect for defects, flaws or areas of insufficient coverage. Correct any unsatisfactory condition.
   m. After a minimum of 24 hours has elapsed, inspect the final roof surface for flaws, areas of insufficient coverage, insufficient thickness, etc. The HydroStop® PremiumCoat® dry film thickness is approximately 52 mils in the field of the roof. All unsatisfactory areas must be repaired.

4.03 ADDENDUM 3 - RESURFACING TPO SUBSTRATES

A. PREPERATION OF SUBSTRATE

1. Moisture Survey: A moisture survey shall be performed on the roof system to determine the suitability of the existing roof for application of the HydroStop® PremiumCoat® System. Any wet or deteriorated areas shall be removed and replaced.
2. Preparation of the roof substrate is the responsibility of the installer who shall address and correct all of the conditions listed in this section. Do not proceed with the installation of the HydroStop® PremiumCoat® System until unsatisfactory conditions have been corrected in a manner acceptable to the manufacturer (GAF).
3. Treatment of damaged/deteriorated membrane: Any areas where the membrane has torn, cracked and/or buckled must be repaired using similar or compatible products manufactured by GAF. Any wet insulation must be replaced as part of the roofing repair. Allow 24 hours drying time before application of other HydroStop® PremiumCoat® products.
4. Treatment of ponding water areas: Installer shall make every effort to mechanically eliminate all ponding water areas on the roof prior to application of HydroStop® PremiumCoat® products. Ponding water is defined as water that does not properly drain and remains on the roof for more than 48 hours after precipitations stops.
5. Deteriorated Seams: Repair all delaminated or open seams using method acceptable to the manufacturer.
6. Pitch Pans: Pitch Pans shall be capped with sheet metal so they may be sealed with HydroStop® PremiumCoat® products.
7. Condensate Lines: Condensate lines shall be installed from HVAC units to gutters as part of the overall drainage system. The type of piping used for condensate lines may vary depending on local building codes.
8. Membrane Cleaning: Roof substrate must be carefully pressure washed with water. Use an approximate working pressure of 2,000 psi (depending on condition of roof) to remove all dirt, dust, chalking, loose materials, etc. Take care not to damage the roof surface or force water into the roof system. Use hot water and mild detergent to remove grease and/or oils from the roof substrate. If mildew or algae are present, use bleach to treat these areas, then pressure wash surface.
9. Application of primer: Spray TPO Red Primer at the rate of 0.25 - 0.50 gal per 100 ft2 (1.02 - 2.04 L/10 m2) over the entire surface to be covered.

B. FLASHING APPLICATION
1. Preliminary work consists of substrate preparation and all flashing details. After completion of substrate preparation, all flashing details, penetrations and curbs shall be flashed with either 6 inches (152 mm) or 12 inches (305 mm) HydroStop® PremiumCoat® Fabric and HydroStop® PremiumCoat® Butter Grade Flashing in accordance with HydroStop® PremiumCoat® Detail Drawings. HydroStop® PremiumCoat® Butter Grade Flashing shall be feathered at the edges (see current HydroStop® PremiumCoat® Detail Drawings) so that water may flow over the various flashing details.
2. Parapet Walls: All parapet wall details within the roof system shall be secured and sealed with a 12 inches (305 mm) minimum width of HydroStop® PremiumCoat® Fabric and HydroStop® PremiumCoat® Butter Grade Flashing. All voids and open areas shall be filled with polyurethane foam prior to application of HydroStop® PremiumCoat® Fabric and HydroStop® PremiumCoat® Butter Grade Flashing.
3. Curb Flashings: All curb flashings, including cricket details, shall be flashed with at least a 12 inches (305 mm) width of HydroStop® PremiumCoat® Fabric and HydroStop® PremiumCoat® Butter Grade Flashing. Encapsulate all fasteners using HydroStop® PremiumCoat® Butter Grade Flashing. Do not bridge fasteners. HydroStop® PremiumCoat® Fabric shall be cut around all fasteners so fabric lies flat.
4. Penetrations: HydroStop® PremiumCoat® Butter Grade Flashing shall be applied around the base of the penetration extending at least 6 inches (152 mm) onto the vertical and 6 inches (152 mm) onto the base. Embed a 12 inches (305 mm) width of HydroStop® PremiumCoat® Fabric using additional HydroStop® PremiumCoat® Butter Grade Flashing as necessary. Cut the HydroStop® PremiumCoat® fabric to accommodate the shape of the penetration. Both the top and bottom of neoprene pipe boots shall be flashed

using HydroStop® PremiumCoat® Butter Grade and HydroStop® PremiumCoat® Fabric as describes above.

5. Skylights: Curb skylights shall be treated in the same fashion as curb flashings. After flashing work has been completed and the coating has cured, treat deteriorated fiberglass skylight panels with United Coatings™ Acrysheen Sealer.
6. Gutters: Trowel or brush apply FlexSeal™ Sealant to the interior or exterior gutter incorporating 12 inches (305 mm) HydroStop® PremiumCoat® fabric at all gutter seams. Gutter shall be completely clean and dry before applying FlexSeal™ Sealant
7. Ponding Water Areas: The severity of the ponding water condition will determine the requirements for additional preparation. Contact the GAF's Technical Service Department for information.
8. Inspect Preliminary Work/Flashing Details for problem areas (e.g., gaps, cracks, fishmouths, air pockets, etc.) to ensure that work is complete and satisfactory.

C. FIELD OF ROOF APPLICATION AND RATES

1. Resurfacing TPO Substrates 10 year System:
   a. Before applying the HydroStop® PremiumCoat® System, an adhesion test is required to ensure an adhesion minimum of 2.0 PLI. Test patches to be applied with the rates listed below.
   b. Conduct moisture survey and remove/replace all wet areas.
   c. Repair membrane including seams, penetrations, flashings, curbs, and terminations with like materials.
   d. Power wash roof to ensure it is free of dirt, debris, oil and other contaminants that could negatively affect adhesion. United Cleaning Concentrate is recommended to clean the roof. Allow the roof to completely dry.
   e. All loose seams are to be 3-coursed with HydroStop® PremiumCoat® Butter Grade at a rate of 2.0 gal per 100 ft2 (8.15 L/10 m2), embed fabric, and apply HydroStop® PremiumCoat® Butter Grade at a rate of 2.0 gal per 100 ft2 (8.15 L/10 m2).
   f. Prime using TPO Red Primer at the rate of 0.25-0.50 gal per 100 ft2 (1.02 - 2.04 L/10 m2).
   g. Treat all penetrations, drains, curbs, and scuppers.
   h. Apply HydroStop® PremiumCoat® Foundation Coat at a rate of 1.5 gal per 100 ft2 (6.11 L/10 m2) embed fabric and apply HydroStop® PremiumCoat® Foundation Coat at the rate of 1.0 gal per 100 ft2 (4.07 L/10 m2). Allow at least 24 hours drying time, and then inspect for defects, flaws or areas of insufficient coverage. Correct any unsatisfactory conditions.
   i. Apply HydroStop® PremiumCoat® Finish Coat at the rate of 0.75 gal per 100 ft2 (3.06 L/10 m2). Allow at least 24 hours drying time, and then inspect for defects, flaws or areas of insufficient coverage. Correct any unsatisfactory condition.
   j. Apply HydroStop® PremiumCoat® Finish Coat at the rate of 0.75 gal per 100 ft2 (3.06 L/10 m2). Allow at least 24 hours drying time, and then inspect for defects, flaws or areas of insufficient coverage. Correct any unsatisfactory condition.
   k. After a minimum of 24 hours has elapsed, inspect the final roof surface for flaws, areas of insufficient coverage, insufficient thickness, etc. The HydroStop® PremiumCoat® dry film thickness is approximately 40 mils in the field of the roof. All unsatisfactory areas must be repaired.
2. Resurfacing TPO Substrates 15 year System:
   a. Before applying the HydroStop® PremiumCoat® System, an adhesion test is required to ensure an adhesion minimum of 2.0 PLI. Test patches to be applied with the rates listed below.
   b. Conduct moisture survey and remove/replace all wet areas.
   c. Repair membrane including seams, penetrations, flashings, curbs, and terminations with like materials.
   d. Power wash roof to ensure it is free of dirt, debris, oil and other contaminants that could negatively affect adhesion. United Cleaning Concentrate is recommended to clean the roof. Allow the roof to completely dry.

e. All loose seams are to be 3-coursed with HydroStop® PremiumCoat® Butter Grade at a rate of 2.0 gal per 100 ft2 (8.15 L/10 m2), embed fabric, and apply HydroStop® PremiumCoat® Butter Grade at a rate of 2.0 gal per 100 ft2 (8.15 L/10 m2).
f. Prime using TPO Red Primer at the rate of 0.25 - 0.50 gal per 100 ft2 (1.02 - 2.04 L/10 m2).
g. Treat all penetrations, drains, curbs, and scuppers.
h. Apply HydroStop® PremiumCoat® Foundation Coat at a rate of 1.5 gal per 100 ft2 (6.11 L/10 m2) embed fabric and apply HydroStop® PremiumCoat® Foundation Coat at the rate of 1.0 gal per 100 ft2 (4.07 L/10 m2). Allow at least 24 hours drying time, and then inspect for defects, flaws or areas of insufficient coverage. Correct any unsatisfactory conditions.
i. Apply HydroStop® PremiumCoat® Finish Coat at the rate of 1.0 gal per 100 ft2 (4.07 L/10 m2). Allow at least 24 hours drying time, and then inspect for defects, flaws or areas of insufficient coverage. Correct any unsatisfactory condition.
j. Apply HydroStop® PremiumCoat® Finish Coat at the rate of 1.0 gal per 100 ft2 (4.07 L/10 m2). Allow at least 24 hours drying time, and then inspect for defects, flaws or areas of insufficient coverage. Correct any unsatisfactory condition.
k. After a minimum of 24 hours has elapsed, inspect the final roof surface for flaws, areas of insufficient coverage, insufficient thickness, etc. The HydroStop® PremiumCoat® dry film thickness is approximately 44 mils in the field of the roof. All unsatisfactory areas must be repaired.

3. Resurfacing TPO Substrates 20 year System:
a. Before applying the HydroStop® PremiumCoat® System, an adhesion test is required to ensure an adhesion minimum of 2.0 PLI. Test patches to be applied with the rates listed below.
b. Conduct moisture survey and remove/replace all wet areas.
c. Repair membrane including seams, penetrations, flashings, curbs, and terminations with like materials.
d. Power wash roof to ensure it is free of dirt, debris, oil and other contaminants that could negatively affect adhesion. United Cleaning Concentrate is recommended to clean the roof. Allow the roof to completely dry.
e. All loose seams are to be 3-coursed with HydroStop® PremiumCoat® Butter Grade at a rate of 2.0 gal per 100 ft2 (8.15 L/10 m2), embed fabric, and apply HydroStop® PremiumCoat® Butter Grade at a rate of 2.0 gal per 100 ft2 (8.15 L/10 m2).
f. Prime using TPO Red Primer at the rate of 0.25-0.50 gal per 100 ft2 (1.02 - 2.04 L/10 m2).
g. Treat all penetrations, drains, curbs, and scuppers.
h. Apply HydroStop® PremiumCoat® Foundation Coat at a rate of 1.5 gal per 100 ft2 (6.11 L/10 m2) embed fabric and apply HydroStop® PremiumCoat® Foundation Coat at the rate of 1.0 gal per 100 ft2 (4.07 L/10 m2). Allow at least 24 hours drying time, and then inspect for defects, flaws or areas of insufficient coverage. Correct any unsatisfactory conditions.
i. Apply HydroStop® PremiumCoat® Finish Coat at the rate of 1.0 gal per 100 ft2 (4.07 L/10 m2). Allow at least 24 hours drying time, and then inspect for defects, flaws or areas of insufficient coverage. Correct any unsatisfactory condition.
j. Apply HydroStop® PremiumCoat® Finish Coat at the rate of 1.0 gal per 100 ft2 (4.07 L/10 m2). Allow at least 24 hours drying time, and then inspect for defects, flaws or areas of insufficient coverage. Correct any unsatisfactory condition.
k. Apply HydroStop® PremiumCoat® Finish Coat at the rate of 1.0 gal per 100 ft2 (4.07 L/10 m2). Allow at least 24 hours drying time, and then inspect for defects, flaws or areas of insufficient coverage. Correct any unsatisfactory condition.
l. After a minimum of 24 hours has elapsed, inspect the final roof surface for flaws, areas of insufficient coverage, insufficient thickness, etc. The HydroStop® PremiumCoat® dry film thickness is approximately 52 mils in the field of the roof. All unsatisfactory areas must be repaired.

4.04 ADDENDUM 4 - RESURFACING EPDM SUBSTRATES

A. PREPERATION OF SUBSTRATE

1. Moisture Survey: A moisture survey shall be performed on the roof system to determine the suitability of the existing roof for application of the HydroStop® PremiumCoat® System. Any wet or deteriorated areas shall be removed and replaced.
2. Preparation of the roof substrate is the responsibility of the installer who shall address and correct all of the conditions listed in this section. Do not proceed with the installation of the HydroStop® PremiumCoat® System until unsatisfactory conditions have been corrected in a manner acceptable to the manufacturer (GAF).
3. Treatment of damaged/deteriorated membrane: Any areas where the membrane has torn, cracked and/or buckled must be repaired using similar or compatible products manufactured by GAF. Any wet insulation must be replaced as part of the roofing repair. Allow 24 hours drying time before application of other HydroStop® PremiumCoat® products.
4. Treatment of ponding water areas: Installer shall make every effort to mechanically eliminate all ponding water areas on the roof prior to application of HydroStop® PremiumCoat® products. Ponding water is defined as water that does not properly drain and remains on the roof for more than 48 hours after precipitations stops.
5. Deteriorated Seams: Repair all delaminated or open seams using method acceptable to the manufacturer.
6. Pitch Pans: Pitch Pans shall be capped with sheet metal so they may be sealed with HydroStop® PremiumCoat® products.
7. Condensate Lines: Condensate lines shall be installed from HVAC units to gutters as part of the overall drainage system. The type of piping used for condensate lines may vary depending on local building codes.
8. Membrane Cleaning: Roof substrate must be carefully pressure washed with water. Use an approximate working pressure of 2,000 psi (depending on condition of roof) to remove all dirt, dust, chalking, loose materials, etc. Take care not to damage the roof surface or force water into the roof system. Use hot water and mild detergent to remove grease and/or oils from the roof substrate. If mildew or algae are present, use bleach to treat these areas, then pressure wash surface.
9. Application of primer: Spray Adhere-It II Primer or Clean Act Rinseable Primer at the rate of 0.20 gal per 100 ft2 (0.81 L/10 m2) over the entire surface to be coated.

B. FLASHING APPLICATION

1. Preliminary work consists of substrate preparation and all flashing details. After completion of substrate preparation, all flashing details, penetrations and curbs shall be flashed with either 6 inches (152 mm) or 12 inches (305 mm) HydroStop® PremiumCoat® Fabric and HydroStop® PremiumCoat® Butter Grade Flashing in accordance with HydroStop® PremiumCoat® Detail Drawings. HydroStop® PremiumCoat® Butter Grade Flashing shall be feathered at the edges (see current HydroStop® PremiumCoat® Detail Drawings) so that water may flow over the various flashing details.
2. Parapet Walls: All parapet wall details within the roof system shall be secured and sealed with a 12 inches (305 mm) minimum width of HydroStop® PremiumCoat® Fabric and HydroStop® PremiumCoat® Butter Grade Flashing. All voids and open areas shall be filled with polyurethane foam prior to application of HydroStop® PremiumCoat® Fabric and HydroStop® PremiumCoat® Butter Grade Flashing.
3. Curb Flashings: All curb flashings, including cricket details, shall be flashed with at least a 12 inches (305 mm) width of HydroStop® PremiumCoat® Fabric and HydroStop® PremiumCoat® Butter Grade Flashing. Encapsulate all fasteners using HydroStop® PremiumCoat® Butter Grade Flashing. Do not bridge fasteners. HydroStop® PremiumCoat® Fabric shall be cut around all fasteners so fabric lies flat.
4. Penetrations: HydroStop® PremiumCoat® Butter Grade Flashing shall be applied around the base of the penetration extending at least 6 inches (152 mm) onto the vertical and 6 inches (152 mm) onto the base. Embed a 12 inches (305 mm) width of HydroStop® PremiumCoat® Fabric using additional HydroStop® PremiumCoat® Butter Grade

Flashing as necessary. Cut the HydroStop® PremiumCoat® fabric to accommodate the shape of the penetration. Both the top and bottom of neoprene pipe boots shall be flashed using HydroStop® PremiumCoat® Butter Grade and HydroStop® PremiumCoat® Fabric as describes above.

5. Skylights: Curb skylights shall be treated in the same fashion as curb flashings. After flashing work has been completed and the coating has cured, treat deteriorated fiberglass skylight panels with United Coatings™ Acrysheen Sealer.
6. Gutters: Trowel or brush apply FlexSeal™ Sealant to the interior or exterior gutter incorporating 12 inches (305 mm) HydroStop® PremiumCoat® fabric at all gutter seams. Gutter shall be completely clean and dry before applying FlexSeal™ Sealant
7. Ponding Water Areas: The severity of the ponding water condition will determine the requirements for additional preparation. Contact the GAF'S Technical Service Department for information.
8. Inspect Preliminary Work/Flashing Details for problem areas (e.g., gaps, cracks, fishmouths, air pockets, etc.) to ensure that work is complete and satisfactory.

C. FIELD OF ROOF APPLICATION RATES

1. Resurfacing EPDM Substrates 10 year System:
    a. Before applying the HydroStop® PremiumCoat® System, an adhesion test is required to ensure an adhesion minimum of 2.0 PLI. Test patches to be applied with the rates listed below.
    b. Conduct moisture survey and remove/replace all wet areas.
    c. Repair membrane including seams, penetrations, flashings, curbs, and terminations with like materials.
    d. Power wash roof to ensure it is free of dirt, debris, oil and other contaminants that could negatively affect adhesion.
    e. All loose seams are to be 3-coursed with HydroStop® PremiumCoat® Butter Grade at a rate of 2.0 gal per 100 ft2 (8.15 L/10 m2), embed fabric, and apply HydroStop® PremiumCoat® Butter Grade at a rate of 2.0 gal per 100 ft2 (8.15 L/10 m2).
    f. Prime using Adhere-It II Primer or Clean Act Rinseable Primer at the rate of 0.20 gal per 100 ft2 (0.81 L/10 m2).
    g. Treat all penetrations, drains, curbs, and scuppers.
    h. Apply HydroStop® PremiumCoat® Foundation Coat at a rate of 1.5 gal per 100 ft2 (6.11 L/10 m2) embed fabric and apply HydroStop® PremiumCoat® Foundation Coat at the rate of 1.0 gal per 100 ft2 (4.07 L/10 m2). Allow at least 24 hours drying time, and then inspect for defects, flaws or areas of insufficient coverage. Correct any unsatisfactory conditions.
    i. Apply HydroStop® PremiumCoat® Finish Coat at the rate of 0.75 gal per 100 ft2 (3.06 L/10 m2). Allow at least 24 hours drying time, and then inspect for defects, flaws or areas of insufficient coverage. Correct any unsatisfactory condition.
    j. Apply HydroStop® PremiumCoat® Finish Coat at the rate of 0.75 gal per 100 ft2 (3.06 L/10 m2). Allow at least 24 hours drying time, and then inspect for defects, flaws or areas of insufficient coverage. Correct any unsatisfactory condition.
    k. After a minimum of 24 hours has elapsed, inspect the final roof surface for flaws, areas of insufficient coverage, insufficient thickness, etc. The HydroStop® PremiumCoat® dry film thickness is approximately 40 mils in the field of the roof. All unsatisfactory areas must be repaired.
2. Resurfacing EPDM 15 year System:
    a. Before applying the HydroStop® PremiumCoat® System, an adhesion test is required to ensure an adhesion minimum of 2.0 PLI. Test patches to be applied with the rates listed below.
    b. Conduct moisture survey and remove/replace all wet areas.
    c. Repair membrane including seams, penetrations, flashings, curbs, and terminations with like materials.
    d. Power wash roof to ensure it is free of dirt, debris, oil and other contaminants that could negatively affect adhesion.

e. All loose seams are to be 3-coursed with HydroStop® PremiumCoat® Butter Grade at a rate of 2.0 gal per 100 ft2 (8.15 L/10 m2), embed fabric, and apply HydroStop® PremiumCoat® Butter Grade at a rate of 2.0 gal per 100 ft2 (8.15 L/10 m2).
f. Prime using Adhere-It II Primer or Clean Act Rinseable Primer at the rate of 0.20 gal per 100 ft2 (0.81 L/10 m2).
g. Treat all penetrations, drains, curbs, and scuppers.
h. Apply HydroStop® PremiumCoat® Foundation Coat at a rate of 1.5 gal per 100 ft2 (6.11 L/10 m2) embed fabric and apply HydroStop® PremiumCoat® Foundation Coat at the rate of 1.0 gal per 100 ft2 (4.07 L/10 m2). Allow at least 24 hours drying time, and then inspect for defects, flaws or areas of insufficient coverage. Correct any unsatisfactory conditions.
i. Apply HydroStop® PremiumCoat® Finish Coat at the rate of 1.0 gal per 100 ft2 (4.07 L/10 m2). Allow at least 24 hours drying time, and then inspect for defects, flaws or areas of insufficient coverage. Correct any unsatisfactory condition.
j. Apply HydroStop® PremiumCoat® Finish Coat at the rate of 1.0 gal per 100 ft2 (4.07 L/10 m2). Allow at least 24 hours drying time, and then inspect for defects, flaws or areas of insufficient coverage. Correct any unsatisfactory condition.
k. After a minimum of 24 hours has elapsed, inspect the final roof surface for flaws, areas of insufficient coverage, insufficient thickness, etc. The HydroStop® PremiumCoat® dry film thickness is approximately 44 mils in the field of the roof. All unsatisfactory areas must be repaired.

3. Resurfacing EPDM Substrates 20 year System:
a. Before applying the HydroStop® PremiumCoat® System, an adhesion test is required to ensure an adhesion minimum of 2.0 PLI. Test patches to be applied with the rates listed below.
b. Conduct moisture survey and remove/replace all wet areas.
c. Repair membrane including seams, penetrations, flashings, curbs, and terminations with like materials.
d. Power wash roof to ensure it is free of dirt, debris, oil and other contaminants that could negatively affect adhesion.
e. All loose seams are to be 3-coursed with HydroStop® PremiumCoat® Butter Grade at a rate of 2.0 gal per 100 ft2 (8.15 L/10 m2), embed fabric, and apply HydroStop® PremiumCoat® Butter Grade at a rate of 2.0 gal per 100 ft2 (8.15 L/10 m2).
f. Prime using Adhere-It II Primer or Clean Act Rinseable Primer at the rate of 0.20 gal per 100 ft2 (0.81 L/10 m2).
g. Treat all penetrations, drains, curbs, and scuppers.
h. Apply HydroStop® PremiumCoat® Foundation Coat at a rate of 1.5 gal per 100 ft2 (6.11 L/10 m2) embed fabric and apply HydroStop® PremiumCoat® Foundation Coat at the rate of 1.0 gal per 100 ft2 (4.07 L/10 m2). Allow at least 24 hours drying time, and then inspect for defects, flaws or areas of insufficient coverage. Correct any unsatisfactory conditions.
i. Apply HydroStop® PremiumCoat® Finish Coat at the rate of 1.0 gal per 100 ft2 (4.07 L/10 m2). Allow at least 24 hours drying time, and then inspect for defects, flaws or areas of insufficient coverage. Correct any unsatisfactory condition.
j. Apply HydroStop® PremiumCoat® Finish Coat at the rate of 1.0 per 100 ft2 (4.07 L/10 m2). Allow at least 24 hours drying time, and then inspect for defects, flaws or areas of insufficient coverage. Correct any unsatisfactory condition.
k. Apply HydroStop® PremiumCoat® Finish Coat at the rate of 1.0 gal per 100 ft2 (4.07 L/10 m2). Allow at least 24 hours drying time, and then inspect for defects, flaws or areas of insufficient coverage. Correct any unsatisfactory condition.
l. After a minimum of 24 hours has elapsed, inspect the final roof surface for flaws, areas of insufficient coverage, insufficient thickness, etc. The HydroStop® PremiumCoat® dry film thickness is approximately 52 mils in the field of the roof. All unsatisfactory areas must be repaired.

4.05 ADDENDUM 5 - RESURFACING STRUCTURAL CONCRETE SUBSTRATES

A. PREPERATION OF SUBSTRATE

1. Moisture Survey: A moisture survey shall be performed on the roof system to determine the suitability of the existing roof for application of the HydroStop® PremiumCoat® System. Any wet or deteriorated areas shall be removed and replaced.
2. Preparation of the roof substrate is the responsibility of the installer who shall address and correct all of the conditions listed in this section. Do not proceed with the installation of the HydroStop® PremiumCoat® System until unsatisfactory conditions have been corrected in a manner acceptable to the manufacturer (GAF).
3. Treatment of ponding water areas: Installer shall make every effort to mechanically eliminate all ponding water areas on the roof prior to application of HydroStop® PremiumCoat® products. Ponding water is defined as water that does not properly drain and remains on the roof for more than 48 hours after precipitations stops.
4. Deteriorated Seams: Repair all delaminated or open seams using method acceptable to the manufacturer.
5. Pitch Pans: Pitch Pans shall be capped with sheet metal so they may be sealed with HydroStop® PremiumCoat® products.
6. Condensate Lines: Condensate lines shall be installed from HVAC units to gutters as part of the overall drainage system. The type of piping used for condensate lines may vary depending on local building codes.
7. Membrane Cleaning: Roof substrate must be carefully pressure washed with water. Use an approximate working pressure of 2,000 psi (depending on condition of roof) to remove all dirt, dust, chalking, loose materials, etc. Take care not to damage the roof surface or force water into the roof system. Use hot water and mild detergent to remove grease and/or oils from the roof substrate. If mildew or algae are present, use bleach to treat these areas, then pressure wash surface.
8. Application of primer: Apply Epoxy Primer at the rate of 0.30 - 0.40 gal per 100 ft2 (1.22 - 1.63 L/10 m2).

B. FLASHING APPLICATION

1. Preliminary work consists of substrate preparation and all flashing details. After completion of substrate preparation, all flashing details, penetrations and curbs shall be flashed with either 6 inches (152 mm) or 12 inches (305 mm) HydroStop® PremiumCoat® Fabric and HydroStop® PremiumCoat® Butter Grade Flashing in accordance with HydroStop® PremiumCoat® Detail Drawings. HydroStop® PremiumCoat® Butter Grade Flashing shall be feathered at the edges (see current HydroStop® PremiumCoat® Detail Drawings) so that water may flow over the various flashing details.
2. Parapet Walls: All parapet wall details within the roof system shall be secured and sealed with a 12 inches (305 mm) minimum width of HydroStop® PremiumCoat® Fabric and HydroStop® PremiumCoat® Butter Grade Flashing. All voids and open areas shall be filled with polyurethane foam prior to application of HydroStop® PremiumCoat® Fabric and HydroStop® PremiumCoat® Butter Grade Flashing.
3. Curb Flashings: All curb flashings, including cricket details, shall be flashed with at least a 12 inches (305 mm) width of HydroStop® PremiumCoat® Fabric and HydroStop® PremiumCoat® Butter Grade Flashing. Encapsulate all fasteners using HydroStop® PremiumCoat® Butter Grade Flashing. Do not bridge fasteners. HydroStop® PremiumCoat® Fabric shall be cut around all fasteners so fabric lies flat.
4. Penetrations: HydroStop® PremiumCoat® Butter Grade Flashing shall be applied around the base of the penetration extending at least 6 inches (152 mm) onto the vertical and 6 inches (152 mm) onto the base. Embed a 12 inches (305 mm) width of HydroStop® PremiumCoat® Fabric using additional HydroStop® PremiumCoat® Butter Grade Flashing as necessary. Cut the HydroStop® PremiumCoat® fabric to accommodate the shape of the penetration. Both the top and bottom of neoprene pipe boots shall be flashed using HydroStop® PremiumCoat® Butter Grade and HydroStop® PremiumCoat® Fabric as describes above.

5. Skylights: Curb skylights shall be treated in the same fashion as curb flashings. After flashing work has been completed and the coating has cured, treat deteriorated fiberglass skylight panels with United Coatings™ Acrysheen Sealer.
6. Gutters: Trowel or brush apply FlexSeal™ Sealant to the interior or exterior gutter incorporating 12 inches (305 mm) HydroStop® PremiumCoat® fabric at all gutter seams. Gutter shall be completely clean and dry before applying FlexSeal™ Sealant
7. Ponding Water Areas: The severity of the ponding water condition will determine the requirements for additional preparation. Contact the GAF'S Technical Service Department for information.
8. Inspect Preliminary Work/Flashing Details for problem areas (e.g., gaps, cracks, fishmouths, air pockets, etc.) to ensure that work is complete and satisfactory.

C. FIELD OF ROOF APPLICATION AND RATES
1. Resurfacing Structural Concrete Substrates 10 year System:
   a. Before applying the HydroStop® PremiumCoat® System, an adhesion test is required to ensure an adhesion minimum of 2.0 PLI. Test patches to be applied with the rates listed below.
   b. Conduct moisture survey to ensure concrete contains less than 8% moisture.
   c. Repair or replace damaged or deteriorated sections with like materials, allowing for cementitious products to cure properly.
   d. Power wash roof to ensure it is free of dirt, debris, oil and other contaminants that could negatively affect adhesion. United Cleaning Concentrate is recommended to clean the roof. Allow the roof to completely dry.
   e. Prime using Epoxy Primer at the rate of 0.3-0.4 gal per 100 ft2 (1.22 - 1.63 L/10 m2).
   f. Treat structural joints with backer rod and compatible sealant, then treat with HydroStop® PremiumCoat® Butter Grade and Fabric.
   g. Control joints in excess of 1/16" (1.6 mm) shall also be caulked with a compatible caulk.
   h. Apply HydroStop® PremiumCoat® Foundation Coat at a rate of 1.5 gal per 100 ft2 (6.11 L/10 m2) embed fabric and apply HydroStop® PremiumCoat® Foundation Coat at the rate of 1.0 gal per 100 ft2 (4.07 L/10 m2). Allow at least 24 hours drying time, and then inspect for defects, flaws or areas of insufficient coverage. Correct any unsatisfactory conditions.
   i. Apply HydroStop® PremiumCoat® Finish Coat at the rate of 0.75 gal per 100 ft2 (3.06 L/10 m2). Allow at least 24 hours drying time, and then inspect for defects, flaws or areas of insufficient coverage. Correct any unsatisfactory condition.
   j. Apply HydroStop® PremiumCoat® Finish Coat at the rate of 0.75 gal per 100 ft2 (3.06 L/10 m2). Allow at least 24 hours drying time, and then inspect for defects, flaws or areas of insufficient coverage. Correct any unsatisfactory condition.
   k. After a minimum of 24 hours has elapsed, inspect the final roof surface for flaws, areas of insufficient coverage, insufficient thickness, etc. The HydroStop® PremiumCoat® dry film thickness is approximately 40 mils in the field of the roof. All unsatisfactory areas must be repaired.
2. Resurfacing Structural Concrete Substrates 15 year System:
   a. Before applying the HydroStop® PremiumCoat® System, an adhesion test is required to ensure an adhesion minimum of 2.0 PLI. Test patches to be applied with the rates listed below.
   b. Conduct moisture survey to ensure concrete contains less than 8% moisture.
   c. Repair or replace damaged or deteriorated sections with like materials, allowing for cementitious products to cure properly.
   d. Power wash roof to ensure it is free of dirt, debris, oil and other contaminants that could negatively affect adhesion. United Cleaning Concentrate is recommended to clean the roof. Allow the roof to completely dry.
   e. Prime using Epoxy Primer at the rate of 0.3-0.4 gal per 100 ft2 (1.22 - 1.63 L/10 m2).
   f. Treat structural joints with backer rod and compatible sealant, then treat with HydroStop® PremiumCoat® Butter Grade and Fabric.

g. Control joints in excess of 1/16” (1.6 mm) shall also be caulked with a compatible caulk.
h. Apply HydroStop® PremiumCoat® Foundation Coat at a rate of 1.5 gal per 100 ft2 (6.11 L/10 m2) embed fabric and apply HydroStop® PremiumCoat® Foundation Coat at the rate of 1.0 gal per 100 ft2 (4.07 L/10 m2). Allow at least 24 hours drying time, and then inspect for defects, flaws or areas of insufficient coverage. Correct any unsatisfactory conditions.
i. Apply HydroStop® PremiumCoat® Finish Coat at the rate of 1.0 gal per 100 ft2 (4.07 L/10 m2). Allow at least 24 hours drying time, and then inspect for defects, flaws or areas of insufficient coverage. Correct any unsatisfactory condition.
j. Apply HydroStop® PremiumCoat® Finish Coat at the rate of 1.0 gal per 100 ft2 (4.07 L/10 m2). Allow at least 24 hours drying time, and then inspect for defects, flaws or areas of insufficient coverage. Correct any unsatisfactory condition.
k. After a minimum of 24 hours has elapsed, inspect the final roof surface for flaws, areas of insufficient coverage, insufficient thickness, etc. The HydroStop® PremiumCoat® dry film thickness is approximately 44 mils in the field of the roof. All unsatisfactory areas must be repaired.

3. Resurfacing Structural Concrete Substrates 20 year System:
a. Before applying the HydroStop® PremiumCoat® System, an adhesion test is required to ensure an adhesion minimum of 2.0 PLI. Test patches to be applied with the rates listed below.
b. Conduct moisture survey to ensure concrete contains less than 8% moisture.
c. Repair or replace damaged or deteriorated sections with like materials, allowing for cementitious products to cure properly.
d. Power wash roof to ensure it is free of dirt, debris, oil and other contaminants that could negatively affect adhesion. United Cleaning Concentrate is recommended to clean the roof. Allow the roof to completely dry.
e. Prime using Epoxy Primer at the rate of 0.3-0.4 gal per 100 ft2 (1.22 - 1.63 L/10 m2).
f. Treat structural joints with backer rod and compatible sealant, then treat with HydroStop® PremiumCoat® Butter Grade and Fabric.
g. Control joints in excess of 1/16” (1.6 mm) shall also be caulked with a compatible caulk.
h. Apply HydroStop® PremiumCoat® Foundation Coat at a rate of 1.5 gal per 100 ft2 (6.11 L/10 m2) embed fabric and apply HydroStop® PremiumCoat® Foundation Coat at the rate of 1.0 gal per 100 ft2 (4.07 L/10 m2). Allow at least 24 hours drying time, and then inspect for defects, flaws or areas of insufficient coverage. Correct any unsatisfactory conditions.
i. Apply HydroStop® PremiumCoat® Finish Coat at the rate of 1.0 gal per 100 ft2 (4.07 L/10 m2). Allow at least 24 hours drying time, and then inspect for defects, flaws or areas of insufficient coverage. Correct any unsatisfactory condition.
j. Apply HydroStop® PremiumCoat® Finish Coat at the rate of 1.0 gal per 100 ft2 (4.07 L/10 m2). Allow at least 24 hours drying time, and then inspect for defects, flaws or areas of insufficient coverage. Correct any unsatisfactory condition.
k. Apply HydroStop® PremiumCoat® Finish Coat at the rate of 1.0 gal per 100 ft2 (4.07 L/10 m2). Allow at least 24 hours drying time, and then inspect for defects, flaws or areas of insufficient coverage. Correct any unsatisfactory condition.
l. After a minimum of 24 hours has elapsed, inspect the final roof surface for flaws, areas of insufficient coverage, insufficient thickness, etc. The HydroStop® PremiumCoat® dry film thickness is approximately 52 mils in the field of the roof. All unsatisfactory areas must be repaired.

4.06 ADDENDUM 6 - RESURFACING CORRUGATED STRUCTURAL TRANSITE PANELS SUBSTRATES

A. PREPERATION OF SUBSTRATE

1. Moisture Survey: A moisture survey shall be performed on the roof system to determine the suitability of the existing roof for application of the HydroStop® PremiumCoat® System. Any wet or deteriorated areas shall be removed and replaced.
2. Preparation of the roof substrate is the responsibility of the installer who shall address and correct all of the conditions listed in this section. Do not proceed with the installation of the HydroStop® PremiumCoat® System until unsatisfactory conditions have been corrected in a manner acceptable to the manufacturer (GAF).
3. Corrugated structural transite panels may contain asbestos. Follow all applicable local, state and federal regulations concerning asbestos. Under no circumstances does GAF have any liability for any damages, costs or expenses arising out of or associated with the pre-existing presence of asbestos-containing materials or any other allegedly hazardous substances or materials upon on the roof to which the new GAF roofing materials are being applied.
4. Treatment of ponding water areas: Installer shall make every effort to mechanically eliminate all ponding water areas on the roof prior to application of HydroStop® PremiumCoat® products. Ponding water is defined as water that does not properly drain and remains on the roof for more than 48 hours after precipitations stops.
5. Deteriorated Seams: Repair all delaminated or open seams using method acceptable to the manufacturer.
6. Pitch Pans: Pitch Pans shall be capped with sheet metal so they may be sealed with HydroStop® PremiumCoat® products.
7. Condensate Lines: Condensate lines shall be installed from HVAC units to gutters as part of the overall drainage system. The type of piping used for condensate lines may vary depending on local building codes.
8. Membrane Cleaning: Roof substrate must be carefully pressure washed with water. Use an approximate working pressure of 2,000 psi (depending on condition of roof) to remove all dirt, dust, chalking, loose materials, etc. Take care not to damage the roof surface or force water into the roof system. Use hot water and mild detergent to remove grease and/or oils from the roof substrate. If mildew or algae are present, use bleach to treat these areas, then pressure wash surface.
9. Application of primer: Apply Epoxy Primer at the rate of 0.30 - 0.40 gal per 100 ft2 (1.22 - 1.63 L/10 m2).

B. FLASHING APPLICATION
1. Preliminary work consists of substrate preparation and all flashing details. After completion of substrate preparation, all flashing details, penetrations and curbs shall be flashed with either 6 inches (152 mm) or 12 inches (305 mm) HydroStop® PremiumCoat® Fabric and HydroStop® PremiumCoat® Butter Grade Flashing in accordance with HydroStop® PremiumCoat® Detail Drawings. HydroStop® PremiumCoat® Butter Grade Flashing shall be feathered at the edges (see current HydroStop® PremiumCoat® Detail Drawings) so that water may flow over the various flashing details.
2. Parapet Walls: All parapet wall details within the roof system shall be secured and sealed with a 12 inches (305 mm) minimum width of HydroStop® PremiumCoat® Fabric and HydroStop® PremiumCoat® Butter Grade Flashing. All voids and open areas shall be filled with polyurethane foam prior to application of HydroStop® PremiumCoat® Fabric and HydroStop® PremiumCoat® Butter Grade Flashing.
3. Curb Flashings: All curb flashings, including cricket details, shall be flashed with at least a 12 inches (305 mm) width of HydroStop® PremiumCoat® Fabric and HydroStop® PremiumCoat® Butter Grade Flashing. Encapsulate all fasteners using HydroStop® PremiumCoat® Butter Grade Flashing. Do not bridge fasteners. HydroStop® PremiumCoat® Fabric shall be cut around all fasteners so fabric lies flat.
4. Penetrations: HydroStop® PremiumCoat® Butter Grade Flashing shall be applied around the base of the penetration extending at least 6 inches (152 mm) onto the vertical and 6 inches (152 mm) onto the base. Embed a 12 inches (305 mm) width of HydroStop® PremiumCoat® Fabric using additional HydroStop® PremiumCoat® Butter Grade Flashing as necessary. Cut the HydroStop® PremiumCoat® fabric to accommodate the

shape of the penetration. Both the top and bottom of neoprene pipe boots shall be flashed using HydroStop® PremiumCoat® Butter Grade and HydroStop® PremiumCoat® Fabric as describes above.

5. Skylights: Curb skylights shall be treated in the same fashion as curb flashings. After flashing work has been completed and the coating has cured, treat deteriorated fiberglass skylight panels with United Coatings™ Acrysheen Sealer.
6. Gutters: Trowel or brush apply FlexSeal™ Sealant to the interior or exterior gutter incorporating 12 inches (305 mm) HydroStop® PremiumCoat® fabric at all gutter seams. Gutter shall be completely clean and dry before applying FlexSeal™ Sealant
7. Ponding Water Areas: The severity of the ponding water condition will determine the requirements for additional preparation. Contact the GAF'S Technical Service Department for information.
8. Inspect Preliminary Work/Flashing Details for problem areas (e.g., gaps, cracks, fishmouths, air pockets, etc.) to ensure that work is complete and satisfactory.

C. FIELD OF ROOF APPLICATION AND RATES

1. Resurfacing Structural Corrugated Transite Panel Substrates 10 year System:
   a. Before applying the HydroStop® PremiumCoat® System, an adhesion test is required to ensure an adhesion minimum of 2.0 PLI. Test patches to be applied with the rates listed below.
   b. Conduct moisture survey and remove/replace all wet areas.
   c. Repair or replace damaged or deteriorated areas with like materials.
   d. Power wash roof to ensure it is free of dirt, debris, oil and other contaminants that could negatively affect adhesion. United Cleaning Concentrate is recommended to clean the roof. Allow the roof to completely dry.
   e. Prime using Epoxy Primer at the rate of 0.3-0.4 gal per 100 ft2 (1.22 - 1.63 L/10 m2).
   f. Treat transite gaps in excess of 1/16" (1.6 mm) with a compatible caulk.
   g. Treat all penetrations, drains, curbs, and scuppers.
   h. Apply HydroStop® PremiumCoat® Foundation Coat at a rate of 1.5 gal per 100 ft2 (6.11 L/10 m2) embed fabric and apply HydroStop® PremiumCoat® Foundation Coat at the rate of 1.0 gal per 100 ft2 (4.07 L/10 m2). Allow at least 24 hours drying time, and then inspect for defects, flaws or areas of insufficient coverage. Correct any unsatisfactory conditions.
   i. Apply HydroStop® PremiumCoat® Finish Coat at the rate of 0.75 gal per 100 ft2 (3.06 L/10 m2). Allow at least 24 hours drying time, and then inspect for defects, flaws or areas of insufficient coverage. Correct any unsatisfactory condition.
   j. Apply HydroStop® PremiumCoat® Finish Coat at the rate of 0.75 gal per 100 ft2 (3.06 L/10 m2). Allow at least 24 hours drying time, and then inspect for defects, flaws or areas of insufficient coverage. Correct any unsatisfactory condition.
   k. After a minimum of 24 hours has elapsed, inspect the final roof surface for flaws, areas of insufficient coverage, insufficient thickness, etc. The HydroStop® PremiumCoat® dry film thickness is approximately 40 mils in the field of the roof. All unsatisfactory areas must be repaired.
2. Resurfacing Structural Corrugated Transite Panel Substrates 15 year System:
   a. Before applying the HydroStop® PremiumCoat® System, an adhesion test is required to ensure an adhesion minimum of 2.0 PLI. Test patches to be applied with the rates listed below.
   b. Conduct moisture survey and remove/replace all wet areas.
   c. Repair or replace damaged or deteriorated areas with like materials.
   d. Power wash roof to ensure it is free of dirt, debris, oil and other contaminants that could negatively affect adhesion. United Cleaning Concentrate is recommended to clean the roof. Allow the roof to completely dry.
   e. Prime using Epoxy Primer at the rate of 0.3-0.4 gal per 100 ft2 (1.22 - 1.63 L/10 m2).
   f. Treat transite gaps in excess of 1/16" (1.6 mm) with a compatible caulk.
   g. Treat all penetrations, drains, curbs, and scuppers.

h. Apply HydroStop® PremiumCoat® Foundation Coat at a rate of 1.5 gal per 100 ft2 (6.11 L/10 m2) embed fabric and apply HydroStop® PremiumCoat® Foundation Coat at the rate of 1.0 gal per 100 ft2 (4.07 L/10 m2). Allow at least 24 hours drying time, and then inspect for defects, flaws or areas of insufficient coverage. Correct any unsatisfactory conditions.
i. Apply HydroStop® PremiumCoat® Finish Coat at the rate of 1.0 gal per 100 ft2 (4.07 L/10 m2). Allow at least 24 hours drying time, and then inspect for defects, flaws or areas of insufficient coverage. Correct any unsatisfactory condition.
j. Apply HydroStop® PremiumCoat® Finish Coat at the rate of 1.0 gal per 100 ft2 (4.07 L/10 m2). Allow at least 24 hours drying time, and then inspect for defects, flaws or areas of insufficient coverage. Correct any unsatisfactory condition.
k. After a minimum of 24 hours has elapsed, inspect the final roof surface for flaws, areas of insufficient coverage, insufficient thickness, etc. The HydroStop® PremiumCoat® dry film thickness is approximately 44 mils in the field of the roof. All unsatisfactory areas must be repaired.

3. Resurfacing Structural Corrugated Transite Panel Substrates 20 year System:
a. Before applying the HydroStop® PremiumCoat® System, an adhesion test is required to ensure an adhesion minimum of 2.0 PLI. Test patches to be applied with the rates listed below.
b. Conduct moisture survey and remove/replace all wet areas.
c. Repair or replace damaged or deteriorated areas with like materials.
d. Power wash roof to ensure it is free of dirt, debris, oil and other contaminants that could negatively affect adhesion. United Cleaning Concentrate is recommended to clean the roof. Allow the roof to completely dry.
e. Prime using Epoxy Primer at the rate of 0.3-0.4 gal per 100 ft2 (1.22 - 1.63 L/10 m2).
f. Treat transite gaps in excess of 1/16” (1.6 mm) with a compatible caulk.
g. Treat all penetrations, drains, curbs, and scuppers.
h. Apply HydroStop® PremiumCoat® Foundation Coat at a rate of 1.5 gal per 100 ft2 (6.11 L/10 m2) embed fabric and apply HydroStop® PremiumCoat® Foundation Coat at the rate of 1.0 gal per 100 ft2 (4.07 L/10 m2). Allow at least 24 hours drying time, and then inspect for defects, flaws or areas of insufficient coverage. Correct any unsatisfactory conditions.
i. Apply HydroStop® PremiumCoat® Finish Coat at the rate of 1.0 gal per 100 ft2 (4.07 L/10 m2). Allow at least 24 hours drying time, and then inspect for defects, flaws or areas of insufficient coverage. Correct any unsatisfactory condition.
j. Apply HydroStop® PremiumCoat® Finish Coat at the rate of 1.0 gal per 100 ft2 (4.07 L/10 m2). Allow at least 24 hours drying time, and then inspect for defects, flaws or areas of insufficient coverage. Correct any unsatisfactory condition.
k. Apply HydroStop® PremiumCoat® Finish Coat at the rate of 1.0 gal per 100 ft2 (4.07 L/10 m2). Allow at least 24 hours drying time, and then inspect for defects, flaws or areas of insufficient coverage. Correct any unsatisfactory condition.
l. After a minimum of 24 hours has elapsed, inspect the final roof surface for flaws, areas of insufficient coverage, insufficient thickness, etc. The HydroStop® PremiumCoat® dry film thickness is approximately 52 mils in the field of the roof. All unsatisfactory areas must be repaired.

4.07 ADDENDUM 7 - RESURFACING ISO SUBSTRATES

A. PREPERATION OF SUBSTRATE
1. Preparation of the roof substrate is the responsibility of the installer who shall address and correct all of the conditions listed in this section. Do not proceed with the installation of the HydroStop® PremiumCoat® System until unsatisfactory conditions have been corrected in a manner acceptable to the manufacturer (GAF).
2. For a recover over an existing roof: one layer of ISO is required. Refer to local building code for further insulation requirements.

3. For new construction or tear-off: one layer of 1.5” thick ISO & minimum 1/4” (6.35 mm) gypsum roof board OR two (2) layers of fully adhered staggered ISO. If the top layer is mechanically attached, plates must be encapsulated with Butter Grade Flashing.

B. FLASHING APPLICATION
1. Preliminary work consists of substrate preparation and all flashing details. After completion of substrate preparation, all flashing details, penetrations and curbs shall be flashed with either 6 inches (152 mm) or 12 inches (305 mm) HydroStop® PremiumCoat® Fabric and HydroStop® PremiumCoat® Butter Grade Flashing in accordance with HydroStop® PremiumCoat® Detail Drawings. HydroStop® PremiumCoat® Butter Grade Flashing shall be feathered at the edges (see current HydroStop® PremiumCoat® Detail Drawings) so that water may flow over the various flashing details.
2. Parapet Walls: All parapet wall details within the roof system shall be secured and sealed with a 12 inches (305 mm) minimum width of HydroStop® PremiumCoat® Fabric and HydroStop® PremiumCoat® Butter Grade Flashing. All voids and open areas shall be filled with polyurethane foam prior to application of HydroStop® PremiumCoat® Fabric and HydroStop® PremiumCoat® Butter Grade Flashing.
3. Curb Flashings: All curb flashings, including cricket details, shall be flashed with at least a 12 inches (305 mm) width of HydroStop® PremiumCoat® Fabric and HydroStop® PremiumCoat® Butter Grade Flashing. Encapsulate all fasteners using HydroStop® PremiumCoat® Butter Grade Flashing. Do not bridge fasteners. HydroStop® PremiumCoat® Fabric shall be cut around all fasteners so fabric lies flat.
4. Penetrations: HydroStop® PremiumCoat® Butter Grade Flashing shall be applied around the base of the penetration extending at least 6 inches (152 mm) onto the vertical and 6 inches (152 mm) onto the base. Embed a 12 inches (305 mm) width of HydroStop® PremiumCoat® Fabric using additional HydroStop® PremiumCoat® Butter Grade Flashing as necessary. Cut the HydroStop® PremiumCoat® fabric to accommodate the shape of the penetration. Both the top and bottom of neoprene pipe boots shall be flashed using HydroStop® PremiumCoat® Butter Grade and HydroStop® PremiumCoat® Fabric as describes above.
5. Skylights: Curb skylights shall be treated in the same fashion as curb flashings. After flashing work has been completed and the coating has cured, treat deteriorated fiberglass skylight panels with United Coatings™ Acrysheen Sealer.
6. Gutters: Trowel or brush apply FlexSeal™ Sealant to the interior or exterior gutter incorporating 12 inches (305 mm) HydroStop® PremiumCoat® fabric at all gutter seams. Gutter shall be completely clean and dry before applying FlexSeal™ Sealant
7. Ponding Water Areas: The severity of the ponding water condition will determine the requirements for additional preparation. Contact the GAF’S Technical Service Department for information.
8. Inspect Preliminary Work/Flashing Details for problem areas (e.g., gaps, cracks, fishmouths, air pockets, etc.) to ensure that work is complete and satisfactory.

C. FIELD OF ROOF APPLICATION AND RATES
1. Resurfacing ISO Substrates 10 year System:
    a. Ensure roof is free of dirt, debris, oil and other contaminants that can negatively affect adhesion.
    b. Before applying the HydroStop® PremiumCoat® System, an adhesion test is required to ensure an adhesion minimum of 2.0 PLI. Test patches to be applied with the rates listed below.
    c. All seams are to be 3-coursed with HydroStop® PremiumCoat® Butter Grade at a rate of 2.0 gal per 100 ft2 (8.15 L/10 m2), embed fabric, and apply HydroStop® PremiumCoat® Butter Grade at a rate of 2.0 gal per 100 ft2 (8.15 L/10 m2).
    d. Apply HydroStop® PremiumCoat® Foundation Coat at a rate of 1.5 gal per 100 ft2 (6.11 L/10 m2) embed fabric and apply HydroStop® PremiumCoat® Foundation Coat at the rate of 1.0 gal per 100 ft2 (4.07 L/10 m2). Allow at least 24 hours drying time, and then inspect for defects, flaws or areas of insufficient coverage. Correct any unsatisfactory conditions.

e. Apply HydroStop® PremiumCoat® Finish Coat at the rate of 0.75 gal per 100 ft2 (3.06 L/10 m2). Allow at least 24 hours drying time, and then inspect for defects, flaws or areas of insufficient coverage. Correct any unsatisfactory condition.
f. Apply HydroStop® PremiumCoat® Finish Coat at the rate of 0.75 gal per 100 ft2 (3.06 L/10 m2). Allow at least 24 hours drying time, and then inspect for defects, flaws or areas of insufficient coverage. Correct any unsatisfactory condition.
g. After a minimum of 24 hours has elapsed, inspect the final roof surface for flaws, areas of insufficient coverage, insufficient thickness, etc. The HydroStop® PremiumCoat® dry film thickness is approximately 40 mils in the field of the roof. All unsatisfactory areas must be repaired.

2. Resurfacing ISO Substrates 15 year System:
   a. Ensure roof is free of dirt, debris, oil and other contaminants that can negatively affect adhesion.
   b. Before applying the HydroStop® PremiumCoat® System, an adhesion test is required to ensure an adhesion minimum of 2.0 PLI. Test patches to be applied with the rates listed below.
   c. All seams are to be 3-coursed with HydroStop® PremiumCoat® Butter Grade at a rate of 2.0 gal per 100 ft2 (8.15 L/10 m2), embed fabric, and apply HydroStop® PremiumCoat® Butter Grade at a rate of 2.0 gal per 100 ft2 (8.15 L/10 m2).
   d. Apply HydroStop® PremiumCoat® Foundation Coat at a rate of 1.5 gal per 100 ft2 (6.11 L/10 m2) embed fabric and apply HydroStop® PremiumCoat® Foundation Coat at the rate of 1.0 gal per 100 ft2 (4.07 L/10 m2). Allow at least 24 hours drying time, and then inspect for defects, flaws or areas of insufficient coverage. Correct any unsatisfactory conditions.
   e. Apply HydroStop® PremiumCoat® Finish Coat at the rate of 1.0 gal per 100 ft2 (4.07 L/10 m2). Allow at least 24 hours drying time, and then inspect for defects, flaws or areas of insufficient coverage. Correct any unsatisfactory condition.
   f. Apply HydroStop® PremiumCoat® Finish Coat at the rate of 1.0 gal per 100 ft2 (4.07 L/10 m2). Allow at least 24 hours drying time, and then inspect for defects, flaws or areas of insufficient coverage. Correct any unsatisfactory condition.
   g. After a minimum of 24 hours has elapsed, inspect the final roof surface for flaws, areas of insufficient coverage, insufficient thickness, etc. The HydroStop® PremiumCoat® dry film thickness is approximately 44 mils in the field of the roof. All unsatisfactory areas must be repaired.
3. Resurfacing ISO Substrates 20 year System:
   a. Ensure roof is free of dirt, debris, oil and other contaminants that can negatively affect adhesion.
   b. Before applying the HydroStop® PremiumCoat® System, an adhesion test is required to ensure an adhesion minimum of 2.0 PLI. Test patches to be applied with the rates listed below.
   c. All seams are to be 3-coursed with HydroStop® PremiumCoat® Butter Grade at a rate of 2.0 gal per 100 ft2 (8.15 L/10 m2), embed fabric, and apply HydroStop® PremiumCoat® Butter Grade at a rate of 2.0 gal per 100 ft2 (8.15 L/10 m2).
   d. Apply HydroStop® PremiumCoat® Foundation Coat at a rate of 1.5 gal per 100 ft2 (6.11 L/10 m2) embed fabric and apply HydroStop® PremiumCoat® Foundation Coat at the rate of 1.0 gal per 100 ft2 (4.07 L/10 m2). Allow at least 24 hours drying time, and then inspect for defects, flaws or areas of insufficient coverage. Correct any unsatisfactory conditions.
   e. Apply HydroStop® PremiumCoat® Finish Coat at the rate of 1.0 gal per 100 ft2 (4.07 L/10 m2). Allow at least 24 hours drying time, and then inspect for defects, flaws or areas of insufficient coverage. Correct any unsatisfactory condition.
   f. Apply HydroStop® PremiumCoat® Finish Coat at the rate of 1.0 gal per 100 ft2 (4.07 L/10 m2). Allow at least 24 hours drying time, and then inspect for defects, flaws or areas of insufficient coverage. Correct any unsatisfactory condition.

g. Apply HydroStop® PremiumCoat® Finish Coat at the rate of 1.0 gal per 100 ft2 (4.07 L/10 m2). Allow at least 24 hours drying time, and then inspect for defects, flaws or areas of insufficient coverage. Correct any unsatisfactory condition.
h. After a minimum of 24 hours has elapsed, inspect the final roof surface for flaws, areas of insufficient coverage, insufficient thickness, etc. The HydroStop® PremiumCoat® dry film thickness is approximately 52 mils in the field of the roof. All unsatisfactory areas must be repaired.

4.08 ADDENDUM 8 - RESURFACING GYPSUM (DENSDECK® PRIME OR UNPRIMED & SECUROCK®) ROOF BOARD SUBSTRATES

A. PREPARATION OF SUBSTRATE
1. Preparation of the roof substrate is the responsibility of the installer who shall address and correct all of the conditions listed in this section. Do not proceed with the installation of the HydroStop® PremiumCoat® System until unsatisfactory conditions have been corrected in a manner acceptable to the manufacturer (GAF).
2. DensDeck prime is preferred over unprimed.
3. Gypsum roof boards must be a minimum of ½" thick.
4. If Gypsum roof board is mechanically attached, plates must be encapsulated with HydroStop® PremiumCoat® Butter Grade Flashing.

B. FLASHING APPLICATION
1. Preliminary work consists of substrate preparation and all flashing details. After completion of substrate preparation, all flashing details, penetrations and curbs shall be flashed with either 6 inches (152 mm) or 12 inches (305 mm) HydroStop® PremiumCoat® Fabric and HydroStop® PremiumCoat® Butter Grade Flashing in accordance with HydroStop® PremiumCoat® Detail Drawings. HydroStop® PremiumCoat® Butter Grade Flashing shall be feathered at the edges (see current HydroStop® PremiumCoat® Detail Drawings) so that water may flow over the various flashing details.
2. Parapet Walls: All parapet wall details within the roof system shall be secured and sealed with a 12 inches (305 mm) minimum width of HydroStop® PremiumCoat® Fabric and HydroStop® PremiumCoat® Butter Grade Flashing. All voids and open areas shall be filled with polyurethane foam prior to application of HydroStop® PremiumCoat® Fabric and HydroStop® PremiumCoat® Butter Grade Flashing.
3. Curb Flashings: All curb flashings, including cricket details, shall be flashed with at least a 12 inches (305 mm) width of HydroStop® PremiumCoat® Fabric and HydroStop® PremiumCoat® Butter Grade Flashing. Encapsulate all fasteners using HydroStop® PremiumCoat® Butter Grade Flashing. Do not bridge fasteners. HydroStop® PremiumCoat® Fabric shall be cut around all fasteners so fabric lies flat.
4. Penetrations: HydroStop® PremiumCoat® Butter Grade Flashing shall be applied around the base of the penetration extending at least 6 inches (152 mm) onto the vertical and 6 inches (152 mm) onto the base. Embed a 12 inches (305 mm) width of HydroStop® PremiumCoat® Fabric using additional HydroStop® PremiumCoat® Butter Grade Flashing as necessary. Cut the HydroStop® PremiumCoat® fabric to accommodate the shape of the penetration. Both the top and bottom of neoprene pipe boots shall be flashed using HydroStop® PremiumCoat® Butter Grade and HydroStop® PremiumCoat® Fabric as describes above.
5. Skylights: Curb skylights shall be treated in the same fashion as curb flashings. After flashing work has been completed and the coating has cured, treat deteriorated fiberglass skylight panels with United Coatings™ Acrysheen Sealer.
6. Gutters: Trowel or brush apply FlexSeal™ Sealant to the interior or exterior gutter incorporating 12 inches (305 mm) HydroStop® PremiumCoat® fabric at all gutter seams. Gutter shall be completely clean and dry before applying FlexSeal™ Sealant
7. Ponding Water Areas: The severity of the ponding water condition will determine the requirements for additional preparation. Contact the GAF'S Technical Service Department for information.

8. Inspect Preliminary Work/Flashing Details for problem areas (e.g., gaps, cracks, fishmouths, air pockets, etc.) to ensure that work is complete and satisfactory.

C. FIELD OF ROOF APPLICATION AND RATES
   1. Resurfacing Gypsum Substrates 10 year System:
      a. Ensure roof is free of dirt, debris, oil and other contaminants that can negatively affect adhesion.
      b. Before applying the HydroStop® PremiumCoat® System, an adhesion test is required to ensure an adhesion minimum of 2.0 PLI. Test patches to be applied with the rates listed below.
      c. All seams are to be 3-coursed with HydroStop® PremiumCoat® Butter Grade at a rate of 2.0 gal per 100 ft2 (8.15 L/10 m2), embed fabric, and apply HydroStop® PremiumCoat® Butter Grade at a rate of 2.0 gal per 100 ft2 (8.15 L/10 m2).
      d. Apply HydroStop® PremiumCoat® Foundation Coat at a rate of 1.5 gal per 100 ft2 (6.11 L/10 m2) embed fabric and apply HydroStop® PremiumCoat® Foundation Coat at the rate of 1.0 gal per 100 ft2 (4.07 L/10 m2). Allow at least 24 hours drying time, and then inspect for defects, flaws or areas of insufficient coverage. Correct any unsatisfactory conditions.
      e. Apply HydroStop® PremiumCoat® Finish Coat at the rate of 0.75 gal per 100 ft2 (3.06 L/10 m2). Allow at least 24 hours drying time, and then inspect for defects, flaws or areas of insufficient coverage. Correct any unsatisfactory condition.
      f. Apply HydroStop® PremiumCoat® Finish Coat at the rate of 0.75 gal per 100 ft2 (3.06 L/10 m2). Allow at least 24 hours drying time, and then inspect for defects, flaws or areas of insufficient coverage. Correct any unsatisfactory condition.
      g. After a minimum of 24 hours has elapsed, inspect the final roof surface for flaws, areas of insufficient coverage, insufficient thickness, etc. The HydroStop® PremiumCoat® dry film thickness is approximately 40 mils in the field of the roof. All unsatisfactory areas must be repaired.
   2. Resurfacing Gypsum 15 year System:
      a. Ensure roof is free of dirt, debris, oil and other contaminants that can negatively affect adhesion.
      b. Before applying the HydroStop® PremiumCoat® System, an adhesion test is required to ensure an adhesion minimum of 2.0 PLI. Test patches to be applied with the rates listed below.
      c. All seams are to be 3-coursed with HydroStop® PremiumCoat® Butter Grade at a rate of 2.0 gal per 100 ft2 (8.15 L/10 m2), embed fabric, and apply HydroStop® PremiumCoat® Butter Grade at a rate of 2.0 gal per 100 ft2 (8.15 L/10 m2).
      d. Apply HydroStop® PremiumCoat® Foundation Coat at a rate of 1.5 gal per 100 ft2 (6.11 L/10 m2) embed fabric and apply HydroStop® PremiumCoat® Foundation Coat at the rate of 1.0 gal per 100 ft2 (4.07 L/10 m2). Allow at least 24 hours drying time, and then inspect for defects, flaws or areas of insufficient coverage. Correct any unsatisfactory conditions.
      e. Apply HydroStop® PremiumCoat® Finish Coat at the rate of 1.0 gal per 100 ft2 (4.07 L/10 m2). Allow at least 24 hours drying time, and then inspect for defects, flaws or areas of insufficient coverage. Correct any unsatisfactory condition.
      f. Apply HydroStop® PremiumCoat® Finish Coat at the rate of 1.0 gal per 100 ft2 (4.07 L/10 m2). Allow at least 24 hours drying time, and then inspect for defects, flaws or areas of insufficient coverage. Correct any unsatisfactory condition.
      g. After a minimum of 24 hours has elapsed, inspect the final roof surface for flaws, areas of insufficient coverage, insufficient thickness, etc. The HydroStop® PremiumCoat® dry film thickness is approximately 44 mils in the field of the roof. All unsatisfactory areas must be repaired.
   3. Resurfacing Gypsum Substrates 20 year System:
      a. Ensure roof is free of dirt, debris, oil and other contaminants that can negatively affect adhesion.

b. Before applying the HydroStop® PremiumCoat® System, an adhesion test is required to ensure an adhesion minimum of 2.0 PLI. Test patches to be applied with the rates listed below.
c. All seams are to be 3-coursed with HydroStop® PremiumCoat® Butter Grade at a rate of 2.0 gal per 100 ft2 (8.15 L/10 m2), embed fabric, and apply HydroStop® PremiumCoat® Butter Grade at a rate of 2.0 gal per 100 ft2 (8.15 L/10 m2).
d. Apply HydroStop® PremiumCoat® Foundation Coat at a rate of 1.5 gal per 100 ft2 (6.11 L/10 m2) embed fabric and apply HydroStop® PremiumCoat® Foundation Coat at the rate of 1.0 gal per 100 ft2 (4.07 L/10 m2). Allow at least 24 hours drying time, and then inspect for defects, flaws or areas of insufficient coverage. Correct any unsatisfactory conditions.
e. Apply HydroStop® PremiumCoat® Finish Coat at the rate of 1.0 gal per 100 ft2 (4.07 L/10 m2). Allow at least 24 hours drying time, and then inspect for defects, flaws or areas of insufficient coverage. Correct any unsatisfactory condition.
f. Apply HydroStop® PremiumCoat® Finish Coat at the rate of 1.0 gal per 100 ft2 (4.07 L/10 m2). Allow at least 24 hours drying time, and then inspect for defects, flaws or areas of insufficient coverage. Correct any unsatisfactory condition.
g. Apply HydroStop® PremiumCoat® Finish Coat at the rate of 1.0 gal per 100 ft2 (4.07 L/10 m2). Allow at least 24 hours drying time, and then inspect for defects, flaws or areas of insufficient coverage. Correct any unsatisfactory condition.
h. After a minimum of 24 hours has elapsed, inspect the final roof surface for flaws, areas of insufficient coverage, insufficient thickness, etc. The HydroStop® PremiumCoat® dry film thickness is approximately 52 mils in the field of the roof. All unsatisfactory areas must be repaired.

4.09 ADDENDUM 9 - RESURFACING FOR A WARRANTY EXTENSION/RENEWAL

A. PREPARATION OF SUBSTRATE
1. The existing HydroStop® PremiumCoat® system will need to be inspected to determine eligibility for recoat.
2. Preparation of the roof substrate is the responsibility of the installer who shall address and correct all of the conditions listed in this section. Do not proceed with the installation of the HydroStop® PremiumCoat® System until unsatisfactory conditions have been corrected in a manner acceptable to the manufacturer (GAF).

B. FIELD OF ROOF APPLICATION AND RATES
1. Resurfacing For a Warranty Extension/Renewal 10 year System:
a. Roof must be inspected before work begins.
b. Ensure roof is free of dirt, debris, oil and other contaminants that can negatively affect adhesion.
c. Before applying the HydroStop® PremiumCoat® System, an adhesion test is required to ensure an adhesion minimum of 2.0 PLI. Test patches to be applied with the rates listed below.
d. Apply HydroStop® PremiumCoat® Finish Coat at the rate of 0.75 gal per 100 ft2 (3.06 L/10 m2). Allow at least 24 hours drying time, and then inspect for defects, flaws or areas of insufficient coverage. Correct any unsatisfactory condition.
e. Apply HydroStop® PremiumCoat® Finish Coat at the rate of 0.75 gal per 100 ft2 (3.06 L/10 m2). Allow at least 24 hours drying time, and then inspect for defects, flaws or areas of insufficient coverage. Correct any unsatisfactory condition.
f. After a minimum of 24 hours has elapsed, inspect the final roof surface for flaws, areas of insufficient coverage, insufficient thickness, etc. The HydroStop® PremiumCoat® dry film thickness is approximately 13 mils in the field of the roof. All unsatisfactory areas must be repaired.
2. Resurfacing For a Warranty Extension/Renewal 15 year System:
a. Roof must be inspected before work begins.
b. Ensure roof is free of dirt, debris, oil and other contaminants that can negatively affect adhesion.

c. Before applying the HydroStop® PremiumCoat® System, an adhesion test is required to ensure an adhesion minimum of 2.0 PLI. Test patches to be applied with the rates listed below.
d. Treat all seams.
e. Apply HydroStop® PremiumCoat® Finish Coat at the rate of 1.0 gal per 100 ft2 (4.07 L/10 m2). Allow at least 24 hours drying time, and then inspect for defects, flaws or areas of insufficient coverage. Correct any unsatisfactory condition.
f. Apply HydroStop® PremiumCoat® Finish Coat at the rate of 1.0 gal per 100 ft2 (4.07 L/10 m2). Allow at least 24 hours drying time, and then inspect for defects, flaws or areas of insufficient coverage. Correct any unsatisfactory condition.
g. After a minimum of 24 hours has elapsed, inspect the final roof surface for flaws, areas of insufficient coverage, insufficient thickness, etc. The HydroStop® PremiumCoat® dry film thickness is approximately 17 mils in the field of the roof. All unsatisfactory areas must be repaired.

4.10 ADDENDUM 10 - RESURFACING NON-METAL WITH HYDROSTOP® AND KYMAX™

A. PREPARATION OF SUBSTRATE

1. Approved non-metal substrates are the following: smooth and granulated asphaltic, PVC, Hypalon®, EPDM, structural concrete, TPO, polyisocyanurate (ISO), gypsum (DensDeck® & SecuRock®) and corrugated structural transite panel.
2. Moisture Survey: A moisture survey shall be performed on the roof system to determine the suitability of the existing roof for application of the HydroStop® PremiumCoat® System. Any wet or deteriorated areas shall be removed and replaced.
3. Preparation of the roof substrate is the responsibility of the installer who shall address and correct all of the conditions listed in this section. Do not proceed with the installation of the HydroStop® PremiumCoat® System until unsatisfactory conditions have been corrected in a manner acceptable to the manufacturer (GAF).
4. Treatment of damaged/deteriorated membrane: Any areas where the membrane has torn, cracked and/or buckled must be repaired using similar or compatible products manufactured by GAF. Any wet insulation must be replaced as part of the roofing repair. Allow 24 hours drying time before application of other HydroStop® PremiumCoat® products.
5. Treatment of ponding water areas: Installer shall make every effort to mechanically eliminate all ponding water areas on the roof prior to application of HydroStop® PremiumCoat® products. Ponding water is defined as water that does not properly drain and remains on the roof for more than 48 hours after precipitations stops.
6. Deteriorated Seams: Repair all delaminated or open seams using method acceptable to the manufacturer.
7. Pitch Pans: Pitch Pans shall be capped with sheet metal so they may be sealed with HydroStop® PremiumCoat® products.
8. Condensate Lines: Condensate lines shall be installed from HVAC units to gutters as part of the overall drainage system. The type of piping used for condensate lines may vary depending on local building codes.
9. Membrane Cleaning: Roof substrate must be carefully pressure washed with water. Use an approximate working pressure of 2,000 psi (depending on condition of roof) to remove all dirt, dust, chalking, loose materials, etc. Take care not to damage the roof surface or force water into the roof system. Use hot water and mild detergent to remove grease and/or oils from the roof substrate. If mildew or algae are present, use bleach to treat these areas, then pressure wash surface.
10. Application of primer: For PVC & Hypalon®, ISO, and Gypsum roof board no primer is required. Asphaltic substrates must be primed using Unibase primer at the rate of 0.5 - 1.0 gal per 100 ft2 (2.04 - 4.07 L/10 m2). TPO must be primed with TPO Red Primer at the rate of 0.25-0.50 gal per 100 ft2 (1.02 - 2.04 L/10 m2). EPDM must be primed with Adhere-It II Primer or Clean Act Rinseable Primer at the rate of 0.20 gal per 100 ft2 (0.81 L/10 m2). Structural concrete and corrugated structural transite panels must be primed using Epoxy Primer at the rate of 0.3-0.4 gal per 100 ft2 (1.22 - 1.63 L/10 m2).

B. FLASHING APPLICATION
   1. Preliminary work consists of substrate preparation and all flashing details. After completion of substrate preparation, all flashing details, penetrations and curbs shall be flashed with either 6 inches (152 mm) or 12 inches (305 mm) HydroStop® PremiumCoat® Fabric and HydroStop® PremiumCoat® Butter Grade Flashing in accordance with HydroStop® PremiumCoat® Detail Drawings. HydroStop® PremiumCoat® Butter Grade Flashing shall be feathered at the edges (see current HydroStop® PremiumCoat® Detail Drawings) so that water may flow over the various flashing details.
   2. Parapet Walls: All parapet wall details within the roof system shall be secured and sealed with a 12 inches (305 mm) minimum width of HydroStop® PremiumCoat® Fabric and HydroStop® PremiumCoat® Butter Grade Flashing. All voids and open areas shall be filled with polyurethane foam prior to application of HydroStop® PremiumCoat® Fabric and HydroStop® PremiumCoat® Butter Grade Flashing.
   3. Curb Flashings: All curb flashings, including cricket details, shall be flashed with at least a 12 inches (305 mm) width of HydroStop® PremiumCoat® Fabric and HydroStop® PremiumCoat® Butter Grade Flashing. Encapsulate all fasteners using HydroStop® PremiumCoat® Butter Grade Flashing. Do not bridge fasteners. HydroStop® PremiumCoat® Fabric shall be cut around all fasteners so fabric lies flat.
   4. Penetrations: HydroStop® PremiumCoat® Butter Grade Flashing shall be applied around the base of the penetration extending at least 6 inches (152 mm) onto the vertical and 6 inches (152 mm) onto the base. Embed a 12 inches (305 mm) width of HydroStop® PremiumCoat® Fabric using additional HydroStop® PremiumCoat® Butter Grade Flashing as necessary. Cut the HydroStop® PremiumCoat® fabric to accommodate the shape of the penetration. Both the top and bottom of neoprene pipe boots shall be flashed using HydroStop® PremiumCoat® Butter Grade and HydroStop® PremiumCoat® Fabric as describes above.
   5. Skylights: Curb skylights shall be treated in the same fashion as curb flashings. After flashing work has been completed and the coating has cured, treat deteriorated fiberglass skylight panels with United Coatings™ Acrysheen Sealer.
   6. Gutters: Trowel or brush apply FlexSeal™ Sealant to the interior or exterior gutter incorporating 12 inches (305 mm) HydroStop® PremiumCoat® fabric at all gutter seams. Gutter shall be completely clean and dry before applying FlexSeal™ Sealant
   7. Ponding Water Areas: The severity of the ponding water condition will determine the requirements for additional preparation. Contact the GAF's Technical Service Department for information.
   8. Inspect Preliminary Work/Flashing Details for problem areas (e.g., gaps, cracks, fishmouths, air pockets, etc.) to ensure that work is complete and satisfactory.

C. FIELD OF ROOF APPLICATION AND RATES
   1. Resurfacing Non-Metal Substrates with HydroStop® and Kymax™ 20 year System:
      a. Before applying the HydroStop® PremiumCoat® System, an adhesion test is required to ensure an adhesion minimum of 2.0 PLI. Test patches to be applied with the rates listed below.
      b. Conduct moisture survey and remove/replace all wet areas.
      c. Repair membrane including seams, penetrations, flashings, curbs, and terminations with like materials.
      d. Power wash roof to ensure it is free of dirt, debris, oil and other contaminants that could negatively affect adhesion. United Cleaning Concentrate is recommended to clean the roof. Allow the roof to completely dry.
      e. For PVC & Hypalon®, ISO, and Gypsum roof board no primer is required. Asphaltic substrates must be primed using Unibase primer at the rate of 0.5 - 1.0 gal per 100 ft2 (2.04 - 4.07 L/10 m2). TPO must be primed with TPO Red Primer at the rate of 0.25-0.50 gal per 100 ft2 (1.02 - 2.04 L/10 m2). EPDM must be primed with Adhere-It II Primer or Clean Act Rinseable Primer at the rate of 0.20 gal per 100 ft2 (0.81 L/10 m2). Structural concrete and corrugated structural transite panels must be primed using Epoxy Primer at the rate of 0.3-0.4 gal per 100 ft2 (1.22 - 1.63 L/10 m2).

f. Treat all penetrations, drains, curbs, and scuppers.
g. Apply HydroStop® PremiumCoat® Foundation Coat at a rate of 1.5 gal per 100 ft2 (6.11 L/10 m2) embed fabric and apply HydroStop® PremiumCoat® Foundation Coat at the rate of 1.0 gal per 100 ft2 (4.07 L/10 m2). Allow at least 24 hours drying time, and then inspect for defects, flaws or areas of insufficient coverage. Correct any unsatisfactory conditions.
h. Apply HydroStop® PremiumCoat® Finish Coat at the rate of 0.75 gal per 100 ft2 (3.06 L/10 m2). Allow at least 24 hours drying time, and then inspect for defects, flaws or areas of insufficient coverage. Correct any unsatisfactory condition.
i. Apply HydroStop® PremiumCoat® Finish Coat at the rate of 0.75 gal per 100 ft2 (3.06 L/10 m2). Allow at least 24 hours drying time, and then inspect for defects, flaws or areas of insufficient coverage. Correct any unsatisfactory condition.
j. Apply Kymax™ at a rate of 0.40 gal per 100 ft2 (1.62 L/10 m2). Allow at least 24 hours drying time, and then inspect for defects, flaws or areas of insufficient coverage. Correct any unsatisfactory condition.
k. Apply Kymax™ at a rate of 0.40 gal per 100 ft2 (1.62 L/10 m2). Allow at least 24 hours drying time, and then inspect for defects, flaws or areas of insufficient coverage. Correct any unsatisfactory condition.
l. After a minimum of 24 hours has elapsed, inspect the final roof surface for flaws, areas of insufficient coverage, insufficient thickness, etc. The HydroStop® PremiumCoat® and Kymax™ system dry film thickness is approximately 44.5 mils in the field of the roof. All unsatisfactory areas must be repaired.

END OF SECTION

SECTION 11400 - FOOD SERVICE EQUIPMENT

PART 1 - GENERAL

1.01 SUMMARY

A. This Section includes the following for food service equipment:
   1. Materials for fabricated and buy-out equipment.
   2. Specifications for fabricated and buy-out equipment.

1.02 DESCRIPTION OF WORK

A. Furnish labor, materials, tools, plant, equipment, transportation to perform all operations necessary for and reasonable incidental to properly execute and complete all "Food Service Equipment" work whether specifically mentioned or not; all as indicated, specified herein and/or implied thereby to carry out the apparent intent thereof.

1.03 COORDINATION WITH OTHER SECTIONS

A. All electrical work related to the Food Service Equipment including but not limited to service connections, switches and final connections to the fixtures, shall be in complete compliance with DIVISION 16 - ELECTRICAL.

B. All mechanical work related to the Food Service Equipment including but not limited to all water, fittings and waste including all piping, shut-off valves, water pressure reducing valves is required; final connections to the fixtures, except duct extensions as specified in individual items shall be in complete compliance with DIVISION 15 - MECHANICAL.

1.04 SUBMITTALS

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

B. Materials List: Within 21 calendar days of receiving Contracting Officer’s Notice to Proceed, submit list of products and items proposed to be provided under this Section.

C. Manufacturer's Literature: Submit 6 copies of manufacturer's technical literature before installation of specific work where called for herein. All items to be furnished shall be clearly indicated in the literature. All installation shall be conformity with approved and/or corrected submittals. “No ordering, fabrication, work or installation shall be started without processing of the submittals.”
   1. Each sheet shall indicate the Item No., quantity required and the model number. Add the following information where applicable; electrical characteristics, (such as voltage, cycle, phase and cord and plug) if mounted; list any attachments or specialties if specified; and state body finish.
   2. Each of the bound brochure submittal shall be complete accounting for all specified buy-out items. Loose sheets or "piece meal" brochure submittals are not permissible. If a catalog sheet is not obtainable for a specific buy-out item, insert a "filler sheet" with all of the required information in typewritten form.

D. Shop Drawings: Submit 6 copies of shop drawings for all items of work included in this contract.
   1. The detail drawings shall be submitted with 3/4-inch scale elevations and 1-1/2 inch scale vertical cross sections.
   2. The drawings shall show all dimensions, all details and methods of construction, materials, gauges, installation and the relation to adjoining and related work requiring cutting or close fittings.
   3. The drawings shall show all reinforcements, anchorage and other work required for complete installation of all fixtures. Show all information required for fabrication and installation of the work. Adjust details where necessary to suit field conditions.
   4. The reproduction of original contract drawings is “not acceptable” for use of shop drawings and rough-in submittals.

E. Prepare and submit 1/4-inch scale equipment plan, dimensioned roughing-in and raised concrete base drawings, including kitchen items listed as "N.I.C.". Also, visit the site to verify all equipment roughing-in requirements.

F. Manufacturer’s literature and shop drawings must be submitted together. “Piece meal” submittal is not acceptable.

G. Three bound copies of operating and maintenance manuals shall be furnished to the State before final acceptance of the installation.

1.05 CODES

A. All work and materials shall be in full accordance with the U.S. Public Health Service, National Board of Fire Commissions Safety Orders and Regulations of the governing Fire Marshall.

B. All regulations, local building, safety (ADA) and health codes in this jurisdiction shall govern. No extra charge will be paid for furnishing items required by the regulations but not specified or shown on the drawings.
   1. Rulings and interpretations of the local enforcing agencies shall be considered a part of the regulations.
   2. Whenever the drawings and specifications require larger sizes or higher standards than are required by the regulations, the drawings and specifications shall govern. Whenever the drawings and specifications set requirements that violate the regulations, the regulations shall govern.

C. All equipment shall conform to Standards of National Sanitation Foundation, Ann Arbor, Michigan.

D. All electric operated or heated equipment shall conform to the standards of the National Electric Manufacturer's Association and of the Underwriter's Laboratories, Inc., of the local city Electric Testing Station.

1.06 MANUFACTURER'S DIRECTIONS

A. Manufacturer's directions shall be verified, followed and installed in all cases where the manufacturers of articles used in this contract. Furnish directions covering points not show in the drawings and specifications.

1.07 QUALITY ASSURANCE

A. To establish quality and type, specifications are based on products manufactured by a specific manufacturer who has a proven performance acceptability in past projects. Similar products of other manufacturers will be considered, provided they meet design criteria and specifications and when submitted for substitution approval as specified in the bidding documents.
   1. All suppliers offering substitutes for equipment specified shall be responsible for payment for all additional charges for changes in electrical, plumbing or general contract work required to accommodate substitution.
   2. Equipment supplier shall also supply diagrams and drawings of changes required to General Contractor immediately after award of contract.
   3. When substitute items have different space requirements or roughing-in dimensions from items specified, Contractor shall be responsible for fitting them into the available space.

1.08 QUALIFICATION OF KITCHEN EQUIPMENT CONTRACTOR

A. The Kitchen Equipment Contractor shall have a satisfactory record of planning, fabricating, coordinating and installing custom metal and food service equipment. Contractor shall have an adequate office, and shop facilities for large scale production.

B. The Kitchen Equipment Contractor shall be a recognized dealer in standard manufactured or “buy-out” equipment.

C. Bidders and installers are required to have a current State of Hawaii contractor’s license, a sheetmetal license C-44 and institutional equipment license C-25.

1. Journeyman installers shall have completed an apprenticeship program and have a minimum of five years of field experience. There shall be a minimum of one journeyman installer.
2. Welders shall have completed qualification tests by a certified testing laboratory.

D. If bidder is dealer only, bidder shall provide in writing at the time of bidding, the name, address, qualification and license numbers of the fabricator and installing contractor to be used for the project.
1. Submit letter from equipment manufacturer that installing contractor is a “Factory Authorized Installer”.
2. Submit copy of and/or list license numbers in submittals to indicate compliance to paragraph “C” above.

E. A qualified foreman or supervisor shall be assigned to the project and shall be on site daily during Food Service related construction/installation to counsel and coordinate with other disciplines regarding connection and installation. Supervisor/foreman will also coordinate delivery schedule with the general contractor to insure adequate openings in the building to receive equipment.
1. Submit name of qualified foreman in submittals to indicate compliance.
2. RFI’s shall be submitted in a “proposed solution” form for review.

1.09 GUARANTEE

A. New equipment under this contract of the specifications shall be guaranteed for a period of one year from the date of final acceptance thereof, against defective materials, design and workmanship. Upon receipt of notice of failure of any part of the guaranteed equipment during the guarantee period, the affected part or parts shall be replaced promptly and at the expense of the Food Service Equipment Contractor. Until the time that the replacement equipment is installed, the State shall have full use of the defective equipment. This guarantee shall include installation start-up and one (1) year guarantee free service for all self-contained refrigeration equipment furnished under this contract, with evidence of manufacturer's one (1) year guarantee on the entire cabinet and additional four (4) years warranty on sealed compressor motor assembly, and also the name, address and telephone number of the servicing agency.

PART 2 - PRODUCTS

2.01 MANUFACTURER'S LABEL

A. All equipment shall have the manufacturer's name, trade name, model number, Underwriters Laboratories, Inc. label (electric energized equipment), American Gas Association certification (gas energized equipment) and NSF label distinctly mounted in a conspicuous place.

2.02 MATERIAL REQUIREMENTS

A. Materials used in the construction of all items shall be in accordance with the specified manufacturer's product.

B. All materials shall be new, first class of their respective kinds, suitable for the purpose specified. Materials shall be free from rust, scale and/or other imperfections affecting appearance or serviceability.

2.03 MATERIALS

A. Fabricated and Buy-out Items:
1. All materials shall be new, or first grade; no seconds will be acceptable. Gauges herein specified shall be minimum and established after polishing. Materials shall be of matching appearance and quality workmanship.
2. Stainless steel shall be U.S. Standard gauges, as specified or as required by the drawings, 18-8 Type 304 No. 4 finish, as defined by "Specification for Corrosion Resisting Chromium-Nickel Steel Plate, Sheet and Strip" ASTM A 167. Finished abrasion marks shall run longitudinally.
3. Steel tops, panels and other surfaces 18-gauge or heavier, shall be welded into one integral unit. All seams and joints shall be shop welded where possible. Welds shall be

finished as specified in the paragraph above and shall be ground smooth and polished to match the adjacent or contiguous surface. Splices shall be smooth finish and even to adjoining surfaces. No apex where S/S sheets are joined. Welds shall be pounded or bumped flat to be even with contiguous surface. Valleys at welds are not acceptable. Tops, panels and surfaces shall be level; bowing is not acceptable.

4. Steel structural sections: ASTM A 36.
5. Soldering stainless: Not permitted for surfaces which may come in contact with food; use welded joints.
6. Concealed fasteners where possible; cap exposed bolts, nuts and pipe ends.
7. Fasteners, locknuts and lock washers shall be non-corrosive, adequate for purpose.
8. All equipment legs and cross-railings shall be 1-5/8 inch, 16-gauge stainless steel tubing unless otherwise noted. All welds at cross-rails shall fully welded and be ground smooth. Each leg shall be fitted with a bullet type foot and cylinder type gusset described hereinafter.
    a. Bullet foot shall be Klein Hardware Model No. 222-SS-1R or approved equal, 18-8, 304 stainless steel; exterior dimension not less than 1-1/2 inch diameter tapered at bottom to 1-inch diameter fitted with 5/8-inch diameter threaded cold rolled stud with not less than 2-inch minimum vertical adjustment; fitted inside foot welded to bottom of foot for rigidity; fitted with 1-1/2 inch diameter x 3/4-inch threaded busing and plug welded to legs.
    b. Cylinder gusset shall be Klein Hardware Model No. 1020-0206-1283 or approved equal, 18-8, 304 stainless steel; gusset to fit 1-5/8 inch O.D. stainless steel tubing; shall have allen screw for staple fastening and adjustment; not less than 3-inch diameter at top and 3-3/4 inches long; outer shell 16-gauge stainless steel reinforced with 12-gauge mild steel insert, welded to exterior shell. Top of gusset shall be completely welded to underside of framing or sinks.
    c. Cabinet base leg shall be Klein Hardware Model No. 1072-0641-1755 or approved equal, 18-8, 304 stainless steel. Leg shall be 6 inches high including foot with a full 1-3/4 inch adjustment. Leg shall be formed into a tapered tubular shape with hex-shaped adjustable foot insert; fitted with mild steel 3-1/2 inch square mounting plate, welded to top; fitted with 3/4 inch threaded cold rolled steel stud.
    d. On metal top tables, the gussets shall be welded to 14-gauge hat sections. Bracing shall be welded to underside of tops.
9. Fabricated sink compartments shall have fully coved vertical and horizontal interior corners. Where one or more sink compartments are adjacent, partitions shall be double thickness continuously welded at top. Fronts of multiple compartment sinks shall be continuous on the exterior. Front face of skirt shall have no indentation or outline of sink bowls. Bottoms of each compartment shall be creased to insure complete drainage to waste opening.
10. Sinks shall be 16-gauge or heavier polished stainless steel, installed as an integral unit. Sinks shall be “deep-drawn” and not “stamped”.
11. Fabricated and buy-out sinks shall be furnished with rotary wastes without overflows, Fisher Manufacturing Co Model No. 22349, or approved equal.
12. Polish out sleeve marks where sink meets drainboard to match contiguous surface. There should be no borders around top of sink bowl.
13. All metal tops shall be one-piece welded construction, reinforced on the underside with hat sections or channels welded in place, not more than 30- inches center to center. Attach channels with welded studs; silicone is not acceptable.
    a. All raised rolls shall be 1-1/2 inch diameter, except as detailed contrary, with corners bullnosed, ground and polished.
    b. All tops with raised rolled rim construction, such as pot sink drainboards shall be reinforced on underside with 14-gauge stainless steel fully enclosed hat sections.
    c. Field joints shall be welded, ground smooth and polished to match contiguous surfaces. Gouges or rough grinding is not acceptable.
    d. Bowing or sagging of tops is not acceptable.

14. All drainboard surfaces on prep tables and pot sinks shall be pitched toward Sinks.
15. The underside of all metal tops shall be coated with a minimum of 1/8-inch thick approved hard-drying, sound-deadening mastic material, 3M or similar. The mastic applied must dry smoothly and shall have a brushed finish with no sharp edges.
16. All pot sinks, drainboards, work tops, splashbacks and turned up edges shall have radius bends on all inside horizontal and vertical corners at intersections.
    a. All shelves with turned up edges such as undershelves, elevated shelves, etc., shall have radius bends on all inside horizontal corners at intersections.
    b. Rounded and coved corners or radius bends shall be 1/2-inch radius or larger, unless specified otherwise on individual items.
17. Shelves in tables with open leg bases shall be notched a full 90 degrees with radius to match leg and welded completely to leg.

2.04 HEATING EQUIPMENT

A. All electric heating equipment shall be complete and of materials, size or rating as specified within the equipment items or drawings. All equipment installed shall be readily cleanable or easily removable for cleaning.

2.05 SWITCHES AND CONTROLS

A. Supply on each motor-driven appliance or electrical heating unit a control switch and starter in accord with Underwriter's Label. All other line switches, safety cut-outs, control panels, fuse boxes, controls, fittings and connections shall be furnished and installed by the Electrical Section, except where specified otherwise.

B. All integral wiring for fabricated equipment items, including all electrical devices, wiring controls, switches, etc., built into or forming an integral part of these items shall be furnished and installed by the Food Service Contractor in his factory or at the site with all items complete to a junction box for final connection by the Electrical Contractor.

C. All equipment with cord and plug shall be provided with adequate length to allow for proper connection to outlet. The cord shall be strapped, bracketed and concealed to underside of counter and prevented from hanging on the floor.

2.06 CONNECTION TERMINALS

A. Equipment shall be complete with connection terminals as standardized by equipment manufacturers, except where otherwise specified for other Contractors to make plumbing, electrical, and ventilation connections.

B. Provide and install properly sized indirect waste lines for equipment and extend to floor sink. All waste lines shall be of copper tubing with soldered fittings where required. Exposed lines shall be insulated with tape to prevent sweating.

2.07 EQUIPMENT DETAILED SPECIFICATIONS

A. General: All equipment items specified and specified as "D.O.E Furnished, D.O.E. Installed" or “School Furnished, School Installed” shall be coordinated for installation as part of this contract.

B. List of Equipment:
    1. Item No. 1 - Refrigeration System (1 Required)
        a. General:
            1) Provide kitchen refrigeration system and specified accessories in accordance with plans and specifications. Refrigeration systems shall be as manufactured by Airdyne Outdoor Air-cooled Weather-Pak Model No. TS045XR404A3 and Freezer Coil with Quick Response Controller Model No. LET12BEKQRC, Cold Zone, or approved equal. They include but are not limited to items listed below.
            2) Furnish and install compressor unit, condenser, refrigerant piping, cold storage room evaporators, all control valves, etc.
            3) Provide cold storage room liquid line solenoid and thermostat.
            4) Caulk and seal all sleeves and wall penetrations after refrigeration and evaporator drainlines have been installed.

5) Furnish and install drainlines with traps for cold storage room evaporators and extend to floor sink position. Exposed lines shall be insulated with tape to prevent sweating.
6) Food service equipment refrigeration system shall be cleaned and ready for operation when the facilities are completed.

b. Work Not Included Under this Item:
1) All electrical services, wiring, final equipment connections and installation of temperature warning equipment and room thermostats.
2) Wall sleeves and/or plates for refrigeration line entries to cold storage room areas.
3) Disconnects.
4) Manufacturer's Directions: Manufacturer's directions shall be verified, followed and installed in all cases where the manufacturers of articles used in this contract. Furnish directions covering points not shown in the drawings and specifications.

c. Regulations:
1) All work and materials shall be in full accordance with the latest rules of the National Board of Fire Underwriters, any local or State Ordinances, State Industrial Accident Commissions safety orders, and the regulations of the State Fire Marshall and with any prevailing rules and regulations pertaining to adequate protection and/or guarding of any moving parts or otherwise hazardous locations.
2) Whenever the drawings and specifications require larger sizes or higher standards then are required by the regulations, the drawings and specifications shall govern.
3) Whenever the drawings and specification set requirements which violate the regulations the regulations shall govern.
4) No extra charge will be paid for furnishing items required by the regulations but not specified or shown on the drawings.

d. Materials:
1) All materials and machines used on this project shall be new.
2) Names of brands used are to establish a standard. Other brands may be used if deemed equivalent and so approved.
3) When substitute items have different space requirements or roughing-in dimensions from the items specified, the Contractor shall be responsible for fitting them into the available space.

e. Permits, Fees and Inspections: Permits, fees and inspections shall be arranged and paid for by the Contractor, if required by local ordinances. The Contractor must present properly signed certificates of final inspection before the work will be approved.

f. Coil and Cooling Units:
1) Units shall be of direct expansion type of such size and design to effect required temperatures, humidity and to suit the application intended. They shall be furnished and installed in accord with the Refrigeration Schedule.
2) Finned and/or blower coils shall be fabricated of minimum 1/2-inch copper tubing with copper or aluminum fins mechanically or hydraulically bonded to the tubes; all return bends shall be PHOD-copper welded and tested to 250 PSI air pressure, dehydrated and sealed by the manufacturer.
3) Blower coil evaporators specified for cold storage rooms shall be supported by means of hangers, hot dipped galvanized after fabrication, attached to the underside of compartment ceiling insulation before construction insulation is erected, whenever possible.
4) Blower coils with fan or blower and motor for voltage shown as a complete unit shall be Underwriters' Laboratories, Inc. approved. Motors wired for 120 volts, 60 cycle, shall have built-in thermal overload protection.

5) Defrosting of all coils above 35 degrees F. box temperatures shall be automatic by proper sizing of the coils and compressors for an off-cycle on the refrigeration compressor. All applications for temperatures 35 degrees or lower, shall be provided with automatic defrost timer or manual defrost as specified.

g. Heat Interchanger: All evaporators shall be provided with heat interchangers as manufactured by Heat-X-Changer Co., or equal, with a capacity to match the condensing units.

h. Valves and Accessories:
   1) All valves shall be of standard weight and manufacture suitable for the service and purpose intended and shall be subject to approval.
   2) Refrigerant evaporator shut-off valves in the refrigerant piping shall be Henry, or equal, ball valves for line sizes 5/8 in O.D. and larger and packless diaphragm type for smaller sizes. All valves shall be placed at each inlet and each outlet of evaporators in systems with multiple evaporators.
   3) Expansion valves shall be Sporlan, or equal, and shall be provided by this Contractor and placed in the refrigerant liquid line at the point where the line enters the evaporator, except when the valve is so furnished with the evaporator by others.
   4) A filter drier shall be provided in the liquid lines located in machine area. Filter driers shall be as manufactured by Sporlan Valve Company. Systems with compressor horsepower up to and including 3 H.P. shall be the Catch All Type.
   5) Solenoid valves shall be Sporlan, or equal, sized to operate at a maximum of 2 lbs. pressure drop across the valve for the capacity required. Solenoids shall be full refrigerant line size using silver solder connections where possible. A liquid line solenoid shall be used with temperature controller for each walk-in box or field assembled equipment.
   6) Each liquid line sight glass shall be Sporlan Manufacturing Company or approved equal. See all Moisture and Liquid indicator.
   7) Each suction pressure regulator shall be Alco, or equal, and shall match the capacity of the equipment it controls.
   8) Each system shall consist of the main liquid line shut-off valve, a sight glass, an evaporator liquid line shut-off valve, filter drier, a solenoid valve in walk-in compartment, an expansion valve, evaporator, heat exchanger, suction line shut-off valve and condensing unit with standard valving. Suction line shut-off valve to be "Controlmatics" refrigeration ball valve with reinforced Teflon seats.

i. Temperature Control:
   1) Temperature control shall be compartment thermostat for cold storage room compartments and otherwise by pressure switch for each individual system. Thermostat shall be line voltage to operate line voltage liquid solenoid.
   2) Each walk-in refrigerator, above or below freezing shall be controlled by an electric thermostat, Penn Type 219 without external range adjustment, or equal.

Temperature Range	Thermostat For Liquid Line Solenoid		Thermostat for Warning Bell Cut-In
	Cut-In	Cut-Out	
-5 deg to 0 deg F.	-3 deg F.	-6 deg F.	7 deg F.

j. Piping:
   1) Copper tubing for use in refrigerant piping shall conform to ASTM standard specifications for copper refrigerant tubing, serial designation B-88. All pipe shall be type "L" hard or soft copper tubing as specified. Tubing shall be cut with pipe cutter and not hack saws. After cutting, the tubing shall be sized with a sizing tool. Refrigerant piping shall be exposed to view as required by the American Standard Safety Code for Mechanical Refrigeration.

2) For exposed areas or accessible furred ceiling spaces, hard copper tubing shall be installed to avoid damage to activities in this area; otherwise tubing shall be run in pipe or conduit, furnished and installed by this Contractor.
3) Suction lines shall be sized to give minimum pressure drop from evaporator to machine of 2 lbs. for high temperature system and of 1 lb. for freezer system and shall allow gas velocities of not less than 750 FPM in horizontal runs and 1500 FPM in vertical risers. Liquid lines shall be sized to give maximum pressure drop of 3 lbs. from receiver to evaporator.
4) Tubing runs shall be graded to prevent trapping of oil.
5) All refrigerant piping shall be properly secured with "Unistrut" clamps located to conform to proper refrigerant piping practice.

k. Insulation:
1) Refrigerant suction lines outside of refrigerated compartments, not run in conduit, shall be insulated back to compressors with Armstrong Armaflex foamed plastic insulation, or equal, verified and applied in accord with direction of the manufacturer. Minimum thickness shall be 3/4-inch for commercial temperature and 1-inch for low temperature. Consult with manufacture for proper thickness requirement to avoid any sweating or condensation.
2) Installation to be done by a Certified Armaflex Installer.
3) Refrigerant lines exposed to weather shall be insulated with cellular ASTM C 552 will all service vapor barrier type external jacket factory fabricated preformed pipe. Insulation thickness shall be 2-inches. Insulate fittings, valves, etc., with pre-molded or pre-cut insulation segments, same thickness as adjoining pipe. Provide aluminum jacket on all pipe insulation exposed to weather 0.020-inch thick. Adhesive, sealants, and compounds shall be suitable for intended service. Insulation, adhesive, vapor barrier material, and accessories shall be non-combustible and shall have maximum flame spread rating of 25 and smoke developed rating of 50.

l. Joints and Connections:
1) Copper tubing joints in piping lines shall be made with Handy & Harmon "Sil-Fos" brazing alloy "Phozon 15", or equal. Melting point shall be between 1185-1300 degrees F. Silver content not less than 15%.
2) Copper to brass joints for piping and fittings shall be made with Handy & Harmon "Easy-Flow 45" brazing alloy, "Silvaloy 45", "Mueller 122", or equal. Melting point shall be between 1125-1145 degrees F. Silver content not less than 45%.
3) All surfaces to be joined must be thoroughly cleaned. When soldering stop valves or solenoid valves, wrap valves with moist fabric to absorb excessive heat. Stop valves shall be partly open. When soldering expansion valves or suction pressure regulating valve, remove power assembly if necessary to prevent damage by excessive heat.

m. Testing and Dehydrating: Pressurize system with nitrogen and trace amount of HCFC-22 to 150 P.S.I., test for leaks after which all systems shall be subjected to a vacuum of 500 microns for a period of 24 hours. For insulated lines, testing shall be done before installation is installed.

n. Charging the System: Provide refrigerant and oil, charge all systems and run an operation check of three days duration.
1) Note: Oil shall be compatible for refrigerant used in system.

o. Instructions and Diagrams:
1) Provide any required instruction to the Plumbing and Electrical Contractors for hook-up of machines or other items.
2) Provide to the State an "as-built" diagram of the piping systems for use by his plant engineer.
3) Provide all required instruction for operation and maintenance of machines and other items of equipment.

p. Equipment Refrigeration Schedule:
    1) Condensing unit shall be Airdyne Outdoor Air-cooled Weather-Pak Model No. TS045XR404A3, powder coat painted, and Freezer Coil with Quick Response Controller Model No. LET12BEKQRC or approved equal.
    2) Size remote package compressor assembly as required and per manufacturer's recommendation.
    3) Verify field conditions and run insulated lines from compressor location as required within hung ceiling space to coil connections.
    4) Provide liquid line solenoid, thermostat, drier, strainer and expansion valve.

2. Item No. 2 - Cold Storage Rooms (1 Assembly Required)
    a. General:
        1) Provide modular panel cold storage rooms as specified accessories in accordance with plans and specifications. Provide necessary labor, material, equipment and tools for complete installation. Assembly shall be as manufactured by RMI, Compton, California, American Panel, or approved equal.
        2) Cutting of equipment holes for alarm system, switches, splice box, etc., which are not shown on the Contract Drawings but which are required for this installation.
        3) Recessed electrical boxes, conduit within the panels, warning bell, silencer relay, splice boxes, light switches and temperature alarm system.
        4) Interior Finished Ceiling Height: 7-feet-0-inches.
        5) Exterior Finished Ceiling Height: 7-feet-8-inches.
    b. Work Not Included:
        1) Mounting light fixtures, including wiring and conduit from splice box.
        2) Sealing utility penetrations made by other contractors.
        3) Wiring, conduit and final connections to the door heater cable and temperature alarm system.
        4) Vaporproof coil switch.
        5) Drainlines from coil to drain positions. (Work shall be furnished and installed by the kitchen equipment contractor.)
            (a) Where aluminum comes in contact with metals other than stainless steel, zinc or other compatible metals, aluminum surfaces shall be kept from direct contact by separating with heavy bodies bituminous paint or mastic tape of plastic membrane.
            (b) Where aluminum surfaces require construction protection from such materials as lime, mortar, concrete or plaster, factory shall apply two sprayed coats of water-white methacrylate lacquer having minimum thickness of .0005.
    c. Materials:
        1) Urethane Foam Insulation: HFC-245fa filled, over 91% closed cell content, nominal density of 2.2 pounds per cubic foot +0.1 CF -0.
        2) Dimension Stability: No change from -20 degrees F. to +160 degrees F.
        3) Flammability: Less than 25 flame spread and less than 450 smoke density when tested in accordance with UL-723 (ASTM E84) and UBC Section 1712.
        4) Classification: Class A, (0-25) flame spread in accord with UBC STD 42-1 based on UL-723 which is similar to ASTM E84 the Steiner Tunnel Test); and Class "A" Interior Finish in accordance with NFPA 101, Section 6-2 and NFPA 255.
        5) Thermal Conductivity: (K-factor) shall not exceed 0.149 BTU per hour per square foot per degree F. per inch thickness as tested in accordance with ASTM C518 at 75 degree F. mean temperature.
    d. Panels (Wall, corner, tee and ceiling):
        1) Modular panels shall be 100% foamed in place, 4-inch thick urethane insulation core, without any wood or metal frame members.

2) Interior and Exterior Die Formed Sheet Metal Panels; fully adhered to urethane core.
3) Perimeter of Sheet Metal Facings: Flanged 1/2-inch to 3/4-inch.
4) Corner panels shall be matching one-piece construction, including 1/2-inch radius at all inside vertical corners.
5) Partition panels shall be matching construction and fascia. Intersection of wall and partition panels shall be accomplished with "T" shaped panels, matching corner panel construction.
6) Panel joints shall be sealed with double bubble PVC gasket at interior and exterior panel edges, maintaining continuity.
7) Lateral alignment of adjoining panels shall be provided for by continuous urethane tongue and groove mating edges.
8) Panels shall be rigidly coupled by steel cam action locks, foamed in place, maximum 4'-0" centers. Section lock ports shall be finished with PVC snap-in buttons. Where floor is depressed or floorless, wall panels shall be anchored to building floor with concealed galvanized steel floor track. Wall panels shall be sealed to building floor with continuous bead of sealant.
9) Maximum deflection of ceiling panels shall not exceed 1/240 of the clear span under uniform loading or 20 pounds per square foot. If ceiling spans require a support system, the Contractor shall submit details and structural calculations demonstrating conformance with specified requirements.
10) Indoor roof panel support system shall use hanger wire network attached to manufacturers hanger brackets, designed to engage with female lock pins imbedded within roof panel foam core, if required.

e. Panel Fascia:
1) Interior and exposed exterior face of wall and ceiling panels shall be clad with flat stainless steel sheets, 20 gauge, Type 304, No. 4 finish.
2) Exterior unexposed face of wall and ceiling panels shall be clad with 0.32-inch mill finish aluminum.
3) Where aluminum surfaces require construction protection from such materials as lime mortar, concrete or plaster, factory shall apply 2 sprayed coats of water-white methacrylate lacquer having minimum thickness of 0.0005-inch.

f. "FP" Floor Panels:
1) Subfloor membrane of 6-mil (minimum) polyvinyl separator sheets laid over cleaned smooth, leveled concrete subfloor with joints lapped 6- inches minimum.
2) Floor Panels: 750-psi load capability without physical damage or denting of panel or insulation. 14-gauge S/S #2B floor, 3/4-inch marine grade plywood, reinforced with high density foam blocks.
3) Floor panels rigidly coupled with cam locks at maximum of 34-inch on centers. All gasketing to be foamed-in-place and not glued or stapled. Fill joints with silicone sealant.
4) Provide matching S/S cove base.
5) Provide s/s interior/exterior ramp.

g. Door (Refrigerator & Freezer):
1) Door size shall be 3'-0" x 6'-6", hinged as shown on plan. Verify field height condition prior to ordering.
2) Door shall be similar to Econocold H-30 type, or approved equal, flush fitting type, insulated with 4-inch core same as specified under materials.
3) Interior door jamb guards shall be 3/16-inch aluminum tread plate 48-inches high.
4) Front, back and edges of door shall be faced with 20-gauge stainless steel, Type 304, No. 4 finish. Corners of door pans heliarc welded ground and polished.
5) Door casing shall be raised 3/4-inch and 4-inches wide, at sides and head, clad with 18-gauge stainless steel, Type 304, No. 4 finish.

6) The ambient side of H-30 door perimeter and frame, including threshold, shall each be provided with dual 120 volt, 240 watt each, electric resistance heating elements, including thermostatic controls, factory wired to "GS" splice box located above door at interior face or wall panel.
7) Gaskets shall be extruded polyvinyl chloride with corners vulcanized and continuous magnetic core at sides and head of door.
8) Interior door cart bumper bar shall be 1/4-inch x 2-inch aluminum channel 3-feet A.F.F.
9) Sill wiper shall be adjustable neoprene secured by removable stainless steel retainer strip and stainless steel fasteners.
10) Threshold shall be removable 1/8-inch thick stainless steel plate.
11) Three hinges, each door, shall be nylon cam, stainless steel pin, zinc die cast, polished chrome finish.
12) Lock set shall be Yale #313 mortise deadbolt, including inside safety release, with bronze or stainless steel components. Exposed surfaces shall be chrome plated, cylinders keyed differently and master keyed alike.
13) Door pull: Kason No. 577; brass with chrome plated finish.
14) Door Closer: Yale #PA 1405; hydraulic rack & pinion door closer, automatic hold open. Three coat aluminum finish with lacquer final coat.
15) Hardware shall be mounted with reinforced steel taping plates and machine screws.
16) Cooler and Freezer door vision panel shall be 15-inches x 20-inches hermetically sealed multi-pane unit including electrically conducting transparent tin coating on interior face of ambient pane, connected to main door circuit.
17) Kickplate, front and back faces shall be 16-gauge, Type 304, No. 4 finish, stainless steel, 3 feet high x full width of each door.
18) PVC low temperature strip curtains, transparent, 8 inches wide, 0.080-inch thick, at cold storage door openings to ambient temperature.

h. Light Fixture and Switches:
1) Quantity of light fixtures shall be as indicated on the Food Service Equipment Electrical Plan.
2) Kason Model No. 1810LX vapor-proof LED 4-foot light fixture with injection-molded polycarbonate with integral gasket & clear, molded high impact polycarbonate diffuser with S/S latches including #P-4310A flush junction box and galvanized nipple, terminated at exterior face of roof panels.
3) Factory install ad wire interior and exterior companion, three-way AC press switch switches, adjacent door latch, mounted in "FS" boxes.
4) Gray Hypalon, weatherproof press switch plates.
5) Pilot light, unbreakable red plastic lens, embedded in Hypalon plate.
(a) Interior pilot - constant burning.
(b) Exterior pilot - indicating.
6) Rigid conduit and wiring run within insulated wall panel. Terminate in vapor tight splice box mounted on inside of wall of compartment near ceiling.
7) Provide 1-1/4 inch diameter hole in ceiling panel through which Electrical Contractor can make power connections.
8) Conduit and wiring within wall panels, including boxes, light fixtures, switches and cover plates, shall be furnished as part of this section.

i. Digital Thermometer and Alarm: Combined into one solid state computer at each room with audio alarm, silencer button, trouble light and digital read out. Modularm Model 75LC System or equal. Interior compartment unit must be mounted at the ambient entrance.

j. Freezer Door Fan Switch:
1) Each freezer door shall be equipped with a door operated switch designed to shut-off freezer coil fan motor when door is open.
2) Switch shall be built into door jamb and factory wired to splice box.

3) Electric connection and conduit between splice box and fan motor(s) shall be by the Electrical section.

k. Vacuum Pressure Relief Vent: Factory mount in head section, above each freezer door and connect to 120V splice box, electrically heated, screened aluminum vent, designed to automatically equalize room.

l. Coil Supports: Furnish to the mechanical refrigeration contractor sufficient quantity of 1/2-inch diameter nylon, threaded rods, stainless steel nuts and washers to accommodate support of refrigeration coils.

m. Utility Penetrations: Provide penetrations at cold storage room wall and ceiling panels required to accommodate electrical and refrigeration lines.

n. Escutcheon Plates:
   1) Furnish sufficient quantity of 5-inch diameter stainless steel escutcheon blanks as required by each trade to seal utility penetrations including drainlines.
   2) Each trade shall be responsible for cutting hole in blanks and sealing of respective penetrations.

o. Trim: All joints that do not exceed 2 inches between refrigerator face, building walls and ceiling shall be trimmed with matching angles and moulding.
   1) Matching trim shall be perforated or grille type for air-circulation and vermin control. Verify type with Contracting Officer.

p. Closure Panel: Space between suspended ceiling and top of cold storage room shall be enclosed with matching sheet metal panels.

q. Provide “EYS” seal offs at all electrical penetrations.

r. Provide and install stainless steel curb base in front of walk-in cold storage rooms and shall be aligned with quarry tile line and avoid any exposure of the concrete floor.

PART 3 - EXECUTION

3.01 INSTALLATION AND WORKMANSHIP

A. Verify field dimensions, conditions before fabricating equipment.

B. Examine related work and surfaces before starting the work of this section. Report defective conditions to the Contracting Officer in writing, conditions which will prevent the proper provisions of this work. Beginning the work of this section without reporting unsuitable conditions constitutes acceptance of conditions. Any required repair replacement and removal of this work caused by unsuitable conditions shall become a part of the work of this section without additional cost to the State.

C. Errors and Omissions: In order to discover and resolve any conflicts or lack of definition which might create construction problems, the Contractor shall require the sub-contractors to submit a written report to the Contractor within 10 days after award of sub-contract for the work covered by this section. This report shall include the following statement.
   1. "We have examined the drawings and specifications for work included in our sub-contract and for related work. Except for the items described in Part 2 - PRODUCTS, we have discovered no errors, omission, impractical details or conflicts between our work and that of other trades, or conditions which would require deviations from the drawings and specifications."
   2. List items for which clarifications are necessary. If none, so state.
   3. Compliance with this requirement does not make Contractor or sub-contractor responsible for such errors, omissions or discrepancies, but merely gives the opportunity to have such items corrected promptly.
   4. This report shall be sent to the Contracting Officer with copy to the Food Facilities Consultant.

D. Coordinating this work with the work with other sections.

E. Work required for the support and accommodation of related work.

F. Cutting of equipment holes for pipe, drains, electric outlets, etc., required for this installation. This work shall be performed in a neat, orderly manner using proper equipment which does not unnecessarily impair the structure or appearance in exposed locations.

G. Repair of all damage to the building resulting from the work of this section. Repair work shall be performed by the Contractor responsible for the work which becomes damaged. Repair work shall meet the Contracting Officer's approval. All costs for repair shall be paid by the Contractor for the work of this section.

H. All debris, crates or packages shall be removed.

I. Mechanically fasten all non-portable equipment to building and to adjacent equipment.

J. Furnish protective covers and wrappings until building finishes are completed.

K. Trimming and Sealing Equipment:
   1. All spaces between all fixed items and walls, ceiling, floor shall be completely sealed with stainless steel trim strips, welding, soldering, mastic or epoxy sealant. Mastic is not permissible in joints or seams which are more than 3/16-inch.
   2. All hollow sections shall be sealed.
   3. All exposed ends of splashbacks and exposed backs of shelves shall be capped with S/S, welded, ground and polished smooth.
   4. Where applicable, ends of all fixtures, splashbacks, shelves, etc., shall be finished flush to walls or adjoining fixtures.
   5. Duct: Verify size and position off all duct connections required for hoods in this contract with the Ventilation Contractor before fabrication. Provide stainless steel formed duct collars at exposed ceiling duct connections.

L. Installation, Workmanship and Final Acceptance of Work:
   1. Work performed by the contractor shall meet the Contracting Officer's and Consultant's approval.

3.02 TESTING, INSPECTION AND DEMONSTRATION

A. After installation, all equipment shall be inspected and tested under operating conditions unless otherwise specified. If inspection or tests show defects, such defects shall be corrected and inspection and tests shall be repeated.

B. A satisfactory test of the range hood fire extinguishing system shall be performed in the presence of the Fire Chief prior to any cooking.

C. Maintenance Instructions and Demonstration: Contractor shall provide a service representative to demonstrate usage of equipment and instruct maintenance employees to lubricate and service contract equipment.

3.03 CLEAN-UP

A. All food service equipment and fixtures shall be cleaned and ready for operation when the structure is turned over to the State.

END OF SECTION

SECTION 13281 - REMOVAL AND DISPOSAL OF ACM

PART 1 - GENERAL

1.01 SUMMARY

A. In performing this project, all possible safeguards, precautions and protective measures shall be utilized to prevent exposure of any individual to asbestos particulates.

1.02 DESCRIPTION OF WORK

A. Furnish all labor, materials, equipment, and services, necessary to carry out the safe removal and disposal of asbestos-containing material in compliance with these specifications, EPA, OSHA, State of Hawaii regulations, and any other applicable Federal and State regulations. Whenever there is a conflict or overlap of the above references, the most stringent shall apply. The asbestos work shall generally include:
   1. Removal and disposal of the ceramic wall tile, grout and beige mortar located in the kitchen adjacent to the walk-in freezer as required to complete the renovation work as identified in the Inspection Report and the Project Drawings.
   2. Removal and disposal of the black tar with silver paint located on the roof pad and condensing unit pipe penetration sealants as required to complete the renovation work as identified in the Inspection Report and the Project Drawings.
   3. Contractor to coordinate all work with the State and the Qualified Consultant. Contractor is responsible to satisfy himself as to the total extent of all work, including to but not limited to the quantity, location, thickness, layers, accessibility, etc. of all material prior to commencement of any work.

B. In general, the principal items of the asbestos removal work shall be as follows:
   1. Worker Protection.
   2. Decontamination Enclosure System.
   3. Preparation of Work Area.
   4. Removal of asbestos-containing materials.
   5. Removal of protective sheeting.
   6. Disposal.

C. Cleaning shall include areas within and immediately around the work area affected by the abatement work and all areas contaminated by the Contractor's work.

D. The asbestos abatement work shall include removal of all asbestos-containing materials within the work area as specified herein and noted on the drawing.

E. Contractor shall comply with all regulations pertaining to asbestos removal. If there is a conflict with the specifications, the more stringent requirement shall apply.

1.03 COORDINATION WITH OTHER SECTIONS

A. Prior to commencement of work, an annotated description of all existing damaged and missing items shall be submitted to the State. It will be the Contractor's responsibility to repair and/or replace to the State’s satisfaction all items identified as damaged and/or missing that cannot be proven to have been in this condition prior to the commencement of this project.

1.04 SUBMITTALS:

A. Final payment will not be made until all submittals have been furnished to and accepted by the State. Submit one complete and compiled electronic copy of the submittal package, no later than 10 consecutive working days from award notice, which will include the items listed below.

B. Testing Laboratory Qualifications. Name, address, and telephone number of testing laboratory being used for HIOSH compliance monitoring. Use a laboratory that is successfully participating in the Proficiency Analytical Testing (PAT) program to perform sample analysis.

C. Notices: As early as possible but prior to commencement of work, as regulated by each agency and before commencement of any on-site project activity, send a courtesy 10-day notice in accordance with 40 CFR Part 61.145 of Subpart M, of the proposed asbestos abatement work with copies to the State and to the following agencies:

1. State of Hawaii, Department of Health, "Asbestos Notification of Demolition and Renovation" form. Send to: State Department of Health, Indoor and Radiological Health Branch, 99-945 Halawa Valley Street, Aiea, Hawaii 96701

D. Permits & Licenses: Submit copies of all permits, licenses (C-19), State of Hawaii Asbestos Entity registration and arrangements for removal, transportation, and disposal of asbestos-containing materials. Contractor shall have or obtain a Permanent or a Temporary User Permit from the Department of Environmental Services, City and County of Honolulu Wastewater Management, Water Quality Division before disposing of construction wastewater into the sanitary sewer.

E. Insurance: Proof of insurance for Workman's Compensation and General Liability which covers asbestos, lead, and pollution.

F. Manufacturer's Data: Electronic copies of manufacturer's specifications, installation instructions and field test procedures for each material and all equipment related to asbestos handling and abatement and include other data as may be required to show compliance with these specifications and proposed uses.

G. Work Plan: Submit a project Work Plan for the asbestos-containing material disturbance work written and signed by the Contractor's State of Hawaii, Department of Health certified Asbestos Project Designer. The Contractor shall also provide detailed information concerning:
   1. Preparation of the work area.
   2. Personal protective equipment including respiratory protection and protective clothing.
   3. Decontamination procedures for the personnel who may be exposed to asbestos.
   4. Handling and disposal methods and procedures to be used.
   5. Required air monitoring procedures and sampling protocols.
   6. Procedures for final cleanup.
   7. A sequence of work and performance schedule in coordination with other trades.
   8. Emergency procedures.

H. Shop Drawings: Submit shop drawings for the following items as a minimum:
   1. Security provisions in and around the project area.
   2. Location and construction of all airtight barriers.
   3. Staging and sequence of the work.
   4. Outline of work procedures to be employed.
   5. Location, size, and number of negative air fan units.
   6. Entrances and exits to the work place.
   7. Location and construction of worker and equipment decontamination units.
   8. Water filtration system for all contaminated water.
   9. Proposed method of patching and repairing all damage to existing finishes from the attachment of polyethylene sheeting.
   10. Location and quantity of asbestos to be removed and disposed.
   11. Location of warning signs.
   12. Location of transparent viewing port.

I. Training: Any individual who may be exposed to airborne asbestos fibers, responsible for any aspects of abatement activities, allowed or permitted to enter areas where such exposure may occur has currently attended and passed the Abatement Worker and/or Abatement Contractor/Supervisor course whichever is relevant to that worker's responsibilities as specified in HAR 11-501, HAR, 11-502, HAR 11-503, and HAR 11-504. These courses shall be approved by the State of Hawaii Asbestos Program. No worker shall be allowed on site if they have an expired State of Hawaii Asbestos Certification I.D. card, does not have the valid certification I.D. card on site, or does not comply with the requirements set forth in HAR 11-504 on training.

J. Medical Clearances: Submit currently completed and signed "Acknowledgement of Instruction and Release" form for all employees or agents who may be exposed to airborne asbestos fibers. The form shall indicate that the individual has received OSHA medical monitoring or had such monitoring made available to them as required in 29 CFR 1926.1101.

K. Rental Equipment: A written notification concerning the intended use of the rental equipment must be provided to the rental agency and a copy submitted to the Contracting Officer.

L. Emergency planning procedures: Submit to the Contracting Officer a written emergency plan agreed to by the Contractor and the Contracting Officer prior to abatement initiation.

M. Daily personal air monitoring strategy: Describe in detail the strategy that shall be followed. Provide contingencies when the PEL is exceeded. Lab results of personal air monitoring shall be completed daily, filed for personnel records and submitted to the Contracting Officer and Project Monitor.

N. Waste disposal forms: Submit a sample of transport manifest forms to be used when disposing of all asbestos waste prior to start of abatement work.

O. Visitor/Worker entry log: Maintain a daily log of ALL personnel who enter the work area while asbestos abatement operations are in progress, until final clearance is received.

P. Completion of removal work: Submit to the Contracting Officer no later than 30 calendar days from the date of the final clearance the following:
   1. Project plans with the designated project designer's name and State of Hawaii Asbestos Certification number.
   2. Completed daily visitor/worker entry logs.
   3. State of Hawaii Asbestos Certification of the Abatement Contractor's employees.
   4. All Contractor's personal air monitoring results, including pump calibrations, date of sampling, pump's on and off times, name of personnel sampled, work activity being done at the time of sampling, 8hr TWA (Time Weighted Average) if applicable, other information as pertinent.
   5. Contractor's notification form to the Hawaii Department of Health.
   6. All asbestos disposal form(s).

1.05 PRODUCT HANDLING

A. Deliver materials to the site in original packages, containers, or bags fully identified with the manufacturer's name, brand, and lot number. Store materials in a dry, well ventilated space, under cover, off the ground, and away from surfaces subject to dampness or condensation as approved by the Contracting Officer. Material that becomes contaminated with asbestos shall be disposed of in accordance with applicable regulations. Replacement materials shall be stored outside the contaminated work area until the abatement is completed.

1.06 PROTECTION

A. Site Security: The work area is to be restricted only to authorized, trained, and protected personnel. These may include the Contractor's employees, employees of Subcontractors, the Contracting Officer and his representatives, state and local inspectors, and any other designated individual. A list of authorized personnel shall be established prior to job start.

B. Site Protection and Safety: At a minimum, follow the requirements of EPA, HIOSH, OSHA, and NIOSH. Take all necessary precautions to ensure there is no asbestos contamination to those areas not included in the work schedule. Cleanup from the work area daily all asbestos removal work debris.

C. Protective Covering: Provide and install protective covering on an "as required" or "upon request" by the Contracting Officer at no additional cost to the State. Protective covering shall be clean plastic sheets with a minimum thickness of 6-mil.

D. Safeguarding of Property: Take whatever steps necessary to safeguard the property of the State and other individuals in and around the work area during the execution of this contract. Repair, pay for, and mitigate all damages incurred by the abatement work.

E. Completed Work: Provide all necessary protection for surfaces and areas abated under this section.

1.07 ABBREVIATIONS

A. ANSI: American National Standards Institute, Inc.

B. CFR: Code of Federal Regulations

C. HIOSH: Division of Occupational Safety and Health, Department of Labor and Industrial Relations, State of Hawaii

D. EPA: U.S. Environmental Protection Agency

E. NESHAP: National Emission Standards for Hazardous Air pollutants

F. NIOSH: National Institute for Occupation Safety and Health

G. OSHA: Occupational Safety and Health Administration

1.08 GENERAL REQUIREMENTS

A. Contractor shall examine and have at all times in his possession at his office (one copy) and in view at each job site office (one copy) a current issue of the following publications:

B. Title 29, Code of Federal Regulations, Section 1910.134 - General Industry Standard for Respiratory Protection, Occupational Safety and Health Administration (OSHA), U.S. Department of Labor.

C. Title 29, Code of Federal Regulations, Section 1910.1001 - Asbestos, General Industry, Occupational Safety and Health Administration (OSHA), U.S. Department of Labor.

D. Title 29, Code of Federal Regulations, Section 1926.1101 - Asbestos, Construction Industry, Occupational Safety and Health Administration (OSHA), U.S. Department of Labor.

E. Title 29, Code of Federal Regulations, Section 1910.20 - Access to Employee Exposure and Medical Records, Occupational Safety and Health Administration (OSHA), U.S. Department of Labor.

F. Title 29, Code of Federal Regulations, Section 1910.1200 - Hazard Communication, Occupational Safety and Health Administration (OSHA), U.S. Department of Labor.

G. Title 40, Code of Federal Regulations, Part 61, Subparts A and M (Revised Subpart B), National Emission Standards for Hazardous Air Pollutants, U.S. Environmental Protection Agency (EPA).

H. Guidance for Controlling Asbestos-Containing Materials in Buildings, EPA 560/5-85-024 (Purple Book), U.S. Environmental Protection Agency (EPA).

I. Title 34, Code of Federal Regulations, Part 231, Appendix C, Procedures for Containing and Removing Building Materials Containing Asbestos, U.S. Environmental Protection Agency (EPA).

J. Title 29, Code of Federal Regulations, Section 1910.145, Specifications for Accident Prevention, Signs and Tags, Occupational Safety and Health Administration (OSHA), U.S. Department of Labor.

K. ANSI Z88.2, Practice for Respiratory Protection.

L. EPA, Final Response to the Asbestos Hazard Emergency Response Act (AHERA), 40 CFR, Part 763, Subpart E.

M. Title 11, Hawaii Administrative Rules, Department of Health, Chapter 501, Asbestos Requirements.

N. Title 11, Hawaii Administrative Rules, Department of Health, Chapter 502, Asbestos-Containing Materials in Schools.

O. Title 11, Hawaii Administrative Rules, Department of Health, Chapter 503, Fees for Asbestos Removal and Certification.

P. Title 11, Hawaii Administrative Rules, Department of Health, Chapter 504, Asbestos Abatement Certification Program.

Q. The Contractor shall comply with the above requirements and any applicable federal, state, and local regulations, laws, and ordinances that pertain to this contract. Where conflict or any inconsistency among requirements or with this specification exists, the more stringent

requirements shall apply. Any question regarding conflict or inconsistency between specification and/or regulations should be directed to the Contracting Officer.

R. Whenever approval of the State is required prior to proceeding with other work, the following shall be complied with:
   1. The Contractor shall allow the State 72 hours from notification to respond to the request for inspection.
   2. The Contractor shall designate one person (either a foreman or superintendent) who will be authorized to request for inspections. The name of the designated person shall be submitted in writing to the State prior to commencing with the work. Request from any other person will not be considered an official request.

1.09 DEFINITIONS

A. Abatement: Procedure to control fiber release from asbestos-containing building materials.
   1. Removal: All herein specified procedures necessary to remove asbestos-containing materials at an approved site in an acceptable manner.
   2. Post-Removal Surface Encapsulation: Procedures necessary to coat surfaces from which asbestos-containing materials have been removed and where designated on the drawings to control any residual fiber release.

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

C. Amended Water: Water to which a surfactant has been added to reduce water surface tension and thereby provide a more rapid penetration.

D. Authorized Visitor: the State, the Qualified Consultant, his representatives, air monitoring personnel, or a representative of any regulatory or other agency having jurisdiction over the project.

E. Holding Area: A secure area used for the storage of double-bagged asbestos containing material before removal from the project site to an approved disposal site.

F. Fixed Object: A unit of equipment or furniture in the work area which cannot be removed from the work area without dismantling.

G. Friable Asbestos: Asbestos containing material which can be crumbled to dust, when dry, under hand pressure.

H. HEPA Filter: A High Efficiency Particulate Absolute filter capable of trapping and retaining 99.97% of asbestos fibers greater than 0.3 micron in length.

I. HEPA Vacuum Equipment: Vacuuming equipment that utilizes a High Efficiency Particulate Absolute (HEPA) filter.

J. Surfactant: A chemical wetting agent added to water to improve penetration, thus reducing the quantity of water required for a given operation or area.

K. Post-Removal Encapsulation: A liquid material which can be applied to surfaces from which asbestos-containing material has been removed to control the possible release of residual fibers, either by creating a membrane over the surface (bridging encapsulant) or by penetrating in to the material and binding its components (penetrating encapsulant). Selected product shall be compatible with the existing finishes including wood, metal, and plastic.

L. Qualified Consultant: Consultant hired by the State who will perform air monitoring and inspection during abatement work and shall have the authority to initiate engineering controls. The Qualified Consultant will be accredited as a State of Hawaii Department of Health accredited Asbestos Project Monitor.

PART 2 - PRODUCTS

2.01 MATERIALS

A. Plastic Sheeting: Minimum thickness is 6-mil polyethylene film.

B. Plastic Bags: Minimum thickness 6-mil polyethylene film labeled as specified hereinafter.

C. Tapes: Tape shall be capable of sealing joints of adjacent sheets of polyethylene and for attaching polyethylene sheets to finished or unfinished surfaces of dissimilar materials and capable of adhering under both dry and wet conditions, including the use of amended water. Silver cloth duct tape, minimum 2 inches wide; red or NATO orange tape, minimum 2 inches wide for exit arrows; and double faced foam tapes, by Nashua, 3-M, Arno, or approved equal.

D. Adhesives: Adhesives shall be capable of sealing joints of adjacent sheets of polyethylene and for attachment of polyethylene sheet to finished or unfinished surfaces of dissimilar materials and capable of adhering under both dry and wet conditions, including use of amended water.

E. Surfactant (Wetting Agent): 50 percent polyoxyethylene ester and 50 percent polyoxyethylene ether, or equivalent, and shall be mixed with water to provide a concentration of one ounce, or more as needed, of surfactant to 5 gallons of water. (An equivalent surfactant shall be understood to mean material with a surface tension of 29 dynes/cm as tested in its properly mixed concentration, using ASTM method D 1331-56 (R 1980), "Surface and Interfacial Tension of Solutions of Surface-Active Agents.")

F. Warning Labels and Signs: As required by OSHA regulations 29 CFR 1926.1101. Permanent signage for access panels and areas with encapsulated asbestos-containing materials shall be as specified hereinafter. Signage shall be as approved by the Contracting Officer.

G. Protective Clothing: As specified hereinafter. The Contractor shall have all the required sets of coveralls required for this project on island prior to the start of work. There will be no time extension for the unavailability of coveralls or related equipment.

H. Post-Removal Encapsulation: The encapsulant shall be applied to surfaces from which asbestos-containing material has been removed to control the possible release of residual fibers, either by creating a membrane over the surface (bridging encapsulant) or by penetrating in to the material and binding its components (penetrating encapsulant) and shall be compatible with the existing finishes including wood, metal, and plastic.

I. Other Materials: Provide all other materials, such as, but not limited to lumber, plywood, nails, fasteners, metal studs, hardware, foam sealants, and caulking which may be required to properly prepare and complete this project.

2.02 TOOLS AND EQUIPMENT

A. General: Provide and fabricate suitable tools for the asbestos abatement procedures.

B. Water Sprayer: Airless or a pressure sprayer for amended water application as applicable.

C. Air Purification Equipment: High Efficiency Particulate Absolute (HEPA) filtration systems.

D. Paint/Encapsulant Sprayer: Airless type.

E. Other tools and equipment as necessary.

2.03 PERSONNEL PROTECTION REQUIREMENTS

A. The contractor acknowledges he alone is responsible for instruction and for enforcing personnel protection requirements and that these specifications provide only a minimum acceptable standard.

B. Provide workers with sufficient sets of disposable protective full body clothing consisting of material impenetrable by asbestos fibers and of the proper size for each individual to accommodate movement without tearing. Such clothing shall consist of full body coveralls, footwear, gloves and headgear. Provide hard hats as required by applicable safety regulations. Disposable clothing shall not be allowed to accumulate and shall be disposed of as asbestos contaminated waste. Protective clothing shall be worn by all personnel within the work area from the start of the removal and post-removal encapsulation work until the work area has received its final clearance.

C. Insulated non-skid rubber boots or an approved equal shall be required for all individuals entering the work area. Protective full body clothing without elastic at sleeves and legs shall require separate elastic or taped protection to seal the opening. Visitors shall be provided full body protective clothing.

D. No visitors shall be allowed in work areas, except as authorized by the Contracting Officer. Visitors must supply their own respiratory protection and show proof training in accordance with DOH 11-501-504.

E. Provide authorized visitors with suitable disposable protective full body clothing consisting of material impenetrable by asbestos fibers and of the proper size for each individual to accommodate movement without tearing. Such clothing shall consist of full body coveralls, footwear, gloves and headgear including hard hat when required and insulated rubber boots or equal. The Contractor shall include in his Bid the expense of a total of 4 changes of clothing per day for each day of asbestos abatement work for visitor's use. The quantity shall accumulate and may be used at any time during asbestos abatement work at the discretion of the Contracting Officer.

F. All electrical systems used for asbestos abatement operations shall as a minimum be protected with "Ground Fault Circuit Interrupters" selected and installed in strict accordance with the manufacturer's instructions, the National Electric Code and all other pertinent codes.

G. Additional safety equipment (e.g. hardhats meeting the requirements of ANSI Z-89.1, eye protection meeting the requirements of ANSI Z87.1, safety shoes meeting the requirements of ANSI Z41.1, disposable PVC gloves), as necessary, shall be provided to all workers and authorized visitors.

H. Wear respirators during the disturbance of asbestos-containing materials. Ensure that all personnel in the regulated work area are wearing the proper respirator and filter cartridge. Ensure that all personnel are properly wearing their respirator at all times inside the regulated work area.

PART 3 - EXECUTION

3.01 TESTING AND AIR MONITORING

A. Testing and Air Monitoring: Refer to Section 13288, ASBESTOS TESTING AND MONITORING for testing and monitoring requirements.

3.02 COMMENCEMENT OF WORK:

A. Under no circumstances shall asbestos be disturbed without the authorization of the Contracting Officer and Project Monitor.

B. Provide at least 10 working day notice when work is scheduled to start to the Contracting Officer and Project Monitor.

C. Contractor must notify and receive approval from the Contracting Officer prior to conducting any work (i.e., mobilization, testing, etc.) at the project site.

3.03 SEPARATION OF WORK AREAS FROM NON WORK AREAS

A. Barriers and Signs: Critically seal the work area with 6-mil plastic or equivalent. Post OSHA Danger signs at a sufficient distance from the regulated work area to permit a person to read the sign and take the necessary protective measures to avoid exposure.

B. Air Systems: Shut down and isolate all ventilation air systems to prevent contamination and fiber dispersal to other areas of the building. Critical seal all vents (intake and supply) with duct tape and two layers of 6-mil polyethylene sheeting. These temporary coverings shall be removed after the area is cleared by the Project Monitor.

C. Penetrations: Prevent contamination to the interior of the building by installing critical barriers to all openings including, but not limited to, ducts, grilles, vents, roof penetrations, and any other penetrations of the work areas with 6-mil plastic sheeting sealed with duct tape.

D. Emergency Exits: Designate and maintain emergency and fire exits from the work area in accordance with local codes and regulations. Post a diagram in each clean room and equipment room locating the emergency exits. In case of fire while doing work in the work areas, emergency exit procedures have priority over normal work exiting procedures.

E. Inspection: Inspect all barriers continuously throughout the day. Document the inspections and observations in a daily project log.

3.04 DECONTAMINATION ENCLOSURE SYSTEMS

A. Construct a decontamination station described in OSHA 29 CFR 1926.1101, approved work plan and elsewhere herein for Class 1 work. The minimum decontamination unit shall consist of a clean room, shower room, and equipment room attached to the work area. Access to the work area shall only be through the decontamination unit.

3.05 WASTE WATER FILTERING SYSTEM

A. Prior to any waste water disposal into the sanitary sewer system, the Contractor shall be responsible for obtaining from the City and County of Honolulu, Environmental Services, Division of Environmental Quality, Temporary Industrial Wastewater Discharge Permit.

B. Filter all wastewater that will be discharged into the sanitary sewer system using two in-line filter cartridges with two-inch inlets and outlets. The outlet of the first cartridge shall connect to the inlet of the second cartridge. The first cartridge shall contain six 100-micron pre-filters and a second cartridge shall contain six 0.5-micron filters or equal staging according to the type of filtering unit. No wastewater shall be released to the ground or in the storm drain system.

C. Maintain one spare set of 100-micron pre-filters at the site to replace pre-filters during cleaning. Maintain at least one set of 0.5-micron or equal filters at the site for replacement as necessary.

D. When pre-filters become clogged, replace with spares, and wash out the pre-filters in the shower room, allowing drainage from the cleanup operation to go through the filtering system.

E. When the final filters become clogged, remove filters, replace with new, and dispose of the clogged filters as contaminated waste.

F. Provide a holding tank for contaminated wastewater as required to prevent backup of water into the shower when the amount of water generated exceeds the flow rate of the filters.

3.06 TEMPORARY FIRE PROTECTION

A. Provide and maintain temporary fire protection equipment during the asbestos abatement operations.

B. Equipment shall be of the appropriate type to fight fires associated with the existing building materials and those materials used during the construction operations.

C. Clearly mark the location of all existing extinguisher cabinets.

3.07 REMOVAL OF ASBESTOS-CONTAINING MATERIALS

A. Do not commence work without valid State of Hawaii Asbestos Certification cards for all employees working on-site.

B. For interior removal work, create a negative pressure enclosure in the work area by installing negative air devices with HEPA filters. This system shall maintain the air in the work area at a pressure differential of at least minus 0.02 inches of water with respect to the outside air and 4 air changes per hour.

C. Have on site at the minimum, one operable backup negative air device during the asbestos removal.

D. Install a transparent viewing port to allow observation of the asbestos removal from outside the work area.

E. Wet the asbestos-containing material with amended water using a fine mist sprayer prior to start of abatement ensuring that it does not leak through the work area. Contractor shall be responsible for repairing all damages incurred.

F. Use hand tools to conduct the removal work.

G. Minimize dust during the disturbance of the asbestos-containing material. Do not release dust and debris outside the work area.

H. Stop work immediately if visible dust and debris is emitted outside the work area. Immediately remedy the situation.

I. Ceramic wall tile, grout and mortar:

1. Pre-clean floor within each work area using HEPA vacuum.
2. Wet the ceramic tile, grout and mortar with water using a fine mist sprayer to the start of the abatement. Wetting agent shall be used to control the release of asbestos fibers from the potentially friable material prior to and during removal.
3. Spray the asbestos-containing material repeatedly during the removal operations to maintain a wet condition and to minimize asbestos fiber dispersion. The Qualified Consultant shall have the authority to stop all work due to improper removal techniques.
4. The asbestos-containing material shall be removed in small sections. Before beginning the next section, the material shall be packed while still moist into sealable 6-mil double polyethylene bags and sealed airtight. No removed material, whether bagged or unbagged, shall be allowed to dry, fall to the ground, be crumbled into small pieces, pulverized, or made friable.
5. It shall be the responsibility of the Contractor to verify the thickness of the material and satisfy himself as to the total work and/or effort to remove said material.
6. The Contractor is prohibited from using methods of removal that create excessive amounts of dust and debris.
7. Mechanical means of removal will not be allowed.

J. Black tar sealants:
1. Thoroughly wet the sealants with amended water before starting the removal.
2. Prevent contamination spreading to the surrounding public area. A fine spray of the amended water shall be applied in small sections to reduce fiber release preceding the removal of the asbestos-containing material. Spray the asbestos-containing material repeatedly during the removal operations to maintain a wet condition and to minimize asbestos fiber dispersion. The Qualified Consultant shall have the authority to stop all work due to improper removal techniques.
3. The asbestos-containing material shall be removed in small sections. Before beginning the next section, the material shall be packed while still moist into sealable 6-mil double polyethylene bags and sealed airtight. No removed material, whether bagged or unbagged, shall be allowed to dry, fall to the ground, be crumbled into small pieces, pulverized, or made friable.
4. It shall be the responsibility of the Contractor to verify the thickness of the material and satisfy himself as to the total work and/or effort to remove said material.
5. The Contractor is prohibited from using methods of removal that create excessive amounts of dust and debris.

3.08 EQUIPMENT CLEANING

A. Wash all contaminated equipment and tools prior to removing them from the work area. Do not wash contaminated equipment and tools outside the work area.

3.09 ASBESTOS-CONTAINING WASTE HANDLING:

A. Double-bag and seal waste by gooseneck tying in 6-mil plastic bags immediately after removal. Do not allow removed asbestos and debris to accumulate in the work area. All gross debris created by the removal process shall be bagged and sealed “leak tight” at the end of each removal day.

B. During the removal process, if plastic sheeting tears, or the duct tape loosens from the surface, immediately stop work, clean up loose asbestos-containing materials, then reseal the surface by taping over the torn or loosened surface, before commencing again.

3.10 CLEANING AND CLEARANCE OF THE WORK AREA

A. Should the Contractor fail to make the work area asbestos free within one working day after the clean-up thereof has been requested by the Contracting Officer, and thereafter to expeditiously complete the said clean-up, the Contracting Officer may without further notice and without termination of contract, do the clean-up and deduct the cost thereof from the contract.

B. Clearance of Removal Work Area: Remove all visible accumulation of asbestos-containing materials and debris by HEPA vacuuming, and wet mopping. Thoroughly clean the work area.

The Contractor, in the presence of the Project Monitor, shall make a complete visual inspection of the work area to ensure all asbestos was removed and collected. Re-clean at Contractor's expense.

C. The work area shall remain a restricted area for entry only with respiratory protection and protective suits until the Project Monitor deems the area dust-free and cleared for occupation without respiratory protection in accordance with Section 13288, ASBESTOS TESTING AND MONITORING.

D. The Project Monitor will provide the Contracting Officer with a certified clearance letter.

E. Remove signage required by the asbestos removal and encapsulation work. Signage applicable to job site safety and the performance of the remaining portions of the work shall remain as applicable.

F. Completely remove all temporary materials and coverings when their use is no longer required. Clean and repair damage caused by temporary installations or use of temporary facilities. Restore existing facilities to their original condition as approved by the Contracting Officer.

3.11 DISPOSAL OF ASBESTOS-CONTAINING MATERIAL

A. As the work progresses asbestos-containing waste is generated the Contractor shall transport all waste generated on a pre-scheduled day to the State of Hawaii, Department of Health's authorized disposal site, or as specifically approved by the Contracting Officer to delay a disposal operation. Transport all waste to the predesignated disposal site in accordance with EPA regulations and specific landfill requirements.

B. Contaminated material shall be double-bagged in bags with OSHA label prescribed by the HIOSH regulations referenced in these specifications. Label shall state, "DANGER - CONTAINS ASBESTOS FIBERS - AVOID CREATING DUST - CANCER AND LUNG DISEASE HAZARD." Additionally, label bags in accordance with OSHA requirement 29 CFR 1926.1101 or EPA 40 CFR 61.150 if more restrictive. Labeling shall include the name of the waste generator and the site where the waste was generated.

C. Mark vehicles used to transport asbestos-containing waste material during the loading and unloading of the waste so that the signs are visible. The marking must be displayed in such a manner and location that a person can easily read the legend. Refer to 40 CFR Part 61.149 for lettering size, fonts and wording of sign requirements. For all loading and unloading activities, the sign referred to in 40 CFR Part 61.150 (b) (3) shall be displayed prominently.

D. Vehicles used for transporting waste to the disposal sites shall have a completely enclosed, lockable storage compartment. Storage compartments shall be plasticized and sealed with a minimum of one layer of 6 mil polyethylene sheeting on the sides and top and two layers of 6 mil polyethylene on the floor (bed). Waste materials, except those with sharp edges (metal lath, screws, nails, metal suspension system, etc.), properly double bagged may be transported to the disposal site without being placed in drums if the transporting vehicle is prepared as specified above in addition to any more stringent requirements by HIOSH. The compartments shall be thoroughly wet-cleaned and/or HEPA vacuumed following the disposal of each load at the disposal sites at an approved location with electrical power as required. At the conclusion of the asbestos abatement, or before transport vehicles are used for other purposes, the polyethylene sheeting shall be properly removed and disposed of as contaminated waste. After this has been accomplished, compartments shall once again be wet-cleaned and HEPA vacuumed in order to eliminate all debris.

E. At the landfill, upon delivery of the waste for disposal, the Contractor shall notify the Scale Attendant and Landfill Spotter that the waste to be disposed of is asbestos material.

F. Workers unloading bags at the disposal sites shall be dressed in full body protective clothing and dual cartridge P-100 respirators.

G. Waste disposal manifest forms shall be properly completed to assure custody and disposal of all asbestos-containing material and asbestos contaminated waste at approved disposal sites. Forms shall be kept on file as directed by the Contracting Officer with copies submitted to the Contracting Officer.

H. It is the Contractor's responsibility to assure that any landfill used for disposal of asbestos-containing or asbestos-contaminated waste is approved for that purpose.

I. Bags must be placed in the hole for burial. Dumping of bags from the containers will not be allowed. However, if a bag is torn and if acceptable by the landfill, the entire container may be buried.

J. Asbestos contaminated wastewater shall be filtered and disposed of in the sanitary sewer with proper permit from the City and County of Honolulu, Wastewater Management, Water Quality Division as specified herein. No wastewater shall be allowed to be dumped on the ground or into the storm drain system.

K. The Contractor shall pay the waste disposal charge and any special handling charges at the landfills. All expenses for landfills shall be the complete responsibility of the Contractor. The bagged material shall be loaded in drums, except as noted previously, and transported to a landfill authorized by the State Department of Health to accept material containing asbestos. In the event the bag is torn, the tear shall be immediately mended with duct tape and the bag placed into another bag and sealed, and the wrapped material covered with another wrap and sealed. The Contractor shall make all prior arrangements with the landfill.

3.12 LOCK DOWN

A. Prior to the removal of the plastic barriers and after clean up of gross contamination and final visual inspection, a post removal (lockdown) encapsulant shall then be sprayed to all surfaces in the removal area. The removal area shall include, but not to be limited, to constructed enclosures, barriers, polyethylene sheeting that covers any equipment articles to be discarded, critical barriers, air locks, load out units for bag removal, and on-site constructed decontamination unit. Protect existing sensors and equipment from damage and plugging during the encapsulation process.

3.13 PAYMENT

A. Final payment will not be made until copies of all submittals, waste manifest forms, and dump receipts have been furnished to the Contracting Officer.

END OF SECTION

SECTION 13283 - DISTURBANCE OF LEAD CONTAINING MATERIAL

PART 1 - GENERAL

1.01 SUMMARY

A. In performing the handling of building components with lead, all possible safeguards, precautions and protective measures shall be utilized to prevent exposure of any individual to lead particulates.

1.02 DESCRIPTION OF WORK

A. Furnish all labor, materials and equipment necessary to carry out the safe removal, clean-up, proper handling, transportation and disposal of lead paint and lead painted items in compliance with all applicable laws and regulations concerning lead, including all incidental and pertinent operations. The lead work shall generally include:
   1. Incidental disturbance of lead paint during the repair, replacement and/or new work as identified in the Inspection Report and Project Drawings.
   2. Removal of lead paint to allow for the safe repair, replacement and/or new work as identified in the Inspection Report and Project Drawings.
   3. Selective demolition and removal of lead painted items as identified in the Inspection Report and Project Drawings.

B. The Contractor shall be responsible for ensuring that all work generating lead debris conforms to the following applicable federal, state and local laws, codes, rules and regulations.

C. Occupational Safety and Health Administration (OSHA).

D. Environmental Protection Agency (EPA), Toxic Substance Control Act (TSCA), 40 CFR Part 745, Lead, Requirements for Lead Based Paint Activities in Target Housing and Child Occupied Facilities.

E. Environmental Protection Agency (EPA), Resource Conservation and Recovery Act (RCRA) of 1976, amended in 1980 and 1984.

1.03 COORDINATION WITH OTHER SECTIONS

A. The Contractor shall coordinate all of his demolition of lead components with the Contracting Officer and the General Contractor.

1.04 CONTRACTOR RESPONSIBILITIES

A. The Contractor acknowledges that he alone is responsible for the instruction and for enforcing personnel protection requirements and that these specifications provide only a minimum acceptable standard. Contractor shall comply with all requirements of 29 CFR 1926.62. The Contractor shall also be responsible for complying with all applicable EPA regulations in regards to lead containing materials.

B. Respirators: Use appropriate respirators and filters which meet all requirements of OSHA 29 CFR 1926.62.

C. Protective Clothing: Use appropriate personal protective clothing (disposable suits, eye protection, gloves, etc.) as required by OSHA 29 CFR 1926.62.

1.05 GENERAL REQUIREMENTS

A. The work specified herein shall include the transportation and disposal procedures as required of lead containing materials by persons with at least OSHA Lead Training. This work must be performed in compliance with all applicable federal, state, and local regulations and be performed by workers who are capable of and willing to perform the work of this contract.

B. Applicable Standards and Guidelines: All work under this contract, and any other trade work conducted with the project, shall be done in strict accordance with all applicable federal, state and local regulations, standards and codes governing lead demolition, transportation and disposal of lead materials.
   1. The most recent edition of any relevant regulation, standard, document or code shall be in effect.

C. Specific Statutory and Regulatory Requirements:
   1. Title 29, Code of Federal Regulations, Section 1926.62, entitled "Lead Exposure in Construction; Interim Final Rule".
   2. Title 29 Code of Federal Regulations Part 1910.134, Respiratory Protection.
   3. Federal Register: Vol. 54, No. 131; Tuesday, July 11, 1989. Department of Labor, Occupational Safety and Health Administration; 29 CFR Parts 1910, 1915, 1917, and 1918; Occupational Exposure to Lead; Statement of Reasons; Final Rule.
   4. Title 40 Code of Federal Regulations Part 61, National Emissions Standards for Hazardous Air Pollutants.
   5. Title 40 Code of Federal Regulations Part 745, Lead; Requirements for Lead Based Paint Activities in Target Housing and Child Occupied Facilities; Final Rule.
   6. Guidelines for the Evaluation and Control of Lead Based Paint Hazards in Housing.

1.06 DEFINITIONS

A. Action Level (AL): Employee exposure averaged over an 8-hour period, without regard to the use of respirators, to a particular airborne concentration. OSHA requirements become effective at this level. Lead: 30 micrograms per cubic meter of air.

B. Air Monitoring: The process of measuring the content of a specific, known, volume of air in a stated period of time. For this project, NIOSH 7082 method for lead monitoring.

C. Authorized Visitor: The Contracting Officer, their representatives, air monitoring personnel, or a representative of any regulatory or other agency having jurisdiction over the project.

D. Competent Person: Person employed or hired by the Contractor, who is educated and trained in recognizing and evaluating work place hazards and stress (in this instance, lead demolition and related work in accordance with 29 CFR 1926.62) and providing guidance on the methods and means of removing or correcting such hazards and stresses within the work environment.

E. Contaminated Area: An area where unwanted toxic or harmful substances exists.

F. HEPA Filter: A High Efficiency Particulate Absolute filter capable of trapping and retaining 99.97 percent of particulates greater than 0.3 micron in length.

G. Lead: Metallic lead, all inorganic lead compounds, and inorganic lead soaps. Excluded are all other organic lead compounds.

H. Monitoring Specialist: A person under the supervision of the Lead Supervisor who is trained in health and safety requirements for lead exposure and air-monitoring in accordance with 40 CFR 745, 29 CFR 1926.62.

I. Permissible Exposure Limit (PEL): The employer shall ensure that no employee is exposed to concentrations greater than the PEL as determined from an 8-hour time weighted average. Lead: 50 micrograms per cubic meter.

J. Personal Monitoring: Contractor's sampling of lead in air concentrations within the breathing zone of an employee to determine the 8-hour time weighted average. The samples shall be representative of the employee's work tasks. The breathing zone shall be considered an area within 12 inches of the nose or mouth of an employee.

1.07 ABBREVIATIONS

A. CFR: Code of Federal Regulations.

B. HIOSH: Department of Occupational Safety and Health, Department of Labor and Industrial Relations, State of Hawaii.

C. EPA: U.S. Environmental Protection Agency.

D. NIOSH: National Institute for Occupational Safety and Health.

E. OSHA: Occupational Safety and Health Administration.

F. NESHAP: National Emissions Standards for Hazardous Air Pollutants.

G. LP: Lead Paint.

H. TCLP: Toxicity Characteristic Leaching Procedure.

1.08 SUBMITTALS PRIOR TO WORK

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

B. Payment: Final payment will not be made until copies of all submittals have been furnished to and accepted by the Contracting Officer. Submit one complete and compiled electronic copy of the submittal package no later than 10 work days from the notice of award unless otherwise specified in this section. The submittal package will include the items listed below.

C. Detailed Work Plan: The Contractor shall submit a project work plan for the lead disturbance work. The Plan shall be prepared by the Certified Industrial Hygienist. The Contractor shall also provide detailed information concerning:
   1. Preparation of the work area.
   2. Personal protective equipment including respiratory protection and protective clothing.
   3. For employees who will participate in the project, include documentation of experience, documented proof of lead removal training based on 29 CFR 1926.62 and/or the proposed EPA Model Accreditation for Lead Based Paint Removal Work Training, in addition to any current EPA regulatory requirements, and assigned responsibilities during the project.
   4. Decontamination procedures for the personnel who may be exposed to lead.
   5. Lead handling and disposal methods and procedures to be used.
   6. Required air monitoring procedures and sampling protocols.
   7. Procedures for final cleanup.
   8. A sequence of work and performance schedule in coordination with other trades.
   9. Emergency procedures.

D. Shop Drawings: Submit shop drawings for the following items as a minimum:
   1. Descriptions of any equipment to be employed not discussed in this section.
   2. Security provisions, if any, in and around the project area.
   3. Outline of work procedures to be employed.
   4. Location of the waste storage area.
   5. Staging of the work, the sequence.
   6. Entrances and exits to the work place.
   7. Location and construction of worker decontamination units.

E. Competent Person: Qualification of the Contractor’s Competent Person.

F. Notices: The Contractor shall obtain a Generator's EPA Identification number (if necessary) for the lead containing waste material generated from the project that is determined to be hazardous.

G. Insurance: Proof of insurance for Workman’s Compensation and General Liability which covers asbestos, lead, and pollution.

H. Manufacturer's Data: Copies of manufacturer's specifications, installation instructions and field test procedures for each material and all equipment related to lead handling and abatement and include other data as may be required to show compliance with these specifications and proposed uses.

I. Documentation for Instructions:
   1. Submit documentation satisfactory to the Contracting Officer that the Contractor's employees, including foremen, supervisors, and any other company personnel or agents who will be exposed to airborne lead dust or who shall be responsible for any aspects of the lead removal work activities, have received training in accordance with this specification, 29 CFR 1926.62, (OSHA Lead Awareness or the EPA Model Accreditation for Lead Based Paint Removal Work Training) and any current EPA regulatory requirements.
   2. Submit to the Contracting Officer a written respiratory protection program meeting the requirements of 29 CFR 1910.134(b)(d)(e) and (f), documentation that all employees using respirators have received training, and documentation of respirator fit-testing for all Contractor employees and agents who will enter the work area wearing negative pressure

respirators. The Contractor shall be solely responsible for his employee's personal protection.

J. Documentation from Physician: Before exposure to lead dust or fumes, the Contractor shall provide workers with a comprehensive medical examination as required by 29 CFR 1926.62, or whichever is stricter. This examination will not be required if adequate records show the employees have been examined as required by the aforementioned regulations within the last year.

K. Respirators: Submit document NIOSH approvals for all respiratory protective devices used on site. Include manufacturer certification of HEPA filtration capabilities for all cartridges and filters.

L. Emergency Planning Procedures:
   1. The Contractor shall submit an emergency evacuation plan for the Contracting Officer's acceptance prior to the commencement of work. This plan shall include consideration of fire explosion, toxic atmospheres, electrical hazards, slips, trips and falls, confined spaces and heat related injury. In non-life threatening situations, the injured or incapacitated employee shall decontaminate following normal procedures, with assistance from co-workers if necessary, before exiting the work area to obtain proper medical treatment. In life threatening situations, worker decontamination shall take least priority after measures to stabilize the injured worker, remove the injured worker from the work area, and secure proper medical treatment.
   2. Emergency Response and Evacuation: The Contractor shall provide and document training in emergency response and evacuation procedures to all workers entering the work area.

M. Weekly Submittals During the Lead Disturbance Work: Copies of the following:
   1. Contractor's weekly job progress reports detailing lead disturbance, handling, transportation, and disposal activities. In the job progress reports, the Contractor shall include information on the review of progress concerning previously established milestones and schedules, major problems and action taken, injury reports, equipment breakdown, and bulk material and air sampling results.
   2. Work site entry logbooks with information on worker and visitor access.
   3. Daily logs documenting filter changes on respirators, HEPA vacuums, and other engineering controls.
   4. Waste disposal manifest forms for all lead containing waste material removed from the lead removal site and transported to the disposal site. The papers will include a chain-of-custody form with the names and addresses of the facility, the Contractor, the landfill operator, as well as the estimated quantity of lead containing waste material, and the number and type of containers used. The form shall be signed and dated by the Facility Owner, the Contractor, and the landfill operator as the material changes custody. If a separate hauler is employed, their name, address, telephone number, and signature also shall appear on the form.

N. Waste Disposal and Landfill Requirements: Contractor shall separate lead chips and debris from non-hazardous waste materials such as used plastics, disposable tools, etc. Contractor shall clean all bulk lead containing debris and waste from non-hazardous plastic, tools, suits, etc. prior to disposal.
   1. If Toxic Characteristic Leaching Procedure (TCLP) test results of the containers of waste material are below the EPA limit the lead containing waste materials shall be disposed of at a landfill approved for such purposes. The Contractor shall submit to the Contracting Officer, documentation that the lead containing waste material removed from the work area has been accepted by the landfill Owner.
   2. If the TCLP test results are above the EPA limit or if materials are identified as hazardous waste, the lead containing waste materials shall be disposed of at an EPA approved facility capable of accepting such hazardous waste.

3. The Contractor shall submit to the Contracting Officer documentation that disposal of the lead containing waste material at the selected landfill is approved by the State of Hawaii, or the EPA approved mainland facility for hazardous lead containing waste material.

1.09 SUBMITTAL AFTER WORK IS COMPLETED

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

B. Report: At the completion of the work, a final report shall be prepared by the Contractor for acceptance by the Contracting Officer. The report shall be submitted and shall include the items listed below.
   1. The project name, Abatement Contractor, Abatement Contractor license number, EPA waste generator nimber, work duration, material removed, respiratory protection employed, waste manifest signed by the Contractor, waste transporter, and ladnfill operator, and total quantity of waste, TCLP lead reports, employee exposure air sample results, and results of the most current PAT round results for the laboratory conducting the employee exposure air sample analysis.
   2. Certification of the Abatement Contractor's employees.
   3. Visitor/Worker Entry Log: The daily log of all personnel including the Contractor's employees and agents who enter the work area while lead abatement operations are in progress, until final clearance is received from the Competent Person. The log shall contain the listed information as a minimum and shall be certified by the Competent Person.
      a. Date of visit/worker entry.
      b. Visitor/Worker's name, employer, business address and telephone number.
      c. Time of entry and exit from work area.
      d. Purpose of visit.
      e. Type of protective clothing and respirator worn.
      f. Certificate of release signed and filed with the Contractor.
   4. Clearance: Clearance certifications received from the Competent Person.
   5. Certification Statement: A statement signed by the Lead Abatement Contractor that all lead abatement and disposal was completed in compliance with this specification, Federal and State regulations, and the approved Work Plan.

PART 2 - PRODUCTS

2.01 TOOLS AND EQUIPMENT

A. General: Provide and fabricate suitable tools for the lead disturbance procedures.

B. Other tools and equipment as necessary.

2.02 PERSONNEL PROTECTION REQUIREMENTS

A. The Contractor acknowledges he alone is responsible for instruction and for enforcing personnel protection requirements and that these specifications provide only a minimum acceptable standard.

B. Provide workers with sufficient sets of disposable protective full body clothing consisting of material impenetrable by lead and of the proper size for each individual to accommodate movement without tearing. Such clothing shall consist of full body coveralls, footwear, gloves and headgear. Provide hard hats as required by applicable safety regulations. Disposable clothing shall not be allowed to accumulate and shall be disposed of as lead contaminated waste. Protective clothing shall be worn by all personnel within the work area from the start of the removal to final visual clearance.

C. Insulated non-skid rubber boots or an approved equal shall be required for all individuals entering the work area. Protective full body clothing without elastic at sleeves and legs shall require separate elastic or taped protection to seal the opening. Visitors shall be provided full body protective clothing.

D. Additional safety equipment (e.g. hardhats meeting the requirements of ANSI Z-89.1-2009, eye protection meeting the requirements of ANSI Z87.1-2015, safety shoes meeting the

requirements of ANSI Z41.1-1991, disposable PVC gloves), as necessary, shall be provided to all workers and authorized visitors.

PART 3 - EXECUTION

3.01 POTENTIAL LEAD HAZARD

A. The disturbance or dislocation of lead containing materials may cause lead containing dust to be released into the atmosphere, thereby creating a potential health hazard to the workers and the general public. Apprise all workers, supervisory personnel, subcontractors, consultants, authorized visitors, occupants and neighbors who will be at or near the job site of the seriousness of the hazard and of proper work and protective procedures which must be followed.

B. Where in the performance of the work, workers, supervisory personnel, subcontractors, or consultants who may encounter, disturb, or otherwise function in the immediate vicinity of any identified lead containing materials, take appropriate continuous measures as necessary to protect all workers and the general public from the potential hazard of exposure to respirable airborne lead dust. Such measures shall include the procedures and methods described in the regulations of applicable federal, state and local agencies.

3.02 WORK AREA PREPARATION

A. Protect occupants, and surrounding area from possible contamination: Inform occupants of the removal work involving lead.

B. Treatment of Surfaces: During disturbance work, acceptable industry standard dust control methods shall be used to control dust (such as wetting items to be disturbed, by misting; provide dust screens; remove items in large, whole pieces; avoid crushing and pulverizing removal methods; encapsulate material prior to disturbance; use amended water; and containerize wet waste material). Prevent contamination spreading to the surrounding public and residential area.

C. Barriers: Standard barriers such as construction warning tape, fencing, etc. shall be used to prevent the general public access on to the work site. Seal any penetrations to the affected work area with 6 mil polyethylene plastic sheeting and duct tape.

D. NESHAP Compliance: Compliance with the requirements of EPA's NESHAP regulation is required for this project. Proper notification of the renovation of the building to the Department of Health shall be the Contractor's responsibility.

E. Ensure that all personnel working on site during the demolition work are properly trained and protected as required by law.

3.03 CLEANUP AND TESTING

A. Post-abatement visual clearance will be conducted by the Competent Person.

B. All non-hazardous waste shall be removed from the site by the completion of the project. The Contractor, in the presence of the Competent Person, shall collect representative samples of the waste stream for TCLP lead analysis. All hazardous waste shall be removed from the site to an EPA approved disposal facility within 90 days of the removal work.

C. Clean Up and Testing: Wet clean and HEPA vacuum clean surfaces and surrounding ground within the lead control area daily. Do not allow lead debris to accumulate. Restrict the spread of dust and debris. Keep waste from being distributed over the general area. Do not dry sweep or use compressed air to clean the area. When the removal operation has been completed, the area will be cleaned of all visible lead debris contamination by vacuuming with a High Efficiency Particulate Absolute (HEPA) filtered vacuum cleaner followed by wet mopping where applicable. The Competent Person will visually inspect the affected surfaces for residual lead debris and accumulated dust before the eventual removal of the lead controlled area. The Contractor shall reclean areas showing dust or residual lead debris or if he fails visual clearance. If recleaning is required, the process will be repeated until the visual clearance is given by the Competent Person. Do not remove the lead control area or roped-off perimeter and warning signs prior to the receipt of the Competent Person’s lead clearance certification.

3.04 TRANSPORTATION AND DISPOSAL

A. Disposal of Hazardous Waste and Non-hazardous Waste: Contractor shall separate potentially non-hazardous waste material (i.e. plastic sheeting, disposable protective suits, etc.) from hazardous waste material prior to testing. All other debris, scraps, waste materials, rubbish and trash contaminated with lead and contaminated dust from the immediate work area and place in UN approved (49 CFR 178) and appropriately labeled containers and store on site for TCLP lead testing. The Contractor shall be responsible for collecting and paying of all TCLP testing.
   1. Local waste landfill facilities do not accept any RCRA hazardous waste. All hazardous waste must be disposed of at an EPA approved mainland U.S. hazardous waste disposal facility. Hazardous waste must be disposed of within 90 days of the waste being created.
   2. Non-hazardous lead waste and debris may be disposed of at the local waste landfill facility that is State approved to accept such waste.
      a. Notify Non-hazardous Waste Landfill Operator: The Contractor shall advise the Non-hazardous Waste landfill operator, at least 24 hours prior to transportation, of the material to be delivered.
      b. Provide the Non-hazardous Waste Landfill Operator with applicable TCLP results which indicate that the waste material is non-hazardous.

B. Disposal of Non-Hazardous Construction Debris (TCLP for Lead Not Exceeding EPA Limits): Remove non-hazardous lead waste including, debris, scraps, waste materials, rubbish, and trash from the site and disposed of at a landfill approved for disposal.

C. The Contractor shall submit disposal manifest and receipts showing acceptance of all waste material by the approved waste disposal site to the Contracting Officer. The shipping papers shall include a chain-of-custody form and include names and addresses of the Facility Owner, the Contractor, and the Landfill Operator and information on the type and number of waste containers.

3.05 CLEARANCE CRITERIA

A. Visual clearance of the work area will be performed by the Competent Person. Any additional clearance inspection initiated by the Contractor or required due to failure of the first set of clearance inspection, shall be at the Contractor's expense.

3.06 TESTING AND AIR MONITORING

A. The Competent Person shall have the authority to instigate engineering controls during the project.

B. Testing, daily area (environmental) air monitoring and final clearance inspections shall be provided by the Competent Person, for the purpose of:
   1. Verifying compliance with this section and the applicable regulations listed in this section.
   2. Ensuring that the documentation required by this section and by law is collected and reported to the Contracting Officer.
   3. Instigating engineering control during the project.

3.07 CONTRACTOR RESPONSIBILITIES

A. The Contractor shall be responsible for all TCLP lead testing and analysis.

B. The Contractor shall be responsible for his employees' personnel protection, personal air monitoring and necessary records as required by OSHA, Hawaii State Law and all other applicable laws and as required in these specifications. The Contractor shall provide all required documentation to the Contracting Officer. Contractor shall collect daily personal air samples on at least 25 percent of the personnel performing removal work with the most exposure for the duration of the project.

3.08 MONITORING RESULTS

A. Airborne lead levels in areas adjacent to the work area or in any part of the work site impacted by the removal activities shall not exceed 30 micrograms per cubic meter of air.

B. If the ambient concentrations exceed 30 micrograms per cubic meter of air,

1. the Contractor shall cease all work immediately in any work area causing or contributing to such a condition. The Contractor shall take remedial action (e.g. misting with more water, encapsulation, provide dust screens, etc.) to reduce concentrations to acceptable levels.

C. The Contractor is solely responsible for monitoring his personnel in compliance with all OSHA requirements.

END OF SECTION

SECTION 13288 - ASBESTOS AIR MONITORING

PART 1 - GENERAL

1.01 SUMMARY

A. In performing this project, all possible safeguards, precautions and protective measures should be utilized to prevent exposure of any individual to asbestos.
   1. These specifications are based upon procedures and standards derived from U.S. regulatory agencies (EPA, OSHA, NIOSH) and the Hawaii State Division of Occupational Safety and Health as well as from industry and sound industrial hygiene practice. They must be followed to ensure that no measurable amount of asbestos fibers is released to the uncontrolled work and public areas.

B. Daily area air monitoring and visual inspections for asbestos abatement shall be provided by the Qualified Consultant hired by the State for the purpose of:
   1. Verifying compliance with the specifications and the applicable regulations listed in SECTION 13281, REMOVAL AND DISPOSAL OF ASBESTOS CONTAINING MATERIALS (ACM);
   2. Ensuring that the State's legally required documentation is collected;
   3. Providing engineering control during the project.

1.02 DEFINITIONS

A. ACM: asbestos containing materials.

B. Air Monitoring Specialist: A qualified person who enters the work area to set up the air monitoring device and then collects the various air samples to be sent to the laboratory for analysis.

C. Building representative(s): The person or persons designated by the users of the building to act on their behalf.

D. Competent Person: The Contractor shall employ Competent Person who is educated and trained in recognizing and evaluating work place hazards and stress and providing guidance on the methods and means of removing or correcting such hazards and stresses within the work environment.

E. Contractor: The construction firm engaged to remove, encapsulate and/or dispose of the ACM.

F. Consultant: The firm contracted by the State to inspect the work of the Contractor during the removal, encapsulation and disposal of the ACM and is capable or has a subcontractor to perform air monitoring, sampling and testing before, during and after the asbestos removal and/or encapsulation.

G. Project Designer: The person or firm who prepared the plans and specifications to remove, encapsulate and dispose of the ACM. The Project Designer shall be certified by the State of Hawaii Department of Health as an Asbestos Project Designer.

H. Project Monitor: A person hired by the State that is certified by the State of Hawaii Department of Health as an Asbestos Project Monitor.

I. Qualified Consultant: Consultant hired by the State who will perform asbestos air monitoring and inspection during the asbestos disturbance work and shall have the authority to initiate engineering controls. The Qualified Consultant will be accredited as a State of Hawaii Department of Health accredited Asbestos Project Monitor.

1.03 COORDINATION WITH OTHER SECTIONS

A. Coordinate with the State's Inspector for testing/air monitoring requirements included in SECTION 13281, REMOVAL AND DISPOSAL OF ASBESTOS-CONTAINING MATERIALS (ACM) for testing/air monitoring consultants or inspectors, and all applicable Federal, State and local regulations.

1.04 PRE-CONSTRUCTION CONFERENCE

A. Hold conference prior to construction and shall be conducted by the Contracting Officer assisted by the Project Designer.
   1. Attendance: Present also shall be the Contractor, Project Designer and/or the Project Monitor, Building Representative(s). When the abatement Contractor is a Subcontractor to a General Contractor, a representative of the General Contractor shall also attend.
   2. Agenda:
      a. Review final schedule for project.
      b. Verify legal requirements and special conditions.
      c. Verify compliance with pre-construction requirement.
      d. Obtain copies of all mandatory notifications.
      e. Inspect sample respiratory equipment and other abatement equipment.
      f. Review procedures and responsibilities.
      g. Clarify the scope of work and its best impact on the users of the building.

PART 2 - PRODUCTS (NOT USED)

PART 3 - EXECUTION

3.01 STATE'S RESPONSIBILITIES

A. Testing and air monitoring will be supplied by the Contracting Officer.

3.02 CONTRACTOR'S RESPONSIBILITIES

A. The Contractor shall be responsible for providing the daily personal air monitoring and necessary records for all of the Contractor's employees for the duration of the project as required by OSHA (29 CFR 1926.1101), and all other applicable laws.

B. The Contractor shall obtain the OSHA required reports for personnel air monitoring as part of the contract.

C. The Contractor shall be responsible for daily personal air samples that shall be collected on at least 25% of the personnel performing removal work on similar tasks and for the duration of the project. Submit within 1 working day to the Contracting Officer.

D. The Contractor is solely responsible for protecting his workers, other personnel, and the public from any of his work activities at the work site and on State property regardless of the testing and monitoring conducted by the State.

E. Monitoring information developed by the State's Project Monitor's activities shall be for the use of the Contracting Officer. The information will be available and offered to the Contractor when developed, but not thereafter, and shall not waive the Contractor's obligations stated elsewhere in this section.

F. Air monitoring and testing becomes necessary to follow up on work by the Contractor which is rejected as not conforming to the requirements will be supplied by the Contracting Officer. However, the full cost of such additional monitoring and testing shall be borne by the Contractor and shall be deducted from the final contract payment.

G. Personal air monitoring that becomes part of the Consultant's scope of work shall be accommodated by the Contractor.

3.03 AIR MONITORING AND INSPECTION SERVICES

A. Duties of the Qualified Consultant and Lead Supervisor.
   1. Photographic Record of Project: Record the asbestos abatement project with representative photos. All photos shall become the property of the State and are to be accompanied by a detailed log.
   2. Project Log: Maintain daily field reports detailing all key activities during abatement and make a summary of project activities to the project designer and the State's project manager. Incorporate the contents of the daily field reports with other project data into a final project report.

3. Visual Inspection of all Containment Areas: Perform regular inspection of all containment areas. Conduct inspections during the actual work performance of the contractor to document the work practices employed by the contractor and prior to air testing in each area to verify that all materials scheduled for abatement were removed and the area was properly cleaned.

B. Air Monitoring: The State's on-site Project Monitor shall perform the following activities associated with this portion of the project:
   1. On-site environmental and personnel air monitoring as required by EPA, HDOH, OSHA, HIOSH, and the project specifications (See methodology below).
   2. Laboratory analysis by PCM analysis using NIOSH 7400 method.
   3. Monitoring of decontamination procedures at site entry/exit.
   4. Monitoring of containment maintenance by visual and instrumental inspection.
   5. Interface with project inspectors, building representatives, representatives of regulatory agencies, and project designers during site visits.
   6. Ensure that proper respiratory protection is utilized by all persons at the project site.
   7. Relay to the State's Project Manager any discrepancies in contractor's action with provisions of project specifications.
   8. Act quickly in case of emergencies with appropriate response.

3.04 SAMPLING DESIGN

A. The following is a typical sampling design per containment area during the actual construction. The number of samples and volume quantities may vary, depending on each project's specifications.
   1. Background Samples: Background baseline samples shall be taken prior to abatement to establish pre-abatement airborne fiber concentration levels. Three high volume continuous flow samples shall be taken per estimated containment area. All work area samples shall be analyzed by the NIOSH 7400 method. All personal samples shall be analyzed in accordance with OSHA 29 CFR 1926.1101. The reference TWA (time weighted average) shall be established one day prior to the masking and sealing operations.
   2. Work Area Samples: Low volume samples of 480 liters each shall be taken in the work area. Ambient air samples shall be taken in the work area for comparison to barrier samples in an to ensure that containment systems are secure and that the persons entering the work area are wearing proper respiratory protection. If monitoring inside and outside the asbestos abatement work area shows airborne concentrations have reached the predetermined specified TWA, the consultant shall stop all work, notify the State immediately, have the contractor correct the condition(s) causing the increase and ensure that the contractor obtains the State's approval prior to restarting the removal work.
   3. Barrier Samples: Monitoring outside the temporary barriers determines if leakage is occurring outside the work area due to loss of negative pressure or faulty seals. Two high volume samples shall be taken per eight-hour day per barrier.
   4. Outside Environmental Samples: Each removal area shall be sealed so that airborne fibers cannot escape into occupied areas. Air is forcibly drawn from the removal area by a negative air machine, filtered and exhausted to the outside environment. High volume samples shall be taken at the negative air unit exhaust to ensure compliance with the levels required by the project specifications and/or any applicable regulations. One sample per eight-hour day per containment area shall be taken.
   5. Final Clearance Samples: For all interior removal work, the clearance air samples shall be collected for analysis by phase contrast microscopy. If the test results reveal that the air has been cleaned to the acceptable standards, the area may be opened for re-occupancy.

3.05 LABORATORY ANALYSIS

A. All air samples collected by the State's Project Monitor shall be analyzed by an AIHA certified laboratory for the analysis being requested. All laboratories shall be registered with the Hawaii Department of Health.

3.06 DAILY TESTING RECORDS

A. At the conclusion of every day's testing, the State’s Project Monitor shall provide copies of all air monitoring records of each containment area to the State within 5 working days of collection.

END OF SECTION

SECTION 13289 - LEAD TESTING AND MONITORING

PART 1 - GENERAL

1.01 SUMMARY

A. Abatement Contractor's Responsibilities for personnel monitoring and record keeping.

B. Project air monitoring and inspectional services for the purposes of:
   1. Verifying compliance with the specifications listed in Section 13283 - DISTURBANCE OF LEAD CONTAINING MATERIALS (or equivalent section title).
   2. Ensuring that the State's legally required documentation is collected.
   3. Providing engineering controls during the project.

1.02 DEFINITIONS

A. Action Level (AL): Employee exposure, without regard to the use of respirators, to an airborne concentration of lead of thirty micrograms per cubic meter of air (30 mg/m3) calculated as an 8-hour time-weighted average (TWA).

B. Building Representative(s): The person or persons designated by the users of the building to act on their behalf.

C. Contractor: The Construction firm engaged to remove and dispose of the lead-containing materials.

D. Consultant: The firm contracted by the State to inspect the work of the Contractor during the removal and disposal of the lead-containing materials and is capable or has a Subcontractor to perform personal air monitoring, sampling and testing before, during and after the lead removal. The Consultant may be the Construction Manager or said Construction Manager may be a Subcontractor to the Consultant.

E. Engineering Controls: Measures other than respiratory and other personal protection or administrative controls that are implemented at the worksite to contain, control, and/or otherwise reduce exposure to lead-contaminated dust and debris usually in the occupational health setting. The measures include process and product substitution, isolation, and ventilation. The term may be used in the occupational health setting in order to prevent workers' exposures to lead; it can also be used in other lead hazard control settings, such as preventing residents' exposure.

F. Project Designer: The person or firm, certified by the DOH, State of Hawaii, who prepared the plans and specifications to remove and dispose of the lead-containing materials.

G. Project Monitor: A person hired by the State who shall certify and document removal and clean-up of all lead-containing material and associated waste from the project site and perform visual clearances and testing.

1.03 COORDINATION WITH OTHER SECTIONS

A. Coordinate with the State's Consultant/Project Monitor for the testing and monitoring requirements included in Section 13283 - DISTURBANCE OF LEAD CONTAINING MATERIALS for testing/ air monitoring consultants or Project Monitor, and all applicable Federal, State and local regulations.

1.04 PRE-CONSTRUCTION CONFERENCE

A. Hold conference prior to construction and shall be conducted by the Contracting Officer assisted by the Project Designer.
   1. Attendance: Present also shall be the Contractor, Project Designer and/or the Project Monitor and Building Representative(s). When the abatement Contractor is a Subcontractor to a General Contractor, a representative of the General Contractor shall also attend.
   2. Agenda:
      a. Review final schedule for project.

B. Verify legal requirements and special conditions.

C. Verify compliance with pre-construction requirement.

D. Obtain copies of all mandatory notifications.

E. Inspect sample respiratory equipment and other abatement equipment.

F. Review procedures and responsibilities.

G. Clarify the scope of work and its best impact on the users of the building.

PART 2 - PRODUCTS (NOT USED)

PART 3 - EXECUTION

3.01 STATE'S RESPONSIBILITIES

A. Testing and monitoring will be supplied by the Contracting Officer.

3.02 CONTRACTOR'S RESPONSIBILITIES

A. The Contractor shall be responsible for providing the daily personal air monitoring and necessary records for all of the Contractor's employees for the duration of the project as required by OSHA (29 CFR 1926.62), and all other applicable laws.

B. The Contractor shall obtain the OSHA required reports for personnel air monitoring as part of the contract.

C. The Contractor shall be responsible for daily personal air samples that shall be collected on at least 25% of the Contractor's personnel performing removal work on similar tasks and for the duration of the project. Submit within 5 working days to the Contracting Officer.

D. The Contractor is solely responsible for protecting his workers, other personnel, and the public from any of his work activities at the work site and on State property regardless of the testing and monitoring conducted by the State.

E. Monitoring information developed by the State's Project Monitor's activities shall be for the use of the Contracting Officer. The information will be available and offered to the Contractor when developed, but not thereafter, and shall not waive the Contractor's obligations stated elsewhere in this section.

F. Air monitoring and testing which becomes necessary to follow up on the work by the Contractor which is rejected as not conforming to the requirements will be supplied by the Contracting Officer. However, the full cost of such additional monitoring and testing shall be borne by the Contractor and shall be deducted from the final contract payment.

G. Personal air monitoring that becomes part of the Consultant's scope of work shall be accommodated by the Contractor.

H. Prior to disposal of lead contaminated wastewater, one wastewater (as applicable) sample shall be collected by the Contractor, to determine whether it can be disposed of as non-hazardous waste or with an EPA approved hazardous waste disposal facility as hazardous waste. Contractor shall obtain and submit to the Contracting Officer, a permit to conduct such disposal into the sanitary sewer system prior to disposal. Disposal of all wastewater suspected of being contaminated with lead in the storm drain system is prohibited. Wastewater, no matter what its lead content, shall not be dumped on the ground. Contractor is ultimately responsible for and shall include in his bid the cost to properly dispose of all waste, hazardous or non-hazardous. Submit a copy of the permit to the Contracting Officer.

I. Perform lead Toxic Characteristic Leaching Procedure (TCLP) metals testing on all solid waste debris contaminated with lead (except for painted scrap metal), in accordance with 40 CFR Part 261 "Identification and Listing of Hazardous Waste". Painted metal debris shall be separated from the rest of the lead- contaminated waste and disposed of as scrap metal at a metal recycler (when disposed of as scrap metal, TCLP testing is not required). The TCLP testing shall be used to determine whether waste is hazardous or non-hazardous prior to disposal. Dispose of lead-contaminated debris as hazardous waste if the waste is determined to be hazardous by the TCLP testing. If the TCLP testing indicates that the waste is non- hazardous, the Contractor shall dispose of the waste as non-hazardous, construction waste.

3.03 AIR MONITORING AND INSPECTIONAL SERVICES

A. Duties of the Consultant:
   1. Photographic Record of Project: Record the lead abatement project with representative photos to the Contracting Officer. All photos shall become the property of the State and are to be accompanied by a detailed log.
   2. Project Log: Maintain daily field reports detailing all key activities during abatement and make a submittal of summary project activities to the project designer and the Contracting Officer. Incorporate the contents of the daily field reports with other project data into a final project report.
   3. Visual Inspection of all Containment Areas: Perform regular inspection of all containment areas. Conduct inspections during the actual work performance of the Contractor to document the work practices employed by the Contractor and conduct visual clearances to verify that all materials scheduled for abatement were removed and the area was properly cleaned. Submit clearances to the Contracting Officer.

B. Air Monitoring: The State's on-site Project Monitor shall perform the following activities associated with this portion of the project:
   1. On-site personnel air monitoring (if not provided by the Contractor) as required by OSHA and HIOSH, and the project specifications (See methodology below).
   2. Laboratory analysis for lead-in-air using NIOSH 7082 or OSHA 105 method.
   3. Monitoring of decontamination procedures at site entry/exit.
   4. Monitoring of containment maintenance by visual and instrumental inspection.
   5. Interface with project inspectors, building representatives, representatives of regulatory agencies, and project designers during site visits.
   6. Ensure that proper respiratory protection is utilized by all persons at the project site.
   7. Relay to the Contracting Officer any discrepancies in Contractor's action with provisions of project specifications.
   8. Act quickly in case of emergencies with appropriate response.

3.04 LABORATORY ANALYSIS

A. All personal air samples collected by the State’s Project Monitor shall be analyzed by an AIHA certified laboratory for the analysis being requested. All laboratories shall be registered with the Hawaii Department of Health.

3.05 DAILY TESTING RECORDS

A. At the conclusion of every day’s testing the State’s Project Monitor shall provide copies of all testing and monitoring records to the State within 5 working days of collection

END OF SECTION

SECTION 13701 - ELECTRONIC SAFETY BASIC REQUIREMENTS

PART 1 - GENERAL

1.01 SECTION INCLUDES

A. Work included in Section 13701, Electronic Safety Basic Requirements applies to Division 13, Special Construction work to provide materials, labor, tools, permits, incidentals, and other services to provide and make ready for Owner's use of electronic safety systems for proposed project.

B. Contract Documents include, but are not limited to, Specifications including Division 00, Procurement and Contracting Requirements and Division 01, General Requirements, Drawings, Addenda, Owner/Architect Agreement, and Owner/Contractor Agreement. Confirm requirements before commencement of work.

C. Definitions:
   1. Provide: To furnish and install, complete and ready for intended use.
   2. Furnish: Supply and deliver to project site, ready for unpacking, assembly and installation.
   3. Install: Includes unloading, unpacking, assembling, erecting, installing, applying, finishing, protecting, cleaning and similar operations at project site as required to complete items of work furnished.
   4. Approved or Approved Equivalent: To possess the same performance qualities and characteristics and fulfill the utilitarian function without any decrease in quality, durability or longevity. For equipment/products defined by the Contractor as "equivalent," substitution requests must be submitted to Engineer for consideration, in accordance with Division 01, General Requirements, and approved by the Engineer prior to submitting bids for substituted items.
   5. Authority Having Jurisdiction (AHJ): Indicates reviewing authorities having jurisdiction, including local fire marshal, Owner's insurance underwriter, Owner's Authorized Representative, and other reviewing entity whose approval is required to obtain systems acceptance.

1.02 RELATED SECTIONS

A. Contents of Section apply to Division 13, Special Construction Contract Documents.

B. Related Work:
   1. Additional conditions apply to this Division including, but not limited to:
      a. Specifications including Division 00, Procurement and Contracting Requirements and Division 01, General Requirements.
      b. Drawings
      c. Addenda
      d. Owner/Architect Agreement
      e. Owner/Contractor Agreement
      f. Codes, Standards, Public Ordinances and Permits

C. Contents of Division 16, Electrical apply to this Section.

1.03 REFERENCES AND STANDARDS

A. References and Standards per Division 00, Procurement and Contracting Requirements and Division 01, General Requirements, individual Division 13, Special Construction Sections and those listed in this Section.

B. Codes to include latest adopted editions, including current amendments, supplements and local jurisdiction requirements in effect as of the date of the Contract Documents, of/from:
   1. State of Hawaii:
      a. IBC - International Building Code, with Hawaii Amendments
      b. IECC - International Energy Conservation Code, with Hawaii Amendments
      c. IMC - International Mechanical Code
      d. NEC - National Electrical Code, with Hawaii Amendments
      e. NFPA 1 - Fire Code, with Hawaii Amendments

f. UFC - Uniform Fire Code, with Hawaii Amendments
g. UPC - Uniform Plumbing Code, with Hawaii Amendments

C. Reference standards and guidelines include but are not limited to the latest adopted editions from:
1. ABA - Architectural Barriers Act
2. ADA - Americans with Disabilities Act
3. ANSI - American National Standards Institute
4. ASCE - American Society of Civil Engineers
5. ASHRAE - American Society of Heating, Refrigerating and Air-Conditioning Engineers
6. ASHRAE Guideline 0, the Commissioning Process
7. ASME - American Society of Mechanical Engineers
8. ASTM - ASTM International
9. CFR - Code of Federal Regulations
10. EPA - Environmental Protection Agency
11. ETL - Electrical Testing Laboratories
12. FM - FM Global
13. ISO - International Organization for Standardization
14. NEC - National Electric Code
15. NEMA - National Electrical Manufacturers Association
16. NFPA - National Fire Protection Association
17. OSHA - Occupational Safety and Health Administration
18. SMACNA - Sheet Metal and Air Conditioning Contractors' National Association
19. UL - Underwriters Laboratories Inc.

D. See Division 13, Special Construction individual Sections for additional references.

1.04 SUBMITTALS

A. See Division 01, General Requirements for Submittal Procedures.

B. Provide drawings in format and software release equal to the design documents. Drawings to be the same sheet size and scale as the Contract Documents.

C. "No Exception Taken" constitutes that review is for general conformance with the design concept expressed in the Contract Documents for the limited purpose of checking for conformance with information given. Any action is subject to the requirements of the Contract Documents. Contractor is responsible for the dimensions and quantity and will confirm and correlate at the job site, fabrication processes and techniques of construction, coordination of the work with that of all other trades, and the satisfactory performance of the work.

D. Provide product submittals and shop drawings in electronic format only. Electronic format must be submitted via zip file via e-mail. For electronic format, provide one file per division containing one bookmarked PDF file with each bookmark corresponding to each Specification Section. Arrange bookmarks in ascending order of Specification Section number. Individual submittals sent piecemeal in a per Specification Section method will be returned without review or comment. Copy Architect on all transmissions/submissions.

E. Product Data: Provide manufacturer's descriptive literature for products specified in Division 13, Special Construction Sections.

F. Identify/mark each submittal in detail. Note what difference, if any, exist between the submitted item and the specified item. Failure to identify the differences will be considered cause for disapproval. If differences are not identified and/or not discovered during the submittal review process, Contractor remains responsible for providing equipment and materials that meet the specifications and drawings.
1. Label submittal to match numbering/references as shown in Contract Documents. Highlight and label applicable information to individual equipment or cross out/remove extraneous data not applicable to submitted model. Clearly note options and accessories to be provided, including field installed items. Highlight connections by/to other trades.

2. Include technical data, installation instructions and dimensioned drawings for products, equipment and devices installed, furnished or provided. Reference individual Division 13, Special Construction specification Sections for specific items required in product data submittal outside of these requirements.
3. See Division 13, Special Construction individual Sections for additional submittal requirements outside of these requirements.

G. Maximum of two reviews of complete submittal package. Arrange for additional reviews and/or early review of long-lead items; Bear costs of additional reviews at Engineer's hourly rates. Incomplete submittal packages/submittals will be returned to contractor without review.

H. Resubmission Requirements: Make corrections or changes in submittals as required, and in consideration of Engineer’s comments. Identify Engineer’s comments and provide an individual response to each of the Engineer’s comments. Cloud changes in the submittals and further identify changes which are in response to Engineer’s comments.

I. Structural/Seismic: Provide weights, dimensions, mounting requirements and like information required for mounting, seismic bracing, and support. Indicate manufacturer's installation and support requirements to meet ASCE 7-10 requirements for non-structural components. Provide engineered seismic drawings and equipment seismic certification. Equipment Importance Factor as specified in Division 01 and in Structural documents.

J. Trade Coordination: Include physical characteristics, electrical characteristics, device layout plans, wiring diagrams, and connections as required per Division 13, Special Construction Coordination Documents. For equipment with electrical connections, furnish copy of approved submittal for inclusion in Division 16, Electrical and Division 13, Special Construction submittals.

K. Make provisions for openings in building for admittance of equipment prior to start of construction or ordering of equipment.

L. Substitutions and Variation from Basis of Design:
1. The Basis of Design designated product establishes the qualities and characteristics for the evaluation of any comparable products by other listed acceptable manufacturers if included in this Specification or included in an approved Substitution Request as judged by the Design Professional.
2. If substitutions and/or equivalent equipment/products are being proposed, it is the responsibility of parties concerned, involved in, and furnishing the substitute and/or equivalent equipment to verify and compare the characteristics and requirements of that furnished to that specified and/or shown. If greater capacity and/or more materials and/or more labor are required for the rough-in, circuitry or connections than for the item specified and provided for, then provide compensation for additional charges required for the proper rough-in, circuitry and connections for the equipment being furnished. No additional charges above the Base Bid, including resulting charges for work performed under other Divisions, will be allowed for such revisions. Coordinate with the requirements of "Submittals." For any product marked "or approved equivalent," a substitution request must be submitted to Engineer for approval prior to purchase, delivery or installation.
3. Where manufacturer equipment or model numbers are indicated with no exceptions, substitutions will be rejected.

M. Shop Drawings:
1. Provide coordinated shop drawings which include physical characteristics of all systems, device layout plans, and control wiring diagrams. Reference individual Division 13, Special Construction specification Sections for additional requirements for shop drawings outside of these requirements.
2. Provide Shop Drawings indicating access panel locations, size and elevation for approval prior to installation.

N. Samples: Provide samples when requested by individual Sections.

O. Resubmission Requirements:

1. Make any corrections or change in submittals when required by Architect/Engineer review comments. Provide submittals as specified. The engineer will not be required to edit and/or interpret the Contractor's submittals. Indicate changes for the resubmittal in a cover letter with reference to page(s) changed and reference response to comment. Cloud changes in the submittals.
2. Resubmit for review until review indicates no exception taken or "make corrections noted."
3. When submitting drawings for Engineers re-review, clearly indicate changes on drawings and "cloud" any revisions. Submit a list describing each change.

P. Operation and Maintenance Manuals, Owner's Instructions:
1. Reference individual Division 13, Special Construction Specification Sections for additional requirements for operations and maintenance manuals.
2. Submit, at one time, electronic files (PDF format) of manufacturer's operation and maintenance instruction manuals and parts lists for equipment or items requiring servicing. Submit data when work is substantially complete and in same order format as submittals. Include name and location of source parts and service for each piece of equipment.
    a. Include copy of approved submittal data along with submittal review letters received from Engineer. Data to clearly indicate installed equipment model numbers. Delete or cross out data pertaining to other equipment not specific to this project.
    b. Include copy of manufacturer's standard Operations and Maintenance for equipment. At front of each tab, provide routine maintenance documentation for scheduled equipment. Include manufacturer's recommended maintenance schedule and highlight maintenance required to maintain warranty. Furnish list of routine maintenance parts, including part numbers, sizes and quantities relevant to each piece of equipment.
    c. Include copy of complete parts list for equipment. Include available exploded views of assemblies and sub-assemblies.
    d. Include Warranty per Division 00, Procurement and Contracting Requirements, Division 01, General Requirements, Section 13701, Electronic Safety Basic Requirements and individual Sections.
    e. Include product certificates of warranties and guarantees.
    f. Include copy of start-up and test reports specific to each piece of equipment.
    g. Include commissioning reports.
    h. Engineer will return incomplete documentation without review.
    i. Engineer will provide one set of review comments in Submittal Review format. Arrange for additional reviews; Bear costs for additional reviews at Engineer's hourly rates.
3. Thoroughly instruct Owner in proper operation of equipment and systems. Where noted in individual Sections, training will include classroom instruction with applicable training aids and systems demonstrations. Field instruction per Section 13701, Electronic Safety Basic Requirements Article titled "Demonstration."
4. Copies of certificates of code authority inspections, acceptance, code required acceptance tests, letter of conformance and other special guarantees, certificates of warranties, specified elsewhere or indicated on Drawings.

Q. Record Drawings:
1. Maintain at site at least one set of drawings for recording “as-constructed” conditions. Indicate on drawings changes to original documents by referencing revision document, and include buried elements and location of concealed items. Include items changed by addenda, field orders, supplemental instructions, and constructed conditions.
2. Record Drawings are to include equipment locations, calculations, and schedules that accurately reflect "as constructed or installed" for project.
3. At completion of project, input changes to original project on CAD Drawings and make one set of black-line drawings created from CAD Files in version/release equal to contract drawings. Submit CAD disk and drawings upon substantial completion.

4. See Division 13, Special Construction individual Sections for additional items to include in Record Drawings.

1.05 QUALITY ASSURANCE

A. Regulatory Requirements: Work and materials installed to conform with all local, State and Federal codes, and other applicable laws and regulations. Where code requirements are at variance with Contract Documents, meet code requirements as a minimum requirement and include costs necessary to meet these in Contract. Machinery and equipment are to comply with OSHA requirements, as currently revised and interpreted for equipment manufacturer requirements. Install equipment provided per manufacturer recommendations.

B. Whenever this Specification calls for material, workmanship, arrangement or construction of higher quality and/or capacity than that required by governing codes, higher quality and/or capacity take precedence.

C. Drawings are intended to be diagrammatic and reflect the Basis of Design manufacturer's equipment. They are not intended to show every item in its exact dimensions, or details of equipment or proposed systems layout. Verify actual dimensions of systems (e.g. cable tray, panels, etc.) and equipment proposed to assure that systems and equipment will fit in available space. Contractor is responsible for design and construction costs incurred for equipment other than Basis of Design, including, but not limited to, architectural, structural, electrical, HVAC, fire sprinkler, and plumbing systems.

D. Manufacturer's Instructions: Follow manufacturer's written instructions. If in conflict with Contract Documents, obtain clarification. Notify Engineer/Architect, in writing, before starting work.

E. Items shown on Drawings are not necessarily included in Specifications or vice versa. Confirm requirements in all Contract Documents.

F. Provide products that are UL listed.

1.06 WARRANTY

A. Provide written warranty covering the work for a period of one year from date of Substantial Completion in accordance with Division 00, Procurement and Contracting Requirements and Division 01, General Requirements, Section 13701, Electronic Safety Basic Requirements and individual Division 13, Special Construction Sections.

B. Sections under this Division can require additional and/or extended warranties that apply beyond basic warranty under Division 01, General Requirements and the General Conditions. Confirm requirements in all Contract Documents.

1.07 COORDINATION DOCUMENTS

A. Prior to construction, prepare and submit coordinated layout drawings (composite drawings), to coordinate installation and location of ductwork, grilles, diffusers, piping, fire sprinklers, plumbing, lights, and electrical services. Composite Drawings show services on single sheet. Key Drawings to structural column identification system. Prior to completion of Drawings, coordinate proposed installation with architectural and structural requirements, and other trades (including plumbing, HVAC, fire protection, electrical, ceiling suspension, and ceiling tile systems, etc.), and provide maintenance access requirements. Coordinate with submitted architectural systems (i.e. roofing, ceiling, finishes) and structural systems as submitted, including footings and foundation. Identify zone of influence from footings and ensure systems are not routed within the zone of influence. Unless otherwise required by Division 00, Procurement and Contracting Requirements and/or Division 01, General Requirements, Division 13, Special Construction to combine information furnished by other trades onto master coordination documents.

B. Prepare Drawings as follows:
   1. Drawings in CAD Format. CAD format release equal to design documents. Drawings to be same sheet size and scale as Contract Drawings and indicate location, size and elevation above finished floor of equipment and distribution systems.

2. Review and revise, as necessary, section cuts in Contract Drawings after verification of field conditions.
3. Indicate fittings, hangers, access panels, and elevation of bottom of cable tray above finished floor.
4. Drawings to indicate proposed ceiling grid and lighting layout as shown on electrical drawings and architectural reflected ceiling drawings and HVAC equipment, ductwork.
5. Incorporate Addenda items and change orders.
6. Provide additional coordination as requested by other trades.

C. Advise Architect in event conflict occurs in location or connection of equipment. Bear costs resulting from failure to properly coordinate installation or failure to advise Architect of conflict.

D. Verify in field exact size, location, and clearances of existing material, equipment and apparatus, and advise Architect of discrepancies between that indicated on Drawings and that existing in field prior to installation related thereto.

E. Submit final Coordination Drawings with changes as Record Drawings at completion of project.

PART 2 - PRODUCTS

2.01 MANUFACTURERS

A. Articles, fixtures, and equipment of a kind to be standard product of one manufacture, including but not limited to panels, devices and equipment unless otherwise specified in individual Division 13, Special Construction Sections.

2.02 STANDARDS OF MATERIALS AND WORKMANSHIP

A. Base contract upon furnishing materials as specified. Materials, equipment, and fixtures used for construction are to be new, latest products as listed in manufacturer's printed catalog data and are to be UL or FM approved or have adequate approval or be acceptable by state, county, and city authorities.

B. Names and manufacturer's names denote character and quality of equipment desired and are not to be construed as limiting competition.

C. Hazardous Materials:
1. Comply with local, State of Hawaii, and Federal regulations relating to hazardous materials.
2. Comply with Division 00, Procurement and Contracting Requirements and Division 01, General Requirements for this project relating to hazardous materials.
3. Do not use any materials containing a hazardous substance. If hazardous materials are encountered, do not disturb; immediately notify Owner and Architect. Hazardous materials will be removed by Owner under separate contract.

PART 3 - EXECUTION

3.01 ACCESSIBILITY AND INSTALLATION

A. Confirm Accessibility and Installation requirements in Division 00, Procurement and Contracting Requirements, Division 01, General Requirements, Section 13701, Electronic Safety Basic Requirements and individual Division 13, Special Construction Sections.

B. Install equipment having components requiring access (i.e., devices, equipment, electrical boxes, panels, etc.) so that they may be serviced, reset, replaced or recalibrated by service people with normal service tools and equipment. Do not install equipment in obvious passageways, doorways, scuttles or crawlspaces which would impede or block intended usage.

C. Install equipment and products complete as directed by manufacturer's installation instructions. Obtain installation instructions from manufacturer prior to rough-in of equipment and examine instructions thoroughly. When requirements of installation instructions conflict with Contract Documents, request clarification from Architect prior to proceeding with installation. This includes proper installation methods, sequencing and coordination with other trades and disciplines.

D. Earthwork:

1. Confirm Earthwork requirements in Contract Documents. In absence of specific requirements, comply with individual Division 13, Special Construction Sections and the following:
    a. Perform excavation, dewatering, shoring, bedding, and backfill required for installation of work in this Division in accordance with related earthwork divisions. Contact utilities and locate existing utilities prior to excavation. Repair any work damaged during excavation or backfilling.
    b. Excavation: Do not excavate under footings, foundation bases, or retaining walls.
    c. Provide protection of underground systems. Review the project Geotechnical Report for references to corrosive or deleterious soils which will reduce the performance or service life of underground systems materials.

E. Firestopping:
1. Confirm Firestopping requirements in Division 07, Thermal and Moisture Protection.
2. In absence of specific requirements, comply with individual Division 13, Special Construction Sections and coordinate location and protection level of fire and/or smoke rated walls, ceilings, and floors. When these assemblies are penetrated, seal around conduit, raceway and equipment with approved firestopping material. Install firestopping material complete as directed by manufacturer's installation instructions. Meet requirements of ASTM E814, Standard Test Method for Fire Tests of Through-Penetration Fire Stops.

F. Plenums: In plenums, provide plenum rated materials that meet the requirements to be installed in plenums.

3.02 SEISMIC CONTROL

A. Confirm Seismic Control requirements in Division 01, General Requirements, Structural documents, and individual Division 28 Electronic Safety Sections.

B. Earthquake resistant designs for Electronic Safety (Division 28) systems and equipment to conform to regulations of jurisdiction having authority.

C. Restraints which are used to prevent disruption of function of piece of equipment because of application of horizontal force to be such that forces are carried to frame of structure in such a way that frame will not be deflected when apparatus is attached to a mounting base and equipment pad, or to structure in normal way, utilizing attachments provided. Secure equipment and distribution systems to withstand a force in direction equal to value defined by jurisdiction having authority.

D. Provide means to prohibit excessive motion of safety equipment during earthquake.

3.03 REVIEW AND OBSERVATION

A. Confirm Review and Observation requirements in Division 00, Procurement and Contracting Requirements, Division 01, General Requirements, Section 13701, Electronic Safety Basic Requirements and individual Division 13, Special Construction Sections.

B. Notify Architect, in writing, at following stages of construction so that they may, at their option, visit site for review and construction observation:
1. Underground conduit and wire installation prior to backfilling.
2. Prior to covering walls when electronic safety systems installation is started.
3. Prior to ceiling cover/installation.
4. When main systems, or portions of, are being tested and ready for inspection by AHJ.

C. Final Punch: Costs incurred by additional trips required due to incomplete systems will be the responsibility of the Contractor.

3.04 CONTINUITY OF SERVICE

A. Confirm requirements in Division 00, Procurement and Contracting Requirements and Division 01, General Requirements. In absence of specific requirements in Division 01, General Requirements, comply with individual Division 13, Special Construction Sections and the following:

1. During remodeling or addition to existing structures, while existing structure is occupied, current services to remain intact until new construction, facilities or equipment is installed.
2. Prior to changing over to new system, verify that every item is thoroughly prepared. Install new wiring to point of connection.
3. Coordinate transfer time to new service with Owner. If required, perform transfer during off peak hours. Once changeover is started, pursue to its completion to keep interference to a minimum. If overtime is necessary, there will be no allowance made by Owner for extra expense for such overtime or shift work.
4. Organize work to minimize duration of power interruption.

3.05 CUTTING AND PATCHING

A. Confirm Cutting and Patching Requirements in Division 00, Procurement and Contracting Requirements and Division 01, General Requirements. In absence of specific requirements, comply with individual Division 13, Special Construction Sections and the following:
   1. Proposed floor cutting/core drilling/sleeve locations to be approved by Project Structural Engineer. Submit proposed locations to Architect/Project Structural Engineer. Where slabs are of post tension construction, perform x-ray scan of proposed penetration locations and submit scan results including proposed penetration locations to Project Structural Engineer/Architect for approval. Where slabs are of waffle type construction, show column cap extent and cell locations relative to proposed penetration(s).
   2. Cutting, patching and repairing for work specified in this Division including plastering, masonry work, concrete work, carpentry work, and painting included under this Section will be performed by skilled craftsmen of each respective trade in conformance with appropriate Division of Work.
   3. Additional openings required in building construction to be made by drilling or cutting. Use of jack hammer is specifically prohibited. Patch openings in and through concrete and masonry with grout.
   4. Restore new or existing work that is cut and/or damaged to original condition. Patch and repair specifically where existing items have been removed. This includes repairing and painting walls, ceilings, etc. where existing conduit and devices are removed as part of this project. Where alterations disturb lawns, paving, and walks, repair, refinish and leave in condition matching existing prior to commencement of work.
   5. Additional work required by lack of proper coordination will be provided at no additional cost to the Owner.

3.06 EQUIPMENT SELECTION AND SERVICEABILITY

A. Replace or reposition equipment which is too large or located incorrectly to permit servicing, at no additional cost to Owner.

3.07 DELIVERY, STORAGE AND HANDLING

A. Confirm requirements in Division 00, Procurement and Contracting Requirements and Division 01, General Requirements. In absence of specific requirements, comply with the individual Division 13, Special Construction Sections and the following:
   1. Handle materials delivered to project site with care to avoid damage. Store materials on site inside building or protected from weather, dirt and construction dust.
   2. Protect equipment and pipe to avoid damage. Close conduit openings with caps or plugs. Keep motors and bearings in watertight and dustproof covers during entire course of installation.
   3. Protect devices, panels and similar items until in service.
   4. Products and/or materials that become damaged due to water, dirt and/or dust as a result of improper storage to be replaced before installation.

3.08 DEMONSTRATION

A. Confirm Demonstration requirements in Division 00, Procurement and Contracting Requirements and Division 01, General Requirements, Section 13701, Electronic Safety Basic Requirements and individual Division 13, Special Construction Sections.

B. Upon completion of work and adjustment of equipment, test systems, demonstrate to Owner's Authorized Representative, Architect and Engineer that equipment furnished and installed or connected under provisions of these Specifications functions in manner required. Provide field instruction to Owner's Staff as specified in Division 01, General Requirements, Section 13701, Electronic Safety Basic Requirements and individual Division 13, Special Construction Sections.

C. Manufacturer's Field Services: Furnish services of a qualified factory certified instructor at time approved by Owner, to instruct maintenance personnel, correct defects or deficiencies, and demonstrate to satisfaction of Owner that entire system is operating in satisfactory manner and complies with requirements of other trades that may be required to complete work. Complete instruction and demonstration prior to final job site observations.

3.09 CLEANING

A. Confirm cleaning requirements in Division 00, Procurement and Contracting Requirements, Division 01, General Requirements, Section 13701, Electronic Safety Basic Requirements and individual Division 28 Sections.

B. Upon completion of installation, thoroughly clean exposed portions of equipment, removing temporary labels and traces of foreign substances. Throughout work, remove construction debris and surplus materials accumulated during work.

3.10 INSTALLATION

A. Confirm Installation requirements in Division 00, Procurement and Contracting Requirements, Division 01, General Requirements, Section 13701, Electronic Safety Basic Requirements and individual Division 13, Special Construction Sections.

B. Install equipment in accordance with manufacturer's installation instructions, plumb and level and firmly anchored to building structure. Maintain manufacturer's recommended clearances.

C. Start up equipment, in accordance with manufacturer's start-up instructions, and in presence of manufacturer's representative. Test controls and demonstrate compliance with requirements. Replace damaged or malfunctioning controls and equipment.

D. Provide miscellaneous supports required for installation of equipment, conduit and wiring.

3.11 PAINTING

A. Confirm Painting requirements in Division 01, General Requirements and Division 09, Finishes. In absence of specific requirements, comply with individual Division 13, Special Construction Sections and the following:
   1. Ferrous Metal: After completion of work, thoroughly clean and paint exposed supports constructed of ferrous metal surfaces, i.e. hangers, hanger rods, equipment stands, with one coat of black asphalt varnish for exterior or black enamel for interior, suitable for hot surfaces.
   2. In electrical and mechanical room, on roof or other exposed areas, equipment not painted with enamel to receive two coats of primer and one coat of rustproof enamel, colors as selected by Architect.
   3. See individual equipment Specifications for other painting.
   4. Structural Steel: Repair damage to structural steel finishes or finishes of other materials damaged by cutting, welding or patching to match original.
   5. Conduit: Clean, primer coat and paint interior conduit exposed in finished areas with two coats paint suitable for metallic surfaces. Color selected by Architect.

3.12 ACCEPTANCE

A. Confirm requirements in Division 00, Procurement and Contracting Requirements and Division 01, General Requirements. In absence of specific requirements, comply with individual Division 13, Special Construction Sections and the following:
   1. System cannot be considered for acceptance until work is completed and demonstrated to Architect that installation is in strict compliance with Specifications, Drawings and manufacturer's installation instructions, particularly in reference to following:

a. Cleaning
b. Operation and Maintenance Manuals
c. Training of Operating Personnel
d. Record Drawings
e. Warranty and Guaranty Certificates
f. Start-up/test Documents and Commissioning Reports

3.13 FIELD QUALITY CONTROL

A. Confirm requirements in Division 00, Procurement and Contracting Requirements and Division 01, General Requirements. In absence of specific requirements, comply with individual Division 13, Special Construction Sections and the following:
   1. Tests:
      a. Conduct tests of equipment and systems to demonstrate compliance with requirements specified. Reference individual Specification Sections for required tests. Document tests and include in Closeout Documents.
      b. During site evaluations by Architect or Engineer, provide appropriate personnel with tools to remove and replace trims, covers, and devices so that proper evaluation of installation can be performed.

3.14 LETTER OF CONFORMANCE

A. Provide Letter of Conformance, copies of manufacturers' warranties and extended warranties with a statement in letter that electronic safety systems were installed in accordance with manufacturer's recommendations, UL listings and FM Global approvals. Include Letter of Conformance, copies of manufacturers' warranties and extended warranties in operating and maintenance manuals.

END OF SECTION

SECTION 13850 - FIRE DETECTION AND ALARM

PART 1 - GENERAL

1.01 SUMMARY

A. Work Included:
   1. Fire Alarm Control Units
   2. Notification Appliance Circuit Panels
   3. Relay Modules
   4. Control Modules
   5. Input Modules
   6. Fault Isolation Modules
   7. Combination Horn/Strobes
   8. Miscellaneous Accessories

B. Scope: Provide modification and extension of the existing fire alarm system to accommodate walk-in freezer replacement.

C. In addition, provide design for the following as required in these Contract Documents: Fire Alarm System.

D. In addition, remove existing fire alarm system in remodel areas.

E. System Design:
   1. Design Criteria: Design systems utilizing equipment appliance and device layouts depicted in the contract documents.
   2. Design of Fire Alarm System:
      a. Provide design of the fire alarm system as required by code.
      b. In addition to code requirements, provide weatherproof horn/strobe within new walk-in freezer.
      c. Fire Alarm Sequence of Operation: Match Existing.
      d. Supervisory Sequence of Operation: Match Existing.
      e. Trouble Sequence of Operation: Match Existing.

1.02 RELATED SECTIONS

A. Contents of Division 13, Special Construction and Division 01, General Requirements apply to this Section.

B. Division 16, Electrical requirements apply to this section.

1.03 REFERENCES AND STANDARDS

A. References and Standards as required by Division 13, Special Construction and Division 01, General Requirements.

B. In addition, meet the following:
   1. NFPA 72, National Fire Alarm and Signaling Code, adopted edition.
   2. NFPA 70, National Electrical Code, adopted edition.

1.04 SUBMITTALS

A. Submittals as required by Division 13, Special Construction and Division 01, General Requirements.

B. In addition, provide:
   1. Shop drawings to include the following:
      a. Provide system designer NICET certification number or Engineer's signature and seal on shop drawings.
      b. Identification of system designer and evidence of qualification or certification of designer as required by AHJ.
      c. Floor plans indicating walls, doors, partitions, room descriptions, device/component locations.

d. A symbol legend with device catalog number, description, back box size and mounting requirements.
e. Detailed riser diagram.
f. Notification appliance circuit and number adjacent to each notification appliance symbol.
g. Point to point wiring indicating the quantity and gauge of the conductors and size of conduit/raceway used.
h. Wiring connection diagrams for control equipment, annunciators, power supplies, chargers, initiating devices, notification appliances, components being connected to the system and interfaces to associated equipment.
i. Battery calculations for each battery backed fire alarm control unit.
j. Voltage drop calculations for each notification appliance circuit, indicating individual appliance current draw, conductor run length and size.

2. Prior to final acceptance, submit a letter confirming that inspections have been completed and system is installed and functioning in accordance with Specifications. Include manufacturer representative's certification of installation and letter of warranty.
3. Operation and Maintenance Manuals. Provide manuals containing the following:
a. Catalog Cut Sheets
b. System Components, Initiating Devices and Notification Appliances' Installation Sheets
c. Manufacturer's Installation, Operation and Maintenance Manual
d. Program Data File Printout
e. Program Data File on Electronic Storage Media
f. Record Drawings
g. Record Drawings on Electronic Storage Media
h. One year warranty agreement including parts and labor. Warranty period begins upon date of completion.
i. Record of Completion
j. Test Reports

1.05 QUALITY ASSURANCE

A. Quality assurance as required by Division 13, Special Construction and Division 01, General Requirements.

B. In addition, meet City of Honolulu, Hawaii requirements, ordinances and amendments.

1.06 WARRANTY

A. Warranty of materials and workmanship as required by Division 13, Special Construction and Division 01, General Requirements.

PART 2 - PRODUCTS

2.01 MANUFACTURERS

A. Fire Alarm Control Units: Existing.

B. Notification Appliance Circuit Panels:
1. Same manufacturer as fire alarm control equipment.
2. Alarmsaf
3. Altronix
4. Federal Signal
5. Wheelock
6. Or approved equivalent.

C. Relay Modules:
1. Same manufacturer as fire alarm control equipment.
2. No substitutions permitted.

D. Control Modules:
1. Same manufacturer as fire alarm control equipment.

2. No substitutions permitted.

E. Input Modules:
1. Same manufacturer as fire alarm control equipment.
2. No substitutions permitted.

F. Fault Isolation Modules:
1. Same manufacturer as fire alarm control equipment.
2. No substitutions permitted.

G. Combination Horn/Strobes:
1. Must be compatible with fire alarm control equipment and notification appliance circuit panels.
2. Same manufacturer as fire alarm control equipment.
3. Federal Signal
4. Gentex
5. System Sensor
6. Wheelock
7. Or approved equivalent.

H. Miscellaneous Accessories:
1. Weatherproof/Surface Backboxes:
a. Same manufacturer as fire alarm detection devices or notification appliances.
b. Or approved equivalent.
2. Circuit Conductors:
a. Allied Wire and Cable
b. Belden
c. CCI
d. West Penn Wire
e. Or approved equivalent.
3. Surge Protection:
a. Ditek
b. Transtector
c. Or approved equivalent.
4. Batteries:
a. Same manufacturer as fire alarm control equipment.
b. Power-Sonic
c. Werker
d. Or approved equivalent.
5. Locks and Keys:
a. Same manufacturer as fire alarm control equipment.
b. Or approved equivalent.

I. Substitutions:
1. For other acceptable manufacturers of specified control units, submit product data showing equivalent features and compliance with Contract Documents.
2. For substitution of products by manufacturers not listed, submit product data showing features and certification by Contractor that the design will comply with contract documents.

J. Equipment to be supplied by a certified manufacturer representative.

2.02 FIRE ALARM CONTROL UNITS

A. Existing to remain.

B. Power Supply: Provide power supply(s), adequate to serve control panel modules, remote annunciators, addressable devices, notification appliances and other connected devices.

C. Power Requirements:

1. Loss of 120VAC power automatically causes system to transfer to battery power. Indicate battery power operation by yellow lamp and audible annunciation at control panel and remote annunciator panels. Upon return of 120VAC power, unit recharges batteries to full capacity and maintains battery on float charge. Provide trickle charge adequate capacity to maintain battery fully charged with automatic rate charge.
2. Provide batteries in locking cabinet manufactured for purpose.

2.03 NOTIFICATION APPLIANCE CIRCUIT PANELS

A. Provide power supply(s), adequate to serve modules, remote annunciators, addressable devices, notification appliances and other connected devices or appliances.

B. Loss of normal and emergency power automatically causes system to transfer to battery power. Indicate battery power operation by yellow lamp and audible annunciation at control panel and remote annunciator panels. Upon return of 120VAC power, unit recharges batteries to full capacity and maintains battery on float charge. Provide trickle charge adequate capacity to maintain battery fully charged with automatic rate charge.

C. Provide batteries in locking cabinet manufactured for purpose.

2.04 RELAY MODULES

A. Signaling line circuit interface module that connects to other building systems for control of fire/life safety functions, e.g., air-handler shutdown, fire/smoke damper closure, elevator recall.

B. Module powered from control panel.

2.05 CONTROL MODULES

A. Signaling line circuit interface module that provides notification appliance circuits or system control outputs.

B. Module powered from control panel.

2.06 INPUT MODULES

A. Signaling line circuit interface module that provides initiating device circuits for connection to contact closure initiating devices.

B. Module powered from control panel.

2.07 FAULT ISOLATION MODULES

A. Signaling line circuit interface modules that provide isolation of wire-to-wire shorts on a signaling line circuit with automatic reconnection upon correction of short circuit.

B. Provide module with status indicator LED.

2.08 COMBINATION HORN/STROBES

A. Multi-candela, flush wall and ceiling mount, insect-proof.

B. Provide horn/strobes that meet the latest requirements of NFPA 72, ANSI 117.1 and UL 1971. Candela rating as required by NFPA 72.

2.09 MISCELLANEOUS ACCESSORIES

A. Circuit Conductors: Copper or optical fiber; color code and label. Type FPL, FPLR and FPLP as required by NEC. Minimum signaling line circuit and initiating device circuit wire size: AWG18. Minimum notification appliance circuit wire size: AWG14, or as approved by Engineer. Fiber optic cable as required by manufacturer.

B. Surge Protection: In accordance with IEEE C62.41 B3 combination waveform and NFPA 70; except for optical fiber conductors.

C. Batteries: Sealed lead acid type. Provide additional cabinet, if required due to space limitations in control panels.

PART 3 - EXECUTION

3.01 GENERAL INSTALLATION REQUIREMENTS

A. Obtain Architect's approval of locations of devices, appliances and annunciators before installation.

B. Circuits:
   1. Notification Appliance Circuits (NAC): Class B.
   2. Spare Capacity - Existing Notification Appliance Circuits (adding to an existing circuit): Utilize UL maximum current draw values for notification appliances. Not to exceed manufacturer's listed loading for the circuit and/or power supply. Voltage drop for last device must be within the manufacturer's listed requirements.

C. Power Sources:
   1. Primary: Dedicated branch circuits of facility power distribution system.
   2. Secondary: Storage batteries.
   3. Capacity: Sufficient to operate fire alarm system under normal supervisory condition for 24 hours and operate alarm signals for five minutes at end of standby period.

D. Obtain approval of system design from AHJ prior to installation. Do not begin installation without approval from AHJ and submittal review comments from Engineer.

E. Install in accordance with applicable codes, NFPA 72, NFPA 70 and the Contract Documents.

F. In accordance with manufacturer's instructions, provide wiring, conduit and outlet boxes required for the erection of a complete system as described in these specifications, as shown on Drawings and as required by AHJ.

G. Conceal wiring, conduit, boxes and supports where installed in finished areas.

H. Provide raceway system for cabling concealed in walls and hard ceilings and in locations where cabling is exposed. Where exposed, provide surface raceway in finished areas and surface mounted EMT in non-finished areas.

I. Provide cabling and conduits system suitable for wet locations for below grade systems.

J. At junction boxes and termination points, provide identification tags on wires and cables.

K. Route wiring to avoid blocking access to equipment requiring service, access, or adjustment.

L. Existing Components:
   1. Existing Fire Alarm System: Maintain fully operational during construction in all areas except areas of remodel.
   2. Disable system only to make switchovers and connections.
      a. Notify Owner before partially or completely disabling system.
      b. Notify local fire service.
      c. Make notifications at least five working days in advance.
      d. Make temporary connections to maintain service in areas adjacent to work area.
   3. Provide fire watch in areas where the system is not functioning if required by the AHJ.
   4. Equipment Removal:
      a. Remove existing system after acceptance of new fire alarm system. Restore damaged surfaces.
      b. Package operational fire alarm and detection equipment that has been removed and deliver to Owner.
      c. Remove from site and legally dispose of remainder of existing material.
   5. On-Premises Supervising Station: Include, as part of this work, modifications necessary to existing supervising station to accommodate new fire alarm work.

M. Inspection and Testing for Completion:
   1. System testing and commissioning to be performed by a certified manufacturer representative.
   2. Perform inspection and testing in accordance with NFPA 72 and requirements of local authorities; document each inspection and test.

3. Document audibility measurements and verify intelligibility for each space on record drawings.
4. Provide the services of the installer's supervisor or person with equivalent qualifications to supervise inspection and testing, correction and adjustments.
5. Provide tools, software and supplies required to accomplish inspection and testing.
6. Prepare for testing by ensuring that work is complete and correct; perform preliminary tests as required to test system.
7. Correct defective work, adjust for proper operation and retest until entire system complies with Contract Documents.
8. Notify Owner seven days prior to beginning completion inspections and tests.
9. Notify authorities having jurisdiction and comply with their requirements for scheduling inspections and tests and for observation by their personnel.
10. Diagnostic Period: After successful completion of inspections and tests, operate system in normal mode for at least 14 days without any system or equipment malfunctions.
    a. Record all system operations and malfunctions.
    b. If a malfunction occurs, start diagnostic period over after correction of malfunction.
    c. Owner will provide attendant operator personnel during diagnostic period; schedule training to allow Owner personnel to perform normal duties.
    d. At end of successful diagnostic period, complete and submit NFPA 72 "Inspection and Testing Form."

N. Owner Personnel Instruction:
1. Provide hands-on instruction to designated Owner personnel; on-site, using operational system.
2. Basic Operation: One-hour sessions for attendant personnel, security officers and engineering staff. Combination of classroom and hands-on refresher training; one session post-occupancy.
3. Detailed Operation: Two-hour sessions for engineering and maintenance staff. Combination of classroom and hands-on refresher training; one session post-occupancy.
4. Furnish the services of instructors and teaching aids; have copies of operation and maintenance data and record drawings available during instruction.
5. Provide means of evaluation of trainees suitable to type of training given; report results to Owner.

O. Closeout:
1. Closeout Demonstration:
    a. Demonstrate proper operation of functions to Owner.
    b. Be prepared to conduct any of the required tests.
    c. Have at least one copy of operation and maintenance data, copy of project record drawings, input/output matrix and operator instruction chart(s) available during demonstration.
    d. Have authorized technical representative of control unit manufacturer present during demonstration.
    e. Demonstration may be combined with inspection and testing required by AHJ. Notify AHJ in time to schedule demonstration.
    f. Repeat demonstration until successful.
2. Substantial Completion of the project cannot be achieved until inspection and testing is successful and:
    a. Specified diagnostic period without malfunction has been completed.
    b. Approved operating and maintenance data has been delivered.
    c. Spare parts, extra materials and tools have been delivered.
    d. All aspects of operation have been demonstrated to Architect.
    e. Final acceptance of the fire alarm system has been given by authorities having jurisdiction.
    f. Occupancy permit has been granted.
    g. Specified pre-closeout instruction is complete.

3. Perform post-occupancy instruction within three months after date of occupancy.

3.02 FIRE ALARM CONTROL UNITS

A. Existing.

B. Do not install cabinets or equipment below the battery cabinet. Do not locate battery and charging system cabinets in ceiling space.

C. Perform system programming at the fire alarm control panel. Program the system without shutting the system down. Programming is done off line. Update and maintain hard copy and CD-ROM copy of program at the site.

D. Room Name Labeling: Control unit schedules, programming and labeling for electrical equipment, to use the room names and room numbers that the Architect adopts at the date of substantial completion of construction. This work is to be done at no added cost to the Owner.

3.03 NOTIFICATION APPLIANCE CIRCUIT PANELS

A. Reference 3.01, General Installation Requirements.

B. Install per manufacturer's instructions and recommendations.

C. Provide notification appliance circuit panel power supplies with 120VAC dedicated circuit per NFPA requirements.

D. Do not install cabinets or equipment below the battery cabinet. Do not locate battery and charging system cabinets in ceiling space.

3.04 RELAY MODULES

A. Reference 3.01, General Installation Requirements.

B. Install per manufacturer's instructions and recommendations.

C. Provide machine printed address labels on addressable devices. Labels to be visible from the floor without magnification.

3.05 CONTROL MODULES

A. Reference 3.01, General Installation Requirements.

B. Install per manufacturer's instructions and recommendations.

C. Provide machine printed address labels on addressable devices. Labels to be visible from the floor without magnification.

3.06 INPUT MODULES

A. Reference 3.01, General Installation Requirements.

B. Install per manufacturer's instructions and recommendations.

C. Provide machine printed address labels on addressable devices. Labels to be visible from the floor without magnification.

3.07 FAULT ISOLATION MODULES

A. Reference 3.01, General Installation Requirements.

B. Install per manufacturer's instructions and recommendations.

C. Provide machine printed address labels on addressable devices. Labels to be visible from the floor without magnification.

D. Provide Fault Isolator Modules for signaling line circuit per code requirements and manufacturer instructions.

3.08 COMBINATION HORN/STROBES

A. Reference 3.01, General Installation Requirements.

B. Install per manufacturer's instructions and recommendations.

C. Provide machine printed labels on notification appliances with appliance circuit number and sequence. Labels to be visible from the floor without magnification.

D. Provide protective guard where device is subject to abuse and where required by AHJ.

3.09 MISCELLANEOUS ACCESSORIES

A. Reference 3.01, General Installation Requirements.

B. Install per manufacturer's instructions and recommendations.

C. Weatherproof/Surface Backboxes: Provide manufacturer's weatherproof backbox listed for use in areas where the device or appliance is subject to humidity in excess of listed rating. Provide manufacturer surface backboxes where devices cannot be installed recessed.

D. Circuit Conductors: Provide wiring to meet the requirements of national, state and local electrical codes. Provide color coded wiring as recommended and specified by the fire alarm and detection system manufacturer. Provide Type FPLR cable when in a riser application or FPLP cable when installed in plenums.

E. Surge Protection; Equipment Connected to Alternating Current Circuits: Maximum let through voltage of 350 V(ac), line-to-neutral and 350 V(ac), line-to-line; do not use fuses.

END OF SECTION

SECTION 13910 - FIRE SUPPRESSION BASIC REQUIREMENTS

PART 1 - GENERAL

1.01 SECTION INCLUDES

A. Work included in 13910, Fire Suppression Basic Requirements applies to Division 13, Special Construction work to provide materials, labor, tools, permits, incidentals, and other services to provide and make ready for Owner's use of fire protection systems for proposed project.

B. Contract Documents include, but are not limited to, Specifications including Division 00, Procurement and Contracting Requirements and Division 01, General Requirements, Drawings, Addenda, Owner/Architect Agreement, and Owner/Contractor Agreement. Confirm requirements before commencement of work.

C. Definitions:
   1. Provide: To furnish and install, complete and ready for intended use.
   2. Furnish: Supply and deliver to project site, ready for unpacking, assembly and installation.
   3. Install: Includes unloading, unpacking, assembling, erecting, installation, applying, finishing, protecting, cleaning and similar operations at project site as required to complete Item of work furnished.
   4. Approved or Approved Equivalent: To possess the same performance qualities and characteristics and fulfill the utilitarian function without any decrease in quality, durability or longevity. For equipment/products defined by the Contractor as "equivalent," substitution requests must be submitted to Engineer for consideration, in accordance with Division 01, General Requirements, and approved by the Engineer prior to submitting bids for substituted Item.
   5. Authority Having Jurisdiction (AHJ): Indicates reviewing authorities, including local fire marshal, Owner's insurance underwriter, Owner's Authorized Representative, and other reviewing entity whose approval is required to obtain systems acceptance.

1.02 RELATED SECTIONS

A. Content of Section applies to Division 13, Special Construction Contract Documents.

B. Related Work:
   1. Additional conditions apply to this Division including, but not limited to:
      a. Specifications including Division 00, Procurement and Contracting Requirements and Division 01, General Requirements.
      b. Drawings
      c. Addenda
      d. Owner/Architect Agreement
      e. Owner/Contractor Agreement
      f. Codes, Standards, Public Ordinances and Permits

1.03 REFERENCES AND STANDARDS

A. References and Standards per Division 00, Procurement and Contracting Requirements and Division 01, General Requirements, individual Division 13, Special Construction Sections and those listed in this Section.

B. Codes to include latest adopted editions, including current amendments, supplements and local jurisdiction requirements in effect as of the date of the Contract Documents, of/from:
   1. State of Hawaii:
      a. IBC - International Building Code, with Hawaii Amendments
      b. IECC - International Energy Conservation Code, with Hawaii Amendments
      c. IMC - International Mechanical Code
      d. NEC - National Electrical Code, with Hawaii Amendments
      e. UFC - Uniform Fire Code, with Hawaii Amendments
      f. UPC - Uniform Plumbing Code, with Hawaii Amendments

C. Reference standards and guidelines include but are not limited to the latest adopted editions from:

1. ABA - Architectural Barriers Act
2. ADA - Americans with Disabilities Act
3. AHRI - Air-Conditioning Heating & Refrigeration Institute
4. ANSI - American National Standards Institute
5. ASCE - American Society of Civil Engineers
6. ASCE-7 Minimum Design Loads for Buildings and Other Structures
7. ASHRAE - American Society of Heating, Refrigerating and Air-Conditioning Engineers
8. ASHRAE Guideline 0, the Commissioning Process
9. ASME - American Society of Mechanical Engineers
10. ASPE - American Society of Plumbing Engineers
11. ASSE - American Society of Sanitary Engineering
12. ASTM - ASTM International
13. AWWA - American Water Works Association
14. CFR - Code of Federal Regulations
15. EPA - Environmental Protection Agency
16. ETL - Electrical Testing Laboratories
17. FCC - Federal Communications Commission
18. FM - FM Global
19. FM Global - FM Global Approval Guide
20. IAPMO - International Association of Plumbing and Mechanical Official
21. ICC - International Code Council
22. IEC - International Electrotechnical Commission
23. ICC-ESR - International Code Council Evaluation Service Reports
24. HI - Hydraulic Institute Standards
25. ISO - International Organization for Standardization
26. MSS - Manufacturers Standardization Society
27. NEC - National Electric Code
28. NEMA - National Electrical Manufacturers Association
29. NFPA - National Fire Protection Association:
    a. NFPA 13 - Standard for the Installation of Sprinkler Systems
    b. NFPA 24 - Standard for Installation of Private Fire Service Mains and Their Appurtenances
    c. NFPA 25 - Standard for Inspection, Testing, and Maintenance of Water-Based Fire Protection Systems
    d. NFPA 70 - National Electrical Code
    e. NFPA 72 - National Fire Alarm and Signaling Code
30. NRCA - National Roofing Contractors Association
31. NSF - National Sanitation Foundation
32. OSHA - Occupational Safety and Health Administration
33. SMACNA - Sheet Metal and Air Conditioning Contractors' National Association, Inc.
34. TIMA - Thermal Insulation Manufacturers Association
35. UL - Underwriters Laboratories Inc.

D. See Division 13, Special Construction individual Sections for additional references.

1.04 SUBMITTALS

A. See Division 01, General Requirements for Submittal Procedures as well as specific individual Division 13, Special Construction sections.

B. Provide drawings in format and software release equal to the design documents. Drawings to be the same sheet size and scale as the Contract Documents.

C. "No Exception Taken" constitutes that review is for general conformance with the design concept expressed in the Contract Documents for the limited purpose of checking for conformance with information given. Any action is subject to the requirements of the Contract Documents. Contractor is responsible for the dimensions and quantity and will confirm and

correlate at the job site, fabrication processes and techniques of construction, coordination of the work with that of all other trades, and the satisfactory performance of the work.

D. Provide product submittals and shop drawings in electronic format only. Electronic format must be submitted via zip file via e-mail. For electronic format, provide one file per division containing one bookmarked PDF file with each bookmark corresponding to each Specification Section. Arrange bookmarks in ascending order of Specification Section number. Individual submittals sent piecemeal in a per Specification Section method will be returned without review or comment. Copy Architect on all transmissions/submissions.

E. Submit shop drawings, calculations and product data sheets as one complete stand-alone package to AHJ, Owner's insurance underwriter and Engineer.

F. Product Data: Provide Manufacturer's descriptive literature for products specified in Division 13, Special Construction Sections.

G. Identify/mark each submittal in detail. Note what differences, if any, exist between the submitted item and the specified item. Failure to identify the differences will be considered cause for disapproval. If differences are not identified and/or not discovered during the submittal review process, Contractor remains responsible for providing equipment and materials that meet the Specifications and Drawings.
   1. Label submittal to match numbering/references as shown in Contract Documents. Highlight and label applicable information to individual equipment or cross out/remove extraneous data not applicable to submitted model. Clearly note options and accessories to be provided, including field installed Item. Highlight connections by/to other trades.
   2. Include technical data, installation instructions and dimensioned drawings for products, equipment and devices installed, furnished or provided. Reference Division 13, Special Construction specification Sections for specific Item required in product data submittal outside of these requirements.
   3. Provide pump curves, operation characteristics, capacities, ambient noise criteria, etc. for equipment.
   4. For vibration isolation of equipment, list make and model selected with operating load and deflection. Indicate frame type where required. Submit manufacturer's product data.
   5. See Division 13, Special Construction Sections for additional submittal requirements outside of these requirements.

H. Maximum of two reviews provided of complete submittal package. Arrange for additional reviews and/or early review of long-lead Item; Bear costs of additional reviews at Engineer's hourly rates. Incomplete submittal packages/submittals will be returned to contractor without review.

I. Resubmission Requirements: Make corrections or changes in submittals as required, and in consideration of Engineer’s comments. Identify Engineer’s comments and provide an individual response to each of the Engineer’s comments. Cloud changes in the submittals and further identify changes which are in response to Engineer’s comments.

J. Structural/Seismic: Provide weights, dimensions, mounting requirements and like information required for mounting, seismic bracing, and support. Indicate manufacturer's installation and support requirements to meet ASCE 7-10 requirements for non-structural components. Provide engineered seismic drawings and equipment seismic certification. Equipment Importance Factor as specified in Division 01 and in Structural documents.

K. Trade Coordination: Include physical characteristics, electrical characteristics, device layout plans, wiring diagrams, and connections as required per Division 13, Special Construction coordination documents. For equipment with electrical connections, furnish copy of approved submittal for inclusion in Division 16, Electrical and Division 28, Electronic Safety submittals.

L. Make provisions for openings in building for admittance of equipment prior to start of construction or ordering of equipment.

M. Substitutions and Variation from Basis of Design:

1. The Basis of Design designated product establishes the qualities and characteristics for the evaluation of any comparable products by other listed acceptable manufacturers if included in this Specification or included in an approved Substitution Request as judged by the Design Professional.
2. If substitutions and/or equivalent equipment/products are being proposed, it is the responsibility of parties concerned, involved in, and furnishing the substitute and/or equivalent equipment to verify and compare the characteristics and requirements of that furnished to that specified and/or shown. If greater capacity and/or more materials and/or more labor is required for the rough-in, circuitry or connections than for the item specified and provided for, then provide compensation for additional charges required for the proper rough-in, circuitry and connections for the equipment being furnished. No additional charges above the Base Bid, including resulting charges for work performed under other Divisions, will be allowed for such revisions. Coordinate with the requirements of "Submittals". For any product marked "or approved equivalent", a substitution request must be submitted to Engineer for approval prior to purchase, delivery or installation.

N. Shop Drawings:
1. Provide coordinated Shop Drawings which include physical characteristics of all systems, equipment and piping layout, pipe layout, hanger layout, sway brace layout, seismic restraints, sway brace calculations, drains, location of drain discharge, risers, valves, details, water test information, physical device layout plans, and control wiring diagrams. Reference individual Division 13, Special Construction Sections for additional requirements for shop drawings outside of these requirements.
2. Shop Drawings and hydraulics calculations, sway brace calculations, trapeze hanger calculations, and the like, to be prepared under the direct supervision and control of a Professional Engineer competent to do such work and licensed in the state of Hawaii. Drawings and calculations to bear the seal and wet signature of the professional Engineer.
3. Provide Shop Drawings which indicate information required by NFPA 13. Include room names and fire sprinkler occupancy hazard classifications.
4. Provide Shop Drawings illustrating information for Hydraulic Information Sign for each hydraulic remote area calculated.
5. Utilizing the Reflected Ceiling backgrounds, provide Shop Drawings illustrating locations of fire sprinklers and piping.
6. Utilizing the Structural backgrounds, provide Shop Drawings illustrating locations and types of hangers and sway braces.
7. Provide Shop Drawings illustrating each type of hanger, including fasteners to structure.
8. Provide Shop Drawings illustrating each type of branchline restraint and sway brace, including length of sway brace member, sway brace fittings, minimum and maximum angles from vertical of sway brace member, method of attachment to structure, size, length and embedment of attachment to structure and size and type of structural member to which sway brace will be attached. Number each type of restraint and sway brace. Indicate on Drawings locations of each type of numbered restraint and sway brace.
9. Provide details for any hanger, attachment, or sway brace to be attached to any I-joist, structural insulated panels (SIPs), cross laminated timber, and similar engineered structural products according to the specifications of the engineered product manufacturer.
10. Provide Shop Drawings illustrating information for Sprinkler System General Information Sign.
11. Shop Drawings to include a cross-sectional view that shows the sprinkler heads and piping in relation to the building's architectural and structural information. View to be chosen based on a location that will display the most information.
12. When required, provide Coordination Drawings.
13. Provide Shop Drawings indicating access panel locations, size and elevation for approval prior to installation.

14. Provide details of hanger, sway bracing and branch line restraint attachments to structure and to piping. Include details on the size and load capacities of fasteners. Provide verification of the structural capacity to withstand seismic load.
15. Provide sway bracing calculations on drawings showing horizontal seismic design load and requirements, with indication of zone of influence for each bracing location.
16. Provide a schedule of sway bracing type, size, and design criteria, including length, angle from vertical, and load capacities.
17. Clearly indicate the elevation of the highest sprinkler in relation to the elevation of the flow test pressure gauge monitor hydrant.
18. Provide details of flexible sprinkler hose fitting per manufacturer's schedule of equivalent feet used in hydraulic calculations, showing device length, maximum number of 90-degree bends and expected radius of bends.
19. Provide a schedule of signage to be installed at each flexible sprinkler hose fitting.
20. On the drawings, provide a list of number, model, temperature, sprinkler Identification number, manufacturer, orifice, deflector type, thermal sensitivity and pressure rating, quantity of each type to be contained in the spare sprinkler cabinet and the issue date or revision date of the list."
21. Spare sprinkler head cabinet size indicating the number of spare sprinkler head to be contained therein.

O. Samples: Provide samples when requested by individual Sections.

P. Resubmission Requirements:
1. Make any corrections or change in submittals when required. Provide submittals as specified. The Engineer will not be required to edit and/or interpret the Contractor's submittals. Indicate changes for the resubmittal in a cover letter with reference to page(s) changed and reference response to comment. Clearly indicate changes on Drawings and cloud changes in the submittals.
2. Resubmit for review until review indicates no exceptions taken or make "corrections as noted".

Q. Operation and Maintenance Manuals/Owner's Instructions:
1. Submit, at one time, electronic files (PDF format) of manufacturer's operation and maintenance instruction manuals and parts lists for equipment or Item requiring servicing. Include valve charts. Submit data when work is substantially complete and in same order format as submittals. Include name and location of source parts and service for each piece of equipment.
    a. Include copies of certificates of code authority acceptance, code-required acceptance tests; test reports and certificates.
    b. Include Warranty per Division 00, Procurement and Contracting Requirements and Division 01, General Requirements, Section 13910, Fire Suppression Basic Requirements and individual Sections.
    c. Catalog description of each Item of equipment actually installed on job.
    d. Instructions for operation and maintenance of fire suppression systems composed of operating instructions, maintenance instructions and manufacturer's literature as follows:
        1) Testing and Maintenance Schedule Chart: Provide an 8-1/2- by 11-inch typewritten list of each item of installed equipment requiring testing inspection , lubrication or service, describing and scheduling performance of maintenance.
        2) Manufacturer's Literature: Provide copies of manufacturer's instructions for operation and maintenance of fire suppression equipment, including replacement parts list with name and address of nearest distributor. Mark each copy with equipment identification label as listed in equipment schedule, i.e. F-5 etc.
    e. Include product certificates of warranties and guarantees.
    f. Include Record Drawings,
    g. Include copy of water supply flow test used as basis for hydraulic calculations.

h. Include hydraulic calculations and sway brace calculations.
i. Include Contractor’s Material and Test Certificates for Aboveground Piping/Underground Piping.
j. Include a copy of NFPA 25.
k. Include a copy of valve charts and whether normally open or normally closed.
l. Include a copy of drain, auxiliary, and low point drains charts.
m. Include a copy of the list to be included in the spare sprinkler head box.
n. Include copy of approved submittal data along with submittal review letters received from Engineer. Data to clearly indicate installed equipment model numbers. Delete or cross out data pertaining to other equipment not specific to this project.
o. Include copy of manufacturer's standard Operations and Maintenance for equipment. At front of each tab, provide routine maintenance documentation for scheduled equipment. Include manufacturer's recommended maintenance schedule and highlight maintenance required to maintain warranty. Furnish list of routine maintenance parts, including part numbers, sizes, and quantities relevant to each piece of equipment: i.e. belts, motors, lubricants, and filters.
p. Include copy of complete parts list for equipment. Include available exploded views of assemblies and sub-assemblies.
q. Include copy of startup and test reports specific to each piece of equipment.
r. Engineer will return incomplete documentation without review. Engineer will provide one set of review comments in Submittal Review format. Contractor must arrange for additional reviews; Contractor to bear costs for additional reviews at Engineer's hourly rates.

2. Thoroughly instruct Owner in proper operation of equipment and systems. Where noted in individual Sections, training will include classroom instruction with applicable training aids and systems demonstrations. Field instruction per Section 13910, Fire Suppression Basic Requirements, Article titled "Demonstration".
3. Copies of certificates of code authority inspections, acceptance, code required acceptance tests, letter of conformance and other special guarantees, certificates of warranties, specified elsewhere or indicated on Drawings.

R. Record Drawings:
1. Maintain at site at least one set of Drawings for recording “As-constructed” conditions. Indicate on Drawings changes to original documents by referencing revision document, and include buried elements, location of cleanouts, and location of concealed mechanical Item. Include items changed by field orders, supplemental instructions, and constructed conditions.
2. Record Drawings are to include equipment and fixture/connection schedules that accurately reflect "as constructed or installed" for project.
3. At completion of project, input changes to original project on CAD Drawings and make one set of black-line drawings created from CAD Files in version/release equal to contract drawings. Submit CAD disk and drawings upon substantial completion.
4. Invert elevations and dimensioned locations for water services and drainage piping below grade extending to 5-feet outside building line.
5. Record Drawings to include site information or reference site information for complete understanding of the fire protection system between the building and the point of connection to the water supply and location of flow test pressure hydrants.
6. See Division 13, Special Construction individual Sections for additional items to include in Record Drawings.

S. Calculations: Submit hydraulic and sway brace and the like calculations.
1. Hydraulic Calculations:
a. Include friction losses between the hydraulically most remote design area and the hydrant flow test pressure hydrant.
b. Hydraulic calculations to be performed on a nationally recognized fire sprinkler hydraulic calculation computer program, with cover sheets in the format required by

the latest edition of NFPA 13. Hydraulic calculations performed “by hand” or not on a nationally recognized fire sprinkler hydraulic calculations computer program will be returned without review by engineer.

c. Provide one or more hydraulic calculations for each hydraulically most remote area.
d. Where it is not obvious which area is most hydraulically remote, perform and submit for review additional hydraulic calculations proving the hydraulically most remote area.
e. For grid systems, either provide “peaked” hydraulic calculations, or provide two additional sets of hydraulic calculations for each hydraulically most remote area.
f. Include pressure losses between the highest sprinkler and the elevation of the pressure gauge monitor hydrant of the flow test.
g. Include friction loss for flexible branch line connectors per manufacturer's schedule of equivalent feet for device length, maximum number of bends and expected radius of bends.
h. When flexible sprinkler hose fittings are added to an existing system, provide hydraulic calculations verifying the design flow rate will be achieved."
i. For Future Tenant Improvement Spaces: Include in hydraulic calculations friction loss allowances for future installation of flexible sprinkler head connectors so that flexible connectors may be installed in the future without revisions to the overhead system.

2. Sway Brace Calculations:
   a. Sway brace calculations utilizing a proprietary computer calculation program only used for the sway brace components supported by that manufacturer. For example, only “manufacturer X” sway brace components, and not those of another manufacturer, may be calculated on a "manufacturer X” sway brace computer calculation program.
   b. Provide seismic calculations for any sway brace to be attached to any I-joist, structural insulated panels (SIPs), cross laminated timber, and similar engineered structural products according to the specifications of the I-joist manufacturer.

1.05 QUALITY ASSURANCE

A. Regulatory Requirements: Work and materials installed to conform with all local, State and Federal codes, and other applicable laws and regulations. Where code requirements are at variance with Contract Documents, meet code requirements as a minimum requirement and include costs necessary to meet these in Contract. Machinery and equipment are to comply with OSHA requirements, as currently revised and interpreted for equipment manufacturer requirements. Install equipment provided per manufacturer recommendations.

B. Whenever this Specification calls for material, workmanship, arrangement or construction of higher quality and/or capacity than that required by governing codes, higher quality and/or capacity take precedence.

C. Drawings are intended to be diagrammatic and reflect the Basis of Design manufacturer's equipment. They are not intended to show every Item in its exact dimensions, or details of equipment or proposed systems layout. Verify actual dimensions of systems (i.e., piping) and equipment proposed to assure that systems and equipment will fit in available space. Contractor is responsible for design and construction costs incurred for equipment other than Basis of Design, including, but not limited to, architectural, structural, electrical, HVAC, fire sprinkler, and plumbing systems.

D. Manufacturer's Instructions: Follow manufacturer's written instructions. If in conflict with Contract Documents, obtain clarification. Notify Engineer/Architect, in writing, before starting work.

E. Items shown on Drawings are not necessarily included in Specifications or vice versa. Confirm requirements in all Contract Documents.

F. Provide products that are UL listed.

G. Piping Insulation products to contain less than 0.1 percent by weight PBDE in all insulating materials.

1.06 WARRANTY

A. Provide written warranty covering the work for a period of one year from date of Substantial Completion in accordance with Division 00, Procurement and Contracting Requirements and Division 01, General Requirements, Section 13910, Fire Suppression Basic Requirements and individual Division 13, Special Construction Sections.

B. Sections under this Division can require additional and/or extended warranties that apply beyond basic warranty under Division 01, General Requirements and the General Conditions. Confirm requirements in all Contract Documents.

1.07 COORDINATION DOCUMENTS

A. Prior to construction, prepare and submit coordinated layout drawings (composite drawings), to coordinate installation and location of ductwork, grilles, diffusers, piping, fire sprinklers, fire alarm, plumbing, cable trays, lights, and electrical services. Composite Drawings show services on single sheet. Key Drawings to structural column identification system. Prior to completion of Drawings, coordinate proposed installation with architectural and structural requirements, and other trades (including plumbing, HVAC, electrical, fire alarm ceiling suspension and tile systems, etc.), and provide maintenance access requirements. Coordinate with submitted architectural systems (i.e. roofing, ceiling and finishes) and structural systems as submitted, including footings and foundation. Identify zone of influence from footings and ensure systems are not routed within the zone of influence. Unless otherwise required by Division 00, Procurement and Contracting Requirements and/or Division 01, General Requirements, Division 15, Mechanical to combine information furnished by other trades onto master coordination documents.

B. Prepare Drawings as follows:
   1. Provide drawings in CAD Format. CAD format release equal to design documents. Drawings to be same sheet size and scale as Contract Drawings and indicate location, size and elevation above finished floor of equipment and distribution systems.
   2. Review and revise, as necessary, section cuts in Contract Drawings after verification of field conditions.
   3. Indicate fire protection system piping including fittings, hangers, access panels, valves, and bottom of pipe elevations above finished floor.
   4. Indicate inverts and provision for piping that must be graded to have right-of-way over more flexible Item. Drawings also to indicate proposed ceiling grid and lighting layout as shown on electrical drawings, architectural reflected ceiling drawings and HVAC equipment, ductwork and piping. Drawings to indicate proposed and identified structural members to which hangers and sway braces will be attached as shown on structural drawings.
   5. Incorporate Addenda Item and change orders.
   6. Provide additional coordination as requested by other trades.

C. Advise Architect in event conflict occurs in location or connection of equipment. Bear costs resulting from failure to properly coordinate installation or failure to advise Architect of conflict.

D. Verify in field exact size, location, invert, and clearances regarding existing material, equipment and apparatus, and advise Architect of discrepancies between that indicated on Drawings and that existing in field prior to installation related thereto.

E. Submit final Coordination Drawings with changes as Record Drawings at completion of project.

PART 2 - PRODUCTS

2.01 MANUFACTURERS

A. Articles, fixtures, and equipment of a kind to be standard product of one manufacturer, including but not limited to sprinkler heads, pipe, fittings, hangers and bracing materials.

2.02 STANDARDS OF MATERIALS AND WORKMANSHIP

A. Base contract upon furnishing materials as specified. Materials, equipment, and fixtures used for construction are to be new, latest products as listed in manufacturer's printed catalog data

and are to be UL, ETL, FM, and ICC-ES approved for their intended fire protection function or have adequate approval or be acceptable by State, County, and City authorities.

B. Names and manufacturer's names denote character and quality of equipment desired and are not to be construed as limiting competition.

C. Hazardous Materials:
   1. Comply with local, State of Hawaii, and Federal regulations relating to hazardous materials.
   2. Comply with Division 00, Procurement and Contracting Requirements and Division 01, General Requirements for this project relating to hazardous materials.
   3. Do not use any materials containing a hazardous substance. If hazardous materials are encountered, do not disturb; immediately notify Owner and Architect. Hazardous materials will be removed by Owner under separate contract.

PART 3 - EXECUTION

3.01 ACCESSIBILITY AND INSTALLATION

A. Confirm Accessibility and Installation requirements in Division 00, Procurement and Contracting Requirements, Division 01, General Requirements, Section 13910, Fire Suppression Basic Requirements and individual Division 13, Special Construction Sections.

B. Install equipment requiring access (i.e. drains, control operators, valves, motors, engines, pumps, controllers, air compressors, gauges, fill cups, tanks, cleanouts and the like) so that they may be serviced, reset, replaced or recalibrated by service people with normal service tools and equipment. Do not install equipment in obvious passageways, doorways, scuttles or crawlspaces which would impede or block intended usage.

C. Install equipment and products complete as directed by manufacturer's installation instructions. Obtain installation instructions from manufacturer prior to rough-in of equipment and examine instructions thoroughly. When requirements of installation instructions conflict with Contract Documents, request clarification from Architect prior to proceeding with installation. This includes proper installation methods, sequencing, and coordination with other trades and disciplines.

D. Earthwork:
   1. Confirm Earthwork requirements in Contract Documents. In absence of specific requirements, comply with the following:
      a. Perform excavation, dewatering, shoring, bedding, and backfill required for installation of work in this Division in accordance with the provisions specified. Contact utilities and locate existing utilities prior to excavation. Repair any work damaged during excavation or backfilling.
      b. Excavation: Do not excavate under footings, foundation bases, or retaining walls.
      c. Provide protection of underground systems. Review the project Geotechnical Report for references to corrosive or deleterious soils which will reduce the performance or service life of underground systems materials.

E. Firestopping:
   1. Confirm Firestopping requirements in Division 07, Thermal and Moisture Protection.
   2. In absence of specific requirements, comply with individual Division 13, Special Construction Sections and coordinate location and protection level of fire and/or smoke rated walls, ceilings, and floors. When these assemblies are penetrated, seal around piping, ductwork and equipment with approved firestopping material. Install firestopping material complete as directed by manufacturer's installation instructions. Meet requirements of ASTM International E814, Standard Test Method for Fire Tests of Through-Penetration Fire Stops.

F. Pipe Installation:
   1. Provide installation of piping systems coordinated to account for expansion and contraction of piping materials and building as well as anticipated settlement or shrinkage of building. Install work to prevent damage to piping, equipment, and building and its

contents. Provide piping offsets, loops, expansion joints, sleeves, anchors or other means to control pipe movement and minimize forces on piping. Verify anticipated settlement and/or shrinkage of building with Project Structural Engineer. Verify construction phasing, type of building construction products and rating coordinating installation of piping systems.

2. Include provisions for servicing and removal of equipment without dismantling piping.

G. Plenums: Provide plenum rated materials that meet the requirements to be installed in plenums. Immediately notify Architect/Engineer of discrepancy.

3.02 SEISMIC CONTROL

A. Confirm Seismic Control requirements in Division 01, General Requirements, Structural documents, and individual Division 13, Special Construction Sections.

B. Provide fire suppression equipment and piping, both hanging and base mounted, with mounting connection points of sufficient strength to resist lateral seismic forces equal to lateral seismic forces as determined by building code and NFPA 13 calculations, whichever is more demanding.

C. See Structural Drawings for seismic design criteria for sway bracing and seismic restraint.

D. Earthquake resistant designs for Fire Protection (Division 13) equipment and distribution, i.e. fire sprinkler systems, fire standpipe systems, fire pumps, fire pump controllers, fire tanks, clean agent fire suppression systems, etc. to conform to regulations of jurisdiction having authority.

E. Restraints which are used to prevent disruption of function of piece of equipment because of application of horizontal force to be such that forces are carried to frame of structure in such a way that frame will not be deflected when apparatus is attached to a mounting base and equipment pad, or to structure in normal way, utilizing attachments provided. Secure equipment and distribution systems to withstand a force in direction equal to value defined by jurisdiction having authority.

F. Provide stamped Shop Drawings from licensed Engineer of seismic bracing and seismic movement assemblies for piping, equipment, tanks, pumps controllers and the like. Submit shop drawings along with equipment submittals.

G. Provide stamped Shop Drawings from licensed Engineer of seismic flexible joints for piping and crossing building expansion or seismic joints. Submit Shop Drawings along with seismic bracing details.

H. Provide details of flexible drops for sprinklers in conformance with Building Code and ASCE 7 requirements of ceilings. Coordinate with Architectural and Structural Drawings and Specifications.

I. Piping: Per NFPA 13, ASCE-7 and local requirements.

J. Equipment:
   1. Per "Seismic Restraints Manual Guidelines for Mechanical Systems" latest edition published by SMACNA, ASCE 7 and local requirements.
   2. Provide means to prohibit excessive motion of fire protection equipment during an earthquake.

3.03 REVIEW AND OBSERVATION

A. Confirm Review and Observation requirements in Division 00, Procurement and Contracting Requirements and Division 01, General Requirements, Section 13910, Fire Suppression Basic Requirements and individual Division 13, Special Construction Sections.

B. Notify Architect, in writing, at following stages of construction so that they may, at their option, visit site for review and construction observation:
   1. Underground piping installation prior to backfilling.
   2. Prior to covering walls.
   3. Prior to ceiling cover/installation.
   4. When main systems, or portions of, are being tested and ready for inspection by AHJ.

5. When mains or branchlines are to be permanently concealed by construction or insulation systems.
6. When fire suppression systems, or portions of, are being tested and ready for inspection by AHJ.

C. Bear responsibility and cost to make piping accessible, to expose concealed lines, or to demonstrate acceptability of the system. If Contractor fails to notify Architect at times prescribed above, costs incurred by removal of such work are the responsibility of the Contractor.

D. Final Punch: Costs incurred by additional trips required due to incomplete systems will be the responsibility of the Contractor.

3.04 CUTTING AND PATCHING

A. Confirm Cutting and Patching requirements in Division 01, General Requirements. In absence of specific requirements, comply with individual Division 13, Special Construction Sections and the following:
1. Cutting and patching performed under Division 13, Special Construction includes, but is not limited to:
   a. Cutting and patching of plaster or partitions.
   b. Cutting and patching of finished ceilings.
2. Perform cutting and patching by skilled craftsmen in trade of work to be performed. Fill holes which are cut oversized for completed work. Match refinished areas with existing adjacent finish in a manner acceptable to Architect.
3. When masonry to concrete construction must be penetrated, provide a steel pipe sleeve in opening and grout in place in a neat manner. Leave grout surface to match existing finish. Provide escutcheons. If sleeves are not provided, core drill penetrations.
4. Locate concealed utilities to eliminate possible service interruption or damage.
5. Additional work required by lack of proper coordination will be provided at no additional cost to the Owner.
6. Proposed floor cutting/core drilling/sleeve locations to be approved by Project Structural Engineer. Submit proposed locations to Architect/Project Structural Engineer. Where slabs are of post tension construction, perform x-ray scan of proposed penetration locations and submit scan results including proposed penetration locations to Project Structural Engineer/Architect for approval. Where slabs are of waffle type construction, show column cap extent and cell locations relative to proposed penetration(s).
7. Cutting, patching and repairing for work specified in this Division including plastering, masonry work, concrete work, carpentry work, and painting included under this Section will be performed by skilled craftsmen of each respective trade in conformance with appropriate Division of Work.
8. Additional openings required in building construction to be made by drilling or cutting. Use of jack hammer is specifically prohibited. Patch openings in and through concrete and masonry with grout.
9. Restore new or existing work that is cut and/or damaged to original condition. Patch and repair specifically where existing items have been removed. This includes repairing and painting walls, ceilings, etc. where existing conduit and devices are removed as part of this project. Where alterations disturb lawns, landscaping, paving, and walks, surfaces to be repaired, refinished and left in condition matching existing prior to commencement of work.
10. Repair mutilation of building around pipes, equipment, hangers, and braces.

3.05 EQUIPMENT SELECTION AND SERVICEABILITY

A. Replace or reposition equipment which is too large or located incorrectly to permit servicing at no additional cost to Owner.

3.06 DELIVERY, STORAGE AND HANDLING

A. Confirm requirements in Division 00, Procurement and Contracting Requirements and Division 01, General Requirements. In absence of specific requirements, comply with individual Division 13, Special Construction Sections and the following:
   1. Handle materials delivered to project site with care to avoid damage and deterioration. Store materials in original containers which identify manufacturer, name, brand and model numbers on site inside building or protected from weather, sun, dirt and construction dust. Insulation and lining that becomes wet from improper storage and handling to be replaced before installation. Products and/or materials that become damaged due to water, dirt and/or dust as a result of improper storage to be replaced before installation.
   2. Protect equipment and pipe to avoid damage. Close pipe openings with caps or plugs. Keep motors and bearings in watertight and dustproof covers during entire course of installation.
   3. Protect bright finished shafts, bearing housings and similar Item until in service.

3.07 DEMONSTRATION

A. Confirm Demonstration requirements in Division 00, Procurement and Contracting Requirements and Division 01, General Requirements, Section 13910, Fire Suppression Basic Requirements and individual Division 13, Special Construction Sections.

B. Upon completion of work and adjustment of equipment and test systems, demonstrate to Owner's Authorized Representative, Architect and Engineer that equipment furnished and installed or connected under provisions of these Specifications functions in manner required. Provide field instruction to Owner's Maintenance Staff as specified in Division 01, General Requirements, Section 13910, Fire Suppression Basic Requirements and individual Division 13, Special Construction Sections.

C. Manufacturer's Field Services: Furnish services of a qualified person at time approved by Owner to instruct maintenance personnel, correct defects or deficiencies, and demonstrate to satisfaction of Owner that entire system is operating in satisfactory manner and complies with requirements of other trades that may be required to complete work. Complete instruction and demonstration prior to final job site observations.

D. Prior to acceptance of work and during time designated by Architect, provide necessary qualified personnel to operate system for a period of two hours.

E. Instruct the Owner in the operation of the sprinkler system, including main valve position (open or closed) recognition, system drainage, system testing, dry pipe valve reset and the relation to the fire alarm system.

F. Upon completion of work and adjustment of equipment, test systems to demonstrate to Owner's Authorized Representative and Architect that equipment is furnished and installed or connected under provisions of these Specifications.

3.08 CLEANING

A. Confirm Cleaning requirements in Division 00, Procurement and Contracting Requirements and Division 01, General Requirements, Section 13910, Fire Suppression Basic Requirements and individual Division 13, Special Construction Sections.

B. Upon completion of installation, except for sprinklers, thoroughly clean exposed portions of equipment, removing temporary labels and traces of foreign substances. Throughout work, remove construction debris and surplus materials accumulated during work.

C. Sprinklers may not be cleaned except for vacuuming in a manner in which no part of the sprinkler is touched by the vacuuming equipment. Replace sprinklers which bear traces of foreign substances with sprinklers of same model, temperature, K-factor, orifice, finish, style, orientation, and the like.

3.09 INSTALLATION

A. Confirm Installation requirements in Division 00, Procurement and Contracting Requirements and Division 01, General Requirements, Section 13910, Fire Suppression Basic Requirements and individual Division 13, Special Construction Sections.

B. Install equipment in accordance with manufacturer's installation instructions, plumb and level and firmly anchored to vibration isolators. Maintain manufacturer's recommended clearances.

C. Start-up equipment, in accordance with manufacturer's start-up instructions, in the presence of manufacturer's representative. Test controls and demonstrate compliance with requirements. Replace damaged or malfunctioning controls and equipment. Provide pump impellers to obtain Basis of Design design capacities.

D. Provide miscellaneous supports/metals required for installation of equipment and piping.

3.10 PAINTING

A. Confirm requirements in Division 01, General Requirements and Division 09, Finishes. In absence of specific requirements, comply with individual Division 13, Special Construction Sections and the following:
   1. Ferrous Metal: After completion of fire protection work, thoroughly clean and paint exposed supports constructed of ferrous metal surfaces, i.e., hangers, hanger rods, equipment stands, with one coat of black asphalt varnish for exterior or black enamel for interior, suitable for hot surfaces.
   2. After acceptance by Authority Having Jurisdiction (AHJ), in a mechanical room, on roof or other exposed areas, machinery and equipment not painted with enamel to receive two coats of primer and one coat of rustproof enamel, colors as selected by Architect.
   3. Structural Steel: Repair damage to structural steel finishes or finishes of other materials damaged by cutting, welding or patching to match original.
   4. Piping: Clean, primer coat and paint exposed piping on roof or at other exterior locations with two coats paint suitable for metallic surfaces and exterior exposures. Color selected by Architect.
   5. Covers: Covers such as vault covers and the like will be furnished with finishes which resist corrosion and rust.

3.11 ACCEPTANCE

A. Confirm requirements in Division 00, Procurement and Contracting Requirements and Division 01, General Requirements. In absence of specific requirements, comply with individual Sections in Division 13, Special Construction and the following:
   1. System cannot be considered for acceptance until work is completed and demonstrated to Architect that installation is in strict compliance with Specifications, Drawings and manufacturer's installation instructions, particularly in reference to following:
      a. Testing reports including Contractor's Material and Test Certificate for Underground Piping, Contractor's Material and Test Certificate for Aboveground Piping, Contractor's Material and Test Certificate for Private Fire Service Mains, Fire pump acceptance test data report, and the like.
      b. Cleaning
      c. Operation and Maintenance Manuals
      d. Training of Operating Personnel
      e. Record Drawings
      f. Warranty and Guaranty Certificates
      g. Start-up/Test Document and Commissioning Reports
      h. Letter of Conformance

3.12 FIELD QUALITY CONTROL

A. Confirm Field Quality Control requirements in Division 00, Procurement and Contracting Requirements and Division 01, General Requirements, Section 13910, Fire Suppression Basic Requirements and individual Division 13, Special Construction Sections.

B. Upon completion of installation of equipment, sprinklers, hose valves and piping and after units are water pressurized, test system to demonstrate capability and compliance with requirements. When possible, correct malfunctioning Item at site, then retest to demonstrate compliance; otherwise remove and replace with new Item and proceed with retesting.

C. Inspect each installed Item for damage to finish. If feasible, restore and match finish to original, except fire sprinklers, at site; otherwise, remove Item and replace with new Item. Feasibility and match to be judged by Architect. Remove cracked or dented Item and replace with new Item.

D. Fire sprinklers may not be reused, or cleaned, except for dusting. Replace damaged, field painted, oversprayed, overcoated or field coated sprinklers with new sprinklers of same manufacturer, model, finish, K-factor and performance characteristics. Where identical replacement sprinklers are not available, provide sprinklers of similar finish, style, K-factor and performance characteristics.

3.13 LETTER OF CONFORMANCE

A. Provide Letter of Conformance and copies of manufacturers' warranties and extended warranties with a statement that fire suppression items were installed in accordance with manufacturer's recommendations, UL listings and FM Global approvals. Include Letter of Conformance, copies of manufacturers' warranties and extended warranties in Operation and Maintenance Manuals.

3.14 ELECTRICAL INTERLOCKS

A. Where equipment motors are to be electrically interlocked with other equipment for simultaneous operation, utilize fire protection equipment wiring diagrams to coordinate with electrical systems so that proper wiring of equipment involved is affected.

3.15 CONNECTIONS TO EXISTING

A. Prior to connection of piping to existing piping or utilities, field verify existing conditions and exact sizes and locations of existing piping. Provide additional offsets, transitions, joints, cut-ins, and replace portions of existing as required to facilitate connections of new.

END OF SECTION

SECTION 13911 - COMMON WORK RESULTS FOR FIRE SUPPRESSION

PART 1 - GENERAL

1.01 SUMMARY

A. Work Included:
   1. Aboveground Black Steel Pipe and Fittings
   2. Aboveground Galvanized Steel Pipe and Fittings
   3. Switches, Water Detector
   4. Hangers and Supports
   5. Anchors and Attachments
   6. Valves
   7. Pipe, Valve, and Fire Protection Equipment Identification
   8. Signs
   9. Drains

1.02 RELATED SECTIONS

A. Contents of Division 13, Special Construction and Division 01, General Requirements apply to this Section.

B. In addition, reference the following:
   1. Division 13, Special Construction
   2. Division 15, Mechanical
   3. Division 16, Electrical
   4. Section 13910, Fire Suppression Basic Requirements
   5. Section 13930, Fire Suppression Sprinkler Systems

1.03 REFERENCES AND STANDARDS

A. References and Standards as required by Section 13910, Fire Suppression Basic Requirements and Division 01, General Requirements.

B. Meet requirements of ASCE 7, Minimum Design Loads for Buildings and Other Structures, by American Society of Civil Engineers, latest adopted edition.

1.04 SUBMITTALS

A. Submittals as required by Section 13910, Fire Suppression Basic Requirements and Division 01, General Requirements.

1.05 QUALITY ASSURANCE

A. Quality assurance as required by Section 13910, Fire Suppression Basic Requirements and Division 01, General Requirements.

B. In addition, meet the following:
   1. Material and Equipment: Listed for its intended fire protection use in current UL Fire Protection Equipment Directory, or UL Online Certifications Directory for Fire Protection, International Code Council Evaluation Service Reports, or FM Global Approval Guide. All material and equipment to be new and from a current manufacturer.
   2. Provide per AHJ requirements.
   3. References to product Specifications for materials are listed according to accepted ANSI, ASTM, ASME, AWWA and other base standards. Materials to meet latest approved versions of these standards.
   4. Fire Suppression Screw-Thread Connections: Comply with local fire department/fire marshal regulations for sizes, threading and arrangement of connections for fire department equipment to fire department connections.
   5. Manufacturers: Unless an item is marked "No substitutions", submit substitution request for materials of other than named manufacturers.
   6. Noise and Vibration:

a. Install vibration isolators and measures required to prevent noise and vibration from being transmitted to occupied areas. Select equipment to operate within noise coefficient (NC) design level for particular type of installation in relation to its location.
b. After installation, make proper adjustments to reduce noise and vibration to acceptable levels as defined by Architect.
c. In acoustically sensitive areas, design system in a manner that minimizes the number of wall penetrations.

1.06 WARRANTY

A. Warranty of materials and workmanship as required by Section 13910, Fire Suppression Basic Requirements and Division 01, General Requirements.

1.07 SYSTEM IMPAIRMENT

A. When returning a water-based fire protection system to service after impairment or control valve closure, verify the system is in working order by performing a main drain test per NFPA 25.

PART 2 - PRODUCTS

2.01 MANUFACTURERS

A. Aboveground Black Steel Pipe and Fittings:
1. Pipe:
a. Bull Moose Tube
b. Wheatland Tube Company
c. Youngstown Tube Company
d. Tex-Tube Company
e. State Pipe and Supply, Incorporated
f. Or approved equivalent
2. Fittings, Mechanical and Grooved Couplings:
a. Victaulic
b. Gruvlok
c. Shurjoint Piping Products Incorporated
d. Smith-Cooper International
e. Tyco Fire & Building Products
f. Viking Corporation
g. Allied Rubber and Gasket Company Incorporated, dba ARGCO
h. Anvil International
i. Dixon Valve & Coupling
j. Or approved equivalent.
3. Fittings, Threaded:
a. Ward Manufacturing
b. Anvil International
c. Smith-Cooper International
d. Aegis Technologies
e. Or approved equivalent.
4. Fittings, Rubber Gasketed:
a. Victaulic
b. Anvil International
c. AnvilStar
d. EBAA Iron, Incorporated
e. Shurjoint Piping Products, Incorporated
f. Smith-Cooper International
g. Tyco Fire & Building Products
h. Viking Corporation
i. Ward Manufacturing
j. Allied Rubber and Gasket Company Incorporated, dba ARGCO

k. Dixon Valve & Coupling
l. Or approved equivalent.

5. Fittings, Welded:
   a. Anvil International
   b. Shurjoint Piping Products Incorporated
   c. Smith-Cooper International
   d. State Pipe & Supply, Incorporated
   e. Or approved equivalent.
6. Fittings, Flanged:
   a. Victaulic; Groove/Flange Adapter.
   b. United Brand Fittings
   c. U.S. Pipe
   d. Anvil S.P.F.
   e. Iowa Fittings Company
   f. Tyco Fire Products; Grinnell Groove/Flange Adapter
   g. Or approved equivalent.

B. Aboveground Galvanized Steel Pipe and Fittings:
1. Pipe:
   a. Bull Moose Tube
   b. Wheatland Tube Company
   c. Youngstown Tube Company
   d. Tex-Tube Company
   e. State Pipe & Supply, Incorporated
   f. Or approved equivalent.
2. Fittings, Mechanical and Grooved Couplings:
   a. Victaulic
   b. Gruvlok
   c. Shurjoint Piping Products Incorporated
   d. Smith-Cooper International
   e. Tyco Fire & Building Products
   f. Viking Corporation
   g. Allied Rubber and Gasket Company Incorporated, dba ARGCO
   h. Anvil International
   i. Dixon Valve & Coupling
   j. Or approved equivalent.
3. Fittings, Threaded:
   a. Smith-Cooper International
   b. Anvil International
   c. Ward Manufacturing
   d. Or approved equivalent.
4. Fittings, Rubber Gasketed:
   a. Anvil International
   b. AnvilStar
   c. Ebaa Iron, Incorporated
   d. Shurjoint Piping Products Incorporated
   e. Smith-Cooper International
   f. Tyco Fire & Building Products
   g. Victaulic
   h. Viking Corporation
   i. Ward Manufacturing
   j. Allied Rubber and Gasket Company Incorporated, dba ARGCO
   k. Dixon Valve & Coupling
   l. Or approved equivalent.

5. Fittings, Welded:
    a. Anvil International
    b. Shurjoint Piping Products Incorporated
    c. Smith-Cooper International
    d. State Pipe & Supply, Incorporated
    e. Or approved equivalent.

C. Switches, Water Detector:
1. Water Flow Switches:
    a. Wet Sprinkler Systems:
        1) Potter Electric Signal Company; Model VSR.
        2) System Sensor; Model WFD.
        3) Or approved equivalent.
2. Pressure Operated Alarm Switches:
    a. Dry Pipe Sprinkler Systems:
        1) Detection of Water Flow:
            (a) Potter Electric Signal Company; Model PS10.
            (b) System Sensor; Model EPS or EPS EXT.
            (c) Or approved equivalent.
        2) Detection of Low Pressure:
            (a) Potter Electric Signal Company; Model PS40.
            (b) System Sensor; Model EPS or EPS EXP.
            (c) Or approved equivalent.

D. Hangers and Supports:
1. Cooper B-Line Tolco
2. Anvil International
3. ITW Buildex Sammys
4. Erico International
5. PHD Manufacturing Incorporated
6. Or approved equivalent.

E. Anchors and Attachments:
1. Concrete:
    a. Cast-In Place Anchors for Hangers:
        1) Cooper B-Line Tolco
        2) Erico International
        3) Or approved equivalent.
    b. Attachments as specified or described by structural. If not specified or described by structural, then as follows:
        1) Hilti
        2) Powers
        3) Simpson Strong-Tie
        4) DeWalt
        5) Or approved equivalent.
2. Steel:
    a. Cooper B-Line Tolco:
    b. Anvil International
    c. Elco Construction Products, Hangermate
    d. Erico International
    e. ITW Buildex Sammys
    f. Or approved equivalent.

F. Valves:
1. Swing Check:
    a. Victaulic

b. Nibco
c. Mueller
d. Viking
e. Tyco
f. AnvilStar
g. Reliable
h. Or approved equivalent.

2. Butterfly Valves:
   a. Victaulic
   b. Nibco
   c. Tyco
   d. Reliable
   e. Or approved equivalent.
3. Automatic Ball Drip Drain Valve:
   a. Tyco
   b. Reliable Automatic Sprinkler Company
   c. Or approved equivalent.
4. Automatic Air Release Valve:
   a. Potter Electric Signal Company
   b. Or approved equivalent.
5. Ball Valve:
   a. Victaulic
   b. Apollo Valves
   c. Fire Protection Products Incorporated (FPPI)
   d. Nibco
   e. Or approved equivalent.

G. Pipe, Valve, and Fire Protection Equipment Identification:
1. Fire Protection Products, Incorporated (FPPI)
2. Allied Rubber and Gasket Company, Incorporated, dba ARGCO
3. Or approved equivalent.

H. Signs:
1. Tyco Fire Products
2. Reliable Automatic Sprinkler
3. Viking Corporation
4. Allied Rubber and Gasket Company, Incorporated, dba ARGCO
5. Or approved equivalent.

I. Drains:
1. Reference Aboveground Black Steel Pipe and Fittings.
2. AGF
3. Victaulic
4. Or approved equivalent.

2.02 ABOVEGROUND BLACK STEEL PIPE AND FITTINGS

A. Wet Pipe Systems:
1. Pipe Size 2-inch Diameter and Smaller: ASTM A53, ASTM A135, or ASTM A795; minimum Corrosion Resistance Ratio (CRR) of 1.00 per UL Listing or FM Global Approval.
2. Pipe Size 2-1/2-inch Diameter and Larger: ASTM A53, ASTM A135, or ASTM A795; minimum CRR of 1.00 per UL Listing or FM Global approval. Wall thickness greater than Schedule 5. Schedule 5 not approved.
3. Exposed pipe 8-feet or less above finished floor: A minimum of Schedule 40.

B. Dry Pipe Systems:
1. Pipe Size 2-inch Diameter and Smaller: ASTM A53, ASTM A135, or ASTM A795; Schedule 40 only, shop welded, or threaded.

2. Pipe Size 2-1/2-inch Diameter and Larger: ASTM A53, ASTM A135, or ASTM A795; Schedule 40, shop welded, threaded or grooved.
3. Exposed pipe 8-feet or less above finished floor: Minimum of Schedule 40.

C. Joints:
1. Threaded, flanged or bevel welded.
2. Piping installed in plenums or shafts to have welded joints.

D. Fittings:
1. Threaded:
a. Malleable Iron: Class 150 and Class 300, ANSI B16.3.
b. Cast Iron: Class 125 and 250, ANSI B16.3.
2. Flanged:
a. Cast iron; Class 125 and 250, ASME B16.1.
b. Raised ground face, bolt holes spot faced.
3. Welded:
a. Carbon Steel: Long radius, standard weight or extra strong.
b. Factory Wrought Steel Buttweld Fittings: ASME B16.9.
c. Buttwelding Ends for Pipe, Valves, Flanges and Fittings: ASME B16.25.
d. Specification for Piping Fittings of Wrought Carbon Steel and Alloy Steel for Moderate and Elevated Temperatures: ASTM A234.
e. Steel Pipe Flanges and Flanged Fittings: ASME B16.5.
f. Forged Steel Fittings, Socket Welded and Threaded: ASME B16.11.
4. Mechanical Fittings and Grooved Couplings:
a. Couplings: UL 213, AWWA C606, ASTM A536 ductile iron or ASTM A47 malleable iron, with enamel finish and grooves or shoulders designed to accept grooved couplings. Synthetic-rubber gasket with central-cavity, pressure-responsive design and ASTM A183 carbon-steel bolts and nuts.
b. FM Global approved.

2.03 ABOVEGROUND GALVANIZED STEEL PIPE AND FITTINGS

A. Provide for dry pipe, preaction and deluge systems. Galvanized inside and out. Threaded or grooved.

B. Pipe Size 2-inch Diameter and Smaller: Hot dipped galvanized ASTM A795; ASTM A123. Schedule 40.

C. Pipe Size 2-1/2-inch Diameter and Larger: ASTM A795; minimum of Schedule 10.

D. Exposed pipe 8-feet or less above finished floor: A minimum of Schedule 40.

E. Joints:
1. Threaded, flanged, grooved or bevel welded.
2. Piping installed in plenums or shafts to have welded joints.

F. Fittings:
1. General: Provide galvanized fittings where piping is exposed.
2. Threaded:
a. Malleable Iron: Class 150 and Class 300, ANSI B16.3.
b. Cast Iron: Class 125 and 250, ANSI B16.3.
3. Flanged:
a. Cast iron; Class 125 and 250, ASME B16.1.
b. Raised ground face, bolt holes spot faced.
4. Welded:
a. Carbon Steel: Long radius, standard weight or extra strong.
b. Factory Wrought Steel Buttweld Fittings: ASME B16.9.
c. Buttwelding Ends for Pipe, Valves, Flanges and Fittings: ASME B16.25.
d. Specification for Piping Fittings of Wrought Carbon Steel and Alloy Steel for Moderate and Elevated Temperatures: ASTM A234.

e. Steel Pipe Flanges and Flanged Fittings: ASME B16.5.
f. Forged Steel Fittings, Socket Welded and Threaded: ASME B16.11.

5. Mechanical Fittings and Grooved Couplings:
   a. Couplings: UL 213, AWWA C606, ASTM A536 ductile iron or ASTM A47 malleable iron, with enamel finish and grooves or shoulders designed to accept grooved couplings. Synthetic-rubber gasket with central-cavity, pressure-responsive design and ASTM A183 carbon-steel bolts and nuts.
   b. FM Global approved.

2.04 SWITCHES, WATER DETECTOR

A. Provide with cover tamper switch where required by AHJ.

B. Water Flow Switches:
   1. Vane-type; SPDT switches; electronic retard, adjustable time delay (0 to 75 seconds).
   2. Wet Sprinkler Systems, NFPA 13: 450 PSI, 18-feet per second, 4-10 gpm.

C. Pressure Operated Alarm Switches: Pressure actuated with SPDT electrical switches and adjustable time delay (0 to 75 seconds).

2.05 HANGERS AND SUPPORTS

A. General: Select size of hangers and supports to exactly fit pipe size for bare piping.

B. Hangers: Ferrous.

C. Hanger Rods: Zinc electroplated carbon steel.

D. Finishes: Use hangers and supports with galvanized metallic coatings for piping and equipment that will not have field-applied finish.

E. Materials:
   1. Use carbon steel pipe hangers and supports, metal trapeze pipe hangers and attachments for general service applications.
   2. Use stainless steel hangers, rods and attachments for corrosive environment applications. Examples of corrosive environment applications include, but are not limited to: swimming pools and spas, pool and spa equipment rooms and adjacent areas, chemical rooms, kidney dialysis areas, marine and beach environments, commercial laundries and the like.

F. Anti-Scratch Padding: Use padded hangers for piping subject to scratching.

2.06 ANCHORS AND ATTACHMENTS

A. General: Anchor supports to masonry, concrete and block walls per anchoring system manufacturer’s recommendations, or as modified by project Structural Engineer.

B. Materials:
   1. Ferrous.
   2. Stainless steel for corrosive environment applications. Examples of corrosive environment applications include, but are not limited to: swimming pools and spas, pool and spa equipment rooms and adjacent areas, chemical rooms, kidney dialysis areas, marine and beach environments, commercial laundries, and the like.

C. Cast in Place Anchors for Hangers: Verify listing is for hangers, braces, or both.

D. Attachments in Concrete:
   1. Suitable for hanging and bracing fire protection systems in concrete which is subject to cracking in a seismic event.
   2. Seismic Design Areas C, D, E and F:
      a. Compatible with International Code Council Evaluation Service Acceptance Criteria AC-193 and AC308 for expansion, screw and adhesive anchors. Meet requirements of ACI 355.2, Qualification of Post-Installed Mechanical Anchors in Concrete and Commentary.
      b. All models of Hilti HDI and ITW Red Head Multi-Set II anchors are not approved for attaching fire protection systems in Seismic Design Areas C, D, E and F. No Exceptions.

E. ITW Buildex Sammys with FM Approval only are not allowed in certain seismic zones. Verify with FM that FM Approval is effective in project's seismic zone.

2.07 VALVES

A. Swing Check: Iron body, rubber and bronze faced checks.

B. Wafer Check: Iron body, rubber seat, spring actuated.

C. Butterfly Valves: Ductile iron body with factory-installed tamper switches. Use lug body next to pumps.

D. Pressure Relief: Bronze body, stainless steel spring.

E. Automatic Ball Drip Drain Valve: Bronze, spring-type.

F. Three-Way Gauge Valve: Brass; rated to 300 psi.

G. Automatic Air-Release Valve for Wet Systems:
   1. Rated to 175 psi.
   2. Automatic float-type with shutoff mounted in a water retention pan.
   3. Single set 24VAC@2A for electronic supervision.
   4. Ball valve switch with cover tamper.

H. Ball Valves: Brass body, brass stem; forged brass ball disc.

2.08 PIPE, VALVE, AND FIRE PROTECTION EQUIPMENT IDENTIFICATION

A. Engraved plastic laminate or corrosion resistant metal sign or plastic equipment marker.

B. Corrosion-resistant chain or permanent adhesive.

2.09 SIGNS

A. Engraved plastic laminate or corrosion resistant metal sign or plastic equipment marker.

B. Corrosion-resistant chain or permanent adhesive.

2.10 DRAINS

A. Reference Aboveground Black Steel Pipe and Fittings.

PART 3 - EXECUTION

3.01 GENERAL INSTALLATION REQUIREMENTS

A. Install in conformance with UL Listing, FM Approval or ICC-ES requirements and restrictions.

3.02 ABOVEGROUND BLACK STEEL PIPE AND FITTINGS

A. Piping Routing:
   1. Route piping, except as otherwise indicated, vertically and horizontally (sloped to drain). Avoid diagonal runs wherever possible. Orient horizontal routes parallel with walls and beam lines.
   2. Install piping as shown or described by diagrams, details and notations on Drawings or, if not indicated, install piping to provide the shortest route which does not obstruct usable space or block access for servicing the building and its equipment.
   3. Install piping in concealed spaces above finished ceilings. Prior to design and installation. obtain pre-approval by Architect for exposed piping.
   4. In open-to-structure areas which are open to public view, route exposed piping to minimize visual impact. Obtain Architect's and Engineer's approval of exposed piping installation.
   5. Coordinate installation with other trades. Route piping as required to avoid building structure, equipment, plumbing piping, HVAC piping, ductwork, lighting fixtures, electrical conduits and bus ducts and similar work. Final location of lighting will have priority over final sprinkler locations. Provide drains to trapped sections of system which result from such routing. Other trades take precedence for installation space.
   6. Support piping adjacent to walls, overhead construction, columns and other structural and permanent enclosure elements of the building. Limit clearance to 2-inches wherever

furring is indicated for concealment of piping. Allow for insulation thickness. Locate insulated piping to provide minimum 1-inch clearance outside insulation.

7. Wherever possible in finished and occupied spaces, conceal piping from view by locating within column or beam enclosures, hollow wall construction, or above suspended ceilings. Do not encase horizontal routes in solid partitions, except where approved.
8. General Electrical Equipment Clearances: Do not route piping through electrical rooms, transformer vaults, elevator equipment rooms and other electrical or electronic equipment spaces and enclosures. Do not route piping above electric power or lighting panel, switchgear, low voltage panel, or similar electric device.
9. Rooms Protected by Alternative Systems: Route water filled and dry system piping around rooms protected by pre-action systems, clean agent systems, gaseous suppression systems and other alternative fire suppression systems.
10. Install pipe runs to minimize obstruction to other work.
11. Pitch all dry and pre-action system piping 1/4-inch per 10-feet for mains and 1/2-inch per 10-feet for branch lines, including pipe passing through both warm and cold areas.

B. Couplings:
1. Install where indicated on Drawings and on each side of pieces of equipment to permit easy removal of equipment.
2. Deburr cut edges.

C. Pipe Penetrations: Wire pipe cutout coupon at point of pipe penetration.

D. Pipe and Pipe Fittings:
1. Expansion and Flexibility: Install work with due regard for expansion and contraction to prevent damage to the piping, equipment, building and its contents. Provide piping offsets, loops, approved type expansion joints, sway bracing, wire restraints, vertical restraints, flexible couplings or other means to control pipe movement and to minimize pipe forces.
2. Coordinate support of pipe 4-inches and larger with Structural Engineer.
3. Provide clearances around piping per NFPA 13.
4. Install dry and pre-action welded pipe with welds facing vertically up, or where this is not possible, as close as possible to vertical between 46 degrees and 234 degrees. Intent is to minimize corrosion caused by moisture in the bottom of pipes.

3.03 ABOVEGROUND GALVANIZED STEEL PIPE AND FITTINGS

A. Piping Routing:
1. Route piping, except as otherwise indicated, vertically and horizontally (sloped to drain). Avoid diagonal runs wherever possible. Orient horizontal routes parallel with walls and beam lines.
2. Install piping as shown or described by diagrams, details and notations on Drawings or, if not indicated, install piping to provide the shortest route which does not obstruct usable space or block access for servicing the building and its equipment.
3. Install piping in concealed spaces above finished ceilings.
4. In open-to-structure areas which are open to public view, route exposed piping to minimize visual impact. Obtain Architect's and Engineer's approval of exposed piping installation.
5. Coordinate installation with other trades. Route piping as required to avoid building structure, equipment, plumbing piping, HVAC piping, ductwork, lighting fixtures, electrical conduits and bus ducts and similar work. Final location of lighting will have priority over final sprinkler locations. Provide drains to trapped sections of system which result from such routing. Other trades take precedence for installation space.
6. Support piping adjacent to walls, overhead construction, columns and other structural and permanent enclosure elements of the building. Limit clearance to 2-inches wherever furring is indicated for concealment of piping. Allow for insulation thickness. Locate insulated piping to provide minimum 1-inch clearance outside insulation.

7. Wherever possible in finished and occupied spaces, conceal piping from view by locating within column or beam enclosures, hollow wall construction, or above suspended ceilings. Do not encase horizontal routes in solid partitions, except where approved.
8. General Electrical Equipment Clearances: Do not route piping through electrical rooms, transformer vaults, elevator equipment rooms and other electrical or electronic equipment spaces and enclosures. Do not route piping above electric power or lighting panel, switchgear, low voltage panel, or similar electric device.
9. Rooms Protected by Alternative Systems: Route water filled and dry system piping around rooms protected by pre-action systems, clean agent systems, gaseous suppression systems and other alternative fire suppression systems.
10. Install pipe runs to minimize obstruction to other work.
11. Pitch all dry and pre-action system piping 1/4-inch per 10-feet for mains and 1/2-inch per 10-feet for branch lines, including pipe passing through both warm and cold areas.

B. Couplings:
1. Install where indicated on Drawings and on each side of pieces of equipment to permit easy removal of equipment.
2. Deburr cut edges.

C. Pipe Penetrations: Wire pipe cutout coupon at point of pipe penetration.

D. Pipe and Pipe Fittings:
1. Expansion and Flexibility: Install work with due regard for expansion and contraction to prevent damage to the piping, equipment, building and its contents. Provide piping offsets, loops, approved type expansion joints, sway bracing, wire restraints, vertical restraints, flexible couplings or other means to control pipe movement and to minimize pipe forces.
2. Coordinate support of pipe 4-inches and larger with Structural Engineer.
3. Provide clearances around piping per NFPA 13.
4. Install dry and pre-action welded pipe with welds facing vertically up, or where this is not possible, as close as possible to vertical between 46 degrees and 234 degrees. Intent is to minimize corrosion caused by moisture in the bottom of pipes.

3.04 SWITCHES, WATER DETECTOR

A. Wire pipe cutout coupon at point of connection of switch to pipe.

B. Flow switches: Connect to system side of valves and drain connections.

C. Coordinate with Division 28, Electronic Safety.

3.05 HANGERS AND SUPPORTS

A. Installation of pipe hangers, inserts and supports to conform to NFPA 13. Provide adjustable hangers, inserts, brackets, clamps, supplementary steel and other accessory materials required for proper support of pipe lines and equipment. Provide supplementary materials for proper support and attachment of hangers.

3.06 ANCHORS AND ATTACHMENTS

A. In post-tension construction, determine location of post-tension cables and install anchors to avoid contact or interference with post-tension cables. Coordinate with Structural.

B. Do not use powder-driven attachments.

C. Building Attachments and Inserts: Install building attachments within concrete slabs or attach to structural steel. Install additional attachments at concentrated loads, including valves and flanges, for sizes NPS 2-1/2 and larger. Install concrete inserts before concrete is placed; fasten inserts to forms and install reinforcing bars through openings at top of inserts.

D. Hanger and Support Attachments:
1. Concrete:
a. After Pouring:

1) Where supports in slabs are required after concrete has been poured, provide drilled-in threaded inserts (mechanical-expansion anchors), installed in accordance with manufacturer's recommendations.
2) Install mechanical-expansion anchors after concrete is completely cured and in accordance with manufacturer's installation instructions.
3) Where anchors are to be installed in post-tension construction, determine and avoid locations of post-tension cables prior to drilling.

2. Metal Floor Deck: Support hangers per UL Listing or FM Approval for selected concrete insert before pouring of concrete topping, or from beam clamps fastened to structural steel.
3. Steel Joists: Support hangers from beam clamps fastened to bar joists or to auxiliary steel between bar joists as required.
4. C-Clamp Hangers: Do not attach to one side of double-angle bottom members.
5. Locate and install hangers, supports and attachments connecting to I-joists, structural insulated panels (SIPs), cross laminated timber and similar engineered structural products according to the structural product manufacturer specifications.

E. Make available to the Architect information required to verify the anchorage, sway bracing and restraint of fire protection systems.

3.07 VALVES

A. General:
1. Provide post indicator on buried control valves.
2. Inspect valves for leaks. Adjust or replace packing to stop leaks. Replace valve if leak persists.

B. Installation:
1. Install valves where required for proper operation, testing and drainage. Locate valves so as to be accessible and so that separate support can be provided when necessary. Install conveniently and accessibly located with reference to finished building for repairs, removal and service.
2. Swing Check Valves: Install in horizontal position with hinge pin horizontally perpendicular to centerline of pipe. Install for proper direction of flow.
3. Wafer Check Valves: Install between two flanges in horizontal or vertical position, position for proper direction of flow.

C. Pressure Relief Valves: Provide piping to permanent drain.

3.08 PIPE, VALVE, AND FIRE PROTECTION EQUIPMENT IDENTIFICATION

A. Install engraved plastic laminate or corrosion resistant metal sign or plastic equipment marker, secured with corrosion-resistant chain or permanent adhesive on or near each Item of fire suppression equipment and each operational device, as specified in this specification if not otherwise specified for each Item or device.

B. Provide signs for the following general categories of equipment and operational devices: Valves, drains, pumps, standpipes, tanks and similar equipment.

C. Each new piece of equipment to bear a permanently attached identification plate, listing manufacturer's name, capacities, sizes and characteristics.

D. Piping to bear the manufacturer's name, schedule of thickness, size and ASTM identification number

E. Provide valve tag on every valve, control device, main drain, auxiliary drain, and drum drip in each system. Exclude check valves and valves within factory fabricated equipment units. List each tagged valve in valve schedule for each piping system.

F. List each tagged item and its location in valve schedule; identify on fire suppression drawings.

G. Install framed, glass or rigid transparent plastic covered, mounted valve schedule and valve location drawing in main riser or fire pump room.

H. Provide identification sign on ceiling tile below valve location.

I. Provide permanent identification sign at pressure regulating valves stating required setting of pressure regulator.

J. Adjusting: Relocate fire suppression identification device which has become visually blocked.

K. Cleaning: Clean face of identification devices and glass frames of valve charts.

3.09 SIGNS

A. General Information Signs: Provide a general information sign used to determine system design basis and information relevant to the inspection, testing and maintenance requirements required by NFPA 25, Standard for the Inspection, Testing and Maintenance of Water-Based Fire Protection Systems. Such general information is to be provided with a permanently marked weatherproof metal or rigid plastic sign, secured with corrosion-resistant wire, chain, or other acceptable means. Such signs are to be placed at each system control rise loop and auxiliary system control valve. The sign is to include the following information:
   1. Name and Location of the Facility Protected
   2. Presence of High-Piled and/or Rack Storage
   3. Maximum Height of Storage Planned
   4. Flow Test Data
   5. Location of Auxiliary Drains and Low Point Drains
   6. Original Results of Main Drain Flow Test
   7. Name of Installing Contractor or Designer
   8. Indication of presence and location of other auxiliary systems.

B. Dry Signs: At system riser supplying dry systems, provide the following information: volume in gallons contained in each system.

3.10 DRAINS

A. Locate drain connections within 7-feet of floor. Provide piping capable of being fully drained.

B. Provide a drain vent at top of vertical drains. Coordinate with Division 15, Mechanical.

C. Coordinate location of auxiliary drains with Architect. Architect to approve location before drain is installed.

D. Protect drains from tampering and accidental operation.

E. Protect drain discharge at the exterior with a turned-down 45 degree elbow.

END OF SECTION

SECTION 13930 - FIRE SUPPRESSION SPRINKLER SYSTEMS

PART 1 - GENERAL

1.01 SUMMARY

A. Work Included:
   1. Sprinklers
   2. Oversized Sprinkler Escutcheons - For dry sprinklers in suspended ceilings which are supplied by a wet pipe or dry pipe system.
   3. Inspector's Test Connection
   4. Sectional Control Test/Drain Unit
   5. Dry System Drum Drip Drains
   6. Spare Sprinkler Cabinet
   7. Sprinkler Guards

B. This is a contractor designed system. Contact AHJ prior to bid to verify fire system requirements. Provide design compliant with codes as interpreted by AHJ.

C. Scope:
   1. Revision and extension of existing system to new and remodeled areas.
   2. Dry-pipe sprinkler system and/or dry barrel sprinklers for areas subject to 40 degrees F or less.

D. Coordinate location and type of tamper, flow and pressure switches and fire alarm system.

E. Provide electrical connections and wiring as required for a complete and operable system. Includes but is not limited to bells, air compressors, sump pumps, fire pumps, jockey pumps and pump controllers.

1.02 RELATED SECTIONS

A. Contents of Division 13, Special Construction and Division 01, General Requirements apply to this Section.

B. In addition, reference the following:
   1. Division 22, Plumbing
   2. Division 23, Heating, Ventilating and Air-Conditioning
   3. Division 16, Electrical
   4. Division 28, Electronic Safety
   5. Section 21 00 00, Fire Suppression Basic Requirements
   6. Section 21 05 00, Common Work Results for Fire Suppression

1.03 REFERENCES AND STANDARDS

A. References and Standards as required by Section 13910, Fire Suppression Basic Requirements and Division 01, General Requirements.

1.04 SUBMITTALS

A. Submittals as required by Section 13910, Fire Suppression Basic Requirements and Division 01, General Requirements.

B. In addition, provide:
   1. Details of interval and end of branch line restraints.
   2. Details of flexible sprinkler hose fitting assembly, including number and radius of bends, corresponding to equivalent feet used in hydraulic calculations. Provide details of sign to be installed at each flexible sprinkler hose fitting assembly.
   3. Details of oversized ceiling penetrations and oversized sprinkler escutcheons.
   4. Trapeze hanger details and calculations, including size, length and material. Additionally, provide size, weight and number of pipes to be carried on the trapeze.
   5. On submittal and As-Built drawings, provide text of sprinkler list to be installed in the spare sprinkler cabinet.

1.05 QUALITY ASSURANCE

A. Quality assurance as required by Section 13910, Fire Suppression Basic Requirements and Division 01, General Requirements.

1.06 WARRANTY

A. Warranty of materials and workmanship as required by Section 13910, Fire Suppression Basic Requirements and Division 01, General Requirements.

1.07 SYSTEM DESCRIPTION

A. Provide coverage for walk-in freezer replacement. Field verify field conditions prior to submittal of bid. Adjust bid to provide protection features in accordance with applicable codes and interpretations by AHJ. Provide design and installation based on more stringent requirements if this specification and AHJ requirements differ from Code.

B. Sprinkler system design to include a 10 percent pressure and flow cushion between system demand point and available water supplies.

C. Extend hydraulic calculations from hydraulically most remote design area back to location of pressure hydrant of flow test or effective point of water supply where characteristics of water supply are known.

1.08 EXTRA STOCK

A. Provide extra sprinklers per code.

B. Provide suitable wrenches for each sprinkler type and metal storage cabinet in riser room.

PART 2 - PRODUCTS

2.01 MANUFACTURERS

A. Sprinklers:
   1. Finished Areas:
      a. Victaulic
      b. Viking
      c. Tyco
      d. Reliable
      e. Globe
      f. Senju
      g. Or approved equivalent.
   2. Nonfinished Areas:
      a. Victaulic
      b. Viking
      c. Tyco
      d. Reliable
      e. Globe
      f. Or approved equivalent.
   3. Dry Sprinklers:
      a. Victaulic
      b. Viking
      c. Tyco
      d. Reliable
      e. Or approved equivalent.

B. Oversized Sprinkler Escutcheons:
   1. Victaulic; FireLock Expansion Plates.
   2. Viking Corporation; Expansion Plate.
   3. Tyco Fire Protection Products; Wide Adapter Plates.
   4. Reliable Automatic Sprinkler; Extender Rings.
   5. Globe Fire Sprinkler Corporation; Seismic Escutcheons.
   6. Or approved equivalent.

C. Inspector's Test Connection:
   1. Combination Test and Drain:
      a. Victaulic
      b. AGF
      c. Or approved equivalent.
   2. Dry System Inspector's Test Connection:
      a. AGF
      b. Or approved equivalent.

D. Sectional Control Test/Drain Unit:
   1. Tyco; Model F350.
   2. Or approved equivalent.

E. Dry System Drum Drip Drains:
   1. Custom Piping and Valves per NFPA 13.
   2. AGF
   3. Or approved equivalent.

F. Spare Sprinkler Cabinet:
   1. Victaulic
   2. Fire Protection Products, Inc. (FPPI).
   3. Tyco Fire & Building Products
   4. Allied Rubber and Gasket Co.
   5. Potter Roemer Fire Pro.
   6. Or approved equivalent.

G. Sprinkler Guards:
   1. Victaulic
   2. Viking
   3. Tyco
   4. Reliable
   5. Globe
   6. Senju
   7. Or approved equivalent.

2.02 SPRINKLERS

A. Finished Areas:
   1. Type: Glass-Bulb
   2. Style: Recessed
   3. Response: Quick-Response
   4. Finish: Chrome
   5. Escutcheon: Chrome

B. Nonfinished Areas:
   1. Type: Glass-Bulb
   2. Response: Quick-Response
   3. Finish: Brass

C. Dry Sprinklers:
   1. Type: Glass-Bulb
   2. Style: Recessed
   3. Response: Quick-Response
   4. Finish: Chrome
   5. Escutcheon: Chrome
   6. Dry Sprinkler Boot: Manufactured for use with the dry sprinkler it protects.

D. Pendent sprinklers supplied by dry or preaction piping: Dry pendent type.

2.03 OVERSIZED SPRINKLER ESCUTCHEONS

A. Metal.

B. Provide oversized ceiling penetrations and oversized sprinkler escutcheons for pendent sprinklers to comply with Building Code and ASCE-7 seismic requirements.

C. Same manufacturer as sprinklers.

2.04 INSPECTOR'S TEST CONNECTION

A. Combination Test and Drain: Bronze body, brass stem, impregnated Teflon seat, chrome coated brass ball, steel handle with positive stops, tamper resistant test orifice, integral tamper resistant sight glasses, tapped and plugged port for system access, steel identification plate. Provide with pressure relief valve and drainage piping with bronze body and stainless steel spring.

B. Dry System Inspector’s Test Connection: Bronze, brass stem, steel handle, chrome-plated bronze ball, Teflon valve seat, tamper and corrosion resistant orifice equivalent to smallest sprinkler orifice, sight flow connection.

2.05 SECTIONAL CONTROL TEST/DRAIN UNIT

A. ASTM A53 pipe, with inspector's test valve, sectional drain valve, sectional isolation valve with tamper switch, restriction union with corrosion resistant orifice equivalent to sprinkler orifice, sight flow connection and waterflow detector.

2.06 DRY SYSTEM DRUM DRIP DRAINS

A. Normally open upper ball valve with lever handle.

B. Normally closed lower ball valve with lever handle.

2.07 SPARE SPRINKLER CABINET

A. NFPA 13 Systems: Sized to accommodate a minimum of two spare sprinklers of each Sprinkler Identification Number (SIN), manufacturer, model, orifice, deflector type, temperature and thermal sensitivity, or a minimum of six sprinklers for facilities having under 300 sprinklers, or a minimum of 12 sprinklers for facilities having 300 to 1000 sprinklers, or a minimum of 24 sprinklers for facilities having over 1000 sprinklers, whichever is more.

B. Welded steel with hinged steel cover.

C. Red enamel or polyester coated finish inside and out.

2.08 SPRINKLER GUARDS

A. Metal.

B. Listed for use with sprinkler model to which it is attached.

PART 3 - EXECUTION

3.01 GENERAL INSTALLATION REQUIREMENTS

A. Install per manufacturer's requirements and recommendations.

3.02 SPRINKLERS

A. Align sprinklers with architectural column lines, lighting, diffusers and other ceiling features. In unfinished ceilings, route piping to minimize visual impact. Sprinklers and piping not so aligned are to be removed and replaced at no additional cost to Owner.

B. Install dry sprinklers in a manner which does not trap water.

C. For Freezers, Coolers and Similar Dry Penetrations: Provide an insulating "boot" manufactured for use with the particular dry sprinkler installed. Do not use spray-on or other insulating methods around dry sprinkler penetrations.

3.03 OVERSIZED SPRINKLER ESCUTCHEONS

A. Coordinate oversized sprinkler escutcheons with ceiling construction and sprinkler style.

B. Provide for dry sprinkler penetrations in suspended ceilings.

3.04 INSPECTOR'S TEST CONNECTION

A. Locate where full flow discharge or pressure relief valve discharge will not do damage, including damage to landscaping and will not cause dangerous conditions to walking surfaces or discoloration to building surfaces.

B. Locate within 5-feet of finished floor.

3.05 SECTIONAL CONTROL TEST/DRAIN UNIT

A. Locate for ease of access and viewing without ladders or other equipment.

3.06 DRY SYSTEM DRUM DRIP DRAINS

A. Locate within 7-feet of finished floor.

B. Coordinate drain locations with architect prior to design and installation of dry sprinkler system.

3.07 SPARE SPRINKLER CABINET

A. Attach to wall at the main sprinkler system riser.

B. Locate so cover is easy to open and readily accessible.

C. Locate in an area with a temperature between 40 and 100 degrees Fahrenheit (4 and 38 degrees Celsius).

D. Locate sprinkler wrenches inside cabinet.

E. Inside the cabinet, provide a list of sprinklers installed in the property, including sprinkler identification number, manufacturer, model, orifice, deflector type, thermal sensitivity and pressure rating, quantity of each type to be contained in the cabinet and issue or revision date of the list.

3.08 SPRINKLER GUARDS

A. Install per manufacturer's instructions and recommendations.

END OF SECTION

SECTION 16000 - ELECTRICAL BASIC REQUIREMENTS

PART 1 - GENERAL

1.01 SECTION INCLUDES

A. Work included in 16000, Electrical Basic Requirements applies to Division 16, Electrical work to provide materials, labor, tools, permits, incidentals, and other services to provide and make ready for Owner's use of electrical systems for proposed project.

B. Contract Documents include, but are not limited to, Specifications including Division 00, Procurement and Contracting Requirements and Division 01, General Requirements, Drawings, Addenda, Owner/Architect Agreement, and Owner/Contractor Agreement. Confirm requirements before commencement of work.

C. Definitions:
   1. Provide: To furnish and install, complete and ready for intended use.
   2. Furnish: Supply and deliver to project site, ready for unpacking, assembly and installation.
   3. Install: Includes unloading, unpacking, assembling, erecting, installation, applying, finishing, protecting, cleaning and similar operations at project site as required to complete items of work furnished.
   4. Approved or Approved Equivalent: To possess the same performance qualities and characteristics and fulfill the utilitarian function without any decrease in quality, durability or longevity. For equipment/products defined by the Contractor as "equivalent", substitution requests must be submitted to Engineer for consideration, in accordance with Division 01, General Requirements, and approved by the Engineer prior to submitting bids for substituted items.
   5. Authority Having Jurisdiction (AHJ): Indicates reviewing authorities, including local fire marshal, Owner's insurance underwriter, Owner's Authorized Representative, and other reviewing entity whose approval is required to obtain systems acceptance.

1.02 RELATED SECTIONS

A. Contents of Section applies to Division 16, Electrical Contract Documents.

B. Related Work:
   1. Additional conditions apply to this Division including, but not limited to:
      a. Specifications including Division 00, Procurement and Contracting Requirements and Division 01, General Requirements.
      b. Drawings
      c. Addenda
      d. Owner/Architect Agreement
      e. Owner/Contractor Agreement
      f. Codes, Standards, Public Ordinances and Permits

1.03 REFERENCES AND STANDARDS

A. References and Standards per Division 00, Procurement and Contracting Requirements and Division 01, General Requirements, individual Division 16, Electrical Sections and those listed in this Section.

B. Codes to include latest adopted editions, including current amendments, supplements and local jurisdiction requirements in effect as of the date of the Contract Documents, of/from:
   1. State of Hawaii:
      a. IBC - International Building Code, with Hawaii Amendments
      b. IECC - International Energy Conservation Code, with Hawaii Amendments
      c. IMC - International Mechanical Code
      d. NEC - National Electrical Code, with Hawaii Amendments
      e. UFC - Uniform Fire Code, with Hawaii Amendments
      f. UPC - Uniform Plumbing Code, with Hawaii Amendments

C. Reference standards and guidelines include but are not limited to the latest adopted editions from:

1. ABA - Architectural Barriers Act
2. ADA - Americans with Disabilities Act
3. ANSI - American National Standards Institute
4. APWA - American Public Works Association
5. ASCE - American Society of Civil Engineers
6. ASHRAE Guideline 0, the Commissioning Process
7. ASTM - ASTM International
8. CFR - Code of Federal Regulations
9. EPA - Environmental Protection Agency
10. ETL - Electrical Testing Laboratories
11. FCC - Federal Communications Commission
12. FDA - Food & Drug Administration
13. FM - FM Global
14. IBC - International Building Code
15. IEC - International Electrotechnical Commission
16. IEEE - Institute of Electrical and Electronics Engineers
17. IES - Illuminating Engineering Society
18. ISO - International Organization for Standardization
19. MSS - Manufacturers Standardization Society
20. NEC - National Electric Code
21. NECA - National Electrical Contractors Association
22. NEMA - National Electrical Manufacturers Association
23. NETA - National Electrical Testing Association
24. NFPA - National Fire Protection Association
25. OSHA - Occupational Safety and Health Administration
26. UL - Underwriters Laboratories Inc.

D. See Division 16, Electrical individual Sections for additional references.

1.04 SUBMITTALS

A. See Division 01, General Requirements for Submittal Procedures as well as individual Division 16, Electrical Sections.

B. Provide drawings in format and software release equal to the design documents. Drawings to be the same sheet size and scale as the Contract Documents.

C. In addition:
   1. "No Exception Taken" constitutes that review is for general conformance with the design concept expressed in the Contract Documents for the limited purpose of checking for conformance with information given. Any action is subject to the requirements of the Contract Documents. Contractor is responsible for the dimensions and quantity and will confirm and correlate at the job site, fabrication processes and techniques of construction, coordination of the work with that of all other trades, and the satisfactory performance of the work.
   2. Provide product submittals and shop drawings in electronic format only. Electronic format must be submitted via zip file via e-mail. For electronic format, provide one file per division containing one bookmarked PDF file with each bookmark corresponding to each Specification Section. Arrange bookmarks in ascending order of Specification Section number. Individual submittals sent piecemeal in a per Specification Section method will be returned without review or comment. All transmissions/submissions to be submitted to Engineer. Deviations will be returned without review.
      a. Provide separate submittals for lighting control cutsheets, and for lighting control shop drawings.
   3. Product Data: Provide manufacturer's descriptive literature for products specified in Division 16, Electrical Sections.
   4. Identify/mark each submittal in detail. Note what differences, if any, exist between the submitted item and the specified item. Failure to identify the differences will be considered

cause for disapproval. If differences are not identified and/or not discovered during the submittal review process, Contractor remains responsible for providing equipment and materials that meet the specifications and drawings.

a. Label submittal to match numbering/references as shown in Contract Documents. Highlight and label applicable information to individual equipment or cross out/remove extraneous data not applicable to submitted model. Clearly note options and accessories to be provided, including field installed items. Highlight connections by/to other trades.
b. Include technical data, installation instructions and dimensioned drawings for products, fixtures, equipment and devices installed, furnished or provided. Reference individual Division 16, Electrical specification Sections for specific items required in product data submittal outside of these requirements.
c. See Division 16, Electrical individual Sections for additional submittal requirements outside of these requirements.

5. Maximum of two reviews of complete submittal package. Arrange for additional reviews and/or early review of long-lead items; Bear costs of these additional reviews at Engineer's hourly rates. Incomplete submittal packages/submittals will be returned to contractor without review.
6. Resubmission Requirements: Make corrections or changes in submittals as required, and in consideration of Engineer’s comments. Identify Engineer’s comments and provide an individual response to each of the Engineer’s comments. Cloud changes in the submittals and further identify changes which are in response to Engineer’s comments.
7. Structural/Seismic: Provide weights, dimensions, mounting requirements and like information required for mounting, seismic bracing, and support. Indicate manufacturer's installation and support requirements to meet ASCE 7-10 requirements for non-structural components. Provide engineered seismic drawings and equipment seismic certification. Equipment Importance Factor as specified in Division 01 and in Structural documents.
8. Trade Coordination: Include physical characteristics, electrical characteristics, device layout plans, wiring diagrams, and connections as required per Division 16, Electrical Coordination Documents. For equipment with electrical connections, furnish copy of approved submittal for inclusion in Division 16, Electrical submittals. Electric motors are supplied and installed by Division 15, Mechanical unless otherwise specified. During shop drawing stage of the project, verify correct disconnect sizes, conductor sizes, etc., and bring any discrepancies to the attention of the Mechanical trade. Be responsible for any modifications to electrical equipment or installations as a result of equipment incompatibility discovered after shop drawing review.
9. Make provisions for openings in building for admittance of equipment prior to start of construction or ordering of equipment.
10. Substitutions and Variation from Basis of Design:
    a. The Basis of Design designated product establishes the qualities and characteristics for the evaluation of any comparable products by other listed acceptable manufacturers if included in this Specification or included in an approved Substitution Request as judged by the Design Professional.
    b. If substitutions and/or equivalent equipment/products are being proposed, it is the responsibility of parties concerned, involved in, and furnishing the substitute and/or equivalent equipment to verify and compare the characteristics and requirements of that furnished to that specified and/or shown. If greater capacity and/or more materials and/or more labor is required for the rough-in, circuitry or connections than for the item specified and provided for, then provide compensation for additional charges required for the proper rough-in, circuitry and connections for the equipment being furnished. No additional charges above the Base Bid, including resulting charges for work performed under other Divisions, will be allowed for such revisions. Coordinate with the requirements of "Submittals". For any product marked "or approved equivalent", a substitution request must be submitted to Engineer for approval prior to purchase, delivery or installation.

11. Shop Drawings: Provide coordinated shop drawings which include physical characteristics of all systems, device layout plans, and control wiring diagrams. Reference individual Division 16, Electrical specification Sections for additional requirements for shop drawings outside of these requirements.
    a. Provide Shop Drawings indicating access panel locations, size and elevation for approval prior to installation.
12. Samples: Provide samples when requested by individual Sections.
13. Resubmission Requirements:
    a. Make any corrections or change in submittals when required. Provide submittals as specified. The engineer will not be required to edit and/or interpret the Contractor's submittals. Indicate changes for the resubmittal in a cover letter with reference to page(s) changed and reference response to comment. Cloud changes in the submittals.
    b. Resubmit for review until review indicates no exception taken or "make corrections as noted".
14. Operation and Maintenance Manuals, Owner's Instructions:
    a. Submit, at one time, electronic files (PDF format) of manufacturer's operation and maintenance instruction manuals and parts lists for equipment or items requiring servicing. Submit data when work is substantially complete and in same order format as submittals. Include name and location of source parts and service for each piece of equipment.
        1) Include copy of approved submittal data along with submittal review letters received from Engineer. Data to clearly indicate installed equipment model numbers. Delete or cross out data pertaining to other equipment not specific to this project.
        2) Include copy of manufacturer's standard Operations and Maintenance for equipment. At front of each tab, provide routine maintenance documentation for scheduled equipment. Include manufacturer's recommended maintenance schedule and highlight maintenance required to maintain warranty. Furnish list of routine maintenance parts, including part numbers, sizes, quantities, relevant to each piece of equipment.
        3) Include Warranty per Division 00, Procurement and Contracting Requirements and Division 01, General Requirements, Section 16000, Electrical Basic Requirements and individual Division 16, Electrical Sections.
        4) Include product certificates of warranties and guarantees.
        5) Include copy of complete parts list for equipment. Include available exploded views of assemblies and sub assemblies.
        6) Include commissioning reports.
        7) Include copy of startup and test reports specific to each piece of equipment.
        8) Engineer will return incomplete documentation without review. Engineer will provide one set of review comments in Submittal Review format. Contractor must arrange for additional reviews; Contractor to bear costs for additional reviews at Engineer's hourly rates.
    b. Thoroughly instruct Owner in proper operation of equipment and systems. Where noted in individual Sections, training will include classroom instruction with applicable training aids and systems demonstrations. Field instruction per Section 16000, Electrical Basic Requirements, Demonstration.
    c. Copies of certificates of code authority inspections, acceptance, code required acceptance tests, letter of conformance and other special guarantees, certificates of warranties, specified elsewhere or indicated on Drawings.
15. Record Drawings:
    a. Maintain at site at least one set of drawings for recording “As-constructed” conditions. Indicate on drawings changes to original documents by referencing revision document, and include buried elements, location of conduit, and location of

concealed electrical items. Include items changed by field orders, supplemental instructions, and constructed conditions.

b. Record Drawings are to include equipment and fixture/connection schedules that accurately reflect "as constructed or installed" for project.

c. At completion of project, input changes to original project on CAD Drawings and make one set of black-line drawings created from CAD Files in version/release equal to contract drawings. Submit CAD disk and drawings upon substantial completion.

d. See Division 16, Electrical individual Sections for additional items to include in record drawings.

1.05 QUALITY ASSURANCE

A. Regulatory Requirements: Work and materials installed to conform with all local, State and Federal codes, and other applicable laws and regulations. Where code requirements are at variance with Contract Documents, meet code requirements as a minimum requirement and include costs necessary to meet these in Contract. Machinery and equipment are to comply with OSHA requirements, as currently revised and interpreted for equipment manufacturer requirements. Install equipment provided per manufacturer recommendations.

B. Whenever this Specification calls for material, workmanship, arrangement or construction of higher quality and/or capacity than that required by governing codes, higher quality and/or capacity take precedence.

C. Drawings are intended to be diagrammatic and reflect the Basis of Design manufacturer's equipment. They are not intended to show every item in its exact dimensions, or details of equipment or proposed systems layout. Verify actual dimensions of systems (i.e. distribution equipment, duct banks, light fixtures, etc.) and equipment proposed to assure that systems and equipment will fit in available space. Contractor is responsible for design and construction costs incurred for equipment other than Basis of Design, including, but not limited to, architectural, structural, electrical, HVAC, fire sprinkler, and plumbing systems.

D. Manufacturer's Instructions: Follow manufacturer's written instructions. If in conflict with Contract Documents, obtain clarification. Notify Engineer/Architect, in writing, before starting work.

E. Items shown on Drawings are not necessarily included in Specifications or vice versa. Confirm requirements in all Contract Documents.

F. Provide products that are UL listed.

1.06 WARRANTY

A. Provide written warranty covering the work for a period of one year from date of Substantial Completion in accordance with Division 00, Procurement and Contracting Requirements and Division 01, General Requirements, Section 16000, Electrical Basic Requirements and individual Division 16, Electrical Sections.

B. Sections under this Division can require additional and/or extended warranties that apply beyond basic warranty under Division 01, General Requirements and the General Conditions. Confirm requirements in all Contract Documents.

1.07 COORDINATION DOCUMENTS

A. Prior to construction, coordinate installation and location of HVAC equipment, ductwork, grilles, diffusers, piping, plumbing equipment/fixtures, fire sprinklers, plumbing, lights, cable tray and electrical services with architectural and structural requirements, and other trades (including ceiling suspension and tile systems), and provide maintenance access requirements. Coordinate with submitted architectural systems (i.e. roofing, ceiling, finishes) and structural systems as submitted, including footings and foundation. Identify zone of influence from footings and ensure systems are not routed within the zone of influence.

B. Advise Engineer in event a conflict occurs in location or connection of equipment. Bear costs resulting from failure to properly coordinate installation or failure to advise Engineer of conflict.

C. Verify in field exact size, location, and clearances regarding existing material, equipment and apparatus, and advise Engineer of discrepancies between that indicated on Drawings and that existing in field prior to installation related thereto.

D. Submit final Coordination Drawings with changes as Record Drawings at completion of project.

PART 2 - PRODUCTS

2.01 MANUFACTURERS

A. Articles, fixtures, and equipment of a kind to be standard product of one manufacturer.

2.02 STANDARDS OF MATERIALS AND WORKMANSHIP

A. Base contract upon furnishing materials as specified. Materials, equipment, and fixtures used for construction are to be new, latest products as listed in manufacturer's printed catalog data and are to be UL approved or have adequate approval or be acceptable by state, county, and city authorities. Equipment/fixture supplier is responsible for obtaining State, County, and City acceptance on equipment/fixtures that are not UL approved or are not listed for installation.

B. Names and manufacturer's names denote character and quality of equipment desired and are not to be construed as limiting competition.

C. Hazardous Materials:
   1. Comply with local, State of Hawaii, and Federal regulations relating to hazardous materials.
   2. Comply with Division 00, Procurement and Contracting Requirements and Division 01, General Requirements for this project relating to hazardous materials.
   3. Do not use any materials containing a hazardous substance. If hazardous materials are encountered, do not disturb; immediately notify Owner and Engineer. Hazardous materials will be removed by Owner under separate contract.

PART 3 - EXECUTION

3.01 ACCESSIBILITY AND INSTALLATION

A. Confirm Accessibility and Installation requirements in Division 00, Procurement and Contracting Requirements, Division 01, General Requirements, Section 16000, Electrical Basic Requirements and individual Division 16, Electrical Sections.

B. Install equipment requiring access (i.e., junction boxes, light fixtures, power supplies, motors, etc.) so that they may be serviced, reset, replaced or recalibrated by service people with normal service tools and equipment. Do not install equipment in passageways, doorways, scuttles or crawlspaces which would impede or block the intended usage.

C. Install equipment and products complete as directed by manufacturer's installation instructions. Obtain installation instructions from manufacturer prior to rough-in of equipment and examine instructions thoroughly. When requirements of installation instructions conflict with Contract Documents, request clarification from Engineer prior to proceeding with installation. This includes proper installation methods, sequencing, and coordination with other trades and disciplines.

D. Firestopping:
   1. Confirm requirements in Division 07, Thermal and Moisture Protection. In the absence of specific requirements, comply with individual Division 16, Electrical Sections and the following:
      a. Coordinate location and protection level of fire and/or smoke rated walls, ceilings, and floors. When these assemblies are penetrated, seal around piping and equipment with approved firestopping material. Install firestopping material complete as directed by manufacturer's installation instructions. Meet requirements of ASTM E814, Standard Test Method for Fire Tests of Through-Penetration Fire Stops.

E. Plenums:
   1. In plenums, provide plenum rated materials that meet the requirements to be installed in plenums. Immediately notify Architect/Engineer of discrepancy.

F. Start up equipment, in accordance with manufacturer's start-up instructions, and in presence of manufacturer's representative. Test controls and demonstrate compliance with requirements. Replace damaged or malfunctioning controls and equipment.

G. Provide miscellaneous supports/metals required for installation of equipment and conduit.

3.02 SEISMIC CONTROL

A. Confirm Seismic Control requirements in Division 01, General Requirements, Structural documents, and individual Division 16, Electrical Sections.

B. General:
   1. Earthquake resistant designs for Electrical (Division 16) equipment and distribution, i.e. power distribution equipment to conform to regulations of jurisdiction having authority.
   2. Restraints which are used to prevent disruption of function of piece of equipment because of application of horizontal force to be such that forces are carried to frame of structure in such a way that frame will not be deflected when apparatus is attached to a mounting base and equipment pad, or to structure in normal way, utilizing attachments provided. Secure equipment and distribution systems to withstand a force in direction equal to value defined by jurisdiction having authority.
   3. Provide stamped shop drawings from licensed Structural Engineer of seismic bracing and seismic movement assemblies for conduit and equipment. Submit shop drawings along with equipment submittals.
   4. Provide stamped shop drawings from licensed Structural Engineer of seismic flexible joints for conduit crossing building expansion or seismic joints. Submit shop drawings along with seismic bracing details.
   5. Provide means to prohibit excessive motion of electrical equipment during earthquake.

3.03 REVIEW AND OBSERVATION

A. Confirm Review and Observation requirements in Division 00, Procurement and Contracting Requirements, Division 01, General Requirements, Section 16000, Electrical Basic Requirements and individual Division 16, Electrical Sections.

B. Notify Engineer, in writing, at following stages of construction so that they may, at their option, visit site for review and construction observation:
   1. Underground conduit installation prior to backfilling.
   2. Prior to covering walls.
   3. Prior to ceiling cover/installation.
   4. When main systems, or portions of, are being tested and ready for inspection by AHJ.

C. Final Punch:
   1. Prior to requesting a final punch visit from the Engineer, request from Engineer the Electrical Precloseout Checklist, complete the checklist confirming completion of systems' installation, and return to Engineer. Request a final punch visit from the Engineer, upon Engineer's acceptance that the electrical systems are ready for final punch.
   2. Costs incurred by additional trips required due to incomplete systems will be the responsibility of the Contractor.

3.04 CONTINUITY OF SERVICE

A. Confirm requirements in Division 00, Procurement and Contracting Requirements and Division 01, General Requirements. In the absence of specific requirements in Division 01, General Requirements, comply with individual Division 16, Electrical Sections and the following:
   1. During remodeling or addition to existing structure, while existing structure is occupied, present services to remain intact until new construction, facilities or equipment is installed.
   2. Prior to changing over to new service, verify that every item is thoroughly prepared. Install new wiring, and wiring to point of connection.
   3. Coordinate transfer time to new service with Owner. If required, perform transfer during off-peak hours. Once changeover is started, pursue to its completion to keep interference to a minimum.

a. If overtime is necessary, there will be no allowance made by Owner for extra expense for such overtime or shift work.

4. No interruption of services to any part of existing facilities will be permitted without express permission in each instance from Owner. Requests for outages must state specific dates, hours and maximum durations, with outages kept to these specific dates, hours and maximum durations. Obtain written permission from Owner for any interruption of power, lighting or signal circuits and systems.
   a. Organize work to minimize duration of power interruption.
   b. Coordinate utility service outages with utility company.

3.05 CUTTING AND PATCHING

A. Confirm requirements in Division 00, Procurement and Contracting Requirements and Division 01, General Requirements. In the absence of specific requirements in Division 01, General Requirements, comply with individual Division 16, Electrical Sections and the following:
   1. Proposed floor cutting/core drilling/sleeve locations to be approved by Project Structural Engineer. Submit proposed locations to Project Structural Engineer. Where slabs are of post tension construction, perform x-ray scan of proposed penetration locations and submit scan results including proposed penetration locations to Project Structural Engineer for approval. Where slabs are of waffle type construction, show column cap extent and cell locations relative to proposed penetration(s).
   2. Cutting, patching and repairing for work specified in this Division including plastering, masonry work, concrete work, carpentry work, and painting included under this Section will be performed by skilled craftsmen of each respective trade in conformance with appropriate Division of Work.
   3. Additional openings required in building construction to be made by drilling or cutting. Use of jack hammer is specifically prohibited. Patch openings in and through concrete and masonry with grout.
   4. Restore new or existing work that is cut and/or damaged to original condition. Patch and repair specifically where existing items have been removed. This includes repairing and painting walls, ceilings, etc. where existing conduit and devices are removed as part of this project. Where alterations disturb lawns, paving, and/or walks, surfaces to be repaired, refinished and left in condition matching existing prior to commencement of work.
   5. Additional work required by lack of proper coordination will be provided at no additional cost to the Owner.

3.06 EQUIPMENT SELECTION AND SERVICEABILITY

A. Replace or reposition equipment which is too large or located incorrectly to permit servicing, at no additional cost to Owner.

3.07 DELIVERY, STORAGE AND HANDLING

A. Confirm requirements in Division 00, Procurement and Contracting Requirements and Division 01, General Requirements. In the absence of specific requirements, comply with individual Division 16, Electrical Sections and the following:
   1. Handle materials delivered to project site with care to avoid damage. Store materials on site inside building or protected from weather, dirt and construction dust. Products and/or materials that become damaged due to water, dirt, and/or dust as a result of improper storage and handling to be replaced before installation.
   2. Protect equipment to avoid damage. Close conduit openings with caps or plugs. Keep motors and bearings in watertight and dustproof covers during entire course of installation.
   3. Protect bus duct and similar items until in service.

3.08 DEMONSTRATION

A. Confirm Demonstration requirements in Division 00, Procurement and Contracting Requirements, Division 01, General Requirements, and individual Division 16, Electrical Sections.

B. Upon completion of work and adjustment of equipment, test systems and demonstrate to Owner's Authorized Representative, Architect, and Engineer that equipment furnished and installed or connected under provisions of these Specifications functions in manner required. Provide field instruction to Owner's Maintenance Staff as specified in Division 01, General Requirements, Section 16000, Electrical Basic Requirements and individual Division 16, Electrical Sections.

C. Manufacturer's Field Services: Furnish services of a qualified person at time approved by Owner, to instruct maintenance personnel, correct defects or deficiencies, and demonstrate to satisfaction of Owner that entire system is operating in satisfactory manner and complies with requirements of other trades that may be required to complete work. Complete instruction and demonstration prior to final job site observations.

3.09 CLEANING

A. Confirm Cleaning requirements in Division 01, General Requirements, Section 16000, Electrical Basic Requirements and individual Division 16, Electrical Sections.

B. Upon completion of installation, thoroughly clean electrical equipment, removing dirt, debris, dust, temporary labels and traces of foreign substances. Throughout work, remove construction debris and surplus materials accumulated during work.

3.10 INSTALLATION

A. Confirm Installation requirements in Division 00, Procurement and Contracting Requirements and Division 01, General Requirements, Section 16000, Electrical Basic Requirements and individual Division 16, Electrical Sections.

B. Install equipment and fixtures in accordance with manufacturer's installation instructions, plumb and level and firmly anchored to vibration isolators. Maintain manufacturer's recommended clearances.

C. Start up equipment, in accordance with manufacturer's start-up instructions, and in presence of manufacturer's representative. Test controls and demonstrate compliance with requirements. Replace damaged or malfunctioning controls and equipment.

D. Provide miscellaneous supports/metals required for installation of equipment.

3.11 PAINTING

A. Confirm requirements in Division 01, General Requirements and Division 09, Finishes. In the absence of specific requirements, comply with individual Division 16, Electrical Sections and the following:
   1. Ferrous Metal: After completion of work, thoroughly clean and paint exposed supports constructed of ferrous metal surfaces (i.e., hangers, hanger rods, equipment stands, etc.) with one coat of black asphalt varnish for exterior or black enamel for interior, suitable for hot surfaces.
   2. In Electrical Room, on roof or other exposed areas, equipment not painted with enamel to receive two coats of primer and one coat of rustproof enamel, colors as selected by Architect.
   3. See individual equipment Specifications for other painting.
   4. Structural Steel: Repair damage to structural steel finishes or finishes of other materials damaged by cutting, welding or patching to match original.
   5. Conduit: Clean, primer coat and paint interior/exterior conduit exposed in public areas with two coats paint suitable for metallic surfaces. Color selected by Architect.

3.12 DEMOLITION

A. Confirm requirements in Division 01, General Requirements and Division 02, Existing Conditions. In the absence of specific requirements, comply with individual Division 16, Electrical Sections and the following:
   1. It is the intent of these documents to provide necessary information and adjustments to electrical system required to meet code, and accommodate installation of new work.

2. Coordinate with Owner so that work can be scheduled not to interrupt operations, normal activities, building access or access to different areas. Owner will cooperate to best of their ability to assist in coordinated schedule, but will remain final authority as to time of work permitted.
3. Examination:
    a. Determine exact location of existing utilities and equipment before commencing work, compensate Owner for damages caused by failure to locate and preserve utilities. Replace damaged items with new material to match existing.
    b. Verify that abandoned wiring and equipment serve only abandoned facilities.
    c. Demolition drawings are based on casual field observation and existing record documents.
        1) Verify accuracy of information shown prior to bidding and provide such labor and material as is necessary to accomplish work.
        2) Verify location and number of electrical outlets, luminaires, panels, etc. in field.
    d. Report discrepancies to Architect before disturbing existing installation.
        1) Promptly notify Owner if utilities are found which are not shown on Drawings.
4. Execution:
    a. Remove existing luminaires, switches, receptacles, and other electrical equipment and devices and associated wiring from walls, ceilings, floors, and other surfaces scheduled for remodeling, relocation, or demolition unless shown as retained or relocated on Drawings.
    b. Provide temporary wiring and connections to maintain electrical continuity of existing systems during construction. Remove or relocate electrical boxes, conduit, wiring, equipment, and luminaires, as encountered in removed or remodeled areas in existing construction affected by this work.
    c. Remove and restore wiring which serves usable existing outlets clear of construction or demolition.
    d. If existing junction boxes will be made inaccessible, or if abandoned outlets serve as feed through boxes for other existing electrical equipment which is being retained, provide new conduit and wire to bypass inaccessible junction boxes and abandoned outlets.
    e. If existing conduits pass through partitions or ceiling which are being removed or remodeled, provide new conduit and wire to reroute clear of construction or demolition and maintain service to existing load.
    f. Extend circuiting and devices in existing walls to be furred out.
    g. Remove abandoned wiring to source of supply.
    h. Remove exposed abandoned conduit, including abandoned conduit above accessible ceiling finishes. Cut conduit flush with walls and floors, and patch surfaces.
    i. Disconnect abandoned outlets and remove devices. Remove abandoned outlets if conduit servicing them is abandoned and removed. Provide blank cover for abandoned outlets which are not removed.
    j. Disconnect and remove abandoned panelboards and distribution equipment.
    k. Disconnect and remove electrical devices and equipment serving utilization equipment that has been removed.
    l. Existing lighting which is to remain, leave luminaires in proper working order.
    m. Repair adjacent construction and finishes damaged during demolition work.
    n. Maintain access to existing electrical installations which remain active. Modify installation or provide access panel as appropriate.

3.13 ACCEPTANCE

A. Confirm requirements in Division 00, Procurement and Contracting Requirements and Division 01, General Requirements. In the absence of specific requirements, comply with individual Division 16, Electrical Sections and the following:

1. System cannot be considered for acceptance until work is completed and demonstrated to Engineer that installation is in strict compliance with Specifications, Drawings and manufacturer's installation instructions, particularly in reference to following:
    a. Cleaning
    b. Operation and Maintenance Manuals
    c. Training of Operating Personnel
    d. Record Drawings
    e. Warranty and Guaranty Certificates
    f. Start-up/Test Document and Commissioning Reports

3.14 FIELD QUALITY CONTROL

A. Confirm Field Quality Control requirements in Division 01, General Requirements, Section 16000, Electrical Basic Requirements and individual Division 16, Electrical Sections.

B. Tests:
    1. Conduct tests of equipment and systems to demonstrate compliance with requirements specified. Reference individual Specification Sections for required tests. Document tests and include in operation and maintenance manuals.
    2. During site evaluations by Architect or Engineer, provide appropriate personnel with tools to remove and replace trims, covers, and devices so that proper evaluation of installation can be performed.

3.15 LETTER OF CONFORMANCE

A. Provide Letter of Conformance, copies of manufacturers' warranties and extended warranties with a statement that Electrical items were installed in accordance with manufacturer's recommendations, UL listings and FM Global approvals. Include Letter of Conformance, copies of manufacturers' warranties and extended warranties in Operation and Maintenance Manuals.

3.16 SALVAGED EQUIPMENT AND RECYCLED MATERIAL

A. Salvage the following equipment not being reused and return to Owner:
    1. Luminaires
    2. Panelboards
    3. Breakers
    4. Transformers

B. Electrical equipment that cannot be salvaged for reuse, sell/give to recycling company. Recycle following excess, removed, or demolished electrical material:
    1. Copper or aluminum conductors, buses, and motor/transformer windings.
    2. Steel and aluminum from raceways, boxes, enclosures, and housings.
    3. Acrylic and glass from luminaire lenses/refractors.

C. Provide separate on-site storage space for recycled and salvaged material. Clearly label space.

D. Confirm additional salvaged equipment and recycled materials in the Contract Documents.

END OF SECTION

SECTION 16060 - GROUNDING AND BONDING FOR ELECTRICAL SYSTEMS

PART 1 - GENERAL

1.01 SUMMARY

A. Work Included:
   1. Connectors and Accessories
   2. Grounding Conductor

1.02 RELATED SECTIONS

A. Contents of Division 16, Electrical and Division 01, General Requirements apply to this Section.

1.03 REFERENCES AND STANDARDS

A. References and Standards as required by Section 16000, Electrical Basic Requirements and Division 01, General Requirements.

1.04 SUBMITTALS

A. Submittals as required by Section 16000, Electrical Basic Requirements and Division 01, General Requirements.

1.05 QUALITY ASSURANCE

A. Quality assurance as required by Section 16000, Electrical Basic Requirements and Division 01, General Requirements.

B. In addition, meet the following:
   1. Comply with the requirements of ANSI/NFPA 70.

1.06 WARRANTY

A. Warranty of materials and workmanship as required by Section 16000, Electrical Basic Requirements and Division 01, General Requirements.

PART 2 - PRODUCTS

2.01 MANUFACTURERS

A. Connectors and Accessories:
   1. Burndy Hyground Compression System
   2. Erico/Cadweld
   3. Amp Ampact Grounding System
   4. Pipe Grounding Clamp:
      a. Burndy GAR Series
      b. O Z Gedney
      c. Thomas & Betts
      d. Or approved equivalent.

B. Grounding Conductor
   1. General Cable
   2. Okonite
   3. Southwire
   4. Or approved equivalent

2.02 CONNECTORS AND ACCESSORIES

A. Grounding Connectors: Hydraulic compression tool applied connectors or exothermic welding process connectors or powder actuated compression tool applied connectors.

B. Pipe Grounding Clamp: Mechanical ground connector with cable parallel or perpendicular to pipe.

2.03 GROUNDING CONDUCTOR

A. Grounding Electrode Conductor: Soft-draw bare stranded copper for wire sizes larger than #10 AWG Bare. Solid copper for wire sizes #10 AWG and smaller.

B. Equipment Grounding Conductor: Green insulated, insulation type to match that of associated feeder or branch circuit wiring, size as indicated on drawings.

PART 3 - EXECUTION

3.01 GENERAL INSTALLATION REQUIREMENTS

A. Verify site conditions prior to beginning work.

B. Bond Sections of service equipment enclosure to service ground bus.

C. Corrosion inhibitors: Apply a corrosion inhibitor to contact surfaces when making grounding and bonding connections. Use corrosion inhibitor appropriate for protecting a connection between metals used.

D. Inspect and test in accordance with NETA Standard ATS, Except Section 4.

E. Perform inspections and tests listed in NETA Standard AB, Section 7.13.

3.02 CONNECTORS AND ACCESSORIES INSTALLATION

A. Install per manufacturer's instructions.

3.03 GROUNDING CONDUCTOR INSTALLATION

A. Raceways:
   1. Ground metallic raceway systems. Bond to ground terminal with code size jumper except where code size or larger equipment grounding conductor is included with circuit, use grounding bushing with lay-in lug.
   2. Connect metal raceways, which terminate within an enclosure but without mechanical connection to enclosure, by grounding bushings and ground conductor to grounding bus.
   3. Where equipment supply conductors are in flexible metallic conduit, install stranded copper equipment grounding conductor from outlet box to equipment frame.
   4. Install equipment grounding conductor, code size minimum unless noted on drawings, in metallic and nonmetallic raceway systems.

B. Feeders and Branch Circuits:
   1. Provide continuous green insulated copper equipment grounding conductors for feeders and branch circuits.
   2. Where installed in a continuous solid metallic raceway system and larger sizes are not detailed, provide insulated equipment grounding conductors for feeders and branch circuits sized in accordance with the latest adopted edition of NEC Article 250, Table 250-122.

C. Bond boxes, cabinets, enclosures and panelboard equipment grounding conductors to enclosure with specified conductors and lugs. Install lugs only on thoroughly cleaned contact surfaces.

D. Motors, Equipment and Appliances: Install code size equipment grounding conductor to (motor) equipment frame or manufacturer's designated ground terminal.

E. Receptacles: Connect ground terminal of receptacle and associated outlet box to equipment grounding conductor. Self grounding nature of receptacle devices does not eliminate equipment grounding conductor bolted to outlet box.

END OF SECTION

SECTION 16070 - HANGERS AND SUPPORTS FOR ELECTRICAL SYSTEMS AND EQUIPMENT

PART 1 - GENERAL

1.01 SUMMARY

A. Work Included:
   1. Anchors, Threaded Rod and Fasteners
   2. Support Channel, Hangers and Supports
   3. Rooftop Conduit Supports

1.02 RELATED SECTIONS

A. Contents of Division 16, Electrical and Division 01, General Requirements apply to this Section.

1.03 REFERENCES AND STANDARDS

A. References and Standards as required by Section 16000, Electrical Basic Requirements and Division 01, General Requirements.

1.04 SUBMITTALS

A. Submittals not required for this Section.

1.05 QUALITY ASSURANCE

A. Quality assurance as required by Section 16000, Electrical Basic Requirements and Division 01, General Requirements.

B. In addition, meet the following:
   1. Manufacturers regularly engaged in the manufacture of bolted metal framing support systems, whose products have been in satisfactory use in similar service for not less than 10 years.
   2. Support systems to be supplied by a single manufacturer.
   3. Engineering Responsibility: Design and preparation of Shop Drawings and calculations for each multiple pipe support, trapeze, equipment hangers/supports, and seismic restraint by a qualified Structural Professional Engineer.
      a. Professional Engineer Qualifications: A professional engineer who is legally qualified to practice in jurisdiction where Project is located and who is experienced in providing engineering services of the kind indicated. Engineering services are defined as those performed for installations of hangers and supports that are similar to those indicated for this Project in material, design, and extent.

1.06 WARRANTY

A. Warranty of materials and workmanship as required by Section 16000, Electrical Basic Requirements and Division 01, General Requirements.

1.07 PERFORMANCE REQUIREMENTS

A. General: Provide conduit and equipment hangers and supports in accordance with the following:
   1. When supports, anchorages, and seismic restraints for equipment and supports, anchorages and seismic restraints for conduit, cable tray and equipment are not shown on the Drawings, the Contractor is responsible for their design.
   2. Connections to structural framing shall not introduce twisting, torsion, or lateral bending in the framing members. Provide supplementary steel as required.

B. Engineered Support Systems: The following support systems to be designed, detailed, and bear the seal of a professional engineer registered in the State of Hawaii.
   1. Support frames such as conduit racks or stanchions for conduit and equipment which provide support from below.
   2. Equipment and piping support frame anchorage to supporting slab or structure.

C. Provide channel support systems, for conduits to support multiple conduits capable of supporting combined weight of support systems and system contents.

D. Provide heavy-duty steel trapezes for piping to support multiple conduit capable of supporting combined weight of supported systems and system contents.

E. Provide seismic restraint hangers and supports for conduit and equipment.

F. Obtain approval from AHJ for seismic restraint hanger and support system to be installed for piping and equipment.

PART 2 - PRODUCTS

2.01 MANUFACTURERS

A. Anchors, Threaded Rod and Fasteners:
   1. Anchor It
   2. Epcon System
   3. Hilti-Hit System
   4. Power Fast System
   5. Or approved equivalent.

B. Support Channel, Hangers and Supports:
   1. B-Line
   2. Kindorf
   3. Superstrut
   4. Unistrut
   5. Or approved equivalent.

C. Rooftop Conduit Supports:
   1. Cooper B-Line Dura-Block Rooftop Support Base
   2. Or approved equivalent.

2.02 ANCHORS, THREADED ROD AND FASTENERS

A. Anchors, Threaded Rod and Fasteners - General: Corrosion-resistant materials of size and type adequate to carry the loads of equipment and conduit, including weight of wire in conduit.

B. Concrete Inserts: Cast in concrete for support fasteners for loads up to 800 lbs.

C. Anchors and Fasteners:
   1. Do not use powder-actuated anchors.
   2. Concrete Structural Elements: Use precast inserts.
   3. Steel Structural Elements: Use beam clamps.
   4. Concrete Surfaces: Use self-drilling anchors.
   5. Hollow Masonry, Plaster, and Gypsum Board Partitions: Use toggle bolts.
   6. Solid Masonry Walls: Use expansion anchors.
   7. Sheet Metal: Use sheet metal screws.
   8. Wood Elements: Use wood screws.

D. Fasteners: Provide fasteners of types as required for assembly and installation of fabricated items; surface-applied fasteners are specified elsewhere.

E. Bolts: Low carbon steel externally and internally threaded fasteners conforming with requirements of ASTM A307; include necessary nuts and plain hardened washers. For structural steel elements supporting mechanical material or equipment from building structural members or connection thereto, use fasteners conforming to ASTM A325.

F. Miscellaneous Materials: Provide incidental accessory materials, tools, methods, and equipment required for fabrication.

2.03 SUPPORT CHANNEL, HANGERS AND SUPPORTS

A. Hangers and Supports - General: Corrosion-resistant materials of size and type adequate to carry the loads of equipment and conduit, including weight of wire in conduit.
   1. Channel Material: Carbon steel.
   2. Coating: Hot dip galvanized.

B. Pipe Straps: Two-hole galvanized or malleable iron.

C. Miscellaneous Metal: Provide miscellaneous metal items specified hereunder, including materials, fabrication, fastenings and accessories required for finished installation, where indicated on Drawings or otherwise not shown on drawings that are necessary for completion of the project. The Contractor is responsible for their design.
   1. Fabricate miscellaneous units to size shapes and profiles indicated or, if not indicated, of required dimensions to receive adjacent other work to be retained by framing. Except as otherwise shown, fabricate from structural steel shapes and plates and steel bars, of welded construction using mitered joints for field connection. Cut, drill and tap units to receive hardware and similar items.

D. Structural Shapes: Where miscellaneous metal items are needed to be fabricated from structural steel shapes and plates, provide members constructed of steel conforming with requirements of ASTM A36 or approved equivalent.

E. Steel Pipe: Provide seamless steel pipe conforming to requirements of ASTM A53, Type S, Grade A, or Grade B. Weight and size required as specified.

F. Miscellaneous Materials: Provide incidental accessory materials, tools, methods, and equipment required for fabrication.

2.04 ROOFTOP CONDUIT SUPPORTS

A. Curb base made of 100 percent recycled rubber and polyurethane prepolymer with a uniform load

B. Capacity of 500 pounds per linear foot of support.

C. UV resistant.

D. Steel Frame: Steel, 14 gauge strut galvanized per ASTM A653 or 12 gauge strut galvanized per ASTM A653 for bridge series.

E. Continuous block channel supports with 1-inch gaps to allow water flow, bridge channel supports, extendable height channel supports and elevated single conduit supports.

F. Attaching Hardware: Zinc-plated threaded rod, nuts and attaching hardware per ASTM B633 fastened directly into rubber material with weather resistant Type 12 lag screws.

G. Provide load distribution plates when required for heavy loads.

H. Finish: Black with safety yellow striping.

I. Provide hot dipped galvanized components for items exposed to weather.

PART 3 - EXECUTION

3.01 GENERAL INSTALLATION REQUIREMENTS

A. Fabrication - Miscellaneous Metals
   1. General: Verify dimensions prior to fabrication. Form metal items to accurate sizes and configurations as indicated on Drawings and otherwise required for proper installation; make with lines straight and angles sharp, clean and true; drill, countersink, tap, and otherwise prepare items for connections with work of other trades, as required. Fabricate to detail of structural shapes, plates and bars; weld joints where practicable; provide bolts and other connection devices required. Include anchorages; clip angles, sleeves, anchor plates, and similar devices. Hot dipped galvanize after fabrication items installed in exterior locations. Set accurately in position as required and anchor securely to building construction. Construct items with joints formed for strength and rigidity, accurately machining for proper fit; where exposed to weather, form to exclude water.
   2. Finishes:
      a. Ferrous Metal: After fabrication, but before erection, clean surfaces by mechanical or chemical methods to remove rust, scale, oil, corrosion, or other substances detrimental to bonding of subsequently applied protective coatings. For metal items exposed to weather or moisture, galvanize in manner to obtain G90 zinc coating in accordance with ASTM A123. Provide other non-galvanized ferrous metal with one coat of approved rust-resisting paint primer, in manner to obtain not less than 1.0 mil

dry film thickness. Touch-up damaged areas in primer with same material, before installation. Apply zinc coatings and paint primers uniformly and smoothly; leave ready for finish painting as specified elsewhere.

b. Metal in contact with Concrete, Masonry and Other Dissimilar Materials: Where metal items are to be erected in contact with dissimilar materials, provide contact surfaces with coating of an approved zinc-chromate primer in manner to obtain not less than 1.0 mil dry film thickness, in addition to other coatings specified in these specifications.

c. For Galvanized Surfaces: Clean field welds, bolted connections, and abraded areas and apply galvanizing repair paint to comply with ASTM A780.

3.02 ANCHORS, THREADED ROD AND FASTENERS INSTALLATION

A. Safety factor of 4 required for every fastening device or support for equipment installed. Supports to withstand four times the weight of equipment it supports.

B. Do not use other trade's fastening devices as supporting means for equipment or materials.

C. Do not fasten supports to pipes, ducts, mechanical equipment, or conduit.

D. Do not use supports or fastening devices to support other than one particular item.

E. Securely suspend junction boxes, pull boxes or other conduit terminating housings located above suspended ceiling from floor above or roof structure to prevent sagging and swaying.

F. Provide seismic bracing per IBC requirements.

G. Install surface-mounted cabinets and panelboards with minimum of four anchors.

H. Use spring lock washers under fastener nuts for strut.

I. Cutting and Drilling
   1. Do not drill or cut structural members without prior permission from Engineer.

3.03 SUPPORT CHANNEL, HANGERS AND SUPPORTS INSTALLATION

A. Install hangers and supports as required to adequately and securely support electrical system components, in a neat and workmanlike manner, as specified in NECA 1.

B. Safety factor of 4 required for every fastening device or support for equipment installed. Supports to withstand four times the weight of equipment it supports.

C. Install vertical support members for equipment, straight and parallel to building walls.

D. Install horizontal support members straight and parallel to ceilings or finished floor unless otherwise noted.

E. Provide independent supports to structural member for materials, or equipment installed in or on ceiling, walls or in void spaces or over suspended ceilings.

F. Do not use other trade's fastening devices as supporting means for equipment or materials.

G. Do not fasten supports to pipes, ducts, mechanical equipment, or conduit.

H. Do not use supports or fastening devices to support other than one particular item.

I. Support conduits within 18-inches of outlets, boxes, panels, cabinets and deflections unless more stringently required by NEC.

J. Maximum distance between supports not to exceed 8 foot spacing unless otherwise required by NEC.

K. Support flexible conduits and metal clad cable within 12-inches of outlets, boxes, panels, cabinets and deflections unless otherwise required by NEC.

L. Maximum distance between supports for flexible conduits and metal clad cable not to exceed 48-inches spacing unless otherwise required by NEC.

M. Maximum distance between supports for rigid PVC conduits unless otherwise required by NEC is as follows:
   1. 1/2-inch or 3/4-inch and 1-inch conduit, 3-feet apart.

2. 1-1/4-inch or 1-1/2-inch and 2-inch conduit, 4-feet apart.
3. 2-1/2-inch and 3-inch conduit, 5-feet apart.
4. 4-inch and 5-inch conduit, 6-feet apart.
5. 6-inch conduit, 7-feet apart.

N. Maximum distance between supports for auxiliary gutters and wireways unless otherwise required by NEC is as follows:
   1. Sheet metal auxiliary gutters and wireways - 4-feet apart horizontally and 10-feet vertically.
   2. Non-metallic auxiliary gutters and wireways - 30-inches apart horizontally and 3-feet vertically.

O. Install strut hangers as instructed by strut manufacturer. Suspend strut hangers as instructed by strut manufacturer for the load, with a maximum spacing of 8-feet on center and within 2-feet of outlet box, cabinet, junction box or other channel raceway termination unless otherwise required by NEC.

P. Coordinate routing of conduit racks with materials and equipment installed by other trades. Where conduit racks are exposed to view, coordinate location and installation with Engineer for optimal appearance.

Q. Securely suspend junction boxes, pull boxes or other conduit terminating housings located above suspended ceiling from floor above or roof structure to prevent sagging and swaying.

R. Provide seismic bracing per IBC requirements.

S. Where service disconnects are mounted on building exterior, physically attach service disconnect to the building or structure served.

T. Install surface-mounted cabinets and panelboards with minimum of four anchors.

U. Use sheet metal channel to bridge studs above and below cabinets and panelboards recessed in hollow partitions.

V. Wet and Damp Locations:
   1. In wet and damp locations use steel channel supports to stand cabinets and panelboards 1-inch off wall.

3.04 ROOFTOP CONDUIT SUPPORTS INSTALLATION

A. Consult roofing manufacturer for roof membrane compression capacities. If necessary, provide a compatible sheet of roofing material (rubber pad) under rooftop support to disperse concentrated loads and add further membrane protection.

B. Do not use supports that will void roof warranty.

C. Install supports per manufacturer's instructions and recommendations.

D. Use properly sized clamps to suit conduit sizes.

E. Install supports for rooftop raceways to raise raceways a minimum of 7/8-inches above the roof structure unless otherwise noted.

END OF SECTION

SECTION 16075 - IDENTIFICATION FOR ELECTRICAL SYSTEMS

PART 1 - GENERAL

1.01 SUMMARY

A. Work Included:
   1. Equipment Nameplates
   2. Device Labels
   3. Wire Markers

1.02 RELATED SECTIONS

A. Contents of Division 16, Electrical and Division 01, General Requirements apply to this Section.

1.03 REFERENCES AND STANDARDS

A. References and Standards as required by Section 16000, Electrical Basic Requirements and Division 01, General Requirements.

1.04 SUBMITTALS

A. Submittals not required for this Section.

1.05 QUALITY ASSURANCE

A. Quality assurance as required by Section 16000, Electrical Basic Requirements and Division 01, General Requirements.

B. In addition, meet the following:
   1. Manufacturer's Qualifications: Firms regularly engaged in manufacture of identification devices of types and sizes required.
   2. Manufacturer's standard products of categories and types required for each application as referenced in other Division 16, Electrical Sections. Where more than a single type is specified for application, provide single selection for each product category.
   3. Codes and Standards: Comply with ANSI A13.1 for lettering size, length of color field, colors, and viewing angles of identification devices unless otherwise indicated.

1.06 WARRANTY

A. Warranty of materials and workmanship as required by Section 16000, Electrical Basic Requirements and Division 01, General Requirements.

PART 2 - PRODUCTS

2.01 MANUFACTURERS

A. Equipment Nameplates:
   1. B & I Nameplates
   2. Intellicum
   3. JBR Associates
   4. Or approved equivalent.

B. Device Labels:
   1. Kroy
   2. Brady
   3. Or approved equivalent.

C. Wire Markers:
   1. Brady
   2. Panduit
   3. Sumitomo
   4. Or approved equivalent.

2.02 EQUIPMENT NAMEPLATES

A. Engraved phenolic plastic, laminate, minimum 1/8-inch thick in the size indicated, with beveled edge border matching letter color. Federal specification L-P-387. All upper case letters in

engraver standard letter style of the size and wording indicated. Punched for mechanical fastening, except where adhesive mounting is necessary due to substrate. Embossed tape style labels are not acceptable.

B. Color:
   1. Normal (Utility): White letters on black background.

C. Letter Size:
   1. Use 1/2-inch letters minimum for identifying major equipment and loads, including switchgear, switchboards, etc.
   2. Use 1/4-inch or 1/2-inch letters minimum for identifying panels, breakers, etc.
   3. Use 3/16-inch minimum for identifying source, voltage, current, phase, and wire configurations.

D. Fasteners: Self-tapping stainless steel screws, except contact-type permanent adhesive where screws cannot or should not penetrate the substrate.

E. The Architect, Engineer, Commissioning Agent and Owner reserve the right to make modifications to the nameplates as necessary.

F. Locations:
   1. Distribution panels and branch panels.
   2. Main breakers and distribution breakers in distribution panels.
   3. Equipment including, but not limited to, motor controllers, disconnects, and VFDs.

2.03 DEVICE LABELS

A. Extra strength, laminated adhesive tape, with 3/16-inch black letters on clear background. Use only for identification of individual wall switches and receptacles. Indicate device name, source panel, and source circuits. Panel and circuit designation written in permanent marker on the back of the plate and inside the back-box. Do not provide punch tape style labels.

B. Label all junction boxes to show system identification, source circuit, or raceway origin. In finished areas, utilize device label. In unfinished areas or above ceilings, use of permanent ink marker is acceptable.

2.04 WIRE MARKERS

A. Description: Vinyl-cloth self-adhesive type wire markers.

B. Locations: Each conductor at panelboard gutters, pull boxes, outlet boxes, junction boxes, and each load connection.

C. Power and Lighting Circuits: Branch circuit or feeder number as indicated on drawings and source panel.

D. Control Circuits: control wire number indicated on schematic and interconnection diagrams on drawings or shop drawings.

PART 3 - EXECUTION

3.01 GENERAL INSTALLATION REQUIREMENTS

A. Coordinate designations used on Drawings with equipment nameplates and device labels.

B. Install nameplates and labels parallel to equipment lines.

C. Identify empty conduit and boxes with intended use.

D. Provide typewritten branch panel schedules with protective clear transparent covers accounting for every breaker installed. Use actual room designations assigned by name or number near completion of the work, and not the designations shown on drawings.

E. Where changes are made in existing panels, distribution boards, etc., provide new labeling and typewritten schedules to accurately reflect the changes.

F. Provide color coded boxes as follows:
   1. Fire Alarm: Red.

3.02 EQUIPMENT NAMEPLATES

A. Degrease and clean surfaces to receive nameplates.

B. Secure equipment nameplates to equipment front using self-tapping stainless steel screws.

C. Secure equipment nameplates to inside surface of door on panelboard that is recessed in finished locations.

D. Panels to include name source, voltage, current phase, wire configuration and fault current rating.

E. Provide nameplates for flush mounted branch panelboards identifying name on front door. On inside of door provide nameplate as noted above. Verify with Engineer/Owner if nameplate on outside of door is required.

F. Provide a second label at branch panelboards listing the means of identification of branch circuit conductors. This identification legend to consist of the color code used for each voltage system (208Y/120V). Include identification of both voltage systems on each label, regardless of the voltage of the panelboard to which the label is affixed. Comply with requirements of NEC 210.5.

3.03 DEVICE LABELS

A. Reference 3.01, General Installation Requirements.

B. Install per manufacturer's instructions and recommendations.

C. Degrease and clean surfaces to receive labels.

3.04 WIRE MARKERS

A. Reference 3.01, General Installation Requirements.

B. Install per manufacturer's instructions and recommendations.

C. Provide wire markers on each conductor for power, control, signalling circuits.

D. Where switches control remote lighting or power outlets, or where switches or outlets in same location serve different purposes, such as light, power, intercom, etc. or different areas, such as corridor and outside, provide plates with 1/8-inch black letters indicating function of each switch or outlet. Also label the function of light switches where two or more are mounted in same locations.

END OF SECTION

SECTION 16110 - EQUIPMENT WIRING

PART 1 - GENERAL

1.01 SUMMARY

A. Work Included:
   1. Equipment connections, whether furnished by Owner or other Divisions of the Contract.

1.02 RELATED SECTIONS

A. Contents of Division 16, Electrical and Division 01, General Requirements apply to this Section.

1.03 REFERENCES AND STANDARDS

A. References and Standards as required by Section 16000, Electrical Basic Requirements and Division 01, General Requirements.

1.04 SUBMITTALS

A. Submittals as required by Section 16000, Electrical Basic Requirements and Division 01, General Requirements.

B. In addition:
   1. Verify mechanical and utilization equipment electrical characteristics with Drawings and equipment submittals prior to ordering equipment. Submit confirmation of this verification as a part of, or addendum to, the electrical product submittals.

1.05 QUALITY ASSURANCE

A. Quality assurance as required by Section 16000, Electrical Basic Requirements and Division 01, General Requirements apply to this Section.

1.06 WARRANTY

A. Warranty of materials and workmanship as required by Section 16000, Electrical Basic Requirements and Division 01, General Requirements.

PART 2 - PRODUCTS

2.01 MATERIALS

A. Materials and Equipment for Equipment Wiring: As specified in individual Sections.

2.02 GENERAL

A. Unless otherwise noted, the following voltage and phase characteristics apply to motors:
   1. 3/4 HP and Under: 120 volt, 1 phase.
   2. 1 HP and Over: 208 volt, 3 phase.
   3. 1 HP and Less than 5 HP Loads: 208 volt, 3 phase.
   4. 5 HP and Over: 208 volt, 3 phase.

B. Safety Switches: Provide as required by NEC and as specified in Section 16410, Enclosed Switches and Circuit Breakers.

PART 3 - EXECUTION

3.01 EXAMINATION

A. Prior to submittal of product data for electrical distribution equipment, obtain and examine product data and shop drawings for equipment furnished by the Owner and by other trades on the project. Update the schedule of equipment electrical connections accordingly, noting proper ratings for overcurrent devices, fuses, safety disconnect switches, conduit and wiring, and the like. As a minimum, this requirement applies to equipment furnished by Owner and equipment furnished under the following divisions of work under this contract:
   1. Division 8, Openings
   2. Division 11, Equipment
   3. Division 13, Special Construction
   4. Division 15, Mechanical

3.02 INSTALLATION

A. Do not install unrelated electrical equipment or wiring on mechanical equipment without prior approval of Engineer.

B. Provide moisture tight equipment wiring and switches in ducts or plenums used for environmental air.

C. Connect motor and appliance/utilization equipment complete from panel to motor/equipment as required by code.

D. Install motor starters and controllers for equipment furnished by others.

E. Appliance/Utilization Equipment:
   1. Provide appropriate cable and cord cap for final connection unless equipment is provided with same. Provide receptacle configured to receive cord cap.
   2. Verify special purpose outlet NEMA configuration and ampere rating with equipment supplier prior to ordering wiring devices and coverplates.

F. Freezer and Cooler Box Connections:
   1. Obtain supplier's shop drawings prior to rough-in and provide complete connections per supplier's shop drawings.
   2. Provide connections to electric defrost elements, door heaters, vent heaters, door switches, lights, condensate drain heaters, blower fans, and the like.
   3. Provide control wiring as required by control systems, and install per manufacturer's instructions.

3.03 FIELD QUALITY CONTROL

A. Perform field inspection and testing in accordance with Division 01, General Requirements.

3.04 SYSTEMS STARTUP

A. Provide field representative to prepare and start equipment.
   1. Test and correct for proper rotation of polyphase motors.

B. Adjust for proper operation within manufacturer's published tolerances.

C. Demonstrate proper operation of equipment to Owner's Authorized Representative.

END OF SECTION

SECTION 16125 - LOW-VOLTAGE ELECTRICAL POWER CONDUCTORS AND CABLES

PART 1 - GENERAL

1.01 SUMMARY

A. Work Included:
   1. Lugs and Pads
   2. Wires and Cables
   3. Splices
   4. Connectors

1.02 RELATED SECTIONS

A. Contents of Division 16, Electrical and Division 01, General Requirements apply to this Section.

1.03 REFERENCES AND STANDARDS

A. References and Standards as required by Section 16000, Electrical Basic Requirements and Division 01, General Requirements.

1.04 SUBMITTALS

A. Submittals as required by Section 16000, Electrical Basic Requirements and Division 01, General Requirements.

B. In addition, provide:
   1. Cable insulation test reports in project closeout documentation.

1.05 QUALITY ASSURANCE

A. Quality assurance as required by Section 16000, Electrical Basic Requirements and Division 01, General Requirements.

1.06 WARRANTY

A. Warranty of materials and workmanship as required by Section 16000, Electrical Basic Requirements and Division 01, General Requirements.

PART 2 - PRODUCTS

2.01 MANUFACTURERS

A. Lugs and Pads:
   1. Anderson
   2. Ilsco
   3. Panduit
   4. Thomas & Betts
   5. 3M
   6. Or approved equivalent.

B. Wires and Cables:
   1. General:
      a. General Cable
      b. Okonite
      c. Southwire
      d. Or approved equivalent.
   2. Metal Clad Cable - Type MC:
      a. Alflex
      b. AFC
      c. General Cable
      d. Southwire
      e. Or approved equivalent.

C. Splices:
   1. Branch Circuit Splices:
      a. Ideal

b. 3M Scotchlok
c. Uraseal, Inc.
d. Or approved equivalent.

2. Feeder Splices:
a. 3M
b. Uraseal, Inc.

D. Connectors:
1. Anderson Power Products
2. Burndy
3. Ilsco
4. 3M
5. Thomas & Betts
6. Or approved equivalent.

2.02 LUGS AND PADS

A. Ampacity: Cross-sectional area of pad for multiple conductor terminations to match ampere rating of panelboard bus or equipment line terminals.

B. Copper Pads: Drilled and tapped for multiple conductor terminals.

C. Lugs: Compression type for use with stranded branch circuit or control conductors; mechanical lugs for use with solid branch and feeder circuit conductors.

2.03 WIRES AND CABLES

A. Building Wires:
1. Copper: Soft-drawn with conductivity of not less than 98 percent IACS at 20 degrees C (68 degrees F). 600 volt rated throughout. Conductors 12 AWG and 10 AWG, solid. Conductors 8 AWG and larger, stranded. 12 AWG minimum conductor size. Minimum insulation rating of 90 degrees C. Insulation Type: THHN/THWN-2.

B. Phase color to be consistent at feeder terminations; A-B-C, top to bottom, left to right, front to back.

C. Color Code Conductors as Follows:

PHASE	208 VOLT WYE	240 VOLT DELTA	480 VOLT
A	Black	Black	Brown
B	Red	Orange (High Leg)	Orange
C	Blue	Blue	Yellow
Neutral	White	White	Gray or White w/colored strip
Ground	Green	Green	Green
Isolated Ground	Green w/yellow trace	N/A	N/A

D. MC Cable:
1. Standard: High strength galvanized steel flexible armor. Full length minimum size No. 12 copper ground wire, copper dual rated THHN/THWNC, full length tape marker phase/circuit identification on cable armor. Short circuit throat insulators, mechanical compression termination.

E. AC Cable (Armored Cable): Not allowed.

F. NMB Cable: Not allowed.

2.04 SPLICES

A. Branch Circuits: Twist on, high temperature, grounding type wing nuts.
1. Ideal Industries Wing-Nut Twist-On Connectors.
2. 3M Scotchlok Twist-On Wire Connectors.

B. Feeders:
   1. Compression barrel splice with two layers Scotch 23 and four layers Scotch 33+ as vapor barrier.
   2. Uraseal Shake N' Seal series splice kits.

2.05 CONNECTORS

A. Split bolt connectors not allowed.

B. Conductor Branch Circuits: Wire nuts with integral spring connectors for conductors 12 AWG through 8 AWG. Push-in type connectors where conductors are not required to be twisted together are not acceptable.

PART 3 - EXECUTION

3.01 GENERAL INSTALLATION REQUIREMENTS

A. Install per manufacturer instructions and NEC.

B. Field Quality Control:
   1. Test conductor insulation on feeders of 100 amp and greater for conformity with 1000 volt megohmmeter. Use Insulated Cable Engineers Association testing procedures. Minimum insulation resistance acceptable is 1 megohm for systems 600 volts and below. Notify Engineer if insulation resistance is less than 1 megohm.
   2. Test Report: Prepare a typed tabular report indicating the testing instrument, the feeder tested, amperage rating of the feeder, insulation type, voltage, the approximate length of the feeder, conduit type, and the measured resistance of the megohmmeter test. Submit test reports with project closeout documents.
   3. Inspect and test in accordance with NETA Standard ATS, except Section 4.
   4. Perform inspections and tests listed in NETA Standard ATS, Section 7.3.2.

3.02 LUGS AND PADS

A. Thoroughly clean surfaces to remove all dirt, oil, great or paint.

B. Use torque wrench to tighten per manufacturer's directions.

3.03 WIRES AND CABLES

A. General:
   1. Do not install or handle thermoplastic insulated wire and cable in temperatures below -10 degrees C (14 degrees F). Do not handle thermoset insulated wire and cable in temperatures below -40 degrees C (-40 degrees F).
   2. Install conductors in raceways having adequate, code size cross-sectional area for wires indicated.
   3. Install conductors with care to avoid damage to insulation.
   4. Do not apply greater tension on conductors than recommended by manufacturer during installation.
   5. Use of pulling compounds is permitted. Clean residue from exposed conductors and raceway entrances after conductor installation. Do not use pulling compounds for installation of conductors connected to GFCI circuit breakers or GFCI receptacles.
   6. Conductor Size and Quantity:
      a. Install no conductors smaller than 12 AWG unless otherwise shown.
      b. Provide required conductors for a fully operable system.
      c. Power Circuits: No. 12 AWG minimum, except as follows:
         1) No. 10 AWG for 15A, 120V circuits longer than 100 ft.
         2) No. 8 AWG for 15A, 120V circuits longer than 150 ft.
         3) No. 10 AWG for 20A, 120V circuits longer than 70 ft.
         4) No. 8 AWG for 20A, 120V circuits longer than 100 ft.
      d. When exact run lengths are determined for all branch circuits, and prior to installation of the conductors, ensure that the maximum voltage drop, based on 80 percent of the circuit protective device, does not exceed 3 percent. Increase wire size from #12AWG, if necessary, to ensure that the 3 percent voltage drop is not exceeded.

7. Provide dedicated neutrals (one neutral conductor for each phase conductor) in all 120V circuits.

B. Conductors in Cabinets:
   1. Cable and tree wires in panels and cabinets for power and control. Use plastic ties in panels and cabinets.
   2. Tie and bundle feeder conductors in wireways of panelboards.
   3. Hold conductors away from sharp metal edges.

C. Homeruns:
   1. Do not change intent of branch circuit homeruns without approval. Homeruns for 20A branch circuits may be combined to a maximum of six current carrying conductors including neutral conductors in homeruns. Apply derating factors as required per NEC. Increase conductor size as needed.
   2. MC cable homeruns are not allowed unless indicated on drawings.

D. Exposed cable is not allowed.

E. All cable must be run parallel or perpendicular to building lines and hidden from view when possible. Where installed in tray each power cable is to be identified with Lamacoid nametag engraved with identification of equipment being fed. Tag to be fastened to cable using tie-wraps. Provide nametag at each floor level.

F. Do not install PVC jacketed cables in return air plenums, unless they are specially rated plenum cables.

G. Use of MC Cable is limited to the following conditions. Installations that do not comply with the following conditions are to be removed and replaced with no additional expense to the Owner.
   1. 15 and 20 amp branch wiring where following conditions apply:
      a. MC cable is allowed for branch circuits, including both lighting and power outlets, as allowed by code and restricted below.
      b. Use MC cable for final flexible connections from junction or outlet boxes to recessed fixtures. Do not use MC cables to loop between fixtures, except where it is not practical to provide conduit connections between boxes or where existing inaccessible ceilings prevent installation of conduit runs. Each individual luminaire is to be serviced by an individual cable drop from the associated junction box in the ceiling space. Maximum length 6-feet of MC cable. Luminaire drops secured to, and supported by, the building structure with nylon tie wraps. The use of the ceiling suspension system for support of any type of cabling is not permitted.
      c. MC Cable may be used in areas with hard lid ceiling as well as accessible space above, and in walls below windows, provided NEC requirements are otherwise met, and a minimum one 0.75-inch conduit is routed from nearest accessible ceiling space to inaccessible location, terminating in a j-box with blank faceplate, for future circuits.

3.04 SPLICES

A. Make splices complete and promptly after wire installation. Provide single wire pigtails for luminaire and device connections. Wire nuts may be used for luminaire wire connections to single wire circuit conductor pigtails.

B. Make splices for No. 8 and larger wires with mechanically applied pressure type connectors. Make all taped joints with Scotch 33+ or equal, applied in half-lap layers without stretching to deform. Uraseal splice kits are also acceptable through 250 KCMIL.

C. Remove insulation with a stripping tool designed specifically for that purpose. A pocket knife is not an acceptable tool. Leave all conductors nick-free.

3.05 CONNECTORS

A. Install to assure a solid and safe connection.

B. Select hand twist connectors for wire size and install tightly on conductors.

C. Install compression connectors using methods and tools recommended by the manufacturer.

D. Do not install stranded conductors under screw terminals unless compression lugs are installed.

E. Do not connect wiring without UL listed connectors that are listed for the purposes.

END OF SECTION

SECTION 16130 - BOXES

PART 1 - GENERAL

1.01 SUMMARY

A. Work Included:
   1. Outlet Boxes
   2. Pull and Junction Boxes
   3. Box Extension Adapter
   4. Weatherproof Outlet Boxes

B. Provide electrical boxes and fittings for a complete installation. Include but not limited to outlet boxes, junction boxes, pull boxes, bushings, locknuts and other necessary components.

1.02 RELATED SECTIONS

A. Contents of Division 16, Electrical and Division 01, General Requirements apply to this Section.

B. In addition, reference the following:

1.03 REFERENCES AND STANDARDS

A. References and Standards as required by Section 16000, Electrical Basic Requirements and Division 01, General Requirements.

1.04 SUBMITTALS

A. Submittals as required by Section 16000, Electrical Basic Requirements and Division 01, General Requirements.

1.05 QUALITY ASSURANCE

A. Quality assurance as required by Section 16000, Electrical Basic Requirements and Division 01, General Requirements.

1.06 WARRANTY

A. Warranty of materials and workmanship as required by Section 16000, Electrical Basic Requirements and Division 01, General Requirements.

PART 2 - PRODUCTS

2.01 MANUFACTURERS

A. Outlet Boxes:
   1. Hubbell
   2. Thomas & Betts
   3. Eaton/Crouse-Hinds
   4. Or approved equivalent.

B. Pull and Junction Boxes:
   1. Eaton/Crouse-Hinds
   2. Hoffman
   3. Or approved equivalent.

C. Box Extension Adapter:
   1. Hubbell
   2. Thomas & Betts
   3. Eaton/Crouse-Hinds
   4. Or approved equivalent.

D. Weatherproof Outlet Boxes:
   1. Legrand (Pass & Seymour)
   2. Hubbell
   3. Thomas & Betts
   4. Eaton/Crouse-Hinds
   5. Intermatic

6. Or approved equivalent.

2.02 OUTLET BOXES

A. Luminaire Outlet: 4-inch octagonal box, 1-1/2-inches deep with 3/8-inch luminaire stud if required. Provide raised covers on bracket outlets and on ceiling outlets.

B. Device Outlet: Installation of one or two devices at common location, minimum 4-inches square, minimum 1-1/2-inches deep for non-USB type devices. Installation of one or two devices at common locations, minimum 4-inches square, minimum 2-inches deep for USB type devices. Single- or two-gang flush device raised covers.

C. Multiple Devices: Three or more devices at common location. Install one-piece gang boxes with one-piece device cover. Install one device per gang.

D. Masonry Boxes: Outlets in concrete.

E. Construction: For interior locations, provide galvanized steel outlet wiring boxes, of the type, shape and size, including depth of box, to suit each respective location and installation; constructed with stamped knockouts in back and sides, and with threaded holes with screws for securing box covers or wiring devices. All surface mounted outlet boxes are to be drawn. Welded boxes are not acceptable.

F. Accessories: Provide outlet box accessories for each installation, including mounting brackets, wallboard hangers, extension rings, luminaire studs, cable clamps and metal straps for supporting outlet boxes, compatible with outlet boxes being used and meeting requirements of individual wiring situations.

G. Noise Control: Provide acoustic putty pad to back side of each outlet box installed in acoustic rated walls.

2.03 PULL AND JUNCTION BOXES

A. Construction: Provide ANSI 49 gray enamel painted sheet steel (NEMA 3R Stainless steel where outdoors) junction and pull boxes, with screw-on covers; of type shape and size, to suit each respective location and installation; with welded seams and equipped with stainless steel nuts, bolts, screws and washers.

B. Location:
   1. Provide junction boxes above accessible ceilings for drops into walls for receptacle outlets from overhead.
   2. Provide junction boxes and pull boxes to facilitate installation of conductors and limiting accumulated angular sum of bends between boxes, cabinets and appliances to 270 degrees.

2.04 BOX EXTENSION ADAPTER

A. Construction: Diecast aluminum.

B. Location: Install over flush wall outlet boxes to permit flexible raceway extension from flush outlet to fixed or movable equipment.

2.05 WEATHERPROOF OUTLET BOXES

A. Construction: Provide corrosion-resistant cast metal weatherproof outlet wiring boxes, of the type, shape and size, including depth of box, with threaded conduit ends, cast metal faceplate with spring-hinged waterproof cap suitably configured for each application, including faceplate, gasket, blank plugs and corrosion proof fasteners. Weatherproof boxes to be constructed to have smooth sides, gray finish.

PART 3 - EXECUTION

3.01 GENERAL INSTALLATION REQUIREMENTS

A. Coordinate locations of wall mounted wiring device boxes with architectural and structural floor plans prior to rough-in.

B. Install boxes securely, in a neat and workmanlike manner, as specified in NECA 1, Standard Practice of Good Workmanship in Electrical Construction.

C. Secure boxes rigidly to substrate upon which they are being mounted, or solidly embed boxes in concrete or masonry.

D. Install in locations as shown on Drawings, and as required for splices, taps, wire pulling, equipment connections, and as required by NEC. Locate boxes and conduit bodies so as to ensure accessibility of electrical wiring.

E. Set wall mounted boxes at elevations to accommodate mounting heights shown on Architectural Elevations.

F. Electrical boxes are shown on drawings in approximate locations unless dimensioned.
   1. Adjust box locations up to 10-feet if required to accommodate intended purpose.

G. Install boxes to preserve fire resistance rating of partitions and other elements, using materials and methods specified in Division 07, Thermal and Moisture Protection.

H. Locate flush mounting box in masonry wall to require cutting of masonry unit corner only. Coordinate masonry cutting to achieve neat opening.

I. Install flush mounting box without damaging wall insulation or reducing its effectiveness.

J. Support boxes independently of conduit, except cast box that is connected to two rigid metal conduits both supported within 12-inches of box.

K. Adjust boxes to be parallel with building lines. Boxes not plumb to building lines are not acceptable.

L. Install knockout closures in unused box openings.

M. Clean interior of boxes to remove dust, debris, and other material.

N. Clean exposed surfaces and restore finish.

3.02 OUTLET BOXES INSTALLATION

A. Mount outlet boxes, unless otherwise required by ADA, or noted on drawings, following distances above finished floor:
   1. Control Switches:
      a. 48-inches to the top of outlet box.
      b. 4-inches above top of backsplash at countertops/workstations, not-to-exceed 44-inches above finished floor to the top of outlet box per ADA requirements.
   2. Receptacles: 15-inches to the bottom of outlet box.
   3. Other Outlets: As indicated in other sections of specifications or as detailed on drawings.

B. Inaccessible Ceiling Areas: Install outlet and junction boxes no more than 6-inches from ceiling access panel or from removable recessed luminaire.

C. Flush Outlets in Insulated Spaces: Maintain integrity of insulation and vapor barrier.

D. Coordinate electrical device locations and elevations (switches and receptacles) with architectural drawings to prevent mounting devices in mirrors, back splashes, and behind cabinets.

E. Locate outlet boxes to allow luminaires positioned as shown on reflected ceiling plan.

F. Align adjacent wall mounted outlet boxes for switches, thermostats, and similar devices. Adjacent boxes not aligned vertically to be adjusted at no additional cost to Owner.

G. Use flush mounting outlet box in finished areas.

H. Do not install flush mounting box back-to-back in walls; provide minimum 6-inches separation. Provide minimum 24-inches in acoustic rated walls.

I. In acoustical walls, apply acoustic putty pad on outlet box prior to installation of acoustical blanket.

J. Secure flush mounting box to interior wall and partition studs. Accurately position to allow for surface finish thickness.

K. Use stamped steel bridges to fasten flush mounting outlet box between studs.

L. Use adjustable steel channel fasteners for hung ceiling outlet box.

M. Use gang box where more than one device is mounted together. Do not use sectional box.

N. Use gang box with plaster ring for single device outlets.

O. Adjust flush-mounting outlets to make front flush with finished wall material.

3.03 PULL AND JUNCTION BOXES INSTALLATION

A. Install pull boxes and junction boxes above accessible ceilings and in unfinished areas only.

B. Inaccessible Ceiling Areas: Install outlet and junction boxes no more than 6-inches from ceiling access panel or from removable recessed luminaire.

C. Do not fasten boxes to ceiling support wires.

D. Large Pull Boxes: Use hinged enclosure in interior dry locations, surface-mounted cast metal box in other locations.

3.04 BOX EXTENSION ADAPTER INSTALLATION

A. Match material to box.

B. Install gaskets at exterior and wet locations.

3.05 WEATHERPROOF OUTLET BOXES INSTALLATION

A. Use cast outlet box in exterior locations exposed to weather and wet locations.

B. Install gaskets.

END OF SECTION

SECTION 16135 - RACEWAYS

PART 1 - GENERAL

1.01 SUMMARY

A. Work Included:
   1. Rigid Metal Conduit (RMC)
   2. Polyvinyl Chloride (PVC) Externally Coated Galvanized Rigid Metal Conduit
   3. Electrical Metallic Tubing (EMT)
   4. Flexible Metal Conduit (FMC)
   5. Liquidtight Flexible Metal Conduit (LFMC)
   6. Electrical Polyvinyl Chloride (PVC) Conduit
   7. Conduit Fittings

B. Provide a complete system of conduit and fittings, with associated couplings, connectors, and fittings, as shown on drawings and described in these specifications.

1.02 RELATED SECTIONS

A. Contents of Division 16, Electrical and Division 01, General Requirements apply to this Section.

B. In addition, reference the following:
   1. Section 16070, Hangers and Supports for Electrical Systems and Equipment
   2. Section 16130, Boxes

1.03 REFERENCES AND STANDARDS

A. References and Standards as required by Section 16000, Electrical Basic Requirements and Division 01, General Requirements.

1.04 SUBMITTALS

A. Submittals as required by Section 16000, Electrical Basic Requirements and Division 01, General Requirements.

1.05 QUALITY ASSURANCE

A. Quality assurance as required by Section 16000, Electrical Basic Requirements and Division 01, General Requirements.

1.06 WARRANTY

A. Warranty of materials and workmanship as required by Section 16000, Electrical Basic Requirements and Division 01, General Requirements.

1.07 DEFINITIONS

A. Raceway system is defined as consisting of conduit, tubing, duct, and fittings including but not limited to connectors, couplings, offsets, elbows, bushings, expansion/deflection fittings, and other components and accessories. Complete electrical raceway installation before starting the installation of conductors and cables.

PART 2 - PRODUCTS

2.01 MANUFACTURERS

A. Rigid Metal Conduit (RMC):
   1. Allied Tube & Conduit
   2. Beck Manufacturing Inc.
   3. Picoma
   4. Wheatland Tube Company
   5. Or approved equivalent.

B. Polyvinyl Chloride (PVC) Externally Coated Galvanized Rigid Steel Conduit:
   1. Allied Tube & Conduit
   2. Thomas & Betts Corporation
   3. Robroy Industries

4. O'kote Inc.
5. Or approved equivalent.

C. Electrical Metallic Tubing (EMT):
1. Allied Tube & Conduit
2. Beck Manufacturing WL
3. Picoma
4. Wheatland Tube Company
5. Or approved equivalent.

D. Flexible Metal Conduit (FMC):
1. AFC Cable Systems Inc.
2. Electri-Flex Company
3. International Metal Hose
4. Or approved equivalent.

E. Liquidtight Flexible Metal Conduit (LFMC):
1. AFC Cable Systems Inc.
2. Electri-Flex Company
3. International Metal Hose
4. Or approved equivalent.

F. Electrical Polyvinyl Chloride (PVC) Conduit:
1. AFC Cable Systems Inc.
2. Electri-Flex Company
3. International Metal Hose
4. JM Eagle
5. Or approved equivalent.

G. Conduit Fittings:
1. Bushings:
a. Insulated Type for Threaded Raceway Without Factory Installed Plastic Throat Conductor Protection:
1) Thomas & Betts 1222 Series
2) O-Z Gedney B Series
3) Or approved Equivalent.
2. Raceway Connectors and Couplings:
a. Thomas & Betts Series
b. O-Z Gedney Series
c. Or approved Equivalent.
3. Expansion/Deflection Fittings:
a. EMT: O-Z Gedney Type TX
b. RMC: O-Z Gedney Type AX, DX and AXDX, Crouse & Hinds XD
c. PVC: O-Z Gedney Type DX with PVC adapters, Carlon E945 Series, Kraloy OPEJ Series
d. Or approved equivalent.

2.02 RIGID METAL CONDUIT (RMC)

A. UL 6, ANSI C80.1. Hot dipped galvanized steel conduit after thread cutting.
1. Fittings: NEMA FB2.10.

2.03 POLYVINYL CHLORIDE (PVC) EXTERNALLY COATED GALVANIZED RIGID METAL CONDUIT

A. Description: UL 6, ANSI C80.1, and NEMA RN 1; rigid steel conduit with external PVC coating.
1. PVC Coating: Minimum 40 mils in thickness.

B. Fittings and Conduit Bodies: NEMA FB 1; steel fittings with external PVC coating to match conduit.

2.04 ELECTRICAL METALLIC TUBING (EMT)

A. Description: UL 797, ANSI C80.3; steel galvanized tubing.

B. Fittings: NEMA FB 1; steel, compression type.

2.05 FLEXIBLE METAL CONDUIT (FMC)

A. Description: UL 1, Interlocked steel construction.

B. Fittings: NEMA FB 2.20.

2.06 LIQUIDTIGHT FLEXIBLE METAL CONDUIT (LFMC)

A. Description: UL 360, inner core made from spiral wound strip of heavy gauge, hot dipped galvanized low carbon steel. 3/4-inch through 1-1/4-inch trade sizes to have a square lock core and contain an integral bonding strip of copper. 1-1/2-inch and larger to have fully interlocked core. Jacket material to be moisture, oil and sunlight resistant flexible PVC.

B. Fittings: NEMA FB 2.20.

2.07 ELECTRICAL POLYVINYL CHLORIDE (PVC) CONDUIT

A. Description: UL 651, NEMA TC 2; Schedule 40 PVC.

B. Fittings: NEMA TC 3.

2.08 CONDUIT FITTINGS

A. Bushings:
   1. Insulated type for threaded raceway connectors without factory-installed plastic throat conductor protection.
   2. Insulated grounding type for threaded raceway connectors.

B. Raceway Connectors and Couplings:
   1. Steel connectors, couplings, and conduit bodies, hot-dip galvanized.
   2. Connector locknuts to be steel, with threads meeting ASTM tolerances. Locknuts to be hot-dip galvanized.
   3. Connector throats (EMT, flexible conduit, metal clad cable and cordset connectors) to have factory installed plastic inserts permanently installed. For normal cable or conductor exiting angles from raceway, the cable jacket or conductor insulation to bear only on plastic throat insert.
   4. Steel gland, Tomic or Breagle connectors and couplings are recognized for this Contract as having acceptable raceway to fitting electrical conductance.
   5. Set screw connectors and couplings, without integral compression glands, are recognized for this Contract as not having acceptable raceway to fitting electrical conductance. A ground conductor sized per this Specification must be included and bonded within raceway assembly utilizing this type connector or coupling.

C. Provide expansion/deflection fittings for EMT.

PART 3 - EXECUTION

3.01 GENERAL INSTALLATION REQUIREMENTS

A. Finished Surfaces: Schedule raceway installation to avoid conflict with installed wall and ceiling surfaces. If unavoidable, coordinate work and repairs with Engineer.

B. Conduit Size:
   1. Minimum Size: 3/4-inch for power and control, unless otherwise noted. 3/4-inch for communication/data, unless otherwise noted. 3/4-inch for signal systems, unless otherwise noted.

C. Underground Installations:
   1. More than 5-feet from Foundation Wall: Use PVC.
   2. Within 5-feet from Foundation Wall: Use PVC coated RMC.
   3. In or Under Slab on Grade: Use PVC.
   4. Minimum Size: 1-inch.

D. In Slab Above Grade:
   1. Use PVC.
   2. Maximum Size Conduit in Slab: Contact Structural Engineer for maximum outside diameter of conduit.

E. Provide two pull strings/tapes in empty conduits. Types:
   1. Feeders: Polyester measure/pulling tape, Greenlee 4436 or approved.
   2. Branch Circuits and Low Voltage: Greenlee Poly Line 431 or approved.
   3. If fish tape is used for pulling line or low voltage wiring, fiberglass type to be used. Metal fish tapes will not be allowed.
   4. Secure pull string/tape at each end.
   5. Provide caps on ends of empty conduit to be used in future.
   6. Label both ends of empty conduits with location of opposite end.

F. Elbows: Use fiberglass or PVC coated RMC for underground installations.

G. Elbow for Low Energy Signal Systems: Use long radius factory ells where linking sections of raceway for installation of signal cable.

H. Verify that field measurements are as shown on drawings.

I. Plan locations of conduit runs in advance of the installation and coordinate with ductwork, plumbing, ceiling and wall construction in the same areas.

J. Locate penetrations and holes in advance where they are proposed in the structural sections such as footings, beams, and walls. Penetrations are acceptable only when the following occurs:
   1. Where shown on the structural drawings.
   2. As approved by the Structural Engineer prior to construction, and after submittal of drawing showing location, size, and position of each penetration.

K. Verify routing and termination locations of conduit prior to rough-in.

L. Conduit routing is shown on drawings in approximate locations unless dimensioned. Route as required to complete wiring system.

M. Install raceways securely, in neat and workmanlike manner, as specified in NECA 1, Standard Practices for Good Workmanship in Electrical Construction.

N. Install steel conduit as specified in NECA 101, Standard for Installing Steel Conduits.

O. Install nonmetallic conduit in accordance with manufacturer's instructions.

P. Inserts, anchors and sleeves.
   1. Coordinate location of inserts and anchor bolts for electrical systems prior to concrete pour.
   2. Coordinate location of sleeves with consideration for other building systems prior to concrete pour.

Q. Conduit Supports:
   1. Arrange supports to prevent misalignment during wiring installation.
   2. Support conduit using coated steel or malleable iron straps, lay-in adjustable hangers, clevis hangers, and split hangers.
   3. Group related conduits; support using conduit rack. Construct rack using steel channel. Provide space on each for 25 percent additional conduits.
   4. Do not support conduit with wire or perforated pipe straps. Remove wire used for temporary supports.
   5. Do not attach conduit to ceiling support wires.

R. Flexible steel conduit length not-to-exceed 6-feet, 3-feet in concealed walls. Provide sufficient slack to reduce the effect of vibration.

S. Install conduit seals at boundaries where ambient temperatures differ by 10 degrees F or more as shown on the drawings. Install seals on warm side of partition.

T. Seal raceways stubbing up into electrical equipment. Plug raceways with conductors with duct-seal. Cap spare raceways and plug PVC raceway products with plastic plugs as made by Underground Products, or equal, shaped to fit snugly into the stubup.

U. Seal raceways penetrating an exterior building wall to prevent moisture and vermin from entering into the electrical equipment.

V. Use suitable caps on spare and empty conduits to protect installed conduit against entrance of dirt and moisture.

W. Keep emergency system wiring independent of other wiring systems per NEC 700.

X. Arrange conduit to maintain headroom and present neat appearance.

Y. Do not install conduits on surface of building exterior, along vapor barrier, across roof, on top of parapet walls, or across floors, unless otherwise noted on drawings.

Z. Exposed conduits are permitted only in following areas:
   1. Mechanical rooms, electrical rooms or spaces where walls, ceilings and floors will not be covered with finished material.
   2. Existing walls that are concrete or block construction.
   3. Where specifically noted on Drawings.
   4. Route exposed conduit parallel and perpendicular to walls, tight to finished surfaces and neatly offset into boxes.

AA. Do not install conduits or other electrical equipment in obvious passages, doorways, scuttles or crawl spaces which would impede or block area passage's intended usage.

AB. Install continuous conduit and raceways for electrical power wiring.

AC. Route conduit installed above accessible ceilings parallel and perpendicular to walls.

AD. Maintain adequate clearance between conduit and piping.

AE. Keep conduits a minimum of 12-inches away from steam or hot water radiant heating lines (at or above 104 degrees F) or 3-inches away from waste or water lines.

AF. Cut conduit square using saw or pipecutter; deburr cut ends.

AG. Bring conduit to shoulder of fittings; fasten securely.

AH. Use conduit hubs to fasten conduit to cast boxes in damp and wet locations.

AI. Install no more than the equivalent of three 90 degree bends between boxes. Use conduit bodies to make sharp changes in direction, as around beams.

AJ. Use hydraulic one shot bender to fabricate elbows for bends in metal conduit larger than 2-inch size.

AK. Avoid moisture traps; provide junction box with drain fitting at low points in conduit system.

AL. Provide suitable fittings to accommodate expansion and deflection where conduit crosses seismic, control, and expansion joints.

AM. Conduit Terminations for Signal Systems: Provide a plastic bushing on the end of conduit used for signal system wiring.

AN. Feeders: Do not combine or change feeder runs.

AO. Install conduit to preserve fire resistance rating of partitions and other elements, using materials and methods specified in Division 07, Thermal and Moisture Protection.

AP. Route conduit through roof openings for piping and ductwork wherever possible. Where separate roofing penetration is required, coordinate location and installation method with roofing installation and installer.

3.02 RIGID METAL CONDUIT (RMC) INSTALLATION

A. Outdoor Locations Above Grade: RMC.

B. Damp Locations: RMC.

C. In areas exposed to mechanical damage: RMC.

D. For security conduits installed exposed and subject to tampering: RMC.

3.03 POLYVINYL CHLORIDE (PVC) EXTERNALLY COATED GALVANIZED RIGID METAL CONDUIT INSTALLATION

A. Use PVC coated RMC 36-inch radius ells for power service conduits and 48-inch radius ells for telephone service conduits.

3.04 ELECTRICAL METALLIC TUBING (EMT) INSTALLATION

A. Dry Locations:
   1. Concealed: EMT.
   2. Exposed: EMT.

B. Dry, Protected: EMT.

3.05 FLEXIBLE METAL CONDUIT (FMC) INSTALLATION

A. Dry Locations: Motors, recessed luminaires and equipment connections subject to movement or vibration, use flexible metallic conduit.

B. Install 12-inch minimum slack loop on flexible metallic conduit.

3.06 LIQUIDTIGHT FLEXIBLE METAL CONDUIT (LFMC) INSTALLATION

A. Use PVC coated liquidtight flexible metallic conduit for motors and equipment connections subject to movement or vibration and subjected to any of following conditions: Exterior location, moist or humid atmosphere, corrosive environments, water spray, oil, or grease.

B. Install 12-inch minimum slack loop on liquidtight flexible metallic conduit.

3.07 ELECTRICAL POLYVINYL CHLORIDE (PVC) CONDUIT INSTALLATION

A. Install in accordance with manufacturer’s instructions.

B. Provide equipment grounding conductor in PVC conduit runs containing power conductors.

C. Underground Installation:
   1. Areas subject to vehicular traffic: Schedule 80 PVC.
   2. Other underground applications: Schedule 40 PVC, except where prohibited by the NEC or local codes.

D. Convert PVC conduit to Rigid Metal Conduit (RMC) prior to emerging from underground, concrete encasement, or concrete slab.

E. Provide expansion fittings to compensate for expansion and contraction per NEC 352.44.

F. PVC elbows are not acceptable. Use fiberglass or PVC coated RMC.

G. Trim cut ends inside and outside to remove rough edges.

H. Provide bushings when entering a box, fitting or other enclosure.

3.08 CONDUIT FITTINGS INSTALLATION

A. Conduit Joints: Assemble conduits continuous and secure to boxes, panels, luminaires and equipment with fittings to maintain continuity. Provide watertight joints where embedded in concrete, below grade or in damp locations. Seal metal conduit with metal thread primer. Rigid conduit connections to be threaded, clean and tight (metal to metal). Threadless connections are not permitted for RMC.

B. Join nonmetallic conduit using cement as recommended by manufacturer. Wipe nonmetallic conduit dry and clean before joining. Apply full even coat of cement to entire area inserted in fitting. Allow joint to cure for 20 minutes, minimum.

C. Use set screw type fittings only in dry locations. When set screw fittings are utilized provide insulated continuous equipment ground conductor in conduit, from overcurrent protection device to outlet.

D. Use compression fittings in dry locations, damp and rain-exposed locations. Maximum size permitted in damp locations and locations exposed to rain is 2-inches in diameter.

E. Use threaded type fittings in wet locations, hazardous locations, and damp or rain-exposed locations where conduit size is greater than 2-inches.

F. Use PVC coated, threaded type fittings in corrosive environments.

G. Use insulated type bushings with ground provision at switchboards, panelboards, safety disconnect switches, junction boxes that have feeders 60 amperes and greater.

H. Condulets and Conduit Bodies:
   1. Do not use condulets and conduit bodies in conduits for signal wiring, in feeders 100 amp and larger, or for conductor splicing.

I. Sleeves and Chases - Floor, Ceiling and Wall Penetrations: Provide necessary rigid conduit sleeves, openings and chases where conduits or cables are required to pass through floors, ceilings or walls.

J. Expansion Joints:
   1. Provide conduits crossing expansion joints where cast in concrete with expansion-deflection fittings, installed per manufacturer's recommendations.
   2. Secure conduits 3-inches and larger to building structure on opposite sides of a building expansion joint with an expansion-deflection fitting across joint installed per manufacturer's recommendations.
   3. Provide conduits less than 3-inches where not cast in concrete with junction boxes securely fastened on both sides of expansion joint, connected together with 15-inches of slack (minimum of 15-inches longer than straight line length) flexible conduit and copper green ground bonding jumper. In lieu of this flexible conduit, an expansion-deflection fitting, as indicated for conduits 3-inch and larger may be installed.
   4. Verify expansion/deflection requirements with Structural Engineer prior to installation.

K. Seismic Joints:
   1. No conduits cast in concrete allowed to cross seismic joint.
   2. Provide conduits with junction boxes securely fastened on both sides of seismic joint, connected together with 15-inches of slack (minimum of 15-inches longer than straight line length) flexible conduit and copper green ground bonding jumper. Prior to installation, verify with Engineer that 15-inches is adequate for designed movement, and if not, increase this length as required.
   3. Provide conduits less than 3-inches where not cast in concrete with junction boxes securely fastened on both sides of expansion joint, connected together with 15-inches of slack (minimum of 15-inches longer than straight line length) flexible conduit and copper green ground bonding jumper. In lieu of this flexible conduit, an expansion-deflection fitting, as indicated for conduits 3-inch and larger may be installed.

L. Provide rigid conduit coupling flush with surface of slab or wall for conduit stubbed in concrete slab or wall to serve electrical equipment or an outlet under table or to supply shop tool, etc. Provide plug where conduit is to be used in future.

END OF SECTION

SECTION 16140 - WIRING DEVICES

PART 1 - GENERAL

1.01 SUMMARY

A. Work Included: Provision of materials, installation and testing of:
   1. Wall Switches
   2. Receptacles
   3. Finish Plates
   4. Surface Covers

1.02 RELATED SECTIONS

A. Contents of Division 16, Electrical and Division 01, General Requirements apply to this Section.

1.03 REFERENCES AND STANDARDS

A. References and Standards as required by Section 16000, Electrical Basic Requirements and Division 01, General Requirements.

1.04 SUBMITTALS

A. Submittals as required by Section 16000, Electrical Basic Requirements and Division 01, General Requirements.

B. In addition, provide:
   1. Wall switches
   2. Receptacles
   3. Wall Plates
   4. In-Use Cover

1.05 QUALITY ASSURANCE

A. Quality assurance as required by Section 16000, Electrical Basic Requirements and Division 01, General Requirements.

1.06 WARRANTY

A. Warranty of materials and workmanship as required by Section 16000, Electrical Basic Requirements and Division 01, General Requirements.

PART 2 - PRODUCTS

2.01 MANUFACTURERS

A. Wall Switches:
   1. Toggle Type Characteristics:
      a. Cooper AH1201
      b. Hubbell HBL1221
      c. Leviton 1221
      d. Legrand P&S PS20AC1
      e. Or approved equivalent.

B. Receptacles:
   1. Industrial Grade:
      a. Cooper 5362
      b. Hubbell HBL5362
      c. Bryant BRY5362
      d. Leviton 5362
      e. Legrand P&S 5362A
      f. Or approved equivalent.
   2. Commercial Grade:
      a. 20 Amp:
         1) Cooper 5362
         2) Hubbell 5362

3) Bryant CBRS20
4) Leviton 5362S
5) Legrand P&S 5362
6) Or approved equivalent.

3. Ground Fault Circuit Interrupter (GFCI) Receptacle - 20 Amp:
   a. Cooper WRSGF20W
   b. Hubbell GFR5362SGW
   c. Legrand P&S 2097TRWR
   d. Or approved equivalent.

C. Finish Plates:
1. Bryant
2. Cooper
3. Hubbell
4. Leviton
5. Legrand P&S
6. Or approved equivalent.

D. Surface Covers:
1. Aluminum with Gasket, Blanks, Single Gang:
   a. Bell 240-ALF
   b. Carlon
   c. Or approved equivalent.
2. 2-Gang:
   a. Bell 236-ALF
   b. Carlon
   c. Or approved equivalent.
3. While-in-Use Weatherproof Cover:
   a. Die Cast Cover:
      1) Intermatic
      2) Hubbell
      3) Cooper
      4) Or approved equivalent.

E. Provide lighting switches and receptacles of common manufacturer and appearance.

2.02 WALL SWITCHES

A. Characteristics: Toggle type, quiet acting, 20 amp, 120/277 volt, UL listed for motor loads up to 80 percent of rated amperage, extra heavy duty.

B. Finish: White.

2.03 RECEPTACLES

A. Duplex Receptacles Characteristics: Straight parallel blade, 125 volt, 2 pole, 3 wire grounding.
1. Commercial Grade: Riveted. Back and side wired. Brass ground contact on steel strap. Nylon face and nylon base. 20 amp.

B. Ground Fault Circuit Interrupter (GFCI) Receptacle: Feed through type, back-and-side wired, tamper-resistant, weather resistant self-testing, 20 amp, 125VAC.

C. Special Purpose Receptacles: Reference Drawings for NEMA Standard Specification.

D. Finish:
1. Same exposed finish as switches.
2. Receptacles installed in surface raceway to match raceway finish. See Section 26 05 33, Raceways.
3. All automatically controlled, nonlocking type, 125 volt, 15 amp and 20 amp rated receptacles to be permanently marked by the manufacturer with the "universal power" symbol and the word "controlled."

2.04 FINISH PLATES

A. Finish Plates: Type 302 stainless steel with smooth satin finish.

2.05 SURFACE COVERS

A. Material: Galvanized steel, drawn, 1/2-inch raised industrial type with openings appropriate for devices installed on surface receptacles.

B. Cast Box and Extension Adaptors: Aluminum with gasket, blanks single gang or 2-gang.

C. While-in-Use Weatherproof Cover: NEMA 3R when closed over energized plug. Vertical mount for duplex receptacle. Provide continuous use cover with cover capable of closing over energized cord cap with bottom aperture for cord exit.
   1. Die cast cover with closed cell neoprene foam gasket: Capable of being locked closed to prevent tampering or unauthorized use.

PART 3 - EXECUTION

3.01 GENERAL INSTALLATION REQUIREMENTS

A. See Architectural elevations for location and mounting height of wiring devices. Review Architectural elevations prior to rough-in and contact Engineer immediately if conflicts are found between Architectural and Electrical Drawings. Do not rough-in devices until conflicts are resolved.

B. Install wiring devices and finish plates plumb with building lines, equipment cabinets and adjacent devices. Devices not plumb will be fixed at no additional cost to Owner.

C. Orientation:
   1. Install wiring devices with long dimension oriented vertically at centerline height shown on drawings or as specified.
   2. Vertical Alignment: When more than one device is shown on drawings in close proximity to each other, but at different elevations, align devices on a common vertical center line for best appearance. Verify with Engineer.
   3. Horizontal Alignment: When more than one device is shown on drawings in close proximity to each other with same elevation, align devices on a common horizontal center line for best appearance. Verify with Engineer.

D. Provide labeling per Section 16075, Identification for Electrical Systems.

E. Test wiring devices to ensure electrical continuity of grounding connections, and after energizing circuitry, to demonstrate compliance with requirements. Test receptacles for line to neutral, line to ground and neutral to ground faults. Correct any defective wiring.

3.02 WALL SWITCHES INSTALLATION

A. At time of substantial completion, replace those items which have been damaged.

3.03 RECEPTACLES INSTALLATION

A. Upon installation, adhere to proper and cautious use of convenience receptacles. At time of substantial completion, replace those items which have been damaged, including those burned and scored by faulty receptacles or cord caps.

B. GFCI Receptacles: One GFCI receptacle may not be used to provide GFCI protection to downstream duplex receptacles on the same branch circuit.

3.04 FINISH PLATES INSTALLATION

A. Do not install items until finish painting is complete. Replace scratched and paint splattered finish plates and wiring devices.

3.05 SURFACE COVERS INSTALLATION

A. Do not install items until finish painting is complete. Replace scratched and paint splattered finish plates and wiring devices.

END OF SECTION

SECTION 16217 - OVERCURRENT PROTECTIVE DEVICES

PART 1 - GENERAL

1.01 SUMMARY

A. Work Included:
   1. Fuses
   2. Molded Case Circuit Breakers

1.02 RELATED SECTIONS

A. Contents of Division 16, Electrical and Division 01, General Requirements apply to this Section.

1.03 REFERENCES AND STANDARDS

A. References and Standards as required by Section 16000, Electrical Basic Requirements and Division 01, General Requirements.

1.04 SUBMITTALS

A. Submittals as required by Section 16000, Electrical Basic Requirements and Division 01, General Requirements.

B. In addition, provide:
   1. Product data and instantaneous let-through current curves and average melting time current curves for fuses supplied to project.
   2. Product data and time/current trip curves for circuit breakers supplied to project.

1.05 QUALITY ASSURANCE

A. Quality assurance as required by Section 16000, Electrical Basic Requirements and Division 01, General Requirements apply to this Section.

1.06 WARRANTY

A. Warranty of materials and workmanship as required by Section 16000, Electrical Basic Requirements and Division 01, General Requirements.

PART 2 - PRODUCTS

2.01 MANUFACTURERS

A. Fuses:
   1. Bussmann
   2. Ferraz-Shawmut
   3. Littelfuse
   4. McGraw-Edison
   5. Or approved equivalent.

B. Molded Case Circuit Breakers:
   1. Eaton Electrical
   2. ABB/General Electric
   3. Schneider Electric/Square D
   4. Or approved equivalent.

2.02 FUSES

A. Characteristics:
   1. Dual element, time delay, current limiting, nonrenewable type, rejection feature.
   2. Combination Loads: UL Class RK1, RK5, or J, 1/10 to 600 amp. UL Class L, above 600 amps.
   3. Motor Loads: UL Class RK5, 1/10 to 600 amp.
   4. Fuse pullers for complete range of fuses.

2.03 MOLDED CASE CIRCUIT BREAKERS

A. 1-, 2- or 3-pole bolt-on, single handle common trip, 600VAC or 250VAC as indicated on Drawings.

B. Overcenter toggle-type mechanism, quick-make, quick-break action. Trip indication is by handle position.

C. Calibrate for operation in 40 degrees C ambient temperature.

D. 15 to 150 Amp Breakers: Permanent trip unit containing individual thermal and magnetic trip elements in each pole.

E. 151 to 400 Amp Breakers: Adjustable magnetic trip elements. Provide push-to-trip button on cover of breaker for mechanical tripping.

PART 3 - EXECUTION

3.01 GENERAL INSTALLATION REQUIREMENTS

A. Coordination:
   1. Obtain and review the submitted product data for equipment furnished by the Owner, and furnished under other Divisions of this contract, particularly under Division 15, Mechanical.
   2. Confirm the equipment nameplate maximum overcurrent protection (MOCP) and make accommodations and adjustments to overcurrent protective devices as necessary to coordinate with the nameplate rating.

B. Install all items in accordance with manufacturers written instructions.

3.02 FUSES

A. Fuses: For each class and ampere rating of fuse installed, provide the following quantities of spares for quantity of fuses installed:
   1. 0 to 24: Provide 6 spare.
   2. 25 to 48: Provide 9 spare.
   3. 49 and Above: Provide 12 spare.

3.03 MOLDED CASE CIRCUIT BREAKERS

A. Provide testing of ground fault interrupting breakers.

B. Provide circuit breakers, as specified and on Drawings, for installation in panelboards, individual enclosures or combination motor starters.

C. Provide ground fault interrupter circuit breakers for equipment in damp or wet locations.

D. Provide device on handle to lock breaker in "ON" position for breakers feeding time switches, night lights and similar circuits required to be continuously energized.

E. Shunt Trip Circuit Breakers: Provide wiring to remote trip switch/contacts as indicated on Drawings.

F. Provide multi-pole branch circuit breakers for multiwire branch circuits for simultaneous disconnection of circuits.

END OF SECTION

SECTION 16410 - ENCLOSED SWITCHES AND CIRCUIT BREAKERS

PART 1 - GENERAL

1.01 SUMMARY

A. Work Included:
   1. Toggle Type Disconnect Switches
   2. Manual Motor Starters
   3. Safety Switches

1.02 RELATED SECTIONS

A. Contents of Division 16, Electrical and Division 01, General Requirements apply to this Section.

B. In addition, reference the following:
   1. Section 16217, Overcurrent Protective Devices.

1.03 REFERENCES AND STANDARDS

A. References and Standards as required by Section 16000, Electrical Basic Requirements and Division 01, General Requirements.

1.04 SUBMITTALS

A. Submittals as required by Section 16000, Electrical Basic Requirements and Division 01, General Requirements.

1.05 QUALITY ASSURANCE

A. Quality assurance as required by Section 16000, Electrical Basic Requirements and Division 01, General Requirements.

1.06 WARRANTY

A. Warranty of materials and workmanship as required by Section 16000, Electrical Basic Requirements and Division 01, General Requirements.

PART 2 - PRODUCTS

2.01 MANUFACTURERS

A. Toggle Type Disconnect Switches:
   1. Cooper
   2. Hubbell
   3. Leviton
   4. Legrand (Pass & Seymour)
   5. Slater
   6. Or approved equivalent.

B. Manual Motor Starters:
   1. Eaton Electrical
   2. ABB/General Electric
   3. Schneider Electric/Square D
   4. Or approved equivalent.

C. Safety Switches:
   1. Eaton Electrical
   2. ABB/General Electric
   3. Schneider Electric/Square D
   4. Or approved equivalent.

2.02 TOGGLE TYPE DISCONNECT SWITCHES

A. Rating: 120 volt, 1 or 2 pole, 20 amp, 1 hp maximum.

B. Enclosure:
   1. NEMA 1: Dry locations/Indoors.
   2. NEMA 3R Stainless Steel: Damp or wet locations/Outdoors.

C. Handle lockable in 'off' position.

2.03 MANUAL MOTOR STARTERS

A. Quick-Make, Quick-Break. Thermal overload protection. Device labeled with maximum voltage, current, and horsepower.

B. Enclosure:
   1. NEMA 1: Dry locations/Indoors.
   2. NEMA 3R Stainless Steel: Damp or wet locations/Outdoors.

2.04 SAFETY SWITCHES

A. Heavy duty fusible type and non-fusible type (as indicated on drawings), dual rated, quick-make, quick-break with fuse rejection feature for use with Class R fuses only, unless other fuse type is specifically noted.

B. Clearly marked for maximum voltage, current, and horsepower.

C. Operable handle interlocked to prevent opening front cover with switch in 'on' position.

D. Switches rated for maximum available fault current.

E. Handle lockable in 'off' position.

F. Enclosure:
   1. NEMA 1: Dry locations/Indoors.
   2. NEMA 3R Stainless Steel: Damp or wet locations/Outdoors.

G. Fusible Switch Assemblies: NEMA KS 1, quick-make, quick-break, load interrupter enclosed knife switch with externally operable handle. Provide interlock to prevent opening front cover with switch in ON position. Handle lockable in OFF position. Fuse clips: Provide fuse rejection feature for Class R or J fuses up to 600 amp. Remove if circuit breaker type is used. Provide switches of 30 to 200 amp with plug-on line side connections.

H. Fusible Switch Assemblies, 800 Amperes and Larger: Bolted pressure contact switches. Fuse Clips: Designed to accommodate Class L fuses. Provide with shunt-trip and ground fault capabilities. Remove if circuit breaker type is used.

PART 3 - EXECUTION

3.01 GENERAL INSTALLATION REQUIREMENTS

A. Obtain and review the submitted product data for equipment furnished by the Owner, and furnished under other Divisions of this contract, particularly under Division 15.

B. Confirm the equipment nameplate maximum overcurrent protection (MOCP) and make accommodations and adjustments to switches, fuses and circuit breakers as necessary to coordinate with the nameplate rating

C. Install in accordance with manufacturer's instructions.

D. Provide engraved nameplates per Section 16075, Identification for Electrical Systems.

E. Apply neatly typed adhesive tag on inside door of each fusible switch indicating NEMA fuse class and size installed.

3.02 TOGGLE TYPE DISCONNECT SWITCHES

A. Install fuses in fusible disconnect switches. Coordinate fuse ampere rating with installed equipment. Do not provide fuses of lower ampere rating than motor starter thermal units.

B. Install products, systems and equipment in accordance with manufacturer's written instructions and requirements.

C. See General Installation Requirements above.

3.03 MANUAL MOTOR STARTERS

A. Provide disconnecting means within sight of each motor controller and of each motor. Motor controller disconnecting means equipped with lock-out/tag-out padlock provisions do not require a disconnect switch at the controlled motor location. Locate disconnect means in view

of and not inside of equipment, such that tools are not needed to remove covers to access the disconnecting means.

B. Install products, systems and equipment in accordance with manufacturer's written instructions and requirements.

C. See General Installation Requirements above.

3.04 SAFETY SWITCHES

A. Install products, systems and equipment in accordance with manufacturer's written instructions and requirements.

B. See General Installation Requirements above.

END OF SECTION

SECTION 16445 - PANELBOARDS

PART 1 - GENERAL

1.01 SUMMARY

A. Work Included:
   1. Panelboards

1.02 RELATED SECTIONS

A. Contents of Division 16, Electrical and Division 01, General Requirements apply to this Section.

B. In addition, reference the following:
   1. Section 16217, Overcurrent Protective Devices.

1.03 REFERENCES AND STANDARDS

A. References and Standards as required by Section 16000, Electrical Basic Requirements and Division 01, General Requirements.

B. In addition, meet the following:
   1. UL 67, Standards for Panelboards.

1.04 SUBMITTALS

A. Submittals as required by Section 16000, Electrical Basic Requirements and Division 01, General Requirements.

1.05 QUALITY ASSURANCE

A. Quality assurance as required by Section 16000, Electrical Basic Requirements and Division 01, General Requirements.

1.06 WARRANTY

A. Warranty of materials and workmanship as required by Section 16000, Electrical Basic Requirements and Division 01, General Requirements.

PART 2 - PRODUCTS

2.01 MANUFACTURERS

A. Panelboards:
   1. Eaton
   2. ABB/General Electric
   3. Basis of Design: Schneider Electric/Square D
   4. Or approved equivalent.

B. Manufacturers listed above are allowed on condition of meeting specified conditions including available space for equipment, Code required working clearances, and amps interrupting capacity (AIC). Prior to submitting bid, manufacturer to provide documentation to Engineer verifying specific conditions, including those mentioned above, can be met. Remove and replace electrical equipment installed, at no cost to the Owner, that does not meet these conditions.

2.02 PANELBOARDS

A. Molded Case Circuit Breakers: Thermal magnetic trip circuit breakers, bolt-on type, with common trip handle for poles; UL listed. Predrill bus for bolt-on breakers.
   1. Type SWD for lighting circuits.
   2. Type HACR for air conditioning equipment circuits.
   3. Class A ground fault interrupter circuit breakers where scheduled.
   4. Class B ground fault equipment protection circuit breakers for heat trace and other circuits as required by Code. Provide shunt trip circuit breakers where scheduled; provide wiring to remote trip switch/contacts as indicated on Drawings.
   5. Do not use tandem circuit breakers.

B. Accessories: Provide where indicated: shunt trip, arc-fault circuit interrupter (AFCI), Class A ground fault circuit interrupter (GFCI), auxiliary switch, and alarm switch.

PART 3 - EXECUTION

3.01 GENERAL INSTALLATION REQUIREMENTS

A. Provide filler plates for unused spaces in panelboards.

B. Provide typed circuit directory for each branch circuit panelboard. Include all "spaces" and "spares." Revise directory to reflect circuiting changes and as-installed conditions. Use final Owner designated room names and numbers, and not designations shown on drawings.

C. Provide engraved plastic nameplates per Section 16075, Identification for Electrical Systems.

D. Provide two 1-inch spare conduits out of each recessed panelboard to an accessible location above ceiling. Identify each as SPARE.

E. Provide permanent identification number in or on panelboard dead-front adjacent to each breaker pole position. Horizontal centerline of numbers to correspond with centerline of circuit breaker pole position.

F. Ground and bond panelboard enclosure per NEC.

G. Paint:
   1. Standard factory finish unless noted otherwise.
   2. Panelboards located in finished interior areas in view of building occupants; paint to match adjacent wall surface. Color and paint preparation as specified by Engineer. Covers to be painted off wall, then installed over dried, painted wall surface.

H. Provide handle guards on each circuit supplying obviously constant loads such as fire alarm, security, lighting controls, refrigerators and freezers, fire protection, etc.

I. Provide interior wiring diagram, neutral wiring diagram, UL label, and short circuit rating on interior or in booklet format inserted in sleeve inside panel cover.

J. Perform inspections and tests in accordance with manufacturer's requirements.

K. Thoroughly clean exterior and interior of each panelboard in accordance with manufacturer's installation instructions.

L. Vacuum construction dust, dirt, and debris out of each panelboard.

M. Where enclosure finish is damaged, touch up finish with matching paint in accordance with manufacturer's specifications and installation instructions.

3.02 PANELBOARDS INSTALLATION

A. Breakers being added to existing panelboards: Coordinate breaker type and short circuit rating with existing panelboard. Breakers to match existing in manufacturer's type and AIC rating. Provide new typed circuit directory.

B. Provide handle tie to branch circuit breakers of multiwire branch circuits for simultaneous disconnection of circuits. Handle tie will be identified for use with circuit breakers provided. Reconfigure assigned circuits as necessary so that circuit breakers associate with multiwire branch circuits are physically adjacent, record changes in panelboard schedules and circuiting plans for record drawings.

C. Shunt Trip Circuit Breakers: Provide wiring to remote trip switch/contacts as indicated on Drawings.

D. Measure steady state load currents at each panelboard feeder; rearrange circuits in panelboard to balance phase loads to within 20 percent of each other. Maintain proper phasing for multi-wire branch circuits.

END OF SECTION

WALK-IN FREEZER REPLACEMENT FOR:

MALUHIA NURSING HOME

1027 HALA DRIVE
HONOLULU, HAWAII 96817
TMK#: 1-6-009: 004

INTERFACE
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EXPIRES: 4/30/22

THIS WORK WAS PREPARED BY ME OR UNDER MY SUPERVISION AND CONSTRUCTION OF THIS PROJECT WILL BE UNDER MY OBSERVATION. "SUPERVISION OF CONSTRUCTION" AS DEFINED UNDER SECTION 16-82-2 OF CHAPTER 82; RULES OF THE BOARD OF PROFESSIONAL ENGINEERS, ARCHITECTS AND LAND SURVEYORS: STATE OF HAWAII.)

MALUHIA - WALK-IN FREEZER REPLACEMENT

1027 HALA DRIVE HONOLULU, HI 96817

SHEET TITLE
COVER SHEET

REVISIONS

DRAWN BY
JF

CHECKED BY
SS

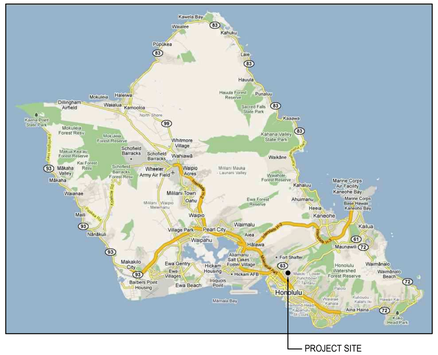
JOB NO.
2020-0132

DATE
04/09/2020

SHEET NUMBER
T-001

FILE: T-001.DWG – E-001 | EDIT: 4/7/2020 4:20 PM BY JESSEF | PLOT: 4/9/2020 7:28 PM BY JESSE FINES

VICINITY MAP



PROJECT INFORMATION

OCCUPANCY GROUP:

CONSTRUCTION TYPE:

SCOPE OF WORK:

A. REPLACEMENT OF EXISTING WALK-IN FREEZER WITH NEW WALK-IN FREEZER IN EXISTING NURSING HOME BUILDING.
B. NO CHANGE IN USE.
C. NO CHANGE IN TOTAL FLOOR AREA/SQUARE FOOTAGE.
D. EXISTING PARKING TO REMAIN AS IS.
E. POWER CONNECTION FOR TEMPORARY OUTDOOR FREEZER FOR USE DURING CONSTRUCTION.

BUILDING CODES
IBC - 2006, WITH CURRENT AMENDMENTS
NEC - 2017, WITH CURRENT AMENDMENTS
NFPA 1 - 2012, WITH LOCAL AMENDMENTS
IECC - 2015, WITH CURRENT AMENDMENTS

ZONING DATA

FEMA FLOOD DESIGNATION: X

SPECIAL MANAGEMENT AREA: NOT IN SMA

TSUNAMI EVACUATION ZONE: NO

ZONING: R-5

LOT SIZE: 2.254 ACRES (98,184 SQ.FT.)

HEIGHT LIMIT: 25 FEET

SHEET INDEX

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EXPIRES: 4/30/22

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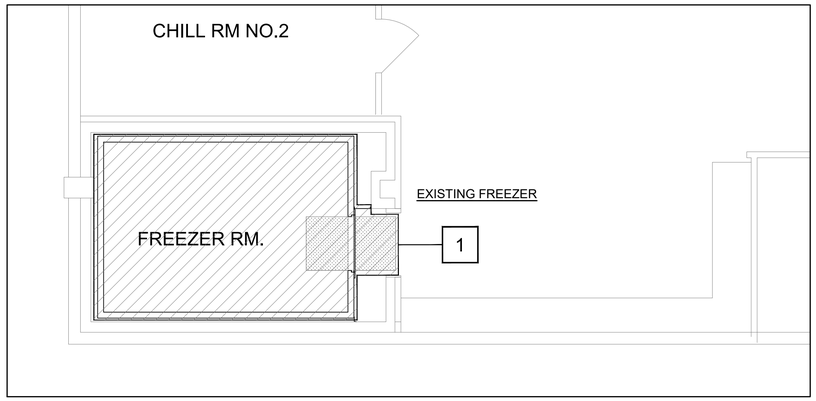
MALUHIA - WALK-IN FREEZER REPLACEMENT

1027 HALA DRIVE
HONOLULU, HI 96817

SHEET TITLE
TITLE SHEET AND PROJECT INFORMATION

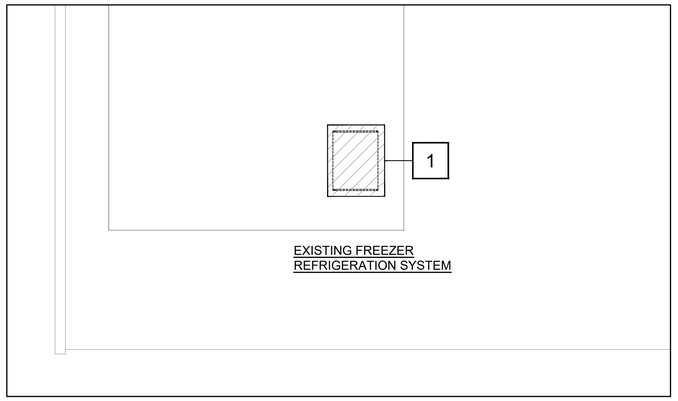
REVISIONS

DRAWN BY: JF
CHECKED BY: SS
JOB NO.: 2020-0132
DATE: 04/09/2020
SHEET NUMBER: T-002



1 K1.0 — 1ST FLOOR – EXISTING FOOD SERVICE EQUIPMENT FLOOR PLAN DEMOLITION PLAN

SCALE: 1/4" = 1'-0"



2 K1.0 — EXISTING FOOD SERVICE EQUIPMENT ROOF PLAN DEMOLITION PLAN

SCALE: 1/4" = 1'-0"

DEMOLITION KEY NOTES:

1 EXISTING EQUIPMENT TO BE REMOVED FROM ORIGINAL LOCATION:

KITCHEN EQUIPMENT CONTRACTOR (K.E.C.) SHALL DISCONNECT POWER, DISASSEMBLE, REMOVE, & DISCARD ENTIRE EXISTING WALK-IN FREEZER INCLUDING LIGHTS, REFRIGERATION SYSTEM, REFRIGERATION LINES, ENCLOSURE PANELS, ELECTRICAL & PLUMBING COMPONENTS.

FLOOR SHALL BE CLEANED, LEVELED AND FREE OF ANY DEBRIS.

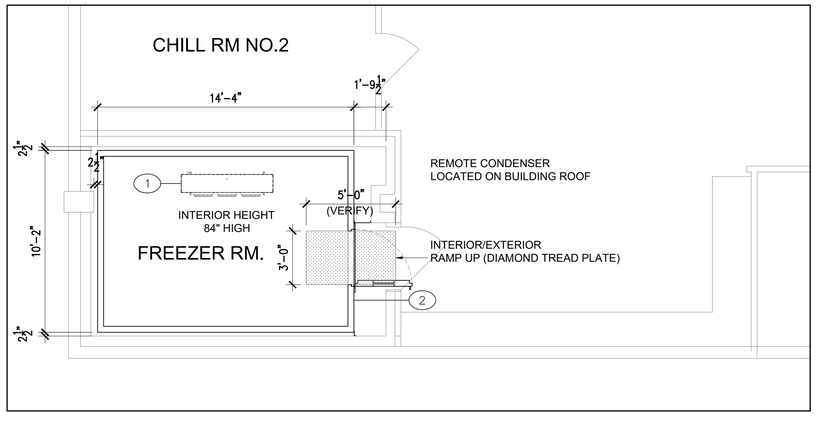
HOSPITAL STAFF SHALL REMOVE EXISTING SHELVING & FOOD ITEMS.

REASONABLE CARE SHALL BE TAKEN WHEN DISASSEMBLING, REMOVING EQUIPMENT. THE BURDEN SHALL BE WITH THE KITCHEN EQUIPMENT CONTRACTOR TO NOTIFY THE CONTRACTING OFFICER AND CONSULTANT IN WRITING OF ANY DISCREPANCIES AND/OR CONCERNS PRIOR TO AND/OR DURING EQUIPMENT REMOVAL.

GENERAL CONTRACTOR (G.C.) SHALL DISCONNECT AND RECONNECT EQUIPMENT UTILITIES AS REQUIRED. G.C. SHALL COORDINATE WITH K.E.C.

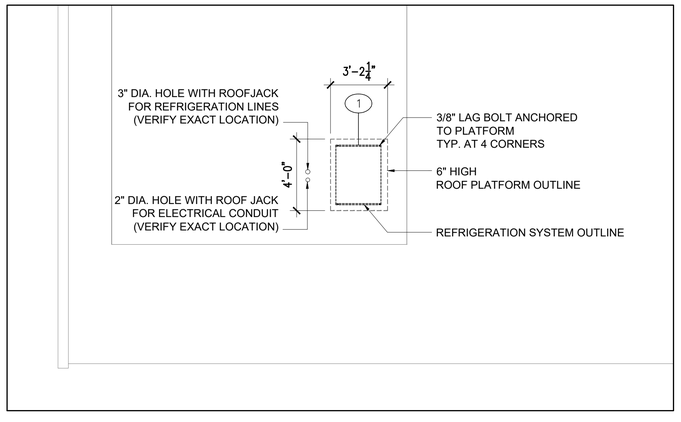
FOOD SERVICE EQUIPMENT SCHEDULE

ITEM NO.	QTY	DESCRIPTION	REMARKS/SPECIFICATIONS
1	1	REFRIGERATION SYSTEM	REFER TO ROOF PLAN FOR REMOTE CONDENSER
2	1	COLD STORAGE ROOM	S/S INTERIOR & EXTERIOR, INT. & EXTERIOR RAMP UP FLOOR, 7'-8" EXT. FINISHED CEILING HEIGHT



3 K1.0 — 1ST FLOOR – FOOD SERVICE EQUIPMENT FLOOR PLAN & SCHEDULE

SCALE: 1/4" = 1'-0"



4 K1.0 — FOOD SERVICE EQUIPMENT ROOF PLAN

SCALE: 1/4" = 1'-0"

KITCHEN EQUIPMENT CONTRACTOR

1. WORK SHALL CONSIST OF FURNISHING ALL LABOR, TOOLS, MATERIALS, ETC., REQUIRED FOR A COMPLETE INSTALLATION WHETHER INDICATED ON DRAWINGS OR NOT. IT IS THE KITCHEN EQUIPMENT CONTRACTOR'S RESPONSIBILITY TO EXAMINE ALL PLANS, SPECIFICATIONS AND JOBSITE CONDITIONS AND NOTIFY THE CONSULTANT IN WRITING OF ANY DISCREPANCIES, AMBIGUITIES, ERRORS AND OMISSIONS. ANY OF THE ABOVE NOT BROUGHT TO THE ATTENTION OF THE CONSULTANT SHALL BECOME THE SOLE RESPONSIBILITY OF THE KITCHEN EQUIPMENT CONTRACTOR. THE KITCHEN EQUIPMENT CONTRACTOR SHALL COORDINATE ALL REQUIRED WORK WITH THE GENERAL CONTRACTOR.
2. THE KITCHEN "K" DRAWINGS INDICATE THE GENERAL PLACEMENT OF EQUIPMENT AND/OR MATERIALS AT THE TIME DRAWN. THE FINAL SELECTION OF EQUIPMENT MAY CHANGE AND AFFECT THE SIZE, LOCATION AND/OR ASSOCIATED ROUGHING-IN AND BUILDING WORK REQUIREMENTS. ALL SUCH REQUIREMENTS AND/OR RELATED CHANGES SHALL BE SUBMITTED IN WRITING.

   KITCHEN EQUIPMENT CONTRACTORS SHOP DRAWING/BROCHURE SUBMITTAL SHALL INDICATE ACTUAL ROUGHING-IN WORK REQUIRED BY THE EQUIPMENT TO BE INSTALLED. REVIEW OF THE "FOR CONSTRUCTION" ROUGHING-IN DRAWINGS/BROCHURE SUBMITTAL DOES NOT RELIEVE THE KITCHEN EQUIPMENT CONTRACTOR OF THEIR RESPONSIBILITY TO ENSURE THAT ALL REQUIRED EQUIPMENT ROUGHING-IN WORK ARE INDICATED AND THEIR RESPONSIBLITY TO COORDINATE THEIR WORK BETWEEN TRADES.

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Revisions

WALK-IN FREEZER REPLACEMENT

MALUHIA HOSPITAL
HONOLULU, HAWAII

Sheet Title

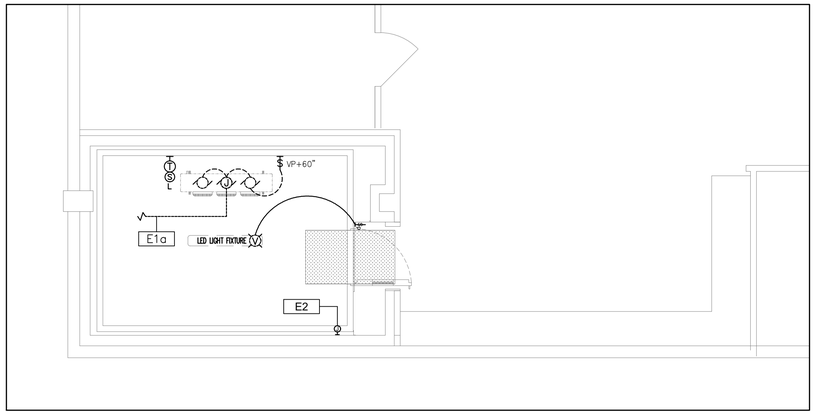
EXISTING FOOD SERVICE EQUIPMENT DEMO PLAN & FOOD SERVICE EQUIPMENT PLAN AND SCHEDULE

Date	4-09-20
Scale	AS NOTED
Drawn	IM/CS
Job	

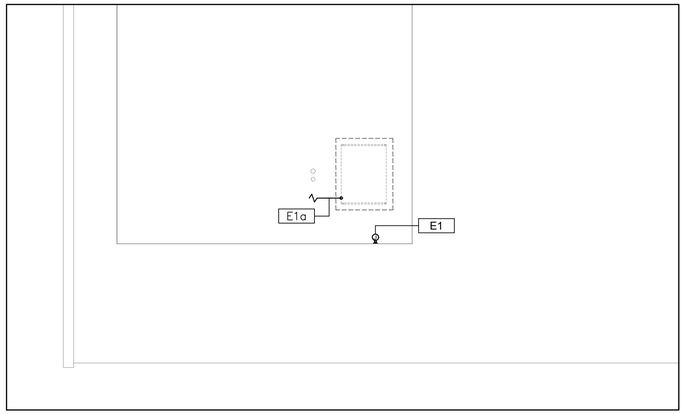
Sheet Number

K1.0

of Sheets



A K2.0 1ST FLOOR – FOOD SERVICE EQUIPMENT ELECTRICAL PLAN
SCALE: 1/4" = 1'-0"



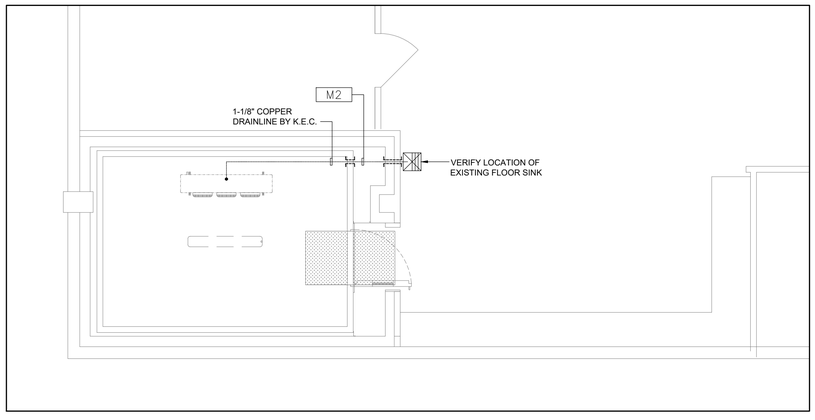
B K2.0 FOOD SERVICE EQUIPMENT ROOF ELECTRICAL PLAN
SCALE: 1/4" = 1'-0"

FOODSERVICE EQUIPMENT ELECTRICAL SCHEDULE

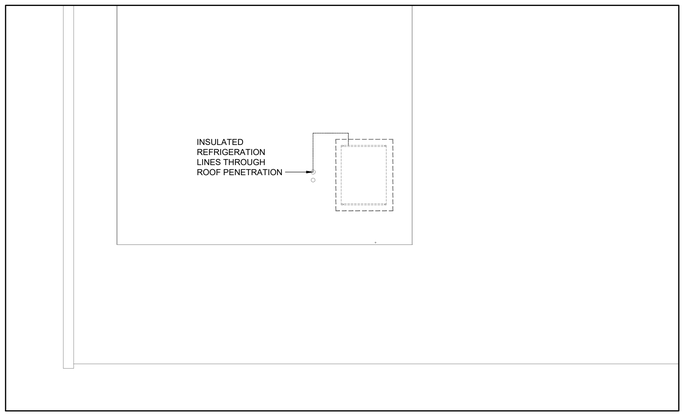
ITEM NO.	QTY	DESCRIPTION	VOLTS	PHASE	AMPS	AFF	REMARKS
E1	1	REFRIGERATION SYSTEM	208	3	17.4	+24"	REFRIGERATION SYSTEM LOCATED ON ROOF
			-	-	-	-	E1a: 1" CONDUIT W/ (5) WIRES BY ELECTRICIAN TO REFRIG. SYSTEM (FREEZER). FOR DEFROST CONTROL. ELECTRICIAN SHALL COLOR CODE WIRES: 1 COMMON, 2 HEATERS, 1 FAN COIL, 1 TERMINATION. RUN FROM ROOF DOWN INTO CEILING SPACE.
E2	1	WALK-IN FREEZER ROOM	120	1	15.0	+108"	ELECTRICAL CONNECTION TO WALK-IN MISC. EQUIPMENT; LIGHTS, DOOR DEFROST HEATERS, DRAIN LINE HEATERS, & TEMP. ALARM

ELECTRICAL SYMBOLS:

- JUNCTION BOX
- WATERPROOF CONDUIT STUB
- CONDUIT STUB FOR REFRIGERATION
- THERMOSTAT
- LIQUID LINE SOLENOID
- ELECTRICAL MOTOR
- VAPORPROOF LIGHT
- SWITCH WITH PILOT LIGHT
- VAPORPROOF SWITCH



C K2.0 1ST FLOOR – FOOD SERVICE EQUIPMENT MECHANICAL PLAN
SCALE: 1/4" = 1'-0"



D K2.0 FOOD SERVICE EQUIPMENT ROOF MECHANICAL PLAN
SCALE: 1/4" = 1'-0"

FOODSERVICE EQUIPMENT MECHANICAL SCHEDULE

ITEM NO.	QTY	DESCRIPTION	HW	CW	WASTE	INDIRECT	REMARKS
M2	1	WALK-IN FREEZER ROOM	-	-	-	●	DRAIN LINES TO EXISTING FLOOR SINK

MECHANICAL SYMBOLS:

- FLOOR SINK WITH HALF GRATING

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Revisions

WALK-IN FREEZER REPLACEMENT
MALUHIA HOSPITAL
HONOLULU, HAWAII

Sheet Title

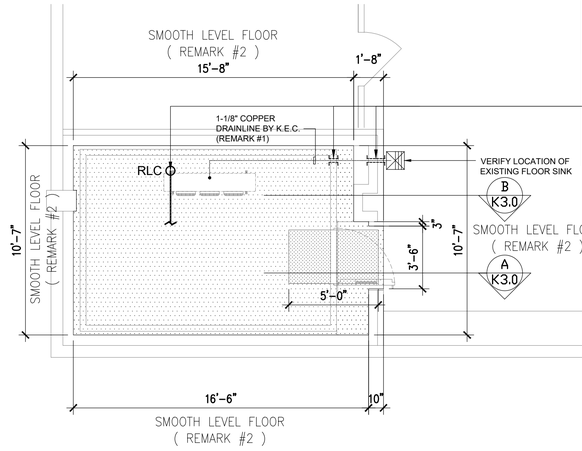
FOOD SERVICE EQUIPMENT ELECTRICAL & MECHANICAL PLAN & SCHEDULE

Date	4-09-20
Scale	AS NOTED
Drawn	IM/CS
Job	

Sheet Number

K2.0

of Sheets



WALL / FLOOR SLEEVES BY GENERAL CONTRACTOR (GC). (G.C.) AND ALL OTHER OPENINGS REQUIRED FOR INSULATED REFRIGERATION LINE RUNS. COORDINATE LOCATION AND SIZE WITH KITCHEN CONTRACTOR (K.E.C.). K.E.C. SHALL INSULATE LINES, SIZED AS REQUIRED TO AVOID SWEATING. INSULATION INSTALLER SHALL BE A CERTIFIED "ARMAFLEX" INSTALLER.

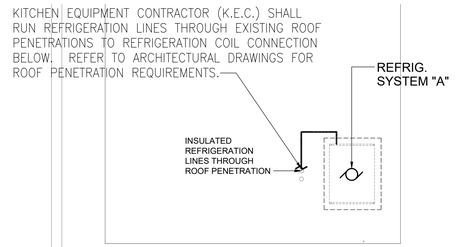
INSULATED REFRIGERATION LINE RUNS SHALL BE RUN WITH MINIMUM BENDS. G.C. SHALL COORDINATE WITH ALL TRADES TO "ENSURE" STRAIGHT RUNS.

REMARKS:

(1) – 1-1/8" COPPER DRAINLINE BY K.E.C. SHALL BE INSULATED TO AVOID SWEATING. PROVIDE HEAT TAP AS REQUIRED. COIL DRAINLINES SHALL BE RUN FROM COLD STORAGE ROOMS AT THE HIGHEST LEVEL POSSIBLE WITHIN WALK-IN TO +12" ABOVE FINISHED FLOOR.

(2) – GENERAL CONTRACTOR SHALL PROVIDE SMOOTH & LEVEL FLOOR. (*)

(*) – FLOOR SHALL BE SMOOTH & LEVEL BY G.C. K.E.C. SHALL ENSURE ALL INSTALLED FLOOR PANELS TO BE LEVEL THROUGHOUT PRIOR TO INSTALL WALL PANELS.



G.C. TO PROVIDE ALL ROOF, FLOOR AND WALL PENETRATIONS FOR REFRIGERATION LINES & ELECTRICAL CONDUIT LINE RUNS. REFER TO MECHANICAL DWGS. FOR REFRIGERATION LINE RUNS.

REFRIGERATION CONTRACTOR NOTE: (INSULATION REQUIREMENTS)

K.E.C. SHALL INSULATE LINES WITH ARMAFLEX INSULATION SIZED AS REQUIRED TO AVOID SWEATING. VERIFY OUTDOOR & INDOOR REQUIREMENTS WITH MANUFACTURER BEFORE START OF INSTALLATION. INSTALLATION INSTALLER SHALL BE A "CERTIFIED" ARMAFLEX INSTALLER.

EXTERIOR INSULATION: PROVIDE ARMAFLEX FOAMED PLASTIC INSULATION WITH S/S JACKET OR S/S TUBING. THE ARMAFLEX INSULATION SHALL BE APPLIED OVER CLEAN & DRY PIPING. S/S JACKET OR TUBING SHALL EXTEND 6" BEYOND PORTION OF ROOF OPENING. REFRIGERATION LINE RUNS ON ROOF SHALL BE SUPPORTED AND BRACKETED WITH UNISTRUTS.

INTERIOR INSULATION: REFRIGERANT SUCTION LINES SHALL BE INSULATED WITH ARMSTRONG ARMAFLEX FOAMED PLASTIC INSULATION TO AVOID SWEATING AND SIZED IN ACCORDANCE WITH THE MANUFACTURER BEFORE INSTALLATION.INSULATION SHALL BE DONE BY A "CERTIFIED" ARMAFLEX INSTALLER. RUN LINES WITHIN CEILING SPACE TO AREA ABOVE WALK-INS AND DOWN TO CONNECTION POINTS. REFRIGERATION LINE RUNS SHALL BE SUPPORTED AND BRACKETED WITH WALL MOUNTED UNISTRUTS. COORDINATE INSTALLATION WITH ALL TRADES TO "ENSURE" STRAIGHT LINE RUNS WITH MINIMAL BENDS.

GENERAL CONTRACTOR (G.C.) SHALL COORDINATE INSULATION LINE RUNS WITH KITCHEN EQUIPMENT CONTRACTOR AND ALL OTHER TRADES TO "ENSURE" A STRAIGHT LINE RUN WITH A MINIMUM OF LINE BENDS.

1 K3.0 **1ST FLOOR – FOOD SERVICE EQUIPMENT BLDG. WORK & REFRIGERATION PLAN**
SCALE: 1/4" = 1'-0"

2 K3.0 **FOOD SERVICE EQUIPMENT ROOF BLDG. WORK & REFRIGERATION PLAN**
SCALE: 1/4" = 1'-0"

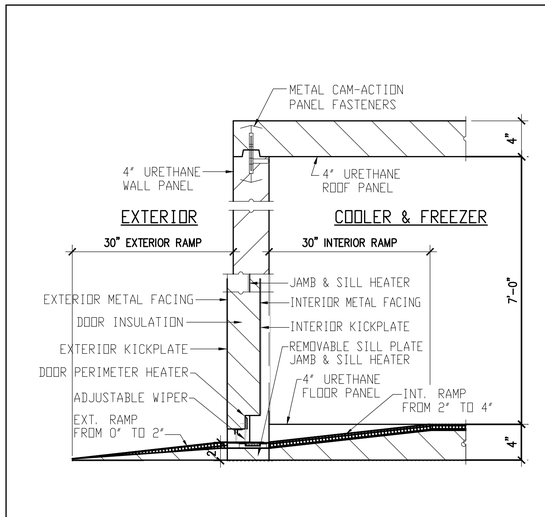
REFRIGERATION SCHEDULE

SYSTEM	DESCRIPTION	OPER. TEMP.	SUCTION TEMP.	COMPRESSOR					DEFROST METHOD	REFRIG.	COMPRESSOR LOCATION
				H.P.	VOLTS	PHASE	COOLING	BTU			
"A"	WALK-IN FREEZER	0°/-5°	-15°	2.0	208	3	AIR	*	DEFROST TIMER	R-404A	ROOF

* – STANDARD RATING

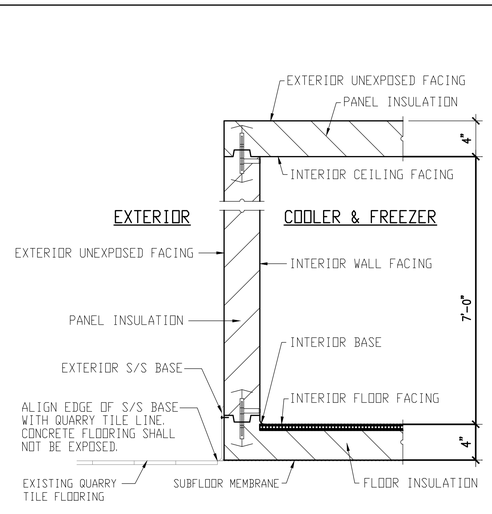
SYMBOLS:

- LEVEL FLOOR
- O RLC REFRIGERANT LINE CONNECTION
- ELECTRICAL MOTOR - REFRIGERATION SYSTEM LOCATION



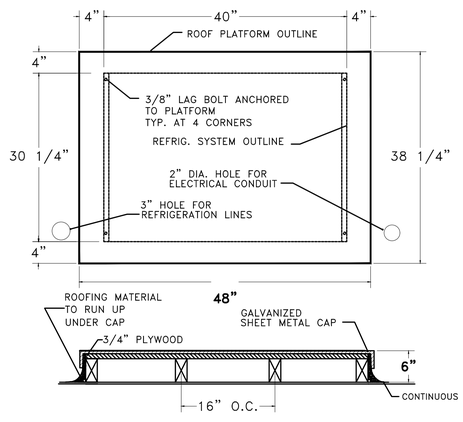
A K3.0 **SECTION AT DOOR**
NOT TO SCALE

KITCHEN EQUIPMENT CONTRACTOR SHALL INSTALL S/S SHIMS TO LEVEL WALK-IN FLOOR PANELS WHERE REQUIRED.



B K3.0 **SECTION AT WALL**
NOT TO SCALE

NOTE: ALLOW MIN. 3 FEET CLEAR AROUND UNIT

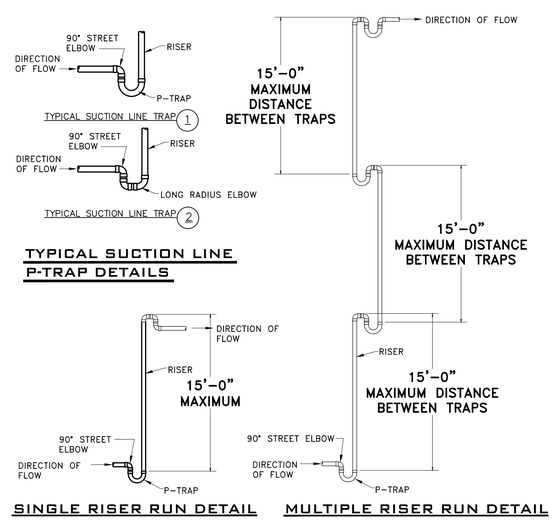


GENERAL CONTRACTOR
1. GENERAL CONTRACTOR TO PROVIDE LEVEL PLATFORM AT CODE HEIGHT.
2. PROVIDE SHEET METAL CAP WITH WATER TIGHT SOLDERED JOINTS.
3. GENERAL CONTRACTOR TO PROVIDE PENETRATION HOLES WITH ROOF JACKS FOR ELECTRICAL CONDUIT AND REFRIGERATION LINES.

REFRIGERATION CONTRACTOR
1. BACK FILL ROOF JACK OPENINGS WITH EXPANDED FOAM AND ROOF SEALANT AFTER COMPLETION OF ELECTRICAL AND REFRIGERATION PIPING.

REFER TO ARCHITECTURAL DRAWINGS FOR REQUIREMENTS

C K3.0 **PLATFORM DETAIL**
NOT TO SCALE



D K3.0 **TYPICAL P-TRAP DETAILS AND SUCTION LINE RISER DETAILS**

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Revisions

WALK-IN FREEZER REPLACEMENT
MALUHIA HOSPITAL
HONOLULU, HAWAII

Sheet Title
FOOD SERVICE EQUIPMENT BUILDING WORK AND REFRIGERATION PLAN

Date	4-09-20
Scale	AS NOTED
Drawn	IM/CS
Job	

Sheet Number
K3.0

of Sheets

ELECTRICAL NOTES:

1. PRIOR TO START OF THEIR WORK ELECTRICAL CONTRACTOR (ELECTRICIAN) SHALL BE RESPONSIBLE TO COORDINATE WORK REQUIRED BY THEIR TRADE WITH THE KITCHEN EQUIPMENT CONTRACTOR TO AVOID CONFLICTS WITH KITCHEN EQUIPMENT, DISCREPANCIES, ERRORS AND OMMISIONS. THE "K" DRAWINGS ARE PROVIDED TO INDICATE GENERAL LOCATIONS OF EQUIPMENT OUTLETS/CONNECTION POINTS. FOR EQUIPMENT REQUIREMENTS REFER TO THE ACTUAL DIMENSIONED "FOR CONSTRUCTION" ROUGHING-IN DRAWINGS PROVOIDED BY THE KITCHEN EQUIPMENT CONTRACTOR.

   THE "K" DRAWINGS ARE PROVIDED FOR THE CONVENIENCE OF THE ARCHITECT, ENGINEERS, GENERAL CONTRACTOR AND/OR SUB-CONTRACTORS. WORK INDICATED ON THESE DRAWINGS DO NOT REFLECT COMPLIANCE TO BUILDING CODES, ORDINANCES, REGULATIONS AND CONSTRUCTION METHODS. FOR SUCH DRAWINGS REFER TO THE ARCHITECT AND/OR ENGINEERS' DESIGN DRAWINGS, THEREFORE IT DOES NOT RELIEVE THE ELECTRICAL CONTRACTOR OF THEIR RESPONSIBILITY TO ASSURE SUCH.

   ANY CONFLICTS, DISCREPANCIES, ERRORS & OMISSIONS SHALL BE SUBMITTED IN WRITING PRIOR TO CONSTRUCTION OR BECOME THE SOLE RESPONSIBILITY OF THE ELECTRICAL CONTRACTOR (ELECTRICIAN).

2. ALL EQUIPMENT AND RECEPTACLES ARE TO BE FULLY CONNECTED. ELECTRICIAN TO FURNISH FINAL CONNECTIONS AND ALL TOOLS, MATERIALS AND ACCESSORIES AS REQUIRED WHETHER INDICATED OR NOT FOR A COMPLETE INSTALLATION.

3. ELECTRICIAN SHALL PROVIDE SERVICE AND MAKE CONNECTIONS TO REFRIGERATION COMPRESSORS. REMOTE DISCONNECT SWITCH FOR COMPRESSORS SHALL BE LOCATED WITHIN 10 FEET. COORDINATE LOCATION OF DISCONNECT SWITCH WITH KITCHEN CONTRACTOR.

4. ELECTRICIAN SHALL FURNISH AND INSTALL CONDUITS AS INDICATED ON PLAN FOR REFRIGERATION. ALL SUCH CONDUITS SHALL HAVE A MINIMUM OF 24-INCH RADIUS BEND AND SHALL TERMINATE 6 INCHES ABOVE FINISHED FLOOR/CONCRETE PAD OR 4 INCHES OUT FROM FINISHED WALL. PROVIDE PULL BOXES AT INTERVALS OF 90 FEET OR AS INDICATED ON PLAN.

7. ELECTRICIAN SHALL PROVIDE ALL CONDUITS, JUNCTION BOXES, CONVENIENCE OUTLETS (MOUNTED HORIZONTALLY), SWITCHES, STAINLESS STEEL COVER PLATES AND PULL BOXES NOT BUILT INTO EQUIPMENT OR FABRICATED FIXTURES.
   a. ALL ROUGH-INS SHALL BE CONCEALED WHEREVER POSSIBLE. CONDUIT AND CONTROL WIRING SHALL BE LOCATED BY THE ELECTRICAL ENGINEER. FLEX CONNECTION SHALL BE MOUNTED TO UNDERSIDE OF EQUIPMENT WHERE APPLICABLE.

8. PRE-FABRICATED COLD STORAGE ROOMS ARE FURNISHED BY THE KITCHEN EQUIPMENT CONTRACTOR COMPLETE WITH SPLICE BOXES, LIGHT FIXTURES, LIGHT SWITCHES AND DOOR HEATERS. ELECTRICIAN TO INSTALL SAME AND SHALL FURNISH AND INSTALL INTERCON-NECTING CONDUITS, WIRING, SEAL OFFS, SEALANT, ETC., AND MAKE FINAL CONNECTIONS.

9. CONDUIT ROUGHING-IN SHALL BE STUBBED IN WALLS, NO EXCEPTIONS.

10. ELECTRICAL REQUIREMENTS ARE INDICATED FOR INDIVIDUAL EQUIPMENT ITEMS. COMBINING OF LINES FOR SIMPLIFICATION IS ACCEPTABLE.

11. IT IS THE INTENTION OF THE "K" DRAWINGS TO SHOW UTILITY REQUIREMENTS AND GENERAL LOCATIONS ONLY. ELECTRICIAN SHALL NOT USE THIS OUTLET PLAN FOR ACTUAL ROUGHING-IN. FOR FINAL ROUGHING-IN LOCATIONS REFER TO THE ACTUAL "FOR CONSTRUCTION" DIMENSTIONED DRAWINGS PROVIDED BY THE KITCHEN EQUIPMENT CONTRACTOR.

    THE KITCHEN EQUIPMENT CONTRACTOR SHALL BE RESPONSIBLE TO INDICATE ALL EQUIPMENT REQUIREMENTS ON THIER ACTUAL "FOR CONSTRUCTION" ROUGHING-IN DRAWINGS RELATED TO AND/OR REQUIRED BY THE EQUIPMENT THAT WILL BE INSTALLED.

    ANY ROUGHING-IN AND/OR ENGINEERING CHANGES REQUIRED BY THE ACTUAL EQUIPMENT TO BE INSTALLED AND/OR ROUGHING-IN DISCREPANCIES SHALL BE SUBMITTED IN WRITING OR BECOME THE SOLE RESPONSIBILITY OF THE KITCHEN EQUIPMENT CONTRACTOR.

    REVIEW OF THE "FOR CONSTRUCTION" ROUGHING-IN DRAWINGS/ BROCHURE SUBMITTAL DOES NOT RELIEVE THE KITCHEN EQUIPMENT CONTRACTOR OF THEIR RESPONSIBILITY TO ENSURE THAT ALL REQUIRED EQUIPMENT ROUGHING-INS ARE INDICATED & PROVIDED ALONG WITH COORDINATION OF WORK BETWEEN CONSTRUCTION TRADES.

12. ALL "K" DRAWING ELECTRICAL DETAILS ARE INDICATED FOR REFERENCE AND CONVENIENCE OF THE ARCHITECT, ENGINEER, CONTRACTOR AND/OR. SUB-CONTRACTORS. REFER TO CORRESPONDING RELATED SECTIONS FOR EXACT REQUIREMENTS.

MECHANICAL NOTES:

1. PRIOR TO START OF THEIR WORK MECHANICAL CONTRACTOR (PLUMBER) SHALL BE RESPONSIBLE TO COORDINATE WORK REQUIRED BY THEIR TRADE WITH THE KITCHEN EQUIPMENT CONTRACTOR TO AVOID CONFLICTS WITH KITCHEN EQUIPMENT, DISCREPANCIES, ERRORS AND OMMISSIONS. THE "K" DRAWINGS ARE PROVIDED TO INDICATE GENERAL LOCATIONS OF EQUIPMENT OUTLETS/CONNECTION POINTS. FOR EQUIPMENT REQUIREMENTS REFER TO THE ACTUAL DIMENSIONED "FOR CONSTRUCTION" ROUGHING-IN DRAWINGS PROVIDED BY THE KTICHEN EQUIPMENT CONTRACTOR.

   THE "K" DRAWINGS ARE PROVIDED FOR THE CONVENIENCE OF THE ARCHITECT, ENGINEERS, GENERAL CONTRACTOR AND OR SUB-CONTRACTORS. WORK INDICATED ON THESE DRAWINGS DO NOT REFLECT COMPLIANCE TO BUILDING CODES, ORDINANCES, REGULATIONS AND CONSTRUCTION METHODS. FOR SUCH DRAWINGS REFER TO THE ARCHITECT AND/OR ENGINEERS' DESIGN DRAWINGS, THEREFORE IT DOES NOT RELIEVE THE MECHANICAL CONTRACTOR OR THEIR RESPONSIBILITY TO ASSURE SUCH.

   ANY CONFLICTS, DISCREPANCIES, ERRORS & OMMISSIONS SHALL BE SUBMITTED IN WRITING PRIOR TO CONSTRUCTION OR BECOME THE SOLE RESPONSIBILITY OF THE MECHANICAL CONTRACTOR (PLUMBER).

2. ALL EQUIPMENT SHALL BE FULLY CONNECTED. PLUMBER TO FURNISH FINAL CONNECTIONS AND ALL TOOLS, MATERIALS AND ACCESSORIES AS REQUIRED WHETHER INDICATED OR NOT FOR COMPLETE INSTALLATION.
   a. FINAL CONNECTION TO EQUIPMENT SHALL BE A FLEX CONNECTION, NOT SOFT COPPER. SEE MECH. DWGS.
   b. FLEX CONNECTIONS SHALL BE CONCEALED AND MOUNTED TO UNDERSIDE OF EQUIPMENT WHERE APPLICABLE.
   c. INTERCONNECTING PIPING SHALL BE HARD/RIGID COPPER.

3. PLUMBER SHALL FURNISH AND INSTALL ALL REQUIRED TRAPS AND SHUT-OFF VALVES. SHUT-OFF VALVES SHALL BE ACCESSIBLE.

4. GREASE TRAPS ARE TO BE PROVIDED WHERE REQUIRED AND SHALL BE LOCATED BELOW OR SET FLUSH WITH FLOOR. VERIFY BUILDING CODE REQUIREMENTS FOR FLOOR DRAINS.

5. PLUMBER SHALL FURNISH AND INSTALL PROPERLY SIZED INDIRECT WASTE LINES FOR WALK-IN REFRIGERATION EQUIPMENT AND EXTEND TO FLOOR SINKS. ALL WASTE LINES SHALL BE OF COPPER TUBING WITH SOLDERED FITTINGS WHERE REQUIRED. EXPOSED LINES SHALL BE INSULATED WITH ARMAFLEX & TAPE TO PREVENT SWEATING ESPECIALLY FOR WALK-IN FREEZER.

6. MECHANICAL REQUIREMENTS ARE INDICATED FOR INDIVIDUAL EQUIPMENT ITEMS. COMBINING OF LINES FOR SIMPLIFICATION OF INSTALLATION IS ACCEPTABLE.

7. FOR WASTE LINES TO GREASE TRAP AND SANITATION DRAINLINE REQUIREMENTS - REFER TO MECHANICAL ENGINEERS DRAWING.

8. IT IS THE INTENTION OF THE "K" DRAWINGS TO SHOW UTILITY REQUIREMENTS AND GENERAL LOCATIONS ONLY. PLUMBER SHALL NOT USE THIS OUTLET PLAN FOR ACTUAL ROUGHING-IN. FOR FINAL ROUGHING-IN LOCATIONS REFER TO THE ACTUAL "FOR CONSTRUCTION" DIMENSIONED DRAWINGS PROVIDED BY THE KITCHEN EQUIPMENT CONTRACTOR.

   THE KITCHEN EQUIPMENT CONTRACTOR SHALL BE RESPONSIBLE TO INDICATE ALL EQUIPMENT REQUIREMENTS ON THE ACTUAL ROUGHING-IN DRAWINGS RELATED TO AND/OR REQUIRED BY THE EQUIPMENT THAT WILL BE INSTALLED.

   ANY ROUGHING-IN AND/OR ENGINEERING CHANGES REQUIRED BY THE ACTUAL EQUIPMENT TO BE INSTALLED AND/OR ROUGHING-IN DISCREPANCIES SHALL BE SUBMITTED IN WRITING OR BECOME THE SOLE RESPONSIBILITY OF THE KITCHEN EQUIPMENT CONTRACTOR.

   REVIEW OF THE "FOR CONSTRUCTION" ROUGHING-IN DRAWINGS/ BROCHURE SUBMITTAL DOES NOT RELIEVE THE KITCHEN EQUIPMENT CONTRACTOR OF THEIR RESPONSIBILITY TO ENSURE THAT ALL REQUIRED EQUIPMENT ROUGHING-INS ARE INDICATED & PROVIDED ALONG WITH COORDINATION OF WORK BETWEEN TRADES.

9. ALL "K" DRAWING MECHANICAL DETAILS ARE INDICATED FOR REFERENCE AND CONVENIENCE OF THE ARCHITECT, CONTRACTOR AND/OR SUBCONTRACTORS. REFER TO CORRESPONDING RELATED SECTIONS FOR EXACT REQUIREMENTS.

GENERAL CONTRACTOR (G.C.) NOTES:

1. THE "K" DRAWINGS ARE PROVIDED FOR THE CONVENIENCE OF THE ARCHITECT, ENGINEERS, GENERAL CONTRACTOR AND/OR SUB-CONTRACTORS. WORK INDICATED ON THESE DRAWINGS DO NOT REFLECT COMPLIANCE TO BUILDING CODES, ORDINANCES, REGULATIONS AND CONSTRUCTION METHODS. FOR SUCH DRAWINGS REFER TO THE ARCHITECT AND/OR ENGINEERS' DESIGN DRAWINGS. IT IS THE GENERAL CONTRACTOR'S RESPONSIBILITY TO ASSURE SUCH

   THE GENERAL CONTRACTOR SHALL BE RESPONSIBLE TO COORDINATE WORK REQUIRED BY ALL OTHER TRADES WITH THE KITCHEN EQUIPMENT CONTRACTOR PRIOR TO THE START OF WORK TO AVOID CONFLICTS, DISCREPANCIES, ERRORS AND OMMISSIONS. THE "K" DRAWINGS ARE PROVIDED TO INDICATE GENERAL LOCATIONS OF EQUIPMENT OUTLETS/ CONNECTION POINTS. FOR EQUIPMENT REQUIREMENTS REFER TO THE ACTUAL DIMENSIONED "FOR CONSTRUCTION" ROUGHING-IN DRAWINGS PROVIDED BY THE KITCHEN EQUIPMENT CONTRACTOR.

   ANY CONFLICTS, DISCREPANCIES, ERRORS & OMISSIONS SHALL BE SUBMITTED IN WRITING PRIOR TO CONSTRUCTION OR BECOME THE SOLE RESPONSIBILITY OF GENERAL CONTRACTOR (G.C.).

2. GENERAL CONTRACTOR SHALL BE RESPONSIBLE TO COORDINATE WITH THE KITCHEN EQUIPMENT CONTRACTOR, BUILDING CONSTRUCTION SCHEDULE ALONG WITH KITCHEN EQUIPMENT INSTALLATION SCHEDULE TO PROVIDE PROPER ACCESS FOR EQUIPMENT DELIVERY AND INSTALLATION. FOR EXAMPLE: COORDINATING CONSTRUCTION OF WALL SECTIONS OR DOOR OPENINGS, ETC.

3. ALL DIMENSIONS SHOWN ON THESE PLANS ARE INDICATED TO BE TAKEN FROM FINISHED SURFACES AND INCLUDE ANY TILE, FURRING, ETC. CONTRACTOR SHALL MAKE ALLOWANCES SUCH THAT WHEN FINISHED MATERIAL IS APPLIED TO VERTICAL AND HORIZONTAL SURFACES THE FINAL DIMENSION CONFORMS TO THIS PLAN.

4. GENERAL CONTRACTOR (G.C.) AND KITCHEN EQUIPMENT CONTRACTOR SHALL COORDINATE THE INSTALLATION & LOCATION OF WALL AND/OR FLOOR SLEEVES TO BE PROVIDED BY THE G.C. AS INDICATED ON DRAWINGS OR AS REQUIRED.

5. GENERAL CONTRACTOR TO COORDINATE REFRIGERATION LINE RUNS WITH OTHER TRADES TO INSURE NON-INTERFERENCE WITH OTHER TRADES' LINE RUNS. REFER TO SHEET K-4 FOR REFRIGERATION LINE RUNS.

6. IT IS THE INTENTION OF THE "K" DRAWINGS TO SHOW GENERAL REQUIREMENTS AND LOCATIONS ONLY. GENERAL CONTRACTOR SHALL NOT USE THIS PLAN FOR ACTUAL ROUGHING-IN. FOR FINAL ROUGHING-IN LOCATIONS SEE "FOR CONSTRUCTION" DIMENSIONED DRAWINGS PROVIDED BY THE KITCHEN EQUIPMENT CONTRACTOR.

   THE KITCHEN EQUIPMENT CONTRACTOR SHALL BE RESPONSIBLE TO INDICATE ALL EQUIPMENT REQUIREMENTS ON THIER ACTUAL "FOR CONSTRUCTION" ROUGHING-IN DRAWINGS RELATED TO AND/OR REQUIRED BY THE EQUIPMENT THAT WILL BE INSTALLED.

   ANY ROUGHING-IN AND/OR ENGINEERING CHANGES REQUIRED BY THE ACTUAL EQUIPMENT TO BE INSTALLED AND/OR ROUGHING-IN DISCREPANCIES SHALL BE SUBMITTED IN WRITING OR BECOME THE SOLE RESPONSIBILITY OF THE KITCHEN EQUIPMENT CONTRACTOR.

   REVIEW OF THE "FOR CONSTRUCTION" ROUGHING-IN DRAWINGS/ BROCHURE SUBMITTAL DOES NOT RELIEVE THE KITCHEN EQUIPMENT CONTRACTOR OF THEIR RESPONSIBILITY TO ENSURE THAT ALL REQUIRED EQUIPMENT ROUGHING-INS ARE INDICATED & PROVIDED ALONG WITH COORDINATION OF THEIR WORK BETWEEN TRADES.

7. ALL "K" DRAWING BUILDING WORK DETAILS ARE INDICATED FOR REFERENCE AND CONVENIENCE OF THE ARCHITECT, CONTRACTOR AND/OR SUBCONTRACTORS. REFER TO CORRESPONDING RELATED SECTIONS FOR EXACT REQUIREMENTS AND CONSTRUCTION METHODS.

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Revisions

WALK-IN FREEZER REPLACEMENT
MALUHIA HOSPITAL
HONOLULU, HAWAII

Sheet Title

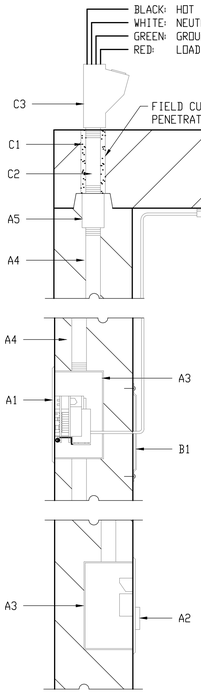
FOOD SERVICE EQUIPMENT ROUGHING-IN NOTES

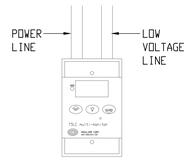
Date	4-09-20
Scale	AS NOTED
Drawn	IM/RY
Job	

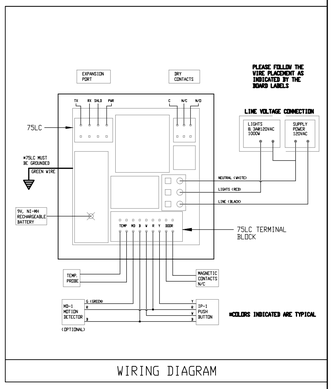
Sheet Number

K4.0

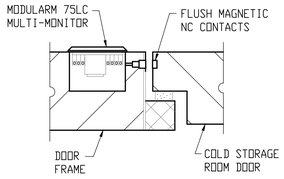
of Sheets







WIRING DIAGRAM



FRAME DETAIL

FACTORY INSTALLED ITEMS

A1 MODULARM 75LC multi-monitor
A2 IP-1 SWITCH
A3 SWITCH BOX
A4 1/2" RIGID CONDUIT
A5 CONDUIT COUPLER
A6 MAGNETIC CONTACT (N/C)

ITEMS FURNISHED BY RMI BUT INSTALLED BY JOBSITE ELECTRICIAN

B1 STAINLESS STEEL ESCUTCHEON

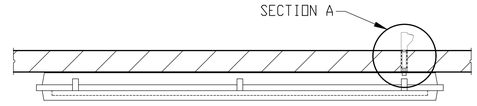
ITEMS FURNISHED AND INSTALLED BY JOBSITE ELECTRICAIN

C1 SEALANT
C2 NIPPLE
C3 EY'S SEAL FITTING

A K5.0 DIGITAL THERM./ALARM and AUTO LIGHT CONTROL

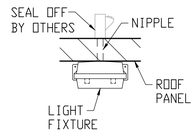
NOT TO SCALE

120V/1PH/60HZ
8.3 AMP MAX



NSF C UL US

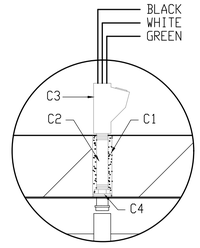
SIDE VIEW



END VIEW

LED LIGHT FIXTURE FEATURES:

LED TECHNOLOGY ASSURES SUSTAINABLE ENERGY SAVINGS OVER THE LIFE OF FIXTURE. 4'-0" VAPORPROOF FIXURE IS SUPPLIED W/LOW ENERGY LED LAMPS, WHICH FIXTURE ONLY ACCEPTS TO ASSURE SUSTAINABLE ENERGY SAVINGS. OPTIMUM DESIGN 67 LUMEN/WATT PROVIDES MAXIMUM LIGHT OUTPUT WITH LONGEST LIFE FOR LOWEST COST OF OWNERSHIP. SPECIFICALLY DESIGNED FOR WET AND LOW TEMPERATURE ENVIROMENTS. OPERATING TEMPERATURE RANGE FROM -40°F TO 110°F. MEETS IP-65. MERCURY-FREE LAMPS ARE UL LISTED FOR WET LOCATIONS WHICH CREATES A SAFER ENVIROMENT.



SECTION A

ELECTRICAL SPECIFICATIONS:

* UNBREAKABLE POLYCARBONATE ENCLOSURE
* 2-LAMP, 36W TOTAL, 120VAC, 0.31 AMPS
* 2,400 LUMENS TOTAL OUTPUT
* 67 LUMENS/WATT - EXCEEDS FEDERAL ENERGY ACT REQUIREMENT
* BRIGHT 5000K COLOR TEMPERATURE
* RATED 50,000 HR LIFE
* SUITABLE FOR WET LOCATIONS
* LAMPS ARE cULus LISTED
* RoHS COMPLIANT

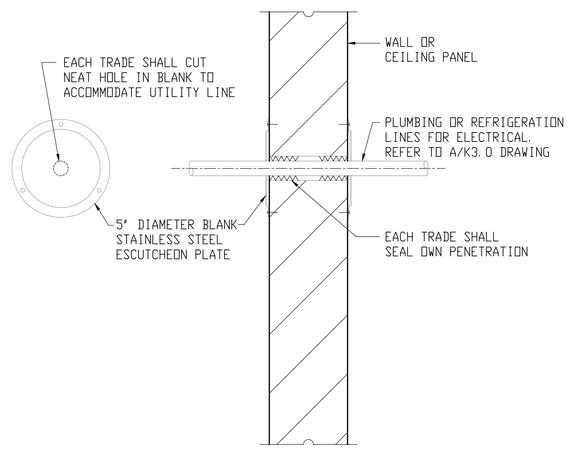
ITEMS FURNISHED AND INSTALLED BY ELECTRICAIN

C1 SEALANT
C2 NIPPLE (PVC-SCHEDULE 80 CONDUIT)
C3 'EY' SEAL OFF
C4 GASKETED CONNECTOR

B K5.0 LIGHT FIXTURE DETAIL

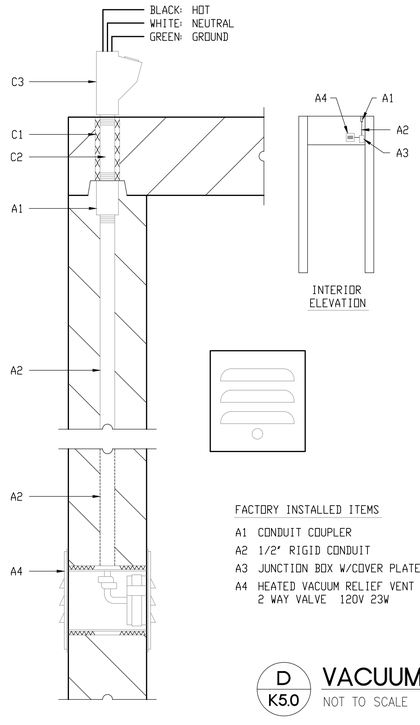
NOT TO SCALE

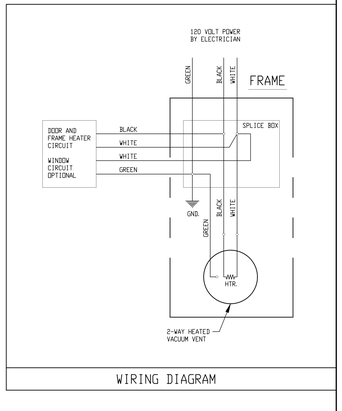
120V 1ø 60HZ
36 WATTS



C K5.0 ESCUTCHEON PLATE DETAIL

NOT TO SCALE





WIRING DIAGRAM

FACTORY INSTALLED ITEMS

A1 CONDUIT COUPLER
A2 1/2" RIGID CONDUIT
A3 JUNCTION BOX W/COVER PLATE
A4 HEATED VACUUM RELIEF VENT 2 WAY VALVE 120V 23W

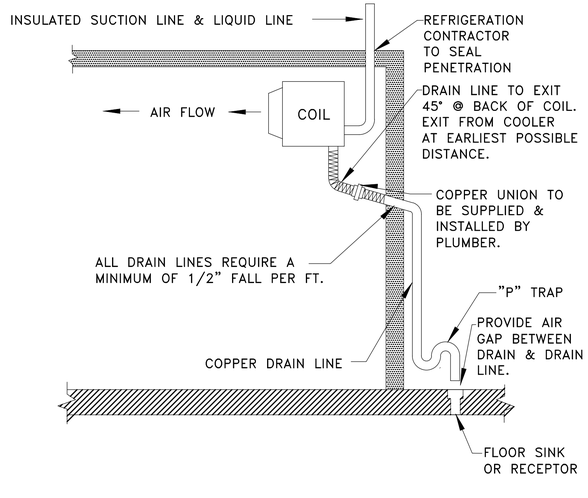
ITEMS FURNISHED AND INSTALLED BY JOBSITE ELECTRICIAN

C1 SEALANT
C2 NIPPLE
C3 'EY' SEAL FITTING

D K5.0 VACUUM VENT DETAIL

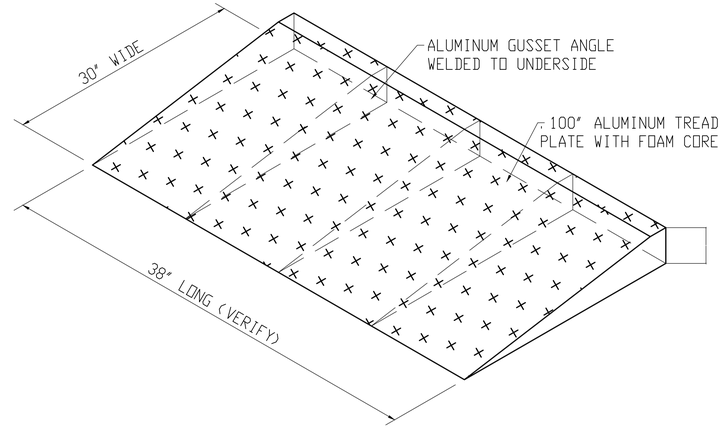
NOT TO SCALE

120V/1PH/60HZ
23 WATTS



E K5.0 TYPICAL DRAIN LINE INSTALLATION

NOT TO SCALE



F K5.0 ESCUTCHEON PLATE DETAIL

NOT TO SCALE

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Revisions

WALK-IN FREEZER REPLACEMENT
MALUHIA HOSPITAL
HONOLULU, HAWAII

Sheet Title

FOOD SERVICE EQUIPMENT
TYPICAL WALK-IN DETAILS

Date	4-09-20
Scale	AS NOTED
Drawn	IM/CS
Job	

Sheet Number

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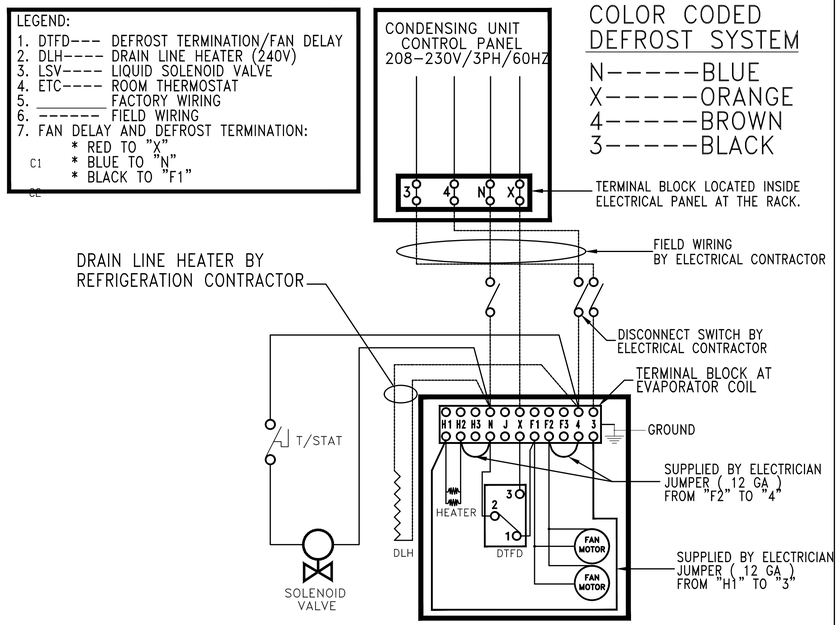
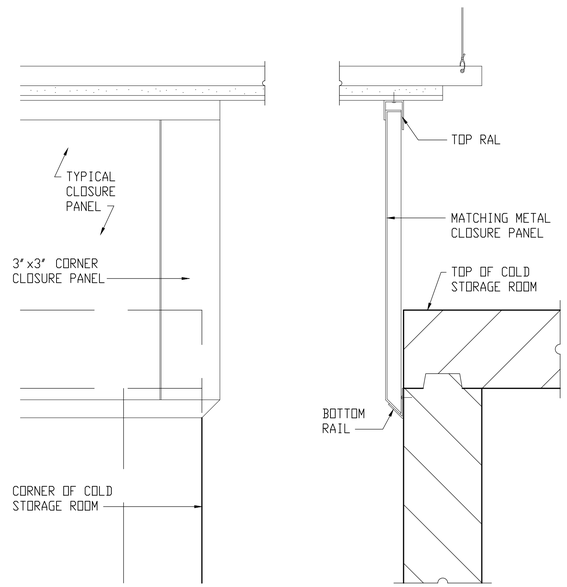


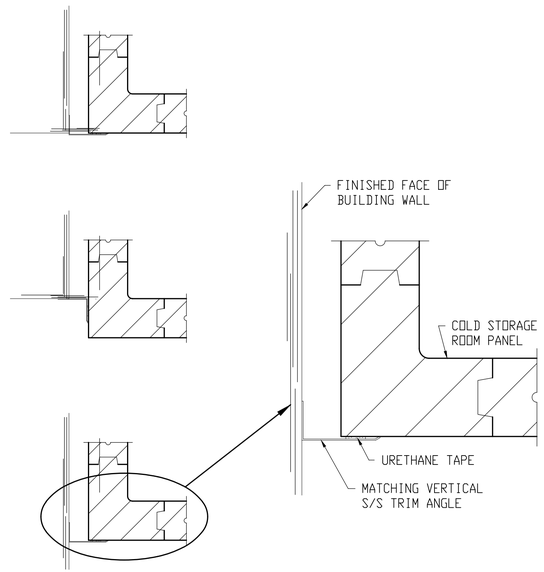
A K6.0 ELECTRIC DEFROST WIRING FOR WALK-IN FREEZER

NOT TO SCALE



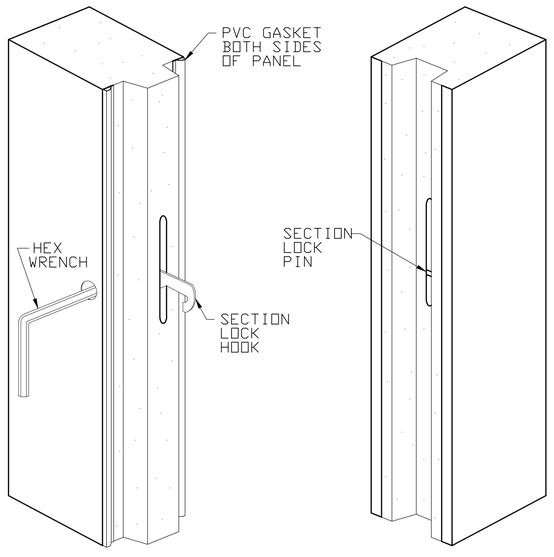
B K6.0 CLOSURE PANEL DETAIL

NOT TO SCALE



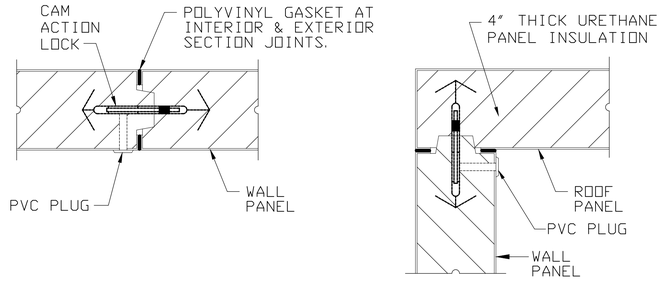
C K6.0 TRIM DETAIL AT SIDE WALLS

NOT TO SCALE

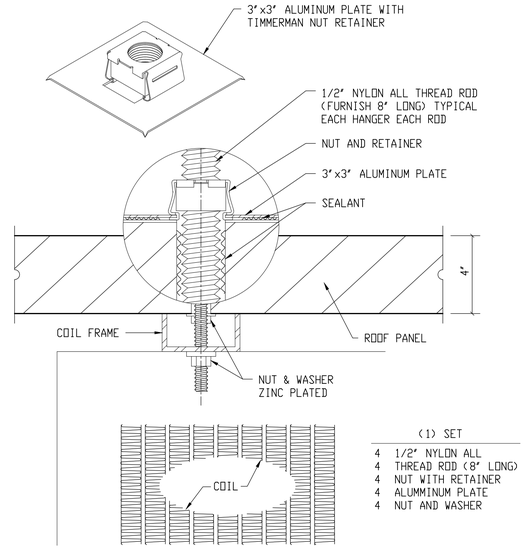


D K6.0 TYPICAL PANEL SECTION JOINT

NOT TO SCALE



LOCK PANELS TOGETHER BY INSERTING ALLEN WRENCH INTO 3/4" HOLE AND TURNING CLOCKWISE UNTIL PANELS MEET.



RODS, WASHERS, NUTS AND ALUMINUM PLATES WITH NUT RETAINER SHALL BE SIGNED OVER TO THE JOBSITE SUPERINTENDENT. ACTUAL INSTALLATION OF PARTS SHALL BE THE RESPONSIBLILTY OF THE MECHANICAL REFRIGERATION CONTRACTOR.

D K6.0 COIL SUPPORT DETAIL

NOT TO SCALE

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Revisions

WALK-IN FREEZER REPLACEMENT
MALUHIA HOSPITAL
HONOLULU, HAWAII

Sheet Title

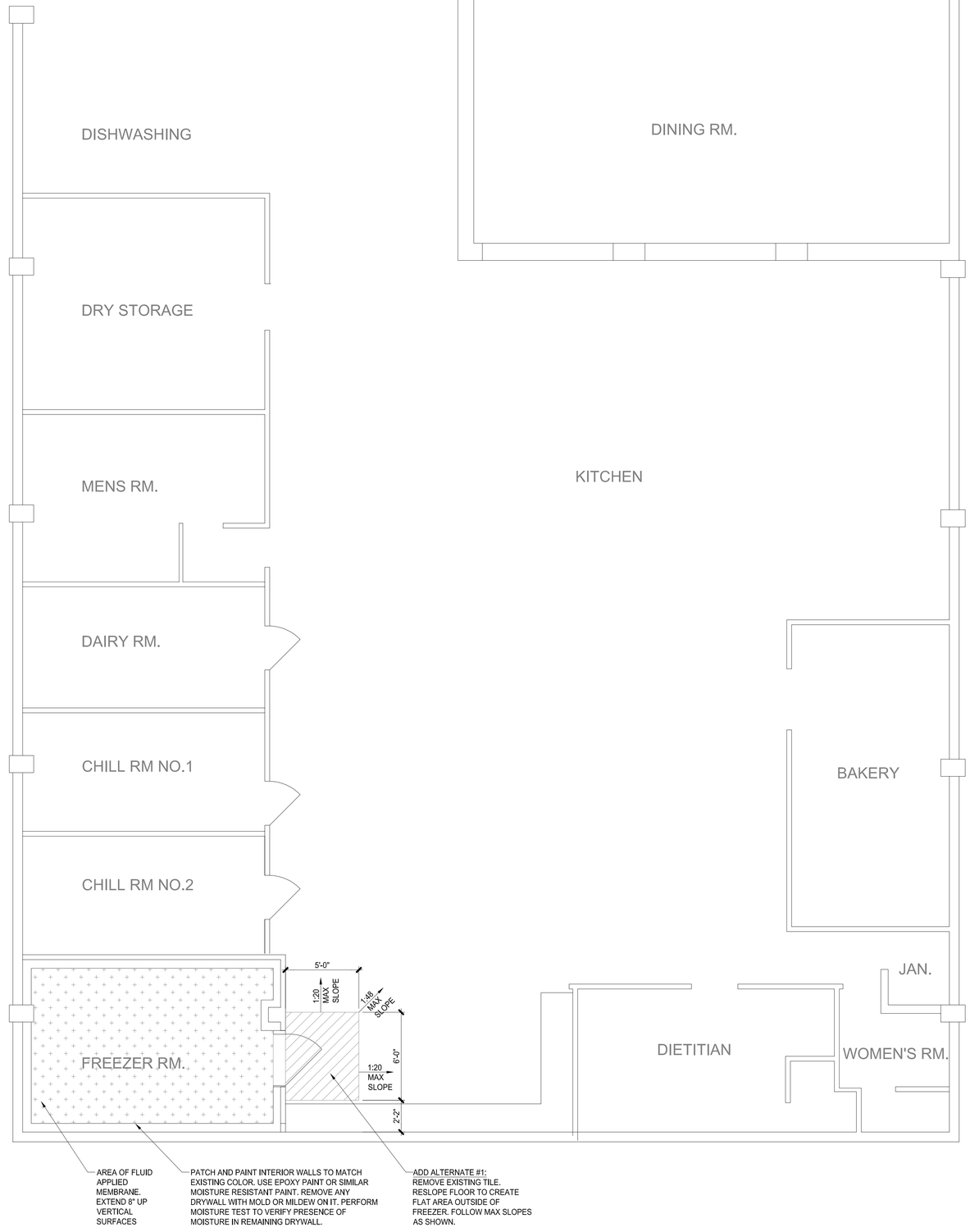
FOOD SERVICE EQUIPMENT
TYPICAL WALK-IN DETAILS

Date	4-09-20
Scale	AS NOTED
Drawn	IM/CS
Job	

Sheet Number

K6.0

of Sheets



1 FLOOR PLAN
SCALE: 1/4" = 1'-0"

ENGLISH HONG ARCHITECTURE

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(808) 341-3781

EDWARD P. ENGLISH
LICENSED PROFESSIONAL ARCHITECT
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HAWAII, U.S.A.

Signature 4/30/2020 License Expiration Date

THIS WORK WAS PREPARED BY ME OR UNDER MY SUPERVISION AND CONSTRUCTION OF THE PROJECT WILL BE UNDER MY OBSERVATION. "OBSERVATION OF CONSTRUCTION" SHALL BE AS DEFINED IN CHAPTER 115, HAWAII ADMINISTRATIVE RULES FOR PROFESSIONAL ENGINEERS, ARCHITECTS, SURVEYORS, AND LANDSCAPE ARCHITECTS, STATE OF HAWAII, SUBCHAPTER 1, SECTION 16-115.2, DEFINITIONS, EFFECTIVE 8/29/94.)

Revisions

WALK-IN FREEZER REPLACEMENT

MALUHIA HOSPITAL
HONOLULU, HAWAII

Sheet Title

FLOOR PLAN

Date 04-09-20
Scale AS NOTED
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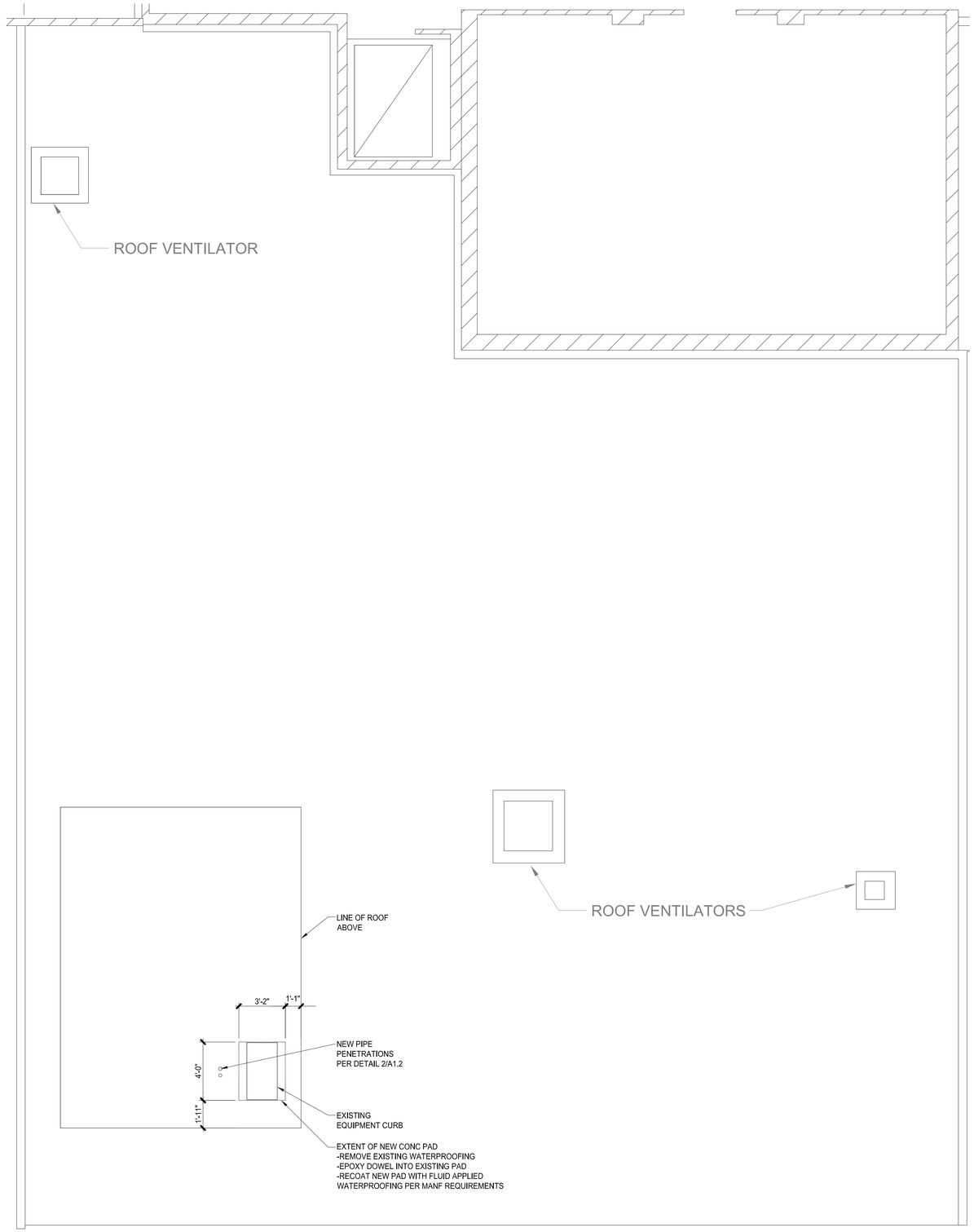
Job

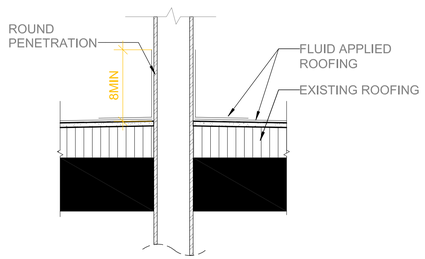
Sheet Number

A1.1

of Sheets



1 ROOF PLAN
SCALE: 1/4" = 1'-0"



2 PIPE_PENETRATION
SCALE: NTS

ENGLISH HONG ARCHITECTURE

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(808) 341-3781

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Revisions

WALK-IN FREEZER REPLACEMENT

MALUHIA HOSPITAL
HONOLULU, HAWAII

Sheet Title

ROOF PLAN
ROOF DETAILS

Date 04-09-20
Scale AS NOTED
Drawn CH
Job

Sheet Number

A1.2

of Sheets

FIRE PROTECTION SYMBOL LIST

NOTE: This is a standard symbol list and not all items listed may be used.

Abbreviations

(A)	ABANDON IN PLACE
(E)	EXISTING
(F)	FUTURE
(N)	NEW
(R)	RELOCATE/RELOCATED LOCATION
(X)	DEMOLITION
AFF	ABOVE FINISHED FLOOR
AS	AUTOMATIC SPRINKLER
BOB	BOTTOM OF BEAM
BOD	BOTTOM OF DECK
BOP	BOTTOM OF PIPE
BOR	BOTTOM OF RISER
BV	BUTTERFLY VALVE
C	CENTER LINE
CV	CHECK VALVE
DDCV	DOUBLE DETECTOR CHECK VALVE ASSEMBLY
DN	DROP NIPPLE
EC	EXTENDED COVERAGE
EL	ELEVATION
F	FAHRENHEIT
FDC	FIRE DEPARTMENT CONNECTION
FF	FINISHED FLOOR
FFL	FLOOR FLANGE
FHC	FIRE HOSE CABINET
FHS	FIRE HOSE STATION
FS	FLOW SWITCH
FT	FEET
G	GRADE
GPM	GALLONS PER MINUTE
GV	GATE VALVE
H	HANGER
HSW	HORIZONTAL SIDE WALL
HV	HOSE VALVE
ID	INSIDE DIAMETER
IN	INCHES
MAX	MAXIMUM
MIN	MINIMUM
N&C	NIPPLE AND CAP
NIC	NOT IN CONTRACT
NO	NUMBER
NTS	NOT TO SCALE
OBJ	OPEN BAR JOIST
OD	OUTSIDE DIAMETER
OS & Y	OUTSIDE SCREW & YOKE
PIV	POST INDICATOR VALVE
PRV	PRESSURE REDUCING VALVE
PS	PRESSURE SWITCH
RM	ROOF MANIFOLD
RN	RISER NIPPLE
SB	SWAY BRACE
SF	SQUARE FEET
SOV	SHUT OFF VALVE
SP	STANDPIPE
SSP	STANDARD SPRAY PENDENT
SSU	STANDARD SPRAY UPRIGHT
TOB	TOP OF BEAM
TOP	TOP OF PIPE
TOR	TOP OF RISER
TOS	TOP OF STEEL
TS	TAMPER SWITCH
TYP	TYPICAL
UNO	UNLESS NOTED OTHERWISE

Control

- BELL/GONG
- CONTROL PANEL
- FLOW DETECTION SWITCH
- MONITOR SWITCH
- PRESSURE GAUGE
- TAMPER DETECTOR
- WATER MOTOR ALARM

General

- DEMOLISH

Miscellaneous

- 2-WAY SWAY BRACE
- 4-WAY SWAY BRACE
- AUXILIARY DRAIN
- BRANCHLINE RESTRAINT (TEXT INDICATES TYPE)
- COUPLING
- DRY HOSE STATION
- ELEVATION ABOVE FINISHED FLOOR
- FLANGED COUPLING
- FLEXIBLE COUPLING
- GROOVED CAP
- GROOVED COUPLING
- HANGER (TEXT INDICATES TYPE)
- HYDRAULIC CALCULATION NODE
- RISER
- SCREWED CAP
- SCREWED PLUG
- UNION
- WET HOSE STATION

GENERAL FIRE PROTECTION NOTES

A. SCOPE OF WORK: DEMOLISH EXISTING SPRINKLER IN EXISTING WALK-IN FREEZER. REPLACE WITH NEW SPRINKLER IN NEW FREEZER. CONNECT NEW SPRINKLER TO EXISTING OVERHEAD SPRINKLER SYSTEM. ALL WORK TO MEET REQUIREMENTS OF NFPA 13, STATE AND LOCAL CODES.

B. CONTRACTOR TO VERIFY EXISTING SPRINKLER SYSTEM AS NO AS-BUILTS ARE AVAILABLE. PRIOR TO WORK REPORT ANY DISCREPANCIES AND SIGNIFICANT IMPACT TO SCOPE OF WORK.

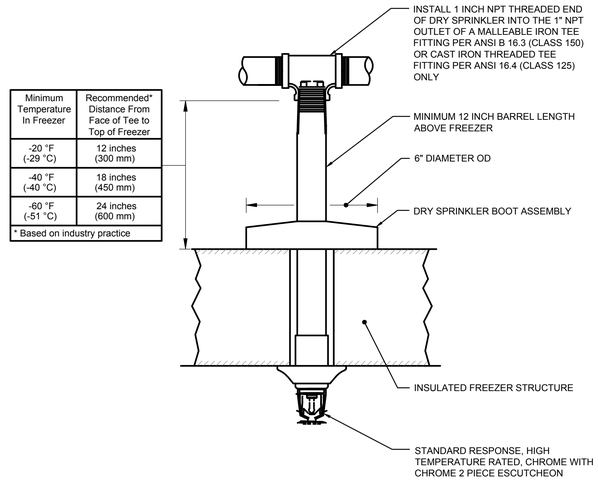
C. CONTRACTOR TO PROVIDE ALL NECESSARY HANGING AND BRACING IN ACCORDANCE WITH NFPA 13, STATE AND LOCAL CODES.

D. CONTRACTOR TO PROVIDE NOTIFICATION TO F.D OF SPRINKLER SYSTEM SHUT DOWN AND PROVIDE FIRE WATCH AS REQUIRED.

E. HYDRAULIC CALCULATIONS NOT REQUIRED SINCE NO CHANCE IN OCCUPANCY, SPRINKLER DENSITY OR HAZARD CLASSIFICATION.

END OF BRANCHLINE HANGER

NO SCALE FSPHG15A



Minimum Temperature In Freezer	Recommended* Distance From Face of Tee to Top of Freezer
-20 °F (-29 °C)	12 inches (300 mm)
-40 °F (-40 °C)	18 inches (450 mm)
-60 °F (-51 °C)	24 inches (600 mm)

* Based on industry practice

FREEZER-COOLER PENETRATION

NO SCALE FSPSP10A

SHEET INDEX

INTERFACE ENGINEERING

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EXPIRES: 4/30/22

THIS WORK WAS PREPARED BY ME OR UNDER MY SUPERVISION AND CONSTRUCTION OF THIS PROJECT WILL BE UNDER MY OBSERVATION. "SUPERVISION OF CONSTRUCTION" AS DEFINED UNDER SECTION 16-82-2 OF CHAPTER 82; RULES OF THE BOARD OF PROFESSIONAL ENGINEERS, ARCHITECTS AND LAND SURVEYORS: STATE OF HAWAII.)

MALUHIA - WALK-IN FREEZER REPLACEMENT

1027 HALA DRIVE
HONOLULU, HI 96817

SHEET TITLE

SYMBOL LIST, GENERAL NOTES AND SHEET INDEX - FIRE PROTECTION

REVISIONS

DRAWN BY: CK

CHECKED BY:

JOB NO.: 2020-0132

DATE: 04/09/2020

SHEET NUMBER

FP-001

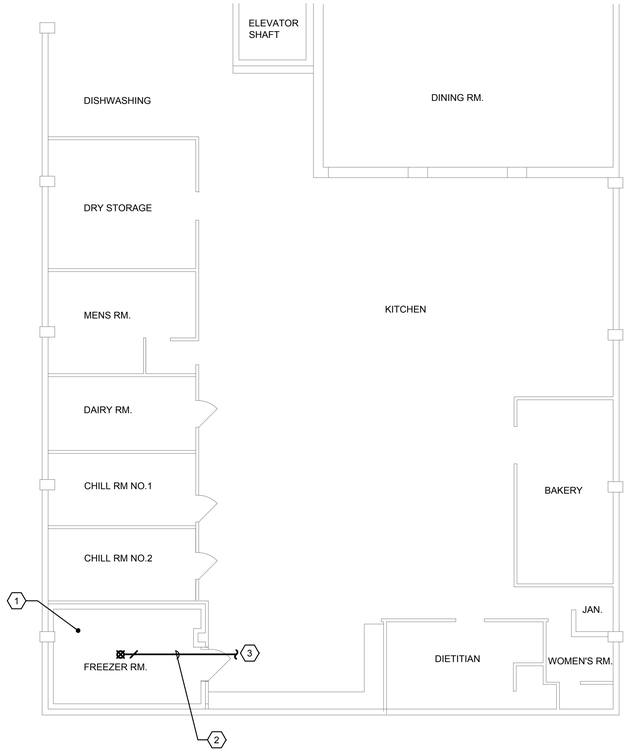
GENERAL SHEET NOTES

A. CONTRACTOR TO FIELD VERIFY EXISTING SPRINKLER SYSTEM IN AREA.

B. NEW SPRINKLERS SHALL BE HIGH-TEMP, DRY BARREL TYPE SPRINKLER IN ACCORDANCE WITH NFPA 13.

SHEET KEYNOTES

1. DEMOLISH EXISTING SPRINKLER IN WALK-IN FREEZER. DEMOLISH EXISTING PIPING TO EXTEND OF WALK-IN FREEZER. CAP AND PROTECT EXISTING LINE FOR CONNECTION TO NEW WORK.
2. PROVIDE NEW CHROME FINISH, HIGH-TEMP SPRINKLER. COORDINATE WITH MECHANICAL, PLUMBING AND LIGHTING.
3. CONNECT NEW PIPING TO EXISTING PIPING. PROVIDE HANGERS AS REQUIRED.



1 FLOOR PLAN - FIRE PROTECTION

0 4' 8' 16'

SCALE: 1/8"=1'-0"

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MALUHIA - WALK-IN FREEZER REPLACEMENT

1027 HALA DRIVE HONOLULU, HI 96817

SHEET TITLE

FLOOR PLAN - FIRE PROTECTION

REVISIONS

DRAWN BY: CK

CHECKED BY:

JOB NO.: 2020-0132

DATE: 04/09/2020

SHEET NUMBER

FP-201

FIRE ALARM SYMBOL LIST

NOTE: This is a standard symbol list and not all items listed may be used.

Fire Alarm

	HORN (EXISTING)
	WEATHERPROOF HORN/STROBE COMBINATION (# INDICATES MINIMUM CANDELA RATING)

GENERAL FIRE ALARM NOTES

A. SCOPE OF THIS PROJECT IS THE EXTENSION OF THE EXISTING FIRE ALARM SYSTEM TO PROVIDE A WEATHERPROOF HORN/STROBE IN THE NEW REPLACEMENT WALK-IN FREEZER.

SHEET INDEX

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MALUHIA - WALK-IN FREEZER REPLACEMENT

1027 HALA DRIVE HONOLULU, HI 96817

SHEET TITLE

SYMBOL LIST, GENERAL NOTES AND SHEET INDEX - FIRE ALARM

REVISIONS

DRAWN BY: JM

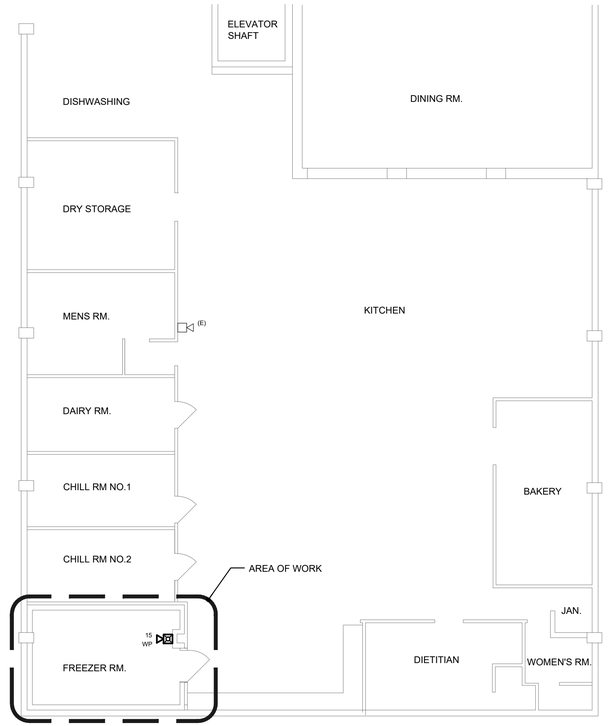
CHECKED BY:

JOB NO.: 2020-0132

DATE: 04/09/2020

SHEET NUMBER

FA-001



1 FLOOR PLAN - FIRE ALARM

0 4' 8' 16'

SCALE: 1/8"=1'-0"

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MALUHIA - WALK-IN FREEZER REPLACEMENT

1027 HALA DRIVE
HONOLULU, HI 96817

SHEET TITLE
FLOOR PLAN - FIRE ALARM

REVISIONS

DRAWN BY: JM
CHECKED BY:
JOB NO.: 2020-0132
DATE: 04/09/2020
SHEET NUMBER

FA-301

ELECTRICAL SYMBOL LIST

NOTE: This is a standard symbol list and not all items listed may be used.

Abbreviations

(E)	EXISTING
(R)	RELOCATE
(X)	DEMOLISH
A	AMPERES, AMBER
AFF	ABOVE FINISHED FLOOR
AIC	AVAILABLE INTERRUPTING CAPACITY
ANSI	AMERICAN NATIONAL STANDARDS INSTITUTE
AWG	AMERICAN WIRE GAUGE
C	CONDUIT, CLOSE, CONTROL
CU	COPPER
DIV	DIVISION
DWG	DRAWING
EA	EACH
FA	FIRE ALARM
G, GND	GROUND
GFCI	GROUND FAULT CIRCUIT INTERRUPTER
GFI	GROUND FAULT INTERRUPTER
IEEE	INSTITUTE OF ELECTRICAL AND ELECTRONICS ENGINEERS
IN	INCH, INCHES
KVA	KILOVOLT AMPERES
KW	KILOWATT
LV	LOW VOLTAGE
MCA	MINIMUM CIRCUIT AMPS
MCC	MOTOR CONTROL CENTER
MOCP	MAXIMUM OVERCURRENT PROTECTION
N.I.C.	NOT IN CONTRACT
N/A	NOT APPLICABLE
N	NEUTRAL
NEC	NATIONAL ELECTRIC CODE
NEMA	NATIONAL ELECTRICAL MANUFACTURERS ASSOCIATION
NESC	NATIONAL ELECTRIC SAFETY CODE
PH	PHASE
RFI	REQUEST FOR INFORMATION
TBD	TO BE DETERMINED
TYP	TYPICAL
UL	UNDERWRITERS LABORATORIES
UON	UNLESS OTHERWISE NOTED
V	VOLTS, VOLTAGE
W/	WITH
W/O	WITHOUT
WP	WEATHERPROOF

Connections / Equipment

- VFD — COMBINATION ADJUSTABLE FREQUENCY DRIVE WITH SAFETY DISCONNECT SWITCH
- COMBINATION MOTOR STARTER/FUSED DISCONNECT SWITCH
- F — HEAVY DUTY FUSED DISCONNECT SWITCH
- J — CEILING MOUNTED JUNCTION BOX
- J — EQUIPMENT INTEGRAL JUNCTION BOX
- J — FLOOR MOUNTED JUNCTION BOX
- J — WALL-MOUNTED JUNCTION BOX
- MOTOR CONNECTION
- NON-FUSED DISCONNECT SWITCH

General

- DEMOLISH
- EXISTING WORK
- NEW WORK
- X / X — DETAIL NUMBER AND SHEET LOCATION
- XX-X / LOCATION — EQUIPMENT IDENTIFICATION
- 1 — KEYED NOTE
- A / XXX — SECTION NUMBER AND SHEET LOCATION

Miscellaneous

- #10 / B-27,29,31. — BRANCH CIRCUIT WIRING. ARROW INDICATES HOME RUN TO PANEL WITH CIRCUITS AS NOTED. WIRE SIZE IS #12 AWG MINIMUM UNLESS NOTED OTHERWISE. SHORT TICK MARKS INDICATE PHASE CONDUCTORS. LONG TICK MARKS INDICATE NEUTRAL CONDUCTORS. A SINGLE CURVED TICK MARK INDICATES INSULATED GREEN GROUND CONDUCTOR. SECOND CURVED TICK MARK INDICATES "ISOLATED GROUND" (GREEN INSULATION WITH YELLOW STRIPE) CONDUCTOR.
- BRANCH PANEL
- CIRCUIT BREAKER
- CIRCUIT BREAKER WITH CURRENT LIMITING FUSES
- DRY TYPE TRANSFORMER
- FLUSH WALL MOUNTED BRANCH PANEL
- GB — GROUND BAR
- MAIN DISTRIBUTION PANEL / SUB DISTRIBUTION PANEL

Raceways

- CONDUIT CONCEALED IN WALL OR CEILING SPACE
- CONDUIT ROUTED BELOW FLOOR / GRADE
- CONDUIT ELLED DOWN
- CONDUIT ELLED UP
- CONDUIT/WIRING CONTINUATION
- CONDUIT/WIRING STUBBED OUT WITH END CAP OR INSULATED PLASTIC BUSHING
- FLEXIBLE CONDUIT

Switches and Receptacles

- DUPLEX RECEPTACLE (MULTIPLE LETTERS INDICATE MULTIPLE OPTIONS)
  - A = ABOVE COUNTER
  - G = GROUND FAULT CIRCUIT INTERRUPTER
  - I = ISOLATED GROUND
  - P = PENDANT MOUNTED WITH CORD GRIPS. VERIFY PENDANT LENGTH
  - T = TAMPER RESISTANT SHUTTERED RECEPTACLE
  - W = WEATHERPROOF CONTINUOUS USE COVER, GFCI PROTECTED, WITH WEATHER-RESISTANT RECEPTACLE
- DUPLEX RECEPTACLE, FLUSH FLOOR
- DOUBLE DUPLEX RECEPTACLE, FLUSH FLOOR
- DOUBLE DUPLEX RECEPTACLE. SEE LETTER CODE LIST AT DUPLEX RECEPTACLE FOR OPTIONS
- EQUIPMENT ELECTRICAL CONNECTION
- SPECIAL PURPOSE RECEPTACLE. LETTER CODE DENOTES RECEPTACLE CONFIGURATION
  - LX-XXR = NEMA CONFIGURATION TWIST-LOCK RECEPTACLE
  - X-XXR = NEMA CONFIGURATION STRAIGHT BLADE RECEPTACLE
  - P = PENDANT MOUNT WITH CORD GRIPS. VERIFY PENDANT LENGTH
  - X = COORDINATE RECEPTACLE CONFIGURATION WITH EQUIPMENT BEING SUPPLIED
- $ — SINGLE POLE SWITCH
  - 2 = DOUBLE POLE SWITCH
  - 3 = THREE-WAY SWITCH
  - 4 = FOUR-WAY SWITCH
  - a THRU z (LOWERCASE) = LUMINAIRE CONTROL DESIGNATION
  - D = DIMMER
  - F = FAN SPEED CONTROL
  - K = KEY OPERATED SWITCH
  - L = LIGHTED HANDLE
  - M = MANUAL MOTOR STARTER WITH THERMAL OVERLOAD
  - P = SWITCH WITH PILOT LIGHT
  - S = SENTRY SWITCH
  - T = INTERVAL TIMER
  - W = WEATHERPROOF SWITCH
  - V = LOW VOLTAGE SWITCH

GENERAL ELECTRICAL NOTES

A. COORDINATE WITH OWNER SO THAT WORK CAN BE SCHEDULED NOT TO INTERRUPT OPERATIONS, NORMAL ACTIVITIES, BUILDING ACCESS, ACCESS TO DIFFERENT AREAS. THE OWNER WILL COOPERATE TO THE BEST OF THEIR ABILITY TO ASSIST IN A COORDINATED SCHEDULE, BUT WILL REMAIN THE FINAL AUTHORITY AS TO TIME OF WORK PERMITTED.

B. ANY ELECTRICAL OUTAGE REQUIRED BY THE WORK SHALL BE COORDINATED WITH THE OWNER AND CONFIRMED IN WRITING. ANY OUTAGE SHALL NOT BE SCHEDULES DURING BUSINESS HOURS. ALL COSTS FOR OVERTIME SHALL BE INCLUDED IN BID

C. VISIT THE SITE BEFORE SUBMITTING A BID TO OBSERVE EXISTING CONDITIONS. ELECTRICAL CONTRACTOR SHALL VISIT AND EXAMINE THE SITE PRIOR TO CONSTRUCTION TO ASCERTAIN THE EXISTING CONDITIONS AND LIMITS OF CONSTRUCTION. ELECTRICAL CONTRACTOR SHALL MAKE NOTE OF ANY ADDITIONAL DEMOLITION AND/OR ANY ADDITIONAL REMOVAL AND RELOCATION WHICH MAYBE REQUIRED TO ACCOMPLISH CONSTRUCTION. ELECTRICAL CONTRACTOR TO NOTIFY THE ARCHITECT IMMEDIATELY OF ANY DISCREPANCIES. FAILURE TO DO SO INDICATES THAT CONTRACTOR ACCEPTS THE CONDITION AS THEY EXIST AND SHALL PERFORM THE WORK REQUIRED.

D. FIELD VERIFY PANELBOARDS LOADS, BUS RATINGS AND AVAILABLE SPARE AND SPACES.

E. ELECTRICAL CONTRACTOR IS RESPONSIBLE TO PROTECT AND RETAIN POWER TO ALL EXISTING ACTIVE EQUIPMENT DURING NEW CONSTRUCTION PERIOD.

F. COORDINATE EXACT LOCATION AND MOUNTING HEIGHT AND LIGHTING CONTROLS WITH ENGINEER PRIOR TO INSTALLATION.

G. COORDINATE EXACT LOCATION AND MOUNTING HEIGHT OF RECEPTACLES AND ELECTRICAL DEVICES WITH ENGINEER PRIOR TO INSTALLATION.

H. COORDINATE EXACT LOCATION AND POWER REQUIREMENTS OF HVAC UNITS WITH DIVISION 23 PRIOR TO INSTALLATION.

I. COORDINATE EXACT POWER REQUIREMENTS OF KITCHEN EQUIPMENT WITH MANUFACTURER PRIOR TO INSTALLATION.

J. COORDINATE WITH OTHER TRADES FOR ITEMS IN THEIR SCOPE OF WORK WHICH MAY REQUIRE ELECTRICAL WORK AND ARE NOT INDICATED ON THE ELECTRICAL PLANS.

K. REMOVE WIRING DEVICES, FIXTURES, COMPONENTS, ELECTRICAL EQUIPMENT AND BOXES IN REMODELED AREAS NOT REQUIRED TO REMAIN IN SERVICE WHEN THIS PROJECT IS COMPLETE.

1. REMOVE WIRE, CONDUITS AND BOXES FOR SUCH DEVICES BACK TO SOURCE. WHERE A CIRCUIT IS INTERRUPTED BY SUCH REMOVAL OF A DEVICE OR FIXTURE FROM THAT CIRCUIT, INSTALL WIRE AND CONDUIT AS REQUIRED TO RESTORE SERVICE TO THE REMAINING DEVICES AND FIXTURES ON THAT CIRCUIT.
2. WHERE THIS WORK WILL DISTURB AREAS NOT BEING RENOVATED, CONSULT WITH THE ARCHITECT BEFORE PERFORMING THE WORK.
3. LEAVE IN PLACE CONCEALED CONDUIT LOCATED IN PARTITIONS OR HARD CEILING NOT TO BE DEMOLISHED. REMOVE CONDUCTORS FROM SUCH CONDUITS. USE PERMANENT MARKER PENS TO LABEL SUCH CONDUITS AS "ABANDONED" AT EACH END, AND NOTE WHERE SUCH CONDUITS REEMERGE FROM THE CONCEALED AREA. CAP SUCH CONDUITS.
4. WHERE ELECTRICAL CIRCUITS, FEEDERS OR WIRING RUN THROUGH A SPACE TO BE DEMOLISHED, MAINTAIN THEM. REPAIR ANY DAMAGE CAUSED BY DEMOLITION OR CONSTRUCTION PERFORMED UNDER THIS CONTRACT.
5. WHERE ELECTRICAL CIRCUITS, FEEDERS OR WIRING RUNS SERVING OTHER AREAS ARE SERVED FROM THE SPACE TO BE DEMOLISHED, RECONNECT THEM TO OTHER SOURCES AS REQUIRED TO MAINTAIN SERVICE TO THE EXISTING DEVICES.

L. WHERE DRAWINGS INDICATE EXISTING ELECTRICAL EQUIPMENT OR DEVICES TO REMAIN IN SERVICE, OR TO BE RELOCATED AND/OR REUSED, REFURBISH THEM. THOROUGHLY CLEAN SUCH ITEMS AND NOTIFY ARCHITECT OF ANY DEFECTS IN SUCH INSTALLATIONS. REPAIR ANY EXISTING DAMAGE AND DAMAGE CAUSED BY DEMOLITION OR CONSTRUCTION PERFORMED UNDER THIS CONTRACT.

M. REMOVE EXISTING LUMINAIRES, SWITCHES, RECEPTACLES, AND OTHER ELECTRICAL EQUIPMENT AND DEVICES AND ASSOCIATED WIRING FROM WALLS, CEILINGS, FLOORS, AND OTHER SURFACES SCHEDULED FOR REMODELING, RELOCATION, OR DEMOLITION UNLESS SHOWN AS RETAINED OR RELOCATED ON DRAWINGS.

N. BEFORE DEMOLITION, OFFER REMOVED LUMINAIRES, WIRING DEVICES, PANELBOARDS AND EQUIPMENT TO THE OWNER IF THE OWNER CHOOSES TO RETAIN THESE ITEMS. CAREFULLY REMOVE AND RETURN SUCH ITEMS TO THE OWNER. REMOVE AND DISPOSE OF ITEMS REJECTED BY THE OWNER FROM THE PROJECT SITE AND IN A LEGAL MANNER.

O. ELECTRICAL CIRCUITS SHALL BE INTERRUPTED ONLY WITH PRIOR WRITTEN CONSENT. SUCH INTERRUPTIONS SHALL BE PRECEDED BY ALL POSSIBLE PREPARATIONS BY THE CONTRACTOR WHICH ARE NECESSARY TO KEEP THE ELECTRICAL CIRCUITS OFF FOR A MINIMUM PERIOD IN AN EXPEDITIOUS MANNER PURSUANT WITH GOOD WORKMANSHIP. THIS INCLUDES CIRCUIT TRACING TO IDENTIFY THE ELECTRICAL LOAD BEING SERVED AND THE ORIGIN OF THE CIRCUIT.

P. COORDINATE THE EXACT LOCATION OF EXISTING UTILITIES AND EQUIPMENT PRIOR TO COMMENCEMENT OF WORK. COMPENSATE THE OWNER FOR DAMAGES CAUSED BY THE FAILURE TO LOCATE AND PRESERVE UTILITIES. REPLACE DAMAGED ITEMS WITH NEW MATERIAL TO MATCH EXISTING.

Q. MAINTAIN ELECTRICAL CONTINUITY OF EXISTING SYSTEMS TO REMAIN. REMOVE OR RELOCATE ELECTRICAL BOXES, CONDUIT, WIRING, EQUIPMENT, LUMINAIRES, AND THE LIKE, AS REQUIRED IN REMOVED OR REMODELED AREAS IN THE EXISTING CONSTRUCTION AFFECTED BY THIS WORK.

R. REMOVE AND RESTORE WIRING WHICH SERVES USABLE EXISTING OUTLETS CLEAR OF THE CONSTRUCTION OR DEMOLITION.

S. IF EXISTING JUNCTION BOXES WILL BE MADE INACCESSIBLE, OR IF ABANDONED OUTLETS SERVE AS FEED THROUGH BOXES FOR OTHER EXISTING ELECTRICAL EQUIPMENT WHICH IS BEING RETAINED, PROVIDE NEW CONDUIT AND WIRE TO BYPASS THE ABANDONED OUTLETS.

T. IF EXISTING CONDUITS PASS THROUGH PARTITIONS OR CEILING WHICH ARE BEING REMOVED OR REMODELED, PROVIDE NEW CONDUIT AND WIRE TO REROUTE CLEAR OF THE CONSTRUCTION OR DEMOLITION AND MAINTAIN SERVICE TO THE EXISTING LOAD.

U. CONCEALED CONDUIT LOCATED IN CONCRETE WALLS OR HARDBOARD CEILING SPACES MAY BE ABANDONED IN PLACE. REMOVE CONDUCTORS AND TAG ABANDONED CONDUITS WITH CORRESPONDING SYSTEM AND TERMINATION POINT. CUT AND CAP ABANDONED CONDUIT. DO NOT EXTEND STUBS ABOVE FINISHED FLOOR.

V. PROVIDE TEMPORARY SUPPORT FOR ELECTRICAL SYSTEMS THAT REMAIN IN PLACE.

W. VERIFY EXACT LOCATION AND NUMBER OF EXISTING ELECTRICAL OUTLETS, ELECTRICAL DEVICES, LIGHTNG CONTROL DEVICES, AND LUMINAIRES IN THE FIELD. LOCATIONS OF ITEMS SHOWN ON DRAWINGS AS EXISTING ARE PARTIALLY BASED ON RECORD AND OTHER DRAWINGS WHICH MAY CONTAIN ERRORS. VERIFY THE ACCURACY OF THE INFORMATION SHOWN PRIOR TO BIDDING AND PROVIDE SUCH LABOR AND MATERIAL AS IS NECESSARY TO ACCOMPLISH THE INTENT OF THE CONTRACT DOCUMENTS.

X. REMOVE ABANDONED WIRING TO LEAVE SITE CLEAN.

Y. RECONNECT EXISTING LUMINAIRES NOT SHOWN ON DRAWINGS AND AFFECTED DUE TO DEMOLITION TO NEAREST AVAILABLE EXISTING LIGHTING CIRCUIT ABLE TO TAKE THE ADDITIONAL LOAD.

Z. ALL WORK ON SERVICE CONDUCTORS, FEEDERS, AND OTHER SUCH EQUIPMENT SHALL BE DONE ONLY WHEN SUCH CONDUCTORS, FEEDERS, AND EQUIPMENT ARE DE-ENERGIZED. THE CONTRACTOR SHALL HAVE AN "ELECTRICAL SAFETY AND LOCK-OUT/TAG-OUT PROCEDURE" IN PLACE PRIOR TO COMMENCEMENT OF WORK.

AA. EXTEND CIRCUITING AND DEVICES IN EXISTING WALLS TO BE FURRED OUT.

AB. FIELD VERIFY AND TRACE EXISTING CIRCUITS CURRENTLY SERVING "THE AREA OF DEMOLITION" ALL THE WAY TO THE EXISTING PANELBOARDS. PROVIDE UPDATED PANEL SCHEDULES AND DIRECTORIES THAT IDENTIFY EXISTING CIRCUITS AND NUMBER OF SPARE CIRCUITS AVAILABLE UPON COMPLETION OF DEMOLITION WORK.

AC. FIELD VERIFY THE ACTUAL LOCATIONS AND SIZES OF EXISTING CONDUITS AND WIRING.

AD. HOLES LEFT BY REMOVAL OF ELECTRICAL DEVICES, ETC SHALL BE PATCHED IN EXISTING WALLS. COORDINATE WITH ARCHITECTURAL DRAWINGS.

AE. ALL DEMOLITION WORK SHALL BE COORDINATED WITH THE ARCHITECT AND THE OTHER DISCIPLINES TO AVOID CONFLICT.

AF. THE WORK SHALL BE CAREFULLY LAID OUT IN ADVANCE WHERE CUTTING, CHANNELING CHASE, CHASING OR DRILLING OF WALLS, PARTITIONS, CEILINGS, SLABS OR OTHER SURFACES IS NECESSARY FOR THE PROPER INSTALLATION, SUPPORT OR ANCHORAGE OF THE CONDUIT, RACEWAY OR OTHER ELECTRICAL WORK. THIS WORK SHALL BE CAREFULLY DONE, AND ANY DAMAGE TO BUILDING, PIPING OR EQUIPMENT SHALL BE REPAIRED AT NO ADDITIONAL COST TO THE OWNER. PATCHING AND PAINTING SHALL BE DONE TO MATCH EXISTING SURFACES.

AG. ALL PENETRATIONS OF FIRE RATED PARTITIONS DUE TO THE REMOVAL OF ELECTRICAL SYSTEMS SHALL BE SEALED TO MAINTAIN THE FIRE RATINGS OF ANY EXISTING TO REMAIN WALLS

AH. DO NOT INSTALL ELECTRICAL BOXES IN ACOUSTIC RATED WALLS CLOSER THAN 2'-0" TO EACH OTHER. PROVIDE PUTTY PADS ON EACH BOX INSTALLED.

AI. PLANS DO NOT GENERALLY INDICATE WIRE COUNTS. FOR EACH 20 AMP, 120 VOLT OR 277 VOLT CIRCUIT, PROVIDE (1) #12 PHASE CONDUCTOR, (1) #12 NEUTRAL CONDUCTOR AND (1) #12 GROUNDING CONDUCTOR. WHERE MULTIPLE CIRCUITS ARE SHOWN, UP TO THREE SEPARATE AND DIFFERENTLY PHASED CIRCUITS (A, B AND C) SHARE A SINGLE NEUTRAL CONDUCTOR AND A SINGLE GROUNDING CONDUCTOR. WHERE DRAWINGS INDICATE WIRE SIZES/COUNTS, PROVIDE SUCH CIRCUIT, NEUTRAL AND GROUNDING CONDUCTORS FOR THE PORTION OF THE CIRCUIT WHERE SUCH CONDUCTORS SHARE A COMMON CONDUIT. GROUND WIRE INSULATION: GREEN. ALL WORK COMPLY WITH NEC 300.17.

AJ. ALL CONDUCTORS AND EQUIPMENT TO BE INSTALLED OR PERMANENTLY CONNECTED (HARDWIRED) MUST BE LISTED, LABELED OR CERTIFIED FOR ITS USE BY A NATIONALLY RECOGNIZED TESTING LABORATORY (NRTL) AS RECOGNIZED BY THE U.S. DEPARTMENT OF LABOR, OCCUPATIONAL SAFETY AND HEALTH ADMINISTRATION. [NEC 110.2]

AK. IN ALL CASES AND FOR ALL SYSTEMS AND COMPONENTS, USE ONLY EQUIPMENT IN ACCORDANCE WITH ITS LISTING OR LABELING. [NEC 110.3(B)]

AL. USE ONLY EQUIPMENT MARKED (LISTED/LABELED) AS SUITABLE FOR INSTALLATION AND WITH HIGHER TEMPERATURE RATED CONDUCTORS AT THE AMPACITY OF THE HIGHER RATED CONDUCTORS. REFER TO THE UL ELECTRICAL CONSTRUCTION MATERIAL DIRECTORY FOR CIRCUIT BREAKERS, SWITCHES, PANELBOARDS, SWITCHBOARDS, ETC. [NEC 110.14(C)]

AM. PROVIDE SUFFICIENT ACCESS AND WORKING CLEARANCE ABOUT THE ELECTRICAL EQUIPMENT IN ACCORDANCE WITH NEC 110.26(A).

AN. PROVIDE ACCESS AND ENTRANCES TO AND EGRESS FROM WORKING SPACE ABOUT ELECTRICAL EQUIPMENT IN ACCORDANCE WITH NEC 110.26(C).

AO. RECEPTACLES INSTALLED ON 15 AMP AND 20 AMP BRANCH CIRCUITS SHALL BE OF THE GROUNDING TYPE. GROUNDING-TYPE RECEPTACLES SHALL BE INSTALLED ONLY ON CIRCUITS OF THE VOLTAGE CLASS AND CURRENT FOR WHICH THEY ARE RATED. [NEC 406.3(A)]

AP. INSTALL ONLY RECEPTACLE OUTLETS WITH GROUND-FAULT CIRCUIT INTERRUPTER PROTECTION IN LOCATIONS SPECIFIED AS BATHROOMS, COMMERCIAL AND INSTITUTIONAL KITCHENS, ROOFTOPS AND OUTDOOR PUBLIC SPACES. SEE EXCEPTIONS. [NEC 210.8(B)]

AQ. PROVIDE OUTLET DEVICE(S) INSTALLED ON A BRANCH CIRCUIT WITH A RATING IN ACCORDANCE WITH NEC 210.21(B) (SEE EXCEPTIONS, AND REFER TO 210.21(B) TABLE(S)).

AR. FOR PVC CONDUIT, PROVIDE AN EQUIPMENT GROUNDING CONDUCTOR RUN WITH THE FEEDER CONDUCTORS AND SIZE PER NEC TABLE 250.122.

AS. OPENINGS AROUND ELECTRICAL PENETRATIONS THROUGH FIRE-RESISTANT-RATED WALLS, PARTITIONS, FLOORS, OR CEILINGS SHALL BE FIRESTOPPED USING APPROVED METHODS TO MAINTAIN THE FIRE RESISTANCE RATING. FIRE STOP MATERIAL SHALL BE TESTED AND ASSEMBLY-APPROVED BY THE OSHPD FIRE MARSHAL. [NEC 300.21]

AT. FOR PERMANENTLY CONNECTED APPLIANCES RATED OVER 300 VOLTAMPERES OR 1/8 HORSEPOWER, THE BRANCH-CIRCUIT SWITCH OR CIRCUIT BREAKER SHALL BE PERMITTED TO SERVE AS THE DISCONNECTING MEANS WHERE THE SWITCH OR CIRCUIT BREAKER IS WITHIN SIGHT FROM THE APPLIANCE OR IS CAPABLE OF BEING LOCKED IN THE OPEN POSITION. [NEC 422.31(B)]

AU. THE DISCONNECTING MEANS SHALL BE LOCATED IN SIGHT FROM THE CONTROLLER LOCATION. [NEC 430.102(A)]

AV. FOR 120 VOLT, 20 AMP CIRCUITS, WHERE CIRCUIT DISTANCE FROM PANELBOARD TO FARTHEST DEVICE/FIXTURE EXCEEDS 75 FEET, PROVIDE #10 SIZE CONDUCTOR.

AW. THE GOVERNING ELECTRICAL CODE IS THE 2017 NEC, ALSO KNOWN AS THE NATIONAL ELECTRICAL CODE.

AX. SEE OTHER NOTES AND REQUIREMENTS ON ALL DRAWINGS.

AY. REFER TO SPECIFICATIONS FOR ADDITIONAL REQUIREMENTS.

AZ. DRAWINGS AND SPECIFICATIONS COMPLIMENT EACH OTHER. REQUIREMENT BY EITHER INFERS REQUIREMENT BY BOTH.

BA. CONNECT EQUIPMENT AND DEVICES FURNISHED UNDER OTHER DIVISIONS OF THIS CONTRACT, BY OWNER OR BY OTHER CONTRACTS.

BB. UNLESS OTHERWISE NOTED, PROVIDE CONCEALED AND FLUSH MOUNTED INSTALLATION OF DEVICES AND EQUIPMENT IN AREAS.

BC. RUN ELECTRICAL CONDUIT CONCEALED AND PARALLEL TO BUILDING LINES. VERIFY WITH ENGINEER.

BD. RECEPTACLE OUTLETS SHALL COMPLY WITH NEC SECTION 210.7.

BE. LIGHTS, SWITCHES AND CONTROL MECHANISMS SHALL COMPLY WITH NEC SECTION 404.

BF. INSTALL COMPLETE SYSTEM OF CONDUCTORS IN RACEWAY SYSTEM THROUGHOUT BUILDING FOR FEEDERS, BRANCH CIRCUITS, ETC.

BG. SEISMIC BRACING POINTS SHALL BE SUBMITTED ON CONTRACTOR'S COORDINATED SHOP DRAWINGS.

BH. A COPY OF THE SELECTED BRACING SYSTEM(S)' INSTALLATION GUIDE/MANUAL SHALL BE PRESENT ON THE JOBSITE PRIOR TO STARTING THE INSTALLATION OF THE COMPONENT. EQUIPMENT HANGERS AND/OR BRACES. SUBMIT APPLICABLE DETAILS FOR REVIEW AND APPROVAL.

CITY AND COUNTY OF HONOLULU
2015 INTERNATIONAL ENERGY CONSERVATION CODE AS AMENDED

To the best of my knowledge, this project's design substanially conforms to the International Energy Conservation Code (IECC 2015 as amended) for electrical and lighting systems (Section C405 and C408):

COMPLIANCE METHOD

- ☒ 2015 IECC as amended. Mandatory & Prescriptive
- ☐ 2015 IECC as amended. Mandatory & Total Building Performance
- ☐ ASHRAE Standard 90.1-2013. Mandatory & Prescriptive
- ☐ ASHRAE Standard 90.1-2013. Mandatory & Energy Cost Budget

INFORMATION IN CONSTRUCTION DOCUMENTS	Yes	N/A
Interior Lighting		
Occupant sensor controls. C405.2.1	☐	☒
Time switch controls. C405.2.2	☐	☒
Daylight responsive controls. C405.2.3	☐	☒
Daylight zones on plans. C405.2.3.2 & C405.2.3.3	☐	☒
Guest room controls. C405.2.4	☐	☒
Interior lighting fixture schedule	☐	☒
Input power for interior lighting fixtures. C405.4.1	☐	☒
Interior lighting fixture locations	☐	☒
Lighting control functional performance testing requirement. C408.3	☐	☒
Exterior Lighting		
Exterior lighting controls. C405.2.5	☐	☒
Exterior lighting fixture schedule	☐	☒
Input power for exterior lighting fixtures	☐	☒
Exterior lighting fixture locations	☐	☒
Electrical		
Electrical transformer efficiency. C405.7	☐	☒
Tenant submetering. C405.10	☐	☒

NOTES

Signature: _____ Date: 04/09/2020
Name: SCOTT K. SATO
Title: PRINCIPAL
License No: 13509-E

ENFORCED CODES

BUILDING CODE: 2012 IBC
ELECTRICAL CODE: 2017
FIRE CODE: 2012 NFPA 1: UNIFORM FIRE CODE
ENERGY CODE: 2015 INTERNATIONAL ENERGY CONSERVATION CODE

SHEET INDEX

INTERFACE ENGINEERING
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SCOTT K. SATO — LICENSED PROFESSIONAL ENGINEER — 13509-E — HAWAII, U.S.A.

EXPIRES: 4/30/22

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MALUHIA - WALK-IN FREEZER REPLACEMENT

1027 HALA DRIVE
HONOLULU, HI 96817

SHEET TITLE
SYMBOL LIST, GENERAL NOTES AND SHEET INDEX - ELECTRICAL

REVISIONS

DRAWN BY: JF
CHECKED BY: SS
JOB NO.: 2020-0132
DATE: 04/09/2020
SHEET NUMBER: **E-001**

GENERAL SHEET NOTES

A. DRAWINGS INDICATE EXISTING CONDITIONS WHICH WERE TAKEN FROM RECORD DRAWINGS AND LIMITED FIELD OBSERVATIONS. THE ENGINEER ASSUMES NO RESPONSIBILITY FOR THE COMPLETENESS OR ACCURACY OF THESE CONDITIONS. CONTRACTOR TO FIELD VERIFY EXISTING CONDITIONS.

B. SEE SINGLE-LINE DIAGRAM FOR FEEDER SIZE.

C. SEE PANEL SCHEDULE ON SHEET E-501 FOR CIRCUITING INFORMATION.

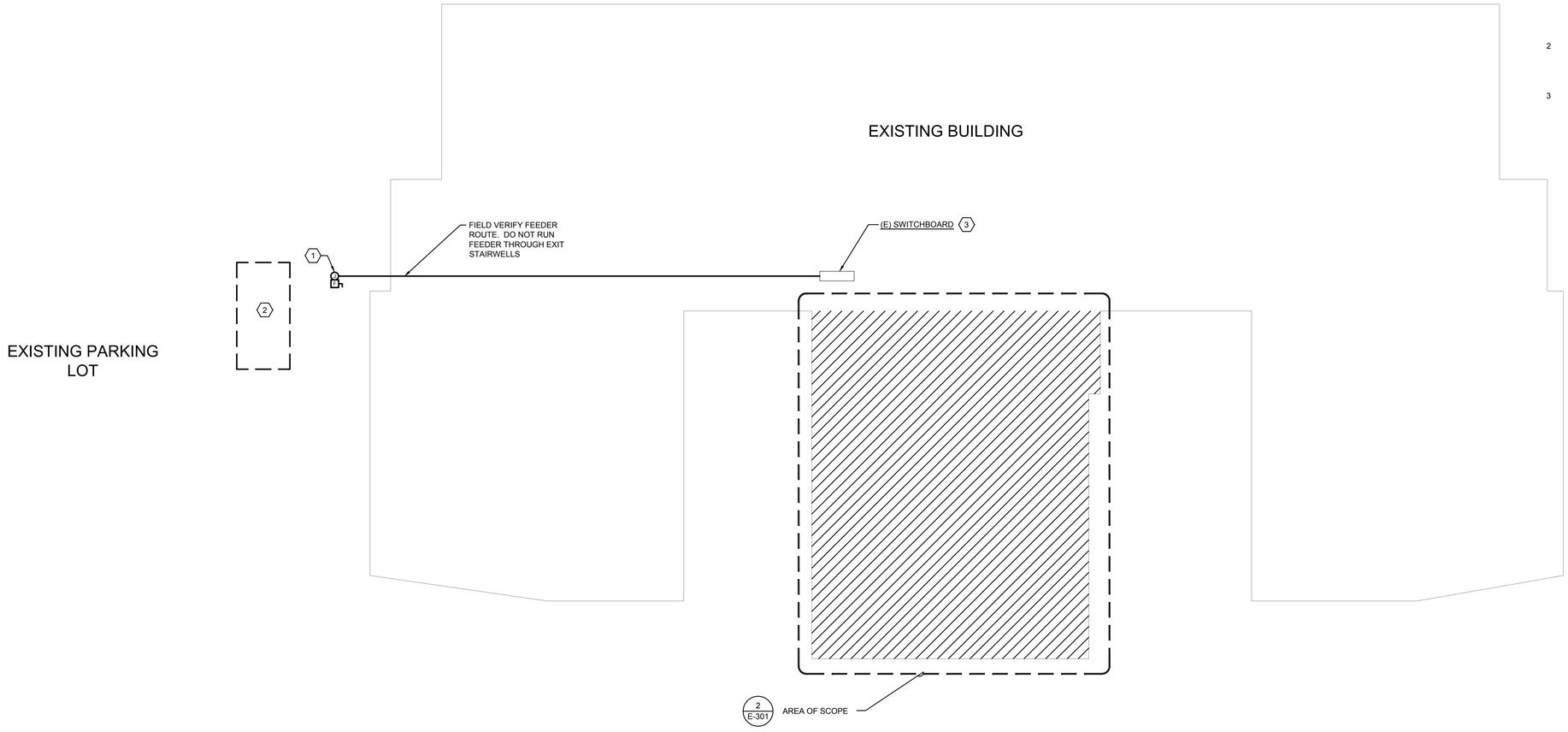
D. PROVIDE ALL CONCRETE CORING NECESSARY TO COMPLETE WORK. X-RAY SLABS AND DO NOT CUT REBARS.

⬡ SHEET KEYNOTES

1 PROVIDE FEEDER AND POWER CONNECTION TO SERVE TEMPORARY MOBILE WALK-IN FREEZER. PROVIDE 208V, 3PH, 30A POWER CONNECTION AND HOMERUN TO (E) SWITCHBAORD. PROVIDE RECEPTACLE OR OTHER CONNECTION TYPE NEEDED TO SERVE TEMPORARY FREEZER. VERIFY POWER REQUIREMENTS WITH FREEZER TO BE PROVIDED. COORDINATE EXACT LOCATION OF POWER CONNECTION WITH FINAL TEMPORARY WALK-IN FREEZER LOCATION.

2 PROVIDE TEMPORARY OUTDOOR FREEZER FOR USE BY THE FACILITY FOR THE DURATION OF CONSTRUCTION. COORDINATE LOCATION WITH OWNER. PROVIDE FREEZER OF SAME CAPACITY AS EXISTING WALK-IN FREEZER AT A MINIMUM.

3 REFER TO SINGLE-LINE DIAGRAM ON SHEET E-501 FOR CIRCUITING INFORMATION.



1 SITE PLAN - ELECTRICAL

0 8' 16' 32'

SCALE: 1/16"=1'-0"

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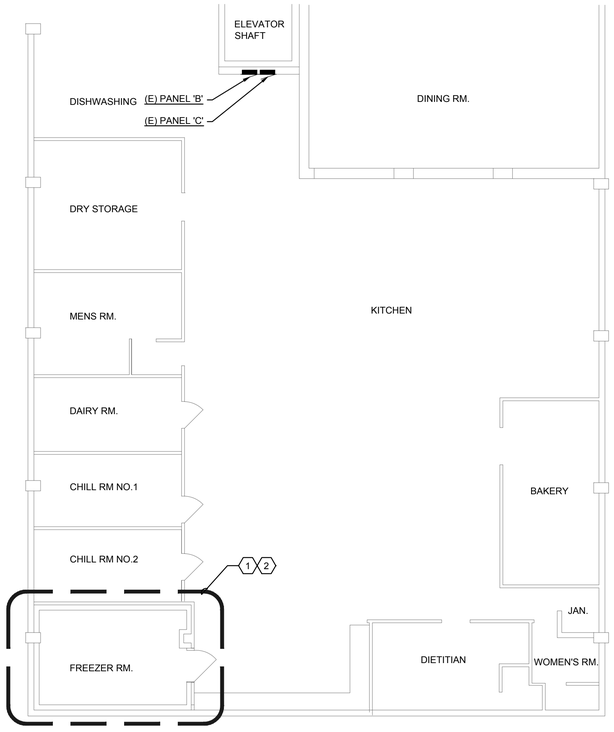
MALUHIA - WALK-IN FREEZER REPLACEMENT

1027 HALA DRIVE
HONOLULU, HI 96817

SHEET TITLE
SITE PLAN - ELECTRICAL

REVISIONS

DRAWN BY: JF
CHECKED BY: SS
JOB NO.: 2020-0132
DATE: 04/09/2020
SHEET NUMBER: **E-100**

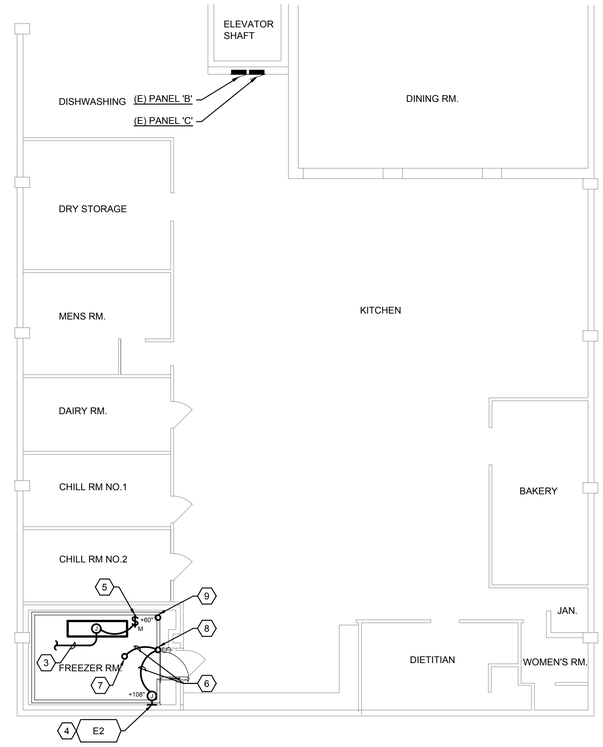


1 DEMOLITION FLOOR PLAN - ELECTRICAL

E-DEMO

0 4' 8' 16'

SCALE: 1/8"=1'-0"



2 FLOOR PLAN - ELECTRICAL

E-DEMO

0 4' 8' 16'

SCALE: 1/8"=1'-0"

GENERAL SHEET NOTES

A. DRAWINGS INDICATE EXISTING CONDITIONS WHICH WERE TAKEN FROM RECORD DRAWINGS AND LIMITED FIELD OBSERVATIONS. THE ENGINEER ASSUMES NO RESPONSIBILITY FOR THE COMPLETENESS OR ACCURACY OF THESE CONDITIONS. CONTRACTOR TO FIELD VERIFY EXISTING CONDITIONS.

B. TAKE CARE DURING DEMOLITION NOT TO DISTURB ANY SURFACES WHICH ARE TO REMAIN. PATCH SURFACES TO MATCH ADJACENT FINISH CONDITION IN ANY DAMAGED AREAS.

C. SEE KITCHEN EQUIPMENT CONNECTION SCHEDULE FOR MORE INFORMATION.

D. VERIFY EXACT REQUIREMENTS WITH FOOD SERVICE DRAWINGS PRIOR TO ROUGH-IN.

D. PROVIDE ALL CONCRETE CORING NECESSARY TO COMPLETE WORK. X-RAY SLABS AND DO NOT CUT REBARS.

SHEET KEYNOTES

1 DEMOLISH ALL ELECTRICAL EQUIPMENT AND DEVICES DEDICATED TO EXISTING WALK-IN FREEZER. DEMOLISH BRANCH CIRCUITS BACK TO SOURCE, UNLESS NOTED OTHERWISE. UPDATE ASSOCIATED PANEL SCHEDULE TO REFLECT DEMOLITION WORK.

2 RETAIN (1) EXISTING 120V/20A BRANCH CIRCUIT WIRING AND CONDUIT TO EXTEND TO NEW WALK-IN FREEZER CONNECTION.

3 PROVIDE 1" CONDUIT W/ (5) WIRES TO REFRIGERATOR SYSTEM (FREEZER). FOR DEFROST CONTROL, ELECTRICIAN SHALL COLOR CODE WIRES: 1 COMMON, 2 HEATERS, 1 FAN COIL, 1 TERMINATION. RUN FROM ROOF DOWN INTO CEILING SPACE.

4 EXTEND EXISTING 120V/20A BRANCH CIRCUIT WITHIN SPACE TO NEW WALK-IN FREEZER CONNECTION. UPDATE ASSOCIATED PANEL SCHEDULE. REPLACE ASSOCIATED EXISTING CIRCUIT BREAKER WITH 30mA GFEP CIRCUIT BREAKER AND MATCH EXISTING PANELBOARD RATINGS.

5 PROVIDE VAPORPROOF MANUAL MOTOR STARTER SWITCH WITH THERMAL OVERLOAD.

6 PROVIDE WIRING AS NECESSARY FOR POWER AND CONTROL BETWEEN WALK-IN FREEZER FACTORY INSTALLED ELECTRICAL DEVICES. REFER TO MANUFACTURER'S INSTALLATION MANUAL FOR MORE INFORMATION.

7 PROVIDE SEALANT, NIPPLE (PVC-SCHEDULE 80 CONDUIT), "EY" SEAL OFF, AND GASKETED CONNECTOR FOR CONNECTION TO LIGHT FIXTURE. REFER TO FOOD SERVICE DRAWINGS FOR MORE INFORMATION AND LOCATION.

8 PROVIDE SEALANT, NIPPLE (PVC-SCHEDULE 80 CONDUIT), AND "EY" SEAL OFF FOR CONNECTION TO DIGITAL THERM./ALARM AND AUTO LIGHT CONTROL. REFER TO FOOD SERVICE DRAWINGS FOR MORE INFORMATION AND LOCATION.

6 PROVIDE SEALANT, NIPPLE (PVC-SCHEDULE 80 CONDUIT), AND "EY" SEAL OFF FOR CONNECTION TO VACUUM VENT. REFER TO FOOD SERVICE DRAWINGS FOR MORE INFORMATION AND LOCATION.

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EXPIRES: 4/30/22

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MALUHIA - WALK-IN FREEZER REPLACEMENT

1027 HALA DRIVE
HONOLULU, HI 96817

SHEET TITLE

FLOOR PLAN - ELECTRICAL

REVISIONS

DRAWN BY: JF

CHECKED BY: SS

JOB NO.: 2020-0132

DATE: 04/09/2020

SHEET NUMBER

E-301

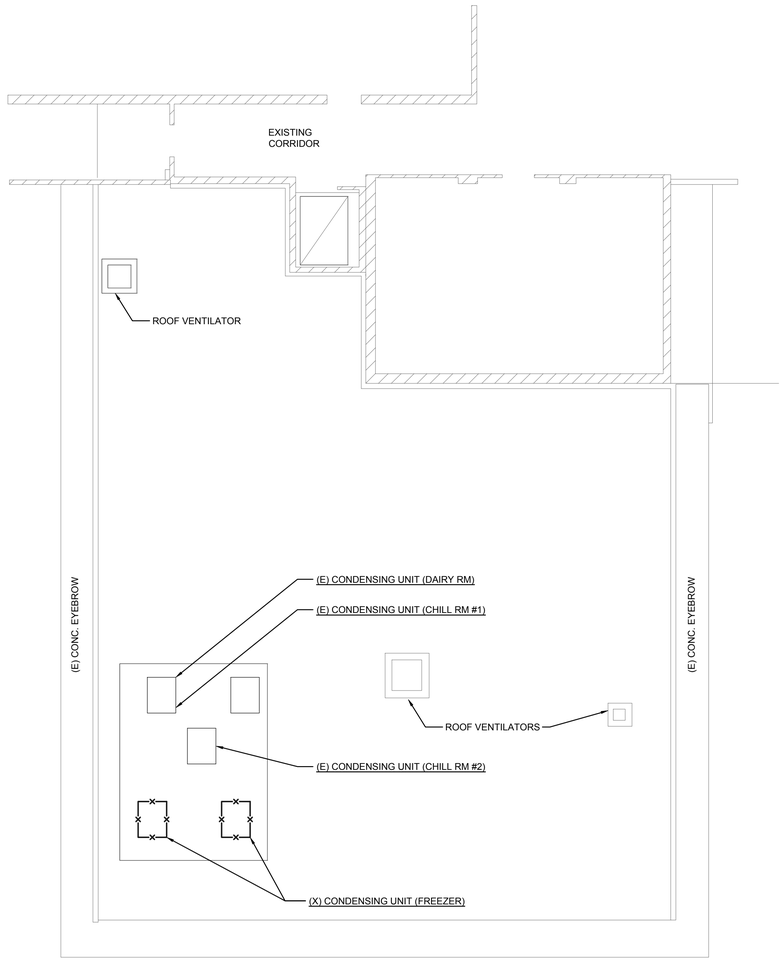
GENERAL SHEET NOTES

A. DRAWINGS INDICATE EXISTING CONDITIONS WHICH WERE TAKEN FROM RECORD DRAWINGS AND LIMITED FIELD OBSERVATIONS. THE ENGINEER ASSUMES NO RESPONSIBILITY FOR THE COMPLETENESS OR ACCURACY OF THESE CONDITIONS. CONTRACTOR TO FIELD VERIFY EXISTING CONDITIONS.

B. TAKE CARE DURING DEMOLITION NOT TO DISTURB ANY SURFACES WHICH ARE TO REMAIN. PATCH SURFACES TO MATCH ADJACENT FINISH CONDITION IN ANY DAMAGED AREAS.

C. SEE KITCHEN EQUIPMENT CONNECTION SCHEDULE FOR MORE INFORMATION.

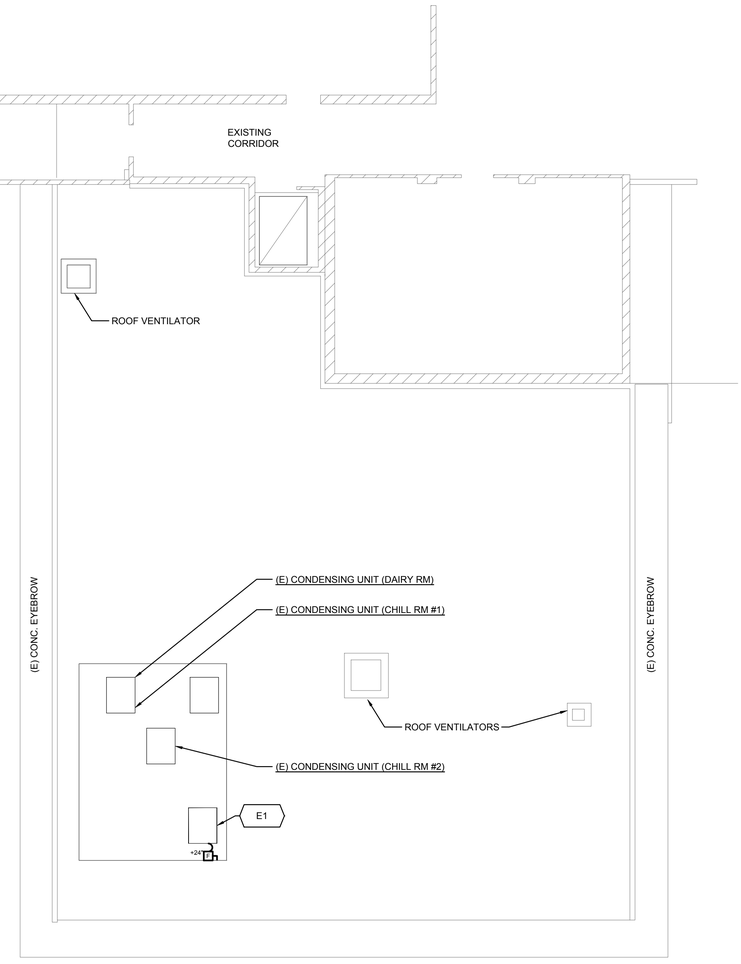
D. PROVIDE ALL CONCRETE CORING NECESSARY TO COMPLETE WORK. X-RAY SLABS AND DO NOT CUT REBARS.



1 DEMOLITION ROOF PLAN - ELECTRICAL

0 4' 8' 16'

SCALE: 1/8"=1'-0"



2 ROOF PLAN - ELECTRICAL

0 4' 8' 16'

SCALE: 1/8"=1'-0"

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MALUHIA - WALK-IN FREEZER REPLACEMENT

1027 HALA DRIVE
HONOLULU, HI 96817

SHEET TITLE

ROOF PLAN - ELECTRICAL

REVISIONS

DRAWN BY: JF

CHECKED BY: SS

JOB NO.: 2020-0132

DATE: 04/09/2020

SHEET NUMBER

E-302

2020-0132

Panel 'B'

120/208V, 3 Ph., 4 W.; 100A Bus with 100A Main Circuit Breaker Flush Mounted Panelboard with an Available Fault Current of 5000A RMS

Ckt. No.	Description / Location	Load (VA)	Type	C.B. A/Pole	Note	Ph.	Note	C.B. A/Pole	Load (VA)	Type	Description / Location	Ckt. No.
1	EVAPORATORS RM 5,6	1,200	M	20/1		A		20/1			SPARE	2
3	EVAPORATORS	1,200	M	20/1		B		20/1			SPARE	4
5	R (TOASTER)	3,000	K	40/2		C		20/2	1,500	K	HOT FOOD UNIT	6
7	---	3,000	K	-		A		-	1,500	K	---	8
9	R (TOASTER)	3,000	K	40/2		B		20/2	1,500	K	FOOD WARMER	10
11	---	3,000	K	-		C		-	1,500	K	---	12
13	R (FUTURE AC UNIT) RM 18	1,100	M	40/2		A		20/2			SPARE	14
15	---	1,100	M	-		B		-			---	16
17	R (SAW) 1-1/2/208/3	650	K	20/3		C		15/3	450	K	R (MIXER) 1/208/3	18
19	---	650	K	-		A		-	450	K	---	20
21	---	650	K	-		B		-	450	K	---	22
23	PFB					C	1	30/3	2,089	M	**WALK-IN FREEZER CU-E1**	24
25	---					A		-	2,089	M	**---**	26
27	---					B		-	2,089	M	**---**	28
29	PFB					C					PFB	30

Total Connected Load:	Ph. A	9,989 VA	83 Amps	Panel Connected Load:	32.2 KVA	89.3 Amps
Total Connected Load:	Ph. B	9,989 VA	83 Amps	Sub-Fed Connected Load:	0.0 KVA	0.0 Amps
Total Connected Load:	Ph. C	12,189 VA	101 Amps	**Total Demand Load:**	26.3 **KVA**	72.9 **Amps**

Notes:
1. Provide new breaker in existing space to match existing panelboard ratings.
2.
3.
4.
5.

Accessories:

KITCHEN EQUIPMENT CONNECTION SCHEDULE

ITEM	DESCRIPTION	VOLTS / PHASE	LOAD	WIRE / CONDUIT	CIRCUIT	NOTES
E1	REFRIGERATION SYSTEM	208/3	17.4 A	303	B-24,26,28.	1,2
E2	WALK-IN FREEZER ROOM	120/1	15.0 A	202	-	3,4

GENERAL KITCHEN EQUIPMENT CONNECTION SCHEDULE NOTES

A. REFER TO KITCHEN CONSULTANT DRAWINGS FOR EXACT LOCATIONS AND CONNECTION TYPES. COORDINATE CONNECTION WITH SUPPLIED EQUIPMENT AND VENDOR DRAWINGS.

KITCHEN EQUIPMENT CONNECTION SCHEDULE NOTES

1 REFRIGERATION SYSTEM LOCATED ON ROOF.

2 PROVIDE 1" CONDUIT W/ (5) WIRES TO REFRIGERATOR SYSTEM (FREEZER).FOR DEFROST CONTROL. ELECTRICIAN SHALL COLOR CODE WIRES: 1 COMMON, 2 HEATERS, 1 FAN COIL, 1 TERMINATION. RUN FROM ROOF DOWN INTO CEILING SPACE.

3 ELECTRICAL CONNECTION TO WALK-IN MISC. EQUIPMENT; LIGHTS, DOOR DEFROST HEATERS, DRAIN LINE HEATERS & TEMP. ALARM.

4 FIELD VERIFY EXISTING BRANCH CIRCUIT WITHIN EXISTING WALK-IN FREEZER SPACE. EXTEND AND INTERCEPT EXISTING CIRCUIT TO PROVIDE POWER FOR WALK-IN FREEZER ROOM.

WIRE / CONDUIT SCHEDULE

202 2 #12 CU, 1 #12 CU GND., IN 3/4" C.
303 3 #10 CU, 1 #10 CU GND., IN 3/4" C.

FEEDER SCHEDULE

Key

A, C, S, X — A = Aluminum; C = Conduit only; S = Service secondary; X = Separately derived system

202 — 2 #12 CU, 1 #12 CU GND., IN 3/4" C.

303 — 3 #10 CU, 1 #10 CU GND., IN 3/4" C.

303L — 3 #6 CU, 1 #10 CU GND., IN 1" C.

GENERAL SHEET NOTES

A. DRAWINGS INDICATE EXISTING CONDITIONS WHICH WERE TAKEN FROM RECORD DRAWINGS AND LIMITED FIELD OBSERVATIONS. THE ENGINEER ASSUMES NO RESPONSIBILITY FOR THE COMPLETENESS OR ACCURACY OF THESE CONDITIONS. CONTRACTOR TO FIELD VERIFY EXISTING CONDITIONS.

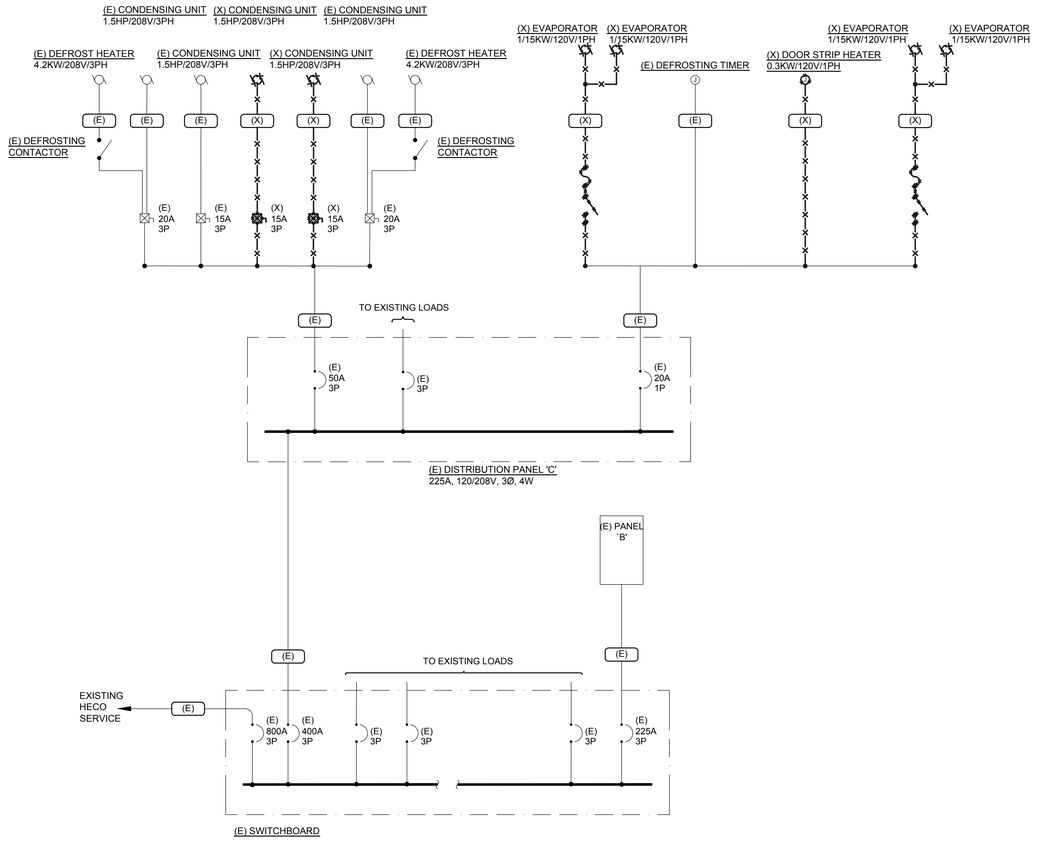
B. LOADS AND DESCRIPTIONS SHOWN ON EXISTING PANEL SCHEDULES ARE FROM AS-BUILT DRAWINGS AND SHOWN FOR REFERENCE ONLY. ITEMS BOLDED ON EXISTING PANEL SCHEDULES DESIGNATE NEW LOADS/DESCRIPTIONS. FIELD VERIFY EXISTING CONDITIONS AND UPDATE EXISTING PANEL SCHEDULE DIRECTORIES.

SHEET KEYNOTES

1 PROVIDE BRANCH-CIRCUIT SPLICE.

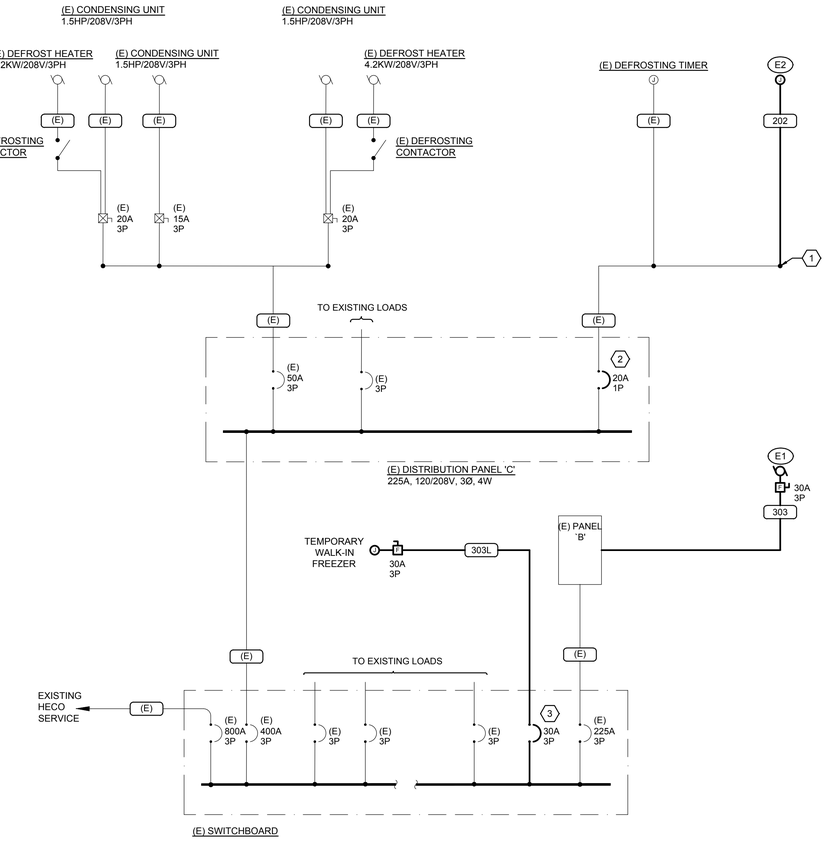
2 REPLACE ASSOCIATED EXISTING CIRCUIT BREAKER WITH 30MA GFEP CIRCUIT BREAKER AND MATCH EXISTING PANELBOARD RATINGS.

3 PROVIDE NEW CIRCUIT BREAKER IN EXISTING SWITCHBOARD MATCHING EXISTING RATINGS OR TAP BUS BARS AND PROVIDE FUSED DISCONNECT TO SERVE TEMPORARY FREEZER.



1 SINGLE LINE DIAGRAM - DEMOLITION

NO SCALE



2 SINGLE LINE DIAGRAM - NEW

NO SCALE

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MALUHIA - WALK-IN FREEZER REPLACEMENT

1027 HALA DRIVE HONOLULU, HI 96817

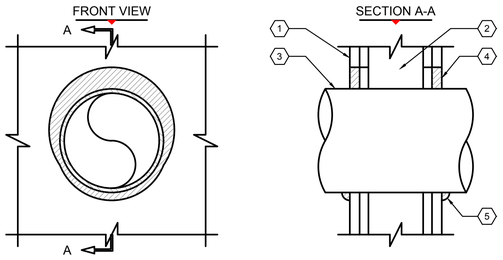
SHEET TITLE
SINGLE-LINE DIAGRAM - ELECTRICAL

REVISIONS

DRAWN BY: JF
CHECKED BY: SS
JOB NO.: 2020-0132
DATE: 04/09/2020
SHEET NUMBER: **E-501**

UL/cUL SYSTEM NO. W-L-1054

METAL PIPE THROUGH GYPSUM WALL ASSEMBLY
F-RATING = 1 AND 2-HOUR
T-RATING = 0-HOUR
L-RATING AT AMBIENT = LESS THAN 1CFM/SQFT
L-RATING AT 400 DEGREES FAHRENHEIT = 4 CFM/SQFT



NOTES

1. MAXIMUM DIAMETER OF OPENING:

   A. 32-1/4" FOR STEEL STUD WALLS.
   B. 14-1/2" FOR WOOD STUD WALLS.

2. ANNULAR SPACE = MINIMUM 0", MAXIMUM 2-1/4".

3. PIPE MAY BE INSTALLED WITH CONTINUOUS POINT OF CONTACT.

4. PIPE MAY BE INSTALLED AT AN ANGLE NOT GREATER THAN 45° FROM PERPENDICULAR.

DETAIL KEYNOTES

1 GYPSUM WALL ASSEMBLY (UL/ULC CLASSIFIED U300 OR U400 SERIES) (1-HR. OR 2-HR. FIRE-RATING) (2-HR. SHOWN).

2 STEEL STUDS TO BE MINIMUM 2-1/2" WIDE.

3 PENETRATING ITEM TO BE ONE OF THE FOLLOWING :

- A. MAXIMUM 30" DIAMETER STEEL PIPE (SCHEDULE 10 OR HEAVIER).
- B. MAXIMUM 30" DIAMETER CAST IRON PIPE.
- C. MAXIMUM 6" NOMINAL DIAMETER COPPER PIPE.
- D. MAXIMUM 6" NOMINAL DIAMETER STEEL CONDUIT.
- E. MAXIMUM 4" NOMINAL DIAMETER EMT.

4 MINIMUM 5/8" DEPTH HILTI FS-ONE INTUMESCENT FIRESTOP SEALANT.

5 MINIMUM 1/2" BEAD HILTI FS-ONE INTUMESCENT FIRESTOP SEALANT AT POINT OF CONTACT.

6 CONCRETE WALL ASSEMBLY (1-HR. OR 2-HR. FIRE-RATING):

- A. LIGHTWEIGHT OR NORMAL WEIGHT CONCRETE WALL (MIN. 3-3/4" THICK, FOR 1-HR. FIRE- RATING).
- B. LIGHTWEIGHT OR NORMAL WEIGHT CONCRETE WALL (MIN. 5" THICK, FOR 2-HR. FIRE-RATING).
- C. ANY UL/ULC CLASSIFIED CONCRETE BLOCK WALL.

7 PENETRATING ITEM TO BE ONE OF THE FOLLOWING :

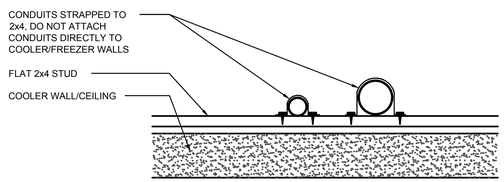
- A. MAXIMUM 4" DIAMETER STEEL PIPE (SCHEDULE 10 OR HEAVIER).
- B. MAXIMUM 4" DIAMETER CAST IRON PIPE.
- C. MAXIMUM 4" NOMINAL DIAMETER COPPER PIPE.
- D. MAXIMUM 4" NOMINAL DIAMETER STEEL CONDUIT.
- E. MAXIMUM 4" NOMINAL DIAMETER EMT.

8 MINIMUM 5/8" DEPTH HILTI CP 606 FLEXIBLE FIRESTOP SEALANT.

9 MINIMUM 1/2" BEAD HILTI CP 606 FLEXIBLE FIRESTOP SEALANT AT POINT OF CONTACT.

1 CONDUIT THROUGH WALL FIRESTOP ASSEMBLY DETAIL

NO SCALE

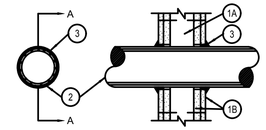


2 CONDUIT AT COOLER/FREEZER WALLS

NO SCALE

SYSTEM NO. WL1001

F RATINGS - 1,2,3, AND 4 HR (SEE ITEMS 2 AND 3)
T RATINGS - 0,1,2,3,AND 4 HR (SEE ITEM 3)



SECTION A-A

1. **WALL ASSEMBLY** - THE 1, 2, 3 OR 4 HR FIRE-RATED GYPSUM WALLBOARD/STUD WALL ASSEMBLY SHALL BE CONSTRUCTED OF THE MATERIALS AND IN THE MANNER DESCRIBED IN THE INDIVIDUAL U300 OR U400 SERIES WALL OR PARTITION DESIGNS IN THE UL FIRE RESISTANCE DIRECTORY AND SHALL INCLUDE THE FOLLOWING CONSTRUCTION FEATURES:

   A. **STUDS** - WALL FRAMING MAY CONSIST OF EITHER WOOD STUDS (MAX. 2HR FIRE RATED ASSEMBLIES) OR STEEL CHANNEL STUDS. WOOD STUDS TO CONSIST OF NOM. 2 BY 4 IN. LUMBER SPACED 16 IN. OC WITH NOM. 2 BY 4 IN. LUMBER END PLATES AND CROSS BRACES. STEEL STUDS TO BE MIN. 3-5/8 IN. WIDE BY 1-3/8 IN. DEEP CHANNELS SPACED MAX. 24 IN. OC.

   B. **WALLBOARD, GYPSUM*** - NOM. 1/2 OR 5/8 IN. THICK, 4 FT. WIDE WITH SQUARE OR TAPERED EDGES. THE GYPSUM WALLBOARD TYPE, THICKNESS, NUMBER OF LAYERS, FASTENER TYPE AND SHEET ORIENTATION SHALL BE AS SPECIFIED IN THE INDIVIDUAL U300 OR U400 SERIES DESIGN IN THE UL FIRE RESISTANCE DIRECTORY. MAX DIAM OF OPENING IS 13-1/2 IN.

2. PIPE OR CONDUIT - NOM 12 IN. DIAM (OR SMALLER) SCHEDULE 10 (OR HEAVIER) STEEL PIPE, NOM 6 IN. DIAM (OR SMALLER) STEEL CONDUIT, NOM 4 IN. DIAM (OR SMALLER) STEEL ELECTRICAL METALLIC TUBING OR TYPE L OR (OR HEAVIER) COPPER TUBING OR NOM 1 IN. DIAM (OR SMALLER) FLEXIBLE STEEL CONDUIT. **WHEN COPPER PIPE OR FLEXIBLE STEEL CONDUIT IS USED, MAX F RATING OF FIRESTOP SYSTEM (ITEM 3) IS 2 HR.** STEEL PIPES OR CONDUITS LARGER THAN NOM 4 IN. DIAM MAY ONLY BE USED IN WALLS CONSTRUCTED USING STEEL CHANNEL STUDS. A MAX OF ONE PIPE OR CONDUIT IS PERMITTED IN THE FIRESTOP SYSTEM. PIPE OR CONDUIT TO BE INSTALLED NEAR CENTER OF STUD CAVITY WIDTH AND TO BE RIGIDLY SUPPORTED ON BOTH SIDES OF WALL ASSEMBLY.

3. **FILL, VOID OR CAVITY MATERIAL - CAULK** -- CAULK FILL MATERIAL INSTALLED TO COMPLETELY FILL ANNULAR SPACE BETWEEN PIPE OR CONDUIT AND GYPSUM WALLBOARD AND WITH A MIN 1/4 IN. DIAM BEAD OF CAULK APPLIED TO PERIMETER OF PIPE OR CONDUIT AT ITS EGRESS FROM THE WALL. CAULK INSTALLED SYMMETRICALLY ON BOTH SIDES OF WALL ASSEMBLY. THE HOURLY F RATING OF THE FIRESTOP SYSTEM IS DEPENDENT UPON THE HOURLY FIRE RATING OF THE WALL ASSEMBLY IN WHICH IT IS INSTALLED, AS SHOWN IN THE FOLLOWING TABLE. THE HOURLY T RATING OF THE FIRESTOP SYSTEM IS DEPENDENT UPON THE TYPE OR SIZE OF THE PIPE OR CONDUIT AND THE HOURLY RATING OF THE WALL ASSEMBLY IN WHICH IT IS INSTALLED, AS TABULATED BELOW:

MAX PIPE OR CONDUIT DIAM, IN.	ANNULAR SPACE IN.	F RATING, HR.	T RATING, HR.
1	0 TO 3/16	1 OR 2	0+, 1 OR 2
1	1/4 TO 1/2	3 OR 4	3 OR 4
4	0 TO 1/4	1 OR 2	0
6	1/4 TO 1/2	3 OR 4	0
12	3/16 TO 3/8	1 OR 2	0

+ WHEN COPPER PIPE IS USED, T RATING IS 0 HR.

MINNESOTA MINING & MFG. CO. CAULK MATERIAL AND ASSEMBLY - SHALL BE APPROVED BY OSHPD FIRE MARSHAL.

* BEARING THE UL CLASSIFICATION MARKING

3 ONE-HOUR FIRE-RATED PARTITION CONDUIT PENETRATION DETAIL

NO SCALE

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EXPIRES: 4/30/22

THIS WORK WAS PREPARED BY ME OR UNDER MY SUPERVISION AND CONSTRUCTION OF THIS PROJECT WILL BE UNDER MY OBSERVATION. "SUPERVISION OF CONSTRUCTION" AS DEFINED UNDER SECTION 16-82-2 OF CHAPTER 82; RULES OF THE BOARD OF PROFESSIONAL ENGINEERS, ARCHITECTS AND LAND SURVEYORS: STATE OF HAWAII.)

MALUHIA - WALK-IN FREEZER REPLACEMENT

1027 HALA DRIVE HONOLULU, HI 96817

SHEET TITLE

DETAILS - ELECTRICAL

REVISIONS

DRAWN BY: JF
CHECKED BY: SS
JOB NO.: 2020-0132
DATE: 04/09/2020
SHEET NUMBER

E-701