

MAUI REDEVELOPMENT AGENCY (MRA)
COUNTY OF MAUI – DEPARTMENT OF PLANNING

WAILUKU CIVIC COMPLEX PHASE 1B

PROJECT MANUAL

100% FINAL DESIGN SUBMITTAL
JULY 25, 2019



FERRARO CHOI

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NOTICE TO BIDDERS

PURSUANT TO CHAPTER 103D, HRS, SEALED BIDS shall be received up to and be publicly opened and read aloud at **2:00 pm on August 29, 2019**, by the Bid Receiver, Purchasing Division, Department of Finance at 2145 Wells Street, Suite 104, Wailuku, Maui, Hawaii, 96793, and shall be labeled:

WAILUKU CIVIC COMPLEX PHASE 1B
Project No. PL 17-01

The work includes the furnishing of all labor, tools, materials, and equipment necessary to construct in place complete, a new WAILUKU CIVIC CENTER PHASE 1B, WAILUKU, MAUI, Hawaii.

A pre-bid meeting will be conducted for the project. Attendance strongly recommended for bidders. Interested parties are to meet at

9:00 A.M. ON AUGUST 9, 2019

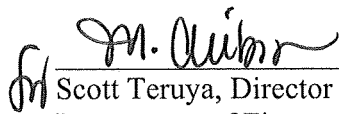
on the 9th floor conference room in Kalana O Maui, 200 S. High St., Wailuku, Maui, Hawaii.

Bidders shall be licensed in accordance with Chapter 444, HRS, relating to the licensing of contractors.

Please note that we are transitioning our construction bid notification to Public Purchase, a web based e-procurement system. In order to be able to view and download the bid specifications and plans for this procurement, you will need to follow the instructions on the following link: <http://www.co.maui.hi.us/DocumentCenter/View/91025>
The registration link is: <https://www.publicpurchase.com/gems/register/vendor/register>.

No bid proposal will be considered unless accompanied by an acceptable form of bid security in an amount equal to at least five percent (5%) of the total bid amount.

The County reserves the right to reject any or all bids and waive any defects if it believes the rejection or waiver is in the best interest of the County.



Scott Teruya, Director
Department of Finance

INSTRUCTIONS TO BIDDERS

1. SCOPE OF WORK

The Contractor shall supply, furnish, and pay for all labor, transportation, materials, tools, and equipment necessary to construct, in place complete, all work as shown and called for in the contract documents.

The Wailuku Civic Complex will be developed in three phases: Phase 1A is comprised of off-site infrastructure improvements along Church, Vineyard, and Main Street and will be bid and contracted separately; Phase 1B is comprised of the parking garage and on-site improvements contained within these bid documents and will be performed concurrently with Phase 1A.

Successful bidders will take into account the complexity of this phase in conjunction with the ongoing Phase 1A construction and take steps to plan for the time and expertise necessary to keep the project moving smoothly. It is important for bidders to be aware of the multitude of stakeholders being impacted by this work and expectation of the County that stakeholders will be adequately informed and appropriately accommodated. Successful bidders will take into account the indirect costs associated with maintaining access to businesses and residents throughout the construction project.

The work generally consists of the furnishing of labor, materials, tools, transportation, and equipment necessary to construct in place complete, a four-story approximately 151,130 square foot parking garage including parking for 428 cars, Central Staircase, Promenade Stairs, elevators, solar canopy, Security Room, and storage rooms. Site improvements include pedestrian walkways and vehicular driveways along Road A and Pili Street, on-grade parking for approximately 11 cars at the First Hawaiian Bank parking lot, and improvements to the future Phase 2 site area. Site work includes clearing, grubbing, and demolition of the existing Municipal Parking Lot, First Hawaiian Bank parking lot [TMK: (2) 3-4-013: 097], One Medical Plaza Building property [TMK: (2) 3-4-013: 051], and former Armstrong Homes lot [TMK: (2) 3-4-013: 060]. Site work shall also include grading, retaining walls, site utilities, AC paving, concrete and precast concrete paving, landscape irrigation, landscaping, site lighting.

2. GENERAL REQUIREMENTS

The Bidder shall comply with the General Terms and Conditions, which are attached hereto, unless otherwise specified herein. Bidders shall refer to Section 2 – Bidding Instructions of the General Terms and Conditions.

3. DEPARTMENT OF MANAGEMENT CONTACT INFORMATION

Bidders shall contact the person listed below for information regarding this solicitation:

Alan Murata, Project Engineer
Dept of Management, County of Maui
200 S. High St., Wailuku, HI 96793
Phone: (808) 270-5534
email: alan.murata@co.maui.hi.us

4. PRE-BID MEETING

Bidders shall refer to the Notice to Bidders for time and date of pre-bid conference.

5. BID SECURITY

The County will not consider a bid proposal unless accompanied by bid security in an amount not less than five percent (5%) of the amount bid. [§103D-323, HRS].

If providing a bid bond, bidders shall refer to Subsection 2.14 Bid Security of the General Terms and Conditions for requirements in providing a bid bond. A copy of the bid bond form is attached hereto. Bidder may also use the 6/21/2007 versions of the state approved bid, which can be found at the following link: <http://www4.hawaii.gov/StateForms/SPOInt/ShowInternal.cfm>

6. PROPOSAL FORMS

Bid proposal forms are included in the project plans and specs. Papers bound with or attached to the proposal form are part of the proposal. The bidder shall not detach or alter these papers when submitting its bid. The bidder shall also consider other documents, including the plans and specifications, a part of the proposal form whether attached or not. Bidders shall refer to Subsection 2.02 – Proposal Forms of the General Terms and Conditions.

7. TIME-STAMPING OF BIDS

Bids received by the Bid Receiver shall be time stamped indicating date and time of receipt of bid. Bid proposals mailed and postmarked earlier than deadline for receipt of bids, but received by the Bid Receiver later than the deadline for receipt of bids shall be rejected. Bid proposals received and time stamped earlier at another department or location other than the Bid Receiver, then received by the Bid Receiver later than the deadline for receipt of bids shall also be rejected. Faxed bids will not be accepted.

8. CONTRACTOR'S LICENSE

Bidder shall be solely responsible to assure that all the specialty licenses required to perform the work are covered by the Bidder, its Subcontractor(s) or Joint Contractors.

Contractor and Subcontractor Licensing Verification Procedure

- A. Bidders must list not only their subcontractor's name, but also a valid license number as indicated on the DCCA contractor's licensing website at (<http://pvl.ehawaii.gov/pvlsearch/app>).
- B. The county project engineer will verify the licenses of the contractor and all of the listed subcontractors on the State Website at (<http://pvl.ehawaii.gov/pvlsearch/app>), after bid opening and no later than the end of that workday. They will also print out the license status for the contractor and each subcontractor listed and keep them in their bid file.
- C. The Purchasing Division will also verify the licenses of the 2nd and 3rd contractor and their subcontractor in case the low bidder does not end up with the contract. If, for whatever reason, a contract is not awarded to one of the 3 lowest bidders, the Purchasing Division will check the licenses of the other bidders, on a later date, and that verification date will be at the sole discretion of the Purchasing Division.
- D. If a subcontractor is listed, and the license number is listed but not listed accurately, or numbers are transposed, etc., the Purchasing Division will have the sole discretion to accept or reject that contractor or subcontractor license based on our ability to quickly locate that license number on the state website using the license holder name, dba name, or any other information available.

- E. If the state contractor's licensing website is unavailable after the bid opening, or if the County of Maui Internet service is down, etc., the County of Maui has the sole discretion to verify licenses as soon as possible.

9. JOINT CONTRACTORS/SUBCONTRACTORS

Under HRS Chapter 103D-302, the Contractor is required to list the names of persons or firms to be engaged by the Contractor as a subcontractor or joint contractor in the performance of the contract. Bids that do not comply with the above requirements may be accepted if acceptance is in the best interest of the County and the value of the work to be performed by the subcontractor or joint contractor is equal to or less than one percent of the total bid amount.

10. VERIFICATION OF SITE CONDITIONS

Bidders are responsible to notify the contact person, in writing, of any discrepancies found between the various parts of the bid documents and between the bid documents and the field conditions. Bidders shall comply with Subsection 2.07 – Examination of the Bid Documents and Project Site, and Conducting Investigations of the General Terms and Conditions.

The Contractor shall examine carefully the project site to become familiar with the conditions to be encountered in performing the work and the requirements of the contract documents. The Contractor shall be charged with knowledge of all conditions at the site that may affect the work, including the storage of materials and equipment and access thereto, that would normally be discovered by a reasonable pre-bid site inspection.

When the contract drawings include a log of test borings showing a record of the data obtained by the County's investigation of subsurface conditions, said log represents only the finding of the County as to the character of material encountered in its test borings and only at the location of each boring. Underground site conditions in Hawaii vary widely. Accordingly, there is no warranty, either expressed or implied, that the conditions indicated are representative of those existing throughout the work or any part of it, or that other conditions may not occur.

Subsurface information or hydrographic survey data furnished are for the bidders' convenience only. Information and data furnished are the product of the Department's interpretation gathered in investigations made at specific locations. These conditions may not be typical of conditions at other locations within the project area or that such conditions remain unchanged. Also, conditions found at the time of the subsurface explorations may not be the same conditions when work starts. The bidder shall be solely responsible for assumptions, deductions, or conclusions the bidder may derive from the subsurface information or data furnished.

11. CLARIFICATION OF BID DOCUMENTS

Bidders shall refer to Subsection 2.10 – Clarification of Bid Documents of the General Terms and Conditions.

Clarification request shall be submitted in writing to:

Alan Murata, Project Engineer
Dept of Management, County of Maui
200 S. High St., Wailuku, HI 96793
Phone: (808) 270-5534
email: alan.murata@co.maui.hi.us

Clarification requests shall be submitted not less than ten (10) calendar days prior to the day designated for opening of bids. If a clarification is in order, it will be issued in the form of an addenda.

12. SUBSTITUTION OF MATERIALS AND EQUIPMENT BEFORE BID OPENING

Bidders shall refer to Subsection 2.16 – Substitution of Materials and Equipment of the General Terms and Conditions. Unless a substitution of material or equipment is approved by addenda, bids shall be based on materials and equipment specified in the bid documents,

13. ADDENDA

No addendum will be issued during the 5 days immediately preceding the day designed for the opening of bids. Bidders shall refer to Subsection 2.11 – Addenda of the General Terms and Conditions.

14. CONTRACT TIME

The time of completion shall be within 480 consecutive calendar days from the Notice to Proceed. Overtime to complete the work shall be the responsibility of the Contractor.

15. AWARD OF CONTRACT

A written notice of award of a contract will be made by the County within three hundred (300) days after the opening of the bids. Said notice shall not be construed to be authorization to proceed with the performance of services under the contract. Any services performed by the Contractor prior to the date indicated in the Notice to Proceed from the County shall be at the Contractor's own risk.

The bid price shall be firm for a minimum of three hundred (300) days from bid opening date to allow for contract execution.

The Bidder shall refer to Subsection 3 – Award and Execution of Contract of the General Terms and Conditions.

16. TAX CLEARANCE, DLIR CERTIFICATE OF COMPLIANCE, AND DCCA CERTIFICATE OF GOOD STANDING

The successful bidder, upon award of a contract, shall demonstrate compliance with Chapter 103D-310(c), HRS, by providing the following documents:

- A. **TAX CLEARANCE.** An original or certified copy of a tax clearance (Form A-6) issued by the Hawaii State Department of Taxation (DOTAX) and the Internal Revenue Service (IRS).
- B. **DLIR CERTIFICATE OF COMPLIANCE.** A certificate of compliance (DLIR Form LIR#27) issued by the Department of Labor and Industrial Relations stating that the contractor complies with Chapters 383, 386, 392 and 393, HRS, current within six (6) months of issuance date.
- C. **DCCA CERTIFICATE OF GOOD STANDING.** A certificate of good standing from the Business Registration Division of the Department of Commerce and Consumer Affairs (DCCA), current within six (6) months of issuance date.

In lieu of the documents referenced above, the bidder may make available proof of compliance by providing certification document issued by the "Hawaii Compliance Express" website,

<http://vendors.hawaii.gov/hce/splash/welcome.html>.

17. CANCELLATION OF AWARD

The County reserves the right to cancel the award of contract before the contract is executed by all parties and the Director of Finance certifies the availability of funds. There will be no liability to the awardee and any other bidders due to the cancellation of the award of contract.

18. PREVAILING WAGES

The contractor shall comply with the schedule of wage rates published by the State of Hawaii Department of Labor and Industrial Relations (DLIR) recognized by the Director of Labor and Industrial Relations to be prevailing on public construction work for the purposes of Chapter 104, Hawaii Revised Statutes. The schedule of wage rates is applicable only to those laborers and mechanics employed at the site of work.

The wage rate schedules are issued on or about February 15 and September 15 of each year. Whenever the Director determines that the prevailing wage has increased as shown in the wage rate schedule, the contractor must increase the wages accordingly during the performance of the contract. Addenda or additional wage rate schedules will be posted on the DLIR website at the weblink:
<http://hawaii.gov/labor/rs/WRS/WRS.htm>.

19. HAWAII PRODUCTS PREFERENCE

The Hawaii Products Preference pursuant to Act 175, SLH 2009 is applicable to this project. The current Hawaii products list is available on the SPO website at <http://hawaii.gov/spo/hawaii-public-procurement-code-chapter-103d-hrs/preferences>. To access the list, click on the “Hawaii Products” link.

Bidders offering a Hawaii Product shall identify the product on the Hawaii Products Preference Schedule included in the bid proposal, which a sample is provided below. Any person desiring a Hawaii product preference shall have the product(s) certified and qualified if not currently on the Hawaii products list, prior to the deadline for receipt of offer(s) specified in the procurement notice and solicitation.

DESIGNATION OF APPROVED HAWAII PRODUCTS TO BE USED					
Product Category	Product Subcategory as applicable	Manufacturer	Cost (a)*	% (b)**	Credit (a) x (b)
*Cost FOB Jobsite, Unloaded Including Applicable General Excise & Use Taxes. **Ten (10%) percent for Class I, Fifteen (15%) percent for Class II			TOTAL =		

Persons wishing to certify and qualify a product not currently listed as a Hawaii Product shall submit a Certification for Hawaii Product Preference (form SPO-38) to the Purchasing Division, at the address below, no later than ten (10) calendar days before the bid opening. Late submittals for this solicitation will not be reviewed by the County.

Purchasing Division
County of Maui
2145 Wells Street, Suite 104
Wailuku HI. 96793
Attn: Purchasing Administrator

For each product being requested, one form shall be completed and submitted (i.e. 3 products should have 3 separate forms completed). The form is available on the State Procurement Office (SPO) webpage at <http://www4.hawaii.gov/StateForms/ShowForm/cfm?ID=SP>. To access the form, click on the “SPO-38” link to download the form. The responsibility for certification and qualification shall rest upon the person requesting the preference.

When a solicitation contains both Hawaii products and non-hawaii products, then for the purpose of selecting the lowest bid or purchase price only, the price offered for a Hawaii product item shall be decreased by subtracting 10% for the class I or 15% for the class II Hawaii product offered, respectively. The lowest total offer, taking the preference into consideration, shall be awarded the contract unless the offer provides for additional award criteria. The contract amount of any contract awarded, however, shall be the amount of the price offered, exclusive of the preferences.

Change in Availability of Hawaii product. In the event of any change that materially alters the bidder’s ability to supply Hawaii products, the bidder shall immediately notify the Purchasing Division, at the address above, in writing and the parties shall enter into discussions for the purposes of revising the contract or terminating the contract for convenience.

Bidders are encouraged to review Section 103D-1002, HRS, as amended by Act 175, Session Laws of Hawaii 2009.

20. HEALTH AND SAFETY PROGRAMS

Prior to award of a contract, the successful bidder, shall demonstrate compliance with Chapter 396-18, HRS, by providing a signed certification that a written safety and health plan for the project will be available and implemented by the “Notice to Proceed” date.

21. CAMPAIGN CONTRIBUTIONS

Contractors are hereby notified of the applicability of Section 11-205.5 HRS, which states that campaign contributions are prohibited from specified County government contractors during the term of the contract if the contractors are paid with funds appropriated by a legislative body.

22. APPRENTICESHIP PROGRAM (ACT 17, SLH 2009)

Bidders with apprenticeship programs that are registered with the State of Hawaii Department of Labor and Industrial Relations may apply for a preference of 5% for this project in which the County of Maui estimates that the project will be \$250,000.00 or more.

Details and procedures shall be in accordance with the State of Hawaii Comptroller’s Memorandum No. 2010-29, which can be found at the following link:
<http://hawaii.gov/dags/cm/memo/CM2010-29.pdf>.

Bidders applying for preference under Act 17, SLH 2009 - Apprenticeship Program shall attach a completed CERTIFICATION OF BIDDER’S PARTICIPATION IN APPROVED APPRENTICESHIP PROGRAM UNDER ACT 17 (FORM 1) prepared by the State Department of Labor and Industrial Relations.

23. EMPLOYMENT OF STATE RESIDENTS ON CONSTRUCTION CONTRACTS (ACT 68, SB 2840)

Bidders are advised of the applicability of Act 68, SB 2840 - Employment of State Residents on Construction Procurement Contracts, (2010) (“Act 68”). Act 68 requires the awarded contractor to ensure that Hawaii Residents (as defined in the Act) compose not less than eighty percent of the workforce employed to perform the contract. This requirement shall also apply to subcontracts of \$50,000 or more in connection with any construction contract procured under HRS Chapter 103D, but does not apply to procurements made pursuant to HRS Chapter 103D-304 (professional services), HRS Chapter 103D-305 (small purchases) or if there is a conflict with any federal law.

END OF SECTION

PRE-BID SUBSTITUTION REQUEST FORM
(To be submitted with each copy of request)

TO: Alan Murata, Project Engineer
Department of Management
200 S High Street
Wailuku, Maui, Hawaii 96793

Date: _____
(not less than 10 day prior to bid date)

SPECIFIED ITEM SECTION NO. PARAGRAPH

PROPOSED SUBSTITUTE: _____

- 1. Attach complete description, designation, catalog or model number, data sheets, other technical data, laboratory tests and samples if applicable.
- 2. Submit full information on both requested substitution and specified product for evaluation of proposed substitution. Also provide a list of all variant characteristics from specified item.
- 3. Attach a letter certifying that the substitution requested is equal or better than the specified product signed by the Contractor and Supplier.

Incomplete request submittals may be rejected.
Proposer to initial in box at left of each item above to verify complete submittal.

State below why substitution should be considered for this project and indicate in detail how substitution will affect guarantees and other trades, products, dimensions, etc. (attach additional pages as required to thoroughly describe any change to project). Use of acceptable substitutions is subject to the requirements of the General Conditions and all applicable sections of the specifications. **No substitution requests will be accepted less than 10 days prior to the bid date.**

CONTRACTOR'S REVIEW/COMMENTS
Remarks: _____

SUBMITTED BY: _____

Contractor: _____

Firm _____

Address _____

By: _____
Date

State Zip Code Tel.

Signature Date

ARCHITECT/PROJECT ENGINEER REVIEW

Remarks: _____

- _____ Accepted
- _____ Accepted as noted
- _____ Not accepted
- _____ Not accepted due to incomplete submittal
- _____ Received too late (less than 10 days prior to bid date)

By: _____

PROPOSAL FOR:
COUNTY OF MAUI
WAILUKU CIVIC COMPLEX PROJECT, PHASE 1B
WAILUKU, MAUI, HAWAII

BIDDER'S NAME: _____

Director, Department of Finance
County of Maui
2145 Wells Street, Suite 104
Wailuku, Maui, Hawaii 96793

Dear Sir:

The undersigned bidder, agrees to furnish and pay for all labor, materials, tools, and equipment, necessary to complete in place, the work called for in the bid documents in accordance with their intent and meaning for the TOTAL SUM BID

DOLLARS (\$ _____), as itemized in the attached Proposal Schedule.

The undersigned bidder declares the following:

1. It is incorporated or organized under the laws of the State of Hawaii, or is registered to do business in the State of Hawaii as a separate branch or division that is capable of fully performing under the contract and shall submit documents to the Department to demonstrate compliance.
2. It has not, either directly or indirectly, entered into any agreement, participated in any collusion, or otherwise taken any action in restraint of free competitive bidding in connection with this proposal.
3. It has not been assisted or represented on this matter by any individual who has, in a County capacity, been involved in the subject matter of this contract within the past two years.
4. It has not and will not, either directly or indirectly offered or given a gratuity (i.e., an entertainment or gift) to any State or County employee to obtain a contract or favorable treatment under a contract.
5. It will not maintain for its employees any segregated facilities at any of its establishments.
6. It does not and will not permit its employees to perform their services at any location under its control, where segregated facilities are maintained.

The undersigned bidder further agrees to the following:

1. **Contract Time** shall not exceed FIVE HUNDRED FIFTY (550) CALENDAR DAYS. The contract time shall commence on the date of notification to begin work, which date will be issued in the notice to proceed.
2. **Liquidated Damages** shall be FIVE HUNDRED DOLLARS (\$500.00) for each calendar day the contract time is exceeded.
3. Bids shall be compared on the basis of total sum bid and award made to the lowest responsible bidder, subject to the availability of funds.
4. That the quantities given in the attached Proposal Schedule are approximate only and are intended principally to serve as a guide in determining and comparing the bids.
5. The County does not, expressly or by implication, agree that the actual amount of work will correspond therewith, but reserves the right to increase or decrease the amount of any class or portion of the work, or to omit portions of the work as may be deemed necessary or advisable by the Director of Public Works, and that all increased or decreased quantities of work shall be performed at the unit prices set forth in the attached Proposal Schedule except as provided for in the specifications.
6. In case of a discrepancy between unit prices and the totals in the attached Proposal Schedule, the unit prices shall prevail. If the addition of the totals is incorrect, the total sum bid shall be corrected.
7. If this proposal is accepted, bidder shall execute a contract with the County to provide all necessary labor, machinery, tools, equipment, apparatus and any other means of construction, to do all the work and to furnish all the materials specified in the contract in the manner and within the contract time, and that it shall accept in full payment therefore the sum of the unit price bid and/or lump sum bid prices as set forth in the attached Proposal Schedule for the actual quantities of work performed and materials furnished.
8. To furnish satisfactory performance and payment bond or security for 100% of the contract price, in accordance with Section 103D-324, Hawaii Revised Statutes, within 10 days after the award of the contract or within such time as the Director of Finance may allow after the undersigned has received the contract documents for execution, and is fully aware that non-compliance with the aforementioned terms will result in the forfeiture of the full amount of the bid guarantee required under Section 103D-323, Hawaii Revised Statutes.
9. The County reserves the right to reject any or all bids and to waive any defects when in the Director's opinion such rejections or waiver will be for the best interest of the public.
10. Upon award of a contract, the bidder to whom the contract is awarded shall comply with Chapters 237 (general excise tax); 383 (employment security); 386 (workers compensation); 392 (temporary disability insurance); and 393 (pre-paid health care), Hawaii Revised Statutes.

The undersigned bidder acknowledges receipt of and certifies that it has completely examined the following listed items:

1. *Hawaii Standard Specifications for Road and Bridge Construction, 2005.*
2. *Water System Standards, 2002*
3. Other standard specifications or details referenced in the project specifications.
4. Notice to Bidders
5. Instructions to Bidders
6. Pre-Bid Substitution Request Form
7. Proposal
8. Bid Bond
9. Contract Form
10. Performance and Payment Bond Forms
11. General Terms and Conditions
12. Project Plans and Specifications
13. All Addendums

Accompanying this proposal is bid security in the amount of:

_____ DOLLARS (\$ _____),

in the form checked below and in accordance with Section 103D-323, Hawaii Revised Statutes.

- | | | |
|--|---|---------------------|
| <input type="checkbox"/> Surety Bond* |) | * Use standard form |
| |) | |
| <input type="checkbox"/> Cash |) | |
| |) | |
| <input type="checkbox"/> Cashier's Check |) | |
| |) | |
| <input type="checkbox"/> Certified Check |) | |
| |) | |
| <input type="checkbox"/> _____ |) | |
| (Fill in other acceptable security) |) | |

The undersigned acknowledges receipt of any addendum issued by the Department of Public Works by recording in the space below the date of receipt. Bidders are responsible for confirming the existence of any addenda up until the day of the bid opening by calling the Purchasing Division at (808) 270-7830.

Addendum No. 1: _____ Addendum No. 2: _____

Addendum No. 3: _____ Addendum No. 4: _____

SUBCONTRACTOR AND JOINT CONTRACTOR LISTING

In accordance with Section 103D-302, Hawaii Revised Statutes, the undersigned as bidder has listed in the table below the name of each person or firm, who will be engaged by the bidder on the project as joint contractor or subcontractor and the nature of work to be done by each. It is understood that failure to comply with these requirements may be cause for rejection of the bid submitted. If no joint contractor or subcontractor is to be engaged, the bidder must complete the form by writing "NONE". If left blank, the Department will interpret the blank as no joint contractor or subcontractor will be used.

Each bidder shall fill in contractor's and subcontractors' license numbers. Bidders must list not only their

name and all subcontractors' names, but also a valid license number for each contractor and subcontractor as indicated on the DCCA contractor's licensing website at <http://pvl.ehawaii.gov/pvlsearch/app>. It is the bidder's responsibility to only work with contractors and subcontractors that are in good standing with the State of Hawaii DCCA contractor's licensing office and are represented as such on the DCCA website. If contractor's license cannot be verified as being in good standing on the DCCA website at the time of bid opening, then the County has discretion to reject the contractor's bid on this basis.

The County will verify the licenses of the contractor and all of the listed subcontractors on the State Website at <http://pvl.ehawaii.gov/pvlsearch/app>, of the lowest bidder after the bid opening. The County will also print out the license status for the contractors and each subcontractor listed and keep them in the bid file. The County will also verify the licenses of the 2nd and 3rd contractor and their subcontractors in case the low bidder does not end up with the contract. If, for whatever reason, the County does not end up contracting with one of the three lowest bidders, the County will check the licenses of the other bidders, on a later date, and that verification date will be at the sole discretion of the County.

If a subcontractor is listed, and the license number is listed but not listed accurately, or numbers are transposed, or the subcontractor name listed does not match DCCA listing, or the name and license number cannot be verified through the State Website, etc., the County will have the sole discretion to accept or reject that contractor's bid based on the ability to quickly locate that license number on the State Website using the license holder information provided below.

If the State contractor's licensing website is unavailable after the bid opening, or if the County internet service is down, etc., the County has the sole discretion to verify licenses as soon as possible at a later date, but prior to the award of a contract.

SUBCONTRACTOR:

	<u>NAME</u>	<u>NATURE OF WORK</u>	<u>LICENSE CLASS</u>	<u>LICENSE NO.</u>
1.	_____	_____	_____	_____
2.	_____	_____	_____	_____
3.	_____	_____	_____	_____
4.	_____	_____	_____	_____
5.	_____	_____	_____	_____
6.	_____	_____	_____	_____
7.	_____	_____	_____	_____
8.	_____	_____	_____	_____
9.	_____	_____	_____	_____

JOINT CONTRACTOR:

	<u>NAME</u>	<u>NATURE OF WORK</u>	<u>LICENSE CLASS</u>	<u>LICENSE NO.</u>
1.	_____	_____	_____	_____
2.	_____	_____	_____	_____

(Use additional sheets, if necessary)

HAWAII PRODUCT PREFERENCE

The Hawaii product preference pursuant to Act 175, SLH 2009 may be applicable to this solicitation. The current Hawaii products list is available on the SPO website at <http://hawaii.gov/spo/hawaii-public-procurement-code-chapter-103d-hrs/preferences>.

Bidders offering a Hawaii Product (HP) shall identify the HP on the Hawaii Products Preference Schedules. Any person desiring a Hawaii product preference shall have the product(s) certified and qualified if not currently on the Hawaii products list, prior to the deadline for receipt of offer(s) specified in the procurement notice and solicitation. Persons wishing to certify and qualify a product not currently listed as a Hawaii Product shall submit a Certification for Hawaii Product Preference (form SPO-38) to:

County of Maui Purchasing Division
2145 Wells Street, Suite 104
Wailuku, HI 96793
Attn: Purchasing Administrator

For each product being requested, one form shall be completed and submitted (i.e. 3 products should have 3 separate forms completed). The form is available on the State Procurement Office (SPO) webpage at <http://www4.hawaii.gov/StateForms/ShowForm/cfm?ID=SP>. To access the form, click on the "SPO-38" link to download the form. The responsibility for certification and qualification shall rest upon the person requesting the preference.

The deadline for submitting a completed SPO-38 is 10 days before bid opening. Late submittals for this solicitation will not be reviewed by the Country.

When a solicitation contains both HP and non-HP, then for the purpose of selecting the lowest bid or purchase price only, the price offered for a HP item shall be decreased by subtracting 10% for the class I or 15% for the class II HP items offered, respectively. The lowest total offer, taking the preference into consideration, shall be awarded the contract unless the offer provides for additional award criteria. The contract amount of any contract awarded, however, shall be the amount of the price offered, exclusive of the preferences.

Change in Availability of Hawaii product. In the event of any change that materially alters the offeror's ability to supply Hawaii products, the offeror shall immediately notify the procurement officer in writing and the parties shall enter into discussions for the purposes of revising the contract or terminating the contract for convenience.

Bidders are encouraged to review Section 103D-1002, HRS, as amended by Act 175, Session Laws of Hawaii 2009.

The Hawaii Product Preference shall not apply whenever its application will disqualify any governmental agency from receiving Federal funds or aid.

HAWAII PRODUCTS PREFERENCE SCHEDULE

Product Description	Class	Manufacturer	Cost FOB Jobsite, Unloading, Including Applicable General Excise and Use Taxes	Preference Amount (10% for Class I or 15% for Class II)
			\$ _____	\$ _____
			\$ _____	\$ _____
			\$ _____	\$ _____
			\$ _____	\$ _____
			\$ _____	\$ _____
			\$ _____	\$ _____
			\$ _____	\$ _____
TOTAL SUM OF PREFERENCE AMOUNTS				\$ _____

Attach additional sheets as necessary.

Notes:

1. Bidders shall fill out the above schedule for each Hawaii product for which a preference is being requested. Hawaii products must be listed in the Hawaii products list at the State of Hawaii SPO website or an approved Certification for Hawaii Product Preference (form SPO-38) shall be attached to the bid proposal for items not listed on the SPO website. Pending certifications or unlisted certifications from the State or other Counties shall not be acceptable unless prior approval from the County of Maui Purchasing Division is obtained.

2. All Hawaii products listed are subject to verification. Any product that cannot be validated due to vague, ambiguous, illegible or unverifiable language; or incorrect manufacturer name, is subject to denial. The Purchasing Administrator’s decision is final.

3. Bidders shall attach written quotes from manufacturers to the bid proposal for each Hawaii product for which a preference is being requested. Quotes shall be dated and shall have the manufacturer’s name and contact information, product description, quantities, unit price and total price. Any Hawaii product preference without an accompanying written quote from the manufacturer will be denied.

4. Bidders shall provide justification for any additional loading, unloading and transportation costs, and taxes. These costs may be in the form of estimates; however, if the additional costs are deemed unreasonable by the Purchasing Administrator, such costs shall be denied and the Preference Amount adjusted accordingly. The Purchasing Administrator’s decision is final.

HEALTH AND SAFETY PROGRAMS

Bidders for construction projects in excess of \$100,000 must include a signed certification with their bids that a written safety and health plan for the job will be available and implemented by the “Notice to Proceed” date of the project. Certificate form is attached to the Proposal.

ACT 17, SLH 2009 - APPRENTICESHIP PROGRAM (JOBS OVER \$250,000)

Bidders with apprenticeship programs that are registered with the State of Hawaii Department of Labor and Industrial Relations may apply for a preference of 5% for projects in which the County of Maui estimates that the project will be \$250,000.00 or more. Details and procedures shall be in accordance with the State of Hawaii Comptroller’s Memorandum No. 2010-29, which can be found at the following link:

<http://hawaii.gov/dags/cm/memo/CM2010-29.pdf>

Bidders applying for preference under Act 17, SLH 2009 Apprenticeship Program shall attach a completed Certification Form 1: CERTIFICATION OF BIDDER’S PARTICIPATION IN APPROVED APPRENTICESHIP PROGRAM UNDER ACT 17 prepared with State DLIR.

ACT 68, EMPLOYMENT OF STATE RESIDENTS ON CONSTRUCTION PROCUREMENT CONTRACTS

Bidders are advised of the applicability of Act 68, SB 2840, Employment of State Residents on Construction Procurement Contracts, (2010) (“Act 68”). Act 68 requires the awarded contractor to ensure that Hawaii Residents (as defined in the Act) compose not less than eighty percent of the workforce employed to perform the contract. This requirement shall also apply to subcontracts of \$50,000 or more in connection with any construction contract procured under HRS Chapter 103D, but does not apply to procurements made pursuant to HRS §103D-304 (professional services), HRS § 103D-305 (small purchases), or if there is a conflict with any federal law. See Instruction to Bidders of these specifications for further information and requirements.

ACT 291, SLH 2006 – PROMPT PAYMENT ACT

In conjunction with Section 109.09 of the Hawaii Standard Specifications for Road, Bridge, and Public Works Construction, 2005; bidders are advised of the applicability of Act 291, SLH 2006 – the Prompt Payment Act. This act enables prompt payment for government work of general contractors, subcontractors, and material suppliers. A copy of the Act can be found at the following link:

http://www.capitol.hawaii.gov/session2006/bills/HB3036_cd1_.htm.

http://www.capitol.hawaii.gov/session2006/bills/HB3036_cd1_.htm.

All applicable references contained in the General Terms and Conditions, Instruction to Bidders, Standard Specifications, Special Provisions, and other bid documents are superseded by this Act.

**Shall not apply if the application of the Act is in conflict with any federal law, or if application of Act will disqualify the County from receiving federal funds or aid.*

**CERTIFICATION OF COMPLIANCE
WITH HRS 396-18, SAFETY AND HEALTH PROGRAMS
FOR CONTRACTOR BIDDING ON COUNTY JOBS IN EXCESS OF \$100,000**

PROJECT NAME AND NUMBER _____

This is to certify that the undersigned will comply with the requirements of HRS 396-18, as follows:

- (A) Pursuant to HRS 396-18, all bids and proposals in excess of \$100,000 shall include a signed certification from the bidder that a written safety and health plan for the job will be available and implemented by the notice to proceed dates of the project. The written safety and health plan shall include:
 - (1) A safety and health policy statement reflecting management commitment;
 - (2) A description of the safety and health responsibilities of all levels of management and supervisors on the job and a statement of accountability appropriate to each;
 - (3) The details of:
 - (a) The mechanism for employee involvement in job hazard analysis;
 - (b) Hazard identification, including periodic inspections and hazard correction and control.
 - (c) Accident and "near-miss" investigations; and
 - (d) Evaluations of employee training programs;
 - (4) A plan to encourage employees to report hazards to management as soon as possible and to require management to address these hazards promptly; and
 - (5) A certification by a senior corporate or company manager that the plan is true and correct
- (B) Failure to submit the required certification may be grounds for disqualification of the bid.
- (C) Failure to have available on site or failure to implement the written safety and health plan by the project's notice to proceed date shall be considered willful noncompliance and be sufficient grounds to disqualify the award and terminate the contract.

Name of Contractor

Signature and Title

Date: _____

PROPOSAL SCHEDULE

WAILUKU CIVIC COMPLEX PROJECT, PHASE 1B

WAILUKU, MAUI, HAWAII

ITEM NO.	DESCRIPTION	APPROX. QUANTITY	UNIT	UNIT COST	TOTAL
01	Division 01 - General Requirements	LUMP SUM	L.S.	L.S.	\$ _____
02	Division 02 - Existing Conditions (including, but not limited to, demolition, soil containing asbestos abatement, asbestos abatement)	LUMP SUM	L.S.	L.S.	\$ _____
03	Division 03 - Concrete	LUMP SUM	L.S.	L.S.	\$ _____
04	Division 04 - Masonry	LUMP SUM	L.S.	L.S.	\$ _____
05	Division 05 - Metals	LUMP SUM	L.S.	L.S.	\$ _____
06	Division 06 - Rough Carpentry	LUMP SUM	L.S.	L.S.	\$ _____
07	Division 07 - Thermal and Moisture Protection	LUMP SUM	L.S.	L.S.	\$ _____
08	Division 08 - Openings	LUMP SUM	L.S.	L.S.	\$ _____
09	Division 09 - Finishes	LUMP SUM	L.S.	L.S.	\$ _____
10	Division 10 - Specialties	LUMP SUM	L.S.	L.S.	\$ _____
14	Division 14 - Conveying Equipment	LUMP SUM	L.S.	L.S.	\$ _____
21	Division 21 - Fire Suppression	LUMP SUM	L.S.	L.S.	\$ _____
22	Division 22 - Plumbing	LUMP	L.S.	L.S.	\$ _____

		SUM			_____
23	Division 23 - Heating, Ventilation, and Air Conditioning	LUMP SUM	L.S.	L.S.	\$ _____
26	Division 26 - Electrical	LUMP SUM	L.S.	L.S.	\$ _____
27	Division 27 - Communication	LUMP SUM	L.S.	L.S.	\$ _____
28	Division 28 - Electronic Safety and Security	LUMP SUM	L.S.	L.S.	\$ _____
31	Division 31 - Earthwork	LUMP SUM	L.S.	L.S.	\$ _____
32.1	Division 32 - Exterior Improvements (including, but not limited to, Base Courses, Flexible Paving, Concrete Paving, Curbs Gutters Sidewalks and Driveways, Parking Bumpers, Pavement Markings)	LUMP SUM	L.S.	L.S.	\$ _____
32.2	Division 32 - Exterior Improvements (including, but not limited to, Decorative Metal Fences and Gates, Planting Irrigation, Soil Preparation, Turf and Grasses, Plants)	LUMP SUM	L.S.	L.S.	\$ _____
33	Division 33 - Site Utilities	LUMP SUM	L.S.	L.S.	\$ _____
TOTAL SUM BID					\$ _____

Act 17, SLH 2009 Apprenticeship Program (A)
 Bidders applying for preference under Act 17, SLH 2009 Apprenticeship Program shall indicate amount of preference (5% of Total Sum Bid) here (subject to verification):

\$ _____

Act 175, SLH 2009 – Hawaii Product Preference Program (B)
 Bidders applying for the Hawaii Product Preference under ACT 175, SHL 2009 shall indicate amount of preference here (subject to verification):

\$ _____

NET TOTAL SUM BID [Total Sum Bid – (A) – (B)] \$ _____

ALTERNATES

~~Deductive Alternate D-1: Parking Garage—Solar Canopy~~ \$ - _____

~~Deductive Alternate D-2: Future Phase 2 Area~~ \$ - _____

~~Deductive Alternate D-3: Road A and Pili Street~~ \$ - _____

~~Deductive Alternate D-4: FHB Parking Lot~~ \$ - _____

Note: Payment for items of work called for in the bid documents for which payment is not specified in the Proposal Schedule shall be considered incidental to the various items in the Proposal Schedule and no additional compensation shall be made to the Contractor.

The undersigned hereby certifies that the bid prices contained in the attached Proposal Schedule have been carefully checked and are submitted as correct and final.

This declaration is made with the understanding that the undersigned is subject to the penalty or perjury under the laws of the United States and violation of the Hawaii Penal Code, Section 710-1063, unsworn falsification to authorize, of the Hawaii Revised Statutes, for knowingly rendering a false declaration.

Bidder

By _____
Authorized Signature

Title

Business Address

Email Address

Business Telephone Business Facsimile

Contractor's License No.

Date

NOTE:

If bidder is a CORPORATION, the legal name of the corporation shall be set forth above, the corporate seal affixed, together with the signature(s) of the officer(s) authorized to sign contracts for the corporation. Please attach to this page current (not more than six months old) evidence of the authority of the officer(s) to sign for the corporation.

If bidder is a PARTNERSHIP, the true name of the partnership shall be set forth above, with the signature(s) of the general partner(s). Please attach to this page current (not more than six months old) evidence of the authority of the partner authorized to sign for the partnership.

If bidder is an INDIVIDUAL, the bidder's signature shall be placed above.

If signature is by an agent, other than an officer of a corporation or a partner of a partnership, a POWER OF ATTORNEY must be on file with the Department before opening bids or submitted with the bid. Otherwise, the Department may reject the bid as irregular and unauthorized.

FOR COUNTY USE ONLY

Total Sum Bid: \$ _____

Contingency: 5% of Total Sum Bid: \$ _____

Contract Amount: \$ _____

BID BOND

KNOWN ALL MEN BY THESE PRESENTS:

That _____, a
 _____ corporation, whose business address is
 _____, hereinafter called
 "Principal", and _____,
 a surety company licensed and authorized to transact business in State of Hawaii and located within the
 State of Hawaii by the Department of Commerce and Consumer Affairs, Insurance Division, hereinafter
 called "Surety", are held and firmly bound unto the COUNTY OF MAUI a political subdivision of the
 State of Hawaii, its successors and assigns, hereinafter called "Obligee", in the penal sum of FIVE
PERCENT (5%) OF BID AMOUNT, referred to as the "Penal Amount", for the payment of which, well
 and truly to be made, the said Principal and the said Surety bind ourselves, our heirs, executors,
 administrators, successors and assigns, jointly and severally, firmly by these presents.

WHEREAS, the conditions of this bond is such that the Principal has submitted a bid called for in
 the document entitled "CONTRACT DOCUMENTS FOR WAILUKU CIVIC CENTER PHASE 1B,
 WAILUKU, MAUI, HAWAII", by reference made a part hereof.

NOW, THEREFORE, if the bid submitted by the Principal is accepted by the Obligee, a contract
 is awarded to the Principal, and the Principal enters into the contract and furnishes a payment and
 performance bond in accordance with the bid documents, this obligation shall be void. If the Principal
 should fail to enter into the contract or furnish the payment and performance bond, the Surety agrees to
 pay the Obligee the Penal Amount.

Signed and sealed this _____ day of _____, 20____.

(Corporate seal)

PRINCIPAL:

By _____
(Signature)

(Print Name)

Its _____
(Title)

SURETY:

By _____
(Signature)

(Print Name)

Its _____
(Title)

NOTE:

Principal's signature does not require notary.

Surety's signature requires notary. If signature is by an agent, other than an officer of a corporation or a partner of a partnership, a POWER OF ATTORNEY must be on file with the Department before opening bids or submitted with the bid. Otherwise, the Department may reject the bid as irregular and unauthorized.

STATE OF _____)
) SS.
COUNTY OF _____)

On this ____ day of _____, 20____, before me personally appeared _____, to me personally known, who, being by me duly sworn or affirmed, did say that such person executed the foregoing instrument as the free act and deed of such person, and if applicable, in the capacity shown, having been duly authorized to execute such instrument in such capacity.

IN WITNESS WHEREOF, I have hereunto set my hand and official seal.

Notary Public, State of Hawaii

Print Name

My commission expires: _____

CONTRACT NO. C//

CONTRACT FOR CONSTRUCTION

Department: //

Project Title: //

Job No. / IFB No. / RFP No. / QBS #: (Select One) //

Certification Requested from County: \$//

This CONTRACT is made and entered into by and between the COUNTY OF MAUI, a political subdivision of the State of Hawaii, whose business address is 200 South High Street, Wailuku, Maui, Hawaii 96793, hereinafter referred to as the "County", and //, a // corporation, whose mailing address is //, hereinafter referred to as the "Contractor." County and Contractor shall hereinafter be referred to collectively as the "Parties".

Source of Funds. The source(s) and availability of the funds for this Contract shall be as set forth in the Contract Certification signed by the Director of Finance of the County of Maui on or before the effective date of this Contract. Contract Certification shall be on file in the office of the Director of Finance of the County of Maui.

R E C I T A L S:

WHEREAS, the County has issued an invitation for competitive sealed bidding ("IFB"), and has received and reviewed bids submitted in response to the IFB.

WHEREAS, the Contractor has been identified as the lowest responsible and responsive bidder whose bid meets the requirements and criteria set forth in the IFB.

WHEREAS, the County desires to retain and engage the Contractor to provide the services described in this Contract and its attachments, and the Contractor desires to render such services for, and on behalf of, the County; and

WHEREAS, the Contract is for construction as defined in Section 103D-104, Hawaii Revised Statutes ("HRS"); and

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WHEREAS, pursuant to Section 46-1.5(4), HRS, the County is authorized to enter into this Contract.

NOW, THEREFORE, in consideration of the following mutual promises and agreements set forth, the Parties agree as follows:

1. Scope of Work. The Contractor shall supply, furnish, and pay for all labor, transportation, materials, tools, and equipment necessary to construct in place complete all work as shown and called for in the Contract Documents (as defined in Paragraph 1.04 of the General Conditions). Contract Documents are maintained and on file in the office of the Director of Finance of the County of Maui, and all of the documents are hereby incorporated by reference as if fully repeated herein and made a part of this Contract.

2. Time of Performance. The Contractor shall commence performance under this Contract upon issuance of the Notice to Proceed, and shall complete performance within // days therefrom, unless sooner terminated or extended in compliance with the terms of this Contract.

Where the contract work is structured into phases or discrete work items, if the commencement of a phase or work item is triggered not by the completion of the prior phase or work item, but by some other event not under the control of the Contractor, the time between the completion of one phase or work item and the commencement of the next shall not count towards the time of performance within which the Contractor agreed to complete its performance under the Contract. The Contractor agrees to cooperate and coordinate with the County to accurately compute and document the time of performance.

3. Compensation and Payment Schedule. In full compensation for Contractor's performance under this Contract, County agrees to pay Contractor, subject to appropriation, a total amount not to exceed the amount of certification requested as set forth above, inclusive of all taxes, and in accordance with the terms and schedule(s) set forth in the Contract Documents. Monthly progress payments shall be made to Contractor in arrears and subject to compensation

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retention, all in accordance with Section 7.3 of the General Conditions. Payments shall be subject to the prior receipt of the Contractor's monthly progress payment request by the Officer in Charge, no later than on the fifth (5th) day of each month for work performed during the previous calendar month. Requests for monthly progress payment shall set forth and include all the information, documentation, and certification required under Section 7.3 of the General Conditions, and any other information reasonably requested from time to time by the Officer in Charge. Final Payment shall be made in accordance with Section 7.7 of the General Conditions.

4. General Terms and Conditions. The Contractor shall comply with the General Terms and Conditions of this Contract (also referred to as the "General Conditions"), which are attached hereto and is hereby made a part of this Contract.

5. Bonds. The Contractor is required to deliver to the County a performance bond in a form provided by the County, executed by a surety company authorized to do business in this County or otherwise secured in a manner satisfactory to the County, in an amount equal to one hundred per cent of the price specified in the Contract. The Contractor is required to deliver to the County a payment bond in a form provided by the County, executed by a surety company authorized to do business in this County or otherwise secured in a manner satisfactory to the County, for the protection of all persons all persons supplying labor and material to the Contractor for the performance of the work provided for in the Contract. The payment bond shall be in an amount equal to one hundred percent of the price specified in the Contract.

6. Standards of Conduct Declaration. The Standards of Conduct Declaration of the Contractor is attached hereto and is made a part of this Contract.

7. Other Terms and Conditions. Any Special Conditions are attached hereto and made a part of this Contract. In the event of a conflict between the General Terms and Conditions and the Special Conditions, the Special Conditions shall control.

8. Liquidated Damages. The Contractor recognizes and agrees that time is of the

CONTRACT NO. C//

essence under this Contract and, due to the speculative character and difficulty of ascertaining damages to the County of Maui resulting from any delay beyond the date set herein for completion, the Parties hereto, for the purpose of putting the question of damages beyond controversy and dispute, hereby agree that the Contractor shall pay to the County the sum of \$// per day as set forth in the Contract Specifications as liquidated damages, and not as a penalty, for each and every work day that work or any portion of work contemplated under this Contract remains uncompleted beyond the time set herein for completion; provided, however, that the remedy of liquidated damages shall be in addition to any other rights and remedies otherwise available to the County of Maui and not expressly waived herein.

The Contractor agrees that the aforesaid sum is a reasonable estimate of, and reasonably proportionate to, the damages which will probably be sustained by the County as a result of any delay.

9. Conflict. In the event of any conflict between or among this Contract and other documents that are attached hereto or incorporated herein by reference or both, the terms of this Contract shall control first, the County's General Conditions second, other documents prepared by the County third, and documents prepared or submitted, or both, by the Contractor last.

10. Notices. Any written notice required to be given by a party to this Contract shall be (a) delivered personally, or (b) sent by United States first class mail, postage prepaid. Notice required to be given to the County shall be sent to:

Procurement Officer
Department of Finance
County of Maui
200 South High Street
Wailuku, Maui, Hawaii 96793

Notice to the Contractor shall be sent to the Contractor's address as indicated in this Contract. A notice shall be deemed to have been received three (3) days after mailing or at the time of actual receipt, whichever is earlier. The Contractor is responsible for notifying the County in writing of

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any change of address.

11. Officer-in-Charge. The Director of //, or an authorized representative, shall be the Officer-in-Charge for all services provided herein, and shall have the right to oversee the successful completion of contract requirements, including monitoring, coordinating and assessing Contractor's performance and approving completed work/services with verification of same for Contractor's invoices or requests for payment. The Officer-in-Charge also serves as the point of contact for the Contractor from award to contract completion.

IN WITNESS WHEREOF, the Parties execute this Contract by their signatures, on the dates below, to be effective as of the date of last signature hereto.

[EXECUTION PAGES TO FOLLOW]

[THE REMAINDER OF THIS PAGE IS INTENTIONALLY LEFT BLANK]

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CONTRACTOR EXECUTION PAGE

I hereby represent and warrant that I have the legal right and authority to execute this Contract on behalf of the Contractor.

CONTRACTOR:

//

By _____
(Signature)

(Print Name)

Its _____
(Title)

Date _____

[THE REMAINDER OF THIS PAGE IS INTENTIONALLY LEFT BLANK]

CONTRACT NO. C//

STATE OF _____)
) SS.
_____)

On this ____ day of _____, 20____, before me personally appeared _____, to me personally known, who, being by me duly sworn or affirmed, did say that such person executed the foregoing instrument as the free act and deed of such person, and if applicable, in the capacity shown, having been duly authorized to execute such instrument in such capacity.

IN WITNESS WHEREOF, I have hereunto set my hand and official seal.

[Stamp or Seal]

Notary Public, State of _____

Print Name: _____

My commission expires: _____

NOTARY PUBLIC CERTIFICATION	
Doc. Date: _____	# Pages: _____
Notary Name: _____	Judicial Circuit: _____
Doc. Description: _____ _____ _____	[Stamp or Seal]
Notary Signature: _____	
Date: _____	

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COUNTY EXECUTION PAGE

COUNTY OF MAUI

By _____
DANILO F. AGSALOG
Its Director of Finance

Date _____

APPROVAL RECOMMENDED:

//
Director, Department of //

Date _____

APPROVED AS TO FORM
AND LEGALITY:

Deputy Corporation Counsel

S:\ALL\CONTRACTS\10-USE THIS FORM 2013\construction&bonds.pub 2015-3-11.wpd

Date _____

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CONTRACT NO. C//

STATE OF HAWAII)
) SS.
COUNTY OF MAUI)

On this ___ day of _____, 20___, before me appeared DANILO F. AGSALOG, to me personally known, who being by me duly sworn, did say that he is the Director of Finance of the County of Maui, a political subdivision of the State of Hawaii, and that the seal affixed to the foregoing instrument is the lawful seal of the said County of Maui, and that the said instrument was signed and sealed on behalf of said County of Maui pursuant to Section 9-18 of the Charter of the County of Maui; and the said DANILO F. AGSALOG acknowledged the said instrument to be the free act and deed of said County of Maui.

IN WITNESS WHEREOF, I have hereunto set my hand and official seal.

[Stamp or Seal]

Notary Public, State of Hawaii

Print Name: _____

My commission expires: _____

NOTARY PUBLIC CERTIFICATION	
Doc. Date: _____	# Pages: _____
Notary Name: _____	Judicial Circuit: _____
Doc. Description: _____	

_____	[Stamp or Seal]

Notary Signature: _____	
Date: _____	

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COUNTY OF MAUI

GENERAL TERMS AND CONDITIONS

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**COUNTY OF MAUI
GENERAL TERMS AND CONDITIONS
CONSTRUCTION CONTRACTS**

Preface

Section numbers of the Hawaii Revised Statutes are referenced at the end of some paragraphs in brackets. The purpose for the inclusion of such references is to indicate that the paragraphs are derived from Hawaii Revised Statutes. The language of the statutes has been retained for the most part, but in some instances the statutes may have been reworded. All Parties should review the referenced statutes.

In the event of a conflict between contract terms, any special provisions shall control first; technical specifications or construction plans second; State of Hawaii, Department of Transportation, Highway Division Standard Specifications & Special Provisions, if applicable, third; and these General Terms and Conditions last.

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Section 1 - Definitions

When used in these General Terms and Conditions or elsewhere in the Contract, the following terms, or pronouns used in place of them, shall have the meaning ascribed to them in this section, unless it is apparent from the context that a different meaning is intended:

1.01 "Addendum (plural-Addenda)" means a written or graphic document, including drawings and specifications, issued by the Procurement Officer during the bidding period which modifies or interprets the bidding documents by additions, deletions, clarifications, or corrections which document shall be considered and made a part of the contract when executed.

1.02 "Bid Documents" mean the composition of the notice to bidders, instructions to bidders, bid proposal form, general terms and conditions, special provisions, construction plans, specifications, and all addenda issued prior to opening of bids.

1.03 "Calendar Day" means any day shown on the calendar, beginning at midnight and ending at midnight of the following day. If no designation of calendar or working day is made, "day" shall mean calendar day.

1.04 "Contract Documents" mean the composition of general terms and conditions, special provisions, construction plans, specifications, addenda, Contractor's bid proposal, notice of award, executed contract, contract amendments, Contractor's performance and payment bonds, Notice to Proceed, and change orders.

1.05 "Contract Time" means the number of calendar days or working days provided in the contract for the completion of the work. The contract time shall commence on the effective date of the Notice to Proceed.

1.06 "County" means the County of Maui.

1.07 "Equipment" means all machinery, tools, and apparatus necessary to complete the work under the contract.

1.08 "HAR" means Hawaii Administrative Rules, as amended.

1.09 "HRS" means Hawaii Revised Statutes, as amended.

1.10 "Inspector" means the County's authorized representative assigned to make detailed inspections of contract performance, prescribed work, and materials supplied.

1.11 "Liquidated Damages" mean the amount set forth in the contract to be paid by the Contractor to the County for each and every day the work remains uncompleted beyond the contract time.

1.12 "Lowest Responsive, Responsible Bidder" means the bidder who has the capability in all respects to perform fully the contract requirements, the integrity and reliability which will assure good faith performance and who has submitted the lowest bid which conforms in all material respects to the invitation for bids.

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1.13 "Notice to Bidders" means the public advertisement inviting bids for the work contemplated. Such advertisement indicates the location of the work to be done and/or the character of the material to be furnished and the time and place for opening of bids.

1.14 "Notice to Proceed" means the written notice given by the Officer-in-Charge to the Contractor establishing the date on which the contract time will commence.

1.15 "Payment Bond" means the security executed by the Contractor and the Contractor's sureties and furnished to the County to guarantee payment by the Contractor to laborers, materials suppliers, and subcontractors according to the terms of the contract.

1.16 "Performance Bond" means the security executed by the Contractor and the Contractor's securities and furnished to the County to guarantee the completion of the work according to the terms of the contract.

1.17 "Plans or Drawings" means any and all designs, plans, construction drawings, specifications, cost estimates, work schedules, proposals, studies, reports, notes, tables, notations and other similar items which show the location, character, dimension, and details of the work to be completed under the contract, including the current and applicable portions of the *Water System Standards 2002, as amended*, for Department of Water Supply contracts.

1.18 "Procurement Officer" means the Director of the Department of Finance of the County of Maui, acting directly or through the Director's duly authorized representative.

1.19 "Shop Drawings" mean the drawings, diagrams, illustrations, schedules, and other data or information which are specifically prepared or assembled by the Contractor and submitted by the Contractor to illustrate some portion of the work.

1.20 "Special Provisions" are the means by which the general terms and conditions are amended.

1.21 "State" means the State of Hawaii.

1.22 "Surety" means the qualified individual or entity, other than the Contractor, that insures the Contractor's acceptable performance of the contract.

1.23 "Total Sum Bid" means the total bid price submitted by the bidder for performing all work in accordance with the contract.

1.24 "Work" means the furnishing of all labor, materials, equipment, and other incidentals necessary or convenient for the successful completion of the construction project and the execution of all duties and obligations imposed by the contract on the Contractor.

1.25 "Working Day" means a calendar day in which the Contractor is capable of working four (4) or more hours with its normal work force, exclusive of:

- (a) Saturdays, Sundays, and State/County recognized legal holidays;
- (b) Days in which work is suspended by the County for four (4) or more hours

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through no fault of the Contractor; and

- (c) Days prevented by or resulting from inclement weather to permit the normal work force to proceed with construction operations for at least four (4) hours. Also, the Contractor shall be performing the current controlling item or items of work.

Section 2 - Bidding Instructions

2.01 Obtaining Bid Documents. Bidders shall refer to the notice to bidders for instructions in obtaining bid documents.

2.02 Proposal Forms. The County will furnish prospective bidders with proposal forms. Papers bound with or attached to the proposal form are part of the proposal. The bidder shall not detach or alter these papers when submitting its bid. The bidder shall also consider other documents, including the plans and specifications, a part of the proposal form whether attached or not.

2.03 Contractor's License Required. All bidders and all their subcontractors shall be licensed in accordance with chapter 444, HRS, and as required in the notice to bidders. It is the sole responsibility of the bidder to review the requirements of the project and determine the appropriate licenses that are required to complete the project.

2.04 Qualification of Bidders. (a) The Procurement Officer shall determine whether the prospective bidder has the financial ability, resources, skills, capability, and business integrity necessary to perform the work. For this purpose, the Procurement Officer, in the Procurement Officer's discretion, may require any prospective bidder to submit answers, under oath, to questions contained in a standard form of questionnaire. Whenever it appears from the answers to the questionnaire or otherwise, that the prospective bidder is not fully qualified and able to perform the work, a written determination of non-responsibility of a bidder shall be made by the Procurement Officer. The reasonable failure of a bidder to promptly supply information in connection with an inquiry with respect to responsibility may be grounds for a determination of non-responsibility with respect to such bidder. The decision of the Procurement Officer shall be final unless the bidder applies for administrative review pursuant to section 103D-709, HRS. [§103D-310, HRS]

(b) Questionnaires, when required by the Procurement Officer, shall be submitted not less than forty-eight (48) hours prior to the time designated for opening of bids.

(c) All bidders shall be incorporated or organized under the laws of the State of Hawaii, 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 bidder shall be in compliance with all laws governing entities doing business in the State. [§103D-310, HRS]

2.05 Preparation of Bids. (a) Bids shall be submitted on the proposal form furnished by the County. The bidder shall complete the proposal using words and figures, which shall be in ink or typed. If a discrepancy occurs between the prices written in words and the those written in figures, the prices written in words shall govern.

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(b) Bids must be signed in ink by a duly authorized representative of the bidder on the spaces provided for signatures.

(c) If the bidder is a corporation, the title or titles of the person or persons signing must be stated and the corporate seal affixed thereto. If the corporation does not have a corporate seal, it should be indicated in the form of acknowledgment attached thereto. A copy of a resolution of the Board of Directors of the corporation, or other written evidence of authority signed by an officer of the corporation, authorizing the person or persons to execute bids, contracts, and other necessary documents in connection therewith shall be attached.

(d) Where the bidder is an association or group, the title or titles of the person or persons signing must be stated and an affidavit which acknowledges the authority of the signer or signers to sign bids and all other necessary documents in connection therewith for the association or group must be attached.

(e) Bids must be submitted in a sealed envelope, bearing on the outside the identity of the project and the bidder's name and address. Bids will be received only at the office designated in the notice to bidders. All bid envelopes will be stamped with the time and date received by the County. The County will reject and return a bid unopened if received after the time set for opening of bids.

2.06 Listing of Joint and Subcontractors. (a) The names of each person or entity to be engaged by the bidder as a joint Contractor or subcontractor and the nature and scope of work to be performed by each shall be submitted with the bidder's proposal. Bids that do not comply with this requirement may be accepted if acceptance is in the best interest of the County and the value of work to be performed by the joint Contractor or subcontractor is equal to or less than one percent (1%) of the total bid amount. [§103D-302, HRS]

(b) If no joint Contractor or subcontractor is to be engaged the bidder must complete the form by writing "NONE." If left blank, the County will interpret the blank as no joint Contractor or subcontractor will be used.

2.07 Examination of the Bid Documents and Project Site, and Conducting Investigations. (a) Before submitting a bid, bidders shall examine the bid documents and the project site, make inquiries at the appropriate offices of the County, State, and Federal governments, and the offices of persons and entities owning, controlling, or operating underground improvements, and conduct investigations to satisfy themselves as to the conditions to be encountered and to determine the correctness of the information contained in the bid documents.

- (b) The submission of a bid shall be considered verification that the bidder:
- (1) Has made such examinations and inquiries;
 - (2) Is satisfied with the conditions to be encountered in performing the work;
 - (3) Acknowledges and understands the terms and conditions contained in the bid documents; and

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(4) Agrees to abide by such terms and conditions if awarded the contract.

2.08 Subsurface Investigations. (a) If the County has conducted subsurface investigations, bidders may inspect the data obtained from such investigations and examine samples, if available.

(b) Any subsurface information made available are for the bidders' convenience only. The information may have been obtained at specific locations, and no assurance is given that these conditions are necessarily typical of conditions at other locations. In addition, no assurance is given that conditions found at the time of the subsurface explorations, such as the presence or absence of water, will be the conditions that will prevail at the time of construction. The bidder shall be responsible for all assumptions, deductions, or conclusions made or derived from the subsurface information made available.

(c) Making available to bidders information from the subsurface explorations is not to be construed as a waiver of subsection 2.07 - Examination of Bid Documents and Project Site, and Conducting of Investigations.

2.09 Pre-bid Conferences. At least fifteen days prior to submission of bids pursuant to an invitation for bids (§ 103D-302) for a construction or design-build project with a total estimated contract value of \$500,000 or more, and at least fifteen days prior to submission of proposals pursuant to a request for proposals (§ 103D-303) for a construction or design-build project with a total estimated contract value of \$100,000 or more, the head of the purchasing agency shall hold a pre-bid conference and shall invite all potential interested bidders, offerors, subcontractors, and union representatives to attend. The County may, for projects that have special or unusual requirements, [e.g., requiring physical inspection,] make attendance at a pre-bid conference a condition for submitting a bid. Pre-bid conferences shall be announced to all prospective bidders in the notice to bidders. Nothing stated at the pre-bid conference shall change the solicitation unless a change is made by written addendum as provided in subsection 2.11 - Addenda.

2.10 Clarification of Bid Documents. (a) If it appears to a bidder that the performance of the work or any matter relating thereto is not sufficiently described or explained in the bid documents, or that a discrepancy exists between different parts thereof, or that the full intent of the bid documents is not clear, the bidder shall submit a written request to the Procurement Officer for clarification not less than ten (10) calendar days prior to the day designated for opening of bids.

(b) The written request may be faxed pursuant to subsection 2.19 - Use of Facsimiles.

(c) If the Procurement Officer deems that a clarification is in order, it shall be issued in the form of an addendum.

2.11 Addenda. (a) Any addendum issued prior to the opening of bids shall be binding upon the bidder and shall be made a part of the contract.

(b) No addendum will be issued during the 5 days immediately preceding the day designated for the opening of bids, unless the purpose of the addendum is to postpone the date of bid opening.

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(c) Failure by the bidder to receive any addendum shall not relieve the bidder from any obligation under its bid as submitted.

(d) No oral interpretation, instruction, or information regarding the bid documents given by any officer or employee of the County shall be binding.

2.12 Determination of Intended Bid. (a) If the proposal form contains a list of unit price or lump sum items, or both, they do not necessarily describe all of the work involved in the performance of the contract, but merely indicate that the compensation for the performance of the contract will be based upon and limited to such items. If a bidder is in doubt as to the proper bid item to which the anticipated cost of any incidental item is to be allocated, the bidder shall include such cost in the bid item which the bidder deems most appropriate.

(b) If the proposal calls for unit price items, and the bidder's unit price bid multiplied by the number of units in any item is not equal to the total amount bid for that item, it will be assumed that the unit price bid represents the bidder's intention and an error was made in the multiplication. The Procurement Officer will correct the total amount bid for the item and total sum bid of the bidder's proposal.

(c) If the figure obtained by adding the individual bid items listed in the proposal does not equal to the total figure written in the proposal, it will be assumed that an error was made in the addition and the Procurement Officer will correct the total sum bid.

(d) The bid price shall include all applicable taxes, including the State of Hawaii General Excise Tax, and shall include delivery charges F.O.B. job site.

(e) The bid price shall be firm for a minimum of sixty (60) days from the bid opening date to allow for contract execution.

2.13 Disqualification of Bids. The County may disqualify a bidder and reject its bid for reasons including but not limited to:

- (a) The bidder is non-responsible;
- (b) The bid is not responsive;
- (c) The bid does not include a listing of subcontractors and joint Contractors or contains only a partial or incomplete listing;
- (d) The bid is unsigned or is not signed by an authorized representative of the bidder;
- (e) Evidence indicating that unit price or lump sum price items are unbalanced in a bid;
- (f) Evidence indicating that bidders are in collusion;
- (g) Submission of more than one bid whether under the same name or a different name.

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Without limiting the generality of the foregoing, a bidder shall be considered to have submitted more than one bid if the bidder submits more than one bid under the bidder's name, through bidder's agents, through joint ventures, partnerships, or corporations or which the bidder has more than twenty-five percent (25%) ownership in each of them, or through any combination of any of them;

(h) The bidder is suspended under chapter 104 or chapter 444, HRS;

(I) The bid is not accompanied by an acceptable form of bid security, or the bid security is in an amount less than five percent (5%) of the amount of the base bid, including additives;

(j) The bidder fails to submit a valid and timely certificate of good standing from the Department of Commerce and Consumer Affairs Business Registration Division and/or the bidder fails to submit a valid and timely certificate of compliance from the Department of Labor and Industrial Relations.

(k) The bidder failed to submit the standard form of questionnaire or failed to submit said questionnaire within the due time, when required by the County; or

(l) Evidence of assistance from a person who has been an employee of the County within the preceding two years and who participated while in County office or employment in the matter with which the contract is directly concerned, pursuant to section 84-15, HRS.

2.14 Bid Security. (a) The County will not consider a bid proposal unless accompanied by bid security in an amount not less than five percent (5%) of the amount bid. [§103D-323, HRS]

(b) Acceptable bid security shall be limited to the following:

(1) Surety bond underwritten by a company licensed to issue bonds in the State of Hawaii, which shall be substantially in the form provided in the project specifications;

(2) Legal tender;

(3) A certificate of deposit; credit union share certificate; or cashier's, treasurer's, teller's, or official check drawn by, or a certified check accepted by a bank, a savings institution, or credit union insured by the Federal Deposit Insurance Corporation or the National Credit Union Administration, and payable at sight or unconditionally assigned to the County. These instruments may be utilized only to a maximum of \$100,000. 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.

(c) The County will return bid security to bidders within ten (10) working days following execution of the contract by all Parties and after the successful bidder furnishes acceptable performance and payment bonds and certificates of insurances.

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2.15 Mandatory Purchase of Hawaii Products. Bidders are instructed to refer to section 103D-1002, HRS and chapter 3-124, HAR.

2.16 Substitution of Materials and Equipment. (a) Bids shall be based on materials and equipment specified in the bid documents, unless the Procurement Officer approves substitution of material or equipment by addendum.

(b) A bidder may make a written request for a material or equipment substitution for the Procurement Officer's determination. The written request shall be submitted to the Procurement Officer not less than ten (10) calendar days prior to the day designated for opening of bids. The substitution request shall be accompanied by four (4) copies of any pertinent information for the Procurement Officer's determination. If the Procurement Officer is unable to determine the quality and suitability of the substitution based on the information provided by the bidder, the request shall be rejected. The burden of proof as to the comparative quality and suitability of the substitution shall be the bidder's responsibility. The Procurement Officer shall be the sole judge as to the comparative quality and suitability of the substitution, and the Procurement Officer's decision shall be final. If the information provided to the Procurement Officer is determined incomplete or insufficient, whereas the Procurement Officer is unable to determine the quality and suitability of the substitution, the request shall be rejected.

(c) If the Procurement Officer approves a material or equipment substitution, an addendum shall be issued by the Procurement Officer.

(d) Bids based on a material or equipment substitution approved by the Procurement Officer, shall include the additional cost required for all modifications, including the cost of revising the construction plans and technical specifications required to accommodate the approved substitution.

2.17 Pre-Opening Modification and Withdrawal of Bids. (a) Bids may be modified prior to the bid submission deadline provided the Procurement Officer receives a written notice stating that a modification to the bid is submitted accompanied by the actual modified bid. The written notice may be faxed pursuant to subsection 2.19 - Use of Facsimiles, provided the bidder submits the actual written notice and actual modified bid prior to the bid submission deadline and within two (2) working days following the faxed notice.

(b) Bids may be withdrawn provided the Procurement Officer receives a written notice stating the bidder's bid is withdrawn prior to the deadline for opening of bids. The written notice may be faxed pursuant to subsection 2.19 - Use of Facsimiles. Bids may not be withdrawn after the bid opening.

2.18 Public Opening of Bids. Bids shall be opened publicly in the presence of one or more witnesses, at the time and place designated in the notice to bidders. The amount of each bid and other relevant information, together with the name of each bidder shall be recorded. The record and each bid shall be open to public inspection. [§103D-302, HRS]

2.19 Use of Facsimiles. Copies of documents transmitted by bidders via facsimile machine shall be limited to the following:

(a) The request for clarification of bid documents pursuant to subsection 2.10 -

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Clarification of Bid Documents;

- (b) The request for material or equipment substitution pursuant to subsection 2.16 - Substitution of Materials and Equipment which includes four (4) copies of any pertinent information; and
- (c) The request for modification or withdrawal of bids pursuant to subsection 2.17 - Pre-Opening Modification or Withdrawal of Bids.

Documents will be received by facsimile machine at the number designated by the County. It is the bidder's responsibility to assure the faxed documents are received by the Procurement Officer in a timely manner.

Section 3 - Award and Execution of Contract

3.1 Award of Contract. The award of the contract, if it be awarded, will be made by written notice by the Officer-in-Charge to the lowest responsive, responsible bidder. Said notice shall not be construed to be authorization to proceed with the performance of services under the Contract. Any services performed by the Contractor prior to the date indicated in the Notice to Proceed from the Officer-in-Charge shall be at the Contractor's own risk. The contract will be awarded within sixty (60) days after the opening of the bids. If it appears that the contract cannot be awarded within such time, the award may be made after the specified time as mutually agreed upon between the County and the lowest responsive, responsible bidder. The County may cancel the award of the contract at any time before the execution of the contract.

3.2 Execution of Contract. Prior to the drafting of the Contract, discussions may be held between the Parties relative to the extent of the services to be performed by the Contractor and other pertinent matters. The Procurement Officer will submit the contract to the Contractor for review and signature. The Contractor shall enter into a contract with the County and provide sufficient performance and payment bonds and certificates of insurance within ten (10) calendar days after the execution of the contract or within such further time as the County may allow. The contract must be signed in ink by persons duly authorized to enter into contracts with the County. If the Contractor is an individual or partnership, the Contractor shall sign the contract before a notary public. If the Contractor is a corporation, the Contractor shall cause the contract to be signed before a notary public by an officer authorized to do so and shall affix to the contract its corporate seal, together with a certificate, resolution or other instrument vesting such officer with authority to sign the contract on the corporation's behalf. If the Contractor is an association or group, the title or titles of the person or persons signing must be stated and an affidavit which acknowledges the authority of the signer or signers to sign the contract and other necessary documents in connection therewith for the association or group must be attached. The signed contract shall be returned to the Procurement Officer for signature and further processing.

3.3 Performance and Payment Bonds. Within ten (10) calendar days after the execution of the contract or within such further time as the County may allow, the Contractor shall submit sufficient performance and payment bonds for the full and faithful performance of the contract in accordance with the terms and intent thereof and also for the prompt payment to all others for all labor and materials furnished by them to the successful bidder and used in the prosecution of the work provided for in the contract. Performance and payment bonds shall each

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be in an amount equal to one hundred percent (100%) of the contract price and shall be limited to:

(a) Surety bond underwritten by a company licensed to issue bonds in the State of Hawaii, which shall be substantially in the form provided in the project specifications;

(b) Legal tender; or

(c) A certificate of deposit; credit union share certificate; or cashier's, treasurer's, teller's, or official check drawn by, or a certified check accepted by a bank, a savings institution, or credit union insured by the Federal Deposit Insurance Corporation or the National Credit Union Administration, and payable at sight or unconditionally assigned to the County. These instruments may be utilized only to a maximum of \$100,000. 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.

3.4 Tax Clearance Requirement. Pursuant to §103D-328, HRS, the Contractor shall submit a tax clearance certificate issued by the Hawaii State Department of Taxation ("DOTAX") and the Internal Revenue Service ("IRS"). The certificate shall be valid for six (6) months from the most recent approval stamp date on the certificate and must be valid on the date it is received by the County. The application for the tax clearance shall be the responsibility of the Contractor, and must be submitted directly to the DOTAX or IRS and not to the County.

3.5 Hawaii Business Requirement. (a) The Contractor shall comply with either §103D-310 (c) (1) or §103D-310(c)(2), HRS, as follows:

(a) §103D-310(c)(1), HRS, Hawaii business. A business entity meeting the requirement of §103D-310(c)(1), HRS, referred to as a "Hawaii business", is incorporated or organized under the laws of the State of Hawaii. As evidence of compliance, the Contractor shall submit a "Certificate of Good Standing" issued by the Department of Commerce and Consumer Affairs Business Registration Division (BREG). A Hawaii business that is a sole proprietorship, however, is not required to register with the BREG, and therefore not required to submit the certificate. A Contractor's status as a sole proprietor and its business street address indicated in Contractor's bid will be used to confirm that the Contractor is a Hawaii business.

(b) §103D-310(c)(2), HRS, Compliant non-Hawaii business. A business entity meeting the requirement of §103D-310(c)(2), HRS, referred to as a "compliant non-Hawaii business," is not incorporated or organized under the laws of the State of Hawaii but is registered to do business in the State as a separate branch or division capable of fully performing under the contract. As evidence of compliance, the Contractor shall submit a "Certificate of Good Standing" issued by the BREG.

(c) The above certificates shall be current within six (6) months of issuance date and submitted to the County prior to award of contract. If a valid certificate is not submitted on a timely basis for award of a contract, a bid otherwise responsive and responsible may not receive the award. The application for the above certificates shall be the responsibility of the Contractor, and must be submitted directly to the BREG and not to the County.

3.6 Department of Labor and Industrial Relations (DLIR) requirement. (a) The Contractor shall submit a certificate of compliance (DLIR form LIR #27), issued by the DLIR

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stating the Contractor complies with chapters 383, 386, 392 and 393 of the Hawaii Revised Statutes.

(b) The above certificate shall be current within six (6) months of issuance date and submitted to the County prior to award of contract. If a valid certificate is not submitted on a timely basis for award of a contract, a bid otherwise responsive and responsible may not receive the award. The application for the above certificates shall be the responsibility of the Contractor, and must be submitted directly to the DLIR and not to the County.

3.7 Contract Not Binding Unless Properly Executed and Appropriation Available. The contract shall not be binding or of any force until said contract has been fully and properly signed by all of the Parties thereto and approved by the Procurement Officer as to availability of funds in the amount and for the purpose set forth therein. The Contractor's execution of the contract shall be considered verification that the Contractor has reviewed, understands, accepts, and agrees to abide by the terms and conditions contained in the bid documents, the proposal submitted by the Contractor, the proposed contract, and the performance and payment bonds.

3.8 Forfeiture of Bid Security. Failure to execute the contract and furnish sufficient performance and payment bonds shall be cause for the cancellation of award to the Contractor. The Contractor also forfeits the bid security which becomes the property of the County, which is not a penalty, but liquidated damages sustained by the County. The County may make award to the next lowest responsive, responsible bidder or the County may re-advertise the work contemplated.

Section 4 - Legal Relations and Responsibility

4.1 Independent Contractor. The Contractor shall perform the contract as an independent contractor and shall not be entitled to any benefits and privileges of an employee of the County of Maui for purposes including, but not limited to, the County's civil service system, fringe benefits, unemployment benefits, worker's compensation benefits, federal and state taxes, social security tax, medicare tax, FICA tax and any other employment taxes. Upon execution of the contract, the Contractor shall comply with chapter 237 (general excise tax); chapter 383 (employment security); chapter 386 (workers' compensation); chapter 392 (temporary disability insurance); and chapter 393 (pre-paid health care), HRS. The Contractor and Contractor's sureties shall be liable for any loss caused to the County by reason of the Contractor's failure to comply with chapter 386, HRS.

4.2 Contractor's Inability to Contract for County. Notwithstanding anything herein contained to the contrary, Contractor shall not have the right to make any contracts or commitments for, or on behalf of, the County without first obtaining written consent of the County.

4.3 Insurance. (a) The Contractor shall submit to the Officer-in-Charge within ten (10) calendar days after execution of the contract, or within such further time as the County may allow, three (3) copies of insurance certification evidencing that the Contractor has in force the following types of insurance with the following minimum limits of liability:

- (1) HRS chapters 383 (Unemployment Insurance), 386 (Workers'

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Compensation), 392 (Temporary Disability Insurance), and 393 (Prepaid Health Care) requirements for award. The Contractor shall submit an approved certificate of compliance issued by the Hawaii State Department of Labor and Industrial Relations (DLIR). The certificate shall be valid for six (6) months from the date of issue and must be valid on the date it is received by the County. The application for the certificate shall be the responsibility of the Contractor, and must be submitted directly to the DLIR and not to the County. [§103D-310(c), HRS]

(2) Employers' Liability Insurance. The Contractor and anyone acting under its direction or control or on its behalf shall at its own expense procure and maintain and require the Contractor's sub-contractors (if any) at their own expense to procure and maintain in full force at all times during the term of this Contract, employers' Liability insurance with minimum limits for bodily injury from accident of FIVE HUNDRED THOUSAND DOLLARS (\$500,000), or such other limit acceptable to the County, - each accident; for bodily injury from disease of FIVE HUNDRED THOUSAND DOLLARS (\$500,000), or such other limit acceptable to the County, - each employee; and for bodily injury from disease of FIVE HUNDRED THOUSAND DOLLARS (\$500,000), or such other limit acceptable to the County, - each policy limit.

(3) Commercial General Liability Insurance. The Contractor and anyone acting under its direction or control or on its behalf shall at its own expense procure and maintain and require the Contractor's sub-contractors (if any) at their own expense to procure and maintain in full force at all times during the terms of this Contract, Commercial General Liability insurance with a bodily injury and property damage combined single limit of liability of at least ONE MILLION DOLLARS (\$1,000,000), for any occurrence, and THREE MILLION DOLLARS (\$3,000,000) in the aggregate, or such other limit acceptable to the County. Such insurance shall include coverage in like amount for products/completed operations, contractual liability, and personal and advertising injury. "Claims made" policies are not acceptable under this section.

(4) Automobile Liability Insurance. The Contractor and anyone acting under its direction or control or on its behalf shall at its own expense procure and maintain and require the Contractor's sub-contractors (if any) at their own expense to procure and maintain in full effect at all times during the term of this Contract, Automobile Liability insurance with a bodily injury and property damage combined single limit of at least ONE MILLION DOLLARS (\$1,000,000), or such other limit acceptable to the County, per accident.

(5) Fire and Standard Extended Coverage Insurance. Except for contracts in which the scope of work is limited to roadway construction or utility improvements that do not include payment for stored materials on-site, the Contractor shall insure the work for one million dollars (\$1,000,000), or such other limit acceptable to the County, plus one hundred percent (100%) of the replaceable value thereof for the life of the contract against all loss or damage by fire at the site and against all loss or damage covered by the Standard Extended Coverage Insurance endorsement, including vandalism and malicious mischief, by an insurance company or companies acceptable to the County. The amount of insurance may vary with the extent of the work complete, but shall at all times be at least equal to one million dollars (\$1,000,000), or such other limit acceptable to the County, plus the replaceable value of the amount paid for the work and materials installed

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and delivered, plus the replaceable value of the work or materials furnished or delivered by the Contractor but not yet paid for by the County. The insurance policy or policies shall be held jointly in the name of the County, the Contractor, and the Contractor's subcontractors as their interest may appear. The Contractor shall submit to the County satisfactory proof of the amount of such insurance carried with each application for partial payment.

(6) County as Additional Insured. Insurance policies providing the insurance coverage required in this section (except for Workers' Compensation) shall name the County, its agents, and its employees as additional insured for any claims arising from the Contractor's activities under this Contract. Coverage must be primary in respect to the additional insured. Any other insurance carried by the County shall be excess only and not contribute with this insurance. Such policies or certificates showing the above coverage shall be deposited with the County within ten (10) days of the execution of this Contract and shall contain the following statement:

"The Named Insured, its Insurance Carrier or Broker shall notify the certificate holder of any cancellation, or reduction in coverage or limits, of any insurance within thirty (30) days of receipt of insurers' notification to that effect."

(b) When a subcontractor is utilized, the Contractor shall furnish or require the subcontractor to furnish the Procurement Officer within ten (10) calendar days after execution of the contract, or within such further time as the County may allow, with a copy of a policy or policies of insurance and certificate of insurance covering the subcontractor and the subcontractor's employees or agents in the same amount and for the same liability specified above.

(c) In the event of cancellation or termination of any policy required above or any substitute policy as provided for hereinafter, the Contractor or the subcontractor, as the case may be, shall immediately furnish the Procurement Officer with a substitute policy of insurance in the same amount and for the same liability specified above.

4.4 Indemnification. The Contractor shall defend, indemnify and hold harmless the County and its officers and employees harmless from any and all deaths, injuries, losses and damages to persons or property, and any and all claims, demands, suits, action and liability therefor, caused by error, omissions or negligence in the performance of the contract by the Contractor or Contractor's subcontractors, agents and employees. The Contractor's obligations under this section shall survive and shall continue to be binding upon Contractor notwithstanding the expiration, termination or surrender of the contract.

4.5 Absence of Interest. The Contractor covenants that it currently has no interest and shall not acquire any interest, direct or indirect, which would conflict in any manner or degree with the performance of services required to be performed under the contract. The Contractor further covenants that in the performance of the contract, no person having such interest shall be employed.

4.6 Laws and Regulations. (a) The Contractor shall keep fully informed of all applicable federal, state and county laws, ordinances, codes, rules and regulations, governmental

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general and development plans and all changes thereto including, but not limited to, the Americans with Disabilities Act, health and safety, labor, anti-discrimination and environmental laws and regulations, and the following:

- (1) All Sections of the local County's Charter and Code;
- (2) Article I of Title 10, Maui County Code, 1980, as amended, relating to the Maui Traffic Code;
- (3) Title 12, Maui County Code, 1980, as amended, relating to Streets, Sidewalks, and Public Places;
- (4) Chapter 16.04A, Maui County Code, 1980, as amended, relating to the Fire Code;
- (5) Chapter 16.18A, Maui County Code, 1980, as amended, relating to the Electrical Code;
- (6) Chapter 16.20A, Maui County Code, 1980, as amended, relating to the Plumbing Code;
- (7) Chapters 103 and 103D, HRS, as amended, relating to Expenditure of Public Money and Public Contracts and the Hawaii Public Procurement Code, including Hawaii Administrative Rules Chapter 103D (Chapters 3-120, 3-121, 3-122, 3-123, 3-124, 3-125, 3-126, 3-128, 3-129, 3-130, 3-131, 3-132);
- (8) Chapter 104, HRS, as amended, relating to Wages and Hours of Employees on Public Works;
- (9) Chapter 22 of Subtitle 4 of Title 12, HAR, relating to Wage Determinations and the Administration and Enforcement of chapter 104, HRS;
- (10) Chapter 132, HRS, as amended, relating to the Fire Protection;
- (11) Chapter 321, HRS, as amended, relating to the Department of Health;
- (12) Chapter 378, HRS, as amended, relating to Fair Employment Practices;
- (13) Chapter 386, HRS, as amended, relating to Workers' Compensation Law;
- (14) Chapter 396, HRS, as amended, relating to Occupational Safety and Health, and specifically, all bids and proposals in excess of \$100,000 for construction jobs shall have a signed certification from the bidder or offeror that a written safety and health plan for the job will be available and implemented by the notice to proceed date of the project (see §396-18, HRS);
- (15) Chapter 444, HRS, as amended, relating to contractors for construction work. Provider shall use properly licensed contractors for all construction work as required by law;

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(16) Part III of Subtitle 8 of Title 12, HAR, relating to Construction Standards;
and

(17) Chapters 120 to 132 of Subtitle 11 of Title 3, HAR, relating to the Hawaii Public Procurement Code.

(b) The Contractor shall comply with all such laws, ordinances, codes, rules, regulations, design standards and criteria, governmental general and development plans. If any discrepancy or inconsistency is discovered between the contract and any such law, ordinance, code, rule, regulation, design standard, design criterion, and governmental general and development plans, the Contractor shall immediately report the same in writing to the Officer-in-Charge.

(c) The Contractor shall obtain all necessary permits and approvals for the performance of the contract and shall pay for all charges in connection with such permits.

Section 5 - County Responsibility

5.1 Cooperation by the County. The County, through the Officer-in-Charge, shall cooperate fully with the Contractor and will promptly place at the disposal of the Contractor all available pertinent information which the County may have in its possession. The Officer-in-Charge will certify to the accuracy of certain information in writing whenever it is possible to do so. The County does not represent that other information not certified as accurate is so and takes no responsibility therefor, and the Contractor shall rely on such information at the Contractor's own risk.

5.2 Review by the County. The Officer-in-Charge shall review all submissions and other work and data required to be made by the Contractor and reject or approve such submissions in their entirety or approve the same subject to such deletions, additions and revisions as the County may deem necessary and proper. For submissions specified in the special provisions, all items not required by the County to be deleted, added or revised after review by the Officer-in-Charge and not defective by reason or error, omissions or negligence on the part of the Contractor, subcontractors, agents or employers shall be deemed to have been approved.

5.3 Limitation of Liability. The County shall be responsible for damage or injury caused by the County's agents, officers, and employees in the course of their employment to the extent that the County's liability for such damage or injury has been determined by a court or otherwise agreed to by the County, and the County shall pay for such damage or injury to the extent permitted by law and approved by the Maui County Council. The County's total liability under the contract, if any, is strictly limited to the provisions in this paragraph.

Section 6 - Performance of Contract.

6.1 Time. (a) Time is of the essence herein. Performance of the services under the contract shall commence on the commencement date designated in the Notice to Proceed and the services described herein shall be completed within the time specified.

(b) If the Contractor cannot complete the contract within the time specified due to

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reasons beyond its control, a written request for a time extension accompanied by a detailed accounting of the causes and reasons for such delays may be submitted to the Officer-in-Charge for determination as to whether a time extension will be granted. The Officer-in-Charge's decision shall be final.

(c) If the scope of the work is amended during construction, an appropriate adjustment may be made to the contract time subject to approval by the Officer-in-Charge.

(d) Any adjustment to the contract time shall be made by contract amendment or change order.

6.2 Preconstruction Meeting. The County may schedule a pre-construction meeting after the execution of the contract.

6.3 Construction Schedule. (a) The Contractor shall submit to the Officer-in-Charge a detailed construction schedule in critical path method ("CPM") format, itemizing the various subdivisions of work and their durations at the pre-construction meeting, if held. If a pre-construction meeting is not held, the Contractor shall submit the schedule to the Officer-in-Charge not more than ten (10) calendar days after the Notice to Proceed is issued.

(b) The detailed construction schedule shall include: construction activities, the submission and approval of samples of materials and shop drawings, the procurement of materials and equipment, fabrication of materials and equipment and their delivery, installation, and testing, and start-up in CPM format.

(c) The Contractor shall revise the construction schedule whenever any delays are anticipated in any of the various items of work, or the performance of such items of work are obviously not in accordance with the construction schedule, and submit it to the Officer-in-Charge, together with the reasons for such anticipated or actual delays, and the planned courses of action to prevent or minimize any delay in the completion of the contract. Acceptance of the revised construction schedule and the reasons for such revisions shall not be construed to mean concurrence or acceptance as a basis for any time extension by the Officer-in-Charge.

6.4 Construction Progress. (a) The Contractor shall furnish such manpower, materials, facilities and equipment as may be necessary to insure the prosecution and completion of the work in accordance with the accepted schedule. If work falls fourteen (14) days or more behind the accepted construction schedule, the Contractor agrees to take some or all of the following actions to return the project to the accepted schedule. These actions may include the following:

- (1) Increase manpower in quantities and crafts;
- (2) Increase the number of working hours per shift, shifts per working day, working days per week, or the amount of equipment, or any combination of the foregoing; and/or
- (3) Reschedule activities.

(b) Upon demand by the Officer-in-Charge, the Contractor shall prepare a proposed construction schedule revision demonstrating a plan to make up the lag in progress and insure completion of the work within the contract time. Upon receipt of an acceptable proposed schedule, the revision to the construction schedule shall be included a change order to the

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contract in accordance with section 8, Contract Amendments/Change Orders.

(c) All actions to return the project to the accepted schedule are at the Contractor's sole expense. The Contractor shall pay all costs incurred by the County which result from the Contractor's action to return the project to its accepted schedule. Contractor agrees that County shall deduct such charges from payments due the Contractor. It is further understood and agreed that none of the services performed by the Officer-in-Charge in monitoring, reviewing and reporting project status and progress shall relieve the Contractor of responsibility for planning and managing construction work in conformance with the construction schedule.

(d) When the Contractor foresees a delay in the prosecution of the work and, in any event, immediately upon the occurrence of a delay which the Contractor regards as unavoidable, the Contractor shall notify the Officer-in-Charge in writing of the probability of the occurrence of such delay, the extent of the delay, and its possible cause. The Contractor shall take immediate steps to prevent, if possible, the occurrence or continuance of the delay. If this cannot be done, the Officer-in-Charge shall determine how long the delay shall continue, to what extent the prosecution and completion of the work are being delayed thereby, and whether the delay is to be considered avoidable or unavoidable. The Officer-in-Charge shall notify the Contractor of the Officer-in-Charge's determination. The Contractor agrees that no claim shall be made for delays which are not called to the attention of the Officer-in-Charge at the time of occurrence.

(e) In case the work is not completed in the time specified, including extension of time as may have been granted for unavoidable delays, the Contractor shall be assessed damages for those costs incurred by the County which are attributable to the fact that the work was not completed on schedule.

6.5 Avoidable delays. (a) Avoidable delays in the prosecution of the work shall include delays which could have been avoided by the exercise of care, prudence, foresight and diligence on the part of the Contractor or its subcontractors. Avoidable delays include:

- (1) Delays which may in themselves be unavoidable but which affect only a portion of the work and do not necessarily prevent or delay the prosecution of other parts of the work nor the completion of the whole work within the contract time.
- (2) Time associated with the reasonable interference of other contractors employed by the County which do not necessarily prevent the completion of the whole work within the contract time.

(b) The County may grant an extension of time for avoidable delay if deemed in the County's best interest. If the County grants an extension of time for avoidable delay, the Contractor agrees to pay actual costs, including charges for construction management, engineering and administration incurred during the extension, and other damages incurred by the County. Such time extension shall be included in the contract as a change order pursuant to section 8, Contract Amendments/Change Orders.

6.6 Unavoidable delays. (a) Unavoidable delays in the prosecution or completion of the work shall include delays which result from causes beyond the control of the Contractor and which could not have been avoided by the exercise of care, prudence, foresight and diligence on the part of the Contractor or its subcontractors. Delays in completion of the work of other contractors employed by the County will be considered unavoidable delays insofar as they interfere with the Contractor's completion of the work. Delays due to normal weather conditions

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shall not be regarded as unavoidable as the Contractor agrees to plan work with prudent allowances for interference by normal weather conditions. Delays caused by fire, unusual storms, floods, tidal waves, earthquakes, strikes, labor disputes, freight embargoes and shortages of materials shall be considered as unavoidable delays insofar as they prevent the Contractor from proceeding with at least seventy-five percent (75%) of the normal labor and equipment force for at least four (4) hours per day toward completion of the current controlling item on the accepted critical path schedule.

(b) Should unavoidable delays prevent the work from beginning at the usual starting time, or prevent the Contractor from proceeding with seventy-five percent (75%) of the normal labor and equipment force for a period of at least four (4) hours per day, and the crew is dismissed as a result thereof, the Contractor will not be charged for a working day whether or not conditions change so that the major portion of the day could be considered to be suitable for work on the controlling item.

(c) For delays which the Contractor considers to be unavoidable, the Contractor shall submit to the Officer-in-Charge complete information demonstrating the effect of the delay on the critical path in the construction schedule. The submission shall be made within thirty (30) calendar days of the occurrence which is claimed to be responsible for the unavoidable delay. The Officer-in-Charge shall review the Contractor's submission and determine the number of days of unavoidable delay and the effect of such unavoidable delay on the critical path of the work. The County agrees to grant an extension of time, but no monetary compensation, to the extent that unavoidable delays affect the critical path in the construction schedule. During such extension of time, neither extra compensation or engineering inspection and administration nor damages for delay will be charged to the Contractor. It is understood and agreed by the Contractor and County that time extensions due to unavoidable delays will be granted only if such unavoidable delay involve critical activities which would prevent completion of the whole work within the specified contract time.

6.7 Furnishing of Plans and Specifications. The County will furnish the Contractor with up to six (6) sets of the plans and specifications at no cost to the Contractor. The Contractor shall be responsible for the cost of printing any additional plans and specifications.

6.8 Breakdown of Lump Sum Items. If the bid form calls for a total sum bid without bid items, or contains lump sum items, the Contractor shall submit a detailed cost breakdown of the total sum bid or such lump sum items not less than twenty (20) calendar days following issuance of Notice to Proceed.

6.9 Commencement of Work. The Contractor shall not commence with any work prior to the effective date of the Notice to Proceed.

6.10 Prosecution of the Work. The Contractor shall be available upon reasonable demand to discuss the progress of the services being performed under the contract. All questions arising during the performance of the contract which must be resolved by the Procurement Officer or Officer-in-Charge shall be brought to their immediate attention by Contractor.

6.11 Contractor to Report Errors or Discrepancies. Should the Contractor discover any apparent inconsistencies within the contract documents, discrepancies between the contract documents and the conditions on the ground, or any error or omission in the contract documents

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or instructions, the Contractor shall immediately advise the Officer-in-Charge in writing thereof. If, after discovery, the Contractor elects to perform any work which may require revisions without authorization by the Officer-in-Charge, such work shall be performed solely at the Contractor's risk.

6.12 Authority of the Procurement Officer and Officer-In-Charge. Any question or dispute concerning any provision of the contract which may arise during its performance shall be decided by the Officer-in-Charge. The decisions of the Officer-in-Charge shall be final and binding upon all Parties unless the same is fraudulent, capricious, arbitrary, or so grossly erroneous as necessarily to imply bad faith or is not supported by substantial evidence, provided that decisions on questions or disputes relating to acceptance of the services performed under the contract, suspension or termination of the contract, extension of time, reduction or increase in the compensation of the Contractor and payment shall become final and binding upon all Parties only upon approval of the Procurement Officer, and provided further that nothing herein shall be construed as making final and binding any decision of the Officer-in-Charge and/or Procurement Officer on a question of law. Pending final decision of any dispute or question, the Contractor shall proceed diligently with the performance of services under the contract in accordance with the decision of the Officer-in-Charge and/or Procurement Officer.

6.13 Subcontracting. (a) The Contractor shall not subcontract any part of the contract except to those subcontractors specifically listed in the proposal submitted by the Contractor; provided that the Contractor may, for good cause, engage other subcontractors with the Officer-in-Charge's approval.

(b) Subcontractors and their employees shall be considered employees of the Contractor. Engaging subcontractors to perform any work shall not relieve the Contractor of its duty to complete the work in accordance with the contract.

(c) The Contractor shall replace any subcontractor for not performing in accordance with the contract when required and so notified by the Officer-in-Charge.

6.14 Rate of Wages for Laborers and Mechanics. (a) Every laborer and mechanic performing work on the job site for the construction of the work shall be paid no less than the prevailing wages provided that:

(1) Prevailing wages shall be not less than the wages that the Director of Labor and Industrial Relations, shall have determined to be the prevailing wages for corresponding classes of laborers and mechanics on projects of similar character in the State;

(2) The prevailing wages shall be not less than the wages payable under federal law to corresponding classes of laborers and mechanics employed on public works in the State that are prosecuted under contract or agreement with the government of the United States; and

(3) Notwithstanding the provisions of the contract, the prevailing wages shall be periodically adjusted during the performance of the contract in an amount equal to the change in the prevailing wages as periodically determined by the Director of Labor and Industrial Relations. [§104-2(b), HRS]

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(b) No laborer or mechanic employed on the job site of any public work of the County thereof shall be permitted or required to work on Saturday, Sunday, or a legal holiday of the State or in excess of eight hours on any other day unless the laborer or mechanic receives overtime compensation for all hours worked on Saturday, Sunday, and a legal holiday of the State or in excess of eight hours on any other day. For purposes of determining overtime compensation under this subsection, the basic hourly rate of any laborer or mechanic shall not be less than the basic hourly rate determined by the Director of Labor and Industrial Relations to be the prevailing basic hourly rate for corresponding classes of laborers and mechanics on projects of similar character in the State. [§104-2(c), HRS]

(c) The Contractor or the Contractor's subcontractors shall pay all mechanics and laborers employed on the job site, unconditionally and not less often than once a week, and without deduction or rebate on any account, except as allowed by law, the full amounts of their wages including overtime, accrued to not more than five (5) working days prior to the time of payment, at wage rates not less than those deemed to be prevailing, regardless of any contractual relationship which may be alleged to exist between the Contractor or subcontractor and the laborers and mechanics.

(d) The rates and wages to be paid shall be posted by the Contractor in a prominent and easily accessible place at the job site, and a copy of the rates of wages required to be posted shall be given to each laborer and mechanic employed under the contract by the Contractor at the time each laborer and mechanic is employed, except that where there is a collective bargaining agreement the Contractor does not have to provide the Contractor's employees the wage rate schedules. [§104-2(d), HRS]

(e) The Contractor shall be solely responsible for any increase in rates and wages during the contract.

(f) The County may withhold from the Contractor so much of the accrued payments as the County may consider necessary to pay to the laborers and mechanics employed by the Contractor or any subcontractor on the job site the difference between the prevailing wages and the wages received and not refunded by the laborers and mechanics. [§104-2(e), HRS]

6.15 Payrolls and Payroll Records. (a) A certified copy of all payrolls shall be submitted weekly to the Officer-in-charge for review. The Contractor shall be responsible for the submission of certified copies of the payrolls of all subcontractors. The certification shall affirm that the payrolls are correct and complete, that the wage rates contained therein are not less than the prevailing wages and the classifications set forth for each laborer or mechanic conform with the work the laborer or mechanic performed. Any certification discrepancy found by the County shall be reported to the Contractor and Director of Labor and Industrial Relations. [§104-3(a), HRS]

(b) Payroll records for all laborers and mechanics working at the site of the work shall be maintained by the Contractor and the Contractor's subcontractors during the course of the work and preserved for a period of three (3) years thereafter. The records shall contain the name of each employee, the employees' correct classification, rate of pay, daily and weekly number of hours worked, deductions made and actual wages paid. [§104-3(b), HRS]

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(c) The Contractor shall make payroll records available for examination within ten (10) calendar days from the date of the written request by the County, Director of Labor and Industrial Relations of the State, or any authorized representatives thereof. Any Contractor who:

- (1) Fails to make payroll records accessible within ten (10) calendar days;
- (2) Fails to provide information requested for the proper enforcement of chapter 104-3, HRS, within ten (10) calendar days; or
- (3) Fails to keep or falsifies any record required under chapter 104-3, HRS, shall be assessed a penalty as set forth in section 104-22(b), HRS. [§104-3(c), HRS]

6.16 Prompt Payment By Contractor to Subcontractors and Vendors. (a) Any money, other than compensation retained, paid to the Contractor shall be dispersed to subcontractors and vendors within ten (10) calendar days after receipt of the money in accordance with the terms of the subcontract; provided that the subcontractor met all the terms and conditions of the subcontract and there are no bona fide disputes on which the County has withheld payment. [§103-10.5(a), HRS]

(b) Upon final payment to the Contractor, full payment to the subcontractor, including compensation retained, shall be made within ten (10) calendar days after receipt of money, provided that there are no bona fide disputes over the subcontractor's performance under the subcontract. [§103-10.5(b), HRS]

(c) Where a subcontractor has provided evidence to the Contractor of satisfactorily completing all work under their subcontract and has provided a properly documented final payment request as described in (b) above, and:

- (1) Has provided the Contractor an acceptable performance and payment bond for the work under the contract executed by a surety company authorized to do business in the State of Hawaii, as provided in Section 103-32.1, HRS; or
- (2) The following has occurred:
 - (A) A period of ninety (90) days) after the day on which the last of the labor was done or performed and the last of the material was furnished or supplied has elapsed without written notice of a claim given to Contractor or surety, as provided in section 103D-324, HRS; and
 - (B) The subcontractor has provided to the Contractor:
 - (I) An acceptable release of retainage bond, executed by a surety company authorized to do business in the State, in an amount of not more than two times the amount being retained or withheld by the Contractor;
 - (ii) Any other bond acceptable to the Contractor; or

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- (iii) Any other form of mutually acceptable collateral, all sums retained or withheld from a subcontractor and otherwise due to the subcontractor for satisfactory performance under the subcontract shall be paid by the Procurement Officer to the Contractor and subsequently, upon receipt from the Procurement Officer, by the Contractor to the subcontractor within the applicable time periods specified in subsection (b) and section 103-10. If the Procurement Officer or the Contractor fails to pay in accordance with this section, a penalty of one and one-half per cent per month shall be imposed upon the outstanding amounts due that were not timely paid by the responsible party. The penalty may be withheld from future payment due to the Contractor, if the Contractor was the responsible party. If a contractor has violated subsection (b) three or more times within two years of the first violation, the Contractor shall be referred by the Procurement Officer to the Contractor license board for action under section 444-17(14), HRS.

(d) A properly documented final payment request from a subcontractor, as required by subsection (c), shall include:

- (1) Substantiation of the amounts requested;

- (2) A certification by the subcontractor, to the best of the subcontractor's knowledge and belief, that:

- (A) The amounts requested are only for performance in accordance with the specifications, terms, and conditions of the subcontract;

- (B) The subcontractor has made payments due to its subcontractors and suppliers from previous payments received under the subcontract and will make timely payments from the proceeds of the payment covered by the certification, in accordance with their subcontract agreements and the requirements of this section; and

- (c) The payment request does not include any amounts that the subcontractor intends to withhold or retain from a subcontractor or supplier in accordance with the terms and conditions of their subcontract; and

- (3) The submission of documentation confirming that all other terms and conditions required under the subcontract agreement have been fully satisfied.

The Procurement Officer shall return any final payment request that is defective to the Contractor within seven days after receipt, with a statement identifying the defect.

(e) In the case of a construction contract, a payment request made by a contractor to the Procurement Officer that includes a request for sums that were withheld or retained from a subcontractor and are due to a subcontractor may not be approved under subsection (c) unless the

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payment request includes:

- (1) Substantiation of the amounts requested; and
- (2) A certification by the Contractor, to the best of the Contractor's knowledge and belief, that:
 - (A) The amounts requested are only for performance in accordance with the specifications, terms, and conditions of the contract;
 - (B) The subcontractor has made payments due to its subcontractors and suppliers from previous payments received under the contract and will make timely payments from the proceeds of the payment covered by the certification, in accordance with their subcontract agreements and the requirements of this section; and
 - (C) The payment request does not include any amounts that the Contractor intends to withhold or retain from a subcontractor or supplier in accordance with the terms and conditions of their subcontract.

The Procurement Officer shall return any final payment request that is defective to the Contractor within seven days after receipt, with a statement identifying the defect.

(f) This section shall not be construed to impair the right of a contractor or a subcontractor at any tier to negotiate and to include in their respective subcontracts provisions that provide for additional terms and conditions that are requested to be met before the subcontractor shall be entitled to receive final payment under subsection (c) of this section; provided that any such payments withheld shall be withheld by the Procurement Officer.

6.17 Termination of Work on Failure to Pay Agreed Wages. If the County finds that any laborer or mechanic employed on the job site by the Contractor or any subcontractor has been or is being paid wages at a rate less than the required rate by the contract or specifications, or has not received the laborer's or mechanic's full overtime compensation, the County may, by written notice to the Contractor, terminate the Contractor's right, or the right of any subcontractor, to proceed with the work or with the part of the work in which the required wages or overtime compensation have not been paid and may complete such work or part by contract or otherwise, and the Contractor and the Contractor's sureties shall be liable to the County for any excess costs occasioned thereby. [§104-4, HRS]

6.18 Vehicular and Pedestrian Traffic, Public Convenience, and Safety. (a) If the project requires the closing or obstruction of any public thoroughfare, the Contractor shall comply with the Manual on Uniform Traffic Control Devices, U. S. Department of Transportation, Federal Highway Administration, and the Maui Traffic Code of the Maui County Codes, 1980, as amended.

(b) No pedestrian or vehicular traffic within public rights of way shall be altered without authorization from the Hawaii State Department of Transportation, Department of Public Works and Environmental Management, Police Department, and Department of Fire and Public Safety.

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(c) The Contractor shall minimize, to the extent possible, hazardous conditions; shall provide additional safety devices as deemed prudent; shall maintain all signs, signals, lighting devices, markings, and barricades provided to minimize public inconvenience; and shall exercise safety practices during all hours of the day for as long as such hazardous conditions exist. The Contractor shall prudently extend applicable provision of this subsection to areas, other than streets and highways, which involve the project.

(d) The presence of inspectors on the project or their oversight to discover or to point out any noncompliance on the part of the Contractor shall not relieve the Contractor from its responsibility under this subsection.

6.19 Work on Weekends and Holidays, Night Work, and Overtime Work. (a) No work, except for resolution of an emergency event, shall be performed on Saturdays, Sundays, or State/County recognized legal holidays, unless authorized by the Officer-in-Charge.

(b) No work shall be performed between sunset and sunrise, unless required by the contract documents or authorized by the Officer-in-Charge.

(c) No work in excess of eight (8) hours per day or in excess of forty (40) hours per week shall be performed unless authorized by the Officer-in-Charge.

(d) The Contractor shall be responsible for costs incurred by the County under paragraphs (a), (b), and (c).

6.20 Value Engineering. (a) Except with specific approval from the Officer-in-Charge, this subsection shall be applicable only if the contract price is in excess of \$100,000 and will result in a net savings in the project of at least \$1,000.

(b) Any cost reduction proposal intended to be considered as a value engineering change proposal (VECP) shall be so identified as a value engineering change proposal and submitted to the Officer-in-Charge.

(c) In order that any proposal be accepted as a VECP, it must result in a net cost savings to the County by providing a system, structure, procedure or process better than the design specified or by providing less costly items than those specified in the contract documents without impairing any of their essential functions and characteristics such as service life, reliability, economy of operation, ease of maintenance, and necessary standardized features. [§103-49, HRS]

(d) With the submission of any VECP, the Contractor shall submit the following information:

(1) A description of the difference between the existing contract requirements and the VECP, and the comparative advantages and disadvantages of each;

(2) An itemization of the requirements of the contract which must be changed if the VECP is accepted and recommendations as to how each change should be made;

(3) An estimate of the reduction in construction costs or the net cost savings to

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the County that would result from acceptance of the VECP, taking into account the costs of implementation by the Contractor, including costs attributable to subcontractors, and the basis of the estimate;

(4) A prediction of effects the VECP would have on other costs to the County, such as County-furnished property costs, costs of related items, and costs of maintenance and operations;

(5) A statement of the time by which a change order accepting the VECP should be issued to obtain the maximum cost reduction during the remainder of the contract period, noting any effect on the contract period; and

(6) The dates of any previous submissions of the value engineering change proposals, the number of any governmental contracts under which submitted and the previous actions by the various branches of government.

(e) The submission of any VECP by the Contractor and the receipt thereof by the Officer-in-Charge, or verbal acceptance of any VECP by any employee, assign, or agent of the County shall not obligate the County to accept or approve any such proposal. The Contractor shall comply with the provisions of the contract until such time that a VECP is approved.

(f) The County may accept in whole or in part any VECP. Its decision in the acceptance of any VECP is final. The County will approve value engineering change proposals by issuing change orders.

(g) The Contractor may restrict the County's right to use any sheet of a value engineering change proposal or of the supporting data in accordance with the terms of the following legend if it is marked as follows on such the sheet:

"This data furnished pursuant to a value engineering incentive clause shall not be duplicated, used, or disclosed, in whole or in part, for any purpose other than to evaluate a value engineering change proposal submitted under said clause. This restriction does not limit the County's right to use information contained in this data if it is or has been obtained from another source, or is otherwise available, without limitations. If after use of the data in evaluating a value engineering change proposal, the County accepts the proposal by issuing a change order, the County shall have the right to duplicate, use, and disclose any data pertinent to the proposal as accepted, in any manner and for any purpose whatsoever, and authorize others to do likewise."

(h) If the VECP is approved, the Contractor grants to the County all rights to use, duplicate or disclose in whole or part, in any manner and for any purpose, and to have or permit others to do likewise, any data reasonably necessary to fully utilize such a proposal. Contract modifications made as a result of this clause will state that they are made pursuant to it.

(I) If a VECP is accepted, affected portions of the construction plans and specifications shall be modified by change order.

(j) An equitable adjustment shall be made in the contract price so that the Contractor

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will share a portion of the realized cost reduction.

(k) If a VECP is accepted, an adjustment shall be made to the contract time, as required.

(l) Previously accepted or previously submitted but not accepted value engineering change proposals under other contracts, or both, may be submitted for consideration; provided that previously accepted value engineering change proposals under other contracts shall not be grounds for automatic acceptance under the contract.

(m) The County may impose, as a condition of acceptance of any VECP, a requirement that the Contractor warrants the statements, claims, and other information contained in the VECP regarding essential functions and characteristics such as service life, reliability, economy of operation, ease of maintenance, and desired appearance, such warranty to be for an appropriate period to be determined by the County.

(n) The determination of the proposed VECP shall be at the County's sole discretion and the decision will be final.

(o) The County shall not be liable for costs or delays incurred by the Contractor regarding the County's determination with respect to a proposed VECP including development costs, anticipated profits, and increased material or labor costs. Non conforming work and the annulment of VECP review shall not be the basis of claim against the County including claims for delay.

6.21 Plans to Be Furnished by the Contractor. (a) Working or shop drawings shall be submitted only by the Contractor for approval by the Officer-in-Charge. Upon approval by the Officer-in-Charge, such drawings shall become part of the contract documents. The Contractor shall not proceed with work and shall not order any material, equipment, or device affected by such drawings, until such drawings are approved by the Officer-in-Charge.

(b) The Contractor shall submit six (6) copies of working or shop drawings and/or catalog cuts for fabricated items and manufactured items (including mechanical and electrical equipment). Submission shall be made in sufficient time to allow the Officer-in-Charge not less than twenty-one (21) calendar days for examining submissions, unless such submissions are for major equipment that requires review by more than one engineering discipline, in which case the time period shall be increased to thirty (30) calendar days.

(c) Drawing size shall be (8.5" x 11"), (11" x 17"), or (24" x 36"). Drawings shall be accurate, distinct, and complete, and shall contain all required information, including satisfactory identification of items, units, and assemblies in relation to the contract drawings and specifications.

(d) The Contractor shall mark drawings by a signed stamp, or other approved means, indicating that the Contractor has checked the shop drawings, and that the work shown is in accordance with contract requirements and has been checked for dimensions and relationship with work of all other trades involved. The practice of submitting incomplete or unchecked drawings will not be acceptable and will be returned to the Contractor for re-submission in the proper form.

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(e) After the Officer-in-Charge's review, two (2) sets of submissions will be returned to the Contractor appropriately stamped. If major changes or corrections are necessary, the drawings may be rejected and will be returned to the Contractor with one (1) set of the submissions indicating such changes or corrections, and the Contractor shall correct and resubmit six (6) revised copies. No changes shall be made by the Contractor to resubmitted shop drawings other than those changes indicated by the Officer-in-Charge.

(f) The Officer-in-Charge's review of shop and working drawings and catalog cuts shall not relieve the Contractor from responsibility for correctness of dimensions, fabrication details, and space requirements.

(g) Operation and maintenance data shall be assembled in three ring binders (Slant "D" style), which shall be indexed and tabbed. The Contractor shall provide six (6) copies of originals (not photocopies) of the operation and maintenance data to the Officer-in-Charge.

6.22 Contract Documents to Be Kept on the Project Site. The Contractor shall keep a copy of the contract documents at the project site, and in such a location where they shall be readily accessible for reference.

6.23 Additional Plans to Be Furnished by the Officer-in-Charge. The construction plans are intended to be fairly comprehensive and indicate in detail the scope of the work. If during the progress of construction, the Contractor should request supplemental plans to clarify or define in greater detail the intent of the contract documents, the Officer-in-Charge may furnish such supplemental plans, and such additional plans shall become a part of the contract documents, and the Contractor shall perform the work in conformance with such supplemental plans.

6.24 Personal Supervision. (a) The Contractor shall either be personally present or have a responsible representative, authorized to act on behalf of the Contractor, at the project site at all times.

(b) The Contractor shall provide the Officer-in-Charge, in writing, with the name(s) of the Contractor's representative(s).

6.25 Character of Workers, Methods, and Equipment. (a) The Contractor shall employ persons who possess the skills required to perform the work under the contract.

(b) When required by the Officer-in-Charge, the Contractor shall replace any employee who lacks the skill to perform the work assigned to such employee, or is discourteous or disorderly while performing such work. A person who has been replaced may be assigned other work with the approval of the Officer-in-Charge.

(c) The Contractor shall use proper and efficient methods and equipment based upon standard construction industry practices for the performance of the contract.

6.26 Lines and Grades. (a) The laying out of base lines, establishment of grades and staking out the entire work shall be done by a surveyor or civil engineer licensed in the State of Hawaii at the expense of the Contractor, and the Contractor shall be solely responsible for their

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accuracy. The Contractor shall be responsible for costs of replacing the horizontal and vertical control points or monuments if disturbed or destroyed by the Contractor.

(b) Should any discrepancy be discovered in the dimensions given in the plans, the Contractor shall immediately notify the Officer-in-Charge before proceeding any further with the work, otherwise the Contractor will be held responsible for any costs involved in correction of construction placed due to such discrepancy.

6.27 Contractor's Entry upon Private Properties. Unless explicitly stated in the contract documents or informed in writing by the Officer-in-Charge, the Contractor is not authorized to enter any property other than the project site. If the Contractor enters any property, whether authorized by the landowner or any other person claiming an interest in the property, or without any authorization, and causes property damage, personal injury, or wrongful death thereupon, the Contractor shall be responsible to settle any and all claims made by the landowner or person claiming an interest in the property.

6.28 Existing Underground Improvements. (a) Whenever the existence of drainage, gas, oil, sewer, or water pipelines (if applicable, see also Article 301.10 of the Water Systems Standards); cable TV, electric, or telephone lines, or other underground utility facilities are indicated in the construction plans, or are not indicated in the construction plans, but inquiries indicate their existence, the Contractor shall exercise utmost caution, keeping in mind the possible existence of unrecorded laterals and other incidental facilities, and protect all such improvements from damage. The Contractor shall be responsible for any and all damages to all such improvements resulting from its operations.

(b) The Contractor is not eligible for additional compensation and shall not make any claims against the County for extra effort required to prevent any damages or extra work caused or resulting from its operations under this subsection.

6.29 Quality of Materials. All materials furnished and installed shall be new, be of standard quality of their respective kinds, and be free of defects. Rejected materials must be removed from the project site immediately or within such time as allowed by the Officer-in-Charge and replaced with materials of the quality required by the contract documents. Failure by the Officer-in-Charge to reject materials or to require the removal of such rejected materials shall not relieve the Contractor from responsibility as to the quality and character of materials used on the project.

6.30 Defective Work. Any defective work which may be discovered before the completion of the work shall be corrected as soon as possible. The fact that the Officer-in-Charge may not be aware of defective work shall not constitute the acceptance of the same. Payment, whether partial or final, shall not be construed to be an acceptance of defective work or improper material.

6.31 Inspectors. (a) The Officer-in-Charge may place inspectors on the project. They shall have free access to inspect any and all portions of the project at all times and shall be afforded all means to inspect the materials furnished and work performed on the project. No defective or noncomplying material or workmanship will be considered as accepted as a consequence of the failure of the inspectors to discover or to point out said defects or deficiencies during the construction; nor will the presence of inspectors on the project relieve the Contractor

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from responsibility for securing the quality and progress of work required by the contract documents.

(b) The inspectors may not alter or waive the provisions of the contract, issue instructions contrary to the contract, or act as foreman for the Contractor. The inspectors shall be free to perform their duties at all times and any intimidation of any inspector by the Contractor or the Contractor's agents or employees, shall be sufficient reason for the County to terminate the contract.

(c) If the Contractor wishes to work at such time of the day which is during the period other than the regular business hours of the County, or on a Saturday, Sunday, or legal State/County holiday, the Contractor shall submit a written request to the Officer-in-Charge for inspection services during such period not less than forty-eight (48) hours in advance of the time when such inspection services are required. If the Contractor's request is granted, the Contractor shall pay the County at the rate per hour designated by the County for each inspector provided. A deposit of legal tender or certified check in an amount estimated by the County to be the cost of be incurred by the County. The Contractor shall be refunded any unused portion of the deposit or be responsible for additional payment based on actual cost incurred by the County for the additional inspection. The County may reject the request for additional inspection services, and consequently deny the Contractor's request to work overtime if inspectors are not available during the period the Contractor is planning to work.

6.32 Findings Confidential. Any reports, information, or data which the County deems confidential and is given to or prepared or assembled by the Contractor under the contract shall not be made available to any individual or entity by the Contractor without the prior written approval of the Officer-in-Charge.

6.33 Ownership Vested in County. It is expressly understood that any and all equipment, materials, data, information, results and any other thing derived or obtained directly or indirectly as a result of the contract, including, but not limited to, equipment, materials, data, information, and results shall be the sole and exclusive property of the County and that the Contractor shall have no interest, right or title to or in any of the foregoing.

6.34 Pollution. In accordance with section 103D-411, HRS, the Contractor shall control any pollution in accordance with applicable federal, state, and county regulations when pollution is encountered in the performance of the contract. The Contractor shall immediately notify the Officer-in-Charge if pollution is encountered in the performance of the contract.

6.35 Best Efforts. Contractor agrees that it will, at all times, faithfully, industriously, and to the best of Contractor's ability, experience and talents, perform all of the duties that may be required of Contractor pursuant to the express and implicit terms hereof to the reasonable satisfaction of the County, as determined by the Officer-in-Charge.

6.36 Clean up. Upon the completion of the work, the Contractor shall remove all temporary structures, surplus materials, rubbish, and obstructions. Should the Contractor fail to do so, the Officer-in-Charge may undertake the work and deduct the cost of performing such work from compensation due the Contractor.

6.37 Responsibility of the Contractor Prior to Final Acceptance of the Work. The

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Contractor shall be responsible for the work until final acceptance by the County. Use of any portion of the work which may be necessitated by tie-ins to existing and live water systems and which portion of the work must be kept live and use of other portions of the work other than water system improvements by the public, with or without permission by the County, shall not be construed as an acceptance of the work and shall not relieve the Contractor from its responsibility hereunder.

6.38 Substantial Completion. (a) The Contractor, on considering the work to be substantially complete and ready for its intended use, shall so notify the Officer-in-Charge in writing. The notification shall include an itemized list of remaining incomplete work. If the Officer-in-Charge determines that the work is not substantially complete, the Officer-in-Charge will so notify the Contractor in writing identifying the reasons for such a determination. If the Officer-in-Charge finds the work substantially complete, the Officer-in-Charge will meet with the Contractor to:

- (1) prepare a punch list of incomplete items of work;
- (2) define the division of responsibility between County and Contractor with respect to security, operation, maintenance, heat, utilities, insurance, and warranties; and
- (3) describe any other issues related to acceptance of the substantially completed work.

The Officer-in-Charge will notify the Contractor in writing of the terms of the County's acceptance of substantial completion. The written notification shall include a punch list of incomplete work items, set the date for their completion, describe the division of responsibility between the County and Contractor, and describe any other terms of acceptance of substantial completion. The Contractor shall acknowledge, in writing, acceptance of all terms specified in the written notice before the project is determined substantially complete by the County.

(b) Upon receipt of the Contractor's written acknowledgment, the County shall take possession of the work or portion of the work and put it into its intended service. The date that the work or portion of the work is put into service will become the date of substantial completion.

(c) Subsequent to the substantial completion date, the County may exclude the Contractor from the work during such periods when construction activities might interfere with the operation of the project. The County, however, shall allow the Contractor reasonable access for completion or correction of incomplete punch list items.

(d) Except for any portion(s) of work specified for early completion or required by the County for early possession, substantial completion will not occur for any work until the entire project is ready for possession and use.

(e) The Officer-in-Charge shall have sole discretion for determination of substantial completion.

6.39 Possession of Portions of the Project. Should the Contractor fail to meet any date specified for substantial completion of the work or any portion of the work requiring early

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possession and use by the County, the County may, after a 10-day written notice to the Contractor, take over such portion or all of the work that is behind schedule. In such case, the Officer-in-Charge will prepare a punch list of incomplete work. The County may allow the Contractor reasonable access to the work at such times that the operation of the project will not be affected or the County may complete the work itself after giving the Contractor notice of the County's intention to do so. The cost of County's work will be charged to and deducted from amounts due to the Contractor. The substantial completion date will be established as the date when the County actually begins using the project or portion of the project for its intended purpose. Division of responsibilities between the County and Contractor, beginning of warranties, and any other issues relating to substantial completion shall be as specified in the contract.

6.40 Acceptance of the Project. (a) Upon completion of the work, including portions of the work previously accepted as substantially complete, the Contractor shall so notify the Officer-in-Charge in writing. Upon receipt of the notification, the Officer-in-Charge will determine if the work conforms to the terms of the contract. If the Officer-in-Charge finds materials, equipment, or workmanship which do not meet the terms of the contract, the Officer-in-Charge shall prepare a punch list of such items and submit it to the Contractor. Following completion of the corrective work by the Contractor, the Contractor shall notify the Officer-in-Charge that the work has been completed in accordance with the contract. Final determination of the acceptability shall be made by the Officer-in-Charge. Upon acceptance of the project, the Officer-in-Charge shall immediately file a notice of completion. For portions of the project not previously accepted as substantially complete, the conditions of guarantee shall commence on the date that the Officer-in-Charge files a notice of completion.

(b) The final application for payment shall be accompanied by all required documentation called for in the contract including complete and legally effective releases or waivers of liens in a form acceptable to the County. Subject to prior approval of the County, the Contractor may submit in lieu of the lien releases and waivers: (1) receipts of releases in full; (2) an affidavit that the releases and receipts cover all labor, services, materials, and equipment for which a lien could be filed and that all payrolls, materials, and equipment bills and other indebtedness connected with the work for which the County or the County's property might in any way be responsible have been paid or otherwise satisfied; and (3) consent of the surety, if any, to final payment.

(c) If any subcontractor or supplier fails to furnish a release or receipt in full, Contractor may furnish a bond or other collateral satisfactory to the County to indemnify the County against any lien.

(d) If, after reviewing the Contractor's final application for payment including all documentation required, the Officer-in-Charge determines that the work is complete, the Officer-in-Charge will recommend that final payment, including all retainages, be made by the County. The final payment will be due and payable by the County within thirty (30) days after any legal notice periods have expired.

6.41 Warranty. (a) The Contractor and Contractor's sureties shall be responsible for the work for a period of one (1) year following final acceptance to be free from defects in workmanship and materials. Product warranties, as applicable, beyond the one (1) year Contractor warranty shall be secured in the name of the County of Maui and furnished to the

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County prior to final payment request.

(b) The performance and payment bond shall remain in force during the Contractor's warranty period, or the Contractor may elect to withdraw the performance and payment bond and deposit a replacement bond in an amount not less than ten percent (10%) of the final contract price; provided that the Contractor and Contractor's sureties for the replacement bond shall be responsible for any and all costs which exceed the replacement bond amount during the warranty period.

(c) The Contractor and Contractor's sureties shall be responsible for the repair or replacement, or both, of all defective work or materials.

(d) If the Contractor or Contractor's sureties fail to perform the responsibilities under this subsection in a timely manner, the Officer-in-Charge may undertake or cause the undertaking of such work, and the Contractor and Contractor's sureties shall be responsible for all costs thereunder.

(e) If the work or any portion thereof fails, and the Officer-in-Charge determines that the public's safety, health, or welfare is jeopardized, the Officer-in-Charge may, with or without notice to the Contractor or the Contractor's surety, undertake the repair or replacement work, and the Contractor and Contractor's sureties shall be responsible for all costs incurred by the County.

Section 7 - Compensation

7.1 Compensation. The Contractor shall be paid the amount stated in the contract less any reduction in compensation and plus any increase in compensation pursuant to the contract change order and modification sections herein, as full compensation for the performance of the services under the contract.

7.2 Compensation Retained. (a) The County may retain a portion of the amount due under the contract to the Contractor to insure proper performance of the contract, provided that the sum withheld shall not exceed five percent (5%) of the amount due the Contractor and that after fifty percent (50%) of the contract is completed and progress is satisfactory, no additional sum shall be withheld; provided further that if progress is not satisfactory, the Procurement Officer may continue to withhold as compensation retained sums not exceeding five percent (5%) of the amount due the Contractor; provided further that the compensation retained shall not include sums deducted and withheld separately as liquidated damages from moneys due or that may become due the Contractor under the contract.[§103-32.1(a), HRS]

(b) The retention amount withheld by the Contractor from its subcontractors shall be the same percentage of compensation retained as that of the Contractor, provided that the subcontractor has provided evidence to the Contractor of:

(1) A valid performance and payment bond for the project that is acceptable to the Contractor and executed by a surety company authorized to do business in the State of Hawaii;

(2) Any other bond acceptable to the Contractor; or

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- (3) Any other form of collateral acceptable to the Contractor.

This subsection shall also apply to the subcontractors who subcontract work to other subcontractors. [§103-32.1(b), HRS]

(c) The County may enter into an agreement with the Contractor which will allow the Contractor to withdraw from time to time the whole or any portion of the sum retained under sub-paragraph (a) upon depositing with the County any general obligation bond of the State or its political subdivisions with a market value not less than the sum to be withdrawn; provided that the County may require that the total market value of such bond be greater than the sum to be withdrawn. [§103-32.2, HRS]

7.3 Monthly Progress Payments. (a) The County shall pay the Contractor monthly progress payments based on the actual quantities of work done and the actual quantities of materials delivered to and safely stored at a site approved by the County. The Contractor shall submit monthly progress payment request to the Officer-in-Charge no later than the fifth (5th) day of each month for work performed during the previous calendar month.

(b) Subject to the retainage provisions of subsection 7.2, Compensation Retained, the County shall pay the Contractor an amount equal to the value of the completed and installed portion of the work for which the Contractor certifies has not previously been paid. The County shall also pay the Contractor for seventy-five percent (75%) of the value of materials furnished, delivered and stored in an approved manner, provided that:

(1) A copy of the paid receipts for the stored materials must be submitted with the pay estimate;

(2) Fire and Standard Extended Coverage Insurance is required if payment for stored materials is requested; and

(3) Payment for perishable stored materials, such as live plants and similar materials, will not be allowed.

(c) The Officer-in-Charge may decline to process a progress payment request if the total value of the work done since last estimate is less than \$1,000.

(d) Monthly progress payments may be subject to compensation retained.

7.4 Death or Disability of Contractor. In the case of an individual Contractor, if the Contractor dies or becomes physically or mentally disabled, the Contractor or the Contractor's estate shall be compensated in the same proportion of the compensation under the contract as the services performed bear to the services to be performed under the contract.

7.5 Campaign Contributions Prohibited. It is understood and agreed by the Parties that no portion of the Contractor's compensation to be paid under the terms of the contract shall be used as a campaign contribution.

7.6 Authority to Withhold Money Due or Payable. The Procurement Officer may withhold such amounts from the money due or to become payable under the contract to the Contractor, or any assignee thereof, as may be necessary to protect the County against liability, to

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satisfy the obligations of the Contractor to the County, employees, subcontractors and material men who have performed labor or furnished material and equipment under the contract, or to satisfy any outstanding debts owed to the County by the Contractor and may make such payments from such amounts as may be necessary to discharge such obligations, satisfy County debts and protect the County.

7.7 Final Payment - Final Acceptance. (a) Final payment will be made only after the issuance of a notice of final approval and acceptance by the Officer-in-Charge advising the Contractor of the satisfactory fulfillment of the terms of the contract, provided that the Director of Finance has determined that the Contractor has fully satisfied all outstanding debts to the County. Acceptance by the Contractor of the final payment shall constitute payment in full for all services performed under the contract.

(b) Upon completion and acceptance of the work under the contract, the County shall pay the Contractor the balance due after deducting previous payments and amounts to be retained or deducted according to the contract.

(c) The County shall not make final payment until the following is received:

(1) Written consent of the Contractor's sureties on the Contractor's bonds;

(2) Tax clearance certificate from the State Director of Taxation stating that all delinquent taxes levied or accrued against the Contractor have been paid. The tax clearance for final payment shall be an original certificate with a green certified copy stamp, not over two (2) months old, with box 3a of the application completed for a specific job number, and indicating tax clearances from the Hawaii State Department of Taxation and the Internal Revenue Service on Tax Clearance Application A-6;

(3) An affidavit stating that payment due to all subcontractors and all persons, companies, corporations for labor, tools, materials, and equipment used in the prosecution of the work under the contract have been paid or have been satisfactorily secured; and

(4) A "Certification of Compliance for Final Payment" (SPO Form-22).

Section 8 - Contract Amendments/Change Orders

8.1 Change Order. In accordance with sections 103D-202, HRS and 3-125-4, HAR, the Procurement Officer, at any time, and without notice to any surety, in a signed writing designated or indicated to be a change order, may make changes in the work within the scope of the contract as may be found to be necessary or desirable. Such changes shall not invalidate the contract or release the sureties, and the Contractor shall perform the work as changed, as though it had been part of the original contract. Minor changes in the work may be directed by the Procurement Officer with no change in contract price or time of performance.

8.2 Adjustments of Price or Time for Performance. In accordance with section 3-125-4, HAR, if any change order increases or decreases the Contractor's cost of, or the time required for performance of any part of the work under the contract, whether or not changed by the order, an adjustment may be made and the contract modified in writing accordingly.

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(a) Any adjustment in contract price shall be determined in accordance with Section 11-Price Adjustment Clause.

(b) Failure of the parties to agree to an adjustment in time shall not excuse a Contractor from proceeding with the contract as changed, provided that the Procurement Officer, within fourteen (14) days after the changed work commences, makes such provisional adjustments in time as the Procurement Officer deems reasonable.

(c) The right of the Contractor to dispute the contract price or time required for performance or both shall not be waived by its performing the work, provided however, that it follows written notice requirements for disputes and claims established by the contract.

(d) The County may choose to formalize a change to the scope of work or contract time by a contract amendment.

8.3 Time Period for Claim. Within thirty (30) days after receipt of a written change order under paragraph 8.1, unless such period is extended by the Procurement Officer in writing, the Contractor shall file a notice of intent to assert claim for an adjustment. The requirement for timely written notice cannot be waived and shall be a condition precedent to the assertion of a claim.

8.4 Claim Barred After Final Payment. No claim by the Contractor for an adjustment hereunder shall be allowed if written notice is not given prior to final payment under the contract.

8.5 Other Claims Not Barred. In the absence of such a change order, nothing in this section shall restrict the Contractor's right to pursue a claim arising under the contract or for breach of contract.

Section 9 - Stop Work Orders

9.1 Suspension of Work. The Procurement Officer may, by written order, suspend the performance of the work, either in whole or in part for periods as the Procurement Officer may deem necessary for any cause, including but not limited to:

- (a) Weather or soil conditions considered unsuitable for prosecution of the work;
- (b) Failure on the part of the Contractor to:
 - (1) Correct conditions unsafe for the general public or for the workers;
 - (2) Carry out orders given by the Procurement Officer;
 - (3) Perform the work in strict compliance with the provisions of the contract;
or
 - (4) Provide adequate supervision on the job site.

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(c) Whenever a redesign that may affect the work is deemed necessary by the Procurement Officer;

(d) Unacceptable noise or dust arising from the construction even if it does not violate any law or regulation; or

(e) The convenience of the County.

9.2 Partial and Total Suspension. Suspension of work on some but not all items of work shall be considered a "partial suspension". Suspension of work on all items shall be considered "total suspension". The period of suspension shall be computed from the date set out in the written order for work to cease until the date of the order for work to resume.

9.3 Reimbursement to Contractor. In the event that the Contractor is ordered by the Procurement Officer in writing as provided herein to suspend all work under the contract in accordance with paragraph (c), (d), or (e) of subsection 9.1, Suspension of Work, the Contractor may be reimbursed for actual money expended towards the project during the period of suspension. No allowance will be made for anticipated profits.

9.4 Cost Adjustment. If the performance of all or part of the work is suspended for reasons beyond the control of the Contractor, an adjustment shall be made for any increase in the cost of performance of the contract (excluding profit) necessarily caused by such suspension, and the contract modified in writing accordingly. However, no adjustment shall be made under this clause for any suspension:

(a) To the extent that performance would have been so suspended, delayed, or interrupted by any other cause, including the fault or negligence of the Contractor; or

(b) For which an adjustment is provided for or excluded under any other provision of the contract.

9.5 Claims For Adjustment. Any adjustment in contract price made pursuant to this clause shall be determined in accordance with the provisions on changes and claims for adjustment. Claims for compensation shall be filed in writing with the Procurement Officer within thirty (30) days after the date of the order to resume work or the claims will not be considered. Together with the claim, the Contractor shall submit substantiating documents covering the entire amount shown on the claim. The Procurement Officer shall take the claim under consideration, may make such investigations as are deemed necessary, and shall be the sole judge as to the equitable nature of the claim. The Procurement Officer's decision shall be final.

9.6 No Adjustment. No provision of this section shall entitle the Contractor to any adjustments for delays due to failure of surety, suspensions made at the request of the Contractor, any delay required under the contract, or suspensions, either partial or whole, made by the Procurement Officer under paragraph (b) of subsection 9.1, Suspension of Work.

Section 10 - Variations in Estimated Quantities

10.1 Variations Requiring Adjustments. Where the estimated quantity of a pay item

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in the contract is an estimated quantity and where the actual quantity of such pay item varies by more than fifteen percent (15%) above or below the estimated quantity in the contract, an adjustment in the contract price shall be made upon demand of either party. The adjustment shall be based upon any increase or decrease in costs due solely to the variation above one hundred fifteen percent (115%) or below eighty five percent (85%) of the estimated quantity. If the quantity variation is such as to cause an increase in the time necessary for completion, the Procurement Officer shall, upon receipt of a timely written request for an extension of time, prior to final payment of the contract, ascertain the facts and make such adjustment for extending the completion date as in the judgment of the Procurement Officer the findings justify.

10.2 Adjustment of Price. Any adjustment in contract price shall be determined in accordance with Section 11 - Price Adjustment Clause.

Section 11 - Price Adjustment Clause

11.1 Price Adjustment. Any adjustment in contract price pursuant to a clause in the contract shall be made in one or more of the following ways:

- (a) By agreement on a fixed price adjustment before commencement of the pertinent performance;
- (b) By unit prices specified in the contract or subsequently agreed upon before commencement of the pertinent performance;
- (c) By the costs attributable to the events or situations under such clauses with adjustment of profit or fee, all as specified in the contract or subsequently agreed upon before commencement of the pertinent performance;
- (d) In any other manner as the parties may mutually agree upon before commencement of the pertinent performance; or
- (e) In the absence of agreement between the Parties, the provisions of section 103D-501(b)(5), HRS shall apply.

11.2 Submission of cost or pricing data. The contractor shall be required to submit cost or pricing data if any adjustment in contract price is subject to the provisions of section 103D-312, HRS (Cost or pricing data), as amended. The submission of any cost or pricing shall be made subject to the provisions of subchapter 15, chapter 3-122, HAR. A fully executed change order or other document permitting billing for the adjustment in price under any method listed in paragraphs 11.1(a) through 11.1(d) shall be issued within ten days after agreement on the method of adjustment.

11.3 Determining Adjustments in Price. (a) In determining the adjustment in price to the County resulting from a change, the allowances for all overhead, extended overhead resulting from adjustments to contact time (including home office and branch office overhead) and profit combined shall not exceed the percentages set forth below:

- (a) For the Contractor, for any work performed by its own forces, twenty percent

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(20%) of the cost;

(b) For each subcontractor, for any work performed by its own forces, twenty percent (20%) of the cost;

(c) For the Contractor or any subcontractor, for work performed by their subcontractors, ten percent (10%) of the amount due the performing subcontractor.

In no event shall overhead and profit exceed a total of twenty percent (20%) of direct costs, regardless of the number of tier subcontractors.

(a) The Contractor may add up to one percent (1%) of direct costs for bonds.

(b) If the bid contains lump sum items, the Officer-in-Charge may delete the lump sum item, which shall be deducted from the contract price based on the bid price of the lump sum item.

(c) If the bid contains unit price items, the Officer-in-Charge may increase or decrease the quantities of such items, or delete such items in their entirety. If quantities are increased, the Contractor shall perform such work at the unit price bids for such items. If quantities are decreased or such unit price items are deleted in their entirety, the deductions from the contract price shall be based on the unit price bids for such items.

11.4 Change Order Work by Force Account. (a) Compensation for change work by force account (time and expenses basis) shall be an amount equal to the sum of the following items:

(1) The cost to the Contractor of all material delivered for the change order work evidenced by bills or vouchers;

(2) The cost of all labor including foremen, except general superintendence, necessary to incorporate the above material in the change work or to finish the change order if no material are required, to be determined from the Contractor's payrolls or by inspections performed by the inspectors, or both;

(3) Ten percent (10%) of the amount from sub-paragraph (2), which shall be considered as covering the cost of superintendence, hand tools, and clerical work in connection with the change order work and the Contractor's overhead costs;

(4) A rental charge for the use of all construction equipment approved by the Officer-in-Charge. The rental rates shall be agreed upon by the Contractor and the Officer-in-Charge, and may or may not, include the cost of fuel oil, gasoline, electric energy, lubricating oil, repairs, and maintenance. The Contractor shall submit a proposed schedule of equipment rental charges to the Officer-in-Charge for approval prior to entering into a change order. The cost of small tools shall not be included;

(5) The cost of workers' compensation insurance and public liability premiums, unemployment tax, social security tax, or other taxes on the labor for sub-paragraph (2);

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(6) Fifteen percent (15%) of the sums of sub-paragraphs (1) through (4), which shall be considered as covering all other expenses and profit;

(7) Where force account work is performed by a subcontractor, the Contractor may add five percent (5%) to the subcontractor's computed compensation to cover its overhead and profit, provided that overhead and profit shall be limited to a total of twenty percent (20%) of direct costs;

(8) One percent (1%) of direct costs for paragraphs (1) through (7) for bonds. The addition for bond cost is applicable only to the Contractor's compensation; and

(9) The cost of state excise tax on the sum of paragraphs (1) through (8).

(b) The performance of change order work on a force account basis shall be under the supervision of the Officer-in-Charge, and the Officer-in-Charge's decision shall be final. The method of performing such work, the equipment to be used, and the amount and character of labor to be employed shall meet with the approval of the Officer-in-Charge. The force account formula may also apply to deleted work.

(c) Whenever the Contractor is directed to perform extra work on a time and expense basis, the Contractor will maintain accurate records. Each day a record of labor, materials and equipment costs shall be submitted to the Officer-in-Charge for verification. These records shall reflect the actual and necessary expenses pertaining to the extra work and shall be available for audit. Audits conducted under this provision shall be in accordance with generally acceptable auditing standards and established procedures and guidelines of the reviewing or auditing agencies.

11.5 Materials Ordered. If the Officer-in-Charge deletes any item, or decreases the quantity of any item in the bid, and the Contractor has already ordered materials involved in such deletions or decreases, the Contractor shall make every effort to return the materials if requested by the Officer-in-Charge. If the materials are returnable, the County shall pay the actual costs incurred to the Contractor to return the materials evidenced by receipt or invoice. If the materials cannot be returned, the County shall pay the actual cost to the Contractor of the materials evidenced by receipt or invoice; provided that the materials are free from defect upon inspection and acceptance by the County. Materials ordered prior to the issuance of the Notice to Proceed shall be the Contractor's responsibility and the County will not make payment for such materials.

11.6 Work by County. If additional work is required to complete the contract, the County reserves the right to (1) perform the additional work itself; and (2) employ another contractor to perform the work. The Contractor shall fully cooperate with the County to schedule the completion of the additional work.

Section 12 - Differing Site Conditions

12.1 Notification. The Contractor shall promptly, and before such conditions are disturbed, notify the Procurement Officer of:

(a) Subsurface or latent physical conditions at the site differing materially from those

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indicated in the contract; or

(b) Unknown physical conditions at the site, of an unusual nature, differing materially from those ordinarily encountered and generally recognized as inherent in work of the character provided for in the contract.

12.2 Adjustments of Price or Time for Performance. After receipt of the notice, the Procurement Officer shall promptly investigate the site, and if it is found that the conditions do materially so differ and cause an increase in the Contractor's cost of, or the time required for, performance of any part of the work under the contract, whether or not changed as a result of the conditions, an adjustment shall be made and the contract modified in writing accordingly. Any adjustment in contract price made pursuant to this section shall be determined in accordance with Section 11 - Price Adjustment Clause.

12.3 Timeliness of Claim. No claim of the Contractor under this section shall be allowed unless the Contractor has given the notice required in this section; provided, however, that the time prescribed therefore may be extended by the Procurement Officer in writing.

12.4 No Claim After Final Payment. No claim by the Contractor for an adjustment thereunder shall be allowed if asserted after final payment under the contract.

12.5 Knowledge. Nothing contained in this section shall be grounds for an adjustment in compensation if the Contractor had actual knowledge of the existence of such conditions prior to the submission of bids.

Section 13 - Novation or Change of Name

13.1 No Assignment. No County contract is transferable, or otherwise assignable, without the written consent of the Procurement Officer. A Contractor may assign monies receivable under a contract with written consent of the Procurement Officer.

13.2 Recognition of a Successor in Interest; Assignment. When in the best interest of the County, a successor in interest may be recognized in an assignment agreement in which the transferor, the transferee and the County shall agree that:

- (a) The transferee assumes all of the transferor's obligations;
- (b) The transferor remains liable for all obligations under the contract but waives all rights under the contract as against the County; and
- (c) The transferor shall continue to furnish, and the transferee shall also furnish, all required bonds.

13.3 Change of Name. When a Contractor requests to change the name in which it holds a contract with the County, the Procurement Officer shall, upon receipt of a document indicating such change of name (for example, an amendment to the articles of incorporation of the corporation), enter into a novation agreement with the requesting Contractor to effect such a change of name. The agreement changing the name shall specifically indicate that no other terms

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and conditions of the contract are thereby changed.

Section 14 - Claims Based on Oral Directives

14.1 Notice Required. Any oral order, direction, instruction, interpretation, or determination from the Procurement Officer which, in the opinion of the Contractor, causes any change, can be considered as a change only if the Contractor gives the Procurement Officer written notice of its intent to treat the oral order, direction, instruction, interpretation, or determination as a change directive. The written notice must be delivered to the Procurement Officer before the Contractor acts in conformity with the oral order, direction, instruction, interpretation, or determination, but not more than five (5) days after delivery of the oral order to the Contractor. The written notice shall state the date, circumstances, whether a time extension will be requested, and source of the order that the Contractor regards as a change. The written notice may not be waived and shall be a condition precedent to the filing of a claim by the Contractor. Unless the Contractor acts in accordance with this procedure, any oral order shall not be treated as a change and the Contractor waives any claim for an increase in the contract time or contract price related to the work.

14.2 Change Order Issued. Not more than five (5) working days after receipt of the written notice from the Contractor, the Procurement Officer shall issue a change order for the subject work if the Procurement Officer agrees that it constitutes a change. If no change order is issued in the time established, it shall be deemed a rejection of the Contractor's claim for a change. If the Contractor objects to the Procurement Officer's refusal to issue a change order, it shall file a written protest with the Procurement Officer within thirty (30) days after delivery to the Procurement Officer of the Contractor's written notice of its intention to treat the oral order as a change. In all cases the Contractor shall proceed with the work. The protest shall be determined as provided in section 17 - Remedies.

Section 15 - Default, Delay, and Time Extensions

15.1 Default. If the Contractor refuses or fails to perform the work, or any separable part thereof, with such diligence as will assure its completion within the time specified in the contract, or any extension thereof, fails to complete the work within such time, or commits any other substantial breach of the contract, and further fails within seven (7) days after receipt of written notice from the Procurement Officer to commence and continue correction of the refusal or failure with diligence and promptness, the Procurement Officer may, by written notice to the Contractor, declare the Contractor in breach and terminate the Contractor's right to proceed with the work or the part of the work as to which there has been delay or other breach of contract. In that event, the County may take over the work and perform the same to completion, by contract or otherwise, and may take possession of, and utilize in completing the work, the materials, appliances, and plant as may be on the site of the work and necessary therefor. Whether or not the Contractor's right to proceed with the work is terminated, the Contractor and the Contractor's sureties shall be liable for any damage to the County resulting from the Contractor's refusal or failure to complete the work within the specified time.

15.2 Liquidated Damages Upon Termination. If fixed and agreed liquidated damages are provided in the contract, and if the County so terminates the Contractor's right to

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proceed, the resulting damage will consist of the liquidated damages for the time as may be required for final completion of the work.

15.3 Liquidated Damages in Absence of Termination. If fixed and agreed liquidated damages are provided in the contract, and if the County does not terminate the Contractor's right to proceed, the resulting damage will consist of liquidated damages accumulated until the work is completed or accepted.

15.4 Time Extension. The Contractor's right to proceed shall not be so terminated nor shall the Contractor be charged with resulting damage if:

(a) The delay in the completion of the work arises from causes such as: acts of God; acts of the public enemy; acts of the State and any other governmental entity in either a sovereign or contractual capacity; acts of another Contractor in the performance of a contract with the County; fires; floods; epidemics; quarantine restrictions; strikes or other labor disputes; freight embargoes; unusually severe weather; delays of subcontractors due to causes similar to those set forth above; or shortage of materials; provided, however, that no extension of time will be granted for a delay caused by a shortage of materials, unless the Contractor furnishes to the Procurement Officer proof that the Contractor has diligently made every effort to obtain the materials from all known sources, and further proof that the inability to obtain the materials when originally planned did in fact cause a delay in final completion of the entire work which could not be compensated for by revising the sequence of the Contractor's operations; and

(b) The Contractor, within ten (10) days from the beginning of the delay (unless the Procurement Officer grants a further period of time before the date of final payment under the contract), notifies the Procurement Officer in writing of the causes of delay. The Procurement Officer shall ascertain the facts and the extent of the delay and extend the time for completing the work when, in the judgment of the Procurement Officer, the findings of fact justify such an extension.

15.5 Additional Rights and Remedies. The rights and remedies of the County provided in the contract are in addition to any other rights and remedies provided by law.

Section 16 - Termination for Convenience

16.1 Terminations. The Procurement Officer may, when the interests of the County so require, terminate the contract in whole or in part, for the convenience of the County. The Procurement Officer shall give written notice of the termination to the Contractor specifying the part of the contract terminated and when termination becomes effective.

16.2 Contractor's Obligations. The Contractor shall incur no further obligations in connection with the terminated work, and on the date set in the notice of termination the Contractor will stop work to the extent specified. The Contractor shall also terminate outstanding orders and subcontracts as they relate to the terminated work. The Contractor shall settle the liabilities and claims arising out of the termination of subcontracts and orders connected with the terminated work subject to the County's approval. The Procurement Officer may direct the Contractor to assign the Contractor's right, title, and interest under terminated orders or subcontracts to the County. The Contractor must still complete the work not terminated by the

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notice of termination and may incur obligations as necessary to do so.

16.3 Right to Construction and Goods. The Procurement Officer may require the Contractor to transfer title and deliver to the County in the manner and to the extent directed by the Procurement Officer:

(a) Any completed constructions; and

(b) The partially completed construction, goods, materials, parts, tools, dies, jigs, fixtures, plans, drawings, information, and contract rights (hereinafter called "construction material") as the Contractor has specifically produced or specially acquired for the performance of the terminated part of the contract. The Contractor shall protect and preserve property in the possession of the Contractor in which the County has an interest. If the Procurement Officer does not exercise this right, the Contractor shall use the Contractor's best efforts to sell the construction, goods, and construction materials in accordance with the standards of section 490:2-706, HRS. This in no way implies that the County has breached the contract by exercise of the termination for convenience clause.

16.4 Compensation. (a) The Contractor shall submit a termination claim specifying the amounts due because of the termination for convenience together with cost or pricing data, submitted to the extent required by sub-chapter 15, chapter 3-122, HAR, bearing on such claim. If the Contractor fails to file a termination claim within one year from the effective date of termination, the Procurement Officer may pay the Contractor, if at all, an amount set in accordance with clause (2) of paragraph (c).

(b) The Procurement Officer and the Contractor may agree to a settlement provided the Contractor has filed a termination claim supported by cost or pricing data submitted as required and that the settlement does not exceed the total contract price plus settlement costs reduced by payments previously made by the County, the proceeds of any sales of construction, goods, and construction materials under clause (3) of paragraph (c), and the contract price of the work not terminated.

(c) Absent complete agreement under paragraph (b), the Procurement Officer shall pay the Contractor the following amounts, provided payments under paragraph (b) shall not duplicate payments under this paragraph, for the total (without duplication of any items) of:

(1) The cost of all contract work performed prior to the effective date of the notice of termination plus a five per cent (5%) markup on actual direct costs on the portion of the work (the markup shall not include anticipatory profit or consequential damages) less amounts paid or to be paid for completed portions of the work; provided, however, that if it appears that the Contractor would have sustained a loss if the entire contract would have been completed, no markup shall be allowed or included and the amount of compensation shall be reduced to reflect the anticipated rate of loss;

(2) Subject to the prior approval of the Procurement Officer, the costs of settling and paying claims arising out of the termination of subcontracts or orders pursuant to the "Contractor's obligations" provisions of the contract. Subcontractors shall be entitled to a markup of no more than ten per cent (10%) on direct costs incurred to the date of termination. These costs must not include costs paid in accordance with clause

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(1);

(3) The total sum to be paid the Contractor under this paragraph shall not exceed the total contract price reduced by the amount of any sales of construction, goods, and construction materials under subsection 16.3, Right to Construction and Goods, and the contract price of work not terminated.

(d) Cost claimed, agreed to, or established under paragraphs (b) and (c) shall be in accordance with chapter 3-123, HAR.

Section 17 - Remedies

17.1 General. Any dispute arising under or out of the contract is subject to chapter 3-126, HAR.

17.2 Disputes. (a) All controversies between the County and the Contractor which arise under, or are by virtue of, the Contract and which are not resolved by mutual agreement shall be decided by the Procurement Officer in writing, within ninety calendar days after a written request by the Contractor for a final decision concerning the controversy; provided that if the Procurement Officer does not issue a written decision within ninety calendar days after written request for a final decision, or within such longer period as may be agreed upon by the Parties, then the Contractor may proceed as if an adverse decision had been received.

(b) The Procurement Officer shall immediately furnish a copy of the decision to the Contractor, by certified mail, return receipt requested, or by any other method that provides evidence of receipt.

(c) Any such decision shall be final and conclusive, unless fraudulent, or unless the Contractor brings an action seeking judicial review of the decision in the Circuit Court of the Second Circuit, State of Hawaii, County of Maui, within the six months from the date of receipt of the decision.

(d) The Contractor shall comply with any decision of the Procurement Officer and proceed diligently with performance of the contract pending final resolution by the Circuit Court of the Second Circuit, State of Hawaii, County of Maui, of any controversy arising under, or by virtue of, the contract, except where there has been a material breach of contract by the County; provided that in any event the Contractor shall proceed diligently with the performance of the contract where the Procurement Officer has made a written determination that work under the contract is essential to the public health and safety.

Section 18 - Miscellaneous Provisions

18.1 Severability. If any provision of the contract is held invalid, the other provisions of the contract shall not be affected thereby. If the application of the contract or any of its provisions as to any person or circumstance is held invalid, the application of the contract and its provisions as to other persons or circumstances shall not be affected thereby.

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18.2 Entire Agreement. The contract contains the complete agreement concerning the subject arrangement between the Parties and shall, as of the effective date hereof, supersede all other agreements between the Parties. The Parties stipulate that neither has made any representations with respect to the subject matter, execution and delivery of the contract except as such representations are specifically set forth herein. Each party acknowledges that the party has relied on the party's own judgment in entering into the contract. The Parties further acknowledge that any payments or representations that may have previously been made by either of them to the other are of no effect and that neither has relied thereon in connection with its dealing with the other.

18.3 Notices. (a) Any written notice required to be given by a party to the contract shall be:

(1) delivered personally to the Contractor's designated representative on the project site, or

(2) sent by United States first class mail, postage prepaid to the party's address listed in the contract.

(b) A notice shall be deemed to have been received three (3) days after mailing or at the time of actual receipt, whichever is earlier. The Contractor shall notify the County in writing of any change of address. The Contractor shall maintain a post office address within the County of Maui and file the same with the Officer-in-Charge prior to or with the execution of the contract. All notices addressed in compliance with the directions of the Contractor and properly mailed shall be effective when mailed, or delivered by any of the above methods.

18.4 Assistance of Legal Counsel. The Parties have carefully read and fully understand all of the provisions and effects of the contract. The Parties shall consult with their respective counsel if any provision of the contract is not fully understood. The Parties are voluntarily entering into the contract and neither Party has made representations concerning the terms or effects of the contract other than those contained herein.

18.5 Applicable Law and Venue. The contract shall be governed by the laws of the State of Hawaii. Any action or court proceeding which may arise from the contract shall be heard in the Circuit Court of the Second Circuit, State of Hawaii, County of Maui.

[END OF GENERAL TERMS AND CONDITIONS]

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PERFORMANCE BOND WITH SURETY

BOND NO. _____

KNOW TO ALL BY THESE PRESENTS:

That //, a Hawaii corporation, whose mailing address is //, as Contractor, hereinafter called "Principal," and _____, as surety, hereinafter called "Surety," a corporation authorized to transact business as a surety in the State of Hawaii, are held and firmly bound unto the COUNTY OF MAUI, a political subdivision of the State of Hawaii, Wailuku, Maui, Hawaii, its successors and assigns, hereinafter called "Obligee," in the amount of \$// as performance bond, (being \$// in the amount of one hundred percent of the contract price as required by section 103D-324, Hawaii Revised Statutes), lawful money of the United States, for the payment of which to the said Obligee, well and truly made, Principal and Surety bind ourselves, our heirs, executors, administrators, successors and assigns, jointly and severally, firmly by these presents.

WHEREAS, the above-bound Principal has signed a Contract with Obligee dated _____, for the following project: //, IFB/RFP/Project/Job No. //, hereinafter called "Contract," which Contract is incorporated herein by reference and made a part hereof.

NOW THEREFORE, the condition of this obligation is such that:

If the Principal shall promptly and faithfully perform, and fully complete the Contract in strict accordance with the terms of the Contract as said Contract may be modified or amended from time to time; then this obligation shall be void; otherwise to remain in full force and effect.

Surety to this bond hereby stipulates and agrees that no changes, extensions of time, alterations, or additions to the terms of the Contract, including the work to be performed thereunder, and the specifications or drawings accompanying same, shall in any way affect its obligation on this bond, and it does hereby waive notice of any such changes, extensions of time,

CONTRACT NO. C//

alterations, or additions, and agrees that they shall become part of the Contract.

In the event of Default by the Principal, of the obligations under the Contract, then after written Notice of Default from the Oblige to the Surety and the Principal and subject to the limitation of the penal sum of this bond, Surety shall remedy the Default, or take over the work to be performed under the Contract and complete such work, or pay moneys to the Oblige in satisfaction of the surety's performance obligation on this bond.

Signed this _____ day of _____, 20____.

[EXECUTION PAGES TO FOLLOW]

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CONTRACT NO. C//

PRINCIPAL:

//

By _____
(Signature)

(Print Name)

Its _____
(Title)

Date _____

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CONTRACT NO. C//

STATE OF _____)
) SS.
_____)

On this ____ day of _____, 20____, before me personally appeared _____, to me personally known, who, being by me duly sworn or affirmed, did say that such person executed the foregoing instrument as the free act and deed of such person, and if applicable, in the capacity shown, having been duly authorized to execute such instrument in such capacity.

IN WITNESS WHEREOF, I have hereunto set my hand and official seal.

[Stamp or Seal]

Notary Public, State of _____

Print Name: _____

My commission expires: _____

NOTARY PUBLIC CERTIFICATION	
Doc. Date: _____	# Pages: _____
Notary Name: _____	Judicial Circuit: _____
Doc. Description: _____ _____ _____	[Stamp or Seal]
Notary Signature: _____	
Date: _____	

CONTRACT NO. C//

SURETY:

By _____
(Signature)

(Print Name)

Its _____
(Title)

Date _____

[THE REMAINDER OF THIS PAGE IS INTENTIONALLY LEFT BLANK]

CONTRACT NO. C//

STATE OF _____)
) SS.
_____)

On this ____ day of _____, 20____, before me personally appeared _____, to me personally known, who, being by me duly sworn or affirmed, did say that such person executed the foregoing instrument as the free act and deed of such person, and if applicable, in the capacity shown, having been duly authorized to execute such instrument in such capacity.

IN WITNESS WHEREOF, I have hereunto set my hand and official seal.

[Stamp or Seal]

Notary Public, State of _____

Print Name: _____

My commission expires: _____

NOTARY PUBLIC CERTIFICATION	
Doc. Date: _____	# Pages: _____
Notary Name: _____	Judicial Circuit: _____
Doc. Description: _____ _____ _____	[Stamp or Seal]
Notary Signature: _____	
Date: _____	

CONTRACT NO. C//

PAYMENT BOND WITH SURETY

BOND NO. _____

KNOW TO ALL BY THESE PRESENTS:

That we, //, a Hawaii corporation, whose mailing address is //, as Contractor, hereinafter called "Principal," and _____, as surety, hereinafter called "Surety," a corporation authorized to transact business as a surety in the State of Hawaii, are held and firmly bound unto the COUNTY OF MAUI, a political subdivision of the State of Hawaii, Wailuku, Hawaii, its successors and assigns, as Obligee, hereinafter called "Obligee," in the amount of \$// as payment bond (being \$// in the amount of one hundred percent of the contract price as required by section 103D-324, Hawaii Revised Statutes), lawful money of the United States of America, for the payment of which to the said Obligee, well and truly to be made, Principal and Surety bind ourselves, our heirs, executors, administrators, successors and assigns, jointly and severally, firmly by these presents.

WHEREAS, the above-bound Principal has signed a Contract with the Obligee dated _____ for the following project: //, IFB/RFP/Project/Job No. //, hereinafter called "Contract," which Contract is incorporated herein by reference and made a part hereof.

NOW THEREFORE, the condition of this obligation is such that if the Principal shall promptly make payment to any Claimant, as hereinafter defined, for all labor and materials supplied to the Principal for use in the performance of the Contract, then this obligation shall be void; otherwise to remain in full force and effect.

1. Surety to this bond hereby stipulates and agrees that no changes, extensions of time, alterations, or additions to the terms of the Contract, including the work to be performed thereunder, and the specifications or drawings accompanying same, shall in any way affect its

CONTRACT NO. C//

obligation on this bond, and it does hereby waive notice of any such changes, extensions of time, alterations, or additions, and agrees that they shall become part of the Contract.

2. A "Claimant" shall be defined herein as any person who has furnished labor or materials to the Principal for the work provided in the Contract.

Every Claimant who has not been paid amounts due for labor and materials furnished for work provided in the Contract may institute an action against the Principal and its Surety on this bond at the time and in the manner prescribed in Section 103D-324, Hawaii Revised Statutes, and have the rights and claims adjudicated in the action, and judgment rendered thereon; subject to the Obligee's priority on this bond. If the full amount of the liability of the Surety on this bond is insufficient to pay the full amount of the claims, then after paying the full amount due the Obligee, the remainder shall be distributed pro rata among the claimants.

Signed this _____ day of _____, 20__.

EXECUTION PAGES TO FOLLOW

[THE REMAINDER OF THIS PAGE IS INTENTIONALLY LEFT BLANK]

CONTRACT NO. C//

PRINCIPAL:

//

By _____
(Signature)

(Print Name)

Its _____
(Title)

Date _____

[THE REMAINDER OF THIS PAGE IS INTENTIONALLY LEFT BLANK]

CONTRACT NO. C//

STATE OF _____)
) SS.
_____)

On this ____ day of _____, 20____, before me personally appeared _____, to me personally known, who, being by me duly sworn or affirmed, did say that such person executed the foregoing instrument as the free act and deed of such person, and if applicable, in the capacity shown, having been duly authorized to execute such instrument in such capacity.

IN WITNESS WHEREOF, I have hereunto set my hand and official seal.

[Stamp or Seal]

Notary Public, State of _____

Print Name: _____

My commission expires: _____

NOTARY PUBLIC CERTIFICATION	
Doc. Date: _____	# Pages: _____
Notary Name: _____	Judicial Circuit: _____
Doc. Description: _____ _____ _____	[Stamp or Seal]
Notary Signature: _____	
Date: _____	

CONTRACT NO. C//

SURETY:

By _____
(Signature)

(Print Name)

Its _____
(Title)

Date _____

[THE REMAINDER OF THIS PAGE IS INTENTIONALLY LEFT BLANK]

CONTRACT NO. C//

STATE OF _____)
) SS.
_____)

On this ____ day of _____, 20____, before me personally appeared _____, to me personally known, who, being by me duly sworn or affirmed, did say that such person executed the foregoing instrument as the free act and deed of such person, and if applicable, in the capacity shown, having been duly authorized to execute such instrument in such capacity.

IN WITNESS WHEREOF, I have hereunto set my hand and official seal.

[Stamp or Seal]

Notary Public, State of _____

Print Name: _____

My commission expires: _____

NOTARY PUBLIC CERTIFICATION	
Doc. Date: _____	# Pages: _____
Notary Name: _____	Judicial Circuit: _____
Doc. Description: _____	

_____ [Stamp or Seal]	
Notary Signature: _____	
Date: _____	

CONTRACT NO. C//

**CONTRACTOR'S
STANDARDS OF CONDUCT DECLARATION**

For the purposes of this declaration:

"Substantial interest" means an interest in a business or other undertaking which is sufficient in fact to control, whether the interest is greater or less than fifty per cent (50%).

"Employee" means any nominated, appointed, or elected officer or employee of the County, including members of boards, commissions, and committees, and employees under contract to the County, but excluding members of the County Council ("County Council Members").

On behalf of //, Contractor, the undersigned does declare as follows:

1. Contractor ___ is / ___ is not a County Council Member or an Employee or a business in which a County Council Member or an Employee has a substantial interest.
2. Contractor has not been represented or assisted personally in the matter by an individual who has been an Employee of the County department awarding this Contract within the preceding year and who participated while so employed in the matter with which the Contract is directly concerned.
3. Contractor has not been assisted or represented by a County Council Member or Employee for a fee or other compensation to obtain this Contract and will not be assisted or represented by a County Council Member or Employee for a fee or other compensation in the performance of this Contract, if the County Council Member or Employee has been involved in the development or award of the Contract.
4. Contractor has not been represented on matters related to this Contract, for a fee or other consideration by an individual who, within the past twelve (12) months, has been an Employee, or in the case of the County Council, a County Council Member, and participated while an Employee or a County Council Member on matters related to this Contract.

***Reminder to agency:** If the "is" block is checked and if the Contract involves goods or services of a value in excess of \$500, the Contract may not be awarded unless the Contract is made after competitive bidding.

CONTRACT NO. C//

Contractor understands that the Contract to which this document is attached is voidable on behalf of the County if this Contract was entered into in violation of any provision of Article 10 of the Revised Charter of the County of Maui (“Code of Ethics”), including the provisions which are the source of the declarations above. Additionally, any fee, compensation, gift, or profit received by any person as a result of a violation of the Code of Ethics may be recovered by the County.

Contractor:

//

By _____
(Signature)

(Print Name)

Its _____
(Title)

Date _____

SECTION 01 1000

SUMMARY

PART 1 GENERAL

1.1 PROJECT

- A. Project Name: Wailuku Civic Complex Phase 1B.
- B. Owner's Name: County of Maui.
- C. Architect's Name: Ferraro Choi.
- D. The project consists of a fully sprinklered 430 stall open concrete parking structure with one elevator and two sets of stairs. The top level of parking has steel framing for future PV panels. Site work includes utilities, fire protection and fire lane.

1.2 CONTRACT DESCRIPTION

- A. Contract Type: A single prime contract based on a stipulated price.

1.3 CONTRACTOR USE OF SITE AND PREMISES

- A. Construction Operations: Limited to areas noted on Drawings.
 - 1. Locate and conduct construction activities in ways that will limit disturbance to site.
- B. Provide access to and from site as required by law and by Owner:
 - 1. Do not obstruct roadways, sidewalks, or other public ways without permit.
- C. Time Restrictions:
- D. Utility Outages and Shutdown:
 - 1. Limit disruption of utility services to hours the building is unoccupied.
 - 2. Do not disrupt or shut down utilities or life safety systems, including but not limited to fire sprinklers and fire alarm system, without 7 days notice to Owner and authorities having jurisdiction.
 - 3. Prevent accidental disruption of utility services to other facilities.

1.4 WORK SEQUENCE

Construct Work in the following stages:

A. Stage 1: Access Roads and Walkways:

1. Complete work in no longer than 4 months from Notice to Proceed in order to provide vehicular and pedestrian access to adjacent businesses during the remainder of the construction period.
2. Work area is shown on Sheet A-100A and labeled as "Stage 1: Access Roads and Walkways".
The Stage 1 area includes the vehicular driveway from Market St. and Vineyard St. into First Hawaiian Bank as well as "Road A" along the Parking Structure and the rear of the Main Street Promenade and Calvary Church buildings and the walkway along the Mauka edge of the Main Street Promenade Building.
3. Parking Lot to remain open until completion of Stage 1.
4. Provide safe access to adjoining property owners during the construction of Stage 1.
5. Provide 8 foot high exterior grade plywood fence separating the Stage 1 area from the Parking Structure; equip with vehicular and pedestrian gates with locks.
6. Provide temporary lighting at the Stage 1 area during the full construction period.

B. Stage 2: Parking Structure

1. Complete balance of work within 480 consecutive calendar days from the Notice to Proceed.
2. Limit staging area during construction of Stage 2 to the area shown on Sheet A-100A and labeled as "Contractor Staging Area Limits"

PART 2 PRODUCTS - NOT USED

PART 3 EXECUTION - NOT USED

END OF SECTION

SECTION 01 2000

PRICE AND PAYMENT PROCEDURES

PART 1 GENERAL

1.01 SECTION INCLUDES

- A. Procedures for preparation and submittal of applications for progress payments.
- B. Documentation of changes in Contract Sum and Contract Time.
- C. Change procedures.
- D. Procedures for preparation and submittal of application for final payment.

1.02 RELATED REQUIREMENTS

- A. Section 00 5000 - Contracting Forms and Supplements: Forms to be used.
- B. Section 00 5200 - Agreement Form: Contract Sum, retainages, payment period, monetary values of unit prices.
- C. Section 00 7200 - General Conditions: Additional requirements for progress payments, final payment, changes in the Work.
- D. Section 00 7300 - Supplementary Conditions: Percentage allowances for Contractor's overhead and profit.
- E. Section 01 7800 - Closeout Submittals: Project record documents.

1.03 SCHEDULE OF VALUES

- A. Use Schedule of Values Form: AIA G703, edition stipulated in the Agreement.
- B. Electronic media printout including equivalent information will be considered in lieu of standard form specified; submit draft to Architect for approval.
- C. Forms filled out by hand will not be accepted.
- D. Submit Schedule of Values in duplicate within 15 days after date of Owner-Contractor Agreement.
- E. Format: Utilize the Proposal Schedule form submitted with the bid. Identify each line item with item number and description.
- F. Include separately from each line item, a direct proportional amount of Contractor's overhead and profit.

- G. Revise schedule to list approved Change Orders, with each Application For Payment.

1.04 APPLICATIONS FOR PROGRESS PAYMENTS

- A. Payment Period: Submit at intervals stipulated in the Agreement.
- B. Use Form AIA G702 and Form AIA G703, current edition
- C. Electronic media printout including equivalent information will be considered in lieu of standard form specified; submit sample to Architect for approval.
- D. Forms filled out by hand will not be accepted.
- E. For each item, provide a column for listing each of the following:
 - 1. Item Number.
 - 2. Description of work.
 - 3. Scheduled Values.
 - 4. Previous Applications.
 - 5. Work in Place and Stored Materials under this Application.
 - 6. Authorized Change Orders.
 - 7. Total Completed and Stored to Date of Application.
 - 8. Percentage of Completion.
 - 9. Balance to Finish.
 - 10. Retainage.
- F. Execute certification by signature of authorized officer.
- G. Use data from approved Schedule of Values. Provide dollar value in each column for each line item for portion of work performed.
- H. List each authorized Change Order as a separate line item, listing Change Order number and dollar amount as for an original item of work.
- I. Submit one electronic and three hard-copies of each Application for Payment.
- J. Include the following with the application:

1. Transmittal letter as specified for submittals in Section 01 3000.
 2. Construction progress schedule, revised and current as specified in Section 01 3000.
 3. Current construction photographs specified in Section 01 3000.
 4. Partial release of liens from major subcontractors and vendors.
- K. When Architect requires substantiating information, submit data justifying dollar amounts in question. Provide one copy of data with cover letter for each copy of submittal. Show application number and date, and line item by number and description.

1.05 MODIFICATION PROCEDURES

- A. For minor changes not involving an adjustment to the Contract Sum or Contract Time, Architect will issue instructions directly to Contractor.
- B. For other required changes, Architect will issue a document signed by Owner instructing Contractor to proceed with the change, for subsequent inclusion in a Change Order.
1. The document will describe the required changes and will designate method of determining any change in Contract Sum or Contract Time.
 2. Promptly execute the change.
- C. For changes for which advance pricing is desired, Architect will issue a document that includes a detailed description of a proposed change with supplementary or revised drawings and specifications, a change in Contract Time for executing the change with a stipulation of any overtime work required and the period of time during which the requested price will be considered valid. Contractor shall prepare and submit a fixed price quotation within 14 days.
- D. Contractor may propose a change by submitting a request for change to Architect, describing the proposed change and its full effect on the work, with a statement describing the reason for the change, and the effect on the Contract Sum and Contract Time with full documentation. Document any requested substitutions in accordance with Section 01 6000.
- E. Computation of Change in Contract Amount: As specified in the Agreement and Conditions of the Contract.
1. For change requested by Architect for work falling under a fixed price contract, the amount will be based on Contractor's price quotation.

2. For change requested by Contractor, the amount will be based on the Contractor's request for a Change Order as approved by Architect.
 3. For pre-determined unit prices and quantities, the amount will be based on the fixed unit prices.
 4. For change ordered by Architect without a quotation from Contractor, the amount will be determined by Architect based on the Contractor's substantiation of costs as specified for Time and Material work.
- F. Substantiation of Costs: Provide full information required for evaluation.
1. On request, provide the following data:
 - a. Quantities of products, labor, and equipment.
 - b. Taxes, insurance, and bonds.
 - c. Overhead and profit.
 - d. Justification for any change in Contract Time.
 - e. Credit for deletions from Contract, similarly documented.
 2. Support each claim for additional costs with additional information:
 - a. Origin and date of claim.
 - b. Dates and times work was performed, and by whom.
 - c. Time records and wage rates paid.
 - d. Invoices and receipts for products, equipment, and subcontracts, similarly documented.
 3. For Time and Material work, submit itemized account and supporting data after completion of change, within time limits indicated in the Conditions of the Contract.
- G. Execution of Change Orders: Architect will issue Change Orders for signatures of parties as provided in the Conditions of the Contract.
- H. After execution of Change Order, promptly revise Schedule of Values and Application for Payment forms to record each authorized Change Order as a separate line item and adjust the Contract Sum.

- I. Promptly revise progress schedules to reflect any change in Contract Time, revise sub-schedules to adjust times for other items of work affected by the change, and resubmit.

1.06 APPLICATION FOR FINAL PAYMENT

- A. Prepare Application for Final Payment as specified for progress payments, identifying total adjusted Contract Sum, previous payments, and sum remaining due.
- B. Application for Final Payment will not be considered until all closeout procedures specified in Section 01 7000 and Section 01 7700 have been met.

PART 2 PRODUCTS - NOT USED

PART 3 EXECUTION - NOT USED

END OF SECTION

SECTION 01 2500

SUBSTITUTION PROCEDURES

PART 1 GENERAL

1.01 SECTION INCLUDES

- A. Procedural requirements for proposed substitutions.

1.02 RELATED REQUIREMENTS

- A. Instructions to Bidders: Restrictions on timing of substitution requests.
- B. Pre-Bid Substitution Request Form.
- C. Section 01 6000 - Product Requirements: Fundamental product requirements, product options, delivery, storage, and handling.

1.03 DEFINITIONS

- A. Substitutions: Changes from Contract Documents requirements proposed by Contractor to materials, products, assemblies, and equipment.
 - 1. Substitutions for Cause: Proposed due to changed Project circumstances beyond Contractor's control.
 - a. Unavailability.
 - b. Regulatory changes.
 - 2. Substitutions for Convenience: Proposed due to possibility of offering substantial advantage to the Project.

PART 2 PRODUCTS - NOT USED

PART 3 EXECUTION

3.01 GENERAL REQUIREMENTS

- A. A Substitution Request for products, assemblies, materials, and equipment constitutes a representation that the submitter:
 - 1. Has investigated proposed product and determined that it meets or exceeds the quality level of the specified product, equipment, assembly, or system.

2. Agrees to provide the same warranty for the substitution as for the specified product.
 3. Agrees to provide same or equivalent maintenance service and source of replacement parts, as applicable.
 4. Agrees to coordinate installation and make changes to other work that may be required for the work to be complete, with no additional cost to Owner.
 5. Waives claims for additional costs or time extension that may subsequently become apparent.
 6. Agrees to reimburse Owner and Architect for review or redesign services associated with re-approval by authorities.
- B. A Substitution Request for specified installer constitutes a representation that the submitter:
1. Has acted in good faith to obtain services of specified installer, but was unable to come to commercial, or other terms.
- C. Document each request with complete data substantiating compliance of proposed substitution with Contract Documents. Burden of proof is on proposer.
- D. Content: Include information necessary for tracking the status of each Substitution Request, and information necessary to provide an actionable response.
1. No specific form is required. Contractor's Substitution Request documentation must include the following:
 - a. Project Information:
 - (1) Official project name and number, and any additional required identifiers established in Contract Documents.
 - (2) Owner's, Architect's, and Contractor's names.
 - b. Substitution Request Information:
 - (1) Discrete and consecutive Substitution Request number, and descriptive subject/title.
 - (2) Indication of whether the substitution is for cause or convenience.
 - (3) Issue date.

- (4) Reference to particular Contract Document(s) specification section number, title, and article/paragraph(s).
 - (5) Description of Substitution.
 - (6) Reason why the specified item cannot be provided.
 - (7) Differences between proposed substitution and specified item.
 - (8) Description of how proposed substitution affects other parts of work.
- c. Attached Comparative Data: Provide point-by-point, side-by-side comparison addressing essential attributes specified, as appropriate and relevant for the item:
- (1) Physical characteristics.
 - (2) In-service performance.
 - (3) Expected durability.
 - (4) Visual effect.
 - (5) Sustainable design features.
 - (6) Warranties.
 - (7) Other salient features and requirements.
 - (8) Include, as appropriate or requested, the following types of documentation:
 - (a) Product Data:
 - (b) Samples.
 - (c) Certificates, test, reports or similar qualification data.
 - (d) Drawings, when required to show impact on adjacent construction elements.
- d. Impact of Substitution:
- (1) Savings to Owner for accepting substitution.
 - (2) Change to Contract Time due to accepting substitution.

- E. Limit each request to a single proposed substitution item.
 - 1. Submit an electronic document, combining the request form with supporting data into single document.

3.02 SUBSTITUTION PROCEDURES DURING PROCUREMENT

- A. Instructions to Bidders specifies time restrictions for submitting requests for substitutions during the bidding period, and the documents required.

3.03 SUBSTITUTION PROCEDURES DURING CONSTRUCTION

- A. Substitutions for Convenience will not be reviewed during construction.
- B. Submit request for Substitution for Cause immediately upon discovery of need for substitution, but not later than 14 days prior to time required for review and approval by Architect, in order to stay on approved project schedule.
- C. Substitutions will not be considered under one or more of the following circumstances:
 - 1. When they are indicated or implied on shop drawing or product data submittals, without having received prior approval.
 - 2. Without a separate written request.
 - 3. When acceptance will require revisions to the Contract Documents.

3.04 RESOLUTION

3.05 ACCEPTANCE

END OF SECTION

SECTION 01 3000

ADMINISTRATIVE REQUIREMENTS

PART 1 GENERAL

1.01 SECTION INCLUDES

- A. General administrative requirements.
- B. Project Coordination.
- C. Electronic document submittal service.
- D. Preconstruction meeting.
- E. Site mobilization meeting.
- F. Progress meetings.
- G. Contractor's daily reports.
- H. Progress photographs.
- I. Submittals for review, information, and project closeout.
- J. Number of copies of submittals.
- K. Requests for Interpretation (RFI) procedures.
- L. Submittal procedures.

1.02 RELATED REQUIREMENTS

- A. Section 01 3216 - Construction Progress Schedule: Form, content, and administration of schedules.
- B. Section 01 6000 - Product Requirements: General product requirements.
- C. Section 01 7800 - Closeout Submittals: Project record documents; operation and maintenance data; warranties and bonds.

1.03 GENERAL ADMINISTRATIVE REQUIREMENTS

- A. Conform to requirements of Section 01 7000 - Execution and Closeout Requirements for coordination of execution of administrative tasks with timing of construction activities.

B. Make the following types of submittals to Architect:

1. Requests for Interpretation (RFI).
2. Requests for substitution.
3. Shop drawings, product data, and samples.
4. Test and inspection reports.
5. Design data.
6. Manufacturer's instructions and field reports.
7. Applications for payment and change order requests.
8. Progress schedules.
9. Correction Punch List and Final Correction Punch List for Substantial Completion.
10. Warranty Samples.
11. Closeout submittals.

1.04 PROJECT COORDINATION

- A. Cooperate and coordinate work with the work Contractors working on other phases of the Wailuku Civic Complex.
- B. Comply with Owner's designated representative the procedures for intra-project communications; submittals, reports and records, schedules, coordination drawings, and recommendations; and resolution of ambiguities and conflicts.
- C. Coordinate with other contractors on the following intra-project construction site procedures.
 1. Traffic control.
 2. Site access.
 3. Field engineering and layout work.

PART 2 PRODUCTS - NOT USED

PART 3 EXECUTION

3.01 ELECTRONIC DOCUMENT SUBMITTAL SERVICE

- A. All documents transmitted for purposes of administration of the contract are to be in electronic (PDF, MS Word, or MS Excel) format, as appropriate to the document, and transmitted via an Internet-based submittal service that receives, logs and stores documents, provides electronic stamping and signatures, and notifies addressees via email.
1. Besides submittals for review, information, and closeout, this procedure applies to Requests for Interpretation (RFIs), progress documentation, contract modification documents (e.g. supplementary instructions, change proposals, change orders), applications for payment, field reports and meeting minutes, Contractor's correction punchlist, and any other document any participant wishes to make part of the project record.
 2. Contractor and Architect are required to use this service.
 3. It is Contractor's responsibility to submit documents in allowable format.
 4. Subcontractors, suppliers, and Architect's consultants are to be permitted to use the service at no extra charge.
 5. Users of the service need an email address, internet access, and PDF review software that includes ability to mark up and apply electronic stamps (such as Adobe Acrobat, www.adobe.com, or Bluebeam PDF Revu, www.bluebeam.com), unless such software capability is provided by the service provider.
 6. Paper document transmittals will not be reviewed; emailed electronic documents will not be reviewed.
 7. All other specified submittal and document transmission procedures apply, except that electronic document requirements do not apply to samples or color selection charts.
- B. Cost: The cost of the service is to be paid by Contractor; include the cost of the service in the Contract Sum.
- C. Submittal Service: Use one of the following:
1. Newforma Project Cloud: www.newformaprojectcloud.com/#sle.
 2. Primavera Submittal Exchange Cloud Service: www.oracle.com.

3. ProjectWise Construction Management: www.bentley.com.
 4. Accepted equal.
- D. Training: One, one-hour, web-based training session will be arranged for all participants, with representatives of Architect and Contractor participating; further training is the responsibility of the user of the service.
- E. Project Closeout: Architect will determine when to terminate the service for the project and is responsible for obtaining archive copies of files for Owner.

3.02 PRECONSTRUCTION MEETING

- A. Architect will schedule a meeting after Notice of Award.
- B. Attendance Required:
1. Owner.
 2. Architect.
 3. Contractor.
- C. Agenda:
1. Execution of Owner-Contractor Agreement.
 2. Submission of executed bonds and insurance certificates.
 3. Distribution of Contract Documents.
 4. Submission of list of subcontractors, list of products, schedule of values, and progress schedule.
 5. Designation of personnel representing the parties to Contract and Architect.
 6. Procedures and processing of field decisions, submittals, substitutions, applications for payments, proposal request, Change Orders, and Contract closeout procedures.
 7. Scheduling.
 8. Scheduling activities of a Geotechnical Engineer.

- D. Record minutes and distribute copies within two days after meeting to participants, with two copies to Architect, Owner, participants, and those affected by decisions made.

3.03 SITE MOBILIZATION MEETING

- A. Owner will schedule meeting at the Project site prior to Contractor occupancy.

- B. Attendance Required:

1. Contractor.
2. Owner.
3. Architect.
4. Contractor's superintendent.
5. Major subcontractors.

- C. Agenda:

1. Use of premises by Owner and Contractor.
2. Owner's requirements.
3. Construction facilities and controls provided by Owner.
4. Temporary utilities provided by Owner.
5. Survey and building layout.
6. Security and housekeeping procedures.
7. Schedules.
8. Application for payment procedures.
9. Procedures for testing.
10. Procedures for maintaining record documents.
11. Requirements for start-up of equipment.
12. Inspection and acceptance of equipment put into service during construction period.

- D. Record minutes and distribute copies within two days after meeting to participants, with two copies to Architect, Owner, participants, and those affected by decisions made.

3.04 PROGRESS MEETINGS

- A. Schedule and administer meetings throughout progress of the work at maximum monthly intervals.
- B. Make arrangements for meetings, prepare agenda with copies for participants, preside at meetings.
- C. Attendance Required:
 - 1. Contractor.
 - 2. Owner.
 - 3. Architect.
 - 4. Contractor's superintendent.
 - 5. Major subcontractors.
- D. Agenda:
 - 1. Review minutes of previous meetings.
 - 2. Review of work progress.
 - 3. Field observations, problems, and decisions.
 - 4. Identification of problems that impede, or will impede, planned progress.
 - 5. Review of submittals schedule and status of submittals.
 - 6. Review of RFIs log and status of responses.
 - 7. Maintenance of progress schedule.
 - 8. Corrective measures to regain projected schedules.
 - 9. Planned progress during succeeding work period.
 - 10. Coordination of projected progress.
 - 11. Maintenance of quality and work standards.

- 12. Effect of proposed changes on progress schedule and coordination.
- 13. Other business relating to work.
- E. Record minutes and distribute copies within two days after meeting to participants, with two copies to Architect, Owner, participants, and those affected by decisions made.

3.05 CONSTRUCTION PROGRESS SCHEDULE

- A. Within 10 days after date of the Agreement, submit preliminary schedule defining planned operations for the first 60 days of work, with a general outline for remainder of work.
- B. If preliminary schedule requires revision after review, submit revised schedule within 10 days.
- C. Within 20 days after review of preliminary schedule, submit draft of proposed complete schedule for review.
 - 1. Include written certification that major contractors have reviewed and accepted proposed schedule.
- D. Within 10 days after joint review, submit complete schedule.
- E. Submit updated schedule with each Application for Payment.

3.06 DAILY CONSTRUCTION REPORTS

- A. Include only factual information. Do not include personal remarks or opinions regarding operations and/or personnel.
- B. Prepare a daily construction report recording the following information concerning events at Project site and project progress:
 - 1. Date.
 - 2. High and low temperatures, and general weather conditions.
 - 3. List of subcontractors at Project site.
 - 4. Approximate count of personnel at Project site.
 - 5. Major equipment at Project site.
 - 6. Material deliveries.

7. Safety, environmental, or industrial relations incidents.
8. Meetings and significant decisions.
9. Stoppages, delays, shortages, and losses. Include comparison between scheduled work activities (in Contractor's most recently updated and published schedule) and actual activities. Explain differences, if any. Note days or periods when no work was in progress and explain the reasons why.
10. Directives and requests of Authority(s) Having Jurisdiction (AHJ).
11. Testing and/or inspections performed.
12. Signature of Contractor's authorized representative.

3.07 PROGRESS PHOTOGRAPHS

- A. Submit photographs with each application for payment, taken not more than 3 days prior to submission of application for payment.
- B. Photography Type: Digital; electronic files.
- C. Provide photographs of site and construction throughout progress of work produced by an experienced photographer, acceptable to Architect.
- D. In addition to periodic, recurring views, take photographs of each of the following events:
 1. Foundations in progress and upon completion.
 2. Structural framing in progress and upon completion.
 3. Enclosure of building, upon completion.
 4. Final completion, minimum of ten (10) photos.
- E. Views:
 1. Provide photographs from four cardinal views at each specified time, until date of Substantial Completion.
 2. Consult with Architect for instructions on views required.
 3. Provide factual presentation.

4. Provide correct exposure and focus, high resolution and sharpness, maximum depth of field, and minimum distortion.
 5. Point of View Sketch: Provide sketch identifying point of view of each photograph.
- F. Digital Photographs: 24 bit color, minimum resolution of 1024 by 768, in JPG format; provide files unaltered by photo editing software.
1. Delivery Medium: Via email.
 2. File Naming: Include project identification, date and time of view, and view identification.
 3. Point of View Sketch: Include digital copy of point of view sketch with each electronic submittal; include point of view identification in each photo file name.
 4. PDF File: Assemble all photos into printable pages in PDF format, with 2 to 3 photos per page, each photo labeled with file name; one PDF file per submittal.
 5. Hard Copy: Printed hardcopy (grayscale) of PDF file and point of view sketch.

3.08 REQUESTS FOR INTERPRETATION (RFI)

- A. Definition: A request seeking one of the following:
1. An interpretation, amplification, or clarification of some requirement of Contract Documents arising from inability to determine from them the exact material, process, or system to be installed; or when the elements of construction are required to occupy the same space (interference); or when an item of work is described differently at more than one place in the Contract Documents.
 2. A resolution to an issue which has arisen due to field conditions and affects design intent.
- B. Whenever possible, request clarifications at the next appropriate project progress meeting, with response entered into meeting minutes, rendering unnecessary the issuance of a formal RFI.
- C. Preparation: Prepare an RFI immediately upon discovery of a need for interpretation of the Contract Documents. Failure to submit a RFI in a timely manner is not a legitimate cause for claiming additional costs or delays in execution of the work.

1. Prepare a separate RFI for each specific item.
 - a. Review, coordinate, and comment on requests originating with subcontractors and/or materials suppliers.
 - b. Do not forward requests which solely require internal coordination between subcontractors.
 2. Prepare in a format with content acceptable to Owner.
 3. Prepare using software provided by the Electronic Document Submittal Service.
 4. Combine RFI and its attachments into a single electronic file. PDF format is preferred.
- D. Reason for the RFI: Prior to initiation of an RFI, carefully study all Contract Documents to confirm that information sufficient for their interpretation is definitely not included.
1. Include in each request Contractor's signature attesting to good faith effort to determine from the Contract Documents information requiring interpretation.
 2. Unacceptable Uses for RFIs: Do not use RFIs to request the following:
 - a. Approval of submittals (use procedures specified elsewhere in this section).
 - b. Approval of substitutions (see Section - 01 6000 - Product Requirements)
 - c. Changes that entail change in Contract Time and Contract Sum (comply with provisions of the Conditions of the Contract).
 - d. Different methods of performing work than those indicated in the Contract Drawings and Specifications (comply with provisions of the Conditions of the Contract).
 3. Improper RFIs: Requests not prepared in conformance to requirements of this section, and/or missing key information required to render an actionable response. They will be returned without a response.
 4. Frivolous RFIs: Requests regarding information that is clearly indicated on, or reasonably inferable from, the Contract Documents, with no additional input required to clarify the question. They will be returned without a response.

- E. Content: Include identifiers necessary for tracking the status of each RFI, and information necessary to provide an actionable response.
1. Official Project name and number, and any additional required identifiers established in Contract Documents.
 2. Owner's, Architect's, and Contractor's names.
 3. Discrete and consecutive RFI number, and descriptive subject/title.
 4. Issue date, and requested reply date.
 5. Reference to particular Contract Document(s) requiring additional information/interpretation. Identify pertinent drawing and detail number and/or specification section number, title, and paragraph(s).
 6. Annotations: Field dimensions and/or description of conditions which have engendered the request.
 7. Contractor's suggested resolution: A written and/or a graphic solution, to scale, is required in cases where clarification of coordination issues is involved, for example; routing, clearances, and/or specific locations of work shown diagrammatically in Contract Documents. If applicable, state the likely impact of the suggested resolution on Contract Time or the Contract Sum.
- F. Attachments: Include sketches, coordination drawings, descriptions, photos, submittals, and other information necessary to substantiate the reason for the request.
- G. RFI Log: Prepare and maintain a tabular log of RFIs for the duration of the project.
1. Indicate current status of every RFI. Update log promptly and on a regular basis.
 2. Note dates of when each request is made, and when a response is received.
 3. Highlight items requiring priority or expedited response.
 4. Highlight items for which a timely response has not been received to date.
- H. Review Time: Architect will respond and return RFIs to Contractor within seven calendar days of receipt. For the purpose of establishing the start of the mandated response period, RFIs received after 12:00 noon will be considered as having been received on the following regular working day.

1. Response period may be shortened or lengthened for specific items, subject to mutual agreement, and recorded in a timely manner in progress meeting minutes.
- I. Responses: Content of answered RFIs will not constitute in any manner a directive or authorization to perform extra work or delay the project. If in Contractor's belief it is likely to lead to a change to Contract Sum or Contract Time, promptly issue a notice to this effect, and follow up with an appropriate Change Order request to Owner.
1. Response may include a request for additional information, in which case the original RFI will be deemed as having been answered, and an amended one is to be issued forthwith. Identify the amended RFI with an R suffix to the original number.
 2. Do not extend applicability of a response to specific item to encompass other similar conditions, unless specifically so noted in the response.
 3. Upon receipt of a response, promptly review and distribute it to all affected parties, and update the RFI Log.
 4. Notify Architect within seven calendar days if an additional or corrected response is required by submitting an amended version of the original RFI, identified as specified above.

3.09 SUBMITTAL SCHEDULE

- A. Submit to Architect for review a schedule for submittals in tabular format.
1. Submit at the same time as the preliminary schedule specified in Section - 01 3216 - Construction Progress Schedule.
 2. Coordinate with Contractor's construction schedule and schedule of values.
 3. Format schedule to allow tracking of status of submittals throughout duration of construction.
 4. Arrange information to include scheduled date for initial submittal, specification number and title, submittal category (for review or for information), description of item of work covered, and role and name of subcontractor.
 5. Account for time required for preparation, review, manufacturing, fabrication and delivery when establishing submittal delivery and review deadline dates.

3.10 SUBMITTALS FOR REVIEW

- A. When the following are specified in individual sections, submit them for review:
 - 1. Product data.
 - 2. Shop drawings.
 - 3. Samples for selection.
 - 4. Samples for verification.
- B. Submit to Architect for review for the limited purpose of checking for conformance with information given and the design concept expressed in the contract documents.
- C. Samples will be reviewed for aesthetic, color, or finish selection.
- D. After review, provide copies and distribute in accordance with SUBMITTAL PROCEDURES article below and for record documents purposes described in Section 01 7800 - Closeout Submittals.

3.11 SUBMITTALS FOR INFORMATION

- A. When the following are specified in individual sections, submit them for information:
 - 1. Design data.
 - 2. Certificates.
 - 3. Test reports.
 - 4. Inspection reports.
 - 5. Manufacturer's instructions.
 - 6. Manufacturer's field reports.
 - 7. Other types indicated.
- B. Submit for Architect's knowledge as contract administrator or for Owner.

3.12 SUBMITTALS FOR PROJECT CLOSEOUT

- A. Submit Correction Punch List for Substantial Completion.

- B. Submit Final Correction Punch List for Substantial Completion.
- C. When the following are specified in individual sections, submit them at project closeout in conformance to requirements of Section 01 7800 - Closeout Submittals:
 - 1. Project record documents.
 - 2. Operation and maintenance data.
 - 3. Warranties.
 - 4. Bonds.
 - 5. Other types as indicated.
- D. Submit for Owner's benefit during and after project completion.

3.13 NUMBER OF COPIES OF SUBMITTALS

- A. Electronic Documents: Submit one electronic copy in PDF format; an electronically-marked up file will be returned. Create PDFs at native size and right-side up; illegible files will be rejected.
- B. Samples: Submit the number specified in individual specification sections; one of which will be retained by Architect.
 - 1. After review, produce duplicates.
 - 2. Retained samples will not be returned to Contractor unless specifically so stated.

3.14 SUBMITTAL PROCEDURES

- A. General Requirements:
 - 1. Submit separate packages of submittals for review and submittals for information, when included in the same specification section.
 - 2. Sequentially identify each item. For revised submittals use original number and a sequential combination numerical and alphabetical suffix, ex. 01 5500 -1, 01 5500 - 1 R1.
 - 3. Identify: Project; Contractor; subcontractor or supplier; pertinent drawing and detail number; and specification section number and article/paragraph, as appropriate on each copy.

4. Apply Contractor's stamp, signed or initialed certifying that review, approval, verification of products required, field dimensions, adjacent construction work, and coordination of information is in accordance with the requirements of the work and Contract Documents.
 - a. Submittals from sources other than the Contractor, or without Contractor's stamp will not be acknowledged, reviewed, or returned.
 5. Deliver each submittal on date noted in submittal schedule, unless an earlier date has been agreed to by all affected parties, and is of the benefit to the project.
 - a. Upload submittals in electronic form to Electronic Document Submittal Service website.
 6. Schedule submittals to expedite the Project, and coordinate submission of related items.
 - a. For each submittal for review, allow 15 days excluding delivery time to and from the Contractor.
 - b. For sequential reviews involving Architect's consultants, Owner, or another affected party, allow an additional 7 days.
 7. Identify variations from Contract Documents and product or system limitations that may be detrimental to successful performance of the completed work.
 8. Provide space for Contractor and Architect review stamps.
 9. When revised for resubmission, identify all changes made since previous submission.
 10. Distribute reviewed submittals. Instruct parties to promptly report inability to comply with requirements.
 11. Incomplete submittals will not be reviewed, unless they are partial submittals for distinct portion(s) of the work, and have received prior approval for their use.
 12. Submittals requiring resubmission will not be grounds for time extension.
 13. Submittals not requested will not be recognized or processed.
- B. Product Data Procedures:
1. Submit only information required by individual specification sections.

2. Collect required information into a single submittal.
3. Submit concurrently with related shop drawing submittal.
4. Do not submit (Material) Safety Data Sheets for materials or products.

C. Shop Drawing Procedures:

1. Prepare accurate, drawn-to-scale, original shop drawing documentation by interpreting the Contract Documents and coordinating related work.
2. Do not reproduce the Contract Documents to create shop drawings.
3. Generic, non-project-specific information submitted as shop drawings do not meet the requirements for shop drawings.

D. Samples Procedures:

1. Transmit related items together as single package.
2. Identify each item to allow review for applicability in relation to shop drawings showing installation locations.

3.15 SUBMITTAL REVIEW

- A. Submittals for Review: Architect will review each submittal, and approve, or take other appropriate action.
- B. Submittals for Information: Architect will not acknowledge receipt, and take no other action.
- C. Architect's actions will be reflected by marking each returned submittal using virtual stamp on electronic submittals.
 1. Notations may be made directly on submitted items and/or listed on appended Submittal Review cover sheet.
- D. Architect's and consultants' actions on items submitted for review:
 1. Authorizing purchasing, fabrication, delivery, and installation:
 - a. "No Exception Taken".
 - b. "Make Corrections Noted".
 2. Not Authorizing fabrication, delivery, and installation:

- a. "Revise and Resubmit".
 - (1) Resubmit revised item, with review notations acknowledged and incorporated.
 - (2) Non-responsive resubmittals may be rejected.
- b. "Rejected".
 - (1) Submit item complying with requirements of Contract Documents.

E. Architect's and consultants' actions on items submitted for information:

- 1. Items for which no action was taken:
 - a. "Received" - to notify the Contractor that the submittal has been received for record only.
- 2. Items for which action was taken:
 - a. "Reviewed" - no further action is required from Contractor.

END OF SECTION

SECTION 01 3216

CONSTRUCTION PROGRESS SCHEDULE

PART 1 GENERAL

1.01 SECTION INCLUDES

- A. Preliminary schedule.
- B. Construction progress schedule, with network analysis diagrams and reports.

1.02 REFERENCE STANDARDS

1.03 SUBMITTALS

- A. Within 10 days after date of Agreement, submit preliminary schedule.
- B. If preliminary schedule requires revision after review, submit revised schedule within 10 days.
- C. Within 20 days after review of preliminary schedule, submit draft of proposed complete schedule for review.
- D. Within 10 days after joint review, submit complete schedule.
- E. Submit updated schedule with each Application for Payment.
- F. Submit the number of opaque reproductions that Contractor requires, plus two copies that will be retained by Architect.

1.04 QUALITY ASSURANCE

- A. Scheduler: Contractor's personnel or specialist Consultant specializing in CPM scheduling with one years minimum experience in scheduling construction work of a complexity comparable to this Project, and having use of computer facilities capable of delivering a detailed graphic printout within 48 hours of request.

1.05 SCHEDULE FORMAT

- A. Listings: In chronological order according to the start date for each activity. Identify each activity with the applicable specification section number.
- B. Diagram Sheet Size: Maximum 22 x 17 inches (560 x 432 mm).
- C. Sheet Size: Multiples of 8-1/2 x 11 inches (216 x 280 mm).

PART 2 PRODUCTS - NOT USED

PART 3 EXECUTION

3.01 PRELIMINARY SCHEDULE

- A. Prepare preliminary schedule in the form of a preliminary network diagram.

3.02 CONTENT

- A. Show complete sequence of construction by activity, with dates for beginning and completion of each element of construction.
- B. Identify each item by specification section number.
- C. Identify work of separate stages and other logically grouped activities.
- D. Include conferences and meetings in schedule.
- E. Show accumulated percentage of completion of each item, and total percentage of Work completed, as of the first day of each month.
- F. Provide separate schedule of submittal dates for shop drawings, product data, and samples, owner-furnished products, and dates reviewed submittals will be required from Architect. Indicate decision dates for selection of finishes.
- G. Indicate delivery dates for owner-furnished products.
- H. Coordinate content with schedule of values specified in Section 01 2000 - Price and Payment Procedures.
- I. Provide legend for symbols and abbreviations used.

3.03 NETWORK ANALYSIS

- A. Prepare network analysis diagrams and supporting mathematical analyses using the Critical Path Method.
- B. Illustrate order and interdependence of activities and sequence of work; how start of a given activity depends on completion of preceding activities, and how completion of the activity may restrain start of subsequent activities.
- C. Mathematical Analysis: Tabulate each activity of detailed network diagrams, using calendar dates, and identify for each activity:
 - 1. Preceding and following event numbers.

2. Activity description.
 3. Estimated duration of activity, in maximum 15 day intervals.
 4. Earliest start date.
 5. Earliest finish date.
 6. Actual start date.
 7. Actual finish date.
 8. Latest start date.
 9. Latest finish date.
 10. Total and free float; float time shall accrue to Owner and to Owner's benefit.
 11. Monetary value of activity, keyed to Schedule of Values.
 12. Percentage of activity completed.
 13. Responsibility.
- D. Analysis Program: Capable of compiling monetary value of completed and partially completed activities, accepting revised completion dates, and recomputation of all dates and float.
- E. Required Reports: List activities in sorts or groups:
1. By preceding work item or event number from lowest to highest.
 2. By amount of float, then in order of early start.

3.04 REVIEW AND EVALUATION OF SCHEDULE

- A. Participate in joint review and evaluation of schedule with Architect at each submittal.
- B. Evaluate project status to determine work behind schedule and work ahead of schedule.
- C. After review, revise as necessary as result of review, and resubmit within 10 days.

3.05 UPDATING SCHEDULE

- A. Maintain schedules to record actual start and finish dates of completed activities.
- B. Indicate progress of each activity to date of revision, with projected completion date of each activity.
- C. Annotate diagrams to graphically depict current status of Work.
- D. Identify activities modified since previous submittal, major changes in Work, and other identifiable changes.
- E. Indicate changes required to maintain Date of Substantial Completion.
- F. Submit reports required to support recommended changes.

3.06 DISTRIBUTION OF SCHEDULE

- A. Distribute copies of updated schedules to Contractor's project site file, to subcontractors, suppliers, Architect, Owner, and other concerned parties.
- B. Instruct recipients to promptly report, in writing, problems anticipated by projections indicated in schedules.

END OF SECTION

SECTION 01 4000

QUALITY REQUIREMENTS

PART 1 GENERAL

1.01 SECTION INCLUDES

- A. Submittals.
- B. References and standards.
- C. Testing and inspection agencies and services.
- D. Control of installation.
- E. Mock-ups.
- F. Tolerances.
- G. Manufacturers' field services.
- H. Defect Assessment.

1.02 RELATED REQUIREMENTS

- A. Section 01 3000 - Administrative Requirements: Submittal procedures.
- B. Section 01 4216 - Definitions.

1.03 REFERENCE STANDARDS

1.04 SUBMITTALS

- A. See Section 01 3000 - Administrative Requirements, for submittal procedures.
- B. Test Reports: After each test/inspection, promptly submit two copies of report to Architect and to Contractor.
 - 1. Include:
 - a. Date issued.
 - b. Project title and number.
 - c. Name of inspector.

- d. Date and time of sampling or inspection.
 - e. Identification of product and specifications section.
 - f. Location in the Project.
 - g. Type of test/inspection.
 - h. Date of test/inspection.
 - i. Results of test/inspection.
 - j. Conformance with Contract Documents.
 - k. When requested by Architect, provide interpretation of results.
2. Test report submittals are for Architect's knowledge as construction contract administrator for the limited purpose of assessing conformance with information given and the design concept expressed in the contract documents, or for Owner's information.
- C. Certificates: When specified in individual specification sections, submit certification by the manufacturer and Contractor or installation/application subcontractor to Architect, in quantities specified for Product Data.
- 1. Indicate material or product conforms to or exceeds specified requirements. Submit supporting reference data, affidavits, and certifications as appropriate.
 - 2. Certificates may be recent or previous test results on material or product, but must be acceptable to Architect.
- D. Manufacturer's Instructions: When specified in individual specification sections, submit printed instructions for delivery, storage, assembly, installation, start-up, adjusting, and finishing, for the Owner's information. Indicate special procedures, perimeter conditions requiring special attention, and special environmental criteria required for application or installation.
- E. Manufacturer's Field Reports: Submit reports for Architect's benefit as contract administrator or for Owner.
- 1. Submit for information for the limited purpose of assessing conformance with information given and the design concept expressed in the Contract Documents.

1.05 REFERENCES AND STANDARDS

- A. For products and workmanship specified by reference to a document or documents not included in the Project Manual, also referred to as reference standards, comply with requirements of the standard, except when more rigid requirements are specified or are required by applicable codes.
- B. Conform to reference standard of date of issue current on date of Contract Documents, except where a specific date is established by applicable code.
- C. Obtain copies of standards where required by product specification sections.
- D. Maintain copy at project site during submittals, planning, and progress of the specific work, until Substantial Completion.
- E. Should specified reference standards conflict with Contract Documents, request clarification from Architect before proceeding.
- F. Neither the contractual relationships, duties, or responsibilities of the parties in Contract nor those of Architect shall be altered from the Contract Documents by mention or inference otherwise in any reference document.

1.06 Testing and Inspection Agencies and Services

- A. Owner will employ and pay for services of an independent testing agency to perform specified testing.
- B. Employment of agency in no way relieves Contractor of obligation to perform Work in accordance with requirements of Contract Documents.

PART 2 PRODUCTS - NOT USED

PART 3 EXECUTION

3.01 CONTROL OF INSTALLATION

- A. Monitor quality control over suppliers, manufacturers, products, services, site conditions, and workmanship, to produce work of specified quality.
- B. Comply with manufacturers' instructions, including each step in sequence.
- C. Should manufacturers' instructions conflict with Contract Documents, request clarification from Architect before proceeding.
- D. Comply with specified standards as minimum quality for the work except where more stringent tolerances, codes, or specified requirements indicate higher standards or more precise workmanship.

- E. Have work performed by persons qualified to produce required and specified quality.
- F. Verify that field measurements are as indicated on shop drawings or as instructed by the manufacturer.
- G. Secure products in place with positive anchorage devices designed and sized to withstand stresses, vibration, physical distortion, and disfigurement.

3.02 MOCK-UPS

- A. Before installing portions of the Work where mock-ups are required, construct mock-ups in location and size indicated for each form of construction and finish required to conform to the following requirements, using materials indicated for the completed Work. The purpose of mock-up is to demonstrate the proposed range of aesthetic effects and workmanship.
- B. Accepted mock-ups establish the standard of quality the Architect will use to judge the Work.
- C. Tests shall be performed under provisions identified in this section and identified in the respective product specification sections.
- D. Assemble and erect specified items with specified attachment and anchorage devices, flashings, seals, and finishes.
- E. Obtain Architect's approval of mock-ups before starting work, fabrication, or construction.
 - 1. Architect will issue written comments within seven (7) working days of initial review and each subsequent follow up review of each mock-up.
 - 2. Make corrections as necessary until Architect's approval is issued.
- F. Accepted mock-ups shall be a comparison standard for the remaining Work.
- G. Where mock-up has been accepted by Architect and is specified in product specification sections to be removed, protect mock-up throughout construction, remove mock-up and clear area when directed to do so by Architect.

3.03 TOLERANCES

- A. Monitor fabrication and installation tolerance control of products to produce acceptable Work. Do not permit tolerances to accumulate.
- B. Comply with manufacturers' tolerances. Should manufacturers' tolerances conflict with Contract Documents, request clarification from Architect before proceeding.

- C. Adjust products to appropriate dimensions; position before securing products in place.

3.04 TESTING AND INSPECTION

- A. See individual specification sections for testing and inspection required.
- B. Testing Agency Duties:
 - 1. Provide qualified personnel at site. Cooperate with Architect and Contractor in performance of services.
 - 2. Perform specified sampling and testing of products in accordance with specified standards.
 - 3. Ascertain compliance of materials and mixes with requirements of Contract Documents.
 - 4. Promptly notify Architect and Contractor of observed irregularities or non-conformance of Work or products.
 - 5. Perform additional tests and inspections required by Architect.
 - 6. Submit reports of all tests/inspections specified.
- C. Limits on Testing/Inspection Agency Authority:
 - 1. Agency may not release, revoke, alter, or enlarge on requirements of Contract Documents.
 - 2. Agency may not approve or accept any portion of the Work.
 - 3. Agency may not assume any duties of Contractor.
 - 4. Agency has no authority to stop the Work.
- D. Contractor Responsibilities:
 - 1. Deliver to agency at designated location, adequate samples of materials proposed to be used that require testing, along with proposed mix designs.
 - 2. Cooperate with laboratory personnel, and provide access to the Work and to manufacturers' facilities.
 - 3. Provide incidental labor and facilities:
 - a. To provide access to Work to be tested/inspected.

- b. To obtain and handle samples at the site or at source of Products to be tested/inspected.
- c. To facilitate tests/inspections.
- d. To provide storage and curing of test samples.
- 4. Notify Architect and laboratory 24 hours prior to expected time for operations requiring testing/inspection services.
- 5. Employ services of an independent qualified testing laboratory and pay for additional samples, tests, and inspections required by Contractor beyond specified requirements.
- 6. Arrange with Owner's agency and pay for additional samples, tests, and inspections required by Contractor beyond specified requirements.
- E. Re-testing required because of non-conformance to specified requirements shall be performed by the same agency on instructions by Architect.
- F. Re-testing required because of non-conformance to specified requirements shall be paid for by Contractor.

3.05 MANUFACTURERS' FIELD SERVICES

- A. When specified in individual specification sections, require material or product suppliers or manufacturers to provide qualified staff personnel to observe site conditions, conditions of surfaces and installation, quality of workmanship, start-up of equipment, test, adjust, and balance equipment as applicable, and to initiate instructions when necessary.
- B. Submit qualifications of observer to Architect 30 days in advance of required observations.
- C. Report observations and site decisions or instructions given to applicators or installers that are supplemental or contrary to manufacturers' written instructions.

3.06 DEFECT ASSESSMENT

- A. Replace work or portions of the work not conforming to specified requirements.
- B. If, in the opinion of Architect, it is not practical to remove and replace the work, Architect will direct an appropriate remedy or adjust payment.

END OF SECTION

SECTION 01 4216

DEFINITIONS

PART 1 GENERAL

1.01 SUMMARY

- A. Other definitions are included in individual specification sections.

1.02 DEFINITIONS

- A. Furnish: To supply, deliver, unload, and inspect for damage.
- B. Install: To unpack, assemble, erect, apply, place, finish, cure, protect, clean, start up, and make ready for use.
- C. Product: Material, machinery, components, equipment, fixtures, and systems forming the work result. Not materials or equipment used for preparation, fabrication, conveying, or erection and not incorporated into the work result. Products may be new, never before used, or re-used materials or equipment.
- D. Project Manual: The book-sized volume that includes the procurement requirements (if any), the contracting requirements, and the specifications.
- E. Provide: To furnish and install.
- F. Supply: Same as Furnish.

PART 2 PRODUCTS - NOT USED

PART 3 EXECUTION - NOT USED

END OF SECTION

SECTION 01 5000

TEMPORARY FACILITIES AND CONTROLS

PART 1 GENERAL

1.01 SECTION INCLUDES

- A. Temporary utilities.
- B. Temporary telecommunications services.
- C. Temporary sanitary facilities.
- D. Temporary Controls: Barriers, enclosures, and fencing.
- E. Security requirements.
- F. Vehicular access and parking.
- G. Waste removal facilities and services.
- H. Project identification sign.
- I. Field offices.

1.02 REFERENCE STANDARDS

1.03 TEMPORARY UTILITIES

- A. Provide and pay for all electrical power, lighting, water, and ventilation required for construction purposes.
- B. New permanent facilities may be used.
- C. Use trigger-operated nozzles for water hoses, to avoid waste of water.

1.04 TELECOMMUNICATIONS SERVICES

- A. Provide, maintain, and pay for telecommunications services to field office at time of project mobilization.
- B. Telecommunications services shall include:
 - 1. Windows-based personal computer dedicated to project telecommunications, with necessary software and laser printer.

2. Internet Connections: Minimum of one; DSL modem or faster with WiFi access.
3. Project web site.

1.05 TEMPORARY SANITARY FACILITIES

- A. Provide and maintain required facilities and enclosures. Provide at time of project mobilization.
- B. Maintain daily in clean and sanitary condition.

1.06 BARRIERS

- A. Provide barriers to prevent unauthorized entry to construction areas, to prevent access to areas that could be hazardous to workers or the public and to protect existing facilities and adjacent properties from damage from construction operations and demolition.
- B. Provide barricades and covered walkways required by governing authorities for public rights-of-way.
- C. Provide protection for plants designated to remain. Replace damaged plants.
- D. Protect non-owned vehicular traffic, stored materials, site, and structures from damage.

1.07 FENCING

- A. Construction: Exterior Grade Plywood
- B. Provide 8 foot (2.44 m) high fence around construction site; equip with vehicular and pedestrian gates with locks.

1.08 SECURITY

- A. Provide security and facilities to protect Work, and Owner's operations from unauthorized entry, vandalism, or theft.

1.09 VEHICULAR ACCESS AND PARKING

- A. Comply with regulations relating to use of streets and sidewalks, access to emergency facilities, and access for emergency vehicles.
- B. Coordinate access and haul routes with governing authorities and Owner.
- C. Provide and maintain access to fire hydrants, free of obstructions.

- D. Provide means of removing mud from vehicle wheels before entering streets.
- E. Provide temporary off-site parking to accommodate Contractor's and Subcontractor's construction personnel either at the War Memorial facility or other sites outside of Wailuku town and Wells park.

Provide shuttles between Project site and parking areas.

Include provisions for removing employees from Project who do not adhere to the parking requirements.

- F. Provide one parking space for Owner use.
- G. Provide one parking space for Architect use.

1.10 WASTE REMOVAL

- A. Provide waste removal facilities and services as required to maintain the site in clean and orderly condition.
- B. Provide containers with lids. Remove trash from site periodically.
- C. If materials to be recycled or re-used on the project must be stored on-site, provide suitable non-combustible containers; locate containers holding flammable material outside the structure unless otherwise approved by the authorities having jurisdiction.
- D. Open free-fall chutes are not permitted. Terminate closed chutes into appropriate containers with lids.

1.11 PROJECT IDENTIFICATION

- A. Erect on site at location established by Architect.
- B. Provide project identification sign of design, construction, and location approved by Owner.
- C. No other signs are allowed without Owner permission except those required by law.

1.12 FIELD OFFICES

- A. Office: Weathertight, with lighting, electrical outlets, cooling equipment, and equipped with sturdy furniture, drawing rack, and drawing display table.
- B. Provide space for Project meetings, with table and chairs to accommodate 10 persons.

- C. Provide separate private 400sf office similarly equipped and furnished, for use of Owner.
- D. Provide 400sf space for community Public Relations, for use of Owner.

1.13 REMOVAL OF UTILITIES, FACILITIES, AND CONTROLS

- A. Remove temporary utilities, equipment, facilities, materials, prior to Date of Substantial Completion inspection.
- B. Remove underground installations to a minimum depth of 2 feet (600 mm). Grade site as indicated.
- C. Clean and repair damage caused by installation or use of temporary work.
- D. Restore new permanent facilities used during construction to specified condition.

PART 2 PRODUCTS - NOT USED

PART 3 EXECUTION - NOT USED

END OF SECTION

SECTION 01 5713 – TEMPORARY EROSION AND SEDIMENT CONTROL

PART 1 GENERAL

1.01 DESCRIPTION OF WORK

Furnish all labor, materials, testing and inspection, and equipment required to complete the work indicated on the Drawings and specified herein. The work shall include, but not be limited to, implementing the temporary erosion and sediment control as well as other storm water pollution prevention measures to prevent sediment from entering streams or water bodies in conformance with the requirements of Section 01 5000 “Temporary Facilities and Controls” and the National Pollution Discharge Elimination System (NPDES) permit.

1.02 RELATED REQUIREMENTS

Section 01 5000 – Temporary Facilities and Controls

Section 02 4116 – Structure Demolition

Section 31 2000 – Earth Moving

1.03 REFERENCE STANDARDS

The publications listed form a part of this specification to the extent referenced.

- A. Hawaii Standard Specifications for Road and Bridge Construction, 2005, as applicable to County of Maui, with exception of subsections regarding “Measurements” and “Payment”; referred to as “Standard Specifications”

Section 209 – Temporary Water Pollution, Dust, and Erosion Control

Amend **Section 209.01” Description”** to replace lines 5 to 22 with the following:

“209.01 Description.

(A) Including detailed plans, diagrams, and written Site-Specific Best Management Practices (BMP); constructing, maintaining, and repairing temporary water pollution, dust, and erosion control measures at the project site, including local material sources, work areas and haul roads; removing and disposing hazardous wastes; control of fugitive dust (defined as uncontrolled emission of solid airborne particulate matter from any source other than combustion); and complying with applicable State and Federal permit conditions.

(B) Work associated with construction stormwater, dewatering, and hydrotesting activities and complying with conditions of the National Pollutant Discharge Elimination System (NPDES) permit(s) authorizing discharges associated with construction stormwater, dewatering, and hydrotesting activities.

(C) Potential pollutant identification and mitigation measures are listed in Appendix A for use in the development of the Contractor’s Site-Specific BMP.

Requirements of this section also apply to construction support activities including concrete or asphalt batch plants, rock crushing plants, equipment staging yards/areas, material storage areas, excavated material disposal areas, and borrow areas located outside the State Right-of-Way. For areas serving multiple construction projects, or operating beyond the completion of the construction project in which it supports, the Contractor shall be responsible for securing the necessary permits, clearances, and documents, and following the conditions of the permits and clearances, at no cost to the State.”

- B. *Construction Best Management Practices (BMPs) for the County of Maui*, May 2001.
- C. Conform to the requirements contained within the State of Hawaii Department of Health for the National Pollution Discharge Elimination System (NPDES) Permit.
- D. Conform to the applicable requirements the water quality and water pollution control standards contained within of Hawaii Administrative Rules, Title 11, Chapter 54, “Water Quality Standards”, and Title 11, Chapter 55, “Water Pollution Control.
- E. Do not commence site clearing or earth disturbing operations until temporary erosion and sedimentation controls are in place.
- F. American Society for Testing and Materials (ASTM)
 - ASTM D 4439 (2004) Geosynthetics
 - ASTM D 4491 (1999a; R 2009) Water Permeability of Geotextiles by Permittivity
 - ASTM D 4533 (2004; R 2009) Trapezoid Tearing Strength of Geotextiles
 - ASTM D 4632 (2008) Grab Breaking Load and Elongation of Geotextiles
 - ASTM D 4751 (2004) Determining Apparent Opening Size of a Geotextile
 - ASTM D 4873 (2002; R 2009) Identification, Storage, and Handling of Geosynthetic Rolls and Samples

1.04 ADMINISTRATIVE REQUIREMENTS

- A. Contractor shall obtain all permits required by the Department of Health, or other applicable State agencies.
- B. Contractor shall provide all air and water quality testing and monitoring work required by the permits during construction.
- C. Contractor shall provide the facilities, equipment, and structural controls for minimizing adverse impacts upon the environment during the construction period.

1.05 GENERAL REQUIREMENTS

- A. Contractor shall comply with all applicable Federal and State laws, including the latest Department of Health regulations, local laws and regulations concerning pollution control and abatement.
- B. Notification: The Architect will notify the Contractor in writing of any noncompliance

with the foregoing provisions and the action to be taken. After receipt of such notice, Contractor shall immediately take corrective action. Such notice, when delivered to the Contractor or his authorized representative at the site of the work, shall be deemed sufficient for the purpose of notification. If the Contractor fails or refuses to comply promptly, the Architect may issue an order stopping all or part of the work until satisfactory corrective action has been taken. No part of the time lost due to any such stop orders shall be made the subject of a claim for extension of time or for excess costs or damages by the Contractor.

- C. Sub-Contractor: Compliance with the provisions of this section by subcontractors will be the responsibility of the Contractor.

1.06 EROSION AND SEDIMENT CONTROLS

Typical controls and measures practicable for use by the Contractor are described below.

- A. Stabilization Practices: The stabilization practices to be implemented shall include temporary seeding, mulching, geotextiles, sod stabilization, vegetative buffer strips, erosion control mats, protection of trees, preservation of mature vegetation, etc. On his daily CQC Report, the Contractor shall record the dates when the major grading activities occur, (e.g., clearing and grubbing, excavation, embankment, and grading); when construction activities temporarily or permanently cease on a portion of the site; and when stabilization practices are initiated. Except as provided in paragraphs UNSUITABLE CONDITIONS and NO ACTIVITY FOR LESS THAN 5 DAYS, stabilization practices shall be initiated as soon as practicable, but no more than 5 calendar days, in any portion of the site where construction activities have temporarily or permanently ceased.
- B. Unsuitable Conditions: Where the initiation of stabilization measures by the fourteenth day after construction activity temporarily or permanently ceases is precluded by unsuitable conditions caused by the weather, stabilization practices shall be initiated as soon as practicable after conditions become suitable.
- C. No Activity for Less Than 5 Days: Where construction activity will resume on a portion of the site within 5 days from when activities ceased (e.g., the total time period that construction activity is temporarily ceased is less than 5 days), then stabilization practices do not have to be initiated on that portion of the site by the fifth day after construction activity temporarily ceased.
- D. Burnoff: Burnoff of the ground cover is not permitted.
- E. Protection of Erodible Soils: Immediately finish the earthwork brought to a final grade, as indicated or specified, and protect the side slopes and back slopes upon completion of rough grading. Plan and conduct earthwork to minimize the duration of exposure of unprotected soils.
- F. Structural Practices: Structural practices shall be implemented to divert flows from exposed soils, temporarily store flows, or otherwise limit runoff and the discharge of pollutants from exposed areas of the site. Structural practices shall be implemented

in a timely manner during the construction process to minimize erosion and sediment runoff. Structural practices shall include the following devices.

- G. Compost Filter Sock: The Contractor shall provide compost filter socks as a temporary structural practice to minimize erosion and sediment runoff. Compost filter socks may be used as a perimeter control, inlet protection, and stockpile containment per manufacturer's recommendation. Compost filter sock shall be properly installed to effectively retain sediment immediately after completing each phase of work where erosion would occur in the form of sheet and rill erosion (e.g. clearing and grubbing, excavation, embankment, and grading). Compost filter socks shall be installed in the locations indicated on the drawings. Final removal of compost filter sock barriers shall be upon approval by the Contracting Officer.
- H. Curb Inlet Filter: Provide and maintain curb inlet filters downslope of construction activities. Filters shall be the fine gravel bag or flush mounted type, consisting of HDPE from recycled materials, filtering particles sizes 425 microns or less. The fine gravel bag type filter shall meet or exceed the performance of the Green Snake Bag, as manufactured by ESI Resource Services, Rancho Cordova, CA (916-985-7787), or equal. The flush mounted filters shall meet or exceed the performance of Curb Inlet Guard, as manufactured by the ERTEC Environmental Systems, 866-521-0724, www.ertecsystems.com, or equal.
- I. Fiber Rolls: The Contractor shall provide fiber rolls as a temporary structural practice to reduce water velocity, minimize erosion, and reduce sediment runoff. Rolls shall be properly placed to effectively retain sediment immediately after completing each phase of work (e.g., clearing and grubbing, excavation, embankment, and grading) in each independent runoff area (e.g., after clearing and grubbing in an area between a ridge and drain, rolls shall be placed as work progresses, rolls shall be removed/replaced/relocated as needed for work to progress in the drainage area). Final removal of fiber rolls barriers shall be upon approval by the Contracting Officer. Rows of fiber rolls shall be provided as follows:
 - 1. Along the downhill perimeter edge of all areas disturbed.
 - 2. Along the top of the slope or top bank of drainage ditches, channels, swales, etc. that traverse disturbed areas.
 - 3. Along the toe of all cut slopes and fill slopes of the construction areas.
 - 4. Perpendicular to the flow in the bottom of existing drainage ditches, channels, swales, etc. that traverse disturbed areas or carry runoff from disturbed areas. Rows shall be spaced at distances not to exceed 35 feet.
 - 5. Perpendicular to the flow in the bottom of new drainage ditches, channels, and swales. Rows shall be spaced at distances not to exceed 35 feet.
 - 6. At the entrance to culverts that receive runoff from disturbed areas.
 - 7. On steep slopes fiber rolls shall be trenched in slightly and spaced at distances not to exceed 35 feet. Rolls shall be placed at the same elevation contour by survey methods. Placement by survey methods will reduce the possibility of a

rill developing along a sloping roll. On steep slopes fiber rolls shall be used with erosion control blankets.

8. The Contractor may use either wooden stakes or steel posts for fence construction. Wooden stakes utilized for silt fence construction, shall have a minimum cross section of 2 inches by 2 inches and shall have a minimum length of 5 feet. Steel posts (standard "U" or "T" section) utilized for silt fence construction, shall have a minimum weight of weight of 1.33 pounds per linear foot diameter and a minimum length of 5 feet.
- K. Erosion Control Blanket: Apply temporary erosion control blanket to cover and protect disturbed soil areas and soil from erosion by wind or water, especially on sloping grades. Apply temporary erosion control blanket to reduce channel erosion by protecting against scour created by concentrated flow.
- L. Polymer emulsions: Hydraulically apply polymer emulsions for dust control, erosion control and soil stabilization.
- M. Minimum BMP Checklist: Development of contract-specific Best Management Practices shall consider the checklist applicable to the size of the project. See Rules Relating to Soil Erosion Standards & Guidelines, Department of Planning & Permitting, City and County of Honolulu, (Figure 4).

1.06 SUBMITTALS

- A. See Section 01330 – Submittal Procedures
- B. Submit manufacturer's certificates of conformance for each type of temporary erosion and sediment control product.

1.07 NATIONAL POLLUTION DISCHARGE ELIMINATION SYSTEM (NPDES) PERMIT

- A. The State is in the process of obtaining a National Pollution Discharge Elimination System (NPDES) Permit for 'Authorizing Discharges of Storm Water Associated With Construction Activity' (Form C) and is preparing a Notice of Intent (NOI) and Storm Water Pollution Prevention Plan (SWPPP) for this project.
- B. It is anticipated that the Notice of General Permit Coverage (NGPC) authorizing discharges from storm water associated with construction will be issued by the Hawaii Department of Health prior to start of construction.
- C. Coverage under the general permit authorizes stormwater discharges only to the receiving State waters discharge point(s) from the project location identified in the NOI provided that the Contractor comply with Hawaii Administrative Rules (HAR) 11-54; HAR 11-55, Appendix A; HAR 11-55, Appendix C; and the information submitted in the NOI. Discharges of non-storm water toxics, and other water pollutants to State waters are not authorized.

PART 2 - PRODUCTS

- A. Materials shall be as specified in Section 209 "Temporary Water Pollution, Dust and

Erosion Control” of the Standard Specifications.

Amend **Section 209.02 “Materials”** to replace lines 24 to 61 with the following:

“209.02 Materials. Comply with applicable materials described in Chapters 2 and 3 of the current HDOT “Construction Best Management Practices Field Manual”. In addition, the materials shall comply with the following:

(A) Grass. Grass shall be a quick growing species such as rye grass, Italian rye grass, or cereal grasses. Grass shall be suitable to the area and provide a temporary cover that will not compete later with permanent cover. Alternative grasses are allowable if acceptable to the Engineer.

(B) Fertilizer and Soil Conditioners. Fertilizer and soil conditioners shall be a standard commercial grade acceptable to the Engineer. Fertilizer shall conform to Subsection 619.02(H)(1) - Commercial Fertilizer.

(C) Hydro-mulching. Hydro-mulching used as a temporary vegetative stabilization measure shall consist of materials in Subsections 209.02(A) - Grass, and 209.02(B) – Fertilizer and Soil Conditioners. Mulches shall be recycled materials including bagasse, hay, straw, wood cellulose bark, wood chips, or other material acceptable to the Engineer. Mulches shall be clean and free of noxious weeds and deleterious materials. Potable water shall meet the requirements of Subsection 712.01 - Water. Submit alternate sources of irrigation water for the Engineer’s acceptance if deviating from 712.01 - Water. Installation and other requirements shall be in accordance with portions of Section 641- Hydro-Mulch Seeding including 641.02(D) - Soil and Mulch Tackifier, 641.03(A) – Seeding, and 641.03(B) - Planting Period. Install non-vegetative controls including mulch or rolled erosion control products while the vegetation is being established. Water and fertilize grass. Apply fertilizer as recommended by the manufacturer. Replace grass the Engineer considers unsuitable or sick. Remove and dispose of trash and debris. Remove invasive species. Mow as needed to prevent site or signage obstructions, fire hazard, or nuisance to the public. Do not remove down stream sediment control measures until the vegetation is uniformly established, including no large bare areas, and provides 70 percent of the density of pre-disturbance vegetation. Temporary vegetative stabilization shall not be used longer than one year.

(D) Silt Fences. Comply with ASTM D6462, Standard Practice for Silt Fence Installation.

(E) Filter Socks. Filter socks shall be manufactured from a 5 mil thick continuous HDPE filament, woven into a tubular mesh netting material with net openings of 3/8”. Filter socks shall be filled with appropriate filtering media consisting of compost of an approved alternate media.

Filter socks shall be 12-inches in diameter. In areas of steep slopes (>3:1 slopes), install 18-inch diameter filter socks or larger. Contractor shall submit a 2-lb sample of the filtering media to the Engineer.

(F) Compost Filter Media for Filter Socks. Compost products for use as filtering media must meet the criteria specified in the table below. Compost shall

meet all applicable local and Federal regulations pertaining to its production and distribution. Approved compost must meet related local and federal chemical containment (e.g. heavy metals, pesticides, etc.) and pathogen limits pertaining to the feedstocks (source materials) in which it is derived.

Filter Sock Media Parameters

Parameters	Reported as (units of measure)	Filter Sock Media
pH	pH units	6 – 8
Moisture Content	% wet weight basis	30 – 60
Organic Matter Content	% dry weight basis	25 – 65
Particle Size	% passing a selected mesh size, dry weight basis	2 inch, 100% passing 0.372 inch, 10%-30% passing
Physical Contaminants	% dry weight basis	<1

(G) Alternate Filter Media for Filter Socks. Non-composted, organic materials may be utilized where only sediment removal and hydraulic flow-through conditions are required. Acceptable organic filter media material include untreated and non-painted wood pallets, land clearing debris, or tree chips. Filter media shall meet parameters tabled above, aside from particle size, where 66% passing a 2 in sieve and a maximum of 40% passing a 3/8 in sieve are allowable. The filter media shall be weed free and derived from a clean, separated source of organic matter. Submit a sample to the Engineer for approval.

Alternative materials or methods to control, prevent, remove and dispose pollution are allowable if acceptable to the Engineer.”

PART 3 EXECUTION

Construct temporary erosion and sediment control in conformance with Section 209 of the Standard Specifications.

Amend **Section 209.03 “Construction”** to replace lines 63 to 334 with the following:

“209.03 Construction.

(A) Preconstruction Requirements.

(1) Water Pollution, Dust, and Erosion Control Meeting. Schedule a water pollution, dust, and erosion control meeting with the Engineer after Site-Specific BMP is accepted in writing by the Engineer. Meeting shall be scheduled a minimum of 14 calendar days prior to the issuance of Notice to Proceed. Discuss sequence of work, plans and proposals for water pollution, dust, and erosion control.

(2) Water Pollution, Dust, and Erosion Control Submittals. Submit a Site-Specific BMP Plan within 30 calendar days of contract execution. Submission of complete and acceptable Site-Specific BMP Plan is the sole responsibility of the Contractor and additional contract time will not be issued for delays due to incompleteness. Include the following:

(a) Written description of activities to minimize water pollution and soil erosion into State waters, drainage or sewer systems. BMP shall include the following:

1. An identification of potential pollutants and their sources.
2. A list of all materials and heavy equipment to be used during construction.
3. Descriptions of the methods and devices used to minimize the discharge of pollutants into State waters, drainage or sewer systems.
4. Details of the procedures used for the maintenance and subsequent removal of any erosion or siltation control devices.
5. Methods of removing and disposing hazardous wastes encountered or generated during construction.
6. Methods of removing and disposing concrete and asphalt pavement cutting slurry, concrete curing water, and hydrodemolition water.
7. Spill Control and Prevention and Emergency Spill Response Plan.
8. Fugitive dust control, including dust from grinding, sweeping, or brooming off operations or combination thereof.
9. Methods of storing and handling of oils, paints and other products used for the project.
10. Material storage and handling areas, and other staging areas.
11. Concrete truck washouts.
12. Concrete waste control.

13. Fueling and maintenance of vehicles and other equipment.
14. Tracking of sediment offsite from project entries and exits.
15. Litter management.
16. Toilet facilities.
17. Other factors that may cause water pollution, dust and erosion control.

(b) Provide plans indicating location of water pollution, dust and erosion control devices; provide plans and details of BMPs to be installed or utilized; show areas of soil disturbance in cut and fill, indicate areas used for construction staging and storage including items (1) through (17) above, storage of aggregate (indicate type of aggregate), asphalt cold mix, soil or solid waste, equipment and vehicle parking, and show areas where vegetative practices are to be implemented. Indicate intended drainage pattern on plans. Include flow arrows. Include separate drawing for each phase of construction that alters drainage patterns. Indicate approximate date when device will be installed and removed.

(c) Construction schedule.

(d) Name(s) of specific individual(s) designated responsible for water pollution, dust, and erosion controls on the project site. Include home, cellular, and business telephone numbers, fax numbers, and e-mail addresses.

(e) Description of fill material to be used.

(f) For projects with an NPDES Permit for Construction Activities, submit information to address all sections in the Storm Water Pollution Prevention Plan (SWPPP).

(g) For projects with an NPDES Permit, information required for compliance with the conditions of the Notice of General Permit Coverage (NGPC)/NPDES Permit.

(h) Site-Specific BMP Review Checklist. The checklist may be downloaded from HDOT's Stormwater Management website at <http://stormwaterhawaii.com>.

Date and sign Site-Specific BMP Plan. Keep accepted copy on site or at an accessible location so that it can be made available at the time of an on-site inspection or upon request by the Engineer, HDOT Third-Party Inspector, and/or DOH/EPA Representative. Amendments to the Site-Specific BMP Plan shall be included with original Site-Specific BMP Plan. Modify SWPPP if necessary to

conform to revisions. Include date of installation and removal of Site-Specific BMP measures. Obtain written acceptance by the Engineer before implementing revised Site-Specific BMPs in the field.

Follow the guidelines in the current HDOT "Construction Best Management Practices Field Manual", in developing, installing, and maintaining Site-Specific BMPs for all projects. For any conflicting requirements between the Manual and applicable bid documents, the applicable bid documents will govern. Should a requirement not be clearly described within the applicable bid documents, notify the Engineer immediately for interpretation. For the purposes of clarification "applicable bid documents" include the construction plans, standard specifications, special provisions, Permits, and the SWPPP when applicable.

Follow Honolulu's City and County "Rules for Soil Erosion Standards and Guidelines" for all projects on Oahu. Use respective Soil Erosion Guidelines for Maui, Kauai and Hawaii projects.

(B) Construction Requirements. Do not begin work until submittals detailed in Subsection 209.03(A)(2) - Water Pollution, Dust, and Erosion Control Submittals are completed and accepted in writing by the Engineer.

Install, maintain, monitor, repair and replace site-specific BMP measures, such as for water pollution, dust and erosion control; installation, monitoring, and operation of hydrotesting activities; removal and disposal of hazardous waste indicated on plans, concrete cutting slurry, concrete curing water; or hydrodemolition water. Site-Specific BMP measures shall be in place, functional and accepted by HDOT personnel prior to initiating any ground disturbing activities.

If necessary, furnish and install rain gage in a secure location prior to field work including installation of site-specific BMP. Provide rain gage with a tolerance of at least 0.05 inches of rainfall. Install rain gage on project site in an area that will not deter rainfall from entering the gate opening. Do not install in a location where rain water may splash into rain gage. The rain gage installation shall be stable and plumbed. Maintain rain gage and replace rain gage that is stolen, does not function properly or accurately, is worn out, or needs to be relocated. Do not begin field work until rain gage is installed and Site-Specific BMPs are in place. Rain gage data logs shall be readily available. Submit rain gage data logs weekly to the Engineer.

Address all comments received from the Engineer.

Modify and resubmit plans and construction schedules to correct conditions that develop during construction which were unforeseen during the design and pre-construction stages.

Coordinate temporary control provisions with permanent control features throughout the construction and post-construction period.

Limit maximum surface area of earth material exposed at any time to 300,000 square feet. Do not expose or disturb surface area of earth material

(including clearing and grubbing) until BMP measures are installed and accepted in writing by the Engineer. Protect temporarily or permanently disturbed soil surface from rainfall impact, runoff and wind before end of the work day.

Immediately initiate stabilizing exposed soil areas upon completion of earth disturbing activities for areas permanently or temporarily ceased on any portion of the site. Earth-disturbing activities have permanently ceased when clearing and excavation within any area of the construction site that will not include permanent structures has been completed. Earth-disturbing activities have temporarily ceased when clearing, grading, and excavation within any area of the site that will not include permanent structures will not resume for a period of 14 or more calendar days, but such activities will resume in the future. The term "immediately" is used in this section to define the deadline for initiating stabilization measures. "Immediately" means as soon as practicable, but no later than the end of the next work day, following the day when the earth-disturbing activities have temporarily or permanently ceased.

For projects with an NPDES Permit for Construction activities:

- 1)** For construction areas discharging into waters not impaired for nutrients or sediments, complete initial stabilization within 14 calendar days after the temporary or permanent cessation of earth-disturbing activities.
- 2)** For construction areas discharging into nutrient or sediment impaired waters, complete initial stabilization within 7 calendar days after the temporary or permanent cessation of earth-disturbing activities.

For projects without an NPDES Permit for Construction activities, complete initial stabilization within 14 calendar days after the temporary or permanent cessation of earth-disturbing activities.

Any of the following types of activities constitutes initiation of stabilization:

- (1)** Prepping the soil for vegetative or non-vegetative stabilization;
- (2)** Applying mulch or other non-vegetative product to the exposed area;
- (3)** Seeding or planting the exposed area;
- (4)** Starting any of the activities in items (1) – (3) above on a portion of the area to be stabilized, but not on the entire area; and
- (5)** Finalizing arrangements to have stabilization product fully installed in compliance with the deadline for completing initial stabilization activities.

Any of the following types of activities constitutes completion of initial stabilization activities:

- (1)** For vegetative stabilization, all activities necessary to initially seed or plant the area to be stabilized; and/or
- (2)** For non-vegetative stabilization, the installation or application of all such non-vegetative measures.

If the Contractor is unable to meet the deadlines above due to circumstances beyond the Contractor's control, and the Contractor is using vegetative cover for temporary or permanent stabilization, the Contractor may comply with the following stabilization deadlines instead as agreed to by the Engineer:

- (1)** Immediately initiate, and complete within the timeframe shown above, the installation of temporary non-vegetative stabilization measures to prevent erosion;
- (2)** Complete all soil conditioning, seeding, watering or irrigation installation, mulching, and other required activities related to the planting and initial establishment of vegetation as soon as conditions or circumstances allow it on the site; and
- (3)** Notify and provide documentation to the Engineer the circumstances that prevent the Contractor from meeting the deadlines above for stabilization and the schedule the Contractor will follow for initiating and completing initial stabilization and as agreed to by the Engineer.

Follow the applicable requirements of the specifications and special provisions including Section 619 and Section 641.

Immediately after seeding or planting the area to be vegetatively stabilized, to the extent necessary to prevent erosion on the seeded or planted area, select, design, and install non-vegetative erosion controls that provide cover (e.g., mulch, rolled erosion control products) to the area while vegetation is becoming established.

Protect exposed or disturbed surface area with mulches, grass seeds or hydromulch. Spray mulches at a rate of 2,000 pounds per acre. Add tackifier to mix at a rate of 85 pounds per acre. Apply grass seeds at a rate of 125 pounds per acre. For hydromulch, use the ingredients and rates required for mulches and grass seeds. Submit recommendations from a licensed Landscape Architect when deviating from the application rates above.

Apply fertilizer to mulches, grass seed or hydromulch per manufacturer's recommendations. Submit recommendations from a licensed Landscape Architect when deviating from the manufacturer's recommendations.

Install velocity dissipation measures when exposing erodible surfaces greater than 15 feet in height.

BMP measures shall be in place and operational at the end of work day or as required by Section 209.03(B).

Install and maintain either or both stabilized construction entrances and wheel washes to minimize tracking of dirt and mud onto roadways. Restrict traffic to stabilized construction areas only. Clean dirt, mud, or other material tracked onto the road, sidewalk, or other paved area by the end of the same day in which the track-out occurs. Modify stabilized construction entrances to prevent mud from being tracked onto road. Stabilize entire access roads if necessary.

Chemicals may be used as soil stabilizers for either or both erosion and dust control if acceptable to the Engineer.

Provide temporary slope drains of rigid or flexible conduits to carry runoff from cuts and embankments. Provide portable flume at the entrance. Shorten or extend temporary slope drains to ensure proper function.

Protect ditches, channels, and other drainageways leading away from cuts and fills at all times by either:

- (1) Hydro-mulching the lower region of embankments in the immediate area.
- (2) Installing check dams and siltation control devices.
- (3) Other methods acceptable to the Engineer.

Provide for controlled discharge of waters impounded, directed, or controlled by project activities or erosion control measures.

Cover exposed surface of materials completely with tarpaulin or similar device when transporting aggregate, soil, excavated material or material that may be source of fugitive dust.

Cleanup and remove any pollutant that can be attributed to the Contractor.

Install or modify Site-Specific BMP measures due to change in the Contractor's means and methods, or for omitted condition that should have been allowed for in the accepted Site-Specific BMP or a Site-Specific BMP that replaces an accepted Site-Specific BMP that is not satisfactorily performing. Modifications to Site-Specific BMP measures shall be accepted in writing by the Engineer prior to implementation.

Properly maintain all Site-Specific BMP measures.

For projects with an NPDES Permit for Construction Activities:

(1) For construction areas discharging into nutrient or sediment impaired waters, inspect, prepare a written report, and make repairs to BMP measures at the following intervals:

(a) Weekly.

(b) Within 24 hours of any rainfall of 0.25 inch or greater which occurs in a 24-hour period.

(c) When existing erosion control measures are damaged or not operating properly as required by Site-Specific BMP.

(2) For construction areas discharging to waters not impaired for nutrients or sediments, inspect, prepare a written report, and make repairs to BMP measures at the following intervals:

(a) Weekly.

(b) When existing erosion control measures are damaged or not operating properly as required by Site-Specific BMP.

For projects without an NPDES Permit for Construction activities, inspect, prepare a written report, and make repairs to BMP measures at the following intervals:

(a) Weekly.

(b) When existing erosion control measures are damaged or not operating properly as required by Site-Specific BMP.

Temporarily remove, replace or relocate any Site-Specific BMP that must be removed, replaced or relocated due to potential or actual flooding, or potential danger or damage to project or public.

Maintain records of inspections of Site-Specific BMP work. Keep continuous records for duration of the project. Submit copy of Inspection Report to the Engineer within 24 hours after each inspection.

The Contractor's designated representative specified in Subsection 209.03(A)(2)(d) shall address any Site-Specific BMP deficiencies brought up by the Engineer immediately, including weekends and holidays, and complete work to fix the deficiencies by the close of the next work day if the problem does not require significant repair or replacement, or if the problem can be corrected through routine maintenance. Address any Site-Specific BMP deficiencies brought up by the State's Third-Party Inspector in the timeframe above or as specified in the Consent Decree or MS4 NPDES Permit, whichever is more stringent. The Consent Decree timeframe requirement applies statewide. The MS4 NPDES Permit only applies to Oahu. In this section, "immediately" means the Contractor shall take all reasonable measures to minimize or prevent discharge of pollutants until a permanent solution is installed and made operational. If a problem is identified at a time in the day in which it is too late to initiate repair, initiation of repair shall begin on the following work day. When installation of a new pollution prevention control or a significant repair is needed, complete installation or repair no later than seven calendar days from the time of notification/Contractor discovery. Notify the Engineer and document why it is infeasible to complete the installation or repair within seven calendar days and complete the work as soon as practicable and as agreed to by the Engineer. Address Site-Specific BMP deficiencies discovered by the Contractor within the timeframe above. The Contractor's failure to satisfactorily address these Site-Specific BMP deficiencies, the Engineer reserves the right to employ outside assistance or use the Engineer's own labor forces to provide necessary corrective measures. The Engineer will charge the Contractor such incurred costs plus any associated project engineering costs. The Engineer will make appropriate deductions from the Contractor's monthly progress estimate. Failure to apply Site-Specific BMP measures may result in one or more of the following: assessment of liquidated damages, suspension, or cancellation of Contract with the Contractor being fully responsible for all additional costs incurred by the State.

(C) Discharges of Storm Water Associated with Construction Activities. If work includes disturbance of one acre or more, an NPDES Permit authorizing Discharges of Storm Water Associated with Construction Activity (CWB-NOI Form C) or Individual Permit authorizing storm water discharges associated with construction activity is required from the Department of Health Clean Water Branch (DOH-CWB). The County has applied for the NPDES Permit for Construction Activities and it is expected to receive the permit prior to start of construction.

Do not begin construction activities until all required conditions of the permit are met and submittals detailed in Subsection 209.03(A)(2) – Water Pollution, Dust, and Erosion Control Submittals are completed and accepted in writing by the Engineer.

(D) Discharges Associated with Hydrotesting Activities. If hydrotesting activities require effluent discharge into State waters or drainage systems, an NPDES Hydrotesting Waters Permit (CWB-NOI Form F) or Individual Permit authorizing discharges associated with hydrotesting from DOH-CWB is required from the DOH-CWB. Contractor is responsible to obtain the NPDES Permit for Hydrotesting Activities if one is needed.

Do not begin hydrotesting activities until the DOH-CWB has issued an Individual NPDES Permit or Notice of General Permit Coverage (NGPC). Conduct Hydrotesting operations in accordance with the conditions of the permit or NGPC.

(E) Discharges Associated with Dewatering Activities. If dewatering activities require effluent discharge into State waters or drainage systems, an NPDES Dewatering Permit (CWB-NOI Form G) or Individual Permit authorizing discharges associated with dewatering from DOH-CWB is required from the DOH-CWB. Contractor is responsible to obtain the NPDES Permit for Dewatering Activities if one is needed.

Do not begin dewatering activities until the DOH-CWB has issued an Individual NPDES Permit or Notice of General Permit Coverage (NGPC). Conduct dewatering operations in accordance with the conditions of the permit or NGPC.

(F) Solid Waste. Submit the Solid Waste Disclosure Form for Construction Sites to the Engineer within 30 calendar days of contract execution. Provide a copy of all the disposal receipts from the facility permitted by the Department of Health to receive solid waste to the Engineer monthly. This should also include documentation from any intermediary facility where solid waste is handled or processed, or as directed by the Engineer.

(G) Construction BMP Training. The Contractor's representative responsible for development of the Site-Specific BMP Plan and implementation of Site-Specific BMPs in the field shall attend the State's Construction Best Management Practices Training. The Contractor shall keep training logs updated and readily available.

Appendix A

The following list identifies potential pollutant sources and corresponding BMPs used to mitigate the pollutants. Each BMP is referenced to the corresponding section of the current HDOT Construction Best Management Practices Field Manual or appropriate Supplemental Sheets. The Manual may be obtained from the HDOT Statewide Stormwater Management Program Website at <http://www.stormwaterhawaii.com/resources/contractors-and-consultants/> under Construction Best Management Practices Field Manual. Supplemental BMP sheets are located at <http://www.stormwaterhawaii.com/resources/contractors-and-consultants/storm-water-pollution-prevention-plan-swppp/> under Concrete Curing and Irrigation Water.

Pollutant Source	Appropriate Site-Specific BMP to be Implemented	BMP Requirements
<p><i>Construction debris, green waste, general litter</i></p>	<ul style="list-style-type: none"> • <i>Separate contaminated clean up materials from construction and demolition (C&D) wastes.</i> • <i>Provide waste containers (e.g., dumpster or trash receptacle) of sufficient size and number to contain construction and domestic wastes.</i> • <i>Inspect construction waste and recycling areas regularly.</i> • <i>Schedule solid waste collection regularly.</i> • <i>Schedule recycling activities based on construction/demolition phases.</i> • <i>Empty waste containers weekly or when they are two-thirds full, whichever is sooner.</i> • <i>Do not allow containers to overflow. Clean up immediately if they do.</i> • <i>On work days, clean up and dispose of waste in designated waste containers.</i> • <i>See Solid Waste Management Section SM-6 for additional requirements.</i> • <i>Provide Storm Drain Inlet Protection and/or Perimeter Sediment Controls as applicable.</i> 	<p><i>See Solid Waste Management Section SM-6. Protect Storm Drain Inlets SC-2, and Perimeter Sediment Controls where applicable.</i></p>

<p><i>Materials associated with the operation and maintenance of equipment, such as oil, fuel, and hydraulic fluid leakage</i></p>	<ul style="list-style-type: none"> • <i>Use off-site wash racks, repair and maintenance facilities, and fueling sites when practical.</i> • <i>Designate bermed wash area if cleaning on site is necessary.</i> • <i>Place drip pans or drop cloths under vehicles and equipment to absorb spills or leaks.</i> • <i>Provide an ample supply of readily available spill cleanup materials.</i> • <i>Clean up spills immediately, using dry clean-up methods where possible, and dispose of used materials properly.</i> • <i>Do not clean surfaces or spills by hosing the area down.</i> • <i>Eliminate the source of the spill to prevent a discharge or a continuation of an ongoing discharge.</i> • <i>Inspect on-site vehicles and equipment regularly and immediately repair leaks.</i> • <i>Regularly inspect fueling areas and storage tanks.</i> • <i>Train employees on proper maintenance and spill practices and procedures and fueling and cleanup procedures.</i> • <i>Store diesel fuel, oil, hydraulic fluid, or other petroleum products or other chemicals in water-tight containers and provide cover or secondary containment.</i> • <i>Do not remove original product labels and comply with manufacturer's labels for proper disposal.</i> • <i>Dispose of containers only after all the product has been used.</i> • <i>Dispose of or recycle oil or oily wastes according to Federal, State, and Local requirements.</i> • <i>Store soaps, detergents, or solvents under cover or other means to prevent contact with rainwater.</i> • <i>See Vehicle and Equipment Cleaning, Maintenance, and Refueling, Sections SM-11, SM-12, and SM-13 and Material</i> 	<p><i>See Vehicle and Equipment Cleaning, Maintenance, and Refueling, Sections SM-11, SM-12, and SM-13, and Material Delivery, Storage and Material Use Sections SM-2 and SM-3, and Spill Prevention and Control SM-10.</i></p>
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<i>Pollutant Source</i>	<i>Appropriate Site-Specific BMP to be Implemented</i>	<i>BMP Requirements</i>
	<i>Use Section SM-3 for additional requirements.</i>	

<p><i>Soil erosion from the disturbed areas</i></p>	<ul style="list-style-type: none"> • <i>Provide Soil Stabilization, Slope Protection, Storm Drain Inlet Protection SC-2, Perimeter Controls and Sediment Barriers, Sediment Basins and Detention Ponds, Check Dams SC-9 ,Level Spreader SC-10, Paving Operations SM-19, Construction Road Stabilization EC-1, Controlling Storm Water Flowing Onto and Through the Project, Post-Construction BMPs, and Non-Structural BMPs (Employee Training SM-1, Scheduling SM-14, Location of Potential Sources of Sediment SM-15, Preservation of Existing Vegetation SM-16) .</i> • <i>Delineate, and clearly mark off, with flags, tape, or other similar marking device all natural buffer areas defined in the SWPPP.</i> • <i>Preserve native topsoil where practicable.</i> • <i>In areas where vegetative stabilization will occur, restrict vehicle/equipment use in areas to avoid soil compaction or condition soil to promote vegetative growth.</i> • <i>For Storm Drain Inlet Protection, clean, or remove and replace, the protection measures as sediment accumulates, the filter becomes clogged, and/or performance is compromised.</i> • <i>Where there is evidence of sediment accumulation adjacent to the inlet protection measure, remove the deposited sediment by the end of the same day in which it is found or by the end of the following work day if removal by the same day is not feasible.</i> • <i>Sediment basins shall be designed and maintained in accordance with HAR 11-55.</i> 	<p><i>Soil Stabilization</i></p> <ol style="list-style-type: none"> 1. <i>SM-21 Topsoil Management</i> 2. <i>EC-5 Seeding and Planting</i> 3. <i>EC-6 Mulching</i> 4. <i>EC-7 Geotextiles and Mats</i> <p><i>Slope Protection</i></p> <ol style="list-style-type: none"> 1. <i>EC-5 Seeding and Planting</i> 2. <i>EC-6 Mulching</i> 3. <i>EC-7 Geotextiles and Mats</i> 4. <i>EC-9 Slope Roughening, Terracing, and Rounding</i> 5. <i>SC-11 Slope Drains and Subsurface Drains</i> 6. <i>SC-12 Top and Toe of Slope Diversion Ditches and Berms</i> <p><i>SC-2 Storm Drain Inlet Protection</i></p> <p><i>Perimeter Controls and Sediment Barriers</i></p> <ol style="list-style-type: none"> 1. <i>SC-1 Silt Fence</i> 2. <i>SC-5 Vegetated Filter Strips and Buffers</i> 3. <i>SC-8 Compost Filter Berm</i> 4. <i>SC-13 Sandbag Barrier</i> 5. <i>SC-14 Brush or Rock Filter</i>
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Pollutant Source	Appropriate Site-Specific BMP to be Implemented	BMP Requirements
	<ul style="list-style-type: none"> • <i>Minimize disturbance on steep slopes (Greater than 15% in grade).</i> • <i>If disturbance of steep slopes are unavoidable, phase disturbances and use stabilization techniques designed for steep grades.</i> • <i>For temporary drains and swales use velocity dissipation devices within and at the outlet to minimize erosive flow velocities.</i> 	<p><i>Sediment Basins and Detention Ponds</i></p> <ol style="list-style-type: none"> 1. <i>SC-15 Sediment Trap</i> 2. <i>SC-16 Sediment Basin</i> <p><i>SC-9 Check Dams</i></p> <p><i>SC-10 Level Spreader</i></p> <p><i>SM-19 Paving Operations EC-1 Construction Road Stabilization</i></p> <p><i>Controlling Storm Water Flowing onto and Through the Project</i></p> <ol style="list-style-type: none"> 1. <i>EC-8 Run-On Diversion</i> 2. <i>SC-6 Earth Dike</i> 3. <i>SC-7 Temporary Drains and Swales</i> <p><i>Post Construction BMPs</i></p> <ol style="list-style-type: none"> 1. <i>EC-4 Flared Culvert End Sections</i> 2. <i>SC-3 Rip-Rap and Gabion Inflow Protection</i> 3. <i>SC-4 Outlet Protection and Velocity Dissipation Devices</i> 4. <i>SM-21 Topsoil Management</i>

Pollutant Source	Appropriate Site-Specific BMP to be Implemented	BMP Requirements
		<p><i>Non-Structural BMPs</i></p> <ol style="list-style-type: none"> 1. <i>SM-1 Employee Training</i> 2. <i>SM-14 Scheduling</i> 3. <i>SM-15 Location of Potential Sources of Sediment</i> 4. <i>SM-16 Preservation of Existing Vegetation</i>
<p><i>Sediment from soil stockpiles</i></p>	<ul style="list-style-type: none"> • <i>Locate stockpiles a minimum of 50 feet or as far as practicable from concentrated runoff or outside of any natural buffers identified on the SWPPP.</i> • <i>Place bagged materials on pallets and under cover.</i> • <i>Provide physical diversion to protect stockpiles from concentrated runoff.</i> • <i>Cover stockpiles with plastic or comparable material when practicable.</i> • <i>Place silt fence, fiber filtration tubes, or straw wattles around stockpiles.</i> • <i>Do not hose down or sweep soil or sediment accumulated on pavement or other impervious surfaces into any storm water conveyance (unless connected to a sediment basin, sediment trap, or similarly effective control), storm drain inlet, or state water.</i> • <i>Unless infeasible, contain and securely protect stockpiles from the wind.</i> • <i>Provide Storm Drain Inlet Protection and/or Perimeter Sediment Controls as applicable.</i> • <i>See Protection of Stockpiles Section SM-4 for additional requirements.</i> 	<p><i>See Protection of Stockpiles Section SM-4. Protect Storm Drain Inlets SC-2, and Perimeter Sediment Controls where applicable.</i></p>

Pollutant Source	Appropriate Site-Specific BMP to be Implemented	BMP Requirements
<p><i>Emulsified asphalt or prime/tack coat</i></p>	<ul style="list-style-type: none"> • <i>Provide training for employees and contractors on proper material delivery and storage practices and procedures.</i> • <i>Restrict paving operations during wet weather to prevent paving materials from being discharged.</i> • <i>Use asphalt emulsions such as prime coat when possible.</i> • <i>Protect drain inlet structures and manholes during application of tack coat, seal coat, slurry seal, and fog seal.</i> • <i>Keep ample supplies of drip pans and absorbent materials on site.</i> • <i>Inspect inlet protection devices.</i> • <i>See Material Delivery and Storage Section SM-2 and Paving Operations Section SM-19 for additional requirements.</i> • <i>Provide Storm Drain Inlet Protection and/or Perimeter Sediment Controls as applicable.</i> 	<p><i>See Material Delivery and Storage Section SM-2 and Material Use Section SM-3, Paving Operations Section SM-19, Protect Storm Drain Inlets SC-2, and Perimeter Sediment Controls where applicable.</i></p>

<p><i>Materials associated with painting, such as paint and paint wash solvent</i></p>	<ul style="list-style-type: none"> • <i>Hazardous chemicals shall be well-labeled and stored in original containers.</i> • <i>Keep ample supply of cleanup materials on site.</i> • <i>Dispose container only after all of the product has been used.</i> • <i>Remove as much paint from brushes on painted surface.</i> • <i>Rinse from water-based paints shall be discharged into the sanitary sewer system where possible. If not, direct all washwater into a leak-proof container or leak-proof pit. The container or pit must be designed so that no overflows can occur due to inadequate sizing or precipitation.</i> • <i>Locate on-site wash area a minimum of 50 feet away or as far as practicable from storm drain inlets, open drainage facilities, or water bodies.</i> • <i>. Do not dump liquid wastes into the storm drainage system.</i> • <i>Filter and re-use solvents and thinners.</i> • <i>Dispose of oil-based paints and residue as a hazardous waste.</i> • <i>Ensure collection, removal, and disposal of hazardous waste complies with regulations.</i> • <i>Immediately clean up spills and leaks.</i> • <i>Properly store paints, solvents, and epoxy compounds.</i> • <i>Properly store and dispose waste materials generated from painting and structure repair and construction activities.</i> • <i>Mix paints in a covered and contained area when possible to minimize adverse impacts from spills.</i> • <i>Do not apply traffic paint or thermoplastic if rain is forecasted.</i> • <i>See Material Delivery and Storage Section SM-2, Material Use SM-3, Waste Management, Hazardous Waste Management Section SM-9, Waste Management, Spill Prevention and Control Section SM-10, and Structure</i> 	<p><i>See Material Delivery and Storage Section SM-2, Material Use Section SM-3, Hazardous Waste Management Section SM-9, Waste Management, Spill Prevention and Control Section SM-10, and Structure Construction and Painting Section SM-20, Protect Storm Drain Inlets SC-2, and Perimeter Sediment Controls where applicable.</i></p>
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<i>Pollutant Source</i>	<i>Appropriate Site-Specific BMP to be Implemented</i>	<i>BMP Requirements</i>
	<p><i>Construction and Painting Section SM-20 for additional requirements.</i></p> <ul style="list-style-type: none"> <li>• <i>Provide Storm Drain Inlet Protection and/or Perimeter Sediment Controls as applicable.</i> 	

<p><i>Industrial chemicals, fertilizers, and/or pesticides</i></p>	<ul style="list-style-type: none"> • <i>Hazardous chemicals shall be well-labeled and stored in original containers.</i> • <i>Keep ample supply of cleanup materials on site.</i> • <i>Clean up spills immediately, using dry clean-up methods where possible, and dispose of used materials properly.</i> • <i>Do not clean surfaces or spills by hosing the area down.</i> • <i>Eliminate the source of the spill to prevent a discharge or a furtherance of an ongoing discharge.</i> • <i>Dispose container only after all of the product has been used.</i> • <i>Retain a complete set of material safety data sheets on site.</i> • <i>Store industrial chemicals in water-tight containers and provide either cover or secondary containment.</i> • <i>Provide cover when storing fertilizers or pesticides to prevent these chemicals from coming into contact with rainwater.</i> • <i>Restrict amount of pesticide prepared to quantity necessary for the current application.</i> • <i>Do not apply fertilizers or pesticides during or just before a rain event.</i> • <i>Do not apply to stormwater conveyance channels with flowing water.</i> • <i>Comply with fertilizer and pesticide manufacturer's recommended usage instructions.</i> • <i>Follow federal, state, and local laws regarding fertilizer application.</i> • <i>Do not dispose of toxic liquid wastes (solvents, used oils, and paints) or chemicals (additives, acids, and curing compounds) in dumpsters allocated for construction debris.</i> • <i>Ensure collection, removal, and disposal of hazardous waste complies with regulations. Hazardous waste that cannot be reused or recycled shall be disposed of by a licensed hazardous waste hauler.</i> • <i>See Material Delivery and Storage Section SM2, Material Use SM-3, and Waste Management, Hazardous Waste</i> 	<p><i>See Material Delivery and Storage Section SM-2, Material Use Section SM-3, and Hazardous Waste Management Section SM-9, and Spill Prevention and Control SM-10</i></p>
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<i>Pollutant Source</i>	<i>Appropriate Site-Specific BMP to be Implemented</i>	<i>BMP Requirements</i>
	<i>Management Section SM-9 for additional requirements.</i>	

<p><i>Hazardous waste (Batteries, Solvents, Treated Lumber, etc.)</i></p>	<ul style="list-style-type: none"> • <i>Do not dispose of toxic materials in dumpsters allocated for construction debris.</i> • <i>Ensure collection, removal, and disposal of hazardous waste complies with regulations.</i> • <i>Hazardous waste that cannot be reused or recycled shall be disposed of by a licensed hazardous waste hauler.</i> • <i>Segregate and recycle wastes from vehicle/equipment maintenance activities such as used oil or oil filters, greases, cleaning solutions, antifreeze, automotive batteries, and hydraulic and transmission fluids.</i> • <i>Store waste in sealed containers, which are constructed of suitable materials to prevent leakage and corrosion, and which are labeled in accordance with applicable Resource Conservation and Recovery Act (RCRA) requirements and all other applicable federal, state, and local requirements.</i> • <i>All containers stored outside shall be kept away from surface waters and within appropriately-sized secondary containment (e.g., spill berms, decks, spill containment pallets). Provide cover if possible.</i> • <i>Clean up spills immediately, using dry clean-up methods where possible, and dispose of used materials properly.</i> • <i>Do not clean surfaces or spills by hosing the area down.</i> • <i>Eliminate the source of the spill to prevent a discharge or a continuation of an ongoing discharge.</i> • <i>Ensure collection, removal, and disposal of hazardous waste complies with manufacturer's recommendations and is in compliance with federal, state, and local requirements.</i> • <i>See Hazardous Waste Management Section SM-9 and Vehicle and Equipment Management, Vehicle and Equipment Maintenance SM-12 for additional requirements.</i> 	<p><i>See Hazardous Waste Management Section SM-9 and Vehicle and Equipment Maintenance SM-12</i></p>
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Pollutant Source	Appropriate Site-Specific BMP to be Implemented	BMP Requirements
<i>Metals and Building Materials</i>	<ul style="list-style-type: none"> • <i>Inspect construction waste and recycling areas regularly.</i> • <i>Schedule solid waste collection regularly.</i> • <i>If building materials or metals are stored on site (such as rebar or galvanized poles) store under cover under tarps or in containers.</i> • <i>Minimize the amount of material stored on site.</i> • <i>Do not stockpile uncovered metals or other building materials in close proximity to discharge points.</i> • <i>See Solid Waste Management Section SM-6 for additional requirements.</i> 	<i>See Solid Waste Management Section SM-6</i>
<i>Contaminated Soil</i>	<ul style="list-style-type: none"> • <i>See Waste Management, Contaminated Soil Management Section SM-8 and/or Hazardous Waste Management Section SM-9 for additional requirements.</i> • <i>At minimum contain contaminated material soil by surrounding with impermeable lined berms or cover exposed contaminated material with plastic sheets.</i> 	<i>See Waste Management, Contaminated Soil Management Section SM-8 and/or Hazardous Waste Management Section SM-9</i>
<i>Dust Control Water</i>	<ul style="list-style-type: none"> • <i>Do not over spray water for dust control purposes which will result in runoff from the area.</i> • <i>Apply water as conditions require.</i> • <i>Washing down of debris or dirt into drainage, sewage systems, or State waters is not allowed.</i> • <i>See Dust Control Section SM-18 for additional requirements.</i> 	<i>See Dust Control Section SM-18</i>

Pollutant Source	Appropriate Site-Specific BMP to be Implemented	BMP Requirements
Concrete Truck Wash Water	<ul style="list-style-type: none"> • <i>Disposal of concrete truck wash water via percolation is prohibited.</i> • <i>Wash concrete-coated vehicles or equipment off-site or in the designated wash area.</i> • <i>Locate on-site wash area a minimum of 50 feet away or as far as practicable from storm drain inlets, open drainage facilities, or water bodies.</i> • <i>Runoff from the on-site concrete wash area shall be contained in a temporary pit or level bermed area where the concrete can set.</i> • <i>Design the area so that no overflow can occur due to inadequate wash area sizing or precipitation.</i> • <i>The temporary pit shall be lined with plastic to prevent seepage of wash water into the ground.</i> • <i>Allow wash water to evaporate or collect wash water and all concrete debris in a concrete washout system bin.</i> • <i>Do not dump liquid wastes into storm drainage system.</i> • <i>Dispose of liquid and solid concrete wastes in compliance with federal, state, and local standards.</i> • <i>See Waste Management, Concrete Waste Management Section SM-5 for additional requirements.</i> 	See Waste Management, Concrete Waste Management Section SM-5

<i>Pollutant Source</i>	<i>Appropriate Site-Specific BMP to be Implemented</i>	<i>BMP Requirements</i>
<i>Sediment Track-Out</i>	<ul style="list-style-type: none"> • <i>Include Stabilized Construction Entrance at all points that exit onto paved roads.</i> • <i>A sediment trapping device is required if a wash rack is used in conjunction with the stabilized construction entrance/exit.</i> • <i>The pavement shall not be cleaned by washing down the street.</i> • <i>If sweeping is ineffective or it is necessary to wash the streets, wash water must be contained either by construction of a sump, diverting the water to an acceptable disposal area, or vacuuming the wash water.</i> • <i>Use BMPs for adjacent drainage structures.</i> • <i>Remove sediment tracked onto the street by the end of the day in which the track-out occurs.</i> • <i>Restrict vehicle use to properly designated exit points.</i> • <i>Include additional BMPs which remove sediment prior to exit when minimum dimensions can not be met.</i> • <i>See Stabilized Construction Entrance Section EC-2 for additional requirements.</i> 	<i>See Stabilized Construction Entrance Section EC-2</i>

Pollutant Source	Appropriate Site-Specific BMP to be Implemented	BMP Requirements
<i>Irrigation Water</i>	<ul style="list-style-type: none"> • <i>Consider irrigation requirements.</i> • <i>Where possible, avoid species which require irrigation.</i> • <i>Design timing and application methods of irrigation water to eliminate the runoff of excess irrigation water into the storm water drainage system.</i> • <i>See Seeding and Planting Section EC-5 and California Stormwater BMP Handbook SD-12 Efficient Irrigation at http://www.stormwaterhawaii.com/resources/contractors-and-consultants/stormwater-pollution-prevention-plan-swppp/ under Irrigation Water for additional requirements.</i> 	<i>See Seeding and Planting Section EC-5 and California Stormwater BMP Handbook SD-12 Efficient Irrigation</i>
<i>Hydrotesting Effluent</i>	<ul style="list-style-type: none"> • <i>If work includes removing, relocation or installing waterlines, and Contractor elects to flush waterline or discharge hydrotesting effluent into State waters or drainage systems, the Contractor shall prepare and obtain HDOT acceptance of a NOI/NPDES Permit Form F application for HDOT submittal to DOH CWB at least 30 calendar days prior to the start of Hydrotesting Activities if necessary. Site-Specific BMPs will be included in the NOI/NPDES Permit Form F submittal.</i> 	<i>Site-Specific BMPs will be included in the NOI/NPDES Permit Form F submittal.</i>

Pollutant Source	Appropriate Site-Specific BMP to be Implemented	BMP Requirements
<i>Dewatering Effluent</i>	<ul style="list-style-type: none"> • <i>If excavation or backfilling operations require dewatering, and Contractor elects to discharge dewatering effluent into State waters or existing drainage systems, Contractor shall prepare and obtain HDOT acceptance of a NOI/NPDES Permit Form G application for HDOT submittal to DOH CWB at least 30 calendar days prior to the start of Dewatering Activities if necessary. See Site Planning and General Practices, Dewatering Operations Section SM-17 for additional requirements.</i> 	<i>See Dewatering Operations SM-17. Site-Specific BMPs will be included in the NOI/NPDES Permit Form G submittal.</i>
<i>Saw-cutting Slurry</i>	<ul style="list-style-type: none"> • <i>Saw cut slurry shall be removed from the site by vacuuming.</i> • <i>Provide storm drain protection during saw cutting. See Paving Operations Section SM-19 for additional requirements.</i> • <i>Provide Storm Drain Inlet Protection and/or Perimeter Sediment Controls as applicable.</i> 	<i>See Paving Operations Section SM-19, Storm Drain Inlet Protection SC-2, Perimeter sediment controls where applicable</i>
<i>Concrete Curing Water</i>	<ul style="list-style-type: none"> • <i>Avoid overspraying of curing compounds.</i> • <i>Apply an amount of compound that covers the surface, but does not allow any runoff of the compound.</i> • <i>See California Stormwater BMP Handbook NS-12 Concrete Curing at http://www.stormwaterhawaii.com/resources/contractors-and-consultants/stormwater-pollution-prevention-plan-swppp/ under Concrete Curing for additional requirements.</i> 	<i>See California Stormwater BMP Handbook NS-12 Concrete Curing</i>

Pollutant Source	Appropriate Site-Specific BMP to be Implemented	BMP Requirements
<i>Plaster Waste Water</i>	<ul style="list-style-type: none"> • <i>Direct all washwater into a leak-proof container or leak-proof pit. The container or pit must be designed so that no overflows can occur due to inadequate sizing or precipitation.</i> • <i>Locate on-site wash area a minimum of 50 feet away or as far as practicable from storm drain inlets, open drainage facilities, or water bodies.</i> • <i>Any significant residual materials remaining on the ground after the completion of construction shall be removed and properly disposed. If the residual materials contaminate the soil, then the contaminated soil shall also be removed and properly disposed of.</i> • <i>Plaster waste water shall not be allowed to flow into drainage structures or State waters.</i> • <i>See Material Delivery and Storage Section SM-2, Material Use SM-3, and Hazardous Waste Management Section SM-9 for additional requirements.</i> 	<i>See Material Delivery and Storage Section SM-2, Material Use Section SM-3, and Hazardous Waste Management Section SM-9</i>

Pollutant Source	Appropriate Site-Specific BMP to be Implemented	BMP Requirements
<i>Water-Jet Wash Water</i>	<ul style="list-style-type: none"> • <i>For Water-Jet Wash Water used to clean vehicles, use off site wash racks or commercial washing facilities when practical.</i> • <i>See Vehicle and Equipment Cleaning Section SM-11 for additional information.</i> • <i>For Water-Jet Wash Water used to clean impervious surfaces, the runoff shall not be allowed to flow into drainage structures or State Waters.</i> 	<i>See Vehicle and Equipment Cleaning Section SM-11</i>
<i>Sanitary/Septic Waste</i>	<ul style="list-style-type: none"> • <i>Locate Sanitary facilities in a convenient place away from drainage facilities.</i> • <i>Position sanitary facilities so they are secure and will not be tipped over or knocked down.</i> • <i>Wastewater shall not be discharged to the ground or buried.</i> • <i>A licensed service provider shall maintain sanitary/septic facilities in good working order.</i> • <i>Schedule regular waste collection by a licensed transporter.</i> • <i>See Sanitary/Septic Waste Section SM-7 for additional requirements.</i> 	<i>See Sanitary/Septic Waste Section SM-7.</i>

END OF SECTION

SECTION 01 6000

PRODUCT REQUIREMENTS

PART 1 GENERAL

1.01 SECTION INCLUDES

- A. General product requirements.
- B. Re-use of existing products.
- C. Transportation, handling, storage and protection.
- D. Product option requirements.
- E. Substitution limitations.
- F. Maintenance materials, including extra materials, spare parts, tools, and software.

1.02 RELATED REQUIREMENTS

- A. Section 01 2500 - Substitution Procedures: Substitutions made during and after the Bidding/Negotiation Phase.
- B. Section 01 4000 - Quality Requirements: Product quality monitoring.

1.03 REFERENCE STANDARDS

1.04 SUBMITTALS

- A. Proposed Products List: Submit list of major products proposed for use, with name of manufacturer, trade name, and model number of each product.
 - 1. Submit within 15 days after date of Agreement.
 - 2. For products specified only by reference standards, list applicable reference standards.
- B. Product Data Submittals: Submit manufacturer's standard published data. Mark each copy to identify applicable products, models, options, and other data. Supplement manufacturers' standard data to provide information specific to this Project.
- C. Shop Drawing Submittals: Prepared specifically for this Project; indicate utility and electrical characteristics, utility connection requirements, and location of utility outlets for service for functional equipment and appliances.

- D. Sample Submittals: Illustrate functional and aesthetic characteristics of the product, with integral parts and attachment devices. Coordinate sample submittals for interfacing work.
 - 1. For selection from standard finishes, submit samples of the full range of the manufacturer's standard colors, textures, and patterns.

PART 2 PRODUCTS

2.01 EXISTING PRODUCTS

- A. Do not use materials and equipment removed from existing premises unless specifically required or permitted by the Contract Documents.
- B. Unforeseen historic items encountered remain the property of the Owner; notify Owner promptly upon discovery; protect, remove, handle, and store as directed by Owner.

2.02 NEW PRODUCTS

- A. Provide new products unless specifically required or permitted by the Contract Documents.
- B. DO NOT USE products having any of the following characteristics:
 - 1. Made using or containing CFC's or HCFC's.
 - 2. Containing lead, cadmium, asbestos.
- C. Where all other criteria are met, Contractor shall give preference to products that:
 - 1. Result in less construction waste.
 - 2. Are made of recycled materials.
 - 3. If made of wood, are made of sustainably harvested wood, wood chips, or wood fiber.
 - 4. Are Cradle-to-Cradle Certified.
 - 5. Have a published Environmental Product Declaration (EPD).
 - 6. Have a published Health Product Declaration (HPD).
 - 7. Have a published GreenScreen Chemical Hazard Analysis.

8. Have a published Manufacturer's Inventory of Chemical Content.

2.03 PRODUCT OPTIONS

- A. Products Specified by Reference Standards or by Description Only: Use any product meeting those standards or description.
- B. Products Identified by a "Basis of Design" with "Other Acceptable Manufacturers" named:
 1. Provide Basis of Design product or equal product meeting specifications from one of the manufacturers named.
 2. Where "Accepted Equal" is included with other acceptable manufacturers, submit request for substitution for any manufacturer not named.

2.04 MAINTENANCE MATERIALS

- A. Furnish extra materials, spare parts, tools, and software of types and in quantities specified in individual specification sections.
- B. Deliver to Project site; obtain receipt prior to final payment.

PART 3 EXECUTION

3.01 SUBSTITUTION LIMITATIONS

- A. See Section 01 2500 - Substitution Procedures.

3.02 TRANSPORTATION AND HANDLING

- A. Package products for shipment in manner to prevent damage; for equipment, package to avoid loss of factory calibration.
- B. If special precautions are required, attach instructions prominently and legibly on outside of packaging.
- C. Coordinate schedule of product delivery to designated prepared areas in order to minimize site storage time and potential damage to stored materials.
- D. Transport and handle products in accordance with manufacturer's instructions.
- E. Transport materials in covered trucks to prevent contamination of product and littering of surrounding areas.
- F. Promptly inspect shipments to ensure that products comply with requirements, quantities are correct, and products are undamaged.

- G. Provide equipment and personnel to handle products by methods to prevent soiling, disfigurement, or damage, and to minimize handling.
- H. Arrange for the return of packing materials, such as wood pallets, where economically feasible.

3.03 STORAGE AND PROTECTION

- A. Designate receiving/storage areas for incoming products so that they are delivered according to installation schedule and placed convenient to work area in order to minimize waste due to excessive materials handling and misapplication.
- B. Store and protect products in accordance with manufacturers' instructions.
- C. Store with seals and labels intact and legible.
- D. Store sensitive products in weather tight, climate controlled, enclosures in an environment favorable to product.
- E. For exterior storage of fabricated products, place on sloped supports above ground.
- F. Protect products from damage or deterioration due to construction operations, weather, precipitation, humidity, temperature, sunlight and ultraviolet light, dirt, dust, and other contaminants.
- G. Comply with manufacturer's warranty conditions, if any.
- H. Do not store products directly on the ground.
- I. Cover products subject to deterioration with impervious sheet covering. Provide ventilation to prevent condensation and degradation of products.
- J. Store loose granular materials on solid flat surfaces in a well-drained area. Prevent mixing with foreign matter.
- K. Prevent contact with material that may cause corrosion, discoloration, or staining.
- L. Provide equipment and personnel to store products by methods to prevent soiling, disfigurement, or damage.
- M. Arrange storage of products to permit access for inspection. Periodically inspect to verify products are undamaged and are maintained in acceptable condition.

END OF SECTION

SECTION 01 7000

EXECUTION AND CLOSEOUT REQUIREMENTS

PART 1 GENERAL

1.01 SECTION INCLUDES

- A. Examination, preparation, and general installation procedures.
- B. Pre-installation meetings.
- C. Cutting and patching.
- D. Surveying for laying out the work.
- E. Cleaning and protection.
- F. Starting of systems and equipment.
- G. Demonstration and instruction of Owner personnel.
- H. Closeout procedures, including Contractor's Correction Punch List, except payment procedures.
- I. General requirements for maintenance service.

1.02 RELATED REQUIREMENTS

- A. Section 01 4000 - Quality Requirements: Testing and inspection procedures.
- B. Section 01 7800 - Closeout Submittals: Project record documents, operation and maintenance data, warranties, and bonds.

1.03 REFERENCE STANDARDS

- A. NFPA 241 - Standard for Safeguarding Construction, Alteration, and Demolition Operations; 2013.

1.04 SUBMITTALS

- A. See Section 01 3000 - Administrative Requirements, for submittal procedures.
- B. Survey work: Submit name, address, and telephone number of Surveyor before starting survey work.
 - 1. On request, submit documentation verifying accuracy of survey work.

2. Submit a copy of site drawing signed by the Land Surveyor, that the elevations and locations of the work are in conformance with Contract Documents.
 3. Submit surveys and survey logs for the project record.
- C. Cutting and Patching: Submit written request in advance of cutting or alteration that affects:
1. Structural integrity of any element of Project.
 2. Integrity of weather exposed or moisture resistant element.
 3. Efficiency, maintenance, or safety of any operational element.
 4. Visual qualities of sight exposed elements.
 5. Work of Owner or separate Contractor.
 6. Include in request:
 - a. Identification of Project.
 - b. Location and description of affected work.
 - c. Necessity for cutting or alteration.
 - d. Description of proposed work and products to be used.
 - e. Alternatives to cutting and patching.
 - f. Effect on work of Owner or separate Contractor.
 - g. Written permission of affected separate Contractor.
 - h. Date and time work will be executed.
- D. Project Record Documents: Accurately record actual locations of capped and active utilities.

1.05 QUALIFICATIONS

- A. For surveying work, employ a land surveyor registered in the State in which the Project is located and acceptable to Architect. Submit evidence of surveyor's Errors and Omissions insurance coverage in the form of an Insurance Certificate. Employ only individual(s) trained and experienced in collecting and recording accurate data relevant to ongoing construction activities,

- B. For field engineering, employ a professional engineer of the discipline required for specific service on Project, licensed in the State in which the Project is located. Employ only individual(s) trained and experienced in establishing and maintaining horizontal and vertical control points necessary for laying out construction work on project of similar size, scope and/or complexity.
- C. For design of temporary shoring and bracing, employ a Professional Engineer experienced in design of this type of work and licensed in the State in which the Project is located.

1.06 PROJECT CONDITIONS

- A. Grade site to drain. Maintain excavations free of water. Provide, operate, and maintain pumping equipment.
- B. Protect site from puddling or running water. Provide water barriers as required to protect site from soil erosion.
- C. Ventilate enclosed areas to assist cure of materials, to dissipate humidity, and to prevent accumulation of dust, fumes, vapors, or gases.
- D. Dust Control: Execute work by methods to minimize raising dust from construction operations. Provide positive means to prevent air-borne dust from dispersing into atmosphere and over adjacent property.
 - 1. Provide dust-proof enclosures to prevent entry of dust generated outdoors.
- E. Erosion and Sediment Control: Plan and execute work by methods to control surface drainage from cuts and fills, from borrow and waste disposal areas. Prevent erosion and sedimentation.
 - 1. Minimize amount of bare soil exposed at one time.
 - 2. Provide temporary measures such as berms, dikes, and drains, to prevent water flow.
 - 3. Construct fill and waste areas by selective placement to avoid erosive surface silts or clays.
 - 4. Periodically inspect earthwork to detect evidence of erosion and sedimentation; promptly apply corrective measures.
- F. Noise Control: Provide methods, means, and facilities to minimize noise produced by construction operations.
 - 1. Outdoors: Limit conduct of especially noisy exterior work to the hours of 8 am to 5 pm.

- G. Pest and Rodent Control: Provide methods, means, and facilities to prevent pests and insects from damaging the work.
- H. Rodent Control: Provide methods, means, and facilities to prevent rodents from accessing or invading premises.
- I. Pollution Control: Provide methods, means, and facilities to prevent contamination of soil, water, and atmosphere from discharge of noxious, toxic substances, and pollutants produced by construction operations. Comply with federal, state, and local regulations.

1.07 COORDINATION

- A. Coordinate scheduling, submittals, and work of the various sections of the Project Manual to ensure efficient and orderly sequence of installation of interdependent construction elements, with provisions for accommodating items installed later.
- B. Notify affected utility companies and comply with their requirements.
- C. Verify that utility requirements and characteristics of new operating equipment are compatible with building utilities. Coordinate work of various sections having interdependent responsibilities for installing, connecting to, and placing in service, such equipment.
- D. Coordinate space requirements, supports, and installation of mechanical and electrical work that are indicated diagrammatically on drawings. Follow routing indicated for pipes, ducts, and conduit, as closely as practicable; place runs parallel with lines of building. Utilize spaces efficiently to maximize accessibility for other installations, for maintenance, and for repairs.
- E. In finished areas except as otherwise indicated, conceal pipes, ducts, and wiring within the construction. Coordinate locations of fixtures and outlets with finish elements.
- F. Coordinate completion and clean-up of work of separate sections.
- G. After Owner occupancy of premises, coordinate access to site for correction of defective work and work not in accordance with Contract Documents, to minimize disruption of Owner's activities.

PART 2 PRODUCTS

2.01 PATCHING MATERIALS

- A. New Materials: As specified in product sections; match existing products and work for patching and extending work.

- B. Type and Quality of Existing Products: Determine by inspecting and testing products where necessary, referring to existing work as a standard.
- C. Product Substitution: For any proposed change in materials, submit request for substitution described in Section 01 6000 - Product Requirements.

PART 3 EXECUTION

3.01 EXAMINATION

- A. Verify that existing site conditions and substrate surfaces are acceptable for subsequent work. Start of work means acceptance of existing conditions.
- B. Verify that existing substrate is capable of structural support or attachment of new work being applied or attached.
- C. Examine and verify specific conditions described in individual specification sections.
- D. Take field measurements before confirming product orders or beginning fabrication, to minimize waste due to over-ordering or misfabrication.
- E. Verify that utility services are available, of the correct characteristics, and in the correct locations.
- F. Prior to Cutting: Examine existing conditions prior to commencing work, including elements subject to damage or movement during cutting and patching. After uncovering existing work, assess conditions affecting performance of work. Beginning of cutting or patching means acceptance of existing conditions.

3.02 PREPARATION

- A. Clean substrate surfaces prior to applying next material or substance.
- B. Seal cracks or openings of substrate prior to applying next material or substance.
- C. Apply manufacturer required or recommended substrate primer, sealer, or conditioner prior to applying any new material or substance in contact or bond.

3.03 PREINSTALLATION MEETINGS

- A. When required in individual specification sections, convene a preinstallation meeting at the site prior to commencing work of the section.
- B. Require attendance of parties directly affecting, or affected by, work of the specific section.

- C. Notify Architect four days in advance of meeting date.
- D. Prepare agenda and preside at meeting:
 - 1. Review conditions of examination, preparation and installation procedures.
 - 2. Review coordination with related work.
- E. Record minutes and distribute copies within two days after meeting to participants, with two copies to Architect, Owner, participants, and those affected by decisions made.

3.04 LAYING OUT THE WORK

- A. Verify locations of survey control points prior to starting work.
- B. Promptly notify Architect of any discrepancies discovered.
- C. Contractor shall locate and protect survey control and reference points.
- D. Control datum for survey is that established by Owner provided survey.
- E. Protect survey control points prior to starting site work; preserve permanent reference points during construction.
- F. Promptly report to Architect the loss or destruction of any reference point or relocation required because of changes in grades or other reasons.
- G. Replace dislocated survey control points based on original survey control. Make no changes without prior written notice to Architect.
- H. Utilize recognized engineering survey practices.
- I. Establish elevations, lines and levels. Locate and lay out by instrumentation and similar appropriate means:
 - 1. Site improvements including pavements; stakes for grading, fill and topsoil placement; utility locations, slopes, and invert elevations.
 - 2. Grid or axis for structures.
 - 3. Building foundation, column locations, ground floor elevations.
 - 4. Controlling lines and levels required for mechanical and electrical trades.
- J. Periodically verify layouts by same means.

- K. Maintain a complete and accurate log of control and survey work as it progresses.
- L. On completion of foundation walls and major site improvements, prepare a certified survey illustrating dimensions, locations, angles, and elevations of construction and site work.

3.05 GENERAL INSTALLATION REQUIREMENTS

- A. In addition to compliance with regulatory requirements, conduct construction operations in compliance with NFPA 241, including applicable recommendations in Appendix A.
- B. Install products as specified in individual sections, in accordance with manufacturer's instructions and recommendations, and so as to avoid waste due to necessity for replacement.
- C. Make vertical elements plumb and horizontal elements level, unless otherwise indicated.
- D. Install equipment and fittings plumb and level, neatly aligned with adjacent vertical and horizontal lines, unless otherwise indicated.
- E. Make consistent texture on surfaces, with seamless transitions, unless otherwise indicated.
- F. Make neat transitions between different surfaces, maintaining texture and appearance.

3.06 CUTTING AND PATCHING

- A. Whenever possible, execute the work by methods that avoid cutting or patching.
- B. Perform whatever cutting and patching is necessary to:
 - 1. Complete the work.
 - 2. Fit products together to integrate with other work.
 - 3. Provide openings for penetration of mechanical, electrical, and other services.
 - 4. Match work that has been cut to adjacent work.
 - 5. Repair areas adjacent to cuts to required condition.

6. Repair new work damaged by subsequent work.
 7. Remove samples of installed work for testing when requested.
 8. Remove and replace defective and non-conforming work.
- C. Execute work by methods that avoid damage to other work and that will provide appropriate surfaces to receive patching and finishing. In existing work, minimize damage and restore to original condition.
 - D. Employ original installer to perform cutting for weather exposed and moisture resistant elements, and sight exposed surfaces.
 - E. Cut rigid materials using masonry saw or core drill. Pneumatic tools not allowed without prior approval.
 - F. Restore work with new products in accordance with requirements of Contract Documents.
 - G. Fit work air tight to pipes, sleeves, ducts, conduit, and other penetrations through surfaces.
 - H. Patching:
 1. Finish patched surfaces to match finish that existed prior to patching. On continuous surfaces, refinish to nearest intersection or natural break. For an assembly, refinish entire unit.
 2. Match color, texture, and appearance.
 3. Repair patched surfaces that are damaged, lifted, discolored, or showing other imperfections due to patching work. If defects are due to condition of substrate, repair substrate prior to repairing finish.

3.07 PROGRESS CLEANING

- A. Maintain areas free of waste materials, debris, and rubbish. Maintain site in a clean and orderly condition.
- B. Remove debris and rubbish from pipe chases, plenums, attics, crawl spaces, and other closed or remote spaces, prior to enclosing the space.
- C. Broom and vacuum clean interior areas prior to start of surface finishing, and continue cleaning to eliminate dust.
- D. Collect and remove waste materials, debris, and trash/rubbish from site periodically and dispose off-site; do not burn or bury.

3.08 PROTECTION OF INSTALLED WORK

- A. Protect installed work from damage by construction operations.
- B. Provide special protection where specified in individual specification sections.
- C. Provide temporary and removable protection for installed products. Control activity in immediate work area to prevent damage.
- D. Provide protective coverings at walls, projections, jambs, sills, and soffits of openings.
- E. Protect finished floors, stairs, and other surfaces from traffic, dirt, wear, damage, or movement of heavy objects, by protecting with durable sheet materials.
- F. Prohibit traffic or storage upon waterproofed or roofed surfaces. If traffic or activity is necessary, obtain recommendations for protection from waterproofing or roofing material manufacturer.
- G. Remove protective coverings when no longer needed; reuse or recycle coverings if possible.

3.09 SYSTEM STARTUP

- A. Coordinate schedule for start-up of various equipment and systems.
- B. Verify that each piece of equipment or system has been checked for proper lubrication, drive rotation, belt tension, control sequence, and for conditions that may cause damage.
- C. Verify tests, meter readings, and specified electrical characteristics agree with those required by the equipment or system manufacturer.
- D. Verify that wiring and support components for equipment are complete and tested.
- E. Execute start-up under supervision of applicable Contractor personnel and manufacturer's representative in accordance with manufacturers' instructions.
- F. When specified in individual specification Sections, require manufacturer to provide authorized representative to be present at site to inspect, check, and approve equipment or system installation prior to start-up, and to supervise placing equipment or system in operation.
- G. Submit a written report that equipment or system has been properly installed and is functioning correctly.

3.10 DEMONSTRATION AND INSTRUCTION

- A. Demonstrate start-up, operation, control, adjustment, trouble-shooting, servicing, maintenance, and shutdown of each item of equipment at scheduled time, at equipment location.
- B. For equipment or systems requiring seasonal operation, perform demonstration for other season within six months.
- C. Provide a qualified person who is knowledgeable about the Project to perform demonstration and instruction of Owner's personnel.

3.11 ADJUSTING

- A. Adjust operating products and equipment to ensure smooth and unhindered operation.

3.12 CLOSEOUT PROCEDURES

- A. Make submittals that are required by governing or other authorities.
- B. Accompany Architect or Owner on preliminary inspection to determine items to be listed for completion or correction in the Contractor's Correction Punch List for Contractor's Notice of Substantial Completion.
- C. Notify Architect when work is considered ready for Architect's Substantial Completion inspection.
- D. Submit written certification containing Contractor's Correction Punch List, that Contract Documents have been reviewed, work has been inspected, and that work is complete in accordance with Contract Documents and ready for Architect's Substantial Completion inspection.
- E. Conduct Substantial Completion inspection and create Final Correction Punch List containing Architect's and Contractor's comprehensive list of items identified to be completed or corrected and submit to Architect.
- F. Correct items of work listed in Final Correction Punch List and comply with requirements for access to Owner-occupied areas.
- G. Notify Architect when work is considered finally complete and ready for Architect's Substantial Completion final inspection.
- H. Complete items of work determined by Architect listed in executed Certificate of Substantial Completion.

3.13 MAINTENANCE

- A. Provide service and maintenance of components indicated in specification sections.
- B. Maintenance Period: As indicated in specification sections or, if not indicated, not less than one year from the Date of Substantial Completion or the length of the specified warranty, whichever is longer.
- C. Examine system components at a frequency consistent with reliable operation. Clean, adjust, and lubricate as required.
- D. Include systematic examination, adjustment, and lubrication of components. Repair or replace parts whenever required. Use parts produced by the manufacturer of the original component.
- E. Maintenance service shall not be assigned or transferred to any agent or subcontractor without prior written consent of the Owner.

END OF SECTION

SECTION 01 7123

CONSTRUCTION SURVEYING

PART 1 GENERAL

1.1 DESCRIPTION OF WORK

- A. This section includes requirements for surveys to document conditions prior to, during, and following construction and monitoring for ground settlement and movements prior to, during, and after construction. The Contractor shall be responsible for monitoring for ground settlement and movement due to his construction activities, for continuously comparing and evaluating the surveying and monitoring results, for immediately making adjustments to his excavation, shoring, dewatering, and/or construction methods as required to prevent ground settlement and moving and damage to buildings and structures, and for repairing any resulting damages to the satisfaction of the Contracting Officer.
- B. The Contractor shall be solely responsible for anticipating, planning, and providing any additional provisions that may be required to prevent damage to existing buildings, structures, above ground and below ground utilities, and new improvements within and adjacent to the work site. The work includes, but is not limited to, photographic surveys of the surrounding buildings and structures.

1.2 RELATED REQUIREMENTS

Section 01 5713 – Temporary Erosion and Sediment Control

Section 01 7419 – Construction Waste Management and Disposal

Section 02 4100 – Demolition

Section 02 6100 – Soil Containing Asbestos Abatement

Section 31 1000 – Site Clearing

Section 31 2000 – Earth Moving

Section 32 1100 – Base Courses

Section 32 9300 – Exterior Plants

Section 33 1100 – Water Distribution

Section 33 3000 – Sanitary Sewers

Section 33 4000 – Storm Drainage Utilities

Section 33 4100 – Subdrainage

1.3 DEFINITIONS

- A. Surface settlement points: Survey control points established as a reference for measuring elevation of the ground surface and adjacent structures using optical survey methods to monitor for settlement. These points shall be measured during the pre- and post-construction surveys as well as on a daily basis during the shoring, underpinning, excavation, dewatering, trenching and backfilling operations.

1.4 QUALITY ASSURANCE

- A. Personnel Qualifications: Employ qualified personnel with a minimum of two (2) years- experience in the installation of geotechnical instrumentation similar to that specified herein.
- B. Each instrument specified herein shall be the product of an acceptable manufacturer currently engaged in manufacturing geotechnical instrumentation hardware of the specified types.
- C. Surveyor Qualifications: Surveying for monitoring surface settlement points shall be performed by a land surveyor licensed in the State of Hawaii with previous experience surveying for the detection of structural deformations and surface movements.

1.5 SUBMITTALS

- A. Submit the following in accordance with Section 01300 - SUBMITTALS.
- B. Submit a written plan 30 calendar days after the Notice to Proceed summarizing the procedures to be employed in performing the surveys, including the personnel and the specific equipment and methods that are proposed for installing the surface settlement points, method and procedure of monitoring, reference bench marks, and reporting formats to be used to satisfy the requirements of this special provision. Provide sufficient detail to allow the Contracting Officer to determine whether or not the proposed equipment, materials, procedures and qualification meet with the Contract requirements.
- C. Submit sample of required written notification to neighboring residential and commercial property owners at least 30 calendar days prior to establishment of surface settlement points for Contracting Officer's approval.
- D. Provide drawings indicating the proposed locations and numbering system of the surface settlement points based on the manufacturer's literature and the requirements provided in the Plans to be approved by the Contracting Officer.
- E. Provide documentation of pre- and post-construction surveys, including copies of field notebooks, annotated photographs, sketches, and inspection reports to the Contracting Officer.
- F. Instrumentation Schedule: Submit the proposed schedule for installing the surface settlement points.

- G. The Contractor shall monitor and evaluate the settlement readings to check if any modification to their operation of equipment is needed. Provide data from readings taken to the Contracting Officer within 24 hours of reading with special notification if ground movement is detected.

1.6 NOTIFICATION

- A. The Contractor shall notify the Contracting Officer at least three (3) weeks prior to conducting the pre- and post-construction surveys. The Contracting Officer will accompany the Contractor on both the pre- and post-construction surveys.
- B. The Contractor shall mail or personally deliver written pre-approved notices to neighboring residential property owners and "The Maui News" Circulation Manager (100 Mahalani Street, Wailuku, HI 96793) at least 30 days in advance of required work.
- C. The Contractor shall also notify each neighboring property owners of cessation of work in writing or verbally after survey settlement points are removed.

PART 2 PRODUCTS

2.1 MATERIALS

- A. Surface Settlement Points: Surface settlement points shall be established by an inscribed marking on buildings and structures and shall not cause any damage to existing structures. In landscaped areas, surface settlement points shall be established by driving a minimum of 12-inch long, 2-inch by 2-inch timber stake flush with the ground. Each control point shall have a tag or marking indicating the station and offset from centerline of the pipeline.

PART 3 EXECUTION

3.1 PRE-CONSTRUCTION SURVEY

- A. Prior to the start of construction on the project the Contractor shall perform a pre-construction survey of all adjacent and nearby existing structures, buildings, pavements, sidewalks, and walls that lie on the following properties:
 - 1. Wailuku Executive Center, 24 North Church Street, TMK: (2) 3-4-013: 044
 - 2. 2086 Main Street, LLC, 2086 Main Street, TMK: (2) 3-4-013: 098
 - 3. Maui Academy of Performing Arts, 2050 Main Street, TMK: (2) 3-4-013: 096 and 100
 - 4. Maui Academy of Performing Arts, 2020 Main Street, TMK: (2) 3-4-013: 076
 - 5. Noa W. Aluli Trust, 31 North Market Street, TMK: (2) 3-4-013: 046

6. First Hawaiian Bank Properties, Inc., 27 North Market Street, TMK: (2) 3-4-013: 097
 7. George S. Gaylord Trust & Gertrude H. Gaylord Trust, Et. Al., 33 North Market Street, TMK: (2) 3-4-013: 048
 8. Ronald A. Kawahara Trust, 45 North Market Street, TMK: (2) 3-4-013: 049
 9. David M. Brooks, 51 North Market Street, TMK: (2) 3-4-013: 063
 10. David L. Y. Huang, 59 North Market Street, TMK: (2) 3-4-013: 050
 11. American Savings Bank F.S.B., 69 North Market Street, TMK: (2) 3-4-013: 055
 12. Ralph S. Ikeda Trust & Loretta Y. Ikeda Trust, 81 North Market Street, TMK: (2) 3-4-013: 056
 13. Otaing Investments LLC, 91 North Market Street, TMK: (2) 3-4-013: 057
- B. Existing conditions shall be documented in detail and, where applicable, quantified (measurement of lengths, widths, and depths of cracks in structures and pavements, etc.). Information obtained from this pre-construction survey shall be used by the Contractor to develop his plans for repair, restoration, or replacement of existing improvements that will be affected by his construction activities, to develop and control his construction methods, and as a baseline against which post-construction conditions may be compared should claims against the Contractor from the State arise.
- C. Documentation of pre-construction survey information shall include the following:
1. Pre-Construction Survey Report - a comprehensive report presenting detailed descriptions of existing improvements, including special features of note, defects (cracks and other damages), irrigation systems (irrigation heads, valves, laterals), locations, dimensions, sketches, and other pertinent field notebook observations and measurements. Information shall be organized in a logical sequence. The report shall be typewritten on 8-1/2" x 11" bond paper, neatly bound with front and back covers.
 2. Pre-Construction Photo Survey - a photo log which provides visual confirmation of the information presented in the Survey Report shall be provided on CD or DVD. Photographs shall be digital with a minimum image resolution of 630x450 pixels, shall be taken by a proficient photographer, and shall be camera date-imprinted. Multiple photographs of each improvement shall be taken to provide sufficient detail (i.e. different angles, close-up, and panoramic views). Photograph subjects shall be properly focused and lighted. Photographs shall be arranged to present information in a sequence similar to the Survey Report. Identifying information (i.e. brief description of each improvement, location) shall be noted with each photograph.

3. Surface Settlement Points

- a. The Pre-Construction Survey shall also include establishing surface settlement points on existing structures near the planned excavations. These points shall be surveyed at least two (2) weeks prior to any construction or demolition operations to establish a baseline reading.
 - b. Establish surface settlement points at minimum at the locations shown on the Plans.
 - c. Survey settlement points using conventional level surveying techniques to a measurement accuracy of at least 0.01 (one hundredth) of a foot.
 - d. Settlement points that cannot be established due to field conflicts or safety hazards to the survey personnel shall be relocated as directed by the Contracting Officer.
 - e. All settlement readings shall be referenced to a benchmark located in an area that will not be affected by the construction and at least 500 feet from the project site. The surface settlement points shall be surveyed at least twice every work week during the shoring, underpinning, excavation, dewatering, trenching and backfilling operations and a copy shall be submitted within 24-hours to the Contracting Officer.
 - f. Pre-Construction Settlement Point Report shall include, but not be limited to, scale drawings on 22" x 34" sheets showing locations of all settlement points, individual settlement point identification numbers, initial survey readings, benchmark information, property lines and existing major structures. The Pre-Construction Settlement Point Report shall also include an electronic file of the readings in Microsoft Excel on compact disc (CD).
- D. Two (2) copies each of the Pre-Construction Survey Report, Photo Survey and Settlement Point Report documents shall be submitted to the Contracting Officer within thirty (30) calendar days after the Notice to Proceed date. Such submittals shall be duplicate copies of the Contractor's original documents (i.e. photographs shall be professionally reproduced from originals; bindings, covers, labeling, and other presentation materials shall be identical).
- E. Under no conditions will the Contractor be allowed to start any construction on the Project until the Pre-Construction Survey has been satisfactorily completed and the documents submitted to the Contracting Officer.

3.2 SURVEYS DURING CONSTRUCTION

- A. Due to the proximity of the excavations to existing buildings and structures, ground movement shall be monitored and evaluated at least twice weekly during construction. The surveys conducted during construction shall involve the monitoring of the surface settlement points.
- B. Throughout construction, the Contractor shall be responsible for continually

comparing and evaluating the results of all survey readings; for protecting and replacing settlement point markers, for taking additional survey readings as he deems necessary; for establishing additional settlement points as he deems necessary; for maintaining records of ground settlement and movement; and for reporting to the Contracting Officer all ground settlement and movement, cause, damages to existing structures or improvements, corrective action taken, and repairs made.

- C. If more than 0.5 inch of settlement is detected or if ground movement is detected, or if distress is observed in existing buildings, walls, pavements, and other structures to remain, the Contractor shall immediately notify the Contracting Officer and modify his construction, excavation, shoring, underpinning, and dewatering methods to reduce the amount of additional settlement, movements, and distress.
- D. The Contractor shall repair all distress and damage at no cost to the State to the satisfaction of the Contracting Officer.

3.3 POST-CONSTRUCTION SURVEY

- A. After the completion of all Project improvements, but prior to final acceptance of the Project by the Contracting Officer, a post-construction survey shall be completed to verify the condition of all buildings, pavements, and existing facilities. The post-construction survey shall include a photographic survey and post construction settlement point report similar in format to the one conducted during the pre-construction survey. Note and document any damage that has occurred.
- B. Two (2) copies each of the Post-Construction Survey Report and Photo Survey documents shall be submitted to the Contracting Officer within thirty (30) calendar days after Substantial Completion or as specified by the Contracting Officer to commence this Work. Such submittals shall be duplicate copies of the original documents (i.e. photographs shall be professionally reproduced; bindings, covers, labeling, and other presentation materials shall be identical).
- C. Surface Settlement Points
 - 1. Perform a final settlement survey no sooner than one month after completion of the construction.
 - 2. The Contractor shall not remove any settlement point until specifically notified by the Contracting Officer to do so. Removal shall be performed as part of the Project clean-up and site restoration work.
- D. The Post-Construction Settlement Point Report shall be made and submitted to the Contracting Officer along with copies of field notes within 10 days of the survey. The final Post- Construction Settlement Point Report shall also include a summary of all changes in survey readings which occurred from the initial pre-construction survey readings to the final survey readings for each settlement point; damages caused by any ground settlement and movement;

and corrective action taken.

END OF SECTION

SECTION 01 7419

CONSTRUCTION WASTE MANAGEMENT

PART 1 GENERAL

1.1 SUMMARY

A. SECTION INCLUDES

1. Description of a Job-Site Construction Waste Management Plan
2. Job-Site Waste Reduction Requirements

B. RELATED REQUIREMENTS

1. SECTION 01 1100 – PROJECT REQUIREMENTS
2. SECTION 01 8113 – SUSTAINABLE BUILDING REQUIREMENTS

C. Drawings, the provisions of the Agreement, the General Conditions, and Division 1 specification sections apply to work of this Section.

D. Job Site Waste Reduction Requirements

1. Divert through salvage, reuse and/or recycle at least 50% (75% if the Contractor verifies that it is a realistic goal) of all C&D waste generated. Calculations may be based on dry weight or volume, but must be consistent throughout.
2. To achieve these goals the Contractor shall develop for review a Waste Management Plan for this Project. See Submittal 1.03.B.
3. Sub-contractors must report all waste, including how much waste is diverted from the landfill but is not controlled through the on-site collection system being monitored by the CWM plan.
4. In addition to diverting waste from the landfill/disposal, the Contractor should also strive to generate less waste on the project site.

1.3 SUBMITTALS

A. Make submittals in accordance with SECTION 01330 – SUBMITTAL PROCEDURES

B. Within fourteen (14) days after receipt of Notice of Award and prior to any waste removal by the Contractor from the Project, the Contractor shall develop and submit to the Owner for review a draft Construction Waste Management Plan.

1. The waste management plan shall include:

- a. Types and estimated quantities (where reasonably available) of salvageable materials that are expected to be generated during demolition. Calculations may be based on dry weight or volume, but must be consistent throughout.
 - b. The method to be used to recycle these materials. Methods shall include one or more of the following options: contracting with a demolition specialist to salvage all or most of materials generated, selective salvage as part of demolition contractor's work, or reuse of materials on-site or in new construction.
 - c. Types and estimated quantities (where reasonably available) of recyclable materials expected to be generated during construction in significant amounts including but not limited to wood, concrete, metals, cardboard, and drywall. Calculations may be based on weight or volume, but must be consistent throughout.
 - d. The method to be used to recycle these materials. Methods shall include one or more of the following options: requiring subcontractors to take materials back for recycling at a permitted facility, contracting with a full service recycling service to recycle all or most materials at a permitted facility, or processing or reusing materials on-site.
2. At a minimum, the waste management plan shall be designed to divert the following waste categories from the landfill
 - a. Acoustical ceiling tiles
 - b. Asphaltic concrete paving
 - c. Cardboard (from supplies and packaging)
 - d. Carpet and carpet pad
 - e. Concrete and concrete masonry units (CMU's)
 - f. Excavated soils
 - g. Fluorescent tubes and ballasts (if not recycled designate as hazardous waste)
 - h. Gypsum drywall (clean, unpainted)
 - i. Metals
 - j. Paint
 - k. Plastic film (sheeting, shrink wrap, packaging)
 - l. Window glass
 - m. Wood (clean, unpainted, untreated wood scrap including pallets and engineered wood)

- n. Job-shack wastes, including office paper, blueprints, pop cans and bottles, and office cardboard.
- C. Final Construction Waste Management Plan. Within 14 days after Owner has determined that the recycling options addressed in the draft Construction Waste Management Plan are acceptable and prior to waste removal, submit the final Construction Waste Management Plan.
- D. Progress Reports. Submit with each Application for Payment a summary of construction waste generated. Include the following:
 - 1. For each material recycled, reused, or salvaged from the Project, the amount (in tons or cubic yards), the receiving party, and the net total cost or savings of salvage or recycling the material. Attach manifests, weight tickets receipts or invoices. For co-mingled materials, the Contractor shall include the co-mingled C&D recycling rate of the receiving facility.
 - 2. The amount (in tons or cubic yards) of material disposed of as garbage from the Project, the location of the Receiving Facility, and the total disposal cost. Include manifests, weight tickets, receipt, and invoices.
 - 3. The Contractor shall be responsible for providing such information whether directly involved in recycling the materials or not (whether the Contractor performs recycling tasks or hires or requires others to do so, such as subcontractors to haul their own drywall or metal).
- E. Final Report: The Contractor shall submit within (14) calendar days of completing the project a final waste management report of waste generated at the Project. The final report shall be submitted on a form acceptable to the Owner's Project Manager and shall contain the following information:
 - 1. For each material recycled, reused, or salvaged from the Project, the total amount (in tons or cubic yards), the receiving party, and the net total cost or savings of salvage or recycling the material. Attach manifests, weight tickets receipts or invoices. For co-mingled materials, the Contractor shall include the co-mingled C&D recycling rate of the receiving facility.
 - 2. The total amount (in tons or cubic yards of material) of material disposed of as garbage from the Project, the location of the Receiving Facility, and the total disposal cost. Include manifests, weight tickets, receipt, and invoices.
 - 3. The Contractor shall be responsible for providing such information whether directly involved in recycling the materials or not (whether the Contractor performs recycling tasks or hires or requires others to do so, such as subcontractors to haul their own drywall or metal).

1.4 DEFINITIONS

- A. Waste: For the purpose of this section, the term applies to all excess building materials. Waste includes materials that can be salvaged, returned, recycled, or reused.

- B. Trash (or Garbage): That part of the waste that cannot be returned, reused, recycled, or salvaged.
- C. Construction & Demolition Waste (C&D): All non-hazardous solid wastes resulting from construction and demolition activities. C&D waste includes, but is not limited to, building materials, demolition rubble, landscaping materials, soils, packaging materials, debris, and trash.
- D. Proper Disposal: As defined by the jurisdiction receiving the waste.
- E. Landfill: Public or private business involved in the practice of trash disposal.
- F. Hazardous Waste: Any material or byproduct of construction that is regulated by the Environmental Protection Agency and that may not be disposed in landfill or other waste end-source without adherence to applicable laws.
- G. Material Recovery Facility (MRF): A general term used to describe a waste-sorting facility. Mechanical, hand-separation, or a combination of both procedures are used to recover recyclable materials from other waste, which is then disposed of as trash.
- H. Recycling: The process of sorting, cleaning, treating, and reconstituting materials for the purpose of using the material in the manufacture of a new product. Can be conducted on site (as in the grinding of concrete and reuse on site).
- I. Recycling Facility: An operation that can legally accept materials for the purpose of processing the materials into an altered form for the manufacture of a new product. Recycling facilities have their own specifications for accepting materials. Depending on the type of facility, it may accept source-separated waste or co-mingled waste or both.
- J. Recycling Services. Types of services include:
 - 1. Source-Separated: Construction waste is sorted on the job-site in separate containers as it is generated. The recycling hauler takes the materials directly to a recycler or a transfer site.
 - 2. Co-mingled: This service allows contractors to put select recyclables such as wood, cardboard, and metals in one container. The recycling hauler takes the materials to a sorting facility where the materials are separated for recycling.
- K. Reuse: Making use of a material without altering its form.
- L. Salvage: Recovery of materials for on-site reuse or donation to a third party.
- M. Source-separated Materials: Materials that are sorted at the site for the purpose of reuse or recycling.
- N. Co-mingled Materials: Mixed recyclable C&D material that has not been source-separated. Some facilities will separate co-mingled materials off-site for recycling.

1.5 REVENUES

- A. Revenues or other savings obtained from recycled, reused, or salvaged materials shall accrue to Contractor unless otherwise noted in the Contract Documents.

PART 2 PRODUCTS

2.1 ENVIRONMENTALLY PREFERABLE MATERIALS

- A. Recycled-content, salvaged, rapidly renewable, or otherwise resource-efficient products are specified in appropriate sections.

PART 3 EXECUTION

3.1 COMMUNICATION

- A. Designate an on-site party (or parties) responsible for instructing workers and overseeing and documenting results of the Waste Management Plan for the Project.
- B. Distribute copies of the Construction Waste Management Plan to each entity performing work at the site.
- C. Use safety meetings, signage, and subcontractor agreements to communicate the goals of the waste reduction plan, including instruction about appropriate separation, handling separation, handling, and recycling, salvage, reuse and return methods to be used by all parties at the appropriate stages of the Project.
- D. Sub-contractors must report all waste and how much was diverted that they take off site that is not controlled through the on-site collection system being monitored by your CWM plan.

3.2 MATERIALS CONSERVATION

- A. Protect products from damage during storage, installation, and in-place. Materials that become wet or damp due to improper storage shall be replaced at contractor's expense.
- B. Include in supply agreements a waste reduction provision specifying a preference for reduced, returnable, and/or recyclable packaging.
- C. Use detailed take-offs and use to identify location and use in structure to reduce risk of unplanned and potentially wasteful cuts.

3.3 MATERIALS HANDLING

- A. Designate specific area(s) to facilitate separation of materials for potential recycling, salvage, reuse and return. Maintain recycling and waste bin areas clean and clearly marked to avoid inadvertent co-mingling of materials. Bins shall be protected during non-working hours from off-site contamination.

1. Separate recycling waste in accordance with requirements of recycling facility/hauler.
- B. Protect materials to be recycled or reused from contamination. Handle, store, and transport materials in a manner that meets the requirements of the designated acceptance facility.
- C. Separately store and dispose of hazardous wastes according to local regulations.
- D. As part of regular clean-up, schedule and conduct visual inspections of dumpsters and recycling bins to identify potential contamination of materials.
- E. Burning or burying of C&D waste is not permitted.

END OF SECTION

SECTION 01 7800

CLOSEOUT SUBMITTALS

PART 1 GENERAL

1.01 SECTION INCLUDES

- A. Project Record Documents.
- B. Operation and Maintenance Data.
- C. Warranties and bonds.

1.02 RELATED REQUIREMENTS

- A. Section 01 3000 - Administrative Requirements: Submittals procedures, shop drawings, product data, and samples.
- B. Section 01 7000 - Execution and Closeout Requirements: Contract closeout procedures.
- C. Individual Product Sections: Specific requirements for operation and maintenance data.
- D. Individual Product Sections: Warranties required for specific products or Work.

1.03 SUBMITTALS

- A. Project Record Documents: Submit documents to Architect with claim for final Application for Payment.
- B. Operation and Maintenance Data:
 - 1. Submit two copies of preliminary draft or proposed formats and outlines of contents before start of Work. Architect will review draft and return one copy with comments.
 - 2. For equipment, or component parts of equipment put into service during construction and operated by Owner, submit completed documents within ten days after acceptance.
 - 3. Submit one copy of completed documents 15 days prior to final inspection. This copy will be reviewed and returned after final inspection, with Architect comments. Revise content of all document sets as required prior to final submission.

4. Submit one set of revised final documents in final form and an electronic copy in "PDF" format bookmarked matching the table of contents within 10 days after final inspection.

C. Warranties and Bonds:

1. For equipment or component parts of equipment put into service during construction with Owner's permission, submit documents within 10 days after acceptance.
2. Make other submittals within 10 days after Date of Substantial Completion, prior to final Application for Payment.
3. For items of Work for which acceptance is delayed beyond Date of Substantial Completion, submit within 10 days after acceptance, listing the date of acceptance as the beginning of the warranty period.

PART 2 PRODUCTS - NOT USED

PART 3 EXECUTION

3.01 PROJECT RECORD DOCUMENTS

- A. Maintain on site one set of the following record documents; record actual revisions to the Work:
 1. Drawings.
 2. Specifications.
 3. Addenda.
 4. Change Orders and other modifications to the Contract.
 5. Reviewed shop drawings, product data, and samples.
 6. Manufacturer's instruction for assembly, installation, and adjusting.
- B. Ensure entries are complete and accurate, enabling future reference by Owner.
- C. Store record documents separate from documents used for construction.
- D. Record information concurrent with construction progress.
- E. Specifications: Legibly mark and record at each product section description of actual products installed, including the following:

1. Manufacturer's name and product model and number.
 2. Product substitutions or alternates utilized.
 3. Changes made by Addenda and modifications.
- F. Record Drawings and Shop Drawings: Legibly mark each item to record actual construction including:
1. Measured depths of foundations in relation to finish first floor datum.
 2. Measured horizontal and vertical locations of underground utilities and appurtenances, referenced to permanent surface improvements.
 3. Measured locations of internal utilities and appurtenances concealed in construction, referenced to visible and accessible features of the Work.
 4. Field changes of dimension and detail.
 5. Details not on original Contract drawings.

3.02 OPERATION AND MAINTENANCE DATA

- A. Source Data: For each product or system, list names, addresses and telephone numbers of Subcontractors and suppliers, including local source of supplies and replacement parts.
- B. Product Data: Mark each sheet to clearly identify specific products and component parts, and data applicable to installation. Delete inapplicable information.
- C. Drawings: Supplement product data to illustrate relations of component parts of equipment and systems, to show control and flow diagrams. Do not use Project Record Documents as maintenance drawings.
- D. Typed Text: As required to supplement product data. Provide logical sequence of instructions for each procedure, incorporating manufacturer's instructions.

3.03 OPERATION AND MAINTENANCE DATA FOR MATERIALS AND FINISHES

- A. For Each Product, Applied Material, and Finish:
 1. Product data, with catalog number, size, composition, and color and texture designations.

- B. Instructions for Care and Maintenance: Manufacturer's recommendations for cleaning agents and methods, precautions against detrimental cleaning agents and methods, and recommended schedule for cleaning and maintenance.
- C. Where additional instructions are required, beyond the manufacturer's standard printed instructions, have instructions prepared by personnel experienced in the operation and maintenance of the specific products.

3.04 OPERATION AND MAINTENANCE DATA FOR EQUIPMENT AND SYSTEMS

- A. For Each Item of Equipment and Each System:
 - 1. Description of unit or system, and component parts.
 - 2. Identify function, normal operating characteristics, and limiting conditions.
 - 3. Include performance curves, with engineering data and tests.
 - 4. Complete nomenclature and model number of replaceable parts.
- B. Where additional instructions are required, beyond the manufacturer's standard printed instructions, have instructions prepared by personnel experienced in the operation and maintenance of the specific products.
- C. Operating Procedures: Include start-up, break-in, and routine normal operating instructions and sequences. Include regulation, control, stopping, shut-down, and emergency instructions. Include summer, winter, and any special operating instructions.
- D. Maintenance Requirements: Include routine procedures and guide for preventative maintenance and trouble shooting; disassembly, repair, and reassembly instructions; and alignment, adjusting, balancing, and checking instructions.
- E. Provide servicing and lubrication schedule, and list of lubricants required.
- F. Include manufacturer's printed operation and maintenance instructions.
- G. Include sequence of operation by controls manufacturer.
- H. Provide original manufacturer's parts list, illustrations, assembly drawings, and diagrams required for maintenance.
- I. Additional Requirements: As specified in individual product specification sections.

3.05 ASSEMBLY OF OPERATION AND MAINTENANCE MANUALS

- A. Assemble operation and maintenance data into durable manuals for Owner's personnel use, with data arranged in the same sequence as, and identified by, the specification sections.
- B. Where systems involve more than one specification section, provide separate tabbed divider for each system.
- C. Binders: Commercial quality, 8-1/2 by 11 inch (216 by 280 mm) three D side ring binders with durable plastic covers; 2 inch (50 mm) maximum ring size. When multiple binders are used, correlate data into related consistent groupings.
- D. Cover: Identify each binder with typed or printed title OPERATION AND MAINTENANCE INSTRUCTIONS; identify title of Project; identify subject matter of contents.
- E. Project Directory: Title and address of Project; names, addresses, and telephone numbers of Architect, Consultants, Contractor and subcontractors, with names of responsible parties.
- F. Tables of Contents: List every item separated by a divider, using the same identification as on the divider tab; where multiple volumes are required, include all volumes Tables of Contents in each volume, with the current volume clearly identified.
- G. Dividers: Provide tabbed dividers for each separate product and system; identify the contents on the divider tab; immediately following the divider tab include a description of product and major component parts of equipment.
- H. Text: Manufacturer's printed data, or typewritten data on 20 pound paper.
- I. Drawings: Provide with reinforced punched binder tab. Bind in with text; fold larger drawings to size of text pages.
- J. Arrangement of Contents: Organize each volume in parts as follows:
 - 1. Project Directory.
 - 2. Table of Contents, of all volumes, and of this volume.
 - 3. Operation and Maintenance Data: Arranged by system, then by product category.
 - a. Source data.
 - b. Product data, shop drawings, and other submittals.

- c. Operation and maintenance data.
- d. Field quality control data.
- e. Photocopies of warranties and bonds.

3.06 WARRANTIES AND BONDS

- A. Obtain warranties and bonds, executed in duplicate by responsible Subcontractors, suppliers, and manufacturers, within 10 days after completion of the applicable item of work. Except for items put into use with Owner's permission, leave date of beginning of time of warranty until Date of Substantial completion is determined.
- B. Verify that documents are in proper form, contain full information, and are notarized.
- C. Co-execute submittals when required.
- D. Retain warranties and bonds until time specified for submittal.
- E. Include originals of each in operation and maintenance manuals, indexed separately on Table of Contents.

END OF SECTION

SECTION 01 8113

SUSTAINABLE BUILDING REQUIREMENTS

PART 1 GENERAL

1.1 SUMMARY

- A. This Section includes detailed sustainable building requirements applicable to the Work of this Project.
 - 1. Contractor shall be responsible for meeting all of the sustainable building requirements of this Section and as described elsewhere in these specifications including, but not limited to:
 - a. Development, implementation and management of a Construction Waste Management Plan (CWMP) in accordance with SECTION 01 7419 - CONSTRUCTION WASTE MANAGEMENT.
 - b. Provide required sustainable building design submittals including certifications, materials cost data and quality assurance as described by this Section.
 - c. Meet product environmental requirements as described by this Section and elsewhere in these specifications.
 - d. Provide a Materials Cost Summary spreadsheet for all materials identified in Division 03 through Division 14.

1.2 RELATED REQUIREMENTS

- A. Related Sections include the following:
 - 1. SECTION 01 7419 – CONSTRUCTION WASTE MANAGEMENT
 - 2. DIVISION 03 – CONCRETE (All Sections)
 - 3. DIVISION 04 – MASONRY (All Sections)
 - 4. DIVISION 05 – METALS (All Sections)
 - 5. DIVISION 06 – WOOD, PLASTICS AND COMPOSITES (All Sections)
 - 6. DIVISION 07 – THERMAL AND MOISTURE PROTECTION (All Sections)
 - 7. DIVISION 08 – OPENINGS (All Sections)
 - 8. DIVISION 09 – FINISHES (All Sections)
 - 9. DIVISION 10 – SPECIALTIES (All Sections)

1.3 DEFINITIONS

- B. Interior of Building: That portion of a building inside the weatherproof membrane applied on site. Defines area of VOC limitation (Exterior construction materials typically do not have VOC limitations).
- C. Agrifiber Products: Composite panel products derived from agricultural fiber.
- D. Biobased Product: As defined in the 2002 Farm Bill, a product determined by the Secretary to be a commercial or industrial product (other than food or feed) that is composed, in whole or in significant part, of biological products or renewable domestic agricultural materials (including plant, animal, and marine materials) or forestry materials.
- E. Biobased Content: The weight of the biobased material divided by the total weight of the product and expressed as a percentage by weight.
- F. Certificates of Chain-of-Custody: Certificates from an approved certifying body signed by manufacturers certifying that wood used to make products has been tracked through its extraction and fabrication to ensure that it is was obtained from forests certified by a specified certification program.
- G. Composite Wood: A product consisting of wood fiber or other plant particles bonded together by a resin or binder.
- H. Construction and Demolition Waste: Includes solid wastes, such as building materials, packaging, rubbish, debris, and rubble resulting from construction, remodeling, repair and demolition operations.
- I. Recycled Content Materials: Products that contain pre-consumer and/or post-consumer materials as all or part of their feedstock.
- J. Post-Consumer Recycled Content: The percentage by weight of constituent materials that have been recovered or otherwise diverted from the solid-waste stream after consumer use.
- K. Pre-Consumer Recycled Content: Materials that have been recovered or otherwise diverted from the solid-waste stream during the manufacturing process. Pre-consumer content must be material that would not have otherwise entered the waste stream as per Section 5 of the FTC Act, Part 260 "Guidelines for the Use of Environmental Marketing Claims": www.ftc.gov/bcp/grnrule/guides980427
- L. Salvaged or Reused Materials: Materials extracted from existing buildings in order to be reused in other buildings without changing their original use or general form.
- M. Sealant: Any material that fills and seals gaps between other materials.
- N. Volatile Organic Compounds (VOCs): Any compound of carbon, excluding carbon monoxide, carbon dioxide, carbonic acid, metallic carbides or carbonates, and ammonium carbonate, which participates in atmospheric photochemical reactions. Compounds that have negligible photochemical reactivity, listed in EPA 40 CFR 51.100(s), are also excluded from this regulatory definition.
- O. Regional Materials: Building materials that are regionally extracted, processed and manufactured within 500 miles of the project site.

1.4 SUBMITTALS

- A. General: Sustainable Building Design submittal requirements are described in this Section and the Sections referenced in 1.2 RELATED REQUIREMENTS above.
- B. Sustainable Building Design Submittals:
 - 1. Site Paving: Provide manufacturer's cut sheets for all impervious paving materials, highlighting the Solar Reflectance Index (SRI) of the material. Also, provide cut sheets for all pervious paving materials.
 - 2. Roofing Materials: Submittals for roofing materials must include manufacturer's cut sheets or product data highlighting the Solar Reflectance Index (SRI) of the material.
 - 3. Exterior Lighting Fixtures: Submittals must include cut sheets with manufacturer's data on initial fixture lumens above 90 degrees from nadir for all exterior lighting fixtures, and, for parking lot lighting, verification that the fixtures are classified by the IESNA as "full cutoff" (FCO); OR provide documentation that exterior luminaires are IDA-Approved as Dark-Sky Friendly by the International Dark Sky Association (IDA) Fixture Seal of Approval Program.
 - 4. Irrigation Systems: Provide manufacturer's cut sheets for all permanent landscape irrigation system components and for any rainwater harvesting system components, such as cisterns.
 - 5. Elimination of CFCs and HCFCs: Provide manufacturer's cut sheets for all cooling and refrigeration equipment with manufacturer's product data, highlighting refrigerants; provide manufacturer's cut sheets for all fire-suppression equipment, highlighting fire-suppression agents; provide manufacturer's cut-sheets for all polystyrene insulation (XPS) and closed-cell spray foam polyurethane insulation, highlighting the blowing agent(s).
 - 6. Salvaged or Reused Materials: Provide documentation that lists each salvaged or reused material, the source or vendor of the material, the purchase price, and the replacement cost if greater than the purchase price.
 - 7. Recycled Content: Submittals for all materials required to have recycled content (excluding MEP systems equipment and components) must include the following documentation:
 - a. Manufacturer's product data, product literature, or letter stating the percentage of post-consumer and pre-consumer recycled content (by weight) of each material or product.
 - b. Cost of the material or product.
 - 8.
 - 9. Interior Adhesives and Sealants: Submittals for all field-applied adhesives and sealants, used within the waterproofing barrier, must include manufacturer's MSDSs or other Product Data highlighting VOC content compliance with this Section.

- a. Provide manufacturers' documentation verifying all adhesives used to apply laminates, whether shop-applied or field-applied, contain added no urea-formaldehyde.
 10. Interior Paints and Coatings: Submittals for all field-applied paints and coatings used within the waterproofing barrier must include manufacturer's MSDSs or other Product Data highlighting VOC content in compliance with this Section.
 11. no added urea-formaldehyde resins and that VOC content is in compliance with this Section.
 12. Mercury in Lighting: Provide manufacturer's cut sheets or product data for all fluorescent or HID lamps highlighting mercury content.
 13. Lighting Controls: Provide manufacturer's cut sheets and shop drawing documentation highlighting all lighting controls systems components.
 14. Thermal Comfort Controls: Provide manufacturer's cut sheets and shop drawing documentation highlighting all thermal comfort-control systems components.
 15. Blended Cement: It is the intent of this specification to reduce CO2 emissions and other environmentally detrimental effects resulting from the production of Portland cement by requiring that all concrete mixes, in aggregate, utilize blended cement mixes to displace 20% of the Portland cement typically included in conventional construction. Provide the following submittals:
 - a. Copies of concrete design mixes for all installed concrete.
 - b. Copies of typical regional baseline concrete design mixes for all compressive strengths used on the Project.
 - c. Quantities in cubic yards of each installed concrete mix.
 16. Duct Acoustical Insulation: Provide manufacturer's cut sheets or product data verifying that mechanical sound insulation materials in air distribution ducts consist of impervious, non-porous coatings that prevent dust from accumulating in the insulating materials.
 17. Regional Materials Extracted, Processed and Manufactured within 500 Miles of the Project Site: Provide product data and spreadsheet listing regional materials and cost (excluding labor).
- C. Construction Waste Management: See SECTION 01 7419 – CONSTRUCTION WASTE MANAGEMENT for submittal requirements.

PART 2 PRODUCTS

2.1 PRODUCT ENVIRONMENTAL REQUIREMENTS

- A. Site Clearing: Topsoil shall be provided by the Contractor from on-site material which has been stockpiled for reuse. Off-site borrow should only be used when on-site sources are exhausted. Chip and/or compost on site all vegetated material identified for removal.

- B. Roofing Materials: All roofing systems, other than vegetated roof systems, must comply with the following requirements:
 - 1. Low-Sloped roofing less than or equal to 2:12 slope must have an SRI of at least 78.
 - 2. Steep-Sloped roofing greater than 2:12 slope must have an SRI of at least 29.
- C. Exterior Lighting Fixtures:
 - 1. All exterior luminaires must emit 0% of the total initial designed fixture lumens at an angle above 90 degrees from nadir and/or meet the requirements of the Dark Sky certification program.
 - 2. Exterior lighting cannot exceed 80% of the lighting power densities defined by ASHRAE/IESNA Standard 90.1-2004, Exterior Lighting Section, without amendments.
 - 3. No permanent lighting of building facades or landscape features is permitted.
- D. Herbicides and Pest Control: Herbicides shall not be permitted, and pest control measures shall utilize EPA-registered biopesticides only.
- E. Irrigation Systems: Any permanent landscape irrigation systems must be comprised of below-grade drip emitters controlled by moisture sensors. Timer controls shall not be permitted.
- F. Elimination of CFCs AND HCFCs:
 - 1. Ozone Protection: Base building cooling equipment shall contain no refrigerants other than the following: HCFC-123, HFC-134a, HFC-245fa, HFC-407c, or HFC 410a.
 - 2. Fire suppression systems may not contain ozone-depleting substances.
 - 3. Extruded polystyrene insulation (XPS) and closed-cell spray foam polyurethane insulation shall not be manufactured with hydrochlorofluorocarbon (HCFC) blowing agents.
- G. Recycled Content of Materials:
 - 1. Materials with recycled content are preferred for this project.
 - a. As a guideline, the materials in the following list should contain the minimum recycled content indicated:

<u>Category</u>	<u>Minimum Recycled Content</u>	
	%	Post/Pre-Consumer
Compost/mulch	100	post-consumer

Asphaltic Concrete Paving	20	post-consumer
Cast-in-Place Concrete	6	pre-consumer
CMU: Gray Block	20	pre-consumer
Steel Reinforcing Bars	90	combined
Structural Steel Shapes	90	combined
Steel Joists	75	combined
Steel Deck	75	combined
Steel Fabrications	60	combined
Steel Studs	45	combined
Steel Roofing	30	post-consumer
Aluminum Fabrications	35	combined
Rigid Insulation	20	pre-consumer
Batt insulation	30	combined
Cellulose Insulation	90	combined
Rock Wool Insulation	75	pre-consumer
Fireproofing	20	combined
Steel Doors and Frames	35	combined
Gypsum Wallboard	100	combined
Carpet	40	combined
Ceramic Tile Flooring	60	combined
Rubber Flooring and Base	60	combined
Acoustical Ceiling Tile (ACT)	40	post-consumer
ACT Suspension System	90	post-consumer
Toilet Partitions	60	post-consumer

H. Adhesives and Sealants:

1. All adhesives and sealants used within the waterproofing barrier must comply with the following limits for VOC content in accordance with the South Coast Air Quality Management District (SCAQMD) Rule #1168. VOC limits are listed in the table below and correspond to an effective date of July 1, 2005 and rule amendment date of January 7, 2005:

Architectural Applications	VOC Limit (g/L less water)	Specialty Applications	VOC Limit (g/L less water)
Indoor carpet adhesives	50	PVC welding	510
Carpet pad adhesives	50	CPVC welding	490
Wood flooring adhesives	100	ABS welding	325
Rubber floor adhesives	60	Plastic cement welding	250
Subfloor adhesives	50	Adhesive primer for plastic	550
Ceramic tile adhesives	65	Contact adhesive	80
VCT and asphalt adhesives	50	Special purpose contact adhesive	250
Drywall and panel adhesives	50	Structural wood member adhesive	140
Cove base adhesives	50	Sheet applied rubber lining operations	850
Multipurpose construction adhesives	70	Top and trim adhesive	250
Structural glazing adhesives	100		
Substrate Specific Applications	VOC Limit (g/L less water)	Sealants	VOC Limit (g/L less water)
Metal to metal	30	Architectural	250
Plastic foams	50	Nonmembrane roof	300
Porous material (except wood)	50	Roadway	250
Wood	30	Single-ply roof membrane	450
Fiberglass	80	Other	420
Sealant Primers	VOC Limit (g/L less water)		
Architectural, nonporous	250		
Architectural, porous	775		
Other	750		

2. Interior sealants shall not contain mercury, butyl rubber, neoprene, SBR (styrene butadiene rubber), or nitrile.
3. Sealants and glazing compounds formulated with aromatic solvents (organic solvent with a benzene ring in its molecular structure) fibrous talc or asbestos, formaldehyde, halogenated solvents, mercury, lead, cadmium, hexavalent chromium, or their components shall not be used.
4. Adhesives used to apply laminates, whether shop-applied or field-applied, shall contain no added urea-formaldehyde.

I. Paints and Coatings:

1. Interior Paints and Coatings: For interior field-applied applications, use paints and coatings that comply with the following limits for VOC content when calculated according to 40 CFR 59, Subpart D (EPA method 24) and the chemical restrictions (Restricted Components listed below) of Green Seal Standard GS-11, Paints, First Edition, May 20, 1993; Green Seal Standard GC-03, Anti-Corrosive Paints, Second Edition, January 7, 1997; and South Coast Air Quality Management District Rule 1113, Architectural Coatings, rules in effect on January 1, 2004, as follows:

- a. Flat Paints and Coatings: Not more than 50 g/L less water and exempt compounds, including pigments.
 - b. Non-Flat Paints and Coatings except High Gloss: Not more than 150 g/L less water and exempt compounds, including pigments.
 - c. High Gloss Paints and Coatings: Not more than 150 g/L less water and exempt compounds, including pigments. High Gloss Coatings are coatings that register a gloss of 70 or above on a 60-degree meter according to ASTM Test Method D 523.
 - d. Water-Based Polychromatic Finish Coatings: Not more than 150 g/L (150 g/L for primer and flat polychromatic paint).
 - e. Anti-Corrosive Coatings: Not more than 250 g/L less water and exempt compounds established in Green Seal Standard GC-03, Anti-Corrosive Paints, Second Edition, January 7, 1997
 - f. Polyurethanes: Not more than 100 g/L less water and exempt compounds.
 - g. Stains: Not more than 250 g/L less water and exempt compounds.
2. Interior paints shall not contain antimicrobial additives (such as fungicides and biocides).
 3. Aromatic Compounds: Paints and coatings shall not contain more than 1% (by weight) total aromatic compounds (hydrocarbon compounds containing one or more benzene rings).
 4. Restricted Components: Paints and coatings shall not contain any of the following:
 - a. Acrolein
 - b. Acrylonitrile
 - c. Aniline dyes
 - d. Antimony
 - e. Benzene
 - f. Butyl benzyl phthalate
 - g. Cadmium
 - h. Di (2-ethylhexyl) phthalate
 - i. Di-n-butyl phthalate
 - j. Di-n-octyl phthalate
 - k. 1, 2-dichlorobenzene

- l. Diethyl phthalate
 - m. Dimethyl phthalate
 - n. Ethylbenzene
 - o. Formaldehyde
 - p. Hexavalent chromium
 - q. Isophorone
 - r. Lead
 - s. Mercury
 - t. Methyl ethyl ketone
 - u. Methyl isobutyl ketone
 - v. Methylene chloride
 - w. Naphthalene
 - x. Toluene (methylbenzene)
 - y. 1, 1, 1-trichloroethane
 - z. Vinyl chloride
 - aa. Xylene
5. Coordinate with paint manufacturers for implementing a “take-back program” for all unused paint. Set aside scrap and unused paint to be returned to the manufacturer for recycling into new product. Close and seal all partially used containers of paint to maintain quality as necessary for reuse.

J. Mercury in Lighting:

- 1. Provide only low-mercury fluorescent or HID lamps with mercury content limited to the following:
 - a. T-5 and T-8 fluorescent lamps: 80 picograms per lumen hour.
- 2. Measurement Standards: Lumens to be measured according to IES LM9 for linear fluorescent lamps, IES LM66 for compact fluorescent lamps, and LM51 for HID lamps; mercury content to be measured according to U.S. EPA “Total Mercury by Cold Vapor Absorption Method” 7471A.

K. Blended Cement Concrete:

- 1. Cementitious Materials: If blast-furnace slag or fly ash is regionally available, provide composite mix of Portland cement and ground granulated blast-furnace slag or fly ash or blended hydraulic cement and limit percentage (by weight) of

Portland cement (ASTM C150) in aggregate (total weighted average of cementitious material weight for all mixes and pours) to 20% less than standard regional concrete mix designs.

2. Limit percentage (by weight) of standard Portland cement (C-150), to the following maximum percentages of the cementitious portion of the mix while maintaining the above-40% required reduction in Portland cement across the Project's total quantity of concrete:
 - a. Footings: 50%.
 - b. Slab on Grade: 60%, except for cold-weather pours.
 - c. Insulated Concrete Form Concrete: 40%.
 - d. Elevated Slabs: 60%, except for cold-weather pours.
 - e. Exterior Concrete: 75%.
- L. Duct Acoustical Insulation: Mechanical sound insulation materials within the duct shall consist of an impervious, non-porous coating that prevents dust from accumulating in the insulating materials.

END OF SECTION

SECTION 01 8116

CONSTRUCTION INDOOR AIR QUALITY MANAGEMENT

PART 1 GENERAL

1.01 SUMMARY

A. SECTION INCLUDES:

1. Description of the Construction Indoor Air Quality (IAQ) Management Plan
2. IAQ Construction Requirements

B. RELATED REQUIREMENTS

1. Section 01 8113 – Sustainable Building Requirements
2. Section 01100 – Project Requirements
3. Division 09 - Finishes
4. Division 22 - Plumbing
5. Division 23 - Heating, Ventilation and Air Conditioning

C. Construction Indoor Air Quality Requirements:

1. The Owner has set indoor air quality goals for job site operations on this project, within the limits of the construction schedule, contract sum, and available materials, equipment, products and services. These goals include:
 - a. Protect workers on the site from undue health risks during construction.
 - b. Install low-VOC materials as specified in Part 2 - Products.
 - c. Prevent residual problems with indoor air quality in the completed building.

D. Drawings, the provisions of the Agreement, the General Conditions, and Division 1 specification sections apply to work of this Section.

1.02 REFERENCES

- A. Sheet Metal and Air Conditioning National Contractors Association (SMACNA) IAQ Guideline for Occupied Buildings Under Construction, 2nd Edition 2007, ANSI/SMACNA 008-2008 (Chapter 3).
- B. "Construction IAQ Management: Job-site Strategies for Ensuring a Healthy Building," Environmental Building News, Vol. 11, No. 5, May 2002. Good discussion of strategies for controlling airborne pollutants and moisture during construction. Provides checklist based on SMACNA guideline referenced above.
- C. LEED for Schools (LEED-SCH) 2009 Credit EQ 3.1, Construction IAQ Management; During Construction and associated references and resources.
- D. LEED for Schools (LEED-SCH) 2009 Credit EQ 3.2, Construction IAQ Management; Before Occupancy and associated references and resources.
- E. LEED for Schools (LEED-SCH) 2009 Credit EQ 5, Indoor Chemical and Pollutant Source Control

1.03 SUBMITTALS

- A. See Section 01 3000 - Administrative Requirements, for submittal procedures.
- B. Within fourteen (14) days after receipt of Notice of Award and prior to beginning any work on the site, the Contractor shall develop and submit to the Owner for review a construction indoor air quality management plan.
- C. The IAQ management plan shall comply with the five requirements of SMACNA IAQ Guideline for Occupied Buildings under Construction, 2nd Edition 2007, Chapter 3: HVAC protection, source control, pathway interruption, housekeeping, and scheduling and shall include:
 - 1. List of IAQ protective measures to be instituted on the site:
 - a. HVAC system component protection during construction.
 - b. Source control through installation of low-toxic or non-toxic materials.
 - c. Pathway interruption to isolate work areas where emitting materials are being installed.
 - d. Housekeeping to protect materials that are stored before installation and to avoid spreading contamination through the Project.
 - e. Sequencing installation of materials to avoid contaminating absorptive materials during construction.

2. Schedule for verification of IAQ measures.

PART 2 PRODUCTS

- 2.01 Low-emitting products are to be used on the project and have been included as appropriate in specific sections.
- 2.02 If air handlers must be used during construction, temporary filtration media with a Minimum Efficiency Reporting Value (MERV) of 13, as determined by ASHRAE 62.1.-2004, must be used at each return air grille.

PART 3 EXECUTION

3.01 GENERAL REQUIREMENTS

- A. Use safety meetings, signage, and subcontractor agreements to communicate the goals of the construction indoor air quality management plan.
- B. Conduct regular inspection and maintenance of indoor air quality measures including ventilation system protection, and ventilation rate.
- C. Dehumidify, and ventilate building during course of Work. Maintain environmental conditions suitable for drying and curing materials and for prevention of conditions suitable for mold and mildew growth.
 1. Ventilate building to remove moisture, dust, fumes, and odors.
 2. Temper and dehumidify air to remove excess moisture.
 3. Do not use moisture generating equipment indoors.
- D. Require VOC-safe masks for interior and exterior workers installing VOC-emitting products (products that contain 150 g/L or more VOCs).
- E. Use low-toxic cleaning supplies for surfaces, equipment, and worker's personal use, like soybean-based and citrus-based cleaners.
- F. Smoking is prohibited inside the building once the building is closed in by any means or absorptive materials are located within the structure.

3.02 VENTILATION SYSTEM PROTECTION:

- A. Do not run HVAC system during course of construction without prior written approval of Owner or as otherwise permitted by these specifications. Seal ductwork intake and exhaust vents to prevent contamination from dust, moisture, and chemical contamination.

- B. Store HVAC equipment in a clean, dry location.
- C. Seal all HVAC inlets and outlets.
- D. Seal HVAC components during installation.
- E. Use a temporary ventilation system during construction.
- F. Use temporary filtration media.
 - 1. Temporary filtration media shall have a Minimum Efficiency Reporting Value [MERV] of 13 as determined by ASHRAE 62.1-2004) on any return air systems operational during construction. For air intakes into rooms that are very sensitive to dust contamination, such as computer rooms, filtration media should be the best that the HVAC systems fans can handle, up to an MERV rating of 17.
 - 2. Replace all filtration media immediately prior to occupancy.
- G. Clean air plenums before closing them in.
- H. Inspect filters regularly and change out as appropriate. Document inspections and filter changeouts on a tracking log.

3.03 MICROBIAL AND FUNGAL CONTAMINATION PREVENTION

- A. Perform, schedule, and sequence Work as required to limit conditions supporting formation of microbes, molds, and fungi
 - 1. Ensure that construction methods will not result in moisture intrusion.
 - 2. Protect on-site stored and installed absorptive materials (such as insulation, drywall, wood and ceiling tiles) from moisture damage and from contamination by construction dust, debris, and fumes during all phases of construction, both before and after installation.
 - 3. Control water penetration, dampness, and humidity to protect products not treated for exterior use.
 - 4. Do not install moisture-damaged materials.
- B. When visible microbial, mold and fungal formations are observed, promptly contact Owner and Contracting Officer for determination by industrial hygienist employed by Owner.
 - 1. Clean non-absorbent materials using low hazard cleaners accepted by Owner and Contracting Officer.

2. Remove and replace affected materials that cannot be completely cleaned by non-abrasive surface treatments.
 3. Remove and replace affected materials identified as being food sources for microbes, molds, and fungi.
- C. Remove interior products and finishes, identified as food sources, that have absorbed sufficient moisture to become damp, and are not immediately made dry, whether or not microbial, mold, or fungal growth is observed. Include:
1. Gypsum board.
 2. Organic materials composed of cellulose fiber or paper.
 3. Materials containing sucrose or other binders and glues identified as supporting microbial growth.
 4. Fibrous insulation materials including duct liner, fiberglass insulation, and mineral fiber.
 5. Mechanical ductwork.
- D. Wood Lumber and Engineered Products:
1. Take remedial action to reduce moisture content of wood products measured by a moisture meter as exceeding 15 percent moisture content.
 2. Remove wood and cellulose based products showing signs of mildew from construction site, including in-place construction not accepted by Owner's industrial hygienist.
- E. Promptly correct conditions supporting or subject to becoming an environment for microbial, mold, and fungal growth.
1. Repair conditions leading to moisture condensation and water penetration.
 2. Do not permit conditions leading to standing water.

3.04 POLLUTION SOURCE CONTROL

- A. Use only low-emitting products including those specified in appropriate sections.
- B. Provide methods to avoid tracking pollutants into the work areas.
- C. Allow materials to off-gas prior to installation. For example, all dry furnishing and materials (such as carpet, floor tile, acoustical tile, textiles, office furniture,

wood shelving, etc.) shall be allowed to "air-out" in clean environments prior to installation in a building.

1. Use the least amount of "wet" materials (such as adhesives, sealants, glazes, caulks, paints, etc.) during construction and product applications while still maintaining installation protocol required to meet manufacturer's warranty requirements.

3.05 POLLUTANT PATHWAY INTERRUPTION

- A. Use an air barrier or pressure differential to isolate areas at different stages of completion.

3.06 HOUSEKEEPING

- A. Confine dust-generating activities and promptly clean up dust and other potential airborne contaminants as they are generated.
- B. Use wet sanding for gypsum board assemblies. Exception: Dry sanding allowed subject to Owner approval of the following measures:
 1. Provide full isolation of space under finishing
 2. Install plastic protection sheeting to provide air sealing during sanding operations
 3. Close/seal all air system devices and ductwork
 4. Sequence construction work to prevent contamination of other spaces with gypsum dust
 5. Provide worker protection
- C. Keep work area dry and promptly clean up all spills.
- D. Keep containers of volatile liquids covered when not in use.
- E. Do not allow accumulations of sawdust, dust, rags, debris, and carbon-based materials and materials emitting fumes and odors to accumulate within concealed construction, including within stud spaces and wall cavities. Remove and clean prior to enclosing behind permanent construction.
- F. Vacuum carpet, upholstery, and other porous materials throughout building using a high-efficiency particulate arrestor HEPA filter vacuum cleaner just prior to Substantial Completion. Replace and dispose of vacuum bags when bag is half full.

3.07 SCHEDULING

- A. Account for curing time and off-gassing when scheduling construction activities.
- B. Enclose building, control humidity, ventilate, and make watertight prior to installing interior materials and finishes.
- C. Allow wet-spray cellulose to dry before covering.
- D. Allow furnishings and materials such as carpet, floor tile, acoustical tile, textiles, office furniture, and casework, to air out in clean environment prior to installation.
- E. Install porous materials only after closing in the building.
- F. Allow sufficient time for work generating significant moisture to dry and cure before installing absorbent materials such as carpet, acoustical material, textiles, and other material of type that may attract and retain moisture.
- G. Provide adequate ventilation during curing period.
 - 1. Provide supplemental (spot) ventilation for at least 72 hours after work is completed. Preferred HVAC system operation uses supply air fans and ducts only; exhaust provided through windows. Use exhaust fans to pull exhaust air from deep interior locations. Stair towers and other paths to exterior can be useful during this process.

3.08 REMEDIAL ACTION

- A. Promptly take action as necessary to identify and remediate conditions suspected of supporting biological, particulate, and chemical indoor air pollution. Identify, stop, and repair causes of uncontrolled water penetration into building.
- B. Promptly notify and consult with Owner and Contracting Officer, prior to beginning removal of material, where contamination by hazardous chemicals, microbes, and fungi is suspected.

3.09 COMMISSIONING

- A. Inspect ductwork for refuse, contaminants, moisture, and other foreign contamination prior to Commissioning. Notify Commissioning Agent of satisfactory inspection prior to beginning of Commissioning.

3.10 PRE-OCCUPANCY FLUSH

- A. Perform one of the following:

1. After construction ends, prior to occupancy and with all interior finishes installed, perform a building flush-out by supplying a total air volume of 14,000 cu.ft. of outdoor air per sq.ft. of floor area while maintaining an internal temperature of at least 60 degrees F and relative humidity no higher than 60%.
2. If occupancy is desired prior to completion of the flush-out, the space may be occupied following delivery of a minimum of 3,500 cu.ft. of outdoor air per sq.ft. of floor area to the space. Once a space is occupied, it shall be ventilated at a minimum rate of 0.30 cfm/sq.ft. of outside air or the design minimum outside air rate determined in EQ Prerequisite 1, whichever is greater. During each day of the flush-out period, ventilation shall begin a minimum of three hours prior to occupancy and continue during occupancy. These conditions shall be maintained until a total of 14,000 cu.ft./sq.ft. of outside air has been delivered to the space.

END OF SECTION

SECTION 02 4100 - DEMOLITION

PART 1 GENERAL

1.01 DESCRIPTION OF WORK

This Section includes requirements for old pavements, sidewalks, curbs, driveways, and signage designated for removal.

1.02 RELATED REQUIREMENTS

Section 01 5713 –Temporary Erosion and Sediment Control

1.03 REFERENCE STANDARDS

The publications listed form a part of this specification to the extent referenced.

- A. Hawaii Standard Specification For Road and Bridge Construction, 2005, as applicable to County of Maui, with exception of subsections regarding “Measurement” and “Payment”; referred to as “Standard Specifications”

Section 202 – Removal of Structures and Obstructions

1.04 SUBMITTALS

- A. See Section 01 3300 – Submittal Procedures

PART 2 PRODUCTS

(NOT USED)

PPART 3 EXECUTION

3.01 GENERAL REQUIREMENTS

- A. Demolition shall be in accordance with Standard Specifications, Section 202– “Removal of Structures and Obstructions.”
- B. Protection
 1. Prevent spread of flying particles and dust. Sprinkle rubbish and debris with water to keep dust to a minimum. Do not use water if it results in hazardous or objectionable condition such as, but not limited to; ice, flooding, or pollution. Vacuum and dust the work area daily.
 2. Before beginning any demolition work, the Contractor shall survey the site and examine the drawings and specifications to determine the extent of the work. The contractor shall take necessary precautions to avoid damages to existing items to remain in place, to be reused, or to remain the property of the Contracting Officer; any damaged items shall be repaired or replaced as approved by the Contracting Officer. The Contractor shall coordinate the work of

this section with all other work.

C. Existing Utilities

1. Existing underground lines shown on the Drawings are shown from best available information. Verify their location prior to the start of any work.
2. It is understood and agreed that certain lines (i.e. irrigation, electrical, sewer and water) cannot be or have not been located and no indication is contained on any of the Drawings or referred to in the specifications; therefore, exercise extreme caution during clearing and like work. Should any such lines be encountered, give notice (in writing), and do not proceed until adequate investigation has been made, the line identified, and instructions are issued as to how to proceed.
3. Interrupting Existing Utilities: Preserve in operating condition all active utilities traversing about the site; protect all such property and items, including but not limited to piping, conduits, mains, laterals, valve boxes, meters, and other appurtenances and structures. Do not interrupt utilities serving facilities occupied by others unless permitted under the following conditions and then only after arranging to provide temporary utility services according to requirements indicated:
 - a. Notify Contracting Officer not less than two days in advance of proposed utility interruptions.
 - b. Do not proceed with utility interruptions without Contracting Officer's written permission.
 - c. Promptly repair and damage to such utility or work due to work under this Contract.
4. Abandoning utilities in place is not allowed unless approved by the Contracting Officer.

C. Barricades: Provide barricade warnings (signs and lights), and maintenance and supervision thereof, in accordance with applicable Federal, State and local codes and their respective requirements, or as may be directed from time to time.

D. Equipment: The use of proper equipment is the responsibility of the Contractor.

E. Disposal of Materials:

1. Material shall be disposed in accordance with the Standard Specifications.
2. Stockpiling of removed materials on the project site, other than topsoil, will not be permitted without written acceptance of the Contracting Officer.

F. Protection of Existing Monuments: Carefully maintain all benchmarks, monuments, and other reference points. If disturbed or destroyed, they are to be replaced at Contractor's expense, utilizing a registered Land Surveyor licensed in the State of Hawaii.

END OF SECTION

SECTION 02 6100 – SOIL CONTAINING ASBESTOS ABATEMENT

GENERAL

1.01 SECTION INCLUDES

- A. Abatement of soil containing asbestos containing material in the “Armstrong Lot.”

1.02 REFERENCES

- A. Preliminary Profiles and Trench Map.
- B. *Phase I Environmental Site Assessment Vacant Lot and One Medical Assessment*, Revised July 2018

1.03 STANDARDS

- A. 29 Code of Federal Regulations (CFR) 1910.1001 - Occupational Safety and Health Act (OSHA)
- B. 29 CFR 1926.1101 - OSHA Asbestos Standard for the Construction Industry
- C. 29 CFR 1910.20 - General Safety and Health Provisions
- D. 40 CFR 61 Subpart M - U.S. Environmental Protection Agency Regulations for Asbestos
- E. State of Hawaii, Department of Health, Hawaii Administrative Rules (HAR), Chapters 11-501 thru 11-504.

1.03 SUBMITTALS

- A. See Section 01 3000 – Administrative Requirements, for submittal procedures.
- B. Plan of Action: The Contractor shall submit for approval a detailed plan of the procedures to comply with all applicable Federal and State rules and regulations and this this specification. The plan shall include: a coordination plan with the archaeologist (hired by others) to survey for historic resources, the location and layout of decontamination areas; the sequencing of asbestos work; the interface of trades involved in the performance of work; methods to protect workers, methods to assure the safety of building occupants and visitors to the site; disposal plan including the location of an

approved disposal site; sampling, monitoring and testing; and a detailed description of the methods to be employed to control pollution. The plan must be approved by the owner or owner's representative prior to commencement of work for conformance to these specifications.

- C. Laboratory Qualification Information: The Contractor shall submit proof of qualifications of the testing laboratory and personnel. Qualifications shall include the accreditation by the American Industrial Hygiene Association (AIHA) for asbestos work and certification that persons counting the samples have been judged proficient by the successful participation in the National Institute for Occupational Safety and Health (NIOSH) Proficiency Analytical Testing (PAT) Program. Submittal must be approved by the owner or owner's representative prior to beginning any testing.
- D. Certificates of Compliance: The Contractor shall submit the certifications for equipment required to contain airborne asbestos fibers to prove conformance to Federal, State and Local regulations, such as but not limited to: vacuum cleaners, vacuum pumps; exhaust equipment; ventilation equipment, etc.

1.04 QUALITY ASSURANCE

- A. Contractor shall become familiar to the archaeological purpose of the excavation and coordinate the work with the archaeologist.
- B. Contractor Qualifications: The Contractor shall submit documentation that the firm has an established reputation (or, if newly organized, whose personnel have previously established a reputation in the field) that is regularly engaged in and that maintain a regular force of workers skilled in asbestos abatement and shall have performed this work on previous projects.
- C. Competent Person: The Contractor shall have the Competent Person on-site during asbestos abatement, at all times. The Contractor shall submit the qualifications for approval of the Competent person. At a minimum, the Competent Person shall have a minimum two years project experience as a Competent Person on similar projects. The Competent Person shall have a Hawaii Department of Health Asbestos Supervisor certification.
- D. The Contractor and their employees shall be licensed to remove asbestos material as required by the State of Hawaii. The Contractor shall submit a list of personnel and qualifications for approval.
- E. The Contractor shall use an independent company (Qualified Consultant) to perform air testing and personnel air monitoring on the Contractor's work force during the abatement work. The air testing and monitoring personnel, at a minimum, will have three years of asbestos abatement project experience, who is not financially or in any way encumbered by the asbestos abatement contractor, and who has a current State of Hawaii Project Monitor certification. The Contractor will submit the qualifications for approval.

1.06 REGULATORY REQUIREMENTS

- A. The Contractor shall obtain approval for disposal from an approved sanitary landfill in compliance with Section 61.25 of the EPA regulations and State of Hawaii Department of Health requirements.
- B. All waste disposal shall be disposed of in an approved sanitary landfill.
- C. The Contractor shall assume full responsibility and liability for compliance with all applicable Federal, State, and Local regulations pertaining to the protection of workers, visitors to the site, and persons occupying areas adjacent to the site. The Contractor is responsible for providing medical examinations and maintaining medical records of personnel as required by the applicable Federal, State, and Local regulations. The Contractor shall assume full responsibility for the safe removal and disposal of all asbestos-containing material, including that not identified and accessible during earlier surveys.
- D. Asbestos Control Limits:
 - 1. Asbestos Work Area: Air concentrations of asbestos shall be maintained at an 8-hour time weighted average below 0.1 fiber (longer than 5 micrometers) per cubic centimeter of air. This applies to all areas surrounding the asbestos work area and in the Construction Site while the work is in progress, except for the asbestos work area.

1.07 PROJECT CONDITIONS

- A. The asbestos abatement will be conducted in accordance with OSHA 29 Code of Federal Regulations Asbestos in Construction Standard 1926.1101 for Class II asbestos abatement.
- B. Means of Egress: Establish and maintain emergency exits from the work area.
- C. Access to Work Area:
 - 1. Access to work area shall be through decontamination areas. The following shall have access to work areas:
 - a. Personnel properly trained and fully equipped for safety will be permitted in the work areas. (List by name).
 - b. Qualified State and EPA personnel will be permitted in the work areas.
 - c. The archaeologists (hired by others), and owner or owner's representatives will be permitted in the work areas with proper personal protective equipment and certifications.

2. The Contractor shall provide protective clothing and respirators for the above listed personnel. The Contractor shall train visitors on proper procedures in working in an asbestos abatement area.

PART 2 - PRODUCTS

2.01 EQUIPMENT

- A. Protective Equipment: Equipment, including protective clothing and respirators, used in the execution of this Contract and provided to visitors to the site shall comply with the applicable Federal, State, and local regulations.
- B. Roll-off Containers: Roll-off containers shall be lined with two layers of 6-mil polyethylene sheeting and securely sealed and labeled as specified by NESHAPS or OSHA.

1. NESHAPS:

Contains Asbestos

Avoid Opening or Breaking Container

Breathing Asbestos is Hazardous to Your Health

2. OSHA:

Caution

Contains Asbestos Fibers

Avoid Creating Dust

Breathing Asbestos Dust

May Cause Serious Bodily Harm

- C. Vacuum Cleaners: All vacuums used shall be high efficiency particulate air (HEPA) filter type.

2.02 MATERIALS

- A. Wetting Agent: The wetting agent shall be 50 percent polyoxyethylene ester and 50 percent polyoxyethylene ether, in concentration of one (1) ounce in five (5) gallons of water.

PART 3 - EXECUTION

3.01 PREPARATION

- A. Coordinate with archaeologists to determine work procedures and methodologies.
- B. Isolate the work area for the duration of the work according to acceptable trade practices and regulatory requirements. Isolation will consist of asbestos barrier ribbon around the perimeter of the work site.
- C. Provide a decontamination area immediately outside of the work area for the interior asbestos abatement. This decontamination area will consist of a 10-mil thick plastic drop cloth so that asbestos-containing material where abatement workers can clean off their respirators and hands with damp wipes.
- D. Post warning signs and labels as required by 29 CFR 1910.1001 and ASTM E 849 and as directed by the owner or owner's representative.

3.02 MONITORING

- A. Monitoring of airborne concentrations of asbestos shall be in accordance with 29 CFR 1910.1001. Personnel air monitoring shall be conducted by the asbestos abatement contractor. Area air monitoring (decontamination chamber entrance, negative air machine exhausts) will be conducted by the Qualified Consultant.

3.03 SITE INSPECTION

- A. While performing asbestos abatement work, the Contractor may be subject to on-site inspection by the Qualified Consultant, OSHA and EPA inspectors.

3.04 ABATEMENT PROCEDURES

- A. All preparation work for asbestos removal shall have been completed before beginning removal. Asbestos material shall be sprayed with water containing a wetting agent in the form of a fine spray. The material shall be sufficiently saturated to prevent emission of airborne fibers in excess of the exposure limits.
- B. The soil in the vacant lot will be carefully excavated and visible asbestos debris removed in such a manner as not to contaminate clean material. Asbestos contaminated soil will be wrapped in two layers of 6 mil. polyethylene sheeting, securely sealed, and marked per regulation. Wrapped soil shall be placed in lined roll-off containers.
- C. All plastic sheeting, clothing and all other disposable material or items used in the work area shall be wrapped in two layers of 6-mil. plastic sheeting, securely sealed, placed into lined roll-off containers and marked per regulations. At the

end of each work day, and prior to transport the roll-off containers shall be securely sealed and marked per regulations.

3.05 CLEANING

- A. The Contractor shall remove all visible asbestos-containing material from the soil in the vacant lot.
- B. After completion of the cleaning operation, the Contractor and the Qualified Consultant shall perform a complete visual inspection of the work area to ensure that the areas are asbestos-containing debris free. If additional asbestos-containing debris is observed, further excavation will be required at Contractor's expense.
- C. After all work areas have been found to be in compliance, all plastic sheeting, warning tape and abatement materials will be removed.

3.06 DISPOSAL

- A. Waste asbestos material shall be disposed of in accordance with all Federal and State regulations implementing the intent of the Resource Conservation and Recovery Act (40 CFR 260-265) and at an approved sanitary landfill. The "small quantity exclusion" of the regulations shall not apply to disposal of waste asbestos materials. Establish a temporary holding area approved by owner or owner's representative for properly packaged asbestos waste.

3.07 PROTECTION

- A. Post warning signs and EPA and OSHA regulations as well as applicable State laws.

END OF SECTION

SECTION 02 8213 - ASBESTOS ABATEMENT

PART 1 GENERAL

1.01 SECTION INCLUDES

- A. Abatement of Wailuku Medical Plaza Asbestos-Containing Materials.
 - 1. Resilient floor tiles and associated mastic material.
 - 2. Sheet vinyl flooring and associated backing material.
 - 3. Stainless steel sink insulation.
 - 4. Window caulking.
 - 5. Roofing materials.
 - 6. Ceramic tiles in Suites 300 and 400, only.

1.02 REFERENCES

- A. *Limited Asbestos Survey, 1 Medical Plaza, May 2018.*
- B. *Phase I Environmental Site Assessment Vacant Lot and One Medical Assessment, Revised July 2018.*

1.03 STANDARDS

- A. 29 Code of Federal Regulations (CFR) 1910.1001 - Occupational Safety and Health Act (OSHA)
- B. 29 CFR 1926.1101 - OSHA Asbestos Standard for the Construction Industry
- C. 29 CFR 1910.20 - General Safety and Health Provisions
- D. 40 CFR 61 Subpart M - U.S. Environmental Protection Agency Regulations for Asbestos
- E. Hawaii Department of Health Administrative Rules (HAR) for Asbestos, HAR Chapters 11-501 through 11-504

1.04 SUBMITTALS

- A. See Section 01 3000 – Administrative Requirements, for submittal procedures.

- B. Plan of Action: The Contractor shall submit for approval a detailed plan of the procedures to comply with all applicable Federal and State rules and regulations and this this specification. The plan shall include: the location and layout of decontamination areas; the sequencing of asbestos work; the interface of trades involved in the performance of work; methods to protect workers, methods to assure the safety of building occupants and visitors to the site; disposal plan including the location of an approved disposal site; sampling, monitoring and testing; and a detailed description of the methods to be employed to control pollution. The plan must be approved by the owner or owner's representative prior to commencement of work for conformance to these specifications.
- C. Laboratory Qualification Information: The Contractor shall submit proof of qualifications of testing laboratory and personnel. Qualifications shall include the accreditation by the American Industrial Hygiene Association (AIHA) for asbestos work and certification that persons counting the samples have been judged proficient by the successful participation in the National Institute for Occupational Safety and Health (NIOSH) Proficiency Analytical Testing (PAT) Program. Submittal must be approved by the owner or owner's representative prior to beginning any testing.
- D. Certificates of Compliance: The Contractor shall submit the certifications for equipment required to contain airborne asbestos fibers to prove conformance to Federal, State and Local regulations, such as but not limited to: vacuum cleaners, vacuum pumps; exhaust equipment; ventilation equipment, etc.

1.05 QUALITY ASSURANCE AND SUBMITTALS

- A. Contractor shall refer to the reference report: *Limited Asbestos Survey, 1 Medical Plaza, May 2018.*
- B. Contractor Qualifications: The Contractor shall submit documentation that the firm has an established reputation (or, if newly organized, whose personnel have previously established a reputation in the field) that is regularly engaged in and that maintain a regular force of workers skilled in asbestos abatement and shall have performed this work on previous projects.
- C. Competent Person: The Contractor shall have the Competent Person on-site during asbestos abatement, at all times. The Contractor shall submit the qualifications for approval of the Competent person. At a minimum, the Competent Person shall have a minimum two years project experience as a Competent Person on similar projects. The Competent Person shall have a Hawaii Department of Health Asbestos Supervisor certification.
- D. The Contractor and their employees shall be licensed to remove asbestos material as required by the State of Hawaii. The Contractor shall submit a list of personnel and qualifications for approval.

- E. The Contractor shall use an independent company (Qualified Consultant) to perform air testing and personnel air monitoring on the Contractor's work force during the abatement work. The air testing and monitoring personnel, at a minimum, will have three years of asbestos abatement project experience, who is not financially or in any way encumbered by the asbestos abatement contractor, and who has a current State of Hawaii Project Monitor certification. The Contractor will submit the qualifications for approval.

1.06 REGULATORY REQUIREMENTS

- A. The Contractor shall obtain approval for disposal from an approved sanitary landfill in compliance with Section 61.25 of the EPA regulations and State of Hawaii Department of Health requirements.
- B. All waste disposal shall be disposed of in approved sanitary landfill.
- C. The Contractor shall be fully responsible and liable for compliance with all applicable Federal, State, and Local regulations pertaining to: the protection of workers; visitors to the site; and persons occupying areas adjacent to the site.
- D. The Contractor is responsible for providing medical examinations and maintaining medical records of personnel as required by the applicable Federal, State, and Local regulations.
- E. The Contractor shall assume full responsibility for the safe removal and disposal of all asbestos-containing material, including asbestos containing material not identified and accessible during earlier surveys and the referenced reports.
- F. Asbestos Control Limits:
 - 1. Inside Asbestos Work Area: Air concentrations of asbestos shall not exceed an 8-hour time weighted average of 0.1 fibers (longer than 5 micrometers) per cubic centimeter of air. Pursuant to 29 CFR 1910.1001.
 - 2. Outside Asbestos Work Area: Air concentrations of asbestos shall be maintained at an 8-hour time weighted average below 0.01 fiber (longer than 5 micrometers) per cubic centimeter of air. This applies to all areas in the building while work is in progress, except for the asbestos work area. When the work area limit is reached, the Contractor shall stop work and correct the situation causing the elevated concentration of asbestos fibers. The Contractor shall clean as necessary affect outside work areas and all expenses and time will be borne by the Contractor.

1.07 PROJECT CONDITIONS

- A. The asbestos abatement will be conducted in accordance with OSHA 29 Code of Federal Regulations Asbestos in Construction Standard 1926.1101 for Class II asbestos abatement. For the removal of the roofing and window caulking, preparation and removal work shall be conducted also in compliance with 29 CFR 1926.1101 for Class II asbestos abatement.
- B. Means of Egress: The Contractor shall establish and maintain emergency and fire exits from the work area.
- C. Use of Existing Facilities: The Contractor shall coordinate electricity and water with building management prior to start of work. The Contractor is responsible for all fees and charges and will not be reimbursed by the owner.
- D. Access to Work Area:
 - 1. Access to work area shall be through decontamination areas. The following shall have access to work areas:
 - a. Personnel properly trained and fully equipped for safety will be permitted in the work areas.
 - b. Qualified State and EPA personnel will be permitted in the work areas.
 - c. The owner or owner's representatives will be permitted in the work areas with proper personal protective equipment and certifications.
 - 2. The Contractor shall provide protective clothing and respirators for the above listed personnel.

PART 2 - PRODUCTS

2.01 EQUIPMENT

- A. Protective Equipment: Includes but not limited to protective clothing and respirators, used in the execution of this Contract and provided to visitors to the site shall comply with the applicable Federal, State, and local regulations.
- B. Vacuum Cleaners: All vacuums used shall be high efficiency particulate air (HEPA) filter type.
- C. Disposal Containers: Plastic bags shall be "leak-tight," 6 mil polyethylene. Bags may be placed in 55 gallon drums for additional protection. Bags and drums (if used) must be properly labeled as specified by NESHAPS or OSHA.
 - 1. NESHAPS:

Contains Asbestos

Avoid Opening or Breaking Container

Breathing Asbestos is Hazardous to Your Health

2. OSHA:

Caution

Contains Asbestos Fibers

Avoid Creating Dust

Breathing Asbestos Dust

May Cause Serious Bodily Harm

2.02 MATERIALS

- A. Wetting Agent: The wetting agent shall be 50 percent polyoxyethylene ester and 50 percent polyoxyethylene ether, in concentration of one (1) ounce in five (5) gallons of water.

PART 3 - EXECUTION

3.01 PREPARATION

- A. Isolate the work area for the duration of the work according to acceptable trade practices and regulatory requirements. For the flooring and ceramic tile removal, critical barriers (6-mil plastic and duct tape) will be installed on all openings to the work area not used for ingress/egress.
- B. HEPA-filtered exhaust units will be supplied in sufficient quantity, with backup, to provide negative two-hundredths (- 0.02) inch of water gauge negative pressure relative to the exterior of the building. This negative pressure shall continuously be verified using a working pressure gauge.
- C. Provide a three-stage decontamination unit immediately outside of the work area for the interior asbestos abatement. The middle stage of the interior asbestos abatement decontamination unit shall be equipped with a HEPA

vacuum cleaner for vacuuming off protective clothing and removing asbestos debris from protective clothing prior to its removal. Wipes will be used for cleaning off hands and respirators.

- D. For the roofing abatement and window caulking removal, a single-stage decontamination chamber will be placed adjacent to the asbestos control area so that asbestos-containing material removal workers can clean off their respirators and hands with damp wipes.
- E. Before the work is begun, remove all unattached items from the work area and store as directed by owner or owner's representative.
- F. Cover all non-removable items and equipment in the work area with plastic sheeting taped securely in place.
- G. Post warning signs and labels as required by 29 CFR 1910.1001 and ASTM E 849 and as directed by owner or owner's representative.

3.02 MONITORING

- A. Monitoring of airborne concentrations of asbestos shall be in accordance with 29 CFR 1910.1001. Personnel air monitoring shall be conducted by the asbestos abatement contractor. Area air monitoring (decontamination chamber entrance, negative air machine exhausts) will be conducted by the Qualified Consultant.

3.03 SITE INSPECTION

- A. The Contractor will be subject to on-site inspection by the owner or owner's representative, Qualified Consultant, OSHA and EPA inspectors. The Contractor shall provide unrestricted access for all inspections and monitoring.

3.04 ABATEMENT PROCEDURES

- A. All preparation work for asbestos removal shall be completed before beginning asbestos removal. Asbestos material shall be sprayed with water containing a wetting agent in the form of a fine spray. The material shall be sufficiently saturated to prevent emission of airborne fibers in excess of the exposure limits.
- B. The floor tile, ceramic tile, and sheet vinyl shall be removed manually and placed wet into double asbestos waste bags. Associated mastic material will be removed using mastic remover; and all waste will be disposed into 6-mil. polyethylene plastic disposal bags. Sinks will be removed intact and

carefully wrapped in two layers of 6-mil. polyethylene plastic. The roofing will be removed in small pieces and the material shall be packed wet into sealable plastic bags and for transporting. All double bags will be goose-necked and securely-sealed with duct tape.

- C. All plastic sheeting, tape, cleaning material, clothing and all other disposable material or items used in the work area shall be packed into sealable plastic bags, placed into drums and marked per regulations.

3.05 CLEANING

- A. The Contractor shall clean all surfaces in the work area.
- B. After completion of the cleaning operation, the Contractor and the Qualified Consultant shall perform a complete visual inspection of the work areas to ensure that the areas are asbestos-containing debris free. If dust is observed, further cleaning will be required at Contractor's expense.
- C. After all work areas have been found in compliance with Federal, State, Local and specifications, all plastic sheeting, warning tape and abatement materials will be removed.

3.06 DISPOSAL

- A. Waste asbestos material shall be disposed of in accordance with all Federal and State regulations implementing the intent of the Resource Conservation and Recovery Act (40 CFR 260-265) and at an approved sanitary landfill. The "small quantity exclusion" of the regulations shall not apply to disposal of waste asbestos materials. Establish a temporary holding area approved by owner or owner's representative for properly packaged asbestos waste.

3.07 PROTECTION

- A. Post warning signs and EPA and OSHA regulations as well as applicable State laws.

END OF SECTION

SECTION 03 1000

CONCRETE FORMWORK

PART 1 – GENERAL

1.01 GENERAL REQUIREMENTS

- A. General: As specified in Division 1

1.02 SECTION INCLUDES

- A. This section includes, but is not limited to, all of the design, shop drawings, materials, labor, construction, and placement of all concrete formwork necessary to complete the project.

1.03 QUALITY ASSURANCE

- A. Formwork, shoring and reshoring system shall be designed by a Hawaii licensed professional engineer with a minimum of 10 years experience in the design of such systems.

1.04 REFERENCES

- A. All work shall conform to the latest edition of the following, unless otherwise noted or specified on the structural drawings or in these specifications.
 1. ACI 301, "Specifications for Structural Concrete Buildings"
 2. ACI 318, "Building Code Requirements for Reinforced Concrete"
 3. ACI 247, "Recommended Practice for Concrete Formwork"
 4. CRSI MSP-2, "Manual of Standard Practice"
 5. 2006 IBC, "International Building Code"

PART 2 – PRODUCTS

2.01 MATERIALS

- A. Plywood shall be commercial-standard Douglas Fir, moisture resistant concrete form plywood not less than 5-ply and at least 5/8 inches thick.
- B. Metal forms may be used if they will produce surfaces equal to those specified for wood forms.
- C. Forms of other materials shall not be used unless approved by the Architect.
- D. Form Liners shall be Spec Formliners, Inc. 6" Pine Wood Grain or approved equal. Form Liners shall be approved by the Architect.

- E. Metal clamps and ties shall be used. Form ties for exposed concrete shall be removable either completely or to a minimum depth of 1 inch from the face of concrete.

PART 3 – EXECUTION

3.01 TOLERANCES

- A. Forms shall be constructed so that the concrete surfaces do not deviate from established lines, grades and dimensions in excess of the tolerances listed below:

1. Variations from plumb:

- a. In the lines and surfaces of columns, piers, walls, and in arrises:

In any 10 ft. of ht.:	¼ inch
Max. for the entire ht. of structure:	½ inch

- b. For exposed corner columns, control-joint grooves, and other conspicuous lines:

In any 20 ft. of length	¼ inch
Max. for the entire length	½ inch

2. Variation from the level or from the grades specified in the contract documents:

- a. In slab soffits, ceilings, beam soffits and in arrises, measured before removal of supporting shores:

In any 10 ft. of length	3/16 inch
In any bay or in any 20 ft. length	3/8 inch
Max. for the entire length	½ inch

- b. In exposed lintels, sills, parapets, horizontal grooves, and other conspicuous lines:

In any bay or in 20 ft. length	¼ inch
Max. for the entire length	½ inch

3. Variation of the linear building lines from established position in plan and related position of columns, walls and partitions:

In any bay	½ inch
In any 20 ft. of length	½ inch
Max. for the entire length	1 inch

4. Variation in the sizes and location of sleeves, floor openings, and wall openings:

Plus or Minus	¼ inch
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5. Variation in cross-sectional dimensions of columns and beams and in thickness of slabs and walls:

Minus	¼ inch
Plus	½ inch

6. Footings: Tolerances apply to concrete dimensions only, not to positioning of vertical reinforcing steel, dowels, or embedded items:

- a. Variations in dimensions in plan:

Minus	½ inch
Plus	2 inches

- b. Misplacement or eccentricity:

2 percent of the footing width in the direction of misplacement but not more than	2 inches
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- c. Thickness:

Decrease in specified thickness	5 percent
Increase in specified thickness	No Limit

3.02 INSERTS, FASTENING DEVICES AND CONDUITS

- A. Install inserts, reglet strips, hangers, metal ties, anchors, bolts, nailing strips, blocking, grounds and other fastening devices as required for attachment of other work. Properly locate all embedded items in cooperation with other trades and secure in position before concrete is placed.

- B. All electrical and mechanical conduits and fittings shall be located such that

they do not impair the strength of the concrete member and shall be subject to acceptance by the Architect. Conduits referred to in the items below include pipes, ducts, and electrical conduits. Conduits and fittings shall conform to the following, unless shown on structural drawings:

1. Concrete Columns:
 - a. Electrical conduits and other pipes and fittings may not be embedded in a column if they will displace more than 4% of the cross-sectional area of the column.
 - b. Conduits in columns shall not be larger in outside diameter than 1/3 the least dimension of the column.
 2. Concrete Walls:
 - a. Conduits larger than 1-inch outside diameter shall not be embedded vertically in any wall. Conduits shall be spaced a minimum of 10 times outside diameter and shall be placed in the middle of the wall thickness.
 - b. No conduits shall be embedded horizontally in any wall, lengthwise.
 - c. Conduits passing through walls shall not impair the strength of the wall and shall be provided with Schedule 40 galvanized steel pipe (ASTM A53) sleeve.
 3. Suspended Concrete Slabs and Toppings:
 - a. Conduits larger than 1 inch outside diameter shall not be embedded in any concrete slab or topping. Conduits shall be spaced a minimum of 10 times outside diameter. Conduit crossings shall be avoided.
 - b. Conduits passing through slabs shall be provided with Schedule 40 galvanized steel pipe (ASTM A53) sleeve.
 4. Concrete Slabs on Grade:
 - a. Conduits shall not be embedded within the thickness of any concrete slab on grade.
 - b. Conduits may be placed in the subgrade below the bottom surface of slabs on grade.
- C. The Contractor shall coordinate the installation of all embedded items and penetrations. Cost of any added reinforcement required at pipe and conduit penetration and embedment shall be borne by the Contractor.

3.03 CONSTRUCTION OF FORMS

- A. All concrete forms shall be placed with metal clamps and ties. Locate ties level and plumb in horizontal rows and vertical tiers.
- B. Where soil conditions will permit excavation to accurate sizes without bracing, side forms for footings may be omitted only if approved by the Architect.
- C. Temporary access openings to forms for cleaning prior to depositing of concrete shall be provided.
- D. Unless otherwise called for on the plans, all exposed concrete surfaces and/or all surfaces designated as "Architectural Concrete" on the plans shall be formed with plywood. The arrangement of the plywood sheets shall be orderly and symmetrical and shall be of 4' x 8' size wherever practicable.

Only new or unmarred plywood shall be used. A $\frac{3}{4}$ inch by $\frac{3}{4}$ inch chamfer shall be provided at external corners of exposed concrete beams, girders, columns and pilasters unless otherwise indicated on the plans. Metal forms may be used if they will produce surfaces equal to those specified for wood forms.

- E. Rough concrete finish may be used for all unexposed concrete surfaces as indicated in Section 03300 or on the plans. Rough concrete finish shall be obtained by using clean, straight lumber or metal forms.
- F. Forms for architectural concrete surfaces or on exposed surfaces which are to receive a finishing material shall be either wetted thoroughly immediately before placing concrete or coated with a bond-breaking material compatible with the finishing material and/or its adhesive prior to the placement of reinforcing steel. Forms for unexposed surfaces may be coated with form oil. However, any surplus oil on the form surfaces and any oil on the reinforcing steel shall be removed by wiping with dry rags.
- G. Forms which cannot be removed shall be of material other than wood and must be approved by the Architect.
- H. All forms other than for the non-removable form described under the preceding subparagraph shall be constructed so that they can be removed without hammering or prying against the concrete.

- I. Forms shall not be removed before the expiration of the minimum lapsed time from concrete pour shown below unless information and/or data justifying a request for a shorter period is submitted to and approved by the Architect. Even with such approval, however, the Contractor shall be fully responsible to repair any damages which may result from the early removal.

Walls, columns and side forms of beams	3 days
Footing side forms	24 hours
Bottom forms of cast-in-place slabs	14 days

No construction loads exceeding the structural design live loads shall be supported upon any unshored portion of the structure under construction. No construction load shall be supported upon, nor any shoring removed from any part of the structure under construction until the portion of the structure has attained sufficient strength to support safely its weight and the loads placed thereon. This strength may be demonstrated by job-cured test specimens and by a structural analysis considering the proposed loads in relation to this test strength. Such analysis and test data shall be furnished by the Contractor to the Architect.

- J. To maintain the tolerances specified in Paragraph 3.01, the formwork shall be cambered to compensate for anticipated deflections in the formwork prior to hardening of the concrete.

- K. Screeds for slabs:

- 1. Edge forms and intermediate screed strips shall be set accurately to produce the designated elevations and contours of the finished surface, and shall be sufficiently strong to support vibrating screeds or roller pipe screeds if the nature of the finish specified requires the use of such equipment.

The concrete surface shall be aligned to the contours of screed strips by the use of strike-off templates or approved compacting type screeds. Screeds shall be set adjacent to all walls and in parallel rows not to exceed 8 feet o.c. Penetrations of the moisture barrier shall be held to a minimum.

- 2. At walks, screeds shall be set at the sides to serve as forms and additional screeds, if required, shall be spaced not exceeding 8 feet o.c.

3.04 INSPECTION

- A. Forms should be inspected and checked before the reinforcing steel is placed to ensure that the dimensions and location of the concrete members will conform to the drawings.
- B. Blockouts, inserts, sleeves, anchors and other embedded items should be properly identified. Positioned and secured.

C. Forms should be checked for camber as specified in 3.03 item J of this section.

END OF SECTION

SECTION 03 2000

CONCRETE REINFORCING

PART 1 – GENERAL

1.1 GENERAL REQUIREMENTS:

- A. General: As specified in Division 1

1.2 SECTION INCLUDES

- A. This section includes, but is not limited to, all of the design, shop drawings, materials, labor, construction, and placement of all concrete reinforcing steel bars necessary to complete the project.

1.3 SUBMITTALS

- A. Submit certified mill test results or laboratory test results for all reinforcing steel indicating the following: bar size; yield strength; ultimate tensile strength; elongation and; bend test. Rebar chemical composition shall be provided for rebars which are to be welded.
- B. Recycled Content: Provide submittals for materials with recycled content in accordance with SECTION 01 8113, SUSTAINABLE BUILDING REQUIREMENTS

1.4 REFERENCES

- A. All work shall conform to the latest edition of the following, unless otherwise noted or specified on the structural drawings or in these specifications.
 1. ACI 301, "Specifications for Structural Concrete Buildings"
 2. ACI 318, "Building Code Requirements for Reinforced Concrete"
 3. ACI 247, "Recommended Practice for Concrete Formwork"
 4. CRSI MSP-2, "Manual of Standard Practice"
 5. 2006 IBC, "International Building Code"
 6. PART 2 – PRODUCTS

1.5 RELATED REQUIREMENTS

- A. SECTION 01 7419 – CONSTRUCTION WASTE MANAGEMENT
- B. SECTION 01 8113 – SUSTAINABLE BUILDING REQUIREMENTS

2.1 MATERIALS

- A. Reinforcing steel shall be deformed bars conforming to ASTM A615, grade as

shown on plans.

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

- C. Accessories such as spacers, chairs, ties, and other devices necessary for properly placing, supporting and fastening reinforcement in place shall be provided. Annealed steel wire of not less than 16-gauge shall be used to secure reinforcement.

PART 3 - EXECUTION

3.1 TOLERANCES

- A. Bars used for concrete reinforcement shall meet the following requirements for fabricating tolerances:
 - 1. Sheared length: 1 inch
 - 2. Depth of truss bars: +0, -1/2 inch
 - 3. Overall dimensions of stirrups, ties, and spirals: 1/2 inch
 - 4. All other bends: 1 inch

- B. Bars shall be accurately placed and adequately supported before the concrete is placed and shall be secured against displacement within the following tolerances:
 - 1. Clear distance to formed soffits (exposed underside of beams and slabs): -1/4 inch
 - 2. Minimum distance between bars: -1/4 inch
 - 3. Where d is less than or equal to 8 inches:
 - a. Tolerance on d: 3/8 inch
 - b. Tolerance on the minimum concrete cover: -3/8 inch.
 - Note: The tolerance for cover shall not exceed minus one third the minimum concrete cover required under Section 3.2H.
 - 4. Where d is greater than 8 inches:
 - a. Tolerance on d: 1/2 inch
 - b. Tolerance on the minimum concrete cover: -1/2 inch
 - Note: The tolerance for cover shall not exceed minus one third the minimum concrete cover required under Section 3.2H.

d = Distance from the extreme compression fiber to the centroid of tension reinforcement.

5. Longitudinal location of bends and ends of reinforcement: 2 inches except at discontinuous ends of members where tolerance shall be 1/2 inch.

6. Bars may be moved as necessary to avoid interference with other reinforcing steel, conduits, or embedded items. If bars are moved more than one bar diameter, or enough to exceed the above tolerances, the resulting arrangement of bars shall be subject to approval by the Architect.

3.2 REINFORCEMENT

- A. Reinforcing steel bars, wire and wire fabric shall be provided in the sizes, lengths and configurations as indicated on plans and shall be thoroughly cleaned, before placing, of loose mill scale, loose flaky rust, oil, and all coatings that will destroy or reduce bond. If necessary, they shall be cleaned again before placing of concrete. All items shall be fabricated, positioned and secured in place as indicated in the plans and as herein specified. Annealed steel wire shall be used to secure reinforcement. Reinforcement shall be placed in specified positions not exceeding the tolerances listed in Sub-section 3.1. Unless otherwise noted, cleaning, bending and placing of reinforcement shall be done in accordance with the standard practice of the Concrete Reinforcing Steel Institute.
- B. Concrete or plastic coated support and spacers shall be used to secure the proper spacing of reinforcement over formwork. Stirrups shall be accurately and securely wired to the bars at both top and bottom. At slabs, footings and beams in contact with earth, pre-cast concrete blocks (not bricks or hollow tile) or chairs shall be used to hold reinforcement at a proper distance above earth.
- C. Bars shall be tied at all intersections, and distances from forms shall be maintained by means of pre-cast concrete blocks, ties, hangers, chairs or other approved supports.
- D. Bars shall be bent cold to the shapes shown on the plans. Bends shall be made around a pin having a diameter not less than 6 times the bar diameter except that for bars of larger than 1 inch diameter the pin diameter shall be 8 times the bar diameter. If required, bars may be bent in the field using a "hickey" bar.
- E. All reinforcing steel bars shall be furnished in the lengths indicated on the plans. Splicing of bars, except where shown will not be permitted without the approval of the Architect. Splices where permitted shall be staggered as far as possible, wired together in such a manner as to maintain the clear depth of the member and the minimum clear distance to the surface of concrete. Unless otherwise shown on the plans, splices shall be lapped in lengths as follows:
 1. #11 bars and smaller 48d or 24 inches, whichever is larger.
 2. Welded splices only shall be used when bar size exceeds #11.
 3. Welding shall conform to AWS D1.4, Structural Welding Code - Reinforcing Steel. The Contractor shall notify the Architect 48 hours prior to making any welded splices.

- F. Vertical bars in columns shall be offset at least one bar diameter at splices.
- G. Unless permitted by the Structural Engineer, reinforcement shall not be bent after being partially embedded in hardened concrete. Improperly and/or excessively bent bars shall be replaced.
- H. Minimum concrete protective covering for reinforcement, shall be as follows:
 - 1. Concrete deposited against the ground: 3 inches
 - 2. Formed surfaces exposed to weather or in contact with the ground: 2 inches for reinforcing bars #6 or larger; 1-1/2 inch for reinforcing bars less than #6; except not less than 1-1/2 times maximum size of aggregate for column spirals or ties.
 - 3. Interior surfaces: 1-1/2 inch for columns; 3/4 inch for slabs, walls and joists with #11 bars or smaller, and 1-1/2 inch with #14 and #18 bars.
- I. Dowels (minimum #3 @ 24 inches o.c. unless otherwise shown in the plans) shall be installed in all concrete to which masonry walls abut.
- J. All reinforcement shall be inspected and approved by the Special Inspector prior to the closing of forms. This approval, however, shall not be construed to relieve the Contractor of his responsibility to place all reinforcement in accordance with the plans.

END OF SECTION

SECTION 03 3000

CAST-IN-PLACE CONCRETE

PART 1- GENERAL

1.1 GENERAL REQUIREMENTS:

- A. As specified in Section Division 1.

1.2 SECTION INCLUDES

- A. This section includes, but is not limited to, all of the design, shop drawings, materials, labor, construction, placement and finishing of all regular reinforced concrete necessary to complete the project.

1.3 REFERENCES

- A. All work shall conform to the latest edition of the following, unless otherwise noted or specified on the structural drawings or in these specifications.

1. ACI 301, "Specifications for Structural Concrete Buildings"
2. ACI 318, "Building Code Requirements for Reinforced Concrete"
3. ACI 247, "Recommended Practice for Concrete Formwork"
4. CRSI MSP-2, "Manual of Standard Practice" ICBO, "Uniform Building Code."
5. ASTM E 1745-11 Standard Specification for Plastic Water Vapor Retarders Used in Contact with Soil or Granular Fill under Concrete Slabs.
6. ASTM E 154-08 Standard Test Methods for Water Vapor Retarders Used in Contact with Earth under Concrete Slabs.
7. ASTM E 96-15 Standard Test Methods for Water Vapor Transmission of Materials
8. ASTM E 1643-11 Standard Practice for Installation of Water Vapor \square in Contact with Earth or Granular Fill Under Concrete Slabs
9. American Concrete Institute (ACI)

1.4 STORAGE OF MATERIALS

- A. Cement and aggregates shall be stored in such a manner as to prevent their deterioration or the intrusion of foreign matter. Any material which has deteriorated or which has been damaged shall not be used for concrete and shall be promptly removed from the site.

1.5 SUBMITTALS

- A. Design Mixes: For each concrete mix. Include alternate mix designs when characteristic of materials, project conditions, weather, test results, or other circumstances warrant adjustments. Indicate amounts of mix water to be withheld for later addition at Project site.
- B. Recycled Content: Provide submittals for materials with recycled content in accordance with SECTION 01 8113, SUSTAINABLE BUILDING REQUIREMENTS
- C. Low/ Emitting Materials/VOC Content: Provide submittals for low emitting materials in accordance with SECTION 01 8113, SUSTAINABLE BUILDING REQUIREMENTS
- D. Regional Materials Extracted, Processed and Manufactured within 500 Miles of the Project Site: Provide submittals for regional materials in accordance with SECTION 01 8113, SUSTAINABLE BUILDING REQUIREMENTS

1.6 TESTS

- A. Slump: Standard slump tests as described in ASTM C143 (Modification: Sampling of concrete for slump test shall be taken after at least 1/4 cubic yard of concrete has been discharged) will be made periodically during the placement of concrete by the testing laboratory to ensure that the slump for which the concrete has been designed is met. Slump test shall be performed prior to the addition of superplasticizer or other site workability additive. Any concrete batch tested and showing slumps exceeding the specified tolerance shall be rejected. Any concrete placed prior to slump testing shall be the sole responsibility of the Contractor and shall be rejected should the subsequent slump test of the batch in question indicate that the slump tolerance is being exceeded. All rejected concrete shall be promptly removed and properly replaced. All costs resulting therefrom shall be borne by the Contractor.
- B. Compressive Strength: During the progress of the work compressive strength tests of concrete shall be made in accordance with ASTM C39 by a testing laboratory hired by the Contractor. 6-inch x 12-inch cylinders shall be taken from each major pour at the rate of 4 cylinders for each 100 cubic yards. Notwithstanding this established rate, take concrete cylinders in whatever quantity is deemed fit and/or necessary from any concrete pour. For pours of less than 15 cubic yards not used for structural purposes, cylinders may be omitted.
- C. The testing laboratory will make and identify all test cylinders. The Contractor shall provide assistance to the laboratory technician to make the cylinders. The testing laboratory shall provide the labor and equipment to deliver the cylinders to the testing laboratory.
- D. Cost of all concrete testing will be borne by the Contractor.
- E. The standard age for testing the cylinders shall be 28 days. However, 48 hours, 72 hours and 7-day tests may be made to determine concrete strength and for indication of final 28-day strengths.

- F. All cylinders shall be made and cured in accordance with ASTM C31.
- G. In all cases where the strength of any group of cylinders falls below the minimum compressive strength specified, the Architect shall have the right to require that test specimens be cut from the structure. Specimens shall be selected by the Architect from the location in the structure represented by the test specimen or specimens which failed. Specimens shall be secured, prepared, and tested in accordance with ASTM C42 within a period of 60 days after placing the concrete. The testing shall be done by a laboratory approved by the Architect. Concrete in the area represented by the core tests will be considered structurally adequate if the average strength of 3 cores is no less than 85 percent and the strength of a single core is no less than 75 percent of the 28-days strength specified. Should laboratory analysis indicate, however, that the proper concrete mix has not been used by the Contractor, all such concrete placed using the improper mix shall be subject to rejection. The cost of cutting specimens from the structure, patching the resulting holes, and making the analysis, including laboratory and consultation costs, shall be borne by the Contractor.
- H. The holes from which the cored samples are taken shall be packed solid with no-slump concrete proportioned in accordance with the ACI 211.3 "Standard Practice for Selecting Proportions of No-Slump Concrete". The patching concrete shall have an "extremely dry" consistency and the same design strength as the specified concrete.
- I. If the strength of the specimens cut from the structure falls below the requirements stipulated above, the Architect shall have the right to require any and all defective concrete to be replaced, and all costs resulting therefrom shall be borne by the Contractor.
- J. Slab protection and slab moisture testing requirements are stated in Division 1.
- K. Slab moisture testing procedures are stated in Division 1.
- L. The flatness and levelness of floors shall be carefully controlled and the tolerances shall be measured by the F-Number system of Paragraph 4.5.6 and 4.5.6.1 of ACI 117. Furnish an approved floor profilograph or other equipment capable of measuring the floor profilograph or other levelness (FL) number in accordance with ASTM E 1155M ASTM E 155. Perform the tolerance measurements within 72 hours after floor slab construction while being observed by the Architect. The tolerances of surfaces beyond the limits of ASTM E 1155M ASTM E 1155 (the areas within 600 mm 24 inches of embedment's and construction joints) will be acceptable to the Architect. Tolerances of the following areas shall meet the requirements for the listed surfaces as specified in paragraphs 4.5.6 and 4.5.6.1 of ACI 117. Contractor to submit documentation to the Architect confirming floor was constructed within levelness tolerances.

1.7 RELATED REQUIREMENTS

A. SECTION 01 7419 – CONSTRUCTION WASTE MANAGEMENT

B. SECTION 01 8113 – SUSTAINABLE BUILDING REQUIREMENTS

PART 2- PRODUCTS

2.1 MATERIALS

- A. Portland Cement shall conform to the requirements of ASTM C150, Type I or II for all concrete work.
- B. Concrete Aggregates:
 - 1. Fine Aggregates shall be calcareous or basalt sands, or a combination thereof. They shall meet the grading requirements of ASTM C33 unless the concrete producer can provide past data that shows that a proposed non- conforming gradation will produce concrete with the required strength and suitable workability.
 - 2. If manufactured sands are used in the concrete mix, the Contractor may select and use a water-reducing and/or an air-entraining admixture as specified hereinafter to provide satisfactory workability in the concrete. The cement content of a mix shall be as specified hereinafter, and the use of an admixture shall in no way result in the reduction of the cement factor.
 - 3. Coarse Aggregates shall be crushed close- grained, blue lava rock meeting the grading requirements of sizes 57 or 67 (ASTM D448) or both. The maximum size of aggregate shall not be larger than 1/5 of the narrowest dimensions between sides of the forms of the member for which the concrete is to be used nor larger than 3/4 of the minimum clear spacing between individual reinforcing bars or bundles of bars.
- C. Water used in mixing concrete shall be clean and free from injurious amounts of oils, acids, alkalis, salts, organic materials or other substances that may be deleterious to concrete or reinforcement. Non-potable water shall not be used.
- D. Non-Slip Grit shall be an abrasive aggregate of silicon carbide or aluminum oxide.
- E. Admixture, if used, shall conform to ASTM C494 or ASTM C260 and shall be mixed in proper amount in accordance with directions of manufacturer. Admixtures, if used for concrete for slabs-on-grade with the exception of sidewalks, shall be site additive type for addition to the mix after slump test.
- F. Curing Compound shall be compatible with the floor finish to be applied.
- G. Pervious Sheeting shall be burlap or other acceptable absorbent material, free from substances that will harm the concrete or cause discoloration.
- H. "Keyed Kold Joint" shall be galvanized.
- I. Cementitious Coatings shall be cement based polymer modified cement finishing materials ("Pro-Finish" by Bonded Materials Company, "Polycoat" by Tremcrete Systems Incorporated, "Durus" by Durus High Tech Cement, or pre-approved equal).

- J. Concrete anchor inserts shall be manufactured by Unistrut or equal.
- K. Expansion Joint Filler: A pre-molded materials of ½ thickness, unless otherwise noted, composed of fiber board impregnated with asphalt conforming to ASTM D 1751.
- L. Joint sealing compound shall be a polysulfide or urethane compound conforming to ASTM C 920 or other approved equal, compatible with the floor finish to be applied. Color shall be approved by the Architect.
- M. Slab Protection Sheets: Water repellant, vapor permeable sheets.
- N. Vapor Retarder: ASTM E 1745, Class A except as modified in Subparagraph 1. Below, nylon- or polyester-cord-reinforced three-ply high-density polyethylene sheet or one-ply extruded polyolefin sheet; 15 mil minimum thickness. Compliance to ASTM standards shall be confirmed by an independent testing agency.
 - 1. Permeance Rating: ASTM E96, ASTM E154 not exceeding 0.03 gr/ft²/hr.

PART 3 - EXECUTION

3.1 DESIGN OF CONCRETE MIXES

- A. Ingredients for concrete shall be Portland cement, fine and coarse aggregates and water.
- B. Concrete shall be designed so that the concrete materials will not segregate nor cause excessive bleeding. Slump shall be 4 inches. A tolerance of 1 inch above the indicated slump will be allowed for individual batches.

3.2 CONCRETE RAMPS

For concrete used in ramps or other sloping construction, the slump tolerance shall be waived.

3.3 CONCRETE COMPRESSIVE STRENGTH

- A. For each class of concrete up to Class 5,000, the test results for twenty eight (28) day compressive strength shall meet the following requirements:

28-Day-Compressive-Strength-Test-Results

Class	Min. Average For 3 Cylinders, psi	Min. Average for 2 Cylinders, psi
5,000	5,000	4,750
4,500	4,500	4,250
4,000	4,000	3,750

3,500	3,500	3,250
3,000	3,000	2,750

- B. Slabs-on-grade shall have a maximum water-cement-ratio of 0.45 or as indicated and shall contain 4 percent to 1-1/2 percent entrained air.
- C. For concrete designed for specified strengths in excess of 4,000 psi and/or containing admixtures other than those used exclusively for the purpose of entraining air, mixture proportions to provide the desired characteristics shall be developed in accordance with Sections 5.2, 5.3 and 5.4 of ACI 318-05.
- D. The Contractor shall submit for approval by the Architect the mixes he intends to use at least fourteen (14) days before the actual concrete placing operations.
- E. The Contractor shall use only approved mixes.
- F. Concrete strength for various elements shall be as indicated.
- G. For slabs-on-grade, the contractor may use a mix design other than that indicated provided the vapor emission rate is equal or less than 3 lbs. per 1000 s.f. at the time of the finished flooring installation. If the vapor emission rate exceeds this limit, the Contractor shall be responsible to take the measures necessary to reduce the emission to an acceptable level without delaying the project.

3.4 JOINTS

- A. Construction joints shall be provided as detailed at locations indicated on the plans. Construction joints not shown on the plans shall be so made as to least impair the strength of the structure and shall be approved by the Architect. In general, they shall be located near the middle of the spans of slabs, beams and girders unless a beam intersects a girder at this point, in which case the construction joints in the girders shall be offset a distance equal to twice the width of the beam. Joints in columns and walls shall be at the underside of floors, slabs, beams or girders and at the top of footings or floor slabs. Beams, girders, brackets, column capitals, haunches and drop panels shall be placed at the same time as slabs. Joints shall be perpendicular to the main reinforcement.
- B. All reinforcing steel shall be continuous across construction joints. Keys and/or inclined dowels shall be provided as required. Longitudinal keys at least 1-1/2 inch deep shall be provided in all joints in walls and between walls and slabs or footings. Unless otherwise indicated, joints shall be sealed with joint sealing compound.
- C. Expansion joints shall be provided as detailed at locations indicated on the plans. Reinforcement or other embedded metal items bonded to the concrete (except dowels in floors or walls bonded on only one side of joint) shall not be permitted to extend continuously through any expansion joint. Joints shall be sealed with expansion joint filler and sealing compound at least 3/8 inch deep.

- D. Contraction/control joints shall be provided where shown or called for on the plans and shall be 1/4 the depth of the slab or a minimum of 1 inch deep. Unless otherwise indicated on the plans, joints may either be tooled, formed-in-place or sawcut. When saw-cut joints are provided, cutting shall be timed properly with the set of the concrete so that it is firm enough not to be torn or damaged by the cutting blade and before random shrinkage cracking can form in the slab. In any case, cutting shall be completed not later than 12 hours after the concrete is placed and finished. Unless otherwise indicated on the plans, joints shall be sealed with joint sealing compound.

3.5 MIXING CONCRETE

- A. All concrete throughout shall be either job or plant mixture in an approved type of power operated mixer that will ensure uniformity and homogeneity of the concrete produced. The Contractor shall provide a sufficient number of mixers to continuously carry on the work.
- B. Mixing at jobsite shall be done in accordance with ACI 304 and as follows:
1. Concrete shall be thoroughly mixed in a batch mixer of an approved type and size which will insure a uniform distribution of materials throughout the mass. The machine shall have a control device to prevent materials from being discharged until they have been mixed for the specified minimum time.
 2. The entire contents of the drum shall be discharged before materials of the succeeding batch are placed therein. No mixer shall be used which has a rated capacity of less than a 1-sack batch and no mixer shall be charged in excess of its rated capacity.
 3. The first batch of materials placed in the mixer after the machine has been cleaned shall contain a sufficient excess of cement, sand and water to coat the inside of the drum without reducing the required mortar content of the mix. Upon cessation of mixing, the mixer shall be thoroughly cleaned.
 4. Ready Mixed and Mixed-In-Transit Concrete shall be mixed to conform to the provisions of ASTM C94 and as follows:
 5. The plant shall have sufficient capacity and transportation equipment to deliver concrete at the rate desired. The interval between batches for a pour shall not exceed 30 minutes.
 6. The time elapsed between the introduction of the mixing water to the cement and aggregates or the cement to the aggregates, and the placing of concrete in its final position shall not exceed 90 minutes.
 7. In hot weather (more than 90 degrees fahrenheit ambient temperature) or under conditions contributing to quick stiffening of the concrete, the elapsed time in item 6 above shall not exceed 60 minutes, if no retarding admixture is used. If an ASTM C494 Type B or D admixture is added to the concrete, the elapsed time in item 6 above shall remain at 90 minutes.

8. Concrete shall be mixed only in such quantity as is required for immediate use. No retempering will be permitted and concrete that has started to harden shall be discarded and promptly removed from the job.
9. Admixtures conforming to Paragraph 2.1 may be used in the concrete as recommended by the supplier and approved by the Architect.
10. Hand mixing of concrete will not be permitted except to make up shortages for fence post footings, sidewalks, thresholds, flagpole foundations, curbs and gutters, and thrust blocks.

3.6 PLACING CONCRETE

- A. No concrete shall be placed in the absence of the Special Inspector or his representative who shall be given one day advance notice of starting time of concrete pour.
- B. Place no concrete until foundation, forms, reinforcing steel, pipes, conduits, sleeves, hangers, anchors, inserts, waterproofing, termite treatment and other work required to be built into or placed ahead of concrete placing have been inspected and approved by the Special Inspector. Concrete placed without such notice and approval shall be rejected.
- C. Preparation
 1. All sawdust, chips and other construction debris and extraneous matter shall be removed from interior of forms. Struts, stays, bracing, or blocking serving temporarily to hold forms in correct shape or alignment shall be removed when the concrete placing has reached an elevation rendering their services unnecessary.
 2. Concrete shall be placed upon clean, damp surfaces with no free water, or upon properly compacted fills but never upon soft mud or dry, porous earth. Before pouring footings or foundations, bottoms of excavations shall be properly leveled off and tamped.
 3. Before depositing new concrete on or against concrete which has set, all accumulations of mortar splashed upon reinforcing steel and the surfaces of forms shall be removed and the forms shall be retightened. The surfaces of previously set concrete shall be thoroughly roughened and cleaned of all foreign matter and laitance, saturated with water and slushed with a coat of cement grout. New concrete shall be placed before the grout has attained its initial set.
- D. Conveying
 1. Concrete shall be conveyed from mixer to forms as rapidly as practicable by methods that will prevent segregation.
 2. Concrete shall be deposited as nearly as practicable in its final position. Extensive spading as a means of transportation shall be avoided and in no case shall vibrators be used to transport concrete inside the forms.
 3. Open troughs and chutes shall have a slope not to exceed 1 vertical to 2 horizontal and not less than 1 vertical to 3 horizontal. Chutes more than

20 ft. long and chutes not meeting the slope requirements may be used provided they discharge into a hopper before distribution.

4. The concrete shall not be allowed to drop freely more than 6 feet except where specifically authorized by the Architect. When placing operations would involve the dropping of concrete from a height of more than 6 feet, it shall be conveyed through pipes or flexible drop chutes.
5. If any appreciable segregation occurs through the conveying methods employed, their use shall be ordered discontinued by the Owner's Representative and some other satisfactory method of placing concrete shall be used.
6. All chutes, troughs, pipes and other means of conveyances shall be kept clean and free from coatings of hardened cement or concrete by thoroughly cleaning with water and chipping after each pour. Water used for flushing shall be discharged away from the vicinity of the concrete or forms already in place.

E. Depositing

1. Unless adequate protection is provided, concrete shall not be placed during rain. Rainwater shall not be allowed to increase the mixing water nor to damage the surface finish. Fresh concrete that has been deposited but has not attained its initial set shall be protected in the event of rain.
2. Concrete shall be placed so as to avoid segregation of the materials and the displacement of the reinforcing. As nearly as practicable, the concrete shall be dropped vertically without hitting reinforcement, sleeves or forms into its final position in order to avoid separation of coarse aggregates from concrete. After the initial set of concrete, the forms shall not be jarred and no strain shall be placed on the projecting reinforcing.
3. Formed concrete shall be deposited in horizontal layers not deeper than 2 feet avoiding inclined layers and inclined construction joints. The depth of layers shall be shallow enough so that the succeeding layer will be placed before the previous layer has attained its initial set.
4. Concrete shall not be allowed nor shall it be caused to flow horizontally or on slopes in the form. Concrete placing on a slope shall begin at the lower end of the slope and progress upward.

F. Construction joints shall be made only where located on the plans unless approved otherwise by the Architect. Pours shall be planned to provide for the continuous placing of concrete from one construction joint to another. The face edges of all joints that are exposed to view shall be carefully finished true to line and elevation.

G. In slab construction, placing of the concrete shall be started at the far end of the work so that each batch will be dumped against previously placed concrete, not away from it. The concrete shall not be dumped in separate piles and the piles then leveled and worked together. For floor slabs on earth,

additional requirements in Paragraph 3.07 shall apply.

H. Beams and girders shall not be placed at the same time as the supporting columns or walls. At least 2 hours must elapse after columns or walls are placed before placing beams and girders supported thereon.

- I. Columns shall be placed in approximately 4-foot sections, with each section being vibrated and compacted as placed.
- J. In placing a deck of slabs and beams, the beams shall be placed first up to the height of the bottom of the floor slab. This placement shall extend in bay modules and end at the midspan, midpoint between columns. The length of this placement shall be determined by the time it takes to return to the slab and the top layer of the beams before the top of the first pour has started to harden and form a cold joint.
- K. If depositing of concrete must be stopped short of a full placement, it shall be leveled to a horizontal plane or stopped against a vertical bulkhead. Such bulkhead or horizontal plane shall be located only as approved by the Architect.
- L. Compaction
 - 1. All concrete shall be consolidated by vibration so that the concrete is thoroughly worked around the reinforcement, around embedded items, and into corners of forms, eliminating all air or stone pockets which may cause honeycombing, pitting, or planes of weakness. All compaction shall be done by use of high frequency internal vibrators. Where the vibrator cannot be inserted into the concrete, compaction shall be done by spading, rodding or forking.
 - 2. Frequency of vibrator shall be not less than 7,000 impulses per minute. The Contractor shall provide a sufficient number of vibrators to properly consolidate all concrete immediately after placing. At least one standby vibrator shall be on hand at all times during placement of the concrete.
 - 3. Vibration shall not be applied through contact with reinforcement of forms. Vibration shall penetrate previously deposited concrete sufficiently to prevent pockets or voids or construction joints from occurring between pours, but must not be applied to concrete which has set up sufficiently to cease to be plastic under vibration.

3.7 FLOOR SLABS ON EARTH

- A. Concrete floor slabs on grade, with the exception of sidewalks, shall be placed directly over a vapor barrier, and a minimum of 4 inches of gravel cushion fill (ASTM C33, No. 67). The edges of the vapor barrier shall be lapped and sealed as required by vapor barrier manufacturer to assure barrier performance. For slabs which will receive vehicular traffic, the slab shall be placed over a 6-inch layer of gravel cushion fill. The gravel cushion fill shall consist of crushed basaltic aggregate compacted to a minimum of 95 percent relative compaction.
 - 1. Repair holes in the vapor barrier created by screeds, formwork or other temporary construction prior to coverage with concrete.

- B. All earth-supported slabs, with the exception of sidewalks, shall be reinforced with a minimum of Grade 60 #3 steel reinforcing bars at 15 inches o.c. each way unless otherwise shown or called for on the plans. Plain bar dowels shall be provided as detailed for construction and expansion joints. Such dowels shall be wrapped or greased on one side of the joints to prevent bonding.
- C. Care shall be taken in handling and placing the reinforcement. Reinforcement shall be positively set to the level required within the slab(s) as indicated on the plans.
- D. Floor slabs shall be placed in alternate panels, long strip pattern, following construction or expansion joints. Narrow contraction/control joints shall be provided transverse to the length of the cast strips. There shall be an interval of at least 2 days between the placing of the initial panels and that of the adjacent ones. "Keyed Kold Joint" may be used in lieu of placement in alternate panels in areas where floor covering is specified provided all shrinkage cracks are sealed prior to installation of floor covering. As an option, slabs may be placed in alternate panel checkerboard pattern. Where slabs are placed in a checkerboard pattern, no panel shall be placed in excess of 500 square feet in area nor exceed 32 feet in its longest dimension.
- E. A bond-break filler shall be provided where edge of slab abuts any vertical surface and where indicated on plans. Width of filler strips shall equal depth of floor slab.

Prior to concrete placement, small mounds of concrete shall be placed at random rebar intersections during the pour to provide support in addition to the chairs or blocks. Reinforcing bars shall be lifted as necessary to ensure proper placement within the slab.

3.8 CONCRETE SIDEWALKS ON GROUND

- A. Concrete walks shall be of one lift construction, 4 inches in thickness with thickened edge, and reinforced with synthetic fiber reinforcement. Keys and /or plain bar dowels shall be provided as detailed for construction and expansion joints. Such dowels shall be wrapped or greased on one side of the joint to prevent bonding.
- B. Expansion joints shall be provided as detailed, not more than 32 feet apart; at junctions with curbs; where walks abut buildings, platforms and other fixed structures; and elsewhere as shown in the plans. Reinforcement or other embedded metal items bonded to the concrete (except dowels in floors or walls bonded on only one side of joint) shall not be permitted to extend continuously through any expansion joint. Joints shall be sealed with expansion joint filler and sealing compound at least 3/8 inch deep.
- C. Contraction/control joints shall be provided where shown on the plans and shall be 1/4 the depth of the slab or a minimum of 1 inch deep. Unless otherwise indicated on the plans, joints may either be tooled, formed-in-place or sawcut. When saw-cut joints are provided, cutting shall be timed properly with the set of the concrete so that it is firm enough not to be torn or damaged

by the cutting blade and before random shrinkage cracking can form in the slab. In any case, cutting shall be completed not later than 12 hours after the concrete is placed and finished. Unless otherwise indicated on the plans, joints shall be sealed with joint sealing compound.

- D. Concrete shall be tamped and screeded true to grade and section, sufficient mortar brought to the surface for finishing, and the required finish given as specified hereinafter before the concrete sets. Steps in connection with walks shall have same finish as walks. All edges except for those at saw-cut control joints shall be rounded to 1/8 inch radius. Cross slope for sloped or crowned walks shall be 5/32 inch per foot. No pedestrian traffic shall be permitted on concrete walks for a period of three (3) days after placing.
- E. Walks shall be finished as indicated hereinafter and scored where shown or called for on the plans.

3.9 REPAIR OF DEFECTS

- A. After forms have been removed, any concrete which is not constructed as shown on the plans or is out of alignment or level beyond required tolerances or which shows a defective surface which in the opinion of the Architect cannot be properly repaired or patched shall be removed.
 - 1. Where cast-in-place concrete which is exposed to view or designated architectural requires repairing or patching, the texture of the surface of such repair or patch shall closely match that of the surrounding surface. If the concrete is to remain unpainted, the surface color shall also be closely matched to that of the surrounding surface.
 - 2. All tie holes and all repairable defective areas shall be patched immediately after form removal as follows:
 - 3. All honeycombed concrete shall be chipped out to sound concrete but in no case to a depth of less than 1 inch. If possible, edges of the chipped-out areas shall be undercut.
 - 4. Rock pockets, form tie holes, deep holes not too large in area, other holes with relatively high ratio of depth to area, and similarly confined areas shall be dry packed.
 - 5. After the area to be patched has been thoroughly cleaned and dampened, mortar, which shall consist of 1 part cement, 2-1/2 parts sand passing a #16 screen, and only enough water to produce a mortar that will stick together upon being molded into a ball by slight pressure of the hands, shall be placed in the holes in layers having a compacted thickness of about 3/8 inch. Each such layer shall be solidly rammed over its entire surface using a hardwood stick and a hammer.
 - 6. Shallow depressions where lateral restraint cannot be obtained, voids behind reinforcement, and holes extending through concrete sections shall be patched using a commercially prepared bonding agent, a stiff mortar mix of 1 part cement and not more than 2-1/2 parts sand.

7. For filling holes in exterior surfaces, an epoxy-bonding agent shall be used. Application of the bonding agent shall be in strict conformance with the manufacturer's instructions.
8. An epoxy-and-sand mixture may be used in lieu of the mortar-and-bonding agent mixture for any of the patching above. The preparation of the surface to receive the patch, as well as the mixture proportions of the epoxy-and-sand, shall be in strict conformance with the manufacturer's instructions.
9. Except for concrete required to be removed under Paragraph 3.9A, any concrete which is not constructed as shown on the plans or is out of alignment and/or level beyond allowable tolerances may be patched using an epoxy-and-sand mixture.
10. The proportions of the mix and the preparation of the surface to receive the patch shall be in strict conformance with the manufacturer's instructions except as or unless otherwise specified herein. The minimum thickness of the patch shall be 1/4 inch. No "feathering" to a lesser thickness will be permitted.
11. Misalignment which requires correction more than 1 inch thickness shall be repaired in the following manner:
 12. The surface of the affected area shall be chipped, etched, or otherwise cleaned and roughened to provide a sound surface for bonding;
 13. Concrete nails or other fasteners which can provide positive mechanical bonding of the patch shall be set into the surface at about 18 inches o.c. in all directions with a minimum of 2 rows;
 14. Wire mesh reinforcement as approved by the Architect shall be installed in those portions of the patch which exceed 2-inch thickness;
 15. A bonding agent suitable for use in the repair location (epoxy required for exterior use) shall be applied over the entire surface to be patched;
 16. Formwork to the true lines called for shall be installed over the area requiring the patch; and
 17. Concrete or grout with aggregate sized appropriately for the cavity and which will provide strength equivalent to that of the base surface shall be placed in the form, properly compacted and suitably cured.

3.10 CURING AND PROTECTION

- A. All concrete shall be cured for a period of not less than seven (7) days. During this curing period, the concrete shall be maintained with minimal moisture loss at a relatively constant temperature. Fresh concrete shall be protected from heavy rains, flowing water, mechanical injury, and injurious action of the sun. Acceptable curing methods:

1. Slabs-on-grade: Water cure only.
 2. Other slabs: Cure by one of the methods listed below. Curing method selected must be compatible with the finish to be applied to the concrete.
- B. Curing shall immediately follow the finishing operation.
- C. To promote drying of slabs on grade to receive floor finish and avoid moisture related flooring problems, once drying of the slab has started, if not sheltered by roofs or other floors it shall be protected by slab protection sheets from getting wet for a minimum of ninety (90) days immediately prior to the placement of the floor finish. If the slab cannot be adequately protected, mechanical drying or other means shall be employed to reduce the vapor emission level to 3 lbs. per 1000 s.f. or less as tested in accordance with Section 01450 prior to placement of the floor finish.
- D. Water Curing - If cured with water, concrete shall be kept wet by mechanical sprinklers, by ponding, or by any other method which will keep the surfaces continuously wet.
- E. Pervious Sheeting - Overlap sheeting edges approximately 6 inches and keep sheets continuously wet throughout the curing period.
- F. Curing Compounds - Curing compounds used on concrete surfaces that are to receive floor covering, paint or colored finish shall be as recommended by the manufacturer to be compatible with the applied finish.
- G. The Contractor shall submit to the Architect a letter certifying that the curing compound is compatible with the applied finish. Application shall be in accordance with the manufacturer's recommendations. If curing, sealing or other compounds are used which are incompatible with applied finish, such compound shall be thoroughly removed by grinding with a terrazzo grinder or other means approved by the Architect.

3.11 CONCRETE FOR ELECTRICAL WORK

- A. Unless otherwise noted on plans, concrete for handholes and manholes shall be 3,000 psi strength at twenty eight (28) days. Concrete for encased ducts shall be Class 2,500. Maximum size of aggregates for concrete encased duct shall be 3/4 inch.
- B. All ducts shall have a minimum cover of 3 inches of concrete or the thickness indicated by the electrical specifications or drawings whichever is greater. Spacers shall be used for placing ducts and for rigidly holding the ducts during the concrete pour. Provide minimum earth cover of 18 inches over top of concrete encasement unless otherwise shown on plans.
- C. The encased section of ducts to which a future connection is to be made shall end with a coupling. An unencased 1-foot section of duct and end cap shall constitute the terminus of such ducts.

3.12 CONCRETE FOR DRAINAGE, SEWER AND PLUMBING SYSTEMS

- A. Unless otherwise noted on plans, all concrete required for construction of manholes, catch basins, foot baths, valve boxes, etc., which are required for plumbing and drainage installations shall be Class 3,000.
- B. Normal weight concrete containing calcareous coarse aggregates shall not be used in sewerage structures and/or components.
- C. Sewer manholes shall be constructed in accordance with civil drawings and specifications.

3.13 CLEAN UP

- A. Contractor shall clean up all concrete and cement materials, equipment and debris upon completion of any portion of the concrete work and upon completion of the entire concrete and related work.

END OF SECTION

SECTION 03 3800

POST-TENSIONED CONCRETE

PART 1 GENERAL

1.01 SUMMARY

- A. This section includes, but not limited to:
 - 1. All of the design, shop drawings, materials, labor, construction, placement, and stressing of all post-tensioned concrete necessary to complete the project.
- B. Related Documents:
 - 1. The General Condition and Provisions of the Contract, including Special and Supplementary Conditions, and applicable portions of General Requirements of this Specification apply to the work specified in this Section.
 - 2. Section 03 3000 – Cast-in-Place Concrete
- C. Work Excluded:
 - 1. This section excludes mild reinforcing steel, embedded items, insulation, and all other items which are covered by other sections of these specifications.
- D. References:
 - 1. All work shall conform to the latest edition of the following, unless otherwise noted or specified on the structural drawings or in these specifications.
 - a. ACI 301, "Specifications for Structural Concrete Buildings"
 - b. ACI 318, "Building Code Requirements for Reinforced Concrete"
 - c. ACI 347, "Recommended Practice for Concrete Formwork"
 - d. ACI 423.3R, "Recommendations for Concrete Members Pre-stressed with Unbonded Tendons"
 - e. ASTM A416, "Specification for Uncoated Seven-Wire Stress-Relieved Strand for Pre-stressed Concrete," including the supplement "Low Relaxation Strand"
 - f. CRSI MSP-2, "Manual of Standard Practice"
 - g. PTI, "Guide Specifications for Post-Tensioning Materials"
 - h. PTI, "Performance Specification for Corrosion Preventive Coating"
 - i. PTI, "Specification for Unbonded Single Strand Tendons"
 - j. PTI, "Field Procedures Manual for Unbonded Single Strand Tendons"
 - k. UBC, "Uniform Building Code"
- E. Coordination with Other Trades: All post-tensioned concrete work shall be coordinated with trades impacted by this work.

1.02 SUBMITTALS

- A. Shop Drawings: Provide complete shop drawings for review a minimum of 14 days prior to placement. Review of the shop drawings does not relieve the contractor from complying with the contract documents. The shop drawings shall include the following information:

1. Dimensions to each tendon, including horizontal curvature at openings and anchorages, and to slab edges, stressing locations, and all anchorages, type of anchorage enclosures, anchoring devices, forms, blockouts, and inserts.
 2. Tendon profiles and chair heights, and support bar spacing.
 3. Details of reinforcement where interference with tendons may occur.
 4. Required elongations after anchorage for each tendon.
 5. Pre-stressing procedure, to include:
 - a. Maximum jacking force (and corresponding gauge pressure).
 - b. Anchorage force (and corresponding gauge pressure).
 - c. Certified jack-pump-gauge calibrations.
 - d. Sequencing of stressing.
 6. Hawaii licensed engineer sealed calculations to account for force loss due to friction and other losses, as required on the structural drawings.
- B. Mill Certificates: Shall be provided for all tendons, to include:
1. Heat number and identification.
 2. Diameter and net area of tendon.
 3. Type of material and modulus of elasticity.
 4. Chemical analysis.
 5. Tensile strength, and yield strength at 1% elongation.
 6. Elongation at failure.
- C. Additional information: Submit the following information to Architect and testing laboratory:
1. Gauge calibration chart for each set of stressing equipment.
 2. Gauge calibration curve, dated just prior to use of equipment.
 3. Test tendon stressing record.
 4. Field stressing procedure.
 5. Stress-strain curves for each heat, by an independent laboratory.
 6. Tendon schedule.
 7. Survey records: Submit three copies of survey result records as required under Article "Field Quality Control" herein.

1.03 QUALITY ASSURANCE

- A. All work shall conform to requirements of ACI 301, ACI 318, and CRSI MSP-2, in addition to the requirements shown on the drawings or in these specifications.
- B. The testing laboratory responsible for testing tendons shall have at least two years of experience in sampling and testing of pre-stressed assemblies of similar nature and shall be under the direct supervision of a registered civil engineer.
- C. All post-tensioning work shall be performed by an organization that has successfully completed at least three previous projects of a similar nature. All work shall be performed under the supervision of an individual with similar experience. That person shall exercise close check and rigid control of all operations necessary to complete the work.

- D. All post-tensioning reinforcement shall have special inspection per the Uniform Building Code. The special inspector shall provide reports for the Architect's review prior to placement of concrete. Any errors or discrepancies shall be corrected prior to placement of concrete. This check shall not relieve the contractor from complying with the contract documents.
- E. The special inspector shall prepare field reports on a form acceptable to the Architect. The reports shall include tendon elongations and gauge pressures. The reports shall be submitted immediately to the Architect for review.

1.04 DELIVERY, STORAGE, AND HANDLING

- A. All materials necessary to complete the post-tensioning work shall be delivered in a timely manner to facilitate the overall construction schedule.
- B. Tendons within each group of the same type of member shall be of the same heat, where practicable. All tendons shall be assigned a heat number and tagged accordingly.
- C. Tendons shall be protected from damage and moisture during shipping and storage. Tendons with damage or corrosion shall be rejected.
- D. Deliver strand or pre-fabricated tendons in coils of adequate diameter to prevent damage or overstressing, each coil securely tied and tagged for identification.

1.05 SEQUENCING AND SCHEDULING

- A. Post-tensioning reinforcement: All post-tensioning reinforcement installation shall be complete per shop drawings which has been reviewed by the Architect prior to placement of any concrete.

PART 2 PRODUCTS

2.01 MATERIAL

- A. Post-Tensioning Tendons: Shall be uncoated, seven-wire stress-relieved type strands conforming to ASTM A416, grade 270. All strands shall be manufactured by a single source.
- B. Sheathing:
 - 1. Shall be seamless and extruded, continuous and watertight over entire length of an individual tendon.
 - 2. Shall have sufficient strength to prevent unrepairable damage or deterioration during shipping, storage, installation, and concrete placement.
 - 3. Sheathing shall be chemically stable, and shall resist softening or hardening during its service life.

C. Tendon Grease:

1. Shall be lithium-based, and shall contain corrosion inhibitors and wetting agents.
2. Shall conform to the requirements of PTI "Performance Specification for Corrosion Preventative Coating."
3. Shall completely fill the void between the tendon and sheathing.

D. Anchorages and Wedges:

1. Shall meet the requirements of ACI 301 Article 15.2.
2. Shall be sized in accordance with ACI 301.
3. Shall develop the tensile strength of the tendon without exceeding anticipated set.
4. Shall not allow anchor slip of more than 1/8-inch during tendon stressing.
5. Shall be designed so that strand wire will not kink, neck down, or otherwise be damaged.

E. Couplings:

1. Shall meet the requirements of ACI 301 Article 15.2.2.
2. Shall not be used unless specifically noted or reviewed by the Architect.
3. Shall develop the tendon tensile strength without exceeding anticipated set.
4. Shall not reduce the elongation of the tendon at rupture.
5. Shall be enclosed in housing of sufficient length to allow anticipated movement during stressing of the tendon.
6. Shall be protected with a corrosion preventative material.

F. Distribution Plates: Provide welded or cast steel bearing assemblies to support and distribute load from anchoring devices. Loaded bending stresses shall not exceed 20 Ksi for structural steel or 15 Ksi for cast steel except as test data may indicate that higher stresses are satisfactory, and corresponding higher stresses may be permitted for higher strength steel; Use structural steel conforming to ASTM A36 and cast steel conforming to ASTM A148. Bearing plates, distribution plates, anchor bolts, bearing bars, and the like shall be hot-dip galvanized after fabrication where these items are exposed and unprotected from the weather. Welding shall be inspected and approved before galvanizing.

G. Recesses: Provide for the concrete or grout covering over strand end connections.

H. Grouting: Provide as indicated or specified using non-shrink grout, Master Builders "Embeco", Grace "Vibrofoil", or equal.

PART 3 EXECUTION

3.01 TENSIONING CRITERIA

A. Maximum Stress (Jacking Stress): To overcome stressing friction, tendons may be temporarily stressed to a tension higher than initial stress. In no case shall temporary stress exceed 80% of guaranteed ultimate strength of the strand.

- B. Stressing Friction: Calculate anticipated stressing friction using, as a basis for calculations, results of field experience and field tests for tendons of similar length. Do not consider this to be actual stressing friction, which must be measured in the field. It is anticipated friction which must be known to properly select the initial stress as specified below.
- C. Initial Stress (Anchoring Stress): Not exceeding 70% of the guaranteed ultimate tensile strength of strand, and not exceeding maximum allowable stress (jacking stress) minus anticipated stressing friction, whichever is the least.
- D. Final Stress (Design Stress): The stress remaining after all losses and is the stress to be used in calculating the minimum working forces as indicated on the Drawings. Final stress shall not exceed 60% of the guaranteed ultimate tensile strength of the strand.

3.01 CONCRETE

- A. Conform to Section 03 3000 and the following requirements.
- B. Inserts in Concrete: Accurately install and secure in forms, including enclosures, spacer bars, and other inserts required for Work of this Section; use of powder driven studs or fasteners is not permitted. Do not attach inserts to tendons.
- C. Edge or End Forms: Accurately drill and prepare for the connection of all anchoring hardware and for projecting strand and reinforcing steel, all securely anchored and braced.
- D. Concrete Placing: Place and compact the concrete by methods that ensure alignment of tendons and reinforcing bars, and to ensure uniform compaction of concrete, especially around end anchorages.
- E. Holes: Holes in concrete, other than those indicated on the Drawings or shown in approved submittals, are not permitted within 2-feet of bearing plates.

3.01 SLIPPAGE SHEATHING:

- A. Enclose tendons in slippage sheathing of an approved type consisting of two or more spiral wrappings of reinforced Kraft paper with non-hardening mastic between paper and strands, a suitable flexible plastic tube, a combination of metal and paper, or other standard type sheathing that prevents strand corrosion, allows adequate slippage, and is free from pockets for air or water to collect. After placing, inspect sheathing for bare spots, holes, and all other defects.
- B. Mastic Coating: All slippage sheathing of any type shall include a mastic coating on strands to prevent corrosion, composed of asphaltic materials with mineral fibers, flake graphite, rust-inhibitors, and volatile solvents, mixed in proportions determined by successful experience record. Other approved mastics may be used.

3.01 FABRICATING TENDONS:

- A. Install strands in the anchorage hardware to form a parallel lay cable with no crossed wires. Apply mastic to completely cover each strand, and cover the mastic with waterproof Kraft paper if not enclosed within sheathing. Continue wrapping or covering to tight contact with bearing plates.

3.01 PLACING TENDONS:

- A. Bearing Plates: Bolt to forms or securely fasten to reinforcing steel to ensure no displacement occurs during concrete placing, aligned perpendicular to tendon axis. Support tendons at exact vertical locations indicated with steel wire chairs or bolsters of correct height. Provide adequate number of supports, not less than four per span, located to support the tendon in correct parabolic curves.
- B. Supports: In addition to indicated reinforcing bars, provide additional reinforcing bars tied to the tendons to prevent tendon movement during concrete placing. Keep tendons straight in plan and at correct curves. Offset tendons or adjust tendon spacing only when approved in advance.
- C. Equipment: In placing tendons, make adequate provision for the stressing equipment by locating the tendons and projecting the reinforcing bars as nearly as possible in a vertical alignment. Keep entire stressing equipment area free of any construction materials and equipment or obstructions until all stressing operations are completed.

3.01 TENSIONING OPERATIONS:

- A. Perform tensioning under continuous inspection of an Inspector. Conform operations to CCR Title 8. Do not start operations until tests on concrete test cylinders specified in Section 03 3000 indicate concrete has attained minimum allowable compressive strength.
- B. Jacks: Stress tendons with approved motor-operated hydraulic jacks that provide uniform pressure, each jack equipped with an accurately calibrated gauge of 6" diameter minimum, having a fine pointer, and with gauge pressure markings at close increments to permit computing of stress at any time.
- C. Stressing Friction: Determined in the field by Contractor and Inspector, using the approved method.
- D. Tensioning: Perform by jacking; jack from one end unless otherwise shown or approved in advance.
- E. Procedure: Based on the stressing friction determined as specified under Paragraph "Stressing Friction" above, stressing procedure shall be established, approved, and followed by the stressing personnel. In general, the procedure for each tendon shall conform to the following:

1. Stressing: Stress to a gauge reading equivalent to initial stress plus maximum stress required to overcome stressing friction, as determined above.
2. Grippers: Insert grippers and gradually reduce jack load to transfer stressing stress to anchorages.
3. Restressing: Restress tendon and record the gauge reading at which all load is completely removed from grippers. This load shall be not less than the gauge reading equal to the initial stress (anchoring stress) on the tendon. A variation of 5% plus or minus is acceptable for any one tendon provided that the initial stress in any three adjacent tendons is no less than the sum of required stress for these three tendons. Any cumulative negative tolerance resulting in overall reduction of initial stress will not be permitted.

F. Stressing Sequence: Conform to the approved submittals.

3.01 GROUTING:

- A. Promptly when the stressing operation is completed on a tendon, coat end anchorages, grippers, and tendon ends with two heavy coats of approved waterproofing mastic equal to A.C. Horn Dehydratine #4; place suitable masking to prevent the coating from contacting concrete. Fill the pockets for stressing terminals with a non-shrink grout, installed as a stiff mixture, rammed solid, troweled smooth where exposed, and damp cured until fully set.
- B. Wherever pockets are larger than 2" diameter, coat the entire recess and all steel surfaces with approved epoxy concrete adhesive in lieu of coating, and place grout while the epoxy adhesive is fresh.

3.01 FIELD QUALITY CONTROL:

- A. Inspection: Continuous inspection is required during placing of tendons and other reinforcing, anchorages, concrete, and during stressing operations.
- B. Survey: Contractor's Surveyor shall instrument survey post-tensioned concrete both before and after post-tensioning operations are performed, and again 30 days after completion of stressing, as directed. Architect. Survey shall include mid-span elevations. Submit copies of complete survey results.

3.01 CLEANING UP

- A. During the progress of the work, the premises shall be kept free from waste material and debris resulting from the work of this section. Upon completion, all surplus material and debris shall be removed from the site.

END OF SECTION

SECTION 04 2000

CONCRETE UNIT MASONRY

PART 1 - GENERAL

1.1 GENERAL REQUIREMENTS

As specified in DIVISION 1 - GENERAL REQUIREMENTS.

1.2 RELATED REQUIREMENTS

- A. SECTION 01 7419 – CONSTRUCTION WASTE MANAGEMENT
- B. SECTION 01 8113 – SUSTAINABLE BUILDING REQUIREMENTS

1.3 SUMMARY

- A. Section Includes:
 - 1. Concrete masonry units.
 - 2. Mortar and grout.
 - 3. Steel reinforcing bars.
 - 4. Mortar skim coat.
 - 5. Precast concrete sills

1.4 DEFINITIONS

- A. CMU(s): Concrete masonry unit(s).
- B. Reinforced Masonry: Masonry containing reinforcing steel in grouted cells.

1.5 ACTION SUBMITTALS

- A. Submit in accordance with SECTION 01 3300 – SUBMITTALS.
- B. Product Data: For each type of product.
- C. Shop Drawings: For the following:
 - 1. Masonry Units: Show sizes, profiles, coursing, and locations of special shapes.
 - 2. Reinforcing Steel: Detail bending, lap lengths, and placement of unit masonry reinforcing bars. Comply with ACI 315. Show elevations of reinforced walls.

3. Fabricated Flashing: Detail corner units, end-dam units, and other special applications.
- D. Samples for Verification: For each type and color of the following:
1. Exposed CMUs.
- E. Recycled Content: Provide submittals for materials with recycled content in accordance with SECTION 01 8113, SUSTAINABLE BUILDING REQUIREMENTS
- F. Low/ Emitting Materials/VOC Content: Provide submittals for low emitting materials in accordance with SECTION 01 8113, SUSTAINABLE BUILDING REQUIREMENTS
- G. Regional Materials Extracted, Processed and Manufactured within 500 Miles of the Project Site: Provide submittals for regional materials in accordance with SECTION 01 8113, SUSTAINABLE BUILDING REQUIREMENTS
- 1.6 INFORMATIONAL SUBMITTALS
- A. Qualification Data: For testing agency.
- B. Material Certificates: For each type and size of the following:
1. Masonry Units:
 - a. Include data on material properties material test reports substantiating compliance with requirements.
 - b. For masonry units used in structural masonry, include data and calculations establishing average net-area compressive strength of units.
 2. Integral water repellent used in CMUs.
 3. Cementitious materials. Include name of manufacturer, brand name, and type.
 4. Mortar admixtures.
 5. Preblended, dry mortar mixes. Include description of type and proportions of ingredients.
 6. Grout mixes. Include description of type and proportions of ingredients.
 7. Reinforcing bars.
 8. Joint reinforcement.
 9. Anchors, ties, and metal accessories.

- C. Mix Designs: For each type of mortar and grout. Include description of type and proportions of ingredients.
 - 1. Include test reports for mortar mixes required to comply with property specification. Test according to ASTM C 109 for compressive strength, ASTM C 1506 for water retention, and ASTM C 91 for air content.
 - 2. Include test reports, according to ASTM C 1019, for grout mixes required to comply with compressive strength requirement.

- D. Statement of Compressive Strength of Masonry: For each combination of masonry unit type and mortar type, provide statement of average net-area compressive strength of masonry units, mortar type, and resulting net-area compressive strength of masonry determined according to TMS 602/ACI 530.1/ASCE 6.

- E. Hot-Weather Procedures: Detailed description of methods, materials, and equipment to be used to comply with requirements.

1.7 QUALITY ASSURANCE

Testing Agency Qualifications: Qualified according to ASTM C 1093 for testing indicated.

1.8 DELIVERY, STORAGE, AND HANDLING

- A. Store masonry units on elevated platforms in a dry location. If units are not stored in an enclosed location, cover tops and sides of stacks with waterproof sheeting, securely tied. If units become wet, do not install until they are dry.
- B. Store cementitious materials on elevated platforms, under cover, and in a dry location. Do not use cementitious materials that have become damp.
- C. Store aggregates where grading and other required characteristics can be maintained and contamination avoided.
- D. Deliver preblended, dry mortar mix in moisture-resistant containers. Store preblended, dry mortar mix in delivery containers on elevated platforms in a dry location or in covered weatherproof dispensing silos.
- E. Store masonry accessories, including metal items, to prevent corrosion and accumulation of dirt and oil.

1.9 FIELD CONDITION

- A. Protection of Masonry: During construction, cover tops of walls, projections, and sills with waterproof sheeting at end of each day's work. Cover partially completed masonry when construction is not in progress. Extend cover a minimum of 24 inches down both sides of walls, and hold cover securely in place.

- B. Do not apply uniform roof loads for at least 12 hours and concentrated loads for at least three days after building masonry walls or columns.
- C. Stain Prevention: Prevent grout, mortar, and soil from staining the face of masonry to be left exposed or painted. Immediately remove grout, mortar, and soil that come in contact with such masonry.
 - 1. Protect base of walls from rain-splashed mud and from mortar splatter by spreading coverings on ground and over wall surface.
 - 2. Protect sills, ledges, and projections from mortar droppings.
 - 3. Protect surfaces of window and door frames, as well as similar products with painted and integral finishes, from mortar droppings.
 - 4. Turn scaffold boards near the wall on edge at the end of each day to prevent rain from splashing mortar and dirt onto completed masonry.
- D. Hot-Weather Requirements: Comply with hot-weather construction requirements contained in TMS 602/ACI 530.1/ASCE 6.

1.10 MASONRY MOCK-UP PANELS

- A. Mock-Up Panel Location: After material samples are approved and prior to starting masonry work, construct a mock-up panel for each type and color of masonry required. At least 48 hours prior to constructing the panel or panels, submit written notification to the University. Do not build-in mock-up panels as part of the structure; locate mock-up panels where directed. Construct portable mock-up panels or locate in an area where they will not be disrupted during construction.
- B. Mock-Up Panel Configuration: Construct mock-up panels L-shaped or otherwise configured to represent all of the wall elements. Construct panels of the size necessary to demonstrate the acceptable level of workmanship for each type of masonry represented on the project. Provide a straight panel or a leg of an L-shaped panel of minimum size 8 feet long by 4 feet high.
- C. Mock-Up Panel Composition: Show full color range, texture, and bond pattern of the masonry work. Demonstrate mortar joint tooling; grouting of reinforced vertical cores, collar joints, bond beams, and lintels; positioning, securing, and lapping of reinforcing steel; positioning and lapping of joint reinforcement (including prefabricated corners); and cleaning of masonry work during the construction of the panels. Also include installation or application procedures for anchors, wall ties, CMU control joints, brick expansion joints, insulation, flashing, brick soldier, row lock courses and weeps. Include a corner and a 2 by 2 foot opening placed at least 2 feet above the panel base and 2 feet away from all free edges, corners, and control joints. Provide required reinforcing around this opening as well as at wall corners and control joints.
- D. Mock-Up Panel Construction Method: Demonstrate provisions to preclude mortar or grout droppings in the cavity and to provide a clear open air space of the di-

mensions shown on the drawings. Where masonry is to be grouted, demonstrate and receive approval on the method that will be used to bring up the masonry wythes; support the reinforcing bars; and grout cells, bond beams, lintels, and collar joints using the requirements specified herein. Construct panels on a properly designed concrete foundation.

E. Mock-Up Panel Purpose: The completed panels is used as the standard of workmanship for the type of masonry represented. Do not commence masonry work until the mock-up panel for that type of masonry construction has been completed and approved. Protect panels from the weather and construction operations until the masonry work has been completed and approved. Perform cleaning procedures on the mockup and obtain approval of the University prior to cleaning the building. After completion of the work, completely remove the mock-up.

1.11 REFERENCES

- A. All work shall conform to the latest edition of the following, unless otherwise noted or specified on the structural drawings or in these specifications.
1. ACI 315 "Details and Detailing of Concrete Reinforcement".
 2. ASTM C91/C91M "Standard Specification for Masonry Cement".
 3. ASTM C109 / C109M "Standard Test Method for Compressive Strength of Hydraulic Cement Mortars (Using 2-in. or [50-mm] Cube Specimens)".
 4. ASTM E514 / E514M "Standard Test Method for Water Penetration and Leakage through Masonry".
 5. ASTM C1019 "Standard Test Method for Sampling and Testing Grout".
 6. ASTM C1093 "Standard Practice for Accreditation of Testing Agencies for Masonry".
 7. ASTM C1314 "Standard Test Method for Compressive Strength of Masonry Prisms".
 8. National Concrete Masonry Association TEK 8-4A (2005).
 9. TMS 402/602/ACI 530 "Building Code Requirements and Specifications for Masonry Structures, 2016 (Formerly ACI 530)".
 10. ASTM B 32 "Standard Specification for Solder Metal".
 11. ASTM A 82 "Standard Specification for Steel Wire, Plain, for Concrete Reinforcement (Withdrawn 2013)".
 12. ASTM A 641 "Standard Specification for Zinc-Coated (Galvanized) Carbon Steel Wire".

13. ASTM A 153 "Standard Specification for Zinc Coating (Hot-Dip) on Iron and Steel Hardware".
14. ASTM C 114 "Standard Test Methods for Chemical Analysis of Hydraulic Cement".
15. ASTM C 140 "Standard Test Methods for Sampling and Testing Concrete Masonry Units and Related Units".
16. ASTM C 143 "Standard Test Method for Slump of Hydraulic-Cement Concrete".
17. ASTM C 144 "Standard Specification for Aggregate for Masonry Mortar".
18. ASTM C 150 "Standard Specification for Portland Cement".
19. ASTM C 207 "Standard Specification for Hydrated Lime for Masonry Purposes".
20. ASTM D 226/D 226M "Standard Specification for Asphalt-Saturated Organic Felt Used in Roofing and Waterproofing".
21. ASTM C 270 "Standard Specification for Mortar for Unit Masonry".
22. ASTM C 404 "Standard Specification for Aggregates for Masonry Grout".
23. ASTM C 476 "Standard Specification for Grout for Masonry".
24. ASTM A 615 "Standard Specification for Deformed and Plain Carbon-Steel Bars for Concrete Reinforcement".
25. ASTM C 780 "Standard Test Method for Preconstruction and Construction Evaluation of Mortars for Plain and Reinforced Unit Masonry".
26. ASTM C 920 "Standard Specification for Elastomeric Joint Sealants".
27. ASTM A 951 "Standard Specification for Steel Wire for Masonry Joint Reinforcement".
28. ASTM D 1056 "Standard Specification for Flexible Cellular Materials—Sponge or Expanded Rubber".
29. ASTM C 1329 "Standard Specification for Mortar Cement".

PART 2 - PRODUCTS

2.1 MANUFACTURERS

- A. Source Limitations for Masonry Units: Obtain exposed masonry units of a uniform texture and color, or a uniform blend within the ranges accepted for these characteristics, from single source from single manufacturer for each product

required.

- B. Source Limitations for Mortar Materials: Obtain mortar ingredients of a uniform quality, including color for exposed masonry, from single manufacturer for each cementitious component and from single source or producer for each aggregate.

2.2 PERFORMANCE REQUIREMENTS

Provide structural unit masonry that develops indicated net-area compressive strengths at 28 days.

1. Determine net-area compressive strength of masonry from average net- area compressive strengths of masonry units and mortar types (unit- strength method) according to TMS 602/ACI 530.1/ASCE 6.
2. Determine net-area compressive strength of masonry by testing masonry prisms according to ASTM C 1314.

2.3 UNIT MASONRY, GENERAL

- A. Masonry Standard: Comply with TMS 602/ACI 530.1/ASCE 6 except as modified by requirements in the Contract Documents.
- B. Defective Units: Referenced masonry unit standards may allow a certain percentage of units to contain chips, cracks, or other defects exceeding limits stated. Do not use units where such defects are exposed in the completed Work and will be within 20 feet vertically and horizontally of a walking surface.
- C. Fire-Resistance Ratings: Comply with requirements for fire-resistance-rated assembly designs indicated.

2.4 CONCRETE MASONRY UNITS

- A. Shapes: Provide shapes indicated and as follows, with exposed surfaces matching exposed faces of adjacent units unless otherwise indicated.
 1. Provide special shapes for lintels, corners, jambs, sashes, movement joints, headers, bonding, and other special conditions.
 2. Provide square-edged units for outside corners unless otherwise indicated.
- B. Integral Water Repellent: Provide units made with integral water repellent for exposed units and where indicated.

Integral Water Repellent: Liquid polymeric, integral water-repellent admixture that does not reduce flexural bond strength. Units made with integral water repellent, when tested according to ASTM E 514 as a wall assembly made with mortar containing integral water-repellent manufacturer's mortar additive, with test period extended to 24 hours, shall show no visible water or leaks on the back of test specimen.

C. CMUs: ASTM C 90.

1. Unit Compressive Strength: Provide units with minimum average net-area compressive strength of 1900 psi.
2. Density Classification: Normal weight.
3. Size (Width): Manufactured to dimensions 3/8 inch less-than-nominal dimensions.
4. Exposed Faces: Provide color and texture matching the range represented by University's sample.
5. Faces to Receive Plaster: Where units are indicated to receive a direct application of plaster, provide textured-face units made with gap-graded aggregates.
6. Provide block with added water repellent in the mix; BASF Rheopel or equal.
7. Color: Grey except where integral colored block are indicated on Architectural drawings.

D. Provide integrally colored concrete masonry units with one or two block faces that have been finely ground; Island Groundstone Units manufactured by Tileco, Inc., Kapolei, HI, www.tilecoinc.com.

1. Refer to Architectural drawings for exterior CMU color, pattern and styles. Provide a mix of colors as selected from the Premium Collection.
2. Sizes: Provide ground faces exterior on face and on solid end and corner blocks.

2.5 MORTAR AND GROUT MATERIALS

- A. Regional Materials: Aggregate for mortar and grout, cement, and lime shall be extracted, harvested, or recovered, as well as manufactured, within 500 miles of Project site.
- B. Portland Cement: ASTM C 150, Type I or II, except Type III may be used for cold-weather construction. Provide natural color or white cement as required to produce mortar color indicated. Alkali content shall not be more than 0.1 percent when tested according to ASTM C 114.
- C. Hydrated Lime: ASTM C 207, Type S.
- D. Portland Cement-Lime Mix: Packaged blend of portland cement and hydrated lime containing no other ingredients.
- E. Masonry Cement: ASTM C 91.

- F. Mortar Cement: ASTM C 1329.
- G. Aggregate for Mortar: ASTM C 144.
 - 1. For mortar that is exposed to view, use washed aggregate consisting of natural sand or crushed stone.
 - 2. For joints less than 1/4 inch thick, use aggregate graded with 100 percent passing the No. 16 sieve.
 - 3. White-Mortar Aggregates: Natural white sand or crushed white stone.
- H. Aggregate for Grout: ASTM C 404.
- I. Water Repellent Additive: Provide mortar and grout with added water repellent in the mix; BASF Rheopel or equal.
- J. Water: Potable.

2.6 REINFORCEMENT

- A. Uncoated Steel Reinforcing Bars: ASTM A 615, Grade 60.
- B. Reinforcing Bar Positioners: Wire units designed to fit into mortar bed joints spanning masonry unit cells and to hold reinforcing bars in center of cells. Units are formed from 0.148-inch steel wire, hot-dip galvanized after fabrication. Provide units designed for number of bars indicated.
- C. Masonry-Joint Reinforcement, General: Ladder type complying with ASTM A 951.
 - 1. Interior Walls: Hot-dip galvanized carbon steel.
 - 2. Exterior Walls: Hot-dip galvanized carbon steel.
 - 3. Wire Size for Side Rods: 0.187-inch diameter.
 - 4. Wire Size for Cross Rods: 0.187-inch diameter.
 - 5. Spacing of Cross Rods: Not more than 16 inches o.c.
 - 6. Provide in lengths of not less than 10 feet, with prefabricated corner and tee units.

2.7 TIES AND ANCHORS

- A. General: Ties and anchors shall extend at least 1-1/2 inches into masonry but with at least a 5/8-inch cover on outside face.
- B. Materials: Provide ties and anchors specified in this article that are made from materials that comply with the following unless otherwise indicated:

1. Mill-Galvanized, Carbon-Steel Wire: ASTM A 82, with ASTM A 641, Class 1 coating.
 2. Hot-Dip Galvanized, Carbon-Steel Wire: ASTM A 82, with ASTM A 153, Class B-2 coating.
- C. Adjustable Anchors for Connecting to Concrete: Provide anchors that allow vertical or horizontal adjustment but resist tension and compression forces perpendicular to plane of wall.

2.8 EMBEDDED FLASHING MATERIALS

- A. Metal Flashing: Provide metal flashing complying with SMACNA's "Architectural Sheet Metal Manual" and SECTION 07620 - SHEET METAL FLASHING and as follows:
1. Copper: ASTM B 370, Temper H00, cold-rolled copper sheet, 16-oz./sq. ft. weight or 0.0216 inch thick or ASTM B 370, Temper H01, high-yield copper sheet, 12-oz./sq. ft. weight or 0.0162 inch thick.
 2. Fabricate continuous flashings in sections 96 inches long minimum, but not exceeding 12 feet. Provide splice plates at joints of formed, smooth metal flashing.
 3. Fabricate metal expansion-joint strips from copper to shapes indicated.
 4. Solder metal items at corners.
- B. Application: Unless otherwise indicated, use the following:
1. Where flashing is indicated to receive counterflashing, use metal flashing.
 2. Where flashing is indicated to be turned down at or beyond the wall face, use metal flashing.
 3. Where flashing is partly exposed and is indicated to terminate at the wall face, use metal flashing with a drip edge.
 4. Where flashing is fully concealed, use metal flashing.
- C. Solder and Sealants for Sheet Metal Flashings: As specified in SECTION 07620 - SHEET METAL FLASHING.
1. Solder for Copper: ASTM B 32, Grade Sn50 with maximum lead content of 0.2 percent.
 2. Elastomeric Sealant: ASTM C 920, chemically curing silicone sealant; of type, grade, class, and use classifications required to seal joints in sheet metal flashing and remain watertight.

- D. Adhesives, Primers, and Seam Tapes for Flashings: Flashing manufacturer's standard products or products recommended by flashing manufacturer for bonding flashing sheets to each other and to substrates.

2.9 MISCELLANEOUS MASONRY ACCESSORIES

- A. Compressible Filler: Premolded filler strips complying with ASTM D 1056, Grade 2A1; compressible up to 35 percent; of width and thickness indicated; formulated from neoprene.
- B. Bond-Breaker Strips: Asphalt-saturated felt complying with ASTM D 226/D 226M, Type I (No. 15 asphalt felt).

2.10 MORTAR AND GROUT MIXES

- A. General: Do not use admixtures, including pigments, air-entraining agents, accelerators, retarders, water-repellent agents, antifreeze compounds, or other admixtures unless otherwise indicated.
 - 1. Do not use calcium chloride in mortar or grout.
 - 2. Use portland cement-lime, masonry cement, or mortar cement mortar unless otherwise indicated.
 - 3. For reinforced masonry, use portland cement-lime, masonry cement or mortar cement mortar.
- B. Preblended, Dry Mortar Mix: Furnish dry mortar ingredients in form of a preblended mix. Measure quantities by weight to ensure accurate proportions, and thoroughly blend ingredients before delivering to Project site.
- C. Mortar for Unit Masonry: Comply with ASTM C 270, Property Specification. Provide the following types of mortar for applications stated unless another type is indicated or needed to provide required compressive strength of masonry.
 - 1. For masonry below grade or in contact with earth, use Type M.
 - 2. For reinforced masonry, use Type M.
 - 3. For mortar parge coats, use Type M.
 - 4. For exterior, above-grade, load-bearing and nonload-bearing walls and parapet walls; and for other applications where another type is not indicated, use Type M.

5. Colors: Mortar for use in the interior and exterior faces of the exterior walls shall be 50% white color and shall be pigmented to match Architect's sample.
 6. Add water repellent in manufacturer's recommended dose to mix.
- D. Grout for Unit Masonry: Comply with ASTM C 476.
1. Use grout of type indicated or, if not otherwise indicated, of type (fine or coarse) that will comply with TMS 602/ACI 530.1/ASCE 6 for dimensions of grout spaces and pour height.
 2. Proportion grout in accordance with ASTM C 476, Table 1 or paragraph 4.2.2 for specified 28-day compressive strength indicated, but not less than 2500 psi.
 3. Provide grout with a slump of 8 to 11 inches as measured according to ASTM C 143.

2.11 MORTAR SKIM COAT

- A. Mortar Mix:
1. Premixed mortar mix: Bonded Profinish (2 coats) or Bonded Universal Patch.
 2. Mapei Tilt Finish polymer modified patching material.
 3. Quickcrete Stucco Mix (cement, coral sand and EasySpred).
 4. Mortar mix 4 or 5 with added acrylic modifier (ThoroAcryl 60 or equal).

PART 3 - EXECUTION

3.1 EXAMINATION

- B. Examine conditions, with Installer present, for compliance with requirements for installation tolerances and other conditions affecting performance of the Work.
1. For the record, prepare written report, endorsed by Installer, listing conditions detrimental to performance of the Work.
 2. Verify that foundations are within tolerances specified.
 3. Verify that reinforcing dowels are properly placed.
 4. Verify that substrates are free of substances that would impair mortar bond.
- C. Before installation, examine rough-in and built-in construction for piping systems to verify actual locations of piping.

- D. Proceed with installation only after unsatisfactory conditions have been corrected.

3.2 INSTALLATION, GENERAL

- A. Build chases and recesses to accommodate items specified in this and other Sections.
- B. Leave openings for equipment to be installed before completing masonry. After installing equipment, complete masonry to match construction immediately adjacent to opening.
- C. Use full-size units without cutting if possible. If cutting is required to provide a continuous pattern or to fit adjoining construction, cut units with motor-driven saws; provide clean, sharp, unchipped edges. Allow units to dry before laying unless wetting of units is specified. Install cut units with cut surfaces and, where possible, cut edges concealed.

3.3 TOLERANCES

- A. Dimensions and Locations of Elements:
 - 1. For dimensions in cross section or elevation, do not vary by more than plus 1/2 inch or minus 1/4 inch.
 - 2. For location of elements in plan, do not vary from that indicated by more than plus or minus 1/2 inch.
 - 3. For location of elements in elevation, do not vary from that indicated by more than plus or minus 1/4 inch in a story height or 1/2 inch total.
- B. Lines and Levels:
 - 1. For bed joints and top surfaces of bearing walls, do not vary from level by more than 1/4 inch in 10 feet, or 1/2-inch maximum.
 - 2. For conspicuous horizontal lines, such as lintels, sills, parapets, and reveals, do not vary from level by more than 1/8 inch in 10 feet, 1/4 inch in 20 feet, or 1/2-inch maximum.
 - 3. For vertical lines and surfaces do not vary from plumb by more than 1/4 inch in 10 feet, 3/8 inch in 20 feet, or 1/2-inch maximum.
 - 4. For conspicuous vertical lines, such as external corners, door jambs, reveals, and expansion and control joints, do not vary from plumb by more than 1/8 inch in 10 feet, 1/4 inch in 20 feet, or 1/2-inch maximum.
 - 5. For lines and surfaces, do not vary from straight by more than 1/4 inch in 10 feet, 3/8 inch in 20 feet, or 1/2-inch maximum.

6. For vertical alignment of exposed head joints, do not vary from plumb by more than 1/4 inch in 10 feet, or 1/2-inch maximum.
 7. For faces of adjacent exposed masonry units, do not vary from flush alignment by more than 1/16 inch.
- C. Joints:
1. For bed joints, do not vary from thickness indicated by more than plus or minus 1/8 inch, with a maximum thickness limited to 1/2 inch.
 2. For exposed bed joints, do not vary from bed-joint thickness of adjacent courses by more than 1/8 inch.
 3. For head and collar joints, do not vary from thickness indicated by more than plus 3/8 inch or minus 1/4 inch.
 4. For exposed head joints, do not vary from thickness indicated by more than plus or minus 1/8 inch.

3.4 LAYING MASONRY WALLS

- A. Lay out walls in advance for accurate spacing of surface bond patterns with uniform joint thicknesses and for accurate location of openings, movement-type joints, returns, and offsets. Avoid using less-than-half-size units, particularly at corners, jambs, and, where possible, at other locations.
- B. Bond Pattern for Exposed Masonry: Shall be as indicated on construction drawings. If not indicated on drawings, lay exposed masonry in running bond; do not use units with less-than-nominal 4-inch horizontal face dimensions at corners or jambs.
- C. Stopping and Resuming Work: Stop work by stepping back units in each course from those in course below; do not tooth. When resuming work, clean masonry surfaces that are to receive mortar, remove loose masonry units and mortar, and wet brick if required before laying fresh masonry.
- D. Built-in Work: As construction progresses, build in items specified in this and other Sections. Fill in solidly with masonry around built-in items.
- E. Fill space between steel frames and masonry solidly with mortar unless otherwise indicated.
- F. Where built-in items are to be embedded in cores of hollow masonry units, place a layer of metal lath, wire mesh, or plastic mesh in the joint below, and rod mortar or grout into core.
- G. Fill cores in hollow CMUs with grout 24 inches under bearing plates, beams, lintels, posts, and similar items unless otherwise indicated.

3.5 MORTAR BEDDING AND JOINTING

A. Lay hollow CMUs as follows:

1. Bed face shells in mortar and make head joints of depth equal to bed joints.
2. Bed webs in mortar in all courses of piers, columns, and pilasters.
3. Bed webs in mortar in grouted masonry, including starting course on footings.
4. Fully bed entire units, including areas under cells, at starting course on footings where cells are not grouted.
5. Clean soiled surfaces with fiber brush and soap powder and rinse thoroughly with clear water.
6. Wet joint surfaces thoroughly before applying mortar.
7. Rake out mortar joints for pointing with sealant.

B. Tool exposed joints slightly concave when thumbprint hard, using a jointer larger than joint thickness unless otherwise indicated.

C. Cut joints flush for masonry walls to receive plaster or other direct-applied finishes (other than paint) unless otherwise indicated.

D. Cut joints flush where indicated to receive waterproofing unless otherwise indicated.

3.7 ANCHORING MASONRY TO CONCRETE

Anchor masonry to structural steel and concrete, where masonry abuts or faces concrete, to comply with the following:

1. Provide an open space not less than 1/2 inch wide between masonry and structural steel or concrete unless otherwise indicated. Keep open space free of mortar and other rigid materials.
2. Anchor masonry with anchors embedded in masonry joints and attached to structure.
3. Space anchors as indicated, but not more than 24 inches o.c. vertically and 36 inches o.c. horizontally.

3.8 CONTROL AND EXPANSION JOINTS

- A. General: Install control- and expansion-joint materials in unit masonry as masonry progresses. Do not allow materials to span control and expansion joints without provision to allow for in-plane wall or partition movement.
- B. Form control joints in concrete masonry using one of the following methods:
 - 1. Fit bond-breaker strips into hollow contour in ends of CMUs on one side of control joint. Fill resultant core with grout, and rake out joints in exposed faces for application of sealant.
 - 2. Install preformed control-joint gaskets designed to fit standard sash block.
 - 3. Install interlocking units designed for control joints. Install bond-breaker strips at joint. Keep head joints free and clear of mortar, or rake out joint for application of sealant.
 - 4. Install temporary foam-plastic filler in head joints, and remove filler when unit masonry is complete for application of sealant.

3.9 FLASHING

- A. General: Install embedded flashing at ledges and other obstructions to downward flow of water in wall where indicated.
- B. Install flashing as follows unless otherwise indicated:
 - 1. Prepare masonry surfaces so they are smooth and free from projections that could puncture flashing. Where flashing is within mortar joint, place through-wall flashing on sloping bed of mortar and cover with mortar. Before covering with mortar, seal penetrations in flashing with adhesive, sealant, or tape as recommended by flashing manufacturer.
 - 2. Interlock end joints of ribbed sheet metal flashing by overlapping ribs not less than 1-1/2 inches or as recommended by flashing manufacturer, and seal lap with elastomeric sealant complying with requirements in SECTION 07920 - SEALERS for application indicated.
 - 3. Install metal drip edges with ribbed sheet metal flashing by interlocking hemmed edges to form hooked seam. Seal seam with elastomeric sealant complying with requirements in SECTION 07920 - SEALERS for application indicated.
- C. Install reglets and nailers for flashing and other related construction where they are shown to be built into masonry.

3.10 REINFORCED UNIT MASONRY INSTALLATION

- A. Temporary Formwork and Shores: Construct formwork and shores as needed to support reinforced masonry elements during construction.
 - 1. Construct formwork to provide shape, line, and dimensions of completed masonry as indicated. Make forms sufficiently tight to prevent leakage of mortar and grout. Brace, tie, and support forms to maintain position and shape during construction and curing of reinforced masonry.
 - 2. Do not remove forms and shores until reinforced masonry members have hardened sufficiently to carry their own weight and other loads that may be placed on them during construction.
- B. Placing Reinforcement: Comply with requirements in TMS 602/ACI 530.1/ASCE 6.
- C. Grouting: Do not place grout until entire height of masonry to be grouted has attained enough strength to resist grout pressure.
 - 1. Comply with requirements in TMS 602/ACI 530.1/ASCE 6 for cleanouts and for grout placement, including minimum grout space and maximum pour height.
 - 2. Limit height of vertical grout pours to not more than 60 inches.

3.11 SKIM COAT FINISH

- A. Where scheduled on the drawings use a steel-trowel finish to produce a smooth, flat, dense surface with a maximum surface variation of 1/8 inch per foot.
 - 1. Fill struck joints.
 - 2. Coat face of block to a thickness of 3/8 inch.
- B. Damp cure coat for at least 24 hours and protect until cured.

3.12 FIELD QUALITY CONTROL

- A. Testing and Inspecting: University will engage special inspectors to perform tests and inspections and prepare reports. Allow inspectors access to scaffolding and work areas as needed to perform tests and inspections. Retesting of materials that fail to comply with specified requirements shall be done at Contractor's expense.
- B. Inspections: Special inspections according to Level B in TMS 402/ACI 530/ASCE 5.

1. Begin masonry construction only after inspectors have verified proportions of site-prepared mortar.
 2. Place grout only after inspectors have verified compliance of grout spaces and of grades, sizes, and locations of reinforcement.
 3. Place grout only after inspectors have verified proportions of site-prepared grout.
- C. Testing Prior to Construction: One set of tests.
- D. Testing Frequency: One set of tests for each 5000 sq. ft. of wall area or portion thereof.
- E. Concrete Masonry Unit Test: For each type of unit provided, according to ASTM C 140 for compressive strength.
- F. Mortar Aggregate Ratio Test (Proportion Specification): For each mix provided, according to ASTM C 780.
- G. Mortar Test (Property Specification): For each mix provided, according to ASTM C 780. Test mortar for mortar air content and compressive strength.
- H. Grout Test (Compressive Strength): For each mix provided, according to ASTM C 1019.
- I. Prism Test: For each type of construction provided, according to ASTM C 1314 at 7 days and at 28 days.
- 3.13 REPAIRING, POINTING, AND CLEANING
- A. Remove and replace masonry units that are loose, chipped, broken, stained, or otherwise damaged or that do not match adjoining units. Install new units to match adjoining units; install in fresh mortar, pointed to eliminate evidence of replacement.
- B. Pointing: During the tooling of joints, enlarge voids and holes, except weep holes, and completely fill with mortar. Point up joints, including corners, openings, and adjacent construction, to provide a neat, uniform appearance. Prepare joints for sealant application, where indicated.
- C. In-Progress Cleaning: Clean unit masonry as work progresses by dry brushing to remove mortar fins and smears before tooling joints.
- D. Final Cleaning: After mortar is thoroughly set and cured, clean exposed masonry as follows:
1. Remove large mortar particles by hand with wooden paddles and nonmetallic scrape hoes or chisels.

2. Test cleaning methods on sample wall panel; leave one-half of panel uncleaned for comparison purposes. Obtain University's approval of sample cleaning before proceeding with cleaning of masonry.
3. Protect adjacent stone and nonmasonry surfaces from contact with cleaner by covering them with liquid strippable masking agent or polyethylene film and waterproof masking tape.
4. Wet wall surfaces with water before applying cleaners; remove cleaners promptly by rinsing surfaces thoroughly with clear water.
5. Clean concrete masonry by applicable cleaning methods indicated in NCMA TEK 8-4A.

3.14 MASONRY WASTE DISPOSAL

- A. Salvageable Materials: Unless otherwise indicated, excess masonry materials are Contractor's property. At completion of unit masonry work, remove from Project site.
- B. Waste Disposal as Fill Material: Dispose of clean masonry waste, including excess or soil-contaminated sand, waste mortar, and broken masonry units, by crushing and mixing with fill material as fill is placed.
 1. Crush masonry waste to less than 4 inches in each dimension.
 2. Mix masonry waste with at least two parts of specified fill material for each part of masonry waste. Fill material is specified in SECTION 02210 EARTH MOVING.
 3. Do not dispose of masonry waste as fill within 18 inches of finished grade.
- C. Masonry Waste Recycling: Return broken CMUs not used as fill to manufacturer for recycling.
- D. Excess Masonry Waste: Remove excess clean masonry waste that cannot be used as fill, as described above or recycled, and other masonry waste, and legally dispose of off University's property.

END OF SECTION

SECTION 05 1200

STRUCTURAL STEEL FRAMING

PART 1 - GENERAL

1.01 GENERAL REQUIREMENTS

- A. General: As specified in Division 1.

1.02 RELATED DOCUMENTS

- A. Drawings and general provisions of the Contract, including General and Supplementary Conditions and Division 1 Specification Sections, apply to this Section.

1.03 SUMMARY

- A. This Section includes the following:

1. Structural steel.
2. Grout.

- B. Related Sections include the following:

1. Section 05 5000 – METAL FABRICATIONS for steel lintels or shelf angles not attached to structural-steel frame miscellaneous steel fabrications and other metal items not defined as structural steel.
2. Sections 09 9000 – PAINTING for surface preparation and priming requirements.

1.04 DEFINITIONS

- A. Structural Steel: Elements of structural-steel frame, as classified by AISC's "Code of Standard Practice for Steel Buildings and Bridges," that support design loads.

1.05 SUBMITTALS

- A. Product Data: For each type of product indicated.

- B. Shop Drawings: Show fabrication of structural-steel components.

1. Include details of cuts, connections, splices, camber, holes, and other pertinent data.
2. Include embedment drawings.

3. Indicate welds by standard AWS symbols, distinguishing between shop and field welds, and show size, length, and type of each weld.
 4. Indicate type, size, and length of bolts, distinguishing between shop and field bolts. Identify pretensioned and slip-critical high-strength bolted connections.
- C. Welding certificates.
1. Coordinate first paragraph below with qualification requirements in Division 1 and as supplemented in "Quality Assurance" Article.
- D. Qualification Data: For Installer
- E. Mill Test Reports: Signed by manufacturers certifying that the following products comply with requirements:
1. Structural steel including chemical and physical properties.
 2. Bolts, nuts, and washers including mechanical properties and chemical analysis.
 3. Shop primers.
 4. Nonshrink grout.
- F. Source quality-control test reports.

1.06 QUALITY ASSURANCE

- A. Fabricator Qualifications: A qualified fabricator who participates in the AISC Quality Certification Program and is designated an AISC-Certified Plant, Category Sbd. Provide Source Quality Control when fabrication is not performed in an AISC-Certified Plant.
- B. Shop-Painting Applicators: Qualified according to AISC's Sophisticated Paint Endorsement P1 or SSPC-QP 3, "Standard Procedure for Evaluating Qualifications of Shop Painting Applicators."
- C. Welding: Qualify procedures and personnel according to AWS D1.1, "Structural Welding Code--Steel."
- D. Comply with applicable provisions of the following specifications and documents:
1. AISC's "Specification for Structural Steel Buildings - Allowable Stress Design and Load Resistance Factor Design (ANSI/AISC 360-05) .
 2. AISC's "Seismic Provisions for Structural Steel Buildings" and "Supplement No. 1."(ANSI/AISC 341-05 and ANSI/AISC 341s1-05).

3. AISC's "Specification for structural joint".
4. AISC's "Code of Standard Practice for Steel Buildings and Bridges."

1.07 DELIVERY, STORAGE, AND HANDLING

- A. Store materials to permit easy access for inspection and identification. Keep steel members off ground and spaced by using pallets, dunnage, or other supports and spacers. Protect steel members and packaged materials from erosion and deterioration.
 1. Store fasteners in a protected place. Clean and relubricate bolts and nuts that become dry or rusty before use.
 2. Do not store materials on structure in a manner that might cause distortion, damage, or overload to members or supporting structures. Repair or replace damaged materials or structures as directed.

1.08 COORDINATION

- A. Furnish anchorage items to be embedded in or attached to other construction without delaying the Work. Provide setting diagrams, sheet metal templates, instructions, and directions for installation.

PART 2 - PRODUCTS

2.01 STRUCTURAL-STEEL MATERIALS

- A. W and WT-Shapes: ASTM A 992/A 992M.
- B. Rectangular and Square HSS: ASTM A500 Grade B
- C. Steel Pipe: ASTM A53 Grade B
- D. All Other Shapes: ASTM A 36/A 36M.
- E. Welding Electrodes: Comply with AWS requirements.

2.02 BOLTS, CONNECTORS, AND ANCHORS

- A. Pretensioned High-Strength Bolts, Nuts, and Washers: ASTM A 325, Type 1, heavy hex steel structural bolts; ASTM A 563 heavy hex carbon-steel nuts; and ASTM F 436 hardened carbon-steel washers.
 1. Shall be twist off or have DTI washer.
 2. Finish: Hot-dip zinc coating, ASTM A 153/A 153M, Class C
- B. Unheaded Anchor Rods: ASTM A 307, Grade A
 1. Configuration: Hooked

2. Nuts: ASTM A 563 heavy hex carbon steel.
3. Plate Washers: ASTM A 36/A 36M carbon steel.
4. Washers: ASTM F 436 hardened carbon steel.
 - a. Finish: Hot-dip zinc coating, ASTM A 153/A 153M, Class C

C. Threaded Rods: ASTM A 307, Grade A

1. Nuts: ASTM A 563 heavy hex carbon steel.
2. Washers: ASTM F 436 hardened carbon steel.
 - a. Finish: Hot-dip zinc coating, ASTM A 153/A 153M, Class C

2.03 PRIMER

- A. Primer: SSPC-Paint 25, Type I, manufacturer's standard gray shop primer. Provide primers that are VOC compliant for building location.
- B. Galvanizing Repair Paint: MPI#18, MPI#19, or SSPC-Paint 20

2.04 GROUT

Cement grout in paragraph below has limited compressive strength.

- A. Cement Grout: Portland cement, ASTM C 150, Type I; and clean, natural sand, ASTM C 404, Size No. 2. Mix at ratio of 1 part cement to 2-1/2 parts sand, by volume, with minimum water required for placement and hydration.
- B. Nonmetallic, Shrinkage-Resistant Grout: ASTM C 1107, factory-packaged, nonmetallic aggregate grout, noncorrosive, nonstaining, mixed with water to consistency suitable for application and a 30-minute working time.

2.05 FABRICATION

- A. Structural Steel: Fabricate and assemble in shop to greatest extent possible. Fabricate according to AISC's "Code of Standard Practice for Steel Buildings and Bridges" and AISC's "Specification for Structural Steel Buildings-- Allowable Stress Design and Plastic Design"
 1. Camber structural-steel members where indicated.
 2. Identify high-strength structural steel according to ASTM A 6/ A 6M and maintain markings until structural steel has been erected.
 3. Mark and match-mark materials for field assembly.
 4. Complete structural-steel assemblies, including welding of units, before starting shop-priming operations.

- B. Thermal Cutting: Perform thermal cutting by machine to greatest extent possible.
 - 1. Plane thermally cut edges to be welded to comply with requirements in AWS D1.1.
- C. Bolt Holes: Cut, drill, mechanically thermal cut, or punch standard bolt holes perpendicular to metal surfaces.
- D. Finishing: Accurately finish ends of columns and other members transmitting bearing loads.
- E. Shear Connectors: Prepare steel surfaces as recommended by manufacturer of shear connectors. Use automatic end welding of headed-stud shear connectors according to AWS D1.1 and manufacturer's written instructions.
- F. Holes: Provide holes required for securing other work to structural steel and for passage of other work through steel framing members.
 - 1. Cut, drill, or punch holes perpendicular to steel surfaces. Do not thermally cut bolt holes or enlarge holes by burning.
 - 2. Base-Plate Holes: Cut, drill, mechanically thermal cut, or punch holes perpendicular to steel surfaces.
 - 3. Weld threaded nuts to framing and other specialty items indicated to receive other work.

2.06 SHOP CONNECTIONS

- A. High-Strength Bolts: Shop install Pre-tensioned high-strength bolts according to RCSC's "Specification for Structural Joints Using ASTM A 325 or A 490 Bolts" for type of bolt and type of joint specified.
 - 1. Joint Type: Slip-Critical
- B. Weld Connections: Comply with AWS D1.1 for welding procedure specifications, tolerances, appearance, and quality of welds and for methods used in correcting welding work.

2.07 SHOP PRIMING

- A. Shop prime steel surfaces except the following:
 - 1. Surfaces embedded in concrete or mortar. Extend priming of partially embedded members to a depth of 2 inches.
 - 2. Surfaces to be field welded.
 - 3. Surfaces to be high-strength bolted with slip-critical connections.

4. Surfaces to receive sprayed fire-resistive materials.
 5. Galvanized surfaces.
- B. Painting: Apply a 1-coat, nonasphaltic primer complying with SSPC-PS Guide 7.00, "Painting System Guide 7.00: Guide for Selecting One-Coat Shop Painting Systems," to provide a dry film thickness of not less than 1.5 mils.

2.08 GALVANIZING

- A. Hot-Dip Galvanized Finish: Apply zinc coating by the hot-dip process to structural steel according to ASTM A 123/ A 123M.
1. Fill vent holes and grind smooth after galvanizing.
 2. Galvanize all exposed structural steel.
 3. Galvanize all structural steel at all canopies.

2.09 SOURCE QUALITY CONTROL

- A. Contractor shall engage an independent testing and inspecting agency to perform shop tests and inspections and prepare test reports.
1. Provide testing agency with access to places where structural-steel work is being fabricated or produced to perform tests and inspections.
- B. Correct deficiencies in Work that test reports and inspections indicate does not comply with the Contract Documents.
- C. Bolted Connections: Shop-bolted connections will be inspected according to RCSC's "Specification for Structural Joints Using ASTM A 325 or A 490 Bolts."
- D. Welded Connections: In addition to visual inspection, shop-welded connections will be tested and inspected according to AWS D1.1 and the following inspection procedures, at testing agency's option:
1. Liquid Penetrant Inspection: ASTM E 165.
 2. Magnetic Particle Inspection: ASTM E 709; performed on root pass and on finished weld. Cracks or zones of incomplete fusion or penetration will not be accepted.
 3. Ultrasonic Inspection: ASTM E 164.
 4. Radiographic Inspection: ASTM E 94.

PART 3 - EXECUTION

3.01 EXAMINATION

- A. Verify elevations of concrete- and masonry-bearing surfaces and locations of anchor rods, bearing plates, and other embedments, with steel erector present, for compliance with requirements.
- B. Proceed with installation only after unsatisfactory conditions have been corrected.

3.02 PREPARATION

- A. Provide temporary shores, guys, braces, and other supports during erection to keep structural steel secure, plumb, and in alignment against temporary construction loads and loads equal in intensity to design loads. Remove temporary supports when permanent structural steel, connections, and bracing are in place, unless otherwise indicated.

3.03 ERECTION

- A. Set structural steel accurately in locations and to elevations indicated and according to AISC's "Code of Standard Practice for Steel Buildings and Bridges" and "Specification for Structural Steel Buildings--Allowable Stress Design and Load Resistance Factor Design.
- B. Base Plates: Clean concrete- and masonry-bearing surfaces of bond-reducing materials, and roughen surfaces prior to setting base plates. Clean bottom surface of base plates.
 - 1. Set base plates for structural members on wedges, shims, or setting nuts as required.
 - 2. Weld plate washers to top of base plate.
 - 3. Snug-tighten anchor rods after supported members have been positioned and plumbed. Do not remove wedges or shims but, if protruding, cut off flush with edge of base plate before packing with grout.
 - 4. Promptly pack grout solidly between bearing surfaces and base plates so no voids remain. Neatly finish exposed surfaces; protect grout and allow to cure. Comply with manufacturer's written installation instructions for shrinkage-resistant grouts.
- C. Maintain erection tolerances of structural steel within AISC's "Code of Standard Practice for Steel Buildings and Bridges."
- D. Align and adjust various members forming part of complete frame or structure before permanently fastening. Before assembly, clean bearing surfaces and other surfaces that will be in permanent contact with members. Perform necessary adjustments to compensate for discrepancies in elevations and alignment.
 - 1. Level and plumb individual members of structure.

- E. Splice members only where indicated.
- F. Do not use thermal cutting during erection
- G. Do not enlarge unfair holes in members by burning or using drift pins. Ream holes that must be enlarged to admit bolts.

3.04 FIELD CONNECTIONS

A. High-Strength Bolts: Shop install high-strength bolts according to RCSC's "Specification for Structural Joints Using ASTM A 325 or A 490 Bolts" for type of bolt and type of joint specified.

1. Joint Type: Slip-Critical

B. Weld Connections: Comply with AWS D1.1 for welding procedure specifications, tolerances, appearance, and quality of welds and for methods used in correcting welding work.

1. Comply with AISC's "Code of Standard Practice for Steel Buildings and Bridges" and "Specification for Structural Steel Buildings--Allowable Stress Design and Load Resistance Factor Design" for bearing, adequacy of temporary connections, alignment, and removal of paint on surfaces adjacent to field welds.

3.05 FIELD QUALITY CONTROL

A. Testing Agency: Contractor will engage a qualified independent testing and inspecting agency to inspect field welds and high-strength bolted connections.

B. Bolted Connections: Shop-bolted connections will be inspected according to RCSC's "Specification for Structural Joints Using ASTM A 325 or A 490 Bolts."

C. Welded Connections: Field welds will be visually inspected according to AWS D1.1.

1. In addition to visual inspection, field welds will be tested according to AWS D1.1 and the following inspection procedures, at testing agency's option:

a. Liquid Penetrant Inspection: ASTM E 165.

b. Magnetic Particle Inspection: ASTM E 709; performed on root pass and on finished weld. Cracks or zones of incomplete fusion or penetration will not be accepted.

c. Ultrasonic Inspection: ASTM E 164.

d. Radiographic Inspection: ASTM E 94.

- D. Correct deficiencies in Work that test reports and inspections indicate does not comply with the Contract Documents.

3.06 REPAIRS AND PROTECTION

- A. Repair damaged galvanized coatings on galvanized items with galvanized repair paint according to ASTM A 780 and manufacturer's written instructions
- B. Touchup Painting: Cleaning and touchup painting are specified in Section – 09 9000 Painting.

END OF SECTION

SECTION 05 5000

METAL FABRICATIONS

PART 1 GENERAL

1.01 SECTION INCLUDES

- A. Shop fabricated steel and aluminum items.
- B. Prefabricated ladders and ship ladders.
- C. Cast Aluminum Bollards.

1.02 RELATED REQUIREMENTS

- A. Section 01 7419 - Construction Waste Management
- B. Section 01 8113 - Sustainable Building Requirements
- C. Section 03 3000 - Cast-in-Place Concrete: Placement of metal fabrications in concrete.
- D. Section 09 9100 - Painting: Paint finish.

1.03 REFERENCE STANDARDS

- A. ASTM A36/A36M - Standard Specification for Carbon Structural Steel; 2014.
- B. ASTM A53/A53M - Standard Specification for Pipe, Steel, Black and Hot-Dipped, Zinc-Coated, Welded and Seamless; 2012.
- C. ASTM A123/A123M - Standard Specification for Zinc (Hot-Dip Galvanized) Coatings on Iron and Steel Products; 2015.
- D. ASTM A153/A153M - Standard Specification for Zinc Coating (Hot-Dip) on Iron and Steel Hardware; 2009.
- E. ASTM A283/A283M - Standard Specification for Low and Intermediate Tensile Strength Carbon Steel Plates; 2013.
- F. ASTM A307 - Standard Specification for Carbon Steel Bolts, Studs, and Threaded Rod 60 000 PSI Tensile Strength; 2014.
- G. ASTM A501/A501M - Standard Specification for Hot-Formed Welded and Seamless Carbon Steel Structural Tubing; 2014.

- H. ASTM B26/B26M - Standard Specification for Aluminum-Alloy Sand Castings; 2014.
- I. AWS D1.1/D1.1M - Structural Welding Code - Steel; 2015 (Errata 2016).
- J. SSPC-Paint 20 - Zinc-Rich Primers (Type I, "Inorganic," and Type II, "Organic"); 2002 (Ed. 2004).

1.04 SUBMITTALS

- A. See Section 01 3000 - Administrative Requirements, for submittal procedures.
- B. Product Data: Submit manufacturer's product data including description of materials, components, finishes, fabrication details, anchors, accessories and installation instructions.
- C. Shop Drawings: Indicate profiles, sizes, connection attachments, reinforcing, anchorage, size and type of fasteners, and accessories. Include erection drawings, elevations, and details where applicable.
- D. Recycled Content: Provide submittals for materials with recycled content in accordance with Section 01 8113, Sustainable Building Requirements.
- E. Welders' Certificates: Submit certification for welders employed on the project, verifying AWS qualification within the previous 12 months.

PART 2 PRODUCTS

2.01 MATERIALS - STEEL

- A. Steel Sections: ASTM A36/A36M.
- B. Steel Tubing: ASTM A501/A501M hot-formed structural tubing.
- C. Plates: ASTM A283/A283M.
- D. Pipe: ASTM A53/A53M, Grade B Schedule 40, black finish.
- E. Bolts, Nuts, and Washers: ASTM A307, Grade A, galvanized to ASTM A153/A153M where connecting galvanized components.
- F. Welding Materials: AWS D1.1/D1.1M; type required for materials being welded.
- G. Touch-Up Primer for Galvanized Surfaces: SSPC-Paint 20, Type I - Inorganic, complying with VOC limitations of authorities having jurisdiction.

2.02 MATERIALS - ALUMINUM

2.03 FABRICATION

- A. Fabricate items with joints tightly fitted and secured.
- B. Grind exposed joints flush and smooth with adjacent finish surface. Make exposed joints butt tight, flush, and hairline. Ease exposed edges to small uniform radius.
- C. Supply components required for anchorage of fabrications. Fabricate anchors and related components of same material and finish as fabrication, except where specifically noted otherwise.

2.04 FABRICATED ITEMS

- A. Standpipe Guards: As detailed; steel, galvanized with painted finish.

2.05 PREFABRICATED BOLLARDS

A. Aluminum Bollard

- 1. Basis of Design: DG4 Surface Mount Bollard, Urban Accessories, www.urbanaccessories.com.
- 2. Material:
 - a. Base: Cast 100 percent recycled aluminum, ASTM B26/B26M.
 - b. Cap: Cast Silicon-Bronze.
- 3. Base Finish: Manufacturer's standard powder coat finish.
- 4. Color: To be selected from manufacturer's full line of colors.

B. Steel Bollard

- 1. Basis of Design: Bolt Down Bollard, Encore Commercial Products, Inc.; www.postguard.com.
- 2. Size: 4 inch diameter, 36 inches high.
- 3. Base Plate: 8 x 8 inches, 0.55 inches thick.
- 4. Material: Schedule D steel pipe.
- 5. Finish: Manufacturer's standard powder coat.

6. Color: White.

7. Anchor Bolts: As recommended by manufacturer.

2.06 FABRICATION

- A. Fit and shop assemble items in largest practical sections, for delivery to site.
- B. Fabricate items with joints tightly fitted and secured.
- C. Continuously seal joined members by continuous welds.
- D. Grind exposed joints flush and smooth with adjacent finish surface. Make exposed joints butt tight, flush, and hairline. Ease exposed edges to small uniform radius.
- E. Exposed Mechanical Fastenings: Flush countersunk screws or bolts; unobtrusively located; consistent with design of component, except where specifically noted otherwise.
- F. Supply components required for anchorage of fabrications. Fabricate anchors and related components of same material and finish as fabrication, except where specifically noted otherwise.

2.07 FINISHES - STEEL

- A. Galvanizing: Galvanize after fabrication to ASTM A123/A123M requirements.
- B. Primer: See Section 09 9113.

2.08 FABRICATION TOLERANCES

- A. Squareness: 1/8 inch (3 mm) maximum difference in diagonal measurements.
- B. Maximum Offset Between Faces: 1/16 inch (1.5 mm).
- C. Maximum Misalignment of Adjacent Members: 1/16 inch (1.5 mm).
- D. Maximum Bow: 1/8 inch (3 mm) in 48 inches (1.2 m).
- E. Maximum Deviation From Plane: 1/16 inch (1.5 mm) in 48 inches (1.2 m).

PART 3 EXECUTION

3.01 EXAMINATION

- A. Verify that field conditions are acceptable and are ready to receive work.

3.02 INSTALLATION

- A. Install items plumb and level, accurately fitted, free from distortion or defects.
- B. Provide for erection loads, and for sufficient temporary bracing to maintain true alignment until completion of erection and installation of permanent attachments.
- C. Obtain approval prior to site cutting or making adjustments not scheduled.

3.03 TOLERANCES

- A. Maximum Variation From Plumb: 1/4 inch (6 mm) per story, non-cumulative.
- B. Maximum Offset From True Alignment: 1/4 inch (6 mm).
- C. Maximum Out-of-Position: 1/4 inch (6 mm).

END OF SECTION

SECTION 05 5200

METAL RAILINGS

PART 1 GENERAL

1.01 SECTION INCLUDES

- A. Barrier Cable Railing

1.02 RELATED REQUIREMENTS

- A. Section 01 7419 - Construction Waste Management.
- B. Section 01 8113 - Sustainable Building Requirements.
- C. Section 05 7300 - Decorative Metal Railings
- D. Section 09 9100 - Painting: Paint finish.
- E. Section 32 1600 - Curbs, Gutters, Sidewalks, and Driveways: Placement of anchors in concrete.

1.03 REFERENCE STANDARDS

- A. ADA Standards - Americans with Disabilities Act (ADA) Standards for Accessible Design; 2010.
- B. ASTM A153/A153M - Standard Specification for Zinc Coating (Hot-Dip) on Iron and Steel Hardware; 2009.
- C. ASTM A283/A283M - Standard Specification for Low and Intermediate Tensile Strength Carbon Steel Plates; 2013.
- D. ASTM A307 - Standard Specification for Carbon Steel Bolts, Studs, and Threaded Rod 60 000 PSI Tensile Strength; 2014.
- E. ASTM A325 - Standard Specification for Structural Bolts, Steel, Heat Treated, 120/105 ksi Minimum Tensile Strength; 2014.
- F. ASTM A325M - Standard Specification for Structural Bolts, Steel, Heat Treated 830 MPa Minimum Tensile Strength (Metric); 2014.
- G. ASTM A36/A36M - Standard Specification for Carbon Structural Steel; 2014.
- H. ASTM A475 - Standard Specification for Zinc-Coated Steel Wire Strand; 2003 (Reapproved 2014).

- I. ASTM A53/A53M - Standard Specification for Pipe, Steel, Black and Hot-Dipped, Zinc-Coated, Welded and Seamless; 2012.
- J. ASTM A123/A123M - Standard Specification for Zinc (Hot-Dip Galvanized) Coatings on Iron and Steel Products; 2015.
- K. ASTM A500/A500M - Standard Specification for Cold-Formed Welded and Seamless Carbon Steel Structural Tubing in Rounds and Shapes; 2013.
- L. ASTM A501/A501M - Standard Specification for Hot-Formed Welded and Seamless Carbon Steel Structural Tubing; 2014.
- M. ASTM A780/A780M - Standard Practice for Repair of Damaged and Uncoated Areas of Hot-Dip Galvanized Coatings; 2009 (Reapproved 2015).
- N. ASTM E935 - Standard Test Methods for Performance of Permanent Metal Railing Systems and Rails for Buildings; 2013.
- O. ASTM E985 - Standard Specification for Permanent Metal Railing Systems and Rails for Buildings; 2000 (Reapproved 2006).
- P. AWS A2.4 - Standard Symbols for Welding, Brazing, and Nondestructive Examination; 2012.
- Q. AWS D1.1/D1.1M - Structural Welding Code - Steel; 2015 (Errata 2016).

1.04 ADMINISTRATIVE REQUIREMENTS

- A. Coordination: Coordinate installation of anchorages for railings. Furnish setting drawings, templates, and directions for installing anchorages, including sleeves, concrete inserts, anchor bolts, and items with integral anchors, that are to be embedded in concrete or masonry. Deliver items to Project site in time for installation.

1.05 SUBMITTALS

- A. See Section 01 3000 - Administrative Requirements, for submittal procedures.
- B. Shop Drawings: Indicate profiles, sizes, connection attachments, anchorage, size and type of fasteners, and accessories.
 - 1. Include installation and fabrication details of all angles, posts or fabricated steel members needed and their anchoring into the structure.
 - 2. Indicate welded connections using standard AWS A2.4 welding symbols. Indicate net weld lengths.

3. Include the design engineer's seal and signature on each sheet of shop drawings.
- C. Structural Design Calculations: Include structural analysis signed and sealed by qualified structural engineer, indicating conformance to specified loading conditions in accordance with the IBC and PTI (Post-Tensioning Institute)
1. Calculation of tendons minimum force for anti-sag criteria.
 2. Calculation of tendons maximum force under impact and verification of acceptance criteria for each cable run.
 3. Verification of the maximum deflection criteria for the barrier under impact for each significant cable.
 4. Determination of the pre-tensioning requirements to cover all criteria above including losses unless a specific procedure is in place to compensate for seating losses.
 5. Provide a load summary of permanent/accidental forces applied by the barrier for verification of their acceptability by the project Engineer of Records.
 6. Design calculations for all steel posts, angles or hardware used in the construction of the barrier cable. Design should be based on impact forces including direct impact on steel posts used in the barrier construction.
- D. Hardware Data Sheets: shall be furnished upon request for each hardware component used in the cable anchoring system.
- E. Designer's Qualification Statement.
- F. Manufacturer's letter indicating approval of installer for this project.
- G. Manufacturer's Installation Instructions: Include stressing procedures and jacking forces to result in the final effective forces.
- H. Recycled Content: Provide submittals for materials with recycled content in accordance with Section 01 8113, Sustainable Building Requirements.
- I. Operation and Maintenance Manual: System maintenance and operations guide to the Owner providing at a minimum the following data:
1. Recommended inspection periodicity and procedures.
 2. Maintenance and repair procedures for minor damage (coating repair...).
 3. Action plan in case of major damage impairing the system functionality.

J. Stressing Records

1.06 QUALITY ASSURANCE

- A. Structural Designer Qualifications: Professional Structural Engineer experienced in design of this work and licensed in the State in which the Project is located, or personnel under direct supervision of such an engineer.
- B. Manufacturer's Qualifications: Company specializing in manufacturing products of the type specified in this section, with minimum five years of documented experience.
- C. Source Limitations: Obtain system components through one source from a single manufacturer. Obtain manufacturer's approval for any products not available through manufacturer.
- D. Welder Qualifications: AWS qualification within the previous 12 months.
- E. Installer Qualifications: Company specializing in installation of with minimum three years experience and approved by manufacturer.
- F. Warranty: Three (3) years on all materials, components and installation

1.07 WARRANTY

- A. Warranty: Three year warranty against defects in materials, fabrication, finishes, and installation commencing on Date of Substantial Completion.

PART 2 PRODUCTS

2.01 MANUFACTURERS

- A. Basis of Design: Barrier Cable Systems, Inc; www.barriercables.net.
- B. Accepted equal.

2.02 RAILINGS - GENERAL REQUIREMENTS

- A. Design, fabricate, and test railing assemblies in accordance with the most stringent requirements of ASTM E985 and applicable local code.
- B. Design Requirements: Barrier cable systems design must be capable of meeting both vehicular and pedestrian

1. Pedestrian Requirements

- a. Distributed Loads: Design railing assembly, wall rails, and attachments to resist distributed force of 75 pounds per linear foot (1095 N/m) applied to the top of the assembly and in any direction, without damage or permanent set. Test in accordance with ASTM E935.
- b. Concentrated Loads: Design railing assembly, wall rails, and attachments to resist a concentrated force of 200 pounds (890 N) applied at any point on the top of the assembly and in any direction, without damage or permanent set. Test in accordance with ASTM E935.

2. Vehicular Requirements

- a. Capable of withstanding a single live load of 9,600 pound applied horizontally in any direction and location (including columns and steel posts) to the barrier systems, with the load center acting at 27 inches above the driving floor or ramp surface over a 12 inch square (3-cables max) without exceeding the allowable barrier deflection of 18-inches.
 - b. Vehicular Barrier Minimum Height: 42 inches.
- C. Allow for expansion and contraction of members and building movement without damage to connections or members.
- D. Provide anchors and other components as required to attach to structure, made of same materials as railing components unless otherwise indicated; where exposed fasteners are unavoidable provide flush countersunk fasteners.

2.03 MATERIALS

A. Cable:

- 1. Type: 7 Wire steel strand, six wires spirally wrapped around one center wire.
- 2. Cable Coating:
 - a. Galvanized Prestressed Concrete Strand (GPC) Zinc Coating: Class A, ASTM A475, table 4.
 - b. Galvanized coating used for the barrier cable shall be free of damage. Small areas of damage may be repaired using the manufactures recommended methods when approved by responsible engineer of record

3. Minimum Strand Diameter (Vehicular Applications): 1/2inch minimum strand nominal diameter.
- B. Steel
1. Steel Sections: ASTM A36/A36M.
 2. Steel Tubing: ASTM A501/A501M hot-formed structural tubing.
 3. Plates: ASTM A283/A283M.
- C. Wire Mesh: Railing Type 4
1. Material: Galvanized Steel
 2. Openings: 2 x 4 inch.
 3. Weight: 0.5lbs/sqft or less.
 4. Attachment: Galvanized Hog Rings.
- D. Metal Screen: Railing Type 5
1. Material: Stainless Steel
 2. Openings: 41 percent.
 3. Weight: 0.5lbs/sqft or less.
 4. Attachment: Galvanized Hog Rings.
- E. Cable Hardware: Provide adjustable anchorages, anchors, anchorages, barrel anchors, donuts, inserts, and wedges as determined by manufacturer for installation.
- F. Bolts, Nuts, and Washers: ASTM A307 Grade A or B, galvanized to ASTM A153/A153M.
- G. Welding Materials: AWS D1.1/D1.1M; type required for materials being welded.
- H. Touch-Up Primer for Galvanized Surfaces: SSPC-Paint 20, Type I - Inorganic, complying with VOC limitations of authorities having jurisdiction

2.04 STEEL RAILING SYSTEM

- A. Steel Tube: ASTM A500/A500M, Grade B cold-formed structural tubing.

- B. Steel Pipe: ASTM A53/A53M, Grade B Schedule 80, galvanized finish.
- C. Welding Fittings: Factory- or shop-welded from matching pipe or tube; seams continuously welded; joints and seams ground smooth.
- D. Exposed Fasteners: Galvanized flush countersunk screws or bolts; consistent with design of railing. All exposed fasteners to be cut flush.
- E. Bolts, Nuts, and Washers: ASTM A325 (ASTM A325M), Type 1, galvanized to ASTM A153/A153M.
- F. Straight Splice Connectors: Steel concealed spigots.
- G. Welding Materials: AWS D1.1/D1.1M

2.05 FABRICATION

- A. Accurately form components to suit specific project conditions and for proper connection to building structure.
- B. Fit and shop assemble components in largest practical sizes for delivery to site.
- C. Fabricate components with joints tightly fitted to exclude water and secured.
- D. Supply components required for anchorage. Fabricate anchors and related components of same material and finish as fabrication, except where specifically noted otherwise.
- E. Welded Joints:
 - 1. Continuously seal joined pieces by continuous welds. Drill condensate drainage holes at bottom of members at locations that will not encourage water intrusion.
 - 2. Grind exposed joints flush and smooth with adjacent finish surface. Make exposed joints butt tight, flush, and hairline. Ease exposed edges to small uniform radius.
- F. Cut or grind all bolt extensions and other protrusions flush and smooth to prevent hazards.
- G. Galvanize components after fabrication.

2.06 FINISHES

- A. Steel: Galvanizing: Hot-dip galvanize to minimum requirements of ASTM A123/A123M.

PART 3 EXECUTION

3.01 EXAMINATION

- A. Verify that field conditions are acceptable and are ready to receive work.

3.02 PREPARATION

- A. Supply items required to be cast into concrete with setting templates, for installation as work of other sections.
- B. Separate all dissimilar metals from other metals susceptible to galvanic action by applying a bituminous coating, self-adhering rubberized asphalt sheet, or other approved permanent method.

3.03 INSTALLATION

- A. Install in accordance with manufacturer's instructions.
- B. Install components plumb and level, accurately fitted, free from distortion or defects, with tight joints.
- C. Install railings in compliance with ADA Standards for accessible design at applicable locations.
- D. Anchor railings securely to structure.
- E. Cut or grind all bolt extensions and other protrusions flush and smooth to prevent hazards.
- F. Repair damaged and uncoated areas of galvanized surfaces per ASTM A780/A780M.

3.04 Cable Stressing:

- A. Stress cables in accordance with manufacturer's procedures and jacking forces to result in the final effective force requirements.
- B. Maintain stressing records filled out by testing agency during stressing operations with the following information.
 - 1. Name of the project
 - 2. Date of approved installation drawings used for installation and stressing
 - 3. Floor number and concrete placement area.

4. Date of stressing operation.
5. Weather conditions including temperature and rainfall
6. Name and signature of inspector
7. Name of individual in charge of stressing operation
8. Serial or identification numbers of jacks and gage
9. Date of jack and gage calibration certifications
10. Gage pressure to achieve required stressing force per supplied calibration chart.
11. Tendon identification mark.
12. Actual gage pressure

3.05 TOLERANCES

- A. Maximum Variation From Plumb: 1/4 inch (6 mm) per floor level, non-cumulative.
- B. Maximum Offset From True Alignment: 1/4 inch (6 mm).
- C. Maximum Out-of-Position: 1/4 inch (6 mm).

END OF SECTION

SECTION 05 7300

DECORATIVE METAL RAILINGS

PART 1 GENERAL

1.01 SECTION INCLUDES

- A. Railing and guardrail assemblies.
- B. Free-standing railings at ramps or steps.

1.02 RELATED REQUIREMENTS

- A. Section 01 7419 - Construction Waste Management.
- B. Section 01 8113 - Sustainable Building Requirements.
- C. Section 05 5200 - Metal Railings

1.03 REFERENCE STANDARDS

- A. 16 CFR 1201 - Safety Standard for Architectural Glazing Materials; current edition.
- B. AAMA 2605 - Voluntary Specification, Performance Requirements and Test Procedures for Superior Performing Organic Coatings on Aluminum Extrusions and Panels (with Coil Coating Appendix); 2013.
- C. ADA Standards - Americans with Disabilities Act (ADA) Standards for Accessible Design; 2010.
- D. ASTM A312/A312M - Standard Specification for Seamless, Welded, and Heavily Cold Worked Austenitic Stainless Steel Pipes; 2017.
- E. ASTM A492 - Standard Specification for Stainless Steel Rope Wire; 1995 (Reapproved 2013).
- F. ASTM A276/A276M - Standard Specification for Stainless Steel Bars and Shapes; 2016a.
- G. ASTM A554 - Standard Specification for Welded Stainless Steel Mechanical Tubing; 2016.
- H. ASTM A666 - Standard Specification for Annealed or Cold-Worked Austenitic Stainless Steel Sheet, Strip, Plate, and Flat Bar; 2015.

- I. ASTM A743/A743M - Standard Specification for Castings, Iron-Chromium, Iron-Chromium-Nickel, Corrosion Resistant, for General Application; 2013ae1.
- J. ASTM B209 - Standard Specification for Aluminum and Aluminum-Alloy Sheet and Plate; 2014.
- K. ASTM B209M - Standard Specification for Aluminum and Aluminum-Alloy Sheet and Plate (Metric); 2014.
- L. ASTM E935 - Standard Test Methods for Performance of Permanent Metal Railing Systems and Rails for Buildings; 2013.
- M. AWS D1.6/D1.6M - Structural Welding Code - Stainless Steel; 2017.

1.04 ADMINISTRATIVE REQUIREMENTS

- A. Coordination: Coordinate installation of anchorages for railings. Furnish setting drawings, templates, and directions for installing anchorages, including sleeves, concrete inserts, anchor bolts, and items with integral anchors, that are to be embedded in concrete or masonry. Deliver items to Project site in time for installation.

1.05 SUBMITTALS

- A. See Section 01 3000 - Administrative Requirements, for submittal procedures.
- B. Product Data: Submit manufacturer's product data including description of materials, components, finishes, fabrication details, anchors, and accessories.
- C. Shop Drawings: Indicate railing system elevations and sections, details of profile, dimensions, sizes, connection attachments, anchorage, size and type of fasteners, and accessories. Indicate anchor and joint locations, brazed connections, transitions, and terminations.
- D. Design Calculations Submittal: Comply with performance requirements and design criteria, including analysis data signed and sealed by the qualified professional engineer responsible for their preparation.
- E. Samples: Submit two (2) of each item below for each type and condition shown.
 - 1. Metal Panel: 12 inch by 12 inch (305 mm by 305 mm), illustrating laser cutting, finish, color, thickness and edge condition.
 - 2. Railing: 12 inch (305 mm) long section of handrail illustrating color, finish and connection detail.
- F. Test Reports: Submit test reports from an independent testing agency showing compliance with specified design and performance requirements.

- G. Manufacturer's Installation Instructions.
- H. Manufacturer's letter indicating approval of installer for this project.
- I. Maintenance Data: Manufacturer's instructions for care and cleaning.
- J. Recycled Content: Provide submittals for materials with recycled content in accordance with Section 01 8113, Sustainable Building Requirements.
- K. Warranty: Submit manufacturer warranty and ensure that forms have been completed in Owner's name and registered with manufacturer.

1.06 QUALITY ASSURANCE

- A. Manufacturer's Qualifications: Company specializing in manufacturing products of the type specified in this section, with minimum five years of documented experience.
- B. Source Limitations: Obtain system components through one source from a single manufacturer. Obtain manufacturer's approval for any products not available through manufacturer.
- C. Structural Designer Qualifications: Professional Structural Engineer experienced in design of this work and licensed in the State in which the Project is located, or personnel under direct supervision of such an engineer.
- D. Welding Qualifications: AWS qualification within the previous 12 months.
- E. Installer Qualifications: Company specializing in installing decorative stairs and railing systems and acceptable to manufacturer.
- F. Templates: Supply installation templates, reinforcing and required anchorage devices.

1.07 DELIVERY, STORAGE, AND HANDLING

- A. Deliver materials in factory provided protective coverings and packaging.
- B. Protect materials against damage during transit, delivery, storage, and installation at site.
- C. Inspect materials upon delivery for damage. Repair damage to be indistinguishable from undamaged areas; if damage cannot be repaired to be indistinguishable from undamaged parts and finishes, replace damaged items.
- D. Prior to installation, store materials and components under cover, in a dry location.

PART 2 PRODUCTS

2.01 MANUFACTURERS

- A. Basis-of-Design: VIVA Railings, LLC; www.vivarailings.com.
 - 1. Types 1 and 2: CUBE Railing.
 - 2. Type 3: FSR Railing System.
- B. Other Acceptable Manufacturers: Subject to compliance with requirements:
 - 1. C.R. Laurence Company Co., Inc.; www.crl-arch.com.
 - 2. Morse Industries; www.morseindustries.com.
 - 3. Wagner Architectural Systems; www.wagnerarchitectural.com.
 - 4. Accepted equal.

2.02 DESIGN CRITERIA

- A. General: Factory- or shop-fabricated in design indicated, to suit specific project conditions, and for proper connection to building structure
- B. Performance Requirements: Design and fabricate railings and anchorages to resist the following loads without failure, damage, or permanent set; loads do not need to be applied simultaneously.
 - 1. Lateral Force: 75 lb (333 N) minimum, at any point, when tested in accordance with ASTM E935.
 - 2. Distributed Load: 50 lb/ft (0.73 kN per m) minimum, applied in any direction at the top of the handrail, when tested in accordance with ASTM E935.
 - 3. Concentrated Loads on Intermediate Rails: 50 psf (0.22 kgs per sq m), minimum.
 - 4. Concentrated Load: 200 lbs (888 N) minimum, applied in any direction at any point along the handrail system, when tested in accordance with ASTM E935.
 - 5. Handrails: Comply with applicable accessibility requirements of ADA Standards.

- C. Expansion Joints: Provide slip-joint internal sleeve expansion joints to accommodate thermal movement.

2.03 MATERIALS:

A. Steel:

1. Tubing: Grade MT 316 or 316L, ASTM A554.
2. Pipe: Grade TP 316 or 316L, ASTM A312/A312M.
3. Castings: Grade CF 8M or CF 3M, ASTM A743/A743M.
4. Sheet, Strip, Plate, and Flat Bar: Type 316 or 316L, ASTM A666.
5. Bars and Shapes: Type 316 or 316L, ASTM A276/A276M.

B. Wire Rope Components: Railing Type 2.

1. Wire Rope: 1-by-19 wire rope, Type 316, ASTM A492.
2. Fittings: Type 316 stainless steel, and with capability to sustain, without failure, a load equal to minimum breaking strength of wire rope with which they are used.

C. Laser Cut Metal Panel: Railing Type 1

1. Aluminum Plate: ASTM B209 (ASTM B209M)
2. Thickness: 0.125 inch (3.18 mm) minimum thickness.
3. Finish: PVDF Superior Performing Organic Coating.
4. Pattern: As indicated.

2.04 FABRICATION

- A. Fabricate railings to comply with requirements indicated for design, dimensions, member sizes and spacing, details, finish, and anchorage[, but not less than that required to support structural loads
- B. Assemble railings in the shop to greatest extent possible to minimize field splicing and assembly.
- C. Assembly: Join lengths, seal open ends, and conceal exposed mounting bolts and nuts using slip-on non-weld mechanical fittings, flanges, escutcheons, and wall brackets. Use connections that maintain structural value of joined pieces.

1. Joints: Tightly fitted and secured, machined smooth with hairline seams.
 2. Fabricate connections that will be exposed to weather in a manner to exclude water. Provide weep holes where water may accumulate. Locate weep holes in inconspicuous locations.
- D. Field Connections: Provide sleeves to accommodate site assembly and installation.
- E. Welded and Joints: Make exposed joints butt tight, flush, and hairline; use methods that avoid discoloration and damage of finish; grind smooth, polish, and restore to required finish.
1. Ease exposed edges to small uniform radius.
 2. Welded Joints: Perform welding in accordance with AWS D1.6/D1.6M
- F. Provide inserts and other anchorage devices for connecting railings to concrete. Fabricate anchorage devices capable of withstanding loads imposed by railings. Coordinate anchorage devices with supporting structure.
- G. Metal Panel:
1. Laser cut panel as indicted.
 2. Finish panel after fabrication.
- H. Illuminated Handrail: Handrail with integral LED-strip fixture system to illuminate walking surfaces adjacent to railings without light leaks
1. Basis of Design: VIVA Railings, LLC; iRAIL
 2. Components:
 - a. Railing: 1-1/2-inch (38-mm) diameter type 316 stainless steel.
 - b. Light Output: 185 lumens/ft.
 - c. Light Angle: 120 degrees.
 - d. Orientation: 30 degrees, asymmetrical.
 - e. LED Lens: Selected from manufacturer's full line.
 - f. Power Supply: As required to meet project requirements.

2.05 FINISHES

A. Stainless Steel:

1. Dull Satin Finish: No. 6, unless otherwise indicated.

B. PVDF Superior Performing Organic Coating:

1. Two-coat, thermally cured polyvinylidene fluoride (PVDF) system, AAMA 2605.
2. Color: Custom color, to match anodized curtainwall color.

2.06 ACCESSORIES

A. Anchors and Fasteners: Provide anchors and other materials as required to attach to structure, made of same materials as railing components unless otherwise indicated; where exposed fasteners are unavoidable provide flush countersunk fasteners.

1. Type 1 and 2 Mounting: As indicated.
2. Type 3 Mounting: Top mounted with cover plate

B. Non-Weld Mechanical Fittings: Manufacturer's standard type 316 stainless steel in-line fittings, with flush setscrews for tightening by standard hex wrench, no bolts or screw fasteners.

C. Fasteners:

1. Select fasteners of type, grade, and class required to produce connections suitable for anchoring railings to other types of construction indicated and capable of withstanding design loads.
2. Material: Type 316 Stainless Steel.

D. Welding Rods and Bare Electrodes: Select according to AWS specifications for metal alloy welded.

PART 3 EXECUTION

3.01 EXAMINATION

- A. Verify that substrate and site conditions are acceptable and ready to receive work.
- B. Verify field dimensions of locations and areas to receive work.

- C. Notify Architect immediately of conditions that would prevent satisfactory installation.
- D. Do not proceed with work until detrimental conditions have been corrected.
- E. Furnish components to be installed in other work to installer of that other work, including but not limited to blocking, sleeves, inserts, anchor bolts, embedded plates and supports for attachment of anchors.

3.02 PREPARATION

- A. Review installation drawings before beginning installation. Coordinate diagrams, templates, instructions and directions for installation of anchorages and fasteners.
- B. Clean surfaces to receive units. Remove materials and substances detrimental to the installation.

3.03 INSTALLATION

- A. Comply with manufacturer's drawings and written instructions.
- B. Install components plumb and level, accurately fitted, free from distortion or defects and with tight joints, except where necessary for expansion.
- C. Anchor securely to structure.
- D. Conceal anchor bolts and screws whenever possible. Where not concealed, use flush countersunk fastenings.
- E. Isolate dissimilar materials with bituminous coating, bushings, grommets or washers to prevent electrolytic corrosion.

3.04 TOLERANCES

- A. Maximum Variation From Plumb: 1/4 inch (6 mm) per floor level, non-cumulative.
- B. Maximum Offset From True Alignment: 1/4 inch (6 mm).
- C. Maximum Out-of-Position: 1/4 inch (6 mm).

3.05 CLEANING

- A. Remove protective film from exposed metal surfaces.

- B. Metal: Clean exposed metal finishes with potable water and mild detergent, in accordance with manufacturer recommendations; do not use abrasive materials or chemicals, detergents or other substances that may damage the material or finish.

3.06 PROTECTION

- A. Protect installed components and finishes from damage after installation.
- B. Repair damage to exposed finishes to be indistinguishable from undamaged areas.
 - 1. If damage to finishes and components cannot be repaired to be indistinguishable from undamaged finishes and components, replace damaged items.

END OF SECTION

SECTION 06 1000

ROUGH CARPENTRY

PART 1 - GENERAL

1.1 GENERAL REQUIREMENTS

As specified in SECTION 01 000 - GENERAL REQUIREMENTS.

1.2 RELATED REQUIREMENTS

- A. SECTION 01 7419 – CONSTRUCTION WASTE MANAGEMENT
- B. SECTION 01 8113 – SUSTAINABLE BUILDING REQUIREMENTS

1.3 SUMMARY

- A. This Section includes the following for rough carpentry:
 - 1. Structural roof framing including, but not limited to structural beams.
 - 2. Wall and Roof Sheathing.
 - 3. Miscellaneous framing and sheathing.
- B. Related Sections:
 - 1. SECTION 06 3110 – PRESERVATIVE TREATED LUMBER

1.4 SUBMITTALS

- A. Submit in accordance with SECTION 01 3000 - SUBMITTALS.
- B. Certificates: Provide a certificate of treatment showing compliance with the specifications and a certificate of dryness for all wood specified to be dried after treatment.
- C. Shop Drawings: Indicate beam type, spacing, locations, anchorages, and special conditions.
- D. Low/ Emitting Materials/VOC Content: Provide submittals for low emitting materials in accordance with SECTION 01 8113, SUSTAINABLE BUILDING REQUIREMENTS
- E. Certified Wood: Provide submittals for materials with certified wood in accordance with SECTION 01 8113, SUSTAINABLE BUILDING REQUIREMENTS
- F. Rapidly Renewable Products Provide submittals for materials with rapidly renewable content in accordance with SECTION 01 8113, SUSTAINABLE

BUILDING REQUIREMENTS

1.5 QUALITY ASSURANCE

Grading Marks: Factory mark each piece of lumber and plywood with type grade, mill and grading by a recognized agency. May be submitted with each shipment in lieu of factory marking at Contractor's option. For exposed lumber or lumber used as exposed trim, grading marks must be placed on backside of lumber. Each sheet of plywood shall be marked by a recognized association or independent inspection agency that maintains continuing control over the quality of the plywood. The mark shall identify the plywood by species group or span rating, exposure durability classification, grade and compliance with PS-1.

1.6 DELIVERY, STORAGE, AND HANDLING

Keep materials dry at all times. Protect against exposure to weather and contact with dry or wet surfaces. Stack lumber and plywood and provide air circulation within stacks.

1.7 GRADING AND MARKING

- A. Lumber: Mark each piece of framing and board lumber or each bundle of small pieces of lumber with the grade mark of recognized association or independent inspection agency. Such association or agency shall be certified by the Board Review, American Lumber Standards Committee, to grade the species used.
- B. Plywood: Mark each sheet with the mark of recognized association or independent inspection agency that maintains continuing control over quality of the plywood. The mark shall identify the plywood by species group or span rating, exposure durability classification, grade and compliance with PS 1.
- C. Preservative Treated Lumber: As specified in SECTION 06311 – PRESERVATIVE TREATED LUMBER.

1.8 SIZES AND SURFACING

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

1.9 MOISTURE CONTENT

- A. Air-dry or kiln-dry lumber. Kiln-dry treated lumber after treatment. Maximum moisture content of wood products shall be as follows at the time of delivery to the job site.
 - 1. Framing Lumber and Boards – 19 percent maximum
 - 2. Materials other than Lumber – Moisture content shall be in accordance with standard under which product was produced.

1.10 COORDINATION

Fit carpentry work to other work. Scribe and cope as required for accurate fit. Correlate location of furring, nailers, blocking, grounds and similar supports to allow proper attachment of other work.

PART 2 - PRODUCTS

2.1 MATERIALS

- A. Lumber, General: Factory mark each piece of lumber with type, grade mill and grading agency. For exposed lumber or lumber used as exposed trim, place grading marks on backside.
 - 1. Structural Lumber: Douglas Fir-Larch No. 1, S4S, preservative treated
 - 2. Decking: 2x6 Douglas Fir; Commercial Decking with minimal knot holes that shall be tight or plugged. Provide sample of decking to be used to University.
- B. Plywood: Comply with U.S. Product Standard PS 1-74 for plywood, Group 1, Douglas Fir unless otherwise specified or noted. Use exterior grade only without visible patches or repairs on exposed sides. For roof sheathing use Structural II, C-D EXT-APA. For wall sheathing use Structural II C-D EXT-APA.
- C. Miscellaneous Materials - Fasteners and Anchorages: Provide size, type, material and finish as indicated and as recommended by applicable standards, complying with applicable ASTM Specifications for nails, staples, screws, bolts, nuts, washers and anchoring devices. Provide metal hangers and framing anchors of the size and type recommended by the manufacturer or as shown on the plans for each use including recommended nails. Hot-dip galvanize all fasteners and anchorages in accordance with ASTM A153
- D. Moisture Barrier: ASTM D 226, Type I (No. 15) asbestos-free, asphalt saturated roofing felt.

2.2 METAL CONNECTORS – EXTERIOR AND INTERIOR USE:

Galvanized 10 G185.

2.3 ROUGH HARDWARE

- A. Unless otherwise indicated or specified, rough hardware shall be the type and size necessary for the project requirements. Sizes, types, and spacing of fasteners of manufactured building materials shall be as recommended by the product manufacturer unless otherwise indicated or specified. Rough hardware shall be hot-dipped zinc-coated (ASA 153)
- B. Bolts and Nuts: ANSI B18.2.1, ANSI B18.5, and ANSI B18.2.2.

- C. Expansion Shields: CID A-A-1924. Except as shown otherwise, maximum size of devices in Groups IV, V, VI, and VII shall be 3/8 inch.
- D. Lag Screws and Lag Bolts: ANSI B18.2.1.
- E. Toggle Bolts: Fed. Spec. FF-B-588.
- F. Wood Screws: ANSI B18.6.1.
- G. Wire Nails: Fed. Spec. FF-N-105, galvanized.
- H. Panel Edge Clips: Extruded aluminum or galvanized steel, H-shaped clips to prevent differential deflection of roof sheathing.

PART 3 - EXECUTION

3.1 INSTALLATION, GENERAL

- A. Discard units of material with defects which might impair quality of work, and units which are too small to use in fabricating work with minimum joints or optimum joint arrangement.
- B. Set carpentry work accurately to required levels and lines, with members plumb and true and accurately cut and fitted. Set structural members level and plumb, in correct position. Make provisions for erection loads, and for sufficient temporary bracing to maintain structure safe, plumb, and true alignment until completion of erection and installation of permanent bracing.
- C. Securely attach carpentry work to substrate by anchoring and fastening as shown and as required by recognized standards. Countersink nail heads on exposed carpentry work and fill holes.
- D. Use common wire nails, except as otherwise indicated. Use finishing nails for finish work. Select fasteners of sizes that will not penetrate members where opposite side will be exposed to view or will receive finish materials. Make tight connections between members. Install fasteners without splitting of wood. Pre-drill as required.
- E. Place horizontal members crown side down.
- F. Construct load bearing framing member's full length without splices.
- G. Install metal connectors per manufacturer's recommendations to develop full capacity of connection.
- H. Coordinate installation of wood decking.

3.2 PLYWOOD INSTALLATION

- A. Comply with applicable recommendations contained in Form No. e3304 “APA Design/Construction Guide – Residential and Commercial” for types of plywood products and applications indicated.
- B. Secure roof sheathing with longer edge (strength axis) perpendicular to framing members and with ends staggered and sheet ends over bearing.
- C. Provide stainless steel spacers between all roof sheathing.

3.3 WOOD FRAMING

- A. Provide framing members of sizes and spacing shown and frame openings as shown, or if not shown, comply with recommendation of “Manual for House Framing” of National Forest Products Association (NFPA).
- B. Do not splice structural members between supports.
- C. Anchor and nail as shown, and comply with “Recommended Nailing Schedule” of “Manual for House Framing” and other recommendation of NFPA.

END OF SECTION

SECTION 07 1400

FLUID-APPLIED WATERPROOFING

PART 1 GENERAL

1.01 SECTION INCLUDES

- A. Fluid-Applied Waterproofing:
 - 1. Polyurethane waterproofing.

1.02 RELATED REQUIREMENTS

- A. Section 01 7419 - Construction Waste Management
- B. Section 01 8113 - Sustainable Building Requirements
- C. Section 01 8116 - Construction Indoor Air Quality
- D. Section 03 3000 - Cast-in-Place Concrete: Concrete substrate.

1.03 REFERENCE STANDARDS

- A. ASTM C1471/C1471M - Standard Guide for the Use of High Solids Content Cold Liquid-Applied Elastomeric Waterproofing Membrane on Vertical Surfaces; 2005.
- B. ASTM C836/C836M - Standard Specification for High Solids Content, Cold Liquid-Applied Elastomeric Waterproofing Membrane for Use with Separate Wearing Course; 2015.
- C. ASTM C898/C898M - Standard Guide for Use of High Solids Content, Cold Liquid-Applied Elastomeric Waterproofing Membrane with Separate Wearing Course; 2017.
- D. ASTM D1777 - Standard Test Method for Thickness of Textile Materials; 1996 (Reapproved 2015).
- E. ASTM D3786/D3786M - Standard Test Method for Hydraulic Bursting Strength of Knitted Goods and Nonwoven Fabrics--Diaphragm Bursting Strength Tester Method; 2013.
- F. ASTM D412 - Standard Test Methods for Vulcanized Rubber and Thermoplastic Elastomers--Tension; 2006a (Reapproved 2015a).
- G. ASTM D4258 - Standard Practice for Surface Cleaning Concrete for Coating; 2005 (Reapproved 2012).

- H. ASTM D4491 - Standard Test Methods for Water Permeability of Geotextiles by Permittivity; 1999a (Reapproved 2014).
- I. ASTM D4833/D4833M - Standard Test Method for Index Puncture Resistance of Geomembranes, and Related Products; 2007, with Editorial Revision (2013).
- J. ASTM D2240 - Standard Test Method for Rubber Property--Durometer Hardness; 2015.
- K. NRCA (WM) - The NRCA Waterproofing Manual; 2005.

1.04 ADMINISTRATIVE REQUIREMENTS

- A. Preinstallation Meeting: Convene a meeting at least one week prior to starting work; require attendance of affected installers; invite Manufacturer's Representative, Architect and Owner.

1.05 SUBMITTALS

- A. See Section 01 3000 - Administrative Requirements, for submittal procedures.
- B. Product Data: Submit manufacturer's product data including description of materials, components, and accessories.
- C. Shop Drawings: Show locations for waterproofing system components. Show details for each type of substrate, joints, corners, and edge conditions, including flashings, counterflashings, penetrations, transitions, and terminations.
- D. Manufacturer's Installation Instructions: Indicate special procedures, perimeter conditions requiring special attention, and acceptable installation temperatures.
- E. Low/ Emitting Materials/VOC Content: Provide submittals for low emitting materials in accordance with Section 01 8113, Sustainable Building Requirements
- F. Warranty:
 - 1. Submit manufacturer warranty and ensure that forms have been completed in Owner's name and registered with manufacturer.
 - 2. Submit installer's certification that installation complies with warranty conditions for the waterproofing membrane.

1.06 QUALITY ASSURANCE

- A. Manufacturer Qualifications: Company specializing in manufacturing products specified in this section, with not less than three years documented experience.

- B. Installer Qualifications: Company specializing in performing work of the type specified and with at least three years of documented experience and approved by manufacturer.
- C. Source Limitations: Obtain system components through one source from a single manufacturer. Obtain manufacturer's approval for any products not available through manufacturer.

1.07 1.8 DELIVERY, STORAGE AND HANDLING

- A. Deliver in manufacturer's original, unopened, undamaged containers with identification labels intact.
- B. Store materials in manufacturer's unopened packaging protected from exposure to harmful environmental conditions and at temperature and humidity conditions recommended by the manufacturer.

1.08 WARRANTY

- A. See Section 01 7800 - Closeout Submittals, for additional warranty requirements.
- B. Contractor shall correct defective Work within a five year period after Date of Substantial Completion; remove and replace materials concealing waterproofing at no cost to Owner.
- C. Provide five year manufacturer warranty for waterproofing failing to resist penetration of water, except where such failures are the result of structural failures of building. Hairline cracking of concrete due to temperature change or shrinkage is not considered a structural failure.

PART 2 PRODUCTS

2.01 MANUFACTURERS

- A. Basis of Design: TREMproof 250GC, Tremco Commercial Sealants & Waterproofing; www.tremcosealants.com/#sle.
- B. Other Acceptable Manufacturers:
 - 1. AVM Industries, Inc: www.avmindustries.com/#sle.
 - 2. Carlisle Coatings & Waterproofing, Inc: www.carlisleccw.com/#sle.
 - 3. Gaco Western: www.gaco.com/#sle.
 - 4. Master Builders Solutions by BASF: www.master-builders-solutions.basf.us/en-us/#sle.

5. Accepted equal.

2.02 FLUID APPLIED WATERPROOFING MATERIALS

- A. Polyurethane Waterproofing: Cold-applied one or two component polyurethane, complying with ASTM C836/C836M.
 1. Basis of Design: TREMproof 250GC, Tremco Commercial Sealants & Waterproofing.
 2. Cured Thickness: 60 mils, 0.060 inch (1.52 mm), minimum.
 3. VOC Content: None.
 4. Tensile Strength: 200 psi (1,380 MPa), measured in accordance with ASTM D412.
 5. Ultimate Elongation: 600 percent, measured in accordance with ASTM D412.
 6. Durometer Hardness, Type 00, 50 minutes: 87, minimum, in accordance with ASTM D2240.

2.03 ACCESSORIES

- A. Sealant for Joints and Cracks in Substrate: Type compatible with waterproofing material and as recommended by waterproofing manufacturer.
- B. Drainage Panel: Drainage layer with geotextile filter fabric on earth side.
 1. Composition: Dimpled polystyrene core; polypropylene or polyester filter fabric.
 2. Basis of Design: TREMDrain 1000, Tremco Commercial Sealants & Waterproofing.
 - a. Thickness: 7/16 inches (11 mm), ASTM D1777.
 - b. Puncture Strength: 65 lbf (289 N), ASTM D4833/D4833M
 - c. Mullen Burst Strength: 225 psi (1,551 kPa), ASTM D3786/D3786M.
 - d. Flow Rate: 165 gpm/square foot, ASTM D4491.

PART 3 EXECUTION

3.01 EXAMINATION

- A. Verify existing conditions before starting work.
- B. Verify substrate surfaces are free of dampness, loose particles, cracks, pits, projections, penetrations, or foreign matter detrimental to adhesion or application of waterproofing system.
- C. Verify that substrate surfaces are smooth, free of honeycomb or pitting, and not detrimental to full contact bond of waterproofing materials.
- D. Verify items that penetrate surfaces to receive waterproofing are securely installed.

3.02 PREPARATION

- A. Protect adjacent surfaces from damage not designated to receive waterproofing.
- B. Clean and prepare surfaces to receive waterproofing in accordance with manufacturer's instructions.
- C. Prepare and treat joints and cracks in substrate per ASTM D4258 and waterproofing manufacturer's written instructions.
- D. Prepare non-moving shrinkage cracks, large cracks, construction joints, expansion joints, projections and protrusions, penetrations, drains, and changes in plane in accordance with waterproofing manufacturer's instructions and details.

3.03 INSTALLATION

- A. Install waterproofing to specified minimum thickness in accordance with manufacturers instructions and NRCA (WM) applicable requirements.
- B. Apply in single pass at minimum thickness of 60 mils (1.5 mm) wet.
- C. Apply extra thickness of waterproofing material at corners, intersections, and angles.
- D. Terminations: Install terminations of waterproofing membrane in accordance with ASTM C898/C898M and ASTM C1471/C1471M as applicable to application, at not less than minimum height recommended by waterproofing manufacturer.

3.04 INSTALLATION - DRAINAGE PANEL

- A. Membrane must be fully cured or set prior to placement of the drainage.
- B. Place drainage panel directly against membrane.
- C. Seams should tightly abut or slightly overlap the flange so that the filter fabric just overlaps. The seam shall then be taped with underground rated.
- D. Fasten above the waterproofing termination and adhere with adhesive. Do not mechanically fasten through the cold fluid applied waterproofing membrane.

3.05 PROTECTION

- A. Do not permit traffic over unprotected or uncovered membrane.

END OF SECTION

SECTION 07 1713

BENTONITE PANEL WATERPROOFING

PART 1 GENERAL

1.01 SECTION INCLUDES

- A. Bentonite clay waterproofing panels and accessories.
- B. Drainage panels.

1.02 RELATED REQUIREMENTS

- A. Section 01 7419 – Construction Waste Management.
- B. Section 01 8113 – Sustainable Building Requirements.

1.03 REFERENCE STANDARDS

- A. ASTM D4833/D4833M - Standard Test Method for Index Puncture Resistance of Geomembranes, and Related Products; 2007, with Editorial Revision (2013).
- B. ASTM D5385/D5385M - Standard Test Method for Hydrostatic Pressure Resistance of Waterproofing Membranes; 1993, with Editorial Revision (2014).
- C. ASTM D903 - Standard Test Method for Peel or Stripping Strength of Adhesive Bonds; 1998 (Reapproved 2010).
- D. NRCA ML104 - The NRCA Roofing and Waterproofing Manual; Fifth Edition, with interim updates.

1.04 ADMINISTRATIVE REQUIREMENTS

- A. Preinstallation Meeting:
 - 1. Review preparation and installation procedures and coordinating and scheduling required with related work.
 - 2. Representatives of the General Contractor, DOE, Installer, and Manufacturer shall be present at pre-installation conference.

1.05 SUBMITTALS

- A. See Section 01 3000 - Administrative Requirements, for submittal procedures.
- B. Product Data: Provide product criteria, characteristics, accessories, jointing and seaming methods, and termination conditions.

- C. Shop Drawings: Indicate required flashings and control joints, sealing at penetrations.
- D. Manufacturer's Installation Instructions: Indicate special preparation of substrate, panel attachment methods, and perimeter conditions requiring special attention.
- E. Warranty: Submit manufacturer warranty and ensure forms have been completed in Owner's name and registered with manufacturer.

1.06 QUALITY ASSURANCE

- A. Manufacturer Qualifications: Company specializing in manufacturing products of the type specified in this section, with minimum five years of documented experience.
- B. Source Limitations: Obtain system components through one source from a single manufacturer. Obtain manufacturer's approval for any products not available through manufacturer.
- C. Perform Work in accordance with 1.
- D. Installer Qualifications: Company specializing in performing the work of this section approved by manufacturer.

1.07 DELIVERY, STORAGE, AND HANDLING

- A. Deliver materials in factory sealed and labeled packaging.
- B. Maintain bentonite products dry. Protect with waterproof cover.

1.08 WARRANTY

- A. See Section 01770 – Closeout Procedures
- B. Provide five year manufacturer warranty for waterproofing failing to resist penetration of water.
 - 1. Exception: Where such failures are the result of structural failures of building. Hairline cracking of concrete due to temperature change or shrinkage is not considered a structural failure.
- C. The Surety shall not be held liable beyond two years from the project acceptance date.

PART 2 PRODUCTS

2.01 MANUFACTURERS

- A. Basis of Design: CETCO; www.cetco.com.
- B. Other Acceptable Manufacturers:
 - 1. Epro Waterproofing Systems: www.eproserv.com.
 - 2. Tremco Commercial Sealants and Waterproofing: www.tremcosealants.com.

2.02 MATERIALS

- A. Geotextile-Faced Panels: Interlocked geotextiles encapsulating granular sodium bentonite. Composite shall consist of one woven and one nonwoven polypropylene geotextile with a polymer liner bonded to the outside non woven geotextile.
 - 1. Basis of Design: Voltex DS, CETCO.
 - 2. Properties:
 - a. Minimum Bentonite Fill: 1.1 pounds per square foot (5.4 kg/sq m).
 - b. Peel Adhesion to Concrete: 15 lbs/in (2.6kN/m min), ASTM D903
 - c. Hydrostatic Pressure Resistance: 231 ft (70 m), ASTM D5385/D5385M
 - d. Puncture Resistance: 140 lbs (620 N), ASTM D4833/D4833M
- B. Drainage Mat
 - 1. Basis of Design: Aquadrain 15XP, CETCO; www.cetco.com.
 - 2. Three-dimensional polypropylene drainage core with a nonwoven geotextile adhered to one side to allow water passage while restricting soil particles. Composite includes a thin polyethylene sheet on the back of the drainage core.
 - a. Compressive Strength, 15,000psf (718 kPa);
 - b. Water Flow Rate: 20gpm/ft (251 l/m/m).
 - c. Thickness: 7/16 inch (11 mm).

2.03 ACCESSORIES

- A. Termination Bar: Min. 1/8 inch thick by 1 inch (25 mm) wide stainless steel or aluminum termination bar with pre-punched holes punched 6" (150 mm) on center.
- B. Seam Tape: Butyl rubber sealant tape.
- C. Mastic: Trowel-grade bentonite-based mastic.
- D. Sealant: Single-component polyether general sealant and adhesive.
- E. Flashing: Self-adhering flashing membrane.
- F. Protection Board: 1/8 inch (3.2 mm) thick biodegradable hardboard.

PART 3 EXECUTION

3.01 EXAMINATION

- A. Verify existing conditions before starting work.
- B. Verify substrate surfaces are smooth and durable; free of matter detrimental to application of waterproofing system.

3.02 PREPARATION

- A. Clean and prepare surfaces to receive waterproofing in accordance with manufacturer's instructions.
- B. Remove concrete fins, projections, and form ties.
- C. Fill holes, cracks, honeycombs, and voids with bentonite gel seal, minimum 1/8 inch (3 mm) thick, extending minimum 3 inches (75 mm) beyond defect.

3.03 APPLICATION - GENERAL

- A. Install panels in accordance with manufacturer's instructions.
- B. Cut panels parallel to corrugations to prevent bentonite loss.
- C. Seal construction joints with joint seal.

3.04 APPLICATION - VERTICAL SURFACES

- A. Install single-ply panels with masonry nails, starting at base of foundation.

- B. Fold panels around corners with corrugations vertical. Install unfolded panels with corrugations horizontal.
- C. Lap adjoining panels 1-1/2 inches (38 mm).
- D. Stagger vertical joints at mid-panel on succeeding courses.
- E. Install one extra layer of panels at external and internal corners.
- F. Place joint packing continuous along junction of wall and footing. Secure to prevent movement.

3.05 APPLICATION - BELOW SLABS

- A. Place polyethylene sheet over subgrade; lap joints 4 inches (100 mm).
- B. Lay single-ply panels in slab form. Align panels with edge of slab. Do not lay panels over pile caps or footings supporting slab edges. Stagger joints of adjoining panel rows.
- C. Lap joints 1-1/2 inch (38 mm). Secure laps to prevent displacement.
- D. Extend panels up vertical surfaces minimum 12 inches (300 mm) to overlap vertically applied bentonite panels.
- E. Install joint seal in 1 inch (25 mm) high beads around penetrations through panels and 1/2 inch (13 mm) high beads around chair legs not placed on pads. Cover beads with polyethylene sheet collars, cut to size.
- F. Lay joint seal continuously along and around protrusions, penetrations, and at abutting walls. Secure to prevent movement.

3.06 INSTALLATION - DRAINAGE PANEL and PROTECTION BOARD

- A. Place drainage panel directly over waterproofing, butt joints, place to encourage drainage downward.
- B. Place protection board over drainage panel; butt joints.
- C. Scribe and cut boards around projections, penetrations, and interruptions.
- D. Adhere protection board to substrate with mastic.

3.07 PROTECTION

- A. Do not permit traffic over unprotected or uncovered waterproofing.

- B. Cover installed waterproofing with temporary polyethylene sheeting. Remove sheeting just before backfilling begins.

END OF SECTION

SECTION 07 1800

TRAFFIC COATINGS

PART 1 GENERAL

1.01 SECTION INCLUDES

- A. Coating for waterproofing and traffic surface

1.02 RELATED REQUIREMENTS

- A. Section 03 3000 - Cast-In-Place Concrete.

1.03 REFERENCE STANDARDS

- A. ASTM D1004 - Standard Test Method for Tear Resistance (Graves Tear) of Plastic Film and Sheeting; 2013.
- B. ASTM D2240 - Standard Test Method for Rubber Property--Durometer Hardness; 2015.
- C. ASTM D412 - Standard Test Methods for Vulcanized Rubber and Thermoplastic Elastomers--Tension; 2006a (Reapproved 2015a).
- D. ASTM D4541 - Standard Test Method for Pull-Off Strength of Coatings Using Portable Adhesion Testers; 2017.
- E. ASTM F710 - Standard Practice for Preparing Concrete Floors to Receive Resilient Flooring; 2011.
- F. ICRI 310.2R - Selecting and Specifying Concrete Surface Preparation for Sealers, Coatings, Polymer Overlays, and Concrete Repair; 2013.

1.04 ADMINISTRATIVE REQUIREMENTS

- A. Coordinate placement of substrate work in Section 03 3000 with requirements for traffic coating. Verify admixtures, curing method, use of any curing agents and finish are compatible with traffic coating requirements.
- B. Preinstallation Meeting:
 - 1. Conduct a preinstallation meeting prior to the start of the work of this section to review conditions, installation procedures, schedules and coordination with other work.

2. Require attendance of parties directly affecting work of this section, including Contractor, owner's representative, applicator, manufacturer's representative and all affected installers of other work.

1.05 SUBMITTALS

- A. See Section 01 3000 - Administrative Requirements, for submittal procedures.
- B. Product Data: Include product characteristics and limitations. Identify dissolving solvents, fuels, and potential destructive compounds.
- C. Selection Samples: For each finish product specified, two complete sets of color chips representing manufacturer's full range of standard colors..
- D. Applicator Approval: Letter from manufacturer stating applicator is approved to install the specified vehicular traffic coating system on this project.
- E. Manufacturer's Installation Instructions: Include special field conditions required to install traffic membrane and potential incompatibilities with adjacent materials.
- F. Maintenance Data: Include procedures for stain removal, repairing surface, and cleaning.

1.06 QUALITY ASSURANCE

- A. Manufacturer Qualifications: Company specializing in manufacturing products of the type specified in this section, with not less than three years of documented experience.
- B. Source Limitations: Obtain system components through one source from a single manufacturer. Obtain manufacturer's approval for any products not available through manufacturer.
- C. Applicator Qualifications: Company specializing in performing installation of traffic membrane, with minimum three years documented experience and approved by manufacturer.

1.07 FIELD SAMPLE

- A. Install a field sample of at least 100 square feet at the project site or pre-selected area as agreed to by owner's representative, applicator and manufacturer.
- B. Apply material in accordance with manufacturer's written application instructions.

- C. Field sample will be standard for judging color and texture on remainder of project.
- D. Maintain field sample during construction for workmanship comparison.
- E. Do not alter, move, or destroy field sample until work is completed and approved by Owner's representative.

1.08 DELIVERY, STORAGE, AND HANDLING

- A. Deliver and store materials in original sealed containers, clearly marked with supplier's name, brand name and type of material.
- B. Do not store at high temperatures or in direct sunlight. Keep away from fire or open flame.

1.09 WARRANTY

- A. See Section 01 7800 - Closeout Submittals, for additional warranty requirements.
- B. Correct defective Work within a five year period after Date of Substantial Completion.
- C. Provide five year manufacturer warranty for delamination of system from substrate and degradation of waterproofing ability.

PART 2 PRODUCTS

2.01 MANUFACTURERS

- A. Basis of Design: Auto-Gard, Neogard Division of Jones-Blair Company:
www.neogard.com.
- B. Other Acceptable Manufacturers::
 - 1. Gaco Western: www.gaco.com/#sle.
 - 2. Pacific Polymers International, Inc: www.pacpoly.com.
 - 3. Pecora Corporation: www.pecora.com.
 - 4. Tremco Commercial Sealants & Waterproofing:
www.tremcosealants.com/#sle.

2.02 MATERIALS

- A. Primer: As recommended by manufacturer for project.
- B. Base Coat:
 - 1. Basis of Design: Neogard 70410, single-component, moisture-cured aromatic urethane.
 - 2. Properties:
 - a. Tensile Strength: 1,200 psi, ASTM D412.
 - b. Elongation: 400 percent, ASTM D412.
 - c. Tear Resistance: 100 pli, ASTM D1004.
 - d. Adhesion: 300 psi, ASTM D4541.
 - e. Hardness: Shore A 70-75, ASTM D2240
- C. Wearing and Top Coat:
 - 1. Basis of Design: Neogard 7430, a single-component, moisture-cured aromatic urethane.
 - 2. Properties:
 - a. Tensile Strength: 2,500 psi, ASTM D412.
 - b. Elongation: 400 percent, ASTM D412.
 - c. Tear Resistance: 200 pli, ASTM D1004.
 - d. Adhesion: 300 psi, ASTM D4541.
 - e. Hardness: Shore A 70-75, ASTM D2240
- D. Aggregate: Silica Quartz Sand Aggregate uniformly graded (16-30 mesh) hard aggregate.

PART 3 EXECUTION

3.01 EXAMINATION

- A. Verify that substrate is ready to receive work, surface is clean, dry and free of substances that could adversely affect bond.

- B. Do not begin work until concrete substrate has cured at least 28 days and moisture content is 16 percent or less. Minimum of 4,000 psi compressive strength.
- C. Test concrete surfaces according to ASTM F710 for acceptable level of alkalinity.

3.02 PREPARATION

- A. Clean substrate surface free of foreign matter and contaminated surfaces.
- B. Shot-Blasting: Mechanically prepare surface by shot-blasting to industry standard surface texture of CSP3–CSP4, ICRI 310.2R
- C. Repair any damaged concrete in accordance with manufacturer's requirements.
- D. Protect adjacent surfaces.

3.03 INSTALLATION

- A. Apply system materials in accordance with manufacturer's instructions.

3.04 PROTECTION

- A. After completion of application, do not allow traffic on coated surfaces for a period of at least 72 hours or completely cured.

END OF SECTION

SECTION 07 1900

WATER REPELLENTS

PART 1 GENERAL

1.01 SECTION INCLUDES

- A. Water repellents applied to exterior and interior concrete surfaces.

1.02 REFERENCE STANDARDS

- A. ICRI 310.2R - Selecting and Specifying Concrete Surface Preparation for Sealers, Coatings, Polymer Overlays, and Concrete Repair; 2013.
- B. NCHRP Report 244 - Concrete Sealers for Protection of Bridge Structures; 1981.

1.03 ADMINISTRATIVE REQUIREMENTS

- A. Preinstallation Meeting: Convene a meeting at least one week prior to starting work; require attendance of affected installers; invite Manufacturer's Representative, Architect and Owner.

1.04 SUBMITTALS

- A. See Section 01 3000 - Administrative Requirements, for submittal procedures.
- B. Product Data: Provide product description, limitations, and chemical composition.
- C. Manufacturer's Installation Instructions: Indicate special procedures and conditions requiring special attention; cautionary procedures required during application.
- D. Manufacturer's qualification statement.
- E. Installer's qualification statement.

1.05 QUALITY ASSURANCE

- A. Manufacturer Qualifications: Company specializing in manufacturing products specified in this section, with not less than three years documented experience.
- B. Installer Qualifications: Company specializing in performing work of type specified and with at least three years of documented experience

1.06 MOCK-UP

- A. Prepare a representative surface 36 inch by 36 inch (0.91 m by 0.91 m) in size using specified materials and preparation and application methods on surfaces identical to those to be coated; approved mock-up constitutes standard for workmanship.
- B. Locate where directed.
- C. Mock-up may remain as part of the Work.

1.07 WARRANTY

- A. See Section 01 7800 - Closeout Submittals, for additional warranty requirements.
- B. Correct defective Work within a five year period after Date of Substantial Completion.
- C. Provide five year manufacturer warranty for defective materials.

PART 2 PRODUCTS

2.01 MANUFACTURERS

- A. Basis of Design: Sikagard 701W, Sika Corporation, www.usa.sika.com.
- B. Other Acceptable Manufacturers:
 - 1. BASF Construction Chemicals: www.buildingsystems.basf.com.
 - 2. Dayton Superior Corporation: www.daytonsuperior.com.
 - 3. Evonik Corporation: www.evonik.com/#sle.
 - 4. Pecora Corporation: www.pecora.com.
 - 5. PROSOCO, Inc: www.prosoco.com.
 - 6. The QUIKRETE Companies: www.quikrete.com.
 - 7. Sherwin-Williams Company: www.sherwin-williams.com.
 - 8. Tnemec Company, Inc: www.tnemec.com.
 - 9. Accepted equal.

2.02 MATERIALS

- A. Water Repellent: Non-glossy, colorless, penetrating, water-vapor-permeable, non-yellowing sealer, that dries invisibly leaving appearance of substrate unchanged.
 - 1. Solids: 50 percent concentrated (silane modified siloxane polymer)
 - 2. No solvents, silicates, fluosilicates, or stearates.
 - 3. Number of Coats: As required to obtain manufacturer's recommended coverage rate of 125 square feet per gallon.
- B. Performance Criteria: NCHRP Report 244, Series II Tests.
 - 1. Reduction in Water Absorption: 91 percent.
 - 2. Water Vapor Transmission: 100 percent.
 - 3. Reduction in Cl ion intrusion: 90 percent.
 - 4. Water Absorption: 0.97 percent.

PART 3 EXECUTION

3.01 EXAMINATION

- A. Verify existing conditions before starting work.
- B. Verify joint sealants are installed and cured.

3.02 PREPARATION

- A. Protection of Adjacent Work:
 - 1. Protect adjacent landscaping, property, and vehicles from drips and overspray.
 - 2. Protect adjacent surfaces not intended to receive water repellent.
- B. Prepare surfaces to be coated as recommended by water repellent manufacturer and ICRI 310.2R for sealers.
- C. Remove dust, laitance, grease, oils, curing compounds, form release agents and all foreign particles by mechanical means.

- D. Remove oil and foreign substances with a chemical solvent that will not affect water repellent.
- E. Scrub and rinse surfaces with water and let dry.

3.03 APPLICATION

- A. Apply water repellent in accordance with manufacturer's instructions, using procedures and application methods recommended as producing the best results.
- B. Apply two coats, minimum.
- C. Remove water repellent from unintended surfaces immediately by a method instructed by water repellent manufacturer.

END OF SECTION

SECTION 07 5605

FLUID-APPLIED ROOFING

PART 1 GENERAL

1.01 SECTION INCLUDES

- A. Repair of existing roof.
- B. Fluid applied roofing membrane for application on an existing metal and membrane roof.
- C. Accessories.

1.02 RELATED REQUIREMENTS

- A. Section 01 7419 – Construction Waste Management.
- B. Section 01 8113 – Sustainable Building Requirements.

1.03 REFERENCE STANDARDS

- A. ASTM B117 - Standard Practice for Operating Salt Spray (Fog) Apparatus; 2016.
- B. ASTM D1777 - Standard Test Method for Thickness of Textile Materials; 1996 (Reapproved 2015).
- C. ASTM D2370 - Standard Test Method for Tensile Properties of Organic Coatings; 2016.
- D. ASTM D3787 - Standard Test Method for Bursting Strength of Textiles—Constant-Rate-of-Traverse (CRT) Ball Burst Test; 2019.
- E. ASTM D412 - Standard Test Methods for Vulcanized Rubber and Thermoplastic Elastomers--Tension; 2006a (Reapproved 2015a).
- F. ASTM D4798/D4798M - Standard Practice for Accelerated Weathering Test Conditions and Procedures for Bituminous Materials (Xenon-Arc Method); 2016.
- G. ASTM D5034 - Standard Test Method for Breaking Strength and Elongation of Textile Fabrics (Grab Test); 2017.
- H. ASTM E96/E96M - Standard Test Methods for Water Vapor Transmission of Materials; 2016.

- I. ASTM G29 - Standard Practice for Determining Algal Resistance of Polymeric Films; 2016.
- J. NRCA (RM) - The NRCA Roofing Manual; 2017.
- K. NRCA (RMLSMRM) - NRCA Repair Manual for Low-slope Membrane Roof Systems; 1997.

1.04 ADMINISTRATIVE REQUIREMENTS

- A. Preinstallation Meeting: Convene meeting after examination of existing roof at least one week prior to application work of this section.
 - 1. Attendees: Owner, Architect, Contractor, Manufacturer's Representative, Subcontractor and Applicator who will be overseeing the work.
 - 2. Review results of the moisture survey results and examination of existing roof. Confirm repair and preparation procedures for each substrate necessary to provide suitable substrate for fluid applied roof system.
 - 3. Review preparation and installation procedures and coordinating and scheduling required with related work.
 - 4. Review warranty and criteria to meet warranty requirements.

1.05 SUBMITTALS

- A. See Section 01 33 00 - Submittal Procedures.
- B. Product Data: Provide manufacturer's data including SRI for membrane and accessory materials.
- C. Shop Drawings: Indicate flashing, special joint or termination conditions and conditions of interface with other materials.
- D. Manufacturer's Certificates:
 - 1. Certificate designating its representative for the project and attesting that this person is both qualified and authorized to act on its behalf in regards to design, inspection and approvals of the roofing system to meet the requirements for its warranty.
 - 2. Certificate that products meet or exceed specified requirements.
 - 3. Certificate the applicator is qualified and authorized by the manufacturer for application of their products for this project.

- E. Installer's Qualifications: Documentation of installer has experience in both fluid applied and modified bitumen roofing systems.
- F. Manufacturer's Installation Instructions: Include standard installation instructions, acceptable installation temperature range, and procedures for unusual perimeter conditions.
- G. Warranty: Submit manufacturer warranty and ensure forms have been completed in Owner's name and registered with manufacturer.

1.06 QUALITY ASSURANCE

- A. Manufacturer Qualifications: Company specializing in manufacture of fluid-applied roofing or waterproofing systems with 5 years experience manufacturing type of product specified.
- B. Source Limitations: Obtain system components through one source from a single manufacturer. Obtain manufacturer's approval for any products not available through manufacturer.
- C. Installer Qualifications: Company specializing in installation of fluid-applied roofing or waterproofing systems and modified bitumen roofing systems.
 - 1. Approved by roofing manufacturer.
 - 2. Five years of documented experience.

1.07 DELIVERY, STORAGE & HANDLING

- A. Deliver products in manufacturer's original containers, dry, undamaged, with seals and labels intact.
- B. Store products out of direct sunlight in weather protected environment, clear of ground and moisture.

1.08 FIELD CONDITIONS

- A. Environmental Requirements: Proceed with installation only when existing and forecast environmental conditions permit work to be performed according to product manufacturers' specified requirements.

1.09 WARRANTY

- A. See Section 01 7800 - Closeout Submittals, for additional warranty requirements.

- B. Provide 20 year manufacturer warranty that roofing membrane will not crack, split, or flake under normal weather conditions and will not fail to resist penetration of water during that time period.

PART 2 PRODUCTS

2.01 MANUFACTURERS

- A. Fluid-Applied Roofing:
 - 1. Basis of Design: HydroStop PremiumCoat Roof System, GAF; www.gaf.com.
- B. Other Acceptable Manufacturer's:
 - 1. AVM Industries, Inc: www.avmindustries.com.
 - 2. IPS Roofing Products: www.metacrylics.com/#sle.

2.02 MATERIALS

- A. Fluid-Applied Roofing: Cold-applied; single-component or two component; water-based acrylic elastomeric, approved by manufacturer for permanent exposure to weather and sunlight.
 - 1. Cured Thickness: 52 mils (1.5 mm), minimum, applied in three coats.
 - 2. Suitable for installation over metal, concrete, built-up bituminous, and single-ply sheet roofing substrates.
 - 3. Elongation of Membrane (40 mils DFT): ASTM D4798/D4798M and ASTM D2370.
 - a. MD: 36 percent at 8000 hrs weathering
 - b. CD: 41 percent at 8000 hrs weathering
 - 4. Tensile Strength (40 mils DFT): 2210 psi (13,789 MPa), minimum, measured in accordance with ASTM D412.
 - 5. Water vapor permeability (40 mils DFT): 3-5 perms; a Class III vapor retarder, ASTM E96/E96M.
 - 6. Salt Stray: No effects, ASTM B117
 - 7. Algae Resistance: 0 Rating, ASTM G29.

8. Color: White.
9. SRI: 78 minimum.

B. Components:

1. Primer: As recommended by manufacturer for substrate.
2. Foundation and Saturation Coats: PremiumCoat FoundationCoat, flexible, water-based, 100 percent acrylic polymer resin coatings.
3. Fabric: PremiumCoat Fabric, polyester, non-woven, stitch-bonded and heat-set fabric.
 - a. Weight: 3 ounces / per square yard (102 grams/sqm).
 - b. Elongation at Break MD: 26 percent, CD: 64 percent, ASTM D5034.
 - c. Ball Burst: 109 lbs. (49 kg), ASTM D3787.
 - d. Thickness: 0.018 inches (0.457 mm), ASTM D1777.
4. FinishCoat: PremiumCoat FinishCoat, ultraviolet light-resistant blend of flexible, water-based, 100 percent acrylic polymer resin coating.
 - a. Color: White

2.03 ACCESSORIES

- A. Provide flashings, and bulking agents as recommended by manufacturer for project conditions.
- B. Sealant, polymer modified cementitious slurry, bulking material and other materials as necessary and recommended by manufacturer for installation of roofing system.
- C. Existing Roof Repair Materials: Provide materials necessary to repair existing roof as recommended by manufacturer and the NRCA (RMLSMRM).

PART 3 EXECUTION

3.01 EXAMINATION

- A. Verify existing conditions prior to starting this work.

- B. Perform moisture survey investigation as recommended by manufacturer to determine the suitability of the existing roof for application.
- C. Adhesion Test: Perform adhesion test in accordance with manufacturer's instructions to ensure minimum adhesion requirements
- D. Verify Roof has adequate slope and does not have areas of ponding.
- E. Verify substrate surfaces are free of loose particles, cracks, pits, projections, penetrations, or foreign matter detrimental to adhesion or application of roofing system.
- F. Verify that roof openings, curbs, and items that penetrate surfaces to receive roofing materials are securely and properly installed.

3.02 PREPARATION

- A. Make all necessary repairs to substrate. Remove and replace wet substrates and insulation, if applicable. Prepare
- B. Clean and prepare surfaces to receive roofing in accordance with manufacturer's instructions and recommendations.
- C. After completion of substrate preparation, treat flashing details, penetrations, curbs or other designated locations with manufacturer's details and instructions.
- D. Protect adjacent surfaces not designated to receive roofing.

3.03 INSTALLATION

- A. Install fluid-applied roofing in accordance with NRCA (RM) and manufacturer's instructions and recommendations.
- B. Apply primer or surface conditioner at a rate recommended by manufacturer, and protect surface conditioner from rain.
- C.
- D. Apply extra thickness of roofing material at corners, intersections, and angles, when recommended by roofing manufacturer.

3.04 PROTECTION

- A. Protect installed roofing and flashings from construction operations.

- B. Where traffic must proceed over installed roofing materials, protect surfaces using durable materials acceptable to roofing material manufacturer.
- C. Repair damaged areas in accordance with manufacturer's instructions.

END OF SECTION

SECTION 07 9100

PREFORMED JOINT SEALS

PART 1 GENERAL

1.01 SECTION INCLUDES

- A. Preformed joint seals
- B. Joint covers.

1.02 RELATED REQUIREMENTS

- A. Section 07 9200 - Joint Sealants: Liquid and mastic joint sealants and their backing materials.

1.03 REFERENCE STANDARDS

1.04 SUBMITTALS

- A. See Section 01 3000 - Administrative Requirements, for submittal procedures.
- B. Product Data: Manufacturer's technical data sheets for each product, including chemical composition, movement capability, color availability, limitations on application, and installation instructions.
- C. Color Cards: For color selection.
- D. Manufacturer's Qualification Statement.
- E. Installer's Qualification Statement.

1.05 QUALITY ASSURANCE

- A. Manufacturer Qualifications: Company specializing in manufacturing the products specified in this section with minimum three years documented experience.
- B. Installer Qualifications: Company specializing in performing work of the type specified in this section with at least three years of documented experience.

1.06 WARRANTY

- A. See Section 01 7800 - Closeout Submittals, for additional warranty requirements.

- B. Correct defective work within a two year period after Date of Substantial Completion.
- C. Warranty: Include coverage for installed sealers that fail to achieve watertight seal or exhibit loss of adhesion or cohesion.

PART 2 PRODUCTS

2.01 MANUFACTURERS

- A. Basis of Design: Watson Bowman Acme Corp.; www.wbacorp.com.
- B. Other Acceptable Manufacturers:
 - 1. D. S. Brown: www.dsbrown.com
 - 2. Inpro Corporation: www.Inprocorp.com
 - 3. M M Systems: www..mm--usa..com.
 - 4. Nystrom, Inc: www.nystrom.com/#sle.

2.02 PREFORMED SEALS

- A. Basis of Design: 75FW, Jeene; Watson Bowman Acme Corp.
- B. Joint Gap: 3 inches (76 mm) wide by 4.75 inches (121 mm) deep.
- C. Movement Requirement: Plus or minus 35 percent.
- D. Structural sealing preformed extruded neoprene seal pressurized during installation and curing time of adhesive complete bonding throughout gap/profile surfaces.
- E. Properties:
 - 1. Tensile Strength: 2,000 psi (13.8 Mpa) minimum, ASTM D412.
 - 2. Elongation at Break: 250 percent minimum, ASTM D412.
 - 3. Heat Resistance (70 hours), ASTM D573
 - a. Tensile Loss: 20 percent maximum.
 - b. Elongation Loss: 20 percent maximum.
 - c. Change in Hardness: 10 points maximum

4. Ozone Resistance (70 hours): No cracks, ASTM D1149.

F. Adhesive: Two component epoxy based as recommended by manufacturer.

2.03 JOINT COVER

A. Basis of Design: SFP-600, Wabo SafetyFlex; Watson Bowman Acme Corp.

B. Molded elastomeric rubber encapsulated, steel hinged cover system capable of spanning joint opening based upon movement requirements.

C. Rubber Cover Properties:

1. Tensile Strength: 1,500 psi (10.4 Mpa) minimum, ASTM D412.

2. Ultimate Elongation: 350 percent minimum, ASTM D412.

3. Heat Resistance (70 hours), ASTM D573

a. Tensile Loss: 25 percent maximum.

b. Elongation Loss: 25 percent maximum.

c. Change in Hardness: 10 points maximum

4. Ozone Resistance (70 hours): 100 quality retention rating, ASTM D1149.

D. Color: Selected from manufacturer's available colors.

E. Anchors: Stainless steel as recommended by manufacturer for project conditions.

PART 3 EXECUTION

3.01 EXAMINATION

A. Verify that joints are ready to receive this work.

B. Measure joint dimensions and verify that seal products are of the correct size to properly seal the joints.

3.02 INSTALLATION

A. Install in accordance with manufacturer's typical details and written instructions

B. Install only when ambient temperature is within recommended application temperature range of adhesive. Consult manufacturer when installing outside this temperature range.

C. Preformed Seals

1. Remove all foreign materials and debris which may be detrimental to sealing the joint.
2. Clean and prepare joint interfaces by disc grinding or sandblasting and then vacuumed or blown with dry.
3. Apply adhesive, install seal and pressurize to assure complete bond.

D. Joint Cover

1. Align work plumb and level, flush with adjacent surfaces.
2. Rigidly anchor to substrate to prevent misalignment.

3.03 CLEANING

A. Clean adjacent soiled surfaces.

3.04 PROTECTION

A. Protect joints from damage until adhesives have properly cured.

END OF SECTION

SECTION 07 9200

JOINT SEALANTS

PART 1 GENERAL

1.01 SECTION INCLUDES

- A. Nonsag gunnable joint sealants.
- B. Self-leveling pourable joint sealants.
- C. Joint backings and accessories.

1.02 RELATED REQUIREMENTS

- A. Section 01 7419 - Construction Waste Management.
- B. Section 01 8113 - Sustainable Building Requirements.

1.03 REFERENCE STANDARDS

- A. ASTM C661 - Standard Test Method for Indentation Hardness of Elastomeric-Type Sealants by Means of a Durometer; 2006 (Reapproved 2011).
- B. ASTM C920 - Standard Specification for Elastomeric Joint Sealants; 2014.
- C. ASTM C1193 - Standard Guide for Use of Joint Sealants; 2016.
- D. ASTM C1248 - Standard Test Method for Staining of Porous Substrate by Joint Sealants; 2008 (Reapproved 2012).
- E. ASTM C1330 - Standard Specification for Cylindrical Sealant Backing for Use with Cold Liquid-Applied Sealants; 2002 (Reapproved 2013).
- F. ASTM C1521 - Standard Practice for Evaluating Adhesion of Installed Weatherproofing Sealant Joints; 2013.

1.04 SUBMITTALS

- A. See Section 01 3000 - Administrative Requirements, for submittal procedures.
- B. Product Data for Sealants: Submit manufacturer's technical data sheets for each product to be used, that includes the following.
 - 1. Physical characteristics, including movement capability, VOC content, hardness, cure time, and color availability.

2. List of backing materials approved for use with the specific product.
 3. Substrates that product is known to satisfactorily adhere to and with which it is compatible.
 4. Substrates the product should not be used on.
 5. Substrates for which use of primer is required.
 6. Substrates for which laboratory adhesion and/or compatibility testing is required.
 7. Installation instructions, including precautions, limitations, and recommended backing materials and tools.
- C. Product Data for Accessory Products: Submit manufacturer's technical data sheet for each product to be used, including physical characteristics, installation instructions, and recommended tools.
- D. Color Cards for Selection: Where sealant color is not specified, submit manufacturer's color cards showing standard colors available for selection.
- E. Low/ Emitting Materials/VOC Content: Provide submittals for low emitting materials in accordance with Section 01 8113 - Sustainable Building Requirements.
- F. Preinstallation Field Adhesion Test Reports: Submit filled out Preinstallation Field Adhesion Test Reports log within 10 days after completion of tests; include bagged test samples and photographic records.
- G. Field Quality Control Log: Submit filled out log for each length or instance of sealant installed, within 10 days after completion of inspections/tests; include bagged test samples and photographic records, if any.

1.05 QUALITY ASSURANCE

- A. Manufacturer Qualifications: Company specializing in manufacturing the products specified in this section with minimum three years documented experience.
- B. Installer Qualifications: Company specializing in performing the work of this section and with at least three years of documented experience and approved by manufacturer.
- C. Preinstallation Field Adhesion Test Plan: Include destructive field adhesion testing of one sample of each combination of sealant type and substrate, except interior acrylic latex sealants, and include the following for each tested sample.

1. Preinstallation Field Adhesion Test Log Form: Include the following data fields, with known information filled out.
 - a. Test date.
 - b. Location on project.
 - c. Sealant used.
 - d. Copy of test method documents.
 - e. Age of sealant upon date of testing.
 - f. Test results, modeled after the sample form in the test method document.
 - g. Indicate use of photographic record of test.

D. Field Quality Control Plan:

1. Visual inspection of entire length of sealant joints.
2. Non-destructive field adhesion testing of sealant joints, except interior acrylic latex sealants.
 - a. For each different sealant and substrate combination, allow for one test every 12 inches (305 mm) in the first 10 linear feet (3 linear meters) of joint and one test every 24 inches (610 mm) thereafter.
 - b. If any failures occur in the first 10 linear feet (3 linear meters), continue testing at 12 inch (305 mm) intervals at no extra cost to Owner.
3. Field Quality Control Log Form: Show same data fields as on Preinstallation Field Adhesion Test Log, with known information filled out and lines for multiple tests per sealant/substrate combinations; include visual inspection and specified field testing; allow for possibility that more tests than minimum specified may be necessary.

E. Field Adhesion Test Procedures:

1. Allow sealants to fully cure as recommended by manufacturer before testing.
2. Have a copy of the test method document available during tests.
3. Record the type of failure that occurred, other information required by test method, and the information required on the Field Quality Control Log.

4. When performing destructive tests, also inspect the opened joint for proper installation characteristics recommended by manufacturer, and report any deficiencies.
 5. Deliver the samples removed during destructive tests in separate sealed plastic bags, identified with project, location, test date, and test results, to Owner.
 6. If any combination of sealant type and substrate does not show evidence of minimum adhesion or shows cohesion failure before minimum adhesion, report results to Architect.
- F. Non-Destructive Field Adhesion Test: Test for adhesion in accordance with ASTM C1521, using Nondestructive Spot Method.
1. Record results on Field Quality Control Log.
 2. Repair failed portions of joints.
- G. Destructive Field Adhesion Test: Test for adhesion in accordance with ASTM C1521, using Destructive Tail Procedure.
1. Sample: At least 18 inch (457 mm) long.
 2. Minimum Elongation Without Adhesive Failure: Consider the tail at rest, not under any elongation stress; multiply the stated movement capability of the sealant in percent by two; then multiply 1 inch (25 mm) by that percentage; if adhesion failure occurs before the "1 inch mark" is that distance from the substrate, the test has failed.
 3. If either adhesive or cohesive failure occurs prior to minimum elongation, take necessary measures to correct conditions and re-test; record each modification to products or installation procedures.
- H. Field Adhesion Tests of Joints: Test for adhesion using most appropriate method in accordance with ASTM C1521, or other applicable method as recommended by manufacturer.

1.06 WARRANTY

- A. See Section 01 7800 - Closeout Submittals, for additional warranty requirements.
- B. Correct defective work within a five year period after Date of Substantial Completion.
- C. Warranty: Include coverage for installed sealants and accessories that fail to achieve watertight seal , exhibit loss of adhesion or cohesion, or do not cure.

PART 2 PRODUCTS

2.01 MANUFACTURERS

- A. Adhesives Technology Corporation: www.atcepoxy.com/#sle.
- B. Bostik Inc: www.bostik-us.com.
- C. Dow Corning Corporation: www.dowcorning.com/construction/#sle.
- D. Pecora Corporation: www.pecora.com.
- E. Sherwin-Williams Company: www.sherwin-williams.com/#sle.
- F. Sika Corporation: www.usa-sika.com/#sle.
- G. Tremco Commercial Sealants & Waterproofing: www.tremcosealants.com/#sle.
- H. W.R. Meadows, Inc: www.wrmeadows.com.

2.02 JOINT SEALANT APPLICATIONS

- A. Scope:
 - 1. Exterior Joints: Seal open joints, whether or not the joint is indicated on drawings, unless specifically indicated not to be sealed. Exterior joints to be sealed include, but are not limited to, the following items.
 - a. Wall expansion and control joints.
 - b. Joints between door, window, and other frames and adjacent construction.
 - c. Joints between different exposed materials.
 - 2. Interior Joints: Do not seal interior joints unless specifically indicated to be sealed. Interior joints to be sealed include, but are not limited to, the following items.
 - a. Joints between door, window, and other frames and adjacent construction.
 - 3. Do not seal the following types of joints.
 - a. Joints indicated to be treated with manufactured expansion joint cover or some other type of sealing device.

- b. Joints where sealant is specified to be provided by manufacturer of product to be sealed.
 - c. Joints where installation of sealant is specified in another section.
- B. Exterior Joints: Use non-sag non-staining silicone sealant, unless otherwise indicated.
- C. Interior Joints: Use non-sag polyurethane sealant, unless otherwise indicated.

2.03 NONSAG JOINT SEALANTS

- A. Non-Staining Silicone Sealant: ASTM C920, Grade NS, Uses M and A; not expected to withstand continuous water immersion or traffic.
 - 1. Movement Capability: Plus and minus 50 percent, minimum.
 - 2. Non-Staining To Porous Stone: Non-staining to light-colored natural stone when tested in accordance with ASTM C1248.
 - 3. Dirt Pick-Up: Reduced dirt pick-up compared to other silicone sealants.
 - 4. Color: To be selected by Architect from manufacturer's standard range.
- B. Polyurethane Sealant: ASTM C920, Grade NS, Uses M and A; single or multi-component; not expected to withstand continuous water immersion or traffic.
 - 1. Movement Capability: Plus and minus 25 percent, minimum.
 - 2. Color: To be selected by Architect from manufacturer's standard range.

2.04 SELF-LEVELING SEALANTS

- A. Self-Leveling Polyurethane Sealant: ASTM C920, Grade P, Uses M and A; single or multi-component; explicitly approved by manufacturer for traffic exposure; not expected to withstand continuous water immersion .
 - 1. Movement Capability: Plus and minus 25 percent, minimum.
 - 2. Hardness Range: 35 to 55, Shore A, when tested in accordance with ASTM C661.
 - 3. Color: To be selected by Architect from manufacturer's standard range.

2.05 ACCESSORIES

- A. Backer Rod: Cylindrical cellular foam rod with surface that sealant will not adhere to, compatible with specific sealant used, and recommended by backing and sealant manufacturers for specific application.
 - 1. Type for Joints Not Subject to Pedestrian or Vehicular Traffic: ASTM C1330; Type B - Bi-Cellular Polyethylene.
 - 2. Type for Joints Subject to Pedestrian or Vehicular Traffic: ASTM C1330; Type B - Bi-Cellular Polyethylene.
 - 3. Closed Cell and Bi-Cellular: 25 to 33 percent larger in diameter than joint width.
- B. Backing Tape: Self-adhesive polyethylene tape with surface that sealant will not adhere to and recommended by tape and sealant manufacturers for specific application.
- C. Masking Tape: Self-adhesive, nonabsorbent, non-staining, removable without adhesive residue, and compatible with surfaces adjacent to joints and sealants.
- D. Joint Cleaner: Non-corrosive and non-staining type, type recommended by sealant manufacturer; compatible with joint forming materials.
- E. Primers: Type recommended by sealant manufacturer to suit application; non-staining.

PART 3 EXECUTION

3.01 EXAMINATION

- A. Verify that joints are ready to receive work.
- B. Verify that backing materials are compatible with sealants.
- C. Verify that backer rods are of the correct size.
- D. Preinstallation Adhesion Testing: Install a sample for each test location indicated in the test plan.
 - 1. Test each sample as specified in PART 1 under QUALITY ASSURANCE article.
 - 2. Notify Architect of date and time that tests will be performed, at least 7 days in advance.

3. Record each test on Preinstallation Adhesion Test Log as indicated.
4. If any sample fails, review products and installation procedures, consult manufacturer, or take whatever other measures are necessary to ensure adhesion; re-test in a different location; if unable to obtain satisfactory adhesion, report to Architect.
5. After completion of tests, remove remaining sample material and prepare joint for new sealant installation.

3.02 PREPARATION

- A. Remove loose materials and foreign matter that could impair adhesion of sealant.
- B. Clean joints, and prime as necessary, in accordance with manufacturer's instructions.
- C. Perform preparation in accordance with manufacturer's instructions and ASTM C1193.
- D. Mask elements and surfaces adjacent to joints from damage and disfigurement due to sealant work; be aware that sealant drips and smears may not be completely removable.
- E. Concrete Floor Joints That Will Be Exposed in Completed Work: Test joint filler in inconspicuous area to verify that it does not stain or discolor slab.

3.03 INSTALLATION

- A. Perform work in accordance with sealant manufacturer's requirements for preparation of surfaces and material installation instructions.
- B. Perform installation in accordance with ASTM C1193.
- C. Measure joint dimensions and size joint backers to achieve width-to-depth ratio, neck dimension, and surface bond area as recommended by manufacturer, except where specific dimensions are indicated.
- D. Install bond breaker backing tape where backer rod cannot be used.
- E. Install sealant free of air pockets, foreign embedded matter, ridges, and sags, and without getting sealant on adjacent surfaces.
- F. Do not install sealant when ambient temperature is outside manufacturer's recommended temperature range, or will be outside that range during the entire curing period, unless manufacturer's approval is obtained and instructions are followed.

- G. Nonsag Sealants: Tool surface concave, unless otherwise indicated; remove masking tape immediately after tooling sealant surface.

3.04 FIELD QUALITY CONTROL

- A. Perform field quality control inspection/testing as specified in PART 1 under QUALITY ASSURANCE article.
- B. Non-Destructive Adhesion Testing: If there are any failures in first 100 linear feet (30 linear m), notify Architect immediately.
- C. Remove and replace failed portions of sealants using same materials and procedures as indicated for original installation.

END OF SECTION

SECTION 08 1113

HOLLOW METAL DOORS AND FRAMES

PART 1 GENERAL

1.01 SECTION INCLUDES

- A. Non-fire-rated hollow metal doors and frames.
- B. Thermally insulated hollow metal doors with frames.

1.02 RELATED REQUIREMENTS

- A. Section 01 7419 - Construction Waste Management.
- B. Section 01 8113 - Sustainable Building Requirements.
- C. Section 08 7100 - Door Hardware.
- D. Section 09 9100 - Painting: Field painting.

1.03 REFERENCE STANDARDS

- A. ADA Standards - Americans with Disabilities Act (ADA) Standards for Accessible Design; 2010.
- B. ANSI/SDI A250.4 - Test Procedure and Acceptance Criteria for Physical Endurance for Steel Doors, Frames and Frame Anchors; 2011.
- C. ANSI/SDI A250.6 - Recommended Practice for Hardware Reinforcing on Standard Steel Doors and Frames; 2003 (R2009).
- D. ANSI/SDI A250.8 - Specifications for Standard Steel Doors and Frames (SDI-100); 2014.
- E. ANSI/SDI A250.10 - Test Procedure and Acceptance Criteria for Prime Painted Steel Surfaces for Steel Doors and Frames; 2011.
- F. ASTM A653/A653M - Standard Specification for Steel Sheet, Zinc-Coated (Galvanized) or Zinc-Iron Alloy-Coated (Galvannealed) by the Hot-Dip Process; 2015.
- G. ASTM A1008/A1008M - Standard Specification for Steel, Sheet, Cold-Rolled, Carbon, Structural, High-Strength Low-Alloy, High-Strength Low-Alloy with Improved Formability, Solution Hardened, and Bake Hardenable; 2016.

- H. ASTM A1011/A1011M - Standard Specification for Steel, Sheet and Strip, Hot-Rolled, Carbon, Structural, High-Strength Low-Alloy, High-Strength Low-Alloy with Improved Formability, and Ultra-High Strength; 2014.
- I. ICC A117.1 - Accessible and Usable Buildings and Facilities; 2009.
- J. NAAMM HMMA 840 - Guide Specifications for Installation and Storage of Hollow Metal Doors and Frames; 2007.
- K. NAAMM HMMA 861 - Guide Specifications for Commercial Hollow Metal Doors and Frames; 2006.
- L. SDI 117 - Manufacturing Tolerances for Standard Steel Doors and Frames; 2013.

1.04 SUBMITTALS

- A. See Section 01 3000 - Administrative Requirements, for submittal procedures.
- B. Product Data: Materials and details of design and construction, hardware locations, reinforcement type and locations, anchorage and fastening methods, and finishes.
- C. Shop Drawings: Details of each opening, showing elevations, glazing, frame profiles, and any indicated finish requirements.
- D. Installation Instructions: Manufacturer's published instructions, including any special installation instructions relating to this project.
- E. Manufacturer's Qualification Statement.
- F. Recycled Content: Provide submittals for materials with recycled content in accordance with Section 01 8113 - Sustainable Building Requirements.
- G. Low/ Emitting Materials/VOC Content: Provide submittals for low emitting materials in accordance with Section 01 8113 - Sustainable Building Requirements.

1.05 QUALITY ASSURANCE

- A. Manufacturer Qualifications: Provide hollow metal doors and frames from SDI Certified manufacturer: www.steeldoor.org/sdicertified.php.
- B. Installer Qualifications: Company specializing in performing work of the type specified and with at least three years of documented experience.
- C. Maintain at project site copies of reference standards relating to installation of products specified.

1.06 DELIVERY, STORAGE, AND HANDLING

- A. Comply with NAAMM HMMA 840 or ANSI/SDI A250.8 (SDI-100) in accordance with specified requirements.
- B. Protect with resilient packaging; avoid humidity build-up under coverings; prevent corrosion and adverse effects on factory applied painted finish.

PART 2 PRODUCTS

2.01 MANUFACTURERS

- A. Hollow Metal Doors and Frames:
 - 1. Ceco Door, an Assa Abloy Group company: www.assaabloydss.com.
 - 2. Curries, an Assa Abloy Group company: www.assaabloydss.com.
 - 3. Republic Doors, an Allegion brand: www.republicdoor.com/#sle.
 - 4. Steelcraft, an Allegion brand: www.allegion.com/#sle.

2.02 DESIGN CRITERIA

- A. Requirements for Hollow Metal Doors and Frames:
 - 1. Steel used for fabrication of doors and frames shall comply with one or more of the following requirements; Galvannealed steel conforming to ASTM A653/A653M, cold-rolled steel conforming to ASTM A1008/A1008M, or hot-rolled pickled and oiled (HRPO) steel conforming to ASTM A1011/A1011M, Commercial Steel (CS) Type B for each.
 - 2. Accessibility: Comply with ICC A117.1 and ADA Standards.
 - 3. Door Top Closures: Flush end closure channel, with top and door faces aligned.
 - 4. Door Edge Profile: Manufacturers standard for application indicated.
 - 5. Typical Door Face Sheets: Flush.
 - 6. Zinc Coating: Provide metal components zinc-coated (galvanized) and/or zinc-iron alloy-coated (galvannealed) by the hot-dip process in accordance with ASTM A653/A653M, with at least A60/ZF180 (galvannealed), unless noted otherwise for specific hollow metal doors and frames.

- B. Combined Requirements: If a particular door and frame unit is indicated to comply with more than one type of requirement, comply with the specified requirements for each type; for instance, an exterior door that is also indicated as being sound-rated must comply with the requirements specified for exterior doors and for sound-rated doors; where two requirements conflict, comply with the most stringent.

2.03 HOLLOW METAL DOORS

- A. Door Finish: Factory primed and field finished.
- B. Typical Doors: .
 - 1. Based on SDI Standards: ANSI/SDI A250.8 (SDI-100).
 - a. Level 3 - Extra Heavy-duty.
 - b. Physical Performance Level A, 1,000,000 cycles; in accordance with ANSI/SDI A250.4.
 - c. Model 2 - Seamless.
 - d. Door Face Metal Thickness: 16 gage, 0.053 inch (1.3 mm), minimum.
 - 2. Door Thickness: 1-3/4 inch (44.5 mm), nominal.
 - 3. Weatherstripping: Refer to Section 08 7100.

2.04 HOLLOW METAL FRAMES

- A. Comply with standards and/or custom guidelines as indicated for corresponding door in accordance with applicable door frame requirements.
- B. Frame Finish: Factory primed and field finished.
- C. Door Frames: Full profile/continuously welded type.
 - 1. Galvanizing: Components hot-dipped zinc-iron alloy-coated (galvannealed) in accordance with ASTM A653/A653M, with A60/ZF180 coating.
 - 2. Frame Metal Thickness: 14 gage, 0.067 inch (1.7 mm), minimum.
 - 3. Weatherstripping: Separate, see Section 08 7100.

2.05 FINISHES

- A. Primer: Rust-inhibiting, complying with ANSI/SDI A250.10, door manufacturer's standard.

2.06 ACCESSORIES

- A. Silencers: Resilient rubber, fitted into drilled hole; provide three on strike side of single door, three on center mullion of pairs, and two on head of pairs without center mullions.
- B. Temporary Frame Spreaders: Provide for factory- or shop-assembled frames.

PART 3 EXECUTION

3.01 EXAMINATION

- A. Verify existing conditions before starting work.
- B. Verify that opening sizes and tolerances are acceptable.
- C. Verify that finished walls are in plane to ensure proper door alignment.

3.02 PREPARATION

3.03 INSTALLATION

- A. Install doors and frames in accordance with manufacturer's instructions and related requirements of specified door and frame standards or custom guidelines indicated.
- B. Coordinate frame anchor placement with wall construction.
- C. Install door hardware as specified in Section 08 7100.
 - 1. Comply with recommended practice for hardware placement of doors and frames in accordance with ANSI/SDI A250.6 or NAAMM HMMA 861.

3.04 TOLERANCES

- A. Clearances Between Door and Frame: Comply with related requirements of specified frame standards or custom guidelines indicated in accordance with SDI 117 or NAAMM HMMA 861.
- B. Maximum Diagonal Distortion: 1/16 inch (1.6 mm) measured with straight edge, corner to corner.

3.05 ADJUSTING

- A. Adjust for smooth and balanced door movement.

END OF SECTION

SECTION 08 3326

OVERHEAD COILING GRILLES

PART 1 GENERAL

1.01 SECTION INCLUDES

- A. Overhead coiling metal grilles and operating hardware, electric operation.

1.02 RELATED REQUIREMENTS

- A. Section 26 0583 - Wiring Connections: Power to disconnect.

1.03 REFERENCE STANDARDS

- A. ASTM B221 - Standard Specification for Aluminum and Aluminum-Alloy Extruded Bars, Rods, Wire, Profiles, and Tubes; 2014.
- B. ASTM B221M - Standard Specification for Aluminum and Aluminum-Alloy Extruded Bars, Rods, Wire, Profiles, and Tubes (Metric); 2013.
- C. ITS (DIR) - Directory of Listed Products; current edition.
- D. NEMA 250 - Enclosures for Electrical Equipment (1000 Volts Maximum); 2014.
- E. NEMA ICS 2 - Industrial Control and Systems Controllers, Contactors and Overload Relays Rated 600 Volts; 2000 (R2005), with errata, 2008.
- F. NEMA MG 1 - Motors and Generators; 2014.
- G. UL (DIR) - Online Certifications Directory; current listings at database.ul.com.
- H. UL 325 - Standard for Door, Drapery, Gate, Louver, and Window Operators and Systems; Current Edition, Including All Revisions.

1.04 SUBMITTALS

- A. See Section 01 3000 - Administrative Requirements, for submittal procedures.
- B. Product Data: Provide general construction component connections and details, and electrical equipment.
- C. Shop Drawings: Indicate pertinent dimensioning, anchorage methods, hardware locations, and installation details.
- D. Manufacturer's Installation Instructions: Indicate installation sequence and procedures, adjustment and alignment procedures.

- E. Maintenance Data: Indicate lubrication requirements and frequency and periodic adjustments required.

1.05 QUALITY ASSURANCE

- A. Products Requiring Electrical Connection: Listed and classified by ITS (DIR), UL (DIR), or testing firm acceptable to authorities having jurisdiction as suitable for purpose specified.

PART 2 PRODUCTS

2.01 MANUFACTURERS

- A. Basis of Design: ESG10, The Cookson Company; www.cooksondoor.com.
- B. Other Acceptable Manufacturers:
 - 1. Alpine Overhead Doors, Inc: www.alpinedoors.com.
 - 2. C.H.I. Overhead Doors; 9300 Lift Ready Series: www.chiohd.com/#sle.
 - 3. Cornell Iron Works, Inc: www.cornelliron.com.
 - 4. Raynor Garage Doors: www.raynor.com
 - 5. Wayne-Dalton, a Division of Overhead Door Corporation: www.waynedalton.com.
 - 6. Accepted equal.

2.02 GRILLES AND COMPONENTS

- A. Grille: Aluminum; horizontal bar curtain, coiling on overhead counterbalanced shaft.
 - 1. Finish: Anodized, clear color.
 - 2. Electric operation.
 - 3. Mounting: Within framed opening.
- B. Curtain: Round horizontal bars connected with vertical links.
 - 1. Horizontal bars: 5/16 inch (8 mm) diameter.
 - 2. Bar spacing: 1-1/2 inch (38 mm) on center.

3. Tube spacers: 1/2 inch (13 mm) diameter.
 4. Spacer spacing: 3-1/4 inch (83 mm) on center.
 5. Link spacing: 9 inch (229 mm) on center.
 6. Bar Ends: Provide with nylon runners for quiet operation.
 7. Bottom Bar: Back-to-back angles with tubular resilient cushion.
- C. Guides: Extruded aluminum angles, of profile to retain grille in place with snap-on trim, mounting brackets of same metal.
- D. Hood Enclosure and Trim: Sheet metal; completely covering operating mechanisms; internally reinforced to maintain rigidity and shape.
1. Material: Same metal as grille.
 2. Finish: Anodized, clear.
- E. Roller Shaft Counterbalance: Steel pipe and helical steel spring system, capable of producing torque sufficient to ensure smooth operation of curtain from any position and capable of holding position at mid-travel; with adjustable spring tension; requiring 25 lb (10 kg) nominal force to operate.

2.03 MATERIALS

- A. Aluminum: ASTM B221 (ASTM B221M).

2.04 ELECTRIC OPERATION

- A. Operator, Controls, Actuators, and Safeties: Comply with UL 325; provide products listed by ITS (DIR), UL (DIR), or testing agency acceptable to authorities having jurisdiction.
1. Provide interlock switches on motor operated units.
 2. Provide tamperproof operation cycle counter.
- B. Electric Operators:
1. Mounting: Side mounted.
 2. Motor Enclosure:
 - a. Exterior Coiling Grilles: NEMA MG 1, Type 4; open drip proof.

3. Minimum Motor Rating: 1/3 hp (250 W); continuous duty
 4. Motor Voltage: 120 volts, single phase, 60 Hz.
 5. Motor Controller: NEMA ICS 2, full voltage, reversing magnetic motor starter.
 6. Controller Enclosure: NEMA 250 Type 1.
 7. Opening Speed: 12 inches per second (300 mm/s).
 8. Brake: Adjustable friction clutch type, activated by motor controller.
 9. Manual override in case of power failure.
 10. Refer to Section 26 0583 for electrical connections.
- C. Control Station: Provide standard three button (Open-Close-Stop) momentary-contact control device for each operator conforming to UL 325.
1. 24 volt circuit.
 2. Surface mounted, at interior door jamb.
 3. Entrapment Protection Devices: Provide sensing devices and safety mechanisms conforming to UL 325.
 - a. Primary Device: Provide electric sensing edge, wireless sensing, NEMA 1 photo eye sensors, or NEMA 4X photo eye sensors as required with momentary-contact control device.

PART 3 EXECUTION

3.01 EXAMINATION

- A. Verify that opening sizes, tolerances and conditions are acceptable.

3.02 INSTALLATION

- A. Install grille unit assembly in accordance with manufacturer's instructions.
- B. Use anchorage devices to securely fasten assembly to wall construction and building framing without distortion or stress.
- C. Securely and rigidly brace components suspended from structure. Secure guides to structural members only.

- D. Fit and align assembly including hardware; level and plumb, to provide smooth operation.
- E. Coordinate installation of electrical service with Section 26 0583.
- F. Complete wiring from disconnect to unit components.
- G. Install enclosure and perimeter trim.

3.03 TOLERANCES

- A. Maintain dimensional tolerances and alignment with adjacent work.
- B. Maximum Variation From Plumb: 1/16 inch (1.5 mm).
- C. Maximum Variation From Level: 1/16 inch (1.5 mm).
- D. Longitudinal or Diagonal Warp: Plus or minus 1/8 inch per 10 ft (3 mm per 3 m) straight edge.

3.04 ADJUSTING

- A. Adjust grille, hardware and operating assemblies for smooth and noiseless operation.

3.05 CLEANING

- A. Clean grille and components.
- B. Remove labels and visible markings.

END OF SECTION

SECTION 08 4413

GLAZED ALUMINUM CURTAIN WALLS

PART 1 GENERAL

1.1 SECTION INCLUDES

- A. Aluminum-framed curtain wall, with vision glazing and glass infill panels.

1.2 RELATED REQUIREMENTS

- A. Section 01 7419 – Construction Waste Management
- B. Section 01 8113 – Sustainable Building Requirements
- C. Section 08 8000 - Glazing
- D. Section 10 7110 - Exterior Sun Control Devices

1.3 REFERENCE STANDARDS

- A. AAMA CW-10 - Care and Handling of Architectural Aluminum From Shop to Site; 2015.
- B. AAMA 609 & 610 - Cleaning and Maintenance Guide for Architecturally Finished Aluminum (Combined Document); 2015.
- C. AAMA 611 - Voluntary Specification for Anodized Architectural Aluminum; 2014 (2015 Errata).
- D. ASCE 7 - Minimum Design Loads for Buildings and Other Structures; 2010, with 2013 Supplements and Errata.
- E. ASTM B221 - Standard Specification for Aluminum and Aluminum-Alloy Extruded Bars, Rods, Wire, Profiles, and Tubes; 2014.
- F. ASTM B221M - Standard Specification for Aluminum and Aluminum-Alloy Extruded Bars, Rods, Wire, Profiles, and Tubes (Metric); 2013.
- G. ASTM E283 - Standard Test Method for Determining the Rate of Air Leakage Through Exterior Windows, Curtain Walls, and Doors Under Specified Pressure Differences Across the Specimen; 2004 (Reapproved 2012).
- H. ASTM E330/E330M - Standard Test Method for Structural Performance of Exterior Windows, Doors, Skylights and Curtain Walls by Uniform Static Air Pressure Difference; 2014.

1.4 SUBMITTALS

Wailluku Civic Complex Phase 1B
2017-001

GLAZED ALUMINUM CURTAIN WALLS
08 4413 - 6

- A. Recycled Content: Provide submittals for materials with recycled content in accordance with SECTION 01 8113, SUSTAINABLE BUILDING REQUIREMENTS
- B. Product Data: Provide component dimensions, describe components within assembly, anchorage and fasteners, internal drainage details, glazing, and infill.
- C. Shop Drawings: Indicate system dimensions, framed opening requirements and tolerances, affected related Work, expansion and contraction joint location and details, and field welding required.
- D. Samples: Submit two samples 12 by 12 inches (300 by 300 mm) in size illustrating finished aluminum surface, glazing, and glazing materials.
- E. Design Data: Provide framing member structural and physical characteristics and engineering calculations, and identify dimensional limitations; include load calculations at points of attachment to building structure.
- F. Structural Sealant Glazing (SSG): Submit product data and calculations showing compliance with performance requirements.
- G. Test Reports: Submit results of full-size mock-up testing. Reports of tests previously performed on the same design are acceptable.
- H. Warranty: Submit manufacturer warranty and ensure forms have been completed in Owner's name and registered with manufacturer.

1.5 QUALITY ASSURANCE

- A. Designer Qualifications: Design curtain wall and its structural support framing components under direct supervision of a Professional Structural Engineer experienced in design of this work and licensed at the State in which the Project is located.
- B. Manufacturer Qualifications: Company specializing in manufacturing products specified in this section with not less than three years of documented experience.
- C. Installer Qualifications: Company specializing in performing work of type specified and with at least three years of documented experience.

1.6 DELIVERY, STORAGE, AND HANDLING

- A. Handle products of this section in accordance with AAMA CW-10.
- B. Protect finished aluminum surfaces with wrapping. Do not use adhesive papers or sprayed coatings that bond to aluminum when exposed to sunlight or weather.

1.7 WARRANTY

- A. See Section 01 7800 - Closeout Submittals, for additional warranty requirements.
- B. Correct defective Work within a five year period after Date of Substantial Completion.

PART 2 PRODUCTS

2.1 MANUFACTURERS

- A. Basis of Design: OPG1900 Series, Arcadia, Inc.; www.arcadiainc.com.
- B. Other Manufacturers: Provide either product identified as "Basis of Design" or an equivalent product of one of the manufacturers listed below.
 - 1. C.R. Laurence Company, Inc; U.S. Aluminum: www.crl-arch.com/#sle.
 - 2. EFCO, a Pella Company: www.efcocorp.com/#sle.
 - 3. Kawneer Company, Inc.: www.kawneer.com
 - 4. Trulite Glass & Aluminum Solutions, LLC: www.trulite.com.
 - 5. Wausau Window and Wall Systems: www.wausauwindow.com.

2.2 CURTAIN WALL

- A. Aluminum-Framed Curtain Wall: Factory fabricated, factory finished aluminum framing members with infill, and related flashings, anchorage and attachment devices.
 - 1. Outside glazed, with pressure plate and mullion cover.
 - 2. Fabrication Method: Either shop/factory or field fabricated system.
 - 3. Glazing Method: Field glazed system.
 - 4. Vertical Mullion Dimensions: 2-1/4 inches wide by 7 inches deep.
 - 5. Finish: Simulated wood grain powder coated finish.
 - a. Basis of Design Manufacturer: Decoral System USA, www.decoralamerica.com
 - b. Factory finish surfaces that will be exposed in completed assemblies.

- c. Touch-up surfaces cut during fabrication so that no natural aluminum is visible in completed assemblies, including joint edges.
 - d. Coat concealed metal surfaces that will be in contact with cementitious materials or dissimilar metals with bituminous paint.
6. Provide flush joints and corners, weathersealed, accurately fitted and secured; prepared to receive anchors; fasteners and attachments concealed from view; reinforced as required for imposed loads.
 7. Construction: Eliminate noises caused by wind and thermal movement, prevent vibration harmonics, and prevent "stack effect" in internal spaces.
 8. System Internal Drainage: Drain to the exterior by means of a weep drainage network any water entering joints, condensation occurring in glazing channel, and migrating moisture occurring within system.
- B. Structural Performance Requirements: Design and size components to withstand the following load requirements without damage or permanent set.
1. Design Wind Loads: Comply with applicable code and ASCE 7.
 - a. Measure performance by testing in accordance with ASTM E330/E330M, using test loads equal to 1.5 times the design wind loads and 10 second duration of maximum pressure.
 - b. Member Deflection: For spans less than 13 feet 6 inches (4115 mm), limit member deflection to flexure limit of glass in any direction, and maximum of 1/175 of span or 3/4 inch (19 mm), whichever is less and with full recovery of glazing materials.
 2. Seismic Loads: Design and size components to withstand seismic loads and sway displacement in accordance with requirements of ASCE 7.
 3. Movement: Accommodate the following movement without damage to components or deterioration of seals:
 - a. Expansion and contraction caused by 180 degrees F (82 degrees C) surface temperature.
 - b. Expansion and contraction caused by cycling temperature range of 170 degrees F (77 degrees C) over a 12 hour period.
 - c. Movement of curtain wall relative to perimeter framing.
 - d. Deflection of structural support framing, under permanent and dynamic loads.

- C. Water Penetration Resistance on Manufactured Assembly: No uncontrolled water on indoor face when tested as follows:
 - 1. Test Pressure Differential: 10 psf (480 Pa).
- D. Air Leakage Laboratory Test: Maximum of 0.06 cu ft/min sq ft (0.3 L/sec sq m) of wall area, when tested in accordance with ASTM E283 at 6.27 psf (300 Pa) pressure differential across assembly.

2.3 COMPONENTS

- A. Aluminum Framing Members: Tubular aluminum sections, thermally broken with interior section insulated from exterior, drainage holes and internal weep drainage system.
- B. Glazing: As specified in Section 08 8000.

2.4 MATERIALS

- A. Extruded Aluminum: ASTM B221 (ASTM B221M).
- B. Glazing Gaskets: Type to suit application to achieve weather, moisture, and air infiltration requirements.
- C. Glazing Accessories: As specified in Section 08 8000.

2.5 FINISHES

- A. Class I Color Anodized Finish: AAMA 611 Integrally colored anodic coating not less than 0.7 mils (0.018 mm) thick.
- B. Color: Champagne AB-2.

PART 3 EXECUTION

3.1 EXAMINATION

- A. Verify dimensions, tolerances, and method of attachment with other related work.
- B. Verify that curtain wall openings and adjoining air and vapor seal materials are ready to receive work of this section.
- C. Verify that anchorage devices have been properly installed and located.

3.2 INSTALLATION

- A. Install curtain wall system in accordance with manufacturer's instructions.
- B. Attach to structure to permit sufficient adjustment to accommodate construction tolerances and other irregularities.
- C. Provide alignment attachments and shims to permanently fasten system to building structure.
- D. Align assembly plumb and level, free of warp or twist. Maintain assembly dimensional tolerances, aligning with adjacent work.
- E. Provide thermal isolation where components penetrate or disrupt building insulation.
- F. Install sill flashings. Turn up ends and edges; seal to adjacent work to form water tight dam.
- G. Touch-up minor damage to factory applied finish; replace components that cannot be satisfactorily repaired.

3.3 TOLERANCES

- A. Maximum Variation from Plumb: 0.06 inches every 3 ft (1.5 mm/m) non-cumulative or 0.5 inches per 100 ft (12 mm/30 m), whichever is less.
- B. Maximum Misalignment of Two Adjoining Members Abutting in Plane: 1/32 inch (0.8 mm).
- C. Sealant Space Between Curtain Wall Mullions and Adjacent Construction: Maximum of 3/4 inch (19 mm) and minimum of 1/4 inch (6 mm).

3.4 ADJUSTING

- A. Adjust operating sash for smooth operation.

3.5 CLEANING

- A. Remove protective material from pre-finished aluminum surfaces.
- B. Wash down surfaces with a solution of mild detergent in warm water, applied with soft, clean wiping cloths, take care to remove dirt from corners, and wipe surfaces clean.
- C. Upon completion of installation, thoroughly clean aluminum surfaces in accordance with AAMA 609 & 610.

3.6 PROTECTION

- A. Protect installed products from damage until Date of Substantial Completion.

END OF SECTION

SECTION 08 7100

DOOR HARDWARE

PART 1 GENERAL

1.01 SECTION INCLUDES

- A. Hardware for hollow metal doors.
- B. Electrically operated and controlled hardware.
- C. Thresholds.
- D. Weatherstripping, seals and door gaskets.
- E. Gate locks.

1.02 RELATED REQUIREMENTS

- A. SECTION 01 7419 – CONSTRUCTION WASTE MANAGEMENT
- B. SECTION 01 8113 – SUSTAINABLE BUILDING REQUIREMENTS
- C. SECTION 08 1113 - HOLLOW METAL DOORS AND FRAMES.
- D. SECTION 32 3119 - DECORATIVE METAL FENCES AND GATES.

1.03 REFERENCE STANDARDS

- A. ADA Standards - Americans with Disabilities Act (ADA) Standards for Accessible Design; 2010.
- B. BHMA A156.5 - American National Standard for Cylinders and Input Devices for Locks; 2014.
- C. BHMA A156.8 - American National Standard for Door Controls - Overhead Stops and Holders; 2010.
- D. BHMA A156.13 - American National Standard for Mortise Locks & Latches Series 1000; 2012.
- E. BHMA A156.16 - American National Standard for Auxiliary Hardware; 2013.
- F. BHMA A156.21 - American National Standard for Thresholds; 2014.
- G. BHMA A156.22 - American National Standard for Door Gasketing and Edge Seal Systems, Builders Hardware Manufacturers Association; 2012.

- H. BHMA A156.115 - American National Standard for Hardware Preparation in Steel Doors and Steel Frames; 2014.
- I. ICC A117.1 - Accessible and Usable Buildings and Facilities; 2009.
- J. NFPA 80 - Standard for Fire Doors and Other Opening Protectives; 2016.
- K. NFPA 101 - Life Safety Code; 2015.
- L. UL (DIR) - Online Certifications Directory; current listings at database.ul.com.

1.04 ADMINISTRATIVE REQUIREMENTS

- A. Coordinate the manufacture, fabrication, and installation of products that door hardware will be installed upon.
- B. Convey Owner's keying requirements to manufacturers.

1.05 SUBMITTALS

- A. Recycled Content: Provide submittals for materials with recycled content in accordance with SECTION 01 8113, SUSTAINABLE BUILDING REQUIREMENTS
- B. Product Data: Manufacturer's catalog literature for each type of hardware, marked to clearly show products to be furnished for this project.
- C. Hardware Schedule: Detailed listing of each item of hardware to be installed on each door. Use door numbering scheme as included in the Contract Documents. Identify electrically operated items and include power requirements.
- D. Keying Schedule: Submit for approval of Owner.
- E. Manufacturer's Installation Instructions: Indicate special procedures, perimeter conditions requiring special attention.
- F. Maintenance Data: Include data on operating hardware, lubrication requirements, and inspection procedures related to preventative maintenance.
 - 1. Submit manufacturer's parts lists and templates.
 - 2. Bitting List: List of combinations as furnished.
- G. Keys: Deliver with identifying tags to Owner by security shipment direct from hardware supplier.
- H. Warranty: Submit manufacturer's warranty and ensure that forms have been completed in Owner's name and registered with manufacturer.

- I. Maintenance Materials and Tools: Furnish the following for Owner's use in maintenance of project.
 - 1. See Section 01 6000 - Product Requirements, for additional provisions.
 - 2. Extra Lock Cylinders: One for each master keyed group.
 - 3. Tools: One set of all special wrenches or tools applicable to each different or special hardware component, whether supplied by the hardware component manufacturer or not.

1.06 QUALITY ASSURANCE

- A. Manufacturer Qualifications: Company specializing in manufacturing the products specified in this section with minimum three years of documented experience.
- B. Hardware Supplier Qualifications: Company specializing in supplying the type of products specified in this section with at least three years documented experience.
- C. Hardware Supplier Personnel: Employ an Architectural Hardware Consultant (AHC) to assist in the work of this section.

1.07 DELIVERY, STORAGE, AND HANDLING

- A. Package hardware items individually; label and identify each package with door opening code to match hardware schedule.

PART 2 PRODUCTS

2.01 MANUFACTURERS

- A. Allegion Brands, Ives, LCN, Schlage, Steelcraft, or Von Duprin: www.allegion.com/us.
- B. Assa Abloy Brands, Corbin Russwin, Curries, McKinney, Norton, Sargent, or Yale: www.assaabloydss.com.
- C. Best Access Systems, division of Stanley Security Solutions: www.bestaccess.com.
- D. C. R. Laurence Company, Inc: www.crl-arch.com/sle.
- E. Hager Companies: www.hagerco.com.

2.02 GENERAL REQUIREMENTS

- A. Provide door hardware specified, or as required to make doors fully functional, compliant with applicable codes, and secure to the extent indicated.
- B. Provide items of a single type of the same model by the same manufacturer.
- C. Provide products that comply with the following:
 - 1. Applicable provisions of federal, state, and local codes.
 - 2. Accessibility: ADA Standards and ICC A117.1.
 - 3. Applicable provisions of NFPA 101, Life Safety Code.
 - 4. Fire-Rated Doors: NFPA 80.
 - 5. Hardware on Fire-Rated Doors, Except Hinges: Listed and classified by UL (DIR) as suitable for the purpose specified and indicated.
 - 6. Auxiliary Hardware: BHMA A156.16.
 - 7. Hardware Preparation for Steel Doors and Steel Frames: BHMA A156.115.
 - 8. Products Requiring Electrical Connection: Listed and classified by UL (DIR) as suitable for the purpose specified and indicated.
- D. Function: Lock and latch function numbers and descriptions of manufactures series as listed in hardware schedule.
- E. Electrically Operated and/or Controlled Hardware: Provide all power supplies, power transfer hinges, relays, and interfaces required for proper operation; provide wiring between hardware and control components and to building power connection.
- F. Finishes: Identified in schedule.

2.03 LOCKS AND LATCHES

- A. Locks: Provide a lock for every door, unless specifically indicated as not requiring locking.
 - 1. If no hardware set is indicated for a swinging door provide an office lockset.
 - 2. Trim: Provide lever handle or pull trim on outside of all locks unless specifically stated to have no outside trim.

3. Lock Cylinders: Provide key access on outside of all locks unless specifically stated to have no locking or no outside trim.
- B. Lock Cylinders: Manufacturer's standard tumbler type, six-pin standard core.
 1. Provide cams and/or tailpieces as required for locking devices required.
 - C. Keying: Grand master keyed.
 1. Include construction keying.
 - D. Latches: Provide a latch for every door that is not required to lock, unless specifically indicated "push/pull" or "not required to latch".

2.04 MORTISE LOCKSETS

- A. Locking Functions: As defined in BHMA A156.13

2.05 AUXILIARY LOCKS (DEADBOLTS)

- A. Locking Functions: As defined in BHMA A156.5.

2.06 FLUSHBOLTS AND COORDINATORS

- A. Flushbolts: Lever extension bolts in leading edge of door, one bolt into floor, one bolt into top of frame.
 1. Pairs of Swing Doors: At inactive leaves, provide flush bolts of type as required to comply with code.
 2. Floor Bolts: Provide dustproof strike except at metal thresholds.

2.07 STOPS AND HOLDERS

- A. Stops: Complying with BHMA A156.8; provide a stop for every swinging door, unless otherwise indicated.
 1. Provide wall stops, unless otherwise indicated.
 2. If wall stops are not practical, due to configuration of room or furnishings, provide overhead stop.
 3. Stop is not required if positive stop feature is specified for door closer; positive stop feature of door closer is not an acceptable substitute for a stop unless specifically so stated.

2.08 GASKETING AND THRESHOLDS

- A. Gaskets: Complying with BHMA A156.22.
 - 1. On each door in smoke partition, provide smoke gaskets; top, sides, and meeting stile of pairs. If fire/smoke partitions are not indicated on drawings, provide smoke gaskets on each door identified as a "smoke door" and 20-minute rated fire doors.
 - 2. On each exterior door, provide weatherstripping gaskets, unless otherwise indicated; top, sides, and meeting stiles of pairs.
 - a. Where exterior door is also required to have fire or smoke rating, provide gaskets functioning as both smoke and weather seals.
 - 3. On each exterior door, provide door bottom sweep, unless otherwise indicated.
- B. Thresholds: Complying with BHMA A156.21.
 - 1. At each exterior door, provide a threshold unless otherwise indicated.

PART 3 EXECUTION

3.01 EXAMINATION

- A. Verify that doors and frames are ready to receive work; labeled, fire-rated doors and frames are present and properly installed, and dimensions are as indicated on shop drawings.
- B. Verify that electric power is available to power operated devices and of the correct characteristics.

3.02 INSTALLATION

- A. Install hardware in accordance with manufacturer's instructions and applicable codes.
- B. Use templates provided by hardware item manufacturer.
- C. Do not install surface mounted items until finishes applied to substrate are complete.
- D. Install hardware on fire-rated doors and frames in accordance with code and NFPA 80.
- E. Mounting heights for hardware from finished floor to center line of hardware item. As indicated in the following list; unless noted otherwise on the drawings.

1. For Steel Doors and Frames: Refer to Section 08 1113.

F. Set exterior door thresholds with full-width bead of elastomeric sealant on each point of contact with floor providing a continuous weather seal; anchor thresholds with stainless steel countersunk screws.

3.03 FIELD QUALITY CONTROL

A. Provide an Architectural Hardware Consultant to inspect installation and certify that hardware and installation has been furnished and installed in accordance with manufacturer's instructions and as specified.

3.04 ADJUSTING

A. Adjust work under provisions of Section 01 7000 - Execution and Closeout Requirements.

B. Adjust hardware for smooth operation.

C. Adjust gasketing for complete, continuous seal; replace if unable to make complete seal.

3.05 CLEANING

A. Clean adjacent surfaces soiled by hardware installation. Clean finished hardware per manufacturer's instructions after final adjustments has been made. Replace items that cannot be cleaned to manufacturer's level of finish quality at no additional cost.

3.06 PROTECTION

A. Protect finished Work under provisions of Section 01 7000 - Execution and Closeout Requirements.

B. Do not permit adjacent work to damage hardware or finish.

3.07 SCHEDULE - ATTACHED

3.08 DOOR LIST

Door Number	Hardware Group
100-1	001
100-2	002
100-3	006
100-4	002
100-5	002
100B-1	001
100B-2	002
101-1	003

102-1	004
103-1	003
104-1	005
104-2	005
105-1	003
106-1	002
107-1	002

3.09 HARDWARE SCHEDULE

MANUFACTURER LIST

CATEGORY	VENDOR NAME	MFG
HINGE	BY MCKINNEY PRODUCTS COMPANY	MCK
DOOR BOTTOM	BY PEMKO MANUFACTURING CO.	PEM
DOOR SEAL	BY PEMKO MANUFACTURING CO.	PEM
SPLIT ASTRAGAL	BY PEMKO MANUFACTURING CO.	PEM
THRESHOLD	BY PEMKO MANUFACTURING CO.	PEM
DUST PROOF STRIKE	BY ROCKWOOD MANUFACTURING CO.	ROC
FLUSH BOLT	BY ROCKWOOD MANUFACTURING CO.	ROC
KICKPLATE	BY ROCKWOOD MANUFACTURING CO.	ROC
WALL STOP (CONVEX)	BY ROCKWOOD MANUFACTURING CO.	ROC
DOOR CLOSER	BY SARGENT MANUFACTURING COMPANY	SAR
LOCKSET	BY SARGENT MANUFACTURING COMPANY	SAR
RIM EXIT DEVICE	BY SARGENT MANUFACTURING COMPANY	SAR

HW GROUP - 001

1.0 EA	RIM EXIT DEVICE	63-64-8843 ETL US32D	SAR
		BALANCE OF HARDWARE BY GATE	

MANUFACTURER

HW GROUP - 002

ALL HARDWARE BY DOOR OR GATE MFG

HW GROUP - 003

6.0 EA	HINGE	TA2314 4.5 X 4.5 US32D-NRP CPC	MCK
1.0 EA	LOCKSET	63-64-8225 FEL US26D WBX	SAR
2.0 EA	FLUSH BOLT	555 626	ROC
1.0 EA	DUST PROOF STRIKE	570 626	ROC
2.0 EA	DOOR CLOSER	351 CPS EN	SAR
1.0 EA	DOOR SEAL	PK55D25	PEM
2.0 EA	WALL STOP (CONVEX)	406 626	ROC
2.0 EA	DOOR BOTTOM	210AV 36"	PEM
2.0 EA	SPLIT ASTRAGAL	29310CV	PEM
1.0 EA	THRESHOLD	171A 72"	PEM
		(VERIFY THRESHOLD TYPE WITH SILL DETAIL	

HW GROUP - 004

3.0 EA	HINGE	TA2314 4.5 X 4.5 US32D-NRP CPC	MCK
1.0 EA	LOCKSET	63-64-8225 FEL US26D WBX	SAR
1.0 EA	DOOR CLOSER	351 CPS EN	SAR
1.0 EA	DOOR BOTTOM	210AV	PEM
1.0 EA	KICKPLATE	K1050 10" X 34" 630	ROC
1.0 EA	THRESHOLD	158A	PEM

VERIFY THRESHOLD TYPE WITH SILL DETAIL

HW GROUP - 005

3.0 EA	HINGE	TA2314 4.5 X 4.5 US32D CPC	MCK
1.0 EA	RIM EXIT DEVICE	63-64-8843 ETL US32D	SAR
1.0 EA	DOOR CLOSER	351 CPSH EN	SAR
1.0 EA	DOOR SEAL	PK55D17	PEM
1.0 EA	DOOR BOTTOM	210AV 36"	PEM
1.0 EA	THRESHOLD	158A	PEM

VERIFY THRESHOLD TYPE WITH SILL DETAIL

HW GROUP - 006

MANUFACTURER

ALL HARDWARE BY DOOR/GATE

SEE TECHNOLOGY SHEET REQUIREMENTS

END OF SECTION

SECTION 08 8000

GLAZING

PART 1 GENERAL

1.01 SECTION INCLUDES

- A. Insulating glass units.
- B. Glazing compounds and accessories.

1.02 RELATED REQUIREMENTS

- A. Section 01 7419 - Construction Waste Management.
- B. Section 01 8113 - Sustainable Building Requirements.
- C. Section 08 4413 - Glazed Aluminum Curtain Walls: Glazing furnished as part of wall assembly.

1.03 REFERENCE STANDARDS

- A. 16 CFR 1201 - Safety Standard for Architectural Glazing Materials; current edition.
- B. ANSI Z97.1 - American National Standard for Safety Glazing Materials Used in Buildings, Safety Performance Specifications and Methods of Test; 2010.
- C. ASTM C864 - Standard Specification for Dense Elastomeric Compression Seal Gaskets, Setting Blocks, and Spacers; 2005 (Reapproved 2015).
- D. ASTM C1048 - Standard Specification for Heat-Strengthened and Fully Tempered Flat Glass; 2012.
- E. ASTM C1172 - Standard Specification for Laminated Architectural Flat Glass; 2014.
- F. ASTM C1193 - Standard Guide for Use of Joint Sealants; 2016.
- G. ASTM C1376 - Standard Specification for Pyrolytic and Vacuum Deposition Coatings on Flat Glass; 2015.
- H. ASTM E1300 - Standard Practice for Determining Load Resistance of Glass in Buildings; 2016.
- I. ASTM E2190 - Standard Specification for Insulating Glass Unit Performance and Evaluation; 2010.

- J. GANA (GM) - GANA Glazing Manual; 2009.
- K. GANA (SM) - GANA Sealant Manual; 2008.
- L. GANA (LGRM) - Laminated Glazing Reference Manual; 2009.
- M. NFRC 100 - Procedure for Determining Fenestration Product U-factors; 2014.
- N. NFRC 200 - Procedure for Determining Fenestration Product Solar Heat Gain Coefficient and Visible Transmittance at Normal Incidence; 2014.
- O. NFRC 300 - Test Method for Determining the Solar Optical Properties of Glazing Materials and Systems; 2014.

1.04 SUBMITTALS

- A. See Section 01 3000 - Administrative Requirements, for submittal procedures.
- B. Product Data on Insulating Glass Unit Glazing Types: Provide structural, physical and environmental characteristics, size limitations, special handling and installation requirements.
- C. Product Data on Glazing Compounds and Accessories: Provide chemical, functional, and environmental characteristics, limitations, special application requirements, and identify available colors.
- D. Recycled Content: Provide submittals for materials with recycled content in accordance with Section 01 8113 - Sustainable Building Requirements.
- E. Low/ Emitting Materials/VOC Content: Provide submittals for low emitting materials in accordance with Section 01 8113 - Sustainable Building Requirements.
- F. Warranty Documentation: Submit manufacturer warranty and ensure that forms have been completed in Owner's name and registered with manufacturer.

1.05 QUALITY ASSURANCE

- A. Perform Work in accordance with GANA (GM), GANA (SM), and GANA (LGRM) for glazing installation methods. Maintain one copy on site.
- B. Manufacturer and Fabricator Qualifications: Company specializing in manufacturing the products specified in this section with minimum three years of documented experience.
- C. Installer Qualifications: Company specializing in performing work of the type specified and with at least three years documented experience.

1.06 WARRANTY

- A. See Section 01 7800 - Closeout Submittals, for additional warranty requirements.
- B. Insulating Glass Units: Provide a five (5) year manufacturer warranty to include coverage for seal failure, interpane dusting or misting, including providing products to replace failed units.
- C. Laminated Glass: Provide a five (5) year manufacturer warranty to include coverage for delamination, including providing products to replace failed units.

PART 2 PRODUCTS

2.01 MANUFACTURERS

- A. Glass Manufacturers and Fabricators:
 - 1. AGC Glass North America, Inc: www.agc-yourglass.com/#sle.
 - 2. Cardinal Glass Industries: www.cardinalcorp.com.
 - 3. Guardian Glass, LLC: www.guardianglass.com.
 - 4. Pilkington North America Inc: www.pilkington.com/na/#sle.
 - 5. Vitro Architectural Glass (formerly PPG Glass): www.vitroglazings.com/#sle.
 - 6. Viracon, Inc: www.viracon.com.
 - 7. Accepted equal.

2.02 PERFORMANCE REQUIREMENTS - EXTERIOR GLAZING ASSEMBLIES

- A. Provide type and thickness of exterior glazing assemblies to support assembly dead loads, and to withstand live loads caused by positive and negative wind pressure acting normal to plane of glass.
 - 1. Comply with ASTM E1300 for design load resistance of glass type, thickness, dimensions, and maximum lateral deflection of supported glass.
 - 2. Provide glass edge support system sufficiently stiff to limit the lateral deflection of supported glass edges to less than 1/175 of their lengths under specified design load.
 - 3. Glass thicknesses listed are minimum.

- B. Vapor Retarder and Air Barrier Seals: Provide completed assemblies that maintain continuity of building enclosure vapor retarder and air barrier.
 - 1. In conjunction with vapor retarder and joint sealer materials described in other sections.

- C. Thermal and Optical Performance: Provide exterior glazing products with performance properties as indicated. Performance properties are in accordance with manufacturer's published data as determined with the following procedures and/or test methods:
 - 1. Center of Glass U-Value: Comply with NFRC 100 using Lawrence Berkeley National Laboratory (LBNL) WINDOW 6.3 computer program.
 - 2. Center of Glass Solar Heat Gain Coefficient (SHGC): Comply with NFRC 200 using Lawrence Berkeley National Laboratory (LBNL) WINDOW 6.3 computer program.
 - 3. Solar Optical Properties: Comply with NFRC 300 test method.

2.03 GLASS MATERIALS

- A. Float Glass: Provide float glass based glazing unless noted otherwise.
 - 1. Heat-Strengthened and Fully Tempered Types: ASTM C1048, Kind HS and FT.
 - 2. Fully Tempered Safety Glass: Complies with ANSI Z97.1 and 16 CFR 1201 criteria.
 - 3. Thicknesses: As indicated; provide greater thickness as required for exterior glazing wind load design.

- B. Laminated Glass: Float glass laminated in accordance with ASTM C1172.
 - 1. Laminated Safety Glass: Complies with ANSI Z97.1 and 16 CFR 1201 test requirements for Category II.
 - 2. Polyvinyl Butyral (PVB) Interlayer: 0.060 inch (1.524 mm) thick, minimum.

2.04 INSULATING GLASS UNITS

- A. Insulating Glass Units: Types as indicated.
 - 1. Durability: Certified by an independent testing agency to comply with ASTM E2190.

2. Coated Glass: Comply with requirements of ASTM C1376 for pyrolytic (hard-coat) or magnetic sputter vapor deposition (soft-coat) type coatings on flat glass; coated vision glass, Kind CV; coated overhead glass, Kind CO; or coated spandrel glass, Kind CS.
 3. Metal Edge Spacers: Aluminum, bent and soldered corners.
 4. Spacer Color: Black.
 5. Edge Seal:
 - a. Dual-Sealed System: Provide polyisobutylene sealant as primary seal applied between spacer and glass panes, and silicone, polysulfide, or polyurethane sealant as secondary seal applied around perimeter.
 6. Color: Black.
 7. Purge interpane space with dry air, hermetically sealed.
- B. Insulating Glass Units: Vision glass, double glazed.
1. Basus if Design: Solarban 90, Vitro Architectural Glass
 2. Applications: Exterior glazing unless otherwise indicated.
 3. Space between lites filled with air.
 4. Outboard Lite: Heat-strengthened float glass, 1/4 inch (6.4 mm) thick, minimum.
 - a. Tint: Clear.
 - b. Coating: Low-E (passive type), on #2 surface.
 5. Inboard Lite: Laminated float glass, 1/4 inch (6.4 mm) thick, minimum.
 - a. Tint: Clear.
 6. Total Thickness: 1 inch (25.4 mm).
 7. Thermal Transmittance (U-Value), Summer - Center of Glass: 1.50, nominal.
 8. Visible Light Transmittance (VLT): 51 percent, nominal.
 9. Solar Heat Gain Coefficient (SHGC): 0.23, nominal.

2.05 ACCESSORIES

- A. Setting Blocks: Silicone, with 80 to 90 Shore A durometer hardness; ASTM C864 Option I. Length of 0.1 inch for each square foot (25 mm for each square meter) of glazing or minimum 4 inch (100 mm) x width of glazing rabbet space minus 1/16 inch (1.5 mm) x height to suit glazing method and pane weight and area.
- B. Spacer Shims: Neoprene, 50 to 60 Shore A durometer hardness; ASTM C864 Option II. Minimum 3 inch (75 mm) long x one half the height of the glazing stop x thickness to suit application.
- C. Glazing Splines: Resilient silicone extruded shape to suit glazing channel retaining slot; ASTM C864 Option II; color black.

PART 3 EXECUTION

3.01 VERIFICATION OF CONDITIONS

- A. Verify that openings for glazing are correctly sized and within tolerances, including those for size, squareness, and offsets at corners.
- B. Verify that surfaces of glazing channels or recesses are clean, free of obstructions that may impede moisture movement, weeps are clear, and support framing is ready to receive glazing system.
- C. Verify that sealing between joints of glass framing members has been completed effectively.
- D. Proceed with glazing system installation only after unsatisfactory conditions have been corrected.

3.02 PREPARATION

- A. Clean contact surfaces with appropriate solvent and wipe dry within maximum of 24 hours before glazing. Remove coatings that are not tightly bonded to substrates.
- B. Seal porous glazing channels or recesses with substrate compatible primer or sealer.
- C. Prime surfaces scheduled to receive sealant where required for proper sealant adhesion.

3.03 INSTALLATION, GENERAL

- A. Install glazing in compliance with written instructions of glass, gaskets, and other glazing material manufacturers, unless more stringent requirements are indicated, including those in glazing referenced standards.
- B. Install glazing sealants in accordance with ASTM C1193, GANA (SM), and manufacturer's instructions.
- C. Do not exceed edge pressures around perimeter of glass lites as stipulated by glass manufacturer.
- D. Set glass lites in proper orientation so that coatings face exterior or interior as indicated.
- E. Prevent glass from contact with any contaminating substances that may be the result of construction operations such as, and not limited to the following; weld splatter, fire-safing, plastering, mortar droppings, etc.

3.04 INSTALLATION - DRY GLAZING METHOD (GASKET GLAZING)

- A. Application - Exterior and/or Interior Glazed: Set glazing infills from either the exterior or the interior of the building.
- B. Place setting blocks at 1/4 points with edge block no more than 6 inch (152 mm) from corners.
- C. Rest glazing on setting blocks and push against fixed stop with sufficient pressure on gasket to attain full contact.
- D. Install removable stops without displacing glazing gasket; exert pressure for full continuous contact.

3.05 INSTALLATION - PRESSURE GLAZED SYSTEMS

- A. Application - Exterior Glazed: Set glazing infills from exterior side of building.
- B. Place setting blocks at 1/4 points with edge block no more than 6 inch (152 mm) from corners.
- C. Rest glazing on setting blocks and push against fixed stop with sufficient pressure on gasket to attain full contact.
- D. Install pressure plates without displacing glazing gasket; exert pressure for full continuous contact.
- E. Install cover plate.

3.06 CLEANING

- A. Remove excess glazing materials from finish surfaces immediately after application using solvents or cleaners recommended by manufacturers.
- B. Remove non-permanent labels immediately after glazing installation is complete.
- C. Clean glass and adjacent surfaces after sealants are fully cured.
- D. Clean glass on both exposed surfaces not more than 4 days prior to Date of Substantial Completion in accordance with glass manufacturer's written recommendations.

3.07 PROTECTION

- A. After installation, mark pane with an 'X' by using removable plastic tape or paste; do not mark heat absorbing or reflective glass units.
- B. Remove and replace glass that is damaged during construction period prior to Date of Substantial Completion.

END OF SECTION

SECTION 08 9100

LOUVERS

PART 1 GENERAL

1.01 SECTION INCLUDES

- A. Louvers, frames, and accessories.

1.02 RELATED REQUIREMENTS

- A. Section 01 7419 - Construction Waste Management.
- B. Section 01 8113 - Sustainable Building Requirements.
- C. Section 07 9200 - Joint Sealants: Sealing joints between frames and adjacent construction.

1.03 REFERENCE STANDARDS

- A. AAMA 611 - Voluntary Specification for Anodized Architectural Aluminum; 2014 (2015 Errata).
- B. AAMA 2605 - Voluntary Specification, Performance Requirements and Test Procedures for Superior Performing Organic Coatings on Aluminum Extrusions and Panels (with Coil Coating Appendix); 2013.
- C. AMCA 511 - Certified Ratings Program for Air Control Devices; 2010.
- D. ASTM A653/A653M - Standard Specification for Steel Sheet, Zinc-Coated (Galvanized) or Zinc-Iron Alloy-Coated (Galvannealed) by the Hot-Dip Process; 2015.

1.04 SUBMITTALS

- A. See Section 01 3000 - Administrative Requirements, for submittal procedures.
- B. Product Data: Provide data describing design characteristics, maximum recommended air velocity, design free area, materials and finishes.
- C. Shop Drawings: Indicate louver layout plan and elevations, opening and clearance dimensions, tolerances; head, jamb and sill details; blade configuration, screens, blankout areas required, and frames.
- D. Samples: Submit two samples 2 by 2 inches (50 by 50 mm) in size illustrating finish and color of exterior and interior surfaces.

- E. Test Reports: Independent agency reports showing compliance with specified performance criteria.
- F. Recycled Content: Provide submittals for materials with recycled content in accordance with Section 01 8113 - Sustainable Building Requirements.
- G. Low/ Emitting Materials/VOC Content: Provide submittals for low emitting materials in accordance with Section 01 8113 - Sustainable Building Requirements.

1.05 QUALITY ASSURANCE

- A. Manufacturer Qualifications: Company specializing in manufacturing products of the type specified in this section, with minimum three years of documented experience.
- B. Installer Qualifications: Company specializing in performing work of type specified and with at least three years of documented experience.

PART 2 PRODUCTS

2.01 MANUFACTURERS

- A. Basis of Design: Ruskin Manufacturing; www.ruskin.com.
- B. Other Acceptable Manufacturers::
 - 1. Airline Louvers: www.airlinelouvers.com/#sle.
 - 2. Airolite Company, LLC: www.airolite.com.
 - 3. American Warming and Ventilating: www.awv.com/#sle.
 - 4. Construction Specialties, Inc: www.c-sgroup.com.
 - 5. Industrial Louvers, Inc: www.industriallouvers.com/#sle.

2.02 LOUVERS

- A. Louvers: Factory fabricated and assembled, complete with frame, mullions, and accessories; AMCA Certified in accordance with AMCA 511.
 - 1. Wind Load Resistance: Design to resist positive and negative wind load of 54 psf (2.58 kPa) without damage or permanent deformation.
 - 2. Drainable Blades: Continuous rain stop at front or rear of blade aligned with vertical gutter recessed into both jambs of frame.

3. Screens: Provide insect screens at intake louvers and bird screens at exhaust louvers.
- B. Aluminum Louvers: Horizontal blade, extruded aluminum construction.
1. Basis of Design: Ruskin Manufacturing; www.ruskin.com.
 - a. Typical Louvers: Model ELF6375DX.
 - b. Heavy Duty Louvers: Model ELF6375DXH.
 2. Properties:
 - a. Material: Extruded aluminum.
 - b. Depth: 6 inches
 - c. Free Area: 57 percent, minimum.
 - d. Blades: Drainable.
 - e. Frame: 6 inches (150 mm) deep, channel profile; corner joints mitered and.
 - f. Typical Frame and Blade Thickness: 12 gage, 0.081 inch (2.1 mm) minimum.
 - g. Heavy Duty Frame and Blade Thickness: 8 gage, 0.128 inch (3.26 mm) minimum.
 - h. Finish: Class II natural anodized; finish welded units after fabrication.
- C. Steel Louvers:
1. Basis of Design: L6375D, Ruskin Manufacturing; www.ruskin.com.
 2. Properties:
 - a. Material: Roll formed galvanized steel.
 - b. Depth: 6 inches
 - c. Free Area: 54 percent, minimum.
 - d. Blades: Drainable.

- e. Frame and Blade Thickness: 18 gage, 0.051 inch (1.31 mm) minimum.
- f. Finish: Superior performing organic coatings, finished after fabrication.

2.03 MATERIALS

- A. Extruded Aluminum: ASTM B221 (ASTM B221M).
- B. Steel Sheet: Hot-dipped galvanized steel sheet, ASTM A653/A653M, with G90/Z275 coating.

2.04 FINISHES

- A. Class I Natural Anodized Finish: AAMA 611 AA-M12C22A41 Clear anodic coating not less than 0.7 mils (0.018 mm) thick.
- B. Superior Performing Organic Coatings: AAMA 2605 multiple coat, thermally cured polyvinylidene fluoride system.

2.05 ACCESSORIES

- A. Screens: Frame of same material as louver, with reinforced corners; removable, screw attached; installed on inside face of louver frame. Provide of same material as louvers.
 - 1. Bird Screen: 3/4 x .051 inches (19 x 1.3 mm) expanded metal, flattened.
 - 2. Insect Screen: 18 x 16 size mesh.
- B. Fasteners and Anchors: Stainless steel.
- C. Flashings: Of same material as louver frame, formed to required shape, single length in one piece per location.
- D. Sealant for Setting Sills and Sill Flashing: Non-curing butyl type.

PART 3 EXECUTION

3.01 EXAMINATION

- A. Verify that prepared openings and flashings are ready to receive this work and opening dimensions are as indicated on shop drawings.

3.02 INSTALLATION

- A. Install louver assembly in accordance with manufacturer's instructions.

- B. Install louvers level and plumb.
- C. Install flashings and align louver assembly to ensure moisture shed from flashings and diversion of moisture to exterior.
- D. Secure louver frames in openings with concealed fasteners.

3.03 CLEANING

- A. Strip protective finish coverings.
- B. Clean surfaces and components.

END OF SECTION

SECTION 09 3000

TILING

PART 1 GENERAL

1.1 SECTION INCLUDES

- A. Tile for floor applications.

1.2 RELATED SECTIONS

- A. 01 7419 – CONSTRUCTION WASTE MANAGEMENT
- B. 01 8113 – SUSTAINABLE BUILDING REQUIREMENTS

1.3 REFERENCE STANDARDS

- A. ANSI A108.1a - American National Standard Specifications for Installation of Ceramic Tile in the Wet-Set Method, with Portland Cement Mortar; 2014.
- B. ANSI A108.1b - American National Standard Specifications for Installation of Ceramic Tile on a Cured Portland Cement Mortar Setting Bed with Dry-Set or Latex-Portland Cement Mortar; 1999 (Reaffirmed 2010).
- C. ANSI A108.1c - Specifications for Contractors Option: Installation of Ceramic Tile in the Wet-Set Method with Portland Cement Mortar or Installation of Ceramic Tile on a Cured Portland Cement Mortar Bed with Dry-Set or Latex-Portland Cement; 1999 (Reaffirmed 2010).
- D. ANSI A108.4 - American National Standard Specifications for Installation of Ceramic Tile with Organic Adhesives or Water Cleanable Tile-Setting Epoxy Adhesive; 2009 (Revised).
- E. ANSI A108.5 - American National Standard Specifications for Installation of Ceramic Tile with Dry-Set Portland Cement Mortar or Latex-Portland Cement Mortar; 1999 (Reaffirmed 2010).
- F. ANSI A108.6 - American National Standard Specifications for Installation of Ceramic Tile with Chemical Resistant, Water Cleanable Tile-Setting and -Grouting Epoxy; 1999 (Reaffirmed 2010).
- G. ANSI A108.8 - American National Standard Specifications for Installation of Ceramic Tile with Chemical Resistant Furan Resin Mortar and Grout; 1999 (Reaffirmed 2010).
- H. ANSI A108.9 - American National Standard Specifications for Installation of Ceramic Tile with Modified Epoxy Emulsion Mortar/Grout; 1999 (Reaffirmed 2010).

- I. ANSI A108.10 - American National Standard Specifications for Installation of Grout in Tilework; 1999 (Reaffirmed 2010).
- J. ANSI A108.12 - American National Standard for Installation of Ceramic Tile with EGP (Exterior Glue Plywood) Latex-Portland Cement Mortar; 1999 (Reaffirmed 2010).
- K. ANSI A108.13 - American National Standard for Installation of Load Bearing, Bonded, Waterproof Membranes for Thin-Set Ceramic Tile and Dimension Stone; 2005 (Reaffirmed 2010).
- L. ANSI A118.3 - American National Standard Specifications for Chemical Resistant, Water Cleanable Tile-Setting and -Grouting Epoxy and Water Cleanable Tile-Setting Epoxy Adhesive; 2013 (Revised).
- M. ANSI A118.15 - American National Standard Specifications for Improved Modified Dry-Set Cement Mortar; 2012.
- N. ANSI A137.1 - American National Standard Specifications for Ceramic Tile; 2013.1.
- O. ASTM C373 - Standard Test Method for Water Absorption, Bulk Density, Apparent Porosity, and Apparent Specific Gravity of Fired Whiteware Products, Ceramic Tiles, and Glass Tiles; 2014a.
- P. TCNA (HB) - Handbook for Ceramic, Glass, and Stone Tile Installation; 2016.

1.4 SUBMITTALS

- A. See Section 01 3000 - Administrative Requirements, for submittal procedures.
- B. Product Data: Provide manufacturers' data sheets on tile, mortar, grout, and accessories. Include instructions for using grouts and adhesives.
- C. Low/ Emitting Materials/VOC Content: Provide submittals for low emitting materials in accordance with SECTION 01 8113, SUSTAINABLE BUILDING REQUIREMENTS

1.5 QUALITY ASSURANCE

- A. Manufacturer Qualifications: Company specializing in manufacturing the types of products specified in this section, with minimum five years of documented experience.
- B. Installer Qualifications: Company specializing in performing tile installation, with minimum of five years of documented experience.

1.6 DELIVERY, STORAGE, AND HANDLING

- A. Protect adhesives from freezing or overheating in accordance with manufacturer's instructions.

PART 2 PRODUCTS

2.1 TILE

- A. Basis of Design: Atlas Concorde; www.atlasconcorde.com.
- B. Other Acceptable Manufacturers:
 - 1. American Olean Corporation: www.americanolean.com.
 - 2. Dal-Tile Corporation: www.daltile.com.
 - 3. Tectura Designs, a division of Wausau Tile Inc: www.tecturadesigns.com/#sle.
- C. Porcelain Tile: ANSI A137.1, standard grade.
 - 1. Basis of Design: Brave Floor, Atlas Concorde; www.atlasconcorde.com.
 - 2. Properties:
 - a. Moisture Absorption: 0 to 0.5 percent as tested in accordance with ASTM C373.
 - b. Sizes: As indicated.
 - (1) 29-1/2x29-1/2 inches (750 x 750 mm).
 - (2) 11-3/4 x23-5/8 inches (300 x 600mm)
 - c. Thickness: 3/8 inch (9.5 mm).
 - d. Surface Finish: Unglazed.
 - e. Color(s): As indicated.

2.2 SETTING MATERIALS

- A. Manufacturers:
 - 1. ARDEX Engineered Cements: www.ardexamericas.com/#sle.
 - 2. Bostik Inc: www.bostik-us.com.
 - 3. Custom Building Products: www.custombuildingproducts.com.

4. LATICRETE International, Inc: www.laticrete.com/sle.
 5. Mapei Corporation: www.mapei.com.
 6. TEC, an H.B. Fuller Construction Products Brand:
www.tecspecialty.com/#sle.
- B. Improved Latex-Portland Cement Mortar Bond Coat: ANSI A118.15.
- C. Epoxy Grout: ANSI A118.3, chemical resistant and water-cleanable epoxy grout.
1. Color: As selected from manufacturer's full line of available colors.

PART 3 EXECUTION

3.1 EXAMINATION

- A. Verify that sub-floor surfaces are smooth and flat within the tolerances specified for that type of work and are ready to receive tile.

3.2 INSTALLATION - GENERAL

- A. Install tile, thresholds, and stair treads and grout in accordance with applicable requirements of ANSI A108.1a through ANSI A108.13, manufacturer's instructions, and TCNA (HB) recommendations.
- B. Request tile pattern. Do not interrupt tile pattern through openings.
- C. Form corners and bases neatly. Align floor joints.
- D. Place tile joints uniform in width, subject to variance in tolerance allowed in tile size. Make grout joints without voids, cracks, excess mortar or excess grout, or too little grout.
- E. Sound tile after setting. Replace hollow sounding units.
- F. Keep control and expansion joints free of mortar, grout, and adhesive.
- G. Prior to grouting, allow installation to completely cure; minimum of 48 hours.
- H. Grout tile joints unless otherwise indicated.
- I. At changes in plane and tile-to-tile control joints, use tile sealant instead of grout, with either bond breaker tape or backer rod as appropriate to prevent three-sided bonding.

3.3 CLEANING

- A. Clean tile and grout surfaces.

3.4 PROTECTION

- A. Do not permit traffic over finished floor surface for 4 days after installation.

END OF SECTION

SECTION 09 9100

PAINTING

PART 1 GENERAL

1.1 SECTION INCLUDES

- A. Surface preparation.
- B. Field application of paints.
- C. Scope: Finish designated surfaces exposed to view, unless fully factory-finished and unless otherwise indicated.
- D. Do Not Paint or Finish the Following Items:
 - 1. Items factory-finished unless otherwise indicated; materials and products having factory-applied primers are not considered factory finished.
 - 2. Items indicated to receive other finishes.
 - 3. Items indicated to remain unfinished.
 - 4. Fire rating labels, equipment serial number and capacity labels, and operating parts of equipment.
 - 5. Non-metallic roofing and flashing.
 - 6. Stainless steel, anodized aluminum, bronze, terne coated stainless steel, zinc, and lead.
 - 7. Floors, unless specifically indicated.
 - 8. Ceramic and other types of tiles.
 - 9. Glass.
 - 10. Concealed pipes, ducts, and conduits.

1.2 RELATED SECTIONS

- A. SECTION 01 7419 – CONSTRUCTION WASTE MANAGEMENT
- B. SECTION 01 8113 – SUSTAINABLE BUILDING REQUIREMENTS

1.3 DEFINITIONS

- A. Conform to ASTM D16 for interpretation of terms used in this section.

1.4 REFERENCE STANDARDS

- A. ASTM D16 - Standard Terminology for Paint, Related Coatings, Materials, and Applications; 2016.
- B. ASTM D4258 - Standard Practice for Surface Cleaning Concrete for Coating; 2005 (Reapproved 2012).
- C. MPI (APSM) - Master Painters Institute Architectural Painting Specification Manual; Current Edition, www.paintinfo.com.
- D. SSPC-SP 1 - Solvent Cleaning; 2015.

1.5 SUBMITTALS

- A. See Section 01 3000 - Administrative Requirements, for submittal procedures.
- B. Product Data: Provide complete list of products to be used, with the following information for each:
 - 1. Manufacturer's name, product name and/or catalog number, and general product category (e.g. "alkyd enamel").
 - 2. Cross-reference to specified paint system(s) product is to be used in; include description of each system.
 - 3. Manufacturer's installation instructions.
- C. Samples: Submit three paper "draw down" samples, 8-1/2 by 11 inches (216 by 279 mm) in size, illustrating range of colors available for each finishing product specified.
 - 1. Paint color submittals will not be considered until color submittals for major materials not to be painted, such as masonry, have been approved.
- D. Manufacturer's Instructions: Indicate special surface preparation procedures.
- E. Maintenance Materials: Furnish the following for Owner's use in maintenance of project.
 - 1. See Section 01 6000 - Product Requirements, for additional provisions.
 - 2. Extra Paint and Finish Materials: 1 gallon (4 L) of each color; from the same product run, store where directed.
 - 3. Label each container with color in addition to the manufacturer's label.
- F. Low/ Emitting Materials/VOC Content: Provide submittals for low emitting materials in accordance with SECTION 01 8113, SUSTAINABLE BUILDING

REQUIREMENTS

1.6 QUALITY ASSURANCE

- A. Manufacturer Qualifications: Company specializing in manufacturing the products specified, with minimum three years documented experience.
- B. Applicator Qualifications: Company specializing in performing the type of work specified with minimum three years' experience.

1.7 DELIVERY, STORAGE, AND HANDLING

- A. Deliver products to site in sealed and labeled containers; inspect to verify acceptability.
- B. Container Label: Include manufacturer's name, type of paint, brand name, lot number, brand code, coverage, surface preparation, drying time, cleanup requirements, color designation, and instructions for mixing and reducing.
- C. Paint Materials: Store at minimum ambient temperature of 45 degrees F (7 degrees C) and a maximum of 90 degrees F (32 degrees C), in ventilated area, and as required by manufacturer's instructions.

1.8 FIELD CONDITIONS

- A. Do not apply materials when surface and ambient temperatures are outside the temperature ranges required by the paint product manufacturer.
- B. Follow manufacturer's recommended procedures for producing best results, including testing of substrates, moisture in substrates, and humidity and temperature limitations.
- C. Do not apply paint and finishes during rain or when relative humidity is outside the humidity ranges required by the paint product manufacturer.
- D. Provide lighting level of 80 ft candles (860 lx) measured mid-height at substrate surface.

PART 2 PRODUCTS

2.1 MANUFACTURERS

- A. Provide paints and finishes used in any individual system from the same manufacturer; no exceptions.
- B. Basis of Design: PPG Paints: www.ppgpaints.com/sle.
- C. Other Acceptable Manufacturers:

1. Behr Process Corporation: www.behr.com.
2. Benjamin Moore & Company: www.benjaminmoore.com.
3. PPG Paints: www.ppgpaints.com/sle.
4. Pratt & Lambert Paints: www.prattandlambert.com.
5. Sherwin-Williams Company: www.sherwin-williams.com.
6. Valspar Corporation: www.valsparpaint.com.

D. Primer Sealers: Same manufacturer as top coats.

2.2 PAINTS AND FINISHES - GENERAL

- A. Paints and Finishes: Ready mixed, unless required to be a field-catalyzed paint.
1. Provide paints and finishes of a soft paste consistency, capable of being readily and uniformly dispersed to a homogeneous coating, with good flow and brushing properties, and capable of drying or curing free of streaks or sags.
 2. Provide materials that are compatible with one another and the substrates indicated under conditions of service and application, as demonstrated by manufacturer based on testing and field experience.
 3. For opaque finishes, tint each coat including primer coat and intermediate coats, one-half shade lighter than succeeding coat, with final finish coat as base color.
 4. Supply each paint material in quantity required to complete entire project's work from a single production run.
 5. Do not reduce, thin, or dilute paint or finishes or add materials unless such procedure is specifically described in manufacturer's product instructions.
- B. Paint Systems: Provide one coat primer and two top coats unless otherwise noted.
- C. Sheens: Provide the sheens specified; where sheen is not specified, sheen will be selected later by Architect from the manufacturer's full line.
- D. Colors: As indicated on drawings.

2.3 PAINT SYSTEMS

A. Concrete Vertical Surfaces: 100 percent Acrylic

1. Basis of Design:

- a. Primer: Perma-Crete Interior/Exterior Acrylic Latex Resistant Primer, 4-603XI, PPG Paints.
- b. Top Coats: PPG Paints Perma-Crete Exterior Acrylic High Build, 4-22 Series, PPG Paints.

2. Sheen: Satin.

B. Concrete Ceilings: 100 percent Acrylic

1. Basis of Design:

- a. Primer: Perma-Crete Interior/Exterior Acrylic Latex Resistant Primer, 4-603XI, PPG Paints.
- b. Top Coats: PPG Paints Perma-Crete Exterior Acrylic High Build, 4-22XI Series, PPG Paints.

2. Sheen: Satin.

C. Galvanized Steel: Acrylic Aliphatic Urethane

1. Basis of Design:

- a. Primer: Multiprime EFD Epoxy, 94-109 Series, PPG Paints.
- b. Top Coats: Pitthane High Build Urethane Enamel, 95-8800 Series, PPG Paints.

2. Sheen: Satin.

D. Hollow Metal Doors, Frames, and Other Miscellaneous Metal: 100 percent Waterborne Acrylic Enamel.

1. Basis of Design:

- a. Primer: Pitt-Tech DTM Industrial Enamel, Series 90-712, PPG Paints.
- b. Top Coats: Pitt-Tech Plus, 90-1210 Series, PPG Paints.

2. Sheen: Satin.

2.4 ACCESSORY MATERIALS

- A. Accessory Materials: Provide primers, sealers, cleaning agents, cleaning cloths, sanding materials, and clean-up materials as required for final completion of painted surfaces.

PART 3 EXECUTION

3.1 EXAMINATION

- A. Verify that surfaces are ready to receive work as instructed by the product manufacturer.
- B. Examine surfaces scheduled to be finished prior to commencement of work. Report any condition that may potentially effect proper application.
- C. Test shop-applied primer for compatibility with subsequent cover materials.
- D. Measure moisture content of surfaces using an electronic moisture meter. Do not apply finishes unless moisture content of surfaces are below the following maximums:
 - 1. Masonry, Concrete, and Concrete Masonry Units: 12 percent.
- E. Measure pH of concrete substrate. Do not apply finishes unless surfaces are less than pH 13.

3.2 PREPARATION

- A. Clean surfaces thoroughly and correct defects prior to application.
- B. Prepare surfaces using the methods recommended by the manufacturer for achieving the best result for the substrate under the project conditions.
- C. Remove or mask surface appurtenances, including electrical plates, hardware, light fixture trim, escutcheons, and fittings, prior to preparing surfaces for finishing.
- D. Seal surfaces that might cause bleed through or staining of topcoat.
- E. Remove mildew from impervious surfaces by scrubbing with solution of tetra-sodium phosphate and bleach. Rinse with clean water and allow surface to dry.
- F. Concrete:

1. Remove release agents, curing compounds, efflorescence, and chalk. Do not coat surfaces if moisture content or alkalinity of surfaces to be coated exceeds that permitted in manufacturer's written instructions.
2. Clean concrete according to ASTM D4258. Allow to dry.

G. Galvanized Surfaces:

1. Remove surface contamination and oils and wash with solvent according to SSPC-SP 1.

3.3 APPLICATION

- A. Apply products in accordance with manufacturer's written instructions and recommendations in "MPI Architectural Painting Specification Manual".
- B. Do not apply finishes to surfaces that are not dry. Allow applied coats to dry before next coat is applied.
- C. Apply each coat to uniform appearance.
- D. Vacuum clean surfaces of loose particles. Use tack cloth to remove dust and particles just prior to applying next coat.
- E. Reinstall electrical cover plates, hardware, light fixture trim, escutcheons, and fittings removed prior to finishing.

3.4 CLEANING

- A. Collect waste material that could constitute a fire hazard, place in closed metal containers, and remove daily from site.

3.5 PROTECTION

- A. Protect finishes until completion of project.
- B. Touch-up damaged finishes after Substantial Completion.

END OF SECTION

SECTION 10 1400

SIGNAGE

PART 1 GENERAL

1.01 SECTION INCLUDES

- A. Room and door signs.
- B. Directional and informational signs.
- C. Building identification signs.

1.02 RELATED REQUIREMENTS

- A. Section 01 7419 - Construction Waste Management.
- B. Section 01 8113 - Sustainable Building Requirements.

1.03 REFERENCE STANDARDS

- A. 36 CFR 1191 - Americans with Disabilities Act (ADA) Accessibility Guidelines for Buildings and Facilities; Architectural Barriers Act (ABA) Accessibility Guidelines; current edition.
- B. AAMA 2605 - Voluntary Specification, Performance Requirements and Test Procedures for Superior Performing Organic Coatings on Aluminum Extrusions and Panels (with Coil Coating Appendix); 2013.
- C. ADA Standards - Americans with Disabilities Act (ADA) Standards for Accessible Design; 2010.
- D. ASTM D4956 - Standard Specification for Retroreflective Sheeting for Traffic Control; 2017.
- E. ICC A117.1 - Accessible and Usable Buildings and Facilities; 2009.

1.04 QUALITY ASSURANCE

- A. Manufacturer Qualifications: Company specializing in manufacturing the products specified in this section with minimum three years of documented experience.

1.05 DELIVERY, STORAGE, AND HANDLING

- A. Package signs as required to prevent damage before installation.

1.06 WARRANTY

- A. Manufacturer's Warranty: Submit, for Owner's acceptance, manufacturer's standard warranty document executed by authorized company official. Manufacturer's warranty is in addition to, and not a limitation of, other rights Owner may have under Contract Documents.
- B. Warranty Period: Five years commencing on Date of Substantial Completion.

PART 2 PRODUCTS

2.01 MANUFACTURERS

- A. Basis of Design: Slide Modular Sign System, 2/90 Sign Systems; www.290signs.com
- B. Dimensional Letter Signs:
- C. Other Signs - _____:

2.02 DESIGN REQUIREMENTS

- A. Accessibility Compliance: Signs are required to comply with ADA Standards and ICC A117.1 and applicable building codes, unless otherwise indicated; in the event of conflicting requirements, comply with the most comprehensive and specific requirements.
- B. Provide signs and sign components to withstand exterior exposure to UV light, participation, and humidity.
- C. Building Identification Signs:

2.03 SYSTEM SIGNS

- A. Types 1 - 4: Modular flat panel sign system consisting of a structural rail with removable sliding copy inserts secured by end caps.
 - 1. Basis of Design: Slide Modular Sign System, 2/90 Sign Systems; www.290signs.com.
 - 2. Structural Rails:
 - a. Structural Rails: Internal structural member of extruded 6063-TS aluminum, anodized black.
 - b. Rail Joiners: Extruded black PVC plastic.

- c. Sizes
 - (1) Flag: Standard
 - (2) Wall Mounted: Thin.
- 3. Trim:
 - a. Endcaps: Slimline, painted end caps
- 4. Insert Material: As indicated.
 - a. Painted polycarbonate.
 - b. Aluminum.
 - c. ADA Photopolymer (Integral dimensional graphics top-coated).
- 5. Graphic Process:
 - a. Direct Print Copy – VOC free, ultra-violet cured inks digitally applied directly to the substrate surface.
 - b. Vinyl First Surface Copy – High Performance Cast PVC Vinyl Copy.
 - c. ADA, Integral Copy – Graphics and Insert materials are one piece. Tactile Photopolymer Inserts are .080 inches phenolic photopolymer with raised copy etched to .032 inches. Background color is painted in acrylic lacquer in the specified Insert color. Top surface of copy characters is then added by roller printing in the specified copy color using Silkscreen inks.
- 6. Mounting Types:
 - a. Wall Mounted: Pressure sensitive tape as indicated.
 - b. Perpendicular: Manufacturer's standard 90 degree angle mount.
 - c. Ceiling Hung: Manufacturer's standard ceiling mounted system.
- 7. Colors: As indicated.

2.04 SIGN FILMS

A. Concrete Wall Applications:

- 1. Basis of Design: Controltac Graphic Film, 3M; www.3M.com

2. Material: Cast Vinyl.
3. Thickness: 2-mil without adhesive.
4. Graphic Process: Ink jet suitable for exterior exposure.
5. Graphic Protection: 3M Overlamine or Clear suitable for exterior exposure.
6. Adhesive: Pressure sensitive suitable for application.

B. Concrete Applications Floor Numbers:

1. Basis of Design: IMAGin STR328 StreetRap, Mactac; www.Mactac.com.
2. Material: PVC Film.
3. Thickness: 2-mil without adhesive.
4. Graphic Process: Ink jet suitable for exterior exposure.
5. Graphic Protection: 2 to 3-mil overlaminating film suitable for application.
6. Adhesive: 3-mil thick, aggressive, permanent, blended acrylic/rubber pressure sensitive adhesive suitable for application

C. Aluminum Plate Applications:

1. Basis of Design: Scotchlite Reflective Graphic Film, 3M; www.3M.com
2. Material: Reflective Vinyl, ASTM D4956.
3. Thickness: 7-8 mil without adhesive.
4. Graphic Process: Ink jet suitable for exterior exposure.
5. Graphic Protection: 3M Overlamine or Clear suitable for exterior exposure
6. Adhesive: Pressure sensitive suitable for application.

2.05 DIMENSIONAL LETTERS

A. Type 14: Metal Letters:

1. Metal: Aluminum casting.

2. Size: As indicated
3. Finish: PVDF Superior Performance Organic Coating, AAMA 2605
4. Color: As indicated.
5. Mounting: Pin mounted.

2.06 POLE MOUNTED SIGNS

- A. Type 6, 9-11: Powder-coated aluminum panels
 1. Applications: Evacuation Plan, Parking ID Directional, Electric Vehicle ID, and Accessibility ID.
 2. Basis of Design: Alto Aluminum, www.altoaluminum.com.
 3. Base Material: Grade 5052 aluminum.
 4. Graphics: Class 2 powder coating.
 5. Colors and finishes: As indicated.

PART 3 EXECUTION

3.01 EXAMINATION

- A. Verify that substrate surfaces are ready to receive work.

3.02 INSTALLATION

- A. Install in accordance with manufacturer's instructions.
- B. Install neatly, with horizontal edges level.
- C. Locate signs and mount at heights indicated on drawings and in accordance with ADA Standards and ICC A117.1.
- D. Protect from damage until Substantial Completion; repair or replace damaged items.
- E. Graphic Film Application:
 1. Install films in accordance with manufacturer's application products and techniques recommended for surface.

2. Install films plumb and level, accurately fitted, free from distortion, defects or air bubbles.

3.03 CLEANING

- A. Clean installed products in accordance with manufacturer's instructions prior to owner's acceptance.
- B. Repair or replace damaged installed products.

3.04 PROTECTION

- A. Protection: Protect installed product from damage during construction.

END OF SECTION

SECTION 10 1453 – TRAFFIC SIGNAGE

PART 1 GENERAL

1.01 DESCRIPTION OF WORK

Furnish all labor, materials, testing and inspection, and equipment required to complete the work indicated on the Drawings and specified herein. The work shall include, but not be limited to, installation of traffic signage as indicated on the drawings and specified herein.

1.02 RELATED REQUIREMENTS

Section 32 1723 – Pavement Markings

1.03 REFERENCE STANDARDS

The publications listed form a part of this specification to the extent referenced.

- A. Hawaii Standard Specification for Road And Bridge Construction, 2005, as applicable to County of Maui, with exception of subsections regarding “Measurement” and “Payment”; referred to as “Standard Specifications”

Section 631– Traffic Control Regulatory, Warning, and Miscellaneous Signs

Section 750 – Traffic Control Sign and Marker Material

- B. American Disabilities Act
- C. Federal Highways Administration, “Manual on Uniform Traffic Control Devies for Streets and Highways.” (MUTCD), latest edition
- D. American Society for Testing and Materials (ASTM) Publications
- ASTM B209 – Aluminum and Aluminum-Alloy Sheet and Plate

1.05 SUBMITTALS

- A. See Section 01 3300 - Submittal Procedures.
- B. Product Data: Catalog cuts, shop drawings and color samples

PART 2 PRODUCTS

2.01 MATERIALS

- A. Sign shall conform to the requirements of Standard Specification Subsection 750.01 “Signs.” Reflective sheeting shall conform to AASHTO M 268, or as amended in accordance with Subsection 750.01 – Signs. The following amendments shall apply.

Amend **Subsection 750.01(A)(1) Retroreflectorization** by replacing lines 8 through 31 to read:

- “(1) **Retroreflectorization.** The following shall be retroreflectorized:
- (a) Background for illuminated guide signs with ASTM D 4956 Type XI retroreflective sheeting.

(b) Background for non-illuminated guide signs with ASTM D 4956 Type XI retroreflective sheeting.

(c) Messages, arrows, and borders of guide signs with ASTM D 4956 Type XI retroreflective sheeting.

(d) Regulatory and warning signs, directional signs ("DIR" designation), construction warning signs, and barricade rails, completely, with Type III, IV, or IX retroreflective sheeting.

(e) Pedestrian, school, bicycle crossing series, completely with Type IX fluorescent yellow green retroreflective sheeting."

Amend **Subsection 750.01(B) Backing** by replacing lines 72 through 73 to read:

"Aluminum sheet shall conform to ASTM B 209, alloy 5052-H38 or 6061-T6 flat sheet."

Amend **Subsection 750.01(E) Retroreflective Sheeting Materials** by replacing lines 1126 through 1137 to read:

(E) Retroreflective Sheeting Materials. Retroreflective sheeting includes white or colored sheeting having smooth outer surface.

Retroreflective sheeting shall be classified in accordance with ASTM D 4956.

The coefficient of retroreflection shall meet the minimum requirements of ASTM D 4956 for the type of reflective sheeting specified.

The color shall conform to the latest appropriate standard color tolerance chart issued by the U.S. Department of Transportation, Federal Highway Administration and to the daytime and nighttime color requirements of ASTM D 4956.

Test methods and procedures shall be in accordance with ASTM."

- B. Signs posts shall be square tube posts (12 or 14 gage) conforming to the requirements of Standard Specification Subsection Section 750.02 "Sign Posts."

Amend **Subsection 750.02 Sign Posts** by replacing lines 1168 through 1172 to read:

750.02 Square Tube Posts. Square and other tube posts shall conform to ASTM A 653 for cold-rolled, carbon steel sheet, commercial quality; or ASTM A 787 for electric-resistance-welded, metallic-coated carbon steel mechanical tubing."

- C. Fasteners for Signs shall conform to the requirements of HDOT Standard Specification Section 750.03 "Fasteners for Signs and Route Markers."
- D. Accessible Stall Sign Posts: Standard weight galvanized steel pipe, diameter as shown on drawings.

2.02 EQUIPMENT

- A. All equipment, tools and machinery used in the performance of the work covered by this section of the specifications shall be suitable for sign installation and removal, and shall be maintained in satisfactory operating condition at all times.

PART 3 EXECUTION

3.01 INSTALLATION

- A. Installation shall be in accordance with Standard Specifications, Section 631– “Traffic Control Regulatory, Warning, and Miscellaneous Signs”, except as amended on the drawings.

3.02 INSPECTION AND ACCEPTANCE

- A. Traffic signs shall be subject to rigid inspection at all times and provisions of this specification will be strictly enforced. Completed work will meet the Contracting Officer’s acceptance in all respects. Final acceptance will be contingent upon conformance with specification requirements outlined in this specification.

END OF SECTION

SECTION 10 2601

WALL AND CORNER GUARDS

PART 1 GENERAL

1.01 SECTION INCLUDES

- A. Corner guards.

1.02 SUBMITTALS

- A. See Section 01 3000 - Administrative Requirements, for submittal procedures.
- B. Product Data: Indicate physical dimensions, features, anchorage details, and rough-in measurements.
- C. Samples: Submit two sections of corner guard, 24 inch (600 mm) long, illustrating component design, configuration, color and finish.

PART 2 PRODUCTS

2.01 MANUFACTURERS

- A. Basis of Design: Pro Tek Industrial & Commercial Impact Protection Systems, Pawling Corporation; www.pawling.com.
- B. Other Acceptable Manufacturers:
 - 1. Babcock-Davis: www.babcockdavis.com/sle.
 - 2. Construction Specialties, Inc: www.c-sgroup.com.
 - 3. Inpro: www.inprocorp.com/#sle.
 - 4. Nystrom, Inc: www.nystrom.com/sle.
 - 5. Trim-Tex, Inc: www.trim-tex.com/#sle.
 - 6. Accepted equal.

2.02 COMPONENTS

- A. Corner Guards - Surface Mounted:
 - 1. Material: Rubber, UV-resistant, gray, uniform in color, smooth texture.

2. Width of Wings: 4-7/8 inches (124 mm).
 3. Corner: Radiused 7/8 inch (22mm).
 4. Length: 48 inches (1220 mm) one piece.
- B. Attachment Hardware: Galvanized bolt and expansion shield as recommended by manufacturer.

2.03 FABRICATION

PART 3 EXECUTION

3.01 INSTALLATION

- A. Install components in accordance with manufacturer's instructions, level and plumb, secured rigidly in position to wall framing members only.
- B. Position corner guards as indicated.

3.02 TOLERANCES

- A. Maximum Variation From Required Height: 1/4 inch (6 mm).

END OF SECTION

SECTION 10 4400

FIRE PROTECTION SPECIALTIES

PART 1 GENERAL

1.01 SECTION INCLUDES

- A. Fire extinguishers.
- B. Fire extinguisher cabinets.

1.02 RELATED REQUIREMENTS

- A. Section 01 7419 - Construction Waste Management.
- B. Section 01 8113 - Sustainable Building Requirements.

1.03 REFERENCE STANDARDS

- A. NFPA 10 - Standard for Portable Fire Extinguishers; 2013.

1.04 SUBMITTALS

- A. See Section 01 3000 - Administrative Requirements, for submittal procedures.
- B. Product Data: Provide extinguisher operational features, color and finish, anchorage details, and installation instructions.
- C. Shop Drawings: Indicate locations of cabinets, cabinet physical dimensions, and installation procedures.
- D. Recycled Content: Provide submittals for materials with recycled content in accordance with Section 01 8113 - Sustainable Building Requirements.
- E. Low/ Emitting Materials/VOC Content: Provide submittals for low emitting materials in accordance with Section 01 8113 - Sustainable Building Requirements.

PART 2 PRODUCTS

2.01 MANUFACTURERS

- A. Activar Construction Products Group - JL Industries: www.activarcpg.com/#sle.
- B. Ansul, a Tyco Business: www.ansul.com.

- C. Kidde, a unit of United Technologies Corp: www.kidde.com.
- D. Larsen's Manufacturing Co: www.larsensmfg.com.
- E. Nystrom, Inc: www.nystrom.com/sle.
- F. Pyro-Chem, a Tyco Business: www.pyrochem.com.
- G. Accepted equal.

2.02 FIRE EXTINGUISHERS

- A. Fire Extinguishers - General: Comply with product requirements of NFPA 10 and applicable codes, whichever is more stringent.
- B. Multipurpose Dry Chemical Type Fire Extinguishers: Carbon steel tank, with pressure gauge.
 - 1. Class: A:B:C type.
 - 2. Size and classification as scheduled.
 - 3. Finish: Baked polyester powder coat, color as selected.
- C. Dry Chemical Type Fire Extinguishers: Stainless steel tank, with pressure gauge.
 - 1. Class: K type.
 - 2. Size and classification as scheduled.

2.03 FIRE EXTINGUISHER CABINETS

- A. Cabinet Construction: Non-fire rated.
 - 1. Formed galvanized steel sheet; 0.036 inch (0.9 mm) thick base metal.
- B. Cabinet Configuration: Surface mounted type.
 - 1. Size to accommodate accessories.
- C. Door:
 - 1. Style: Horizontal Duo.

2. Material: 0.036 inch (0.9 mm) metal thickness, reinforced for flatness and rigidity with nylon catch. Hinge doors for 180 degree opening with two butt hinge.
 3. Glazing: Acrylic plastic, clear, 1/8 inch (3 mm) thick, flat shape and set in resilient channel glazing gasket.
- D. Cabinet Mounting Hardware: Appropriate to cabinet, with pre-drilled holes for placement of anchors.
 - E. Weld, fill, and grind components smooth.
 - F. Finish of Cabinet Exterior Trim and Door: Baked enamel, color as selected.
 - G. Finish of Cabinet Interior: White colored enamel.

PART 3 EXECUTION

3.01 EXAMINATION

- A. Verify existing conditions before starting work.

3.02 INSTALLATION

- A. Install in accordance with manufacturer's instructions.
- B. Secure rigidly in place.
- C. Place extinguishers in cabinets.

END OF SECTION

SECTION 10 7110

EXTERIOR SUN CONTROL DEVICES

PART 1 GENERAL

1.01 SECTION INCLUDES

- A. Modular, shop fabricated, extruded aluminum sun screens to be mounted on structure provided by others.

1.02 RELATED REQUIREMENTS

- A. Section 01 7419 - Construction Waste Management.
- B. Section 01 8113 - Sustainable Building Requirements.
- C. Section 03 3000 - Cast-in-Place Concrete: Mounting substrates.
- D. Section 08 4413 - Glazed Aluminum Curtain Walls: Mounting substrates.

1.03 REFERENCE STANDARDS

- A. ASTM A307 - Standard Specification for Carbon Steel Bolts, Studs, and Threaded Rod 60 000 PSI Tensile Strength; 2014.
- B. ASTM B209 - Standard Specification for Aluminum and Aluminum-Alloy Sheet and Plate; 2014.
- C. ASTM B209M - Standard Specification for Aluminum and Aluminum-Alloy Sheet and Plate (Metric); 2014.
- D. ASTM B211 - Standard Specification for Aluminum and Aluminum-Alloy Rolled or Cold Finished Bar, Rod, and Wire; 2012.
- E. ASTM B211M - Standard Specification for Aluminum and Aluminum-Alloy Rolled or Cold-Finished Bar, Rod, and Wire (Metric); 2012.
- F. ASTM B221 - Standard Specification for Aluminum and Aluminum-Alloy Extruded Bars, Rods, Wire, Profiles, and Tubes; 2014.
- G. ASTM B221M - Standard Specification for Aluminum and Aluminum-Alloy Extruded Bars, Rods, Wire, Profiles, and Tubes (Metric); 2013.
- H. ASTM F593 - Standard Specification for Stainless Steel Bolts, Hex Cap Screws, and Studs; 2017.

1.04 SUBMITTALS

- A. See Section 01 3000 - Administrative Requirements, for submittal procedures.
- B. Shop Drawings: Prior to commencement of fabrication, submit detailed shop drawings, showing all profiles, sections of all components, finishes, fastening details, and manufacturer's technical and descriptive data. Include field dimensions of openings and elevations on shop drawings.
- C. Design Data: Submit comprehensive structural analysis of design for the specified loads. Stamp and sign calculations by professional engineer.
- D. Samples: 10 inches (254 mm) by 10 inches (254 mm) minimum illustrating design, workmanship and finish color.
- E. Sample of Louver: For review of shape only
- F. Designer's Qualification Statement.
- G. Recycled Content: Provide submittals for materials with recycled content in accordance with Section 01 8113 - Sustainable Building Requirements.
- H. Low/ Emitting Materials/VOC Content: Provide submittals for low emitting materials in accordance with Section 01 8113 - Sustainable Building Requirements.
- I. Specimen Warranty: Furnish a copy of manufacturer's standard warranty.

1.05 QUALITY ASSURANCE

- A. Designer Qualifications: Perform structural design under direct supervision of a Professional Engineer experienced in design of this type of work licensed in the State in which the Project is located.
- B. Manufacturer Qualifications: Company specializing in manufacturing products specified in this section, with no less than five years of documented experience.
- C. Installer Qualifications: Company specializing in performing the work of this section.
 - 1. With minimum five years of documented experience.
 - 2. Approved by manufacturer.

1.06 DELIVERY, STORAGE, AND HANDLING

- A. Deliver materials to project site ready for erection.

- B. Package using methods that prevent damage during shipping and storage on site.
- C. Store materials under cover and elevated above grade.

1.07 WARRANTY

- A. See Section 01 7800 - Closeout Submittals, for additional warranty requirements.
- B. Sun Screens: Correct defective work within a one year period after Date of Substantial Completion.
- C. Finish Warranty: Provide manufacturer's ten year warranty on factory finish against cracking, peeling, and blistering.

PART 2 PRODUCTS

2.01 MANUFACTURERS

- A. Basis of Design: Arcadia, Inc.; www.arcadiainc.com.
- B. Other Acceptable Manufacturers:
 - 1. C.R. Laurence Company, Inc; U.S. Aluminum: www.crl-arch.com/#sle.
 - 2. EFCO, a Pella Company: www.efcocorp.com/#sle.
 - 3. Kawneer Company, Inc.: www.kawneer.com
 - 4. Trulite Glass & Aluminum Solutions, LLC: www.trulite.com.
 - 5. Wausau Window and Wall Systems: www.wausauwindow.com.
 - 6. Accepted equal.

2.02 SUN SCREENS

- A. Sun Screens: Shop fabricated, shop finished, extruded aluminum outriggers, louvers, and fascia, free of defects impairing strength, durability or appearance.
 - 1. Configuration: As indicated on drawings.
 - 2. Louver Type: Airfoil, size as indicated.
 - 3. Fascia:

- a. Type 1: Closed Deep Rectangle, 9 by 1-3/4 inches (229 by 44 mm).
 - b. Type 2: Closed Shallow Rectangle, 4 by 3/4 inches (102 by 19 mm).
 - c. Type 3: Closed shallow Angular, 6-1/2 by 1-11/16 inches (165 by 43 mm) 9 degrees.
4. Outrigger Shape:
- a. Type 1: Straight Square.
 - b. Type 2: Angle Square.
 - c. Type 3: Wedge Round.
5. Design Criteria: Design and fabricate to resist the following loads without failure, damage, or permanent deflection:
- a. Design Wind Loads: Comply with applicable code and ASCE 7.
 - b. Thermal Movement: Plus/minus 1/8 inch (3.175 mm), maximum.
6. Sizes: As indicated on drawings.
7. Provide a complete system ready for erection at project site.
8. Mounting: Aluminum angle as indicated.

2.03 MATERIALS

- A. Aluminum Extrusions: ASTM B209 (ASTM B209M) or ASTM B221 (ASTM B221M).
- B. Aluminum Plate: ASTM B211 (ASTM B211M).
- C. Concealed Structural Supports: Aluminum, or steel coated for corrosion resistance and dissimilar metal isolation.
- D. Fasteners: ASTM F593 stainless steel.

2.04 FABRICATION

- A. Fit and shop assemble items in largest practical sections, for delivery to site.
- B. Fabricate items with joints tightly fitted and secured.

- C. Supply components required for anchorage of fabrications. Fabricate anchors and related components of same material and finish as fabrication, except where specifically noted otherwise.

2.05 FINISHES

- A. Manufacturer's standard powder coat simulated wood grain finish.
- B. Finish Color: As selected by Architect from manufacturer's standard range.

PART 3 EXECUTION

3.01 EXAMINATION

- A. Examine substrates and site area for conditions that might prevent satisfactory installation.
- B. Verify that dimensions of supporting structure are within plus/minus 1/8 inch (3.175 mm) of dimensions indicated on shop drawings.
- C. Verify that all adjacent painting, roofing, masonry work, and other work that might damage sun screen finish has been completed prior to installation of sun screens.
- D. Do not install until after all adjacent painting, roofing and masonry have been completed.
- E. Do not proceed with installation until all conditions are satisfactory.

3.02 INSTALLATION

- A. Install in accordance with manufacturer's installation instructions.
- B. Set units level, plumb, with uniform joints, and aligned with building elements.
- C. Separate dissimilar metals using concealed bituminous paint or non-absorbent gasket.
- D. Anchor units to structure as indicated on drawings.
- E. Do not cut or trim aluminum members without approval of manufacturer; do not install damaged members.
- F. Touch-up damaged finish coating using material provided by manufacturer to match original coating.

3.03 TOLERANCES

- A. Maximum Variation from Level: Plus/Minus 1/8 inch (3.175 mm).

3.04 CLEANING

- A. Clean exterior surfaces units of dust and debris; follow manufacturer's cleaning instructions for the finish used.

3.05 PROTECTION

- A. Protect units after installation to prevent damage due to other work until Date of Substantial Completion.

END OF SECTION

SECTION 14 2100

ELECTRIC TRACTION ELEVATORS

PART 1 GENERAL

1.01 SECTION INCLUDES

- A. Complete electric traction elevator systems.
 - 1. Passenger type.
- B. Elevator Maintenance Contract.

1.02 RELATED REQUIREMENTS

- A. Section 21 1300 - Fire-Suppression Sprinkler Systems: Sprinkler heads in hoistway.
- B. Section 26 0533.13 - Conduit for Electrical Systems:
- C. Section 26 0583 - Wiring Connections:

1.03 REFERENCE STANDARDS

- A. 16 CFR 1201 - Safety Standard for Architectural Glazing Materials; current edition.
- B. ADA Standards - Americans with Disabilities Act (ADA) Standards for Accessible Design; 2010.
- C. AISC 360 - Specification for Structural Steel Buildings; 2010.
- D. ANSI Z97.1 - American National Standard for Safety Glazing Materials Used in Buildings, Safety Performance Specifications and Methods of Test; 2010.
- E. ASCE 7 - Minimum Design Loads for Buildings and Other Structures; 2010, with 2013 Supplements and Errata.
- F. ASME A17.1 - Safety Code for Elevators and Escalators; 2013.
- G. ASME A17.2 - Guide for Inspection of Elevators, Escalators, and Moving Walks; 2014.
- H. ASME QEI-1 - Standard for the Qualification of Elevator Inspectors; 2013.
- I. ASTM A276/A276M - Standard Specification for Stainless Steel Bars and Shapes; 2016a.

- J. ASTM A666 - Standard Specification for Annealed or Cold-Worked Austenitic Stainless Steel Sheet, Strip, Plate, and Flat Bar; 2015.
- K. ASTM B221 - Standard Specification for Aluminum and Aluminum-Alloy Extruded Bars, Rods, Wire, Profiles, and Tubes; 2014.
- L. ASTM B221M - Standard Specification for Aluminum and Aluminum-Alloy Extruded Bars, Rods, Wire, Profiles, and Tubes (Metric); 2013.
- M. ASTM C1048 - Standard Specification for Heat-Strengthened and Fully Tempered Flat Glass; 2012.
- N. AWS D1.1/D1.1M - Structural Welding Code - Steel; 2015 (Errata 2016).
- O. ISO 9001 - Quality management systems -- Requirements; 2015.
- P. ITS (DIR) - Directory of Listed Products; current edition.
- Q. NEMA MG 1 - Motors and Generators; 2014.
- R. NFPA 13 - Standard for the Installation of Sprinkler Systems; Most Recent Edition Adopted by Authority Having Jurisdiction, Including All Applicable Amendments and Supplements.
- S. NFPA 70 - National Electrical Code; Most Recent Edition Adopted by Authority Having Jurisdiction, Including All Applicable Amendments and Supplements.
- T. NFPA 80 - Standard for Fire Doors and Other Opening Protectives; 2016.
- U. UL (DIR) - Online Certifications Directory; current listings at database.ul.com.

1.04 ADMINISTRATIVE REQUIREMENTS

- A. Coordination:
 - 1. Coordinate work with other installers to provide necessary conduits for proper installation of wiring, including but not limited to, the following:
 - a. Elevator pit for lighting and sump pump.
 - b. Fire alarm panel from controller cabinet.
- B. Preinstallation Meeting: Convene meeting at least one week prior to start of this work.
 - 1. Review schedule of installation, proper procedures and conditions, and coordination with related work.

C. Construction Use of Elevator: Not permitted.

1.05 SUBMITTALS

A. See Section 01 3000 - Administrative Requirements, for submittal procedures.

B. Product Data: Submit data on following items:

1. Signal and operating fixtures, operating panels, and indicators.
2. Car design, dimensions, layout, and components.
3. Car and hoistway door and frame details.
4. Electrical characteristics and connection requirements.

C. Shop Drawings: Include appropriate plans, elevations, sections, diagrams, and details on following items:

1. Elevator Equipment and Machines: Size and location of driving machines, power units, controllers, governors, and other components.
2. Hoistway Components: Size and location of car machine beams, guide rails, buffers, ropes, and other components.
3. Rail bracket spacing; maximum loads imposed on guide rails requiring load transfer to building structural framing.
4. Individual weight of principal components; load reaction at points of support.
5. Loads on hoisting beams.
6. Clearances and over-travel of car and counterweight.
7. Locations in hoistway and machine room of traveling cables and connections for car lighting and telephone.
8. Location and sizes of hoistway and car doors and frames.
9. Applicable seismic design data; certified by a licensed Professional Structural Engineer.
10. Electrical characteristics and connection requirements.
11. Indicate arrangement of elevator equipment and allow for clear passage of equipment through access openings.

- D. Warranty Documentation: Submit manufacturer warranty and ensure that forms have been completed in Owner's name and registered with manufacturer.
- E. Initial Maintenance Contract.
- F. Maintenance Contract: Submit proposal to Owner for standard one year continuing maintenance contract agreement in accordance with ASME A17.1 and requirements as indicated, starting on date initial maintenance contract is scheduled to expire.
 - 1. Indicate in proposal the services, obligations, conditions, and terms for agreement period and for renewal options.
- G. Operation and Maintenance Data:
 - 1. Parts catalog with complete list of equipment replacement parts; identify each entry with equipment description and identifying code.
 - 2. Operation and maintenance manual.
 - 3. Schematic drawings of equipment, and wiring diagrams of installed electrical equipment with list of corresponding symbols to identify markings on machine room and hoistway apparatus.

1.06 QUALITY ASSURANCE

- A. Manufacturer Qualifications: ISO 9001 certified company specializing in manufacturing products specified in this section with minimum ten years documented experience.
- B. Source Limitations: Provide elevator and associated equipment and components produced by the same manufacturer as the other elevator equipment used for this project and obtained from a single supplier.
- C. Installer Qualifications: Manufacturer or company specializing in performing work of the type specified and with at least five years of documented experience and approved by elevator manufacturer.
- D. Testing Agency Qualifications: Independent firm specializing in performing testing and inspections of type specified in this section.
- E. Products Requiring Fire Resistance Rating: Listed and classified by ITS (DIR), UL (DIR), or testing agency acceptable to authorities having jurisdiction.
- F. Products Requiring Electrical Connection: Listed and classified by UL (DIR) or testing agency acceptable to authorities having jurisdiction as suitable for the purpose indicated in construction documents.

1.07 WARRANTY

- A. See Section 01 7800 - Closeout Submittals, for additional warranty requirements.
- B. Provide manufacturer's warranty for elevator operating equipment and devices for one year from Date of Substantial Completion.

PART 2 PRODUCTS

2.01 MANUFACTURERS

- A. Basis of Design: Gen2, Otis Elevator Company; www.otis.com.
- B. Other Acceptable Manufacturers:
 - 1. KONE: www.kone.com/
 - 2. ThyssenKrupp Elevator: www.thyssenkruppelevator.com.
 - 3. Accepted equal.
- C. Products other than Basis of Design are subject to compliance with specified requirements and prior approval of Architect. By using products other than Basis of Design, the Contractor accepts responsibility for costs associated with any necessary modifications to related work, including any design fees.

2.02 ELEVATORS

- A. Electric Traction Passenger Elevator: Elevs 1 & 2
 - 1. Drive System:
 - a. Gearless machine, with a synchronous permanent-magnet motor, dual solenoid service and emergency disc brakes, mounted at the top of the hoistway.
 - b. Variable voltage alternating current (AC).
 - c. The drive shall be set up for regeneration of AC power back to the building grid.
 - 2. Operation Control:
 - a. Microcomputer based control system shall be provided to perform all of the functions of safe elevator operation.

- b. Controller shall be separated into two distinct halves; Motor Drive side and Control side. High voltage motor power conductors shall be routed so as to be physically segregated from the rest of the controller
3. Interior Car Height: 93 inch (2362 mm).
4. Electrical Power: 480 volts; alternating current (AC); three phase; 60 Hz.
5. Rated Net Capacity: 4000 pounds (1814 kgs).
6. Rated Speed: 200 feet per minute (1 m per second).
7. Hoistway Size: As indicated on drawings.
8. Interior Car Platform Size: 90 inch wide by 66 inch deep (2286 mm wide by 1676 mm deep).
9. Travel Distance: As indicated on drawings.
10. Number of Stops: As indicated on drawings.
11. Traction Machine Location: Top of hoistway shaft.

2.03 COMPONENTS

A. Elevator Equipment:

1. Motors, Controllers, Controls, Buttons, Wiring, Devices, and Indicators: Conform to NFPA 70NFPA 70 requirements,
2. Guide Rails, Cables, Counterweights, Sheaves, Buffers, Attachment Brackets and Anchors: Design criteria for components includes safety factors in accordance with applicable requirements of Elevator Code, ASME A17.1.

B. Electrical Equipment:

1. Motors: NEMA MG 1.
2. Boxes, Conduit, Wiring, and Devices: As required by NFPA 70 and in accordance with Sections 26 0533.13 and 26 0583.
3. Boxes, Conduit, Wiring, and Devices: As required by NFPA 70
4. Spare Conductors: Provide ten percent in extra conductors and two pairs of shielded audio cables in traveling cables.

5. Include wiring and connections to elevator devices remote from hoistway and between elevator machine room. Provide additional components and wiring to suit machine room layout.

2.04 PERFORMANCE REQUIREMENTS

- A. Regulatory Requirements: Conform to ASME A17.1, applicable local codes, and authorities having jurisdiction (AHJ).
- B. Accessibility Requirements: Conform to ADA Standards.
- C. Perform structural steel design, fabrication, and installation in accordance with AISC 360.
- D. Conform to seismic design requirements in accordance with ASME A17.1, applicable local codes, and authorities having jurisdiction (AHJ).
 1. Conform to Elevator Safety Requirements for Seismic Risk Zone in accordance with ASME A17.1, ASCE 7 and other related requirements.
 2. Provide earthquake emergency operations in accordance with ASME A17.1 requirements.
 3. Provide seismic switch in accordance with ASME A17.1 and ASCE 7 requirements.
- E. Perform welding of steel in accordance with AWS D1.1/D1.1M.
- F. Fabricate and install door and frame assemblies in accordance with NFPA 80 and in compliance with requirements of authorities having jurisdiction.
- G. Perform electrical work in accordance with NFPA 70.
- H. Conform to fire protection sprinkler system of hoistway design in accordance with NFPA 13 requirements and authorities having jurisdiction. Refer to Section 21 1300.

2.05 OPERATION CONTROLS

- A. Elevator Controls: Provide landing operating panels and landing indicator panels.
 1. Landing Operating Panels: Metallic type, one for originating "Up" and one for originating "Down" calls, one button only at terminating landings; with illuminating indicators.
 2. Landing Indicator Panels: Illuminating.

3. Conform to ADA Standards for elevator controls.
- B. Interconnect elevator control system with building fire alarm and smoke alarm systems.
- C. Door Operation Controls:
1. Program door control to open doors automatically when car arrives at floor landing.
 2. Render "Door Close" button inoperative when car is standing at dispatch landing with doors open.
 3. Door Safety Devices: Moveable, retractable safety edges, quiet in operation; equipped with photo-electric light rays.

2.06 OPERATION CONTROL TYPE

- A. Selective Collective Automatic Operation Control: Applies to car in single elevator shaft.
1. Refer to description provided in ASME A17.1.
 2. Automatic operation by means of one button in the car for each landing served and by "UP" and "DOWN" buttons at the landings.
 3. Stops are registered by momentary actuation of landing car buttons without consideration of the number of buttons actuated or the sequence buttons are actuated, but the stops are made in the order that landings are reached in each direction of travel.
 4. All "UP" landing calls are made when car is traveling in the up direction.
 5. All "DOWN" landing calls are made when car is traveling in the down direction.
 6. Uppermost and lowermost calls are answered as soon as they are reached without consideration of the car travel direction.

2.07 EMERGENCY POWER

- A. Set-up elevator operation to run with building emergency power supply when the normal building power supply fails, and in compliance with ASME A17.1 requirements.
- B. Building Emergency Power Supply: Supplied by backup generator; provide elevator system components as required for emergency power characteristics with phase rotation the same as for normal power.

1. Provide transfer switches and auxiliary contacts.
 2. Install connections to power feeders.
- C. Emergency Lighting: Conform to ASME A17.1 elevator lighting requirements.
- D. Provide operational control circuitry for adapting the change from normal to emergency power.
- E. Upon transfer to emergency power, advance one elevator at a time to a pre-selected landing, stop car, open doors, disable operating circuits, and hold in standby condition.

2.08 MATERIALS

- A. Stainless Steel Sheet: ASTM A666, Type 304; No. 4 Brushed finish unless otherwise indicated.
- B. Stainless Steel Bars, Shapes and Moldings: ASTM A276/A276M, Type 304.
- C. Extruded Aluminum: ASTM B221 (ASTM B221M), natural anodized finish unless otherwise indicated.
- D. Tempered Glass: 3/8 inch (9.5 mm) minimum thickness, fully tempered in compliance with ASME A17.1, 16 CFR 1201, ANSI Z97.1, and ASTM C1048 tempered glass requirements.

2.09 CAR AND HOISTWAY ENTRANCES

- A. Car and Hoistway Entrances:
1. Elevator Door Fire Rating: 1-1/2 Hours.
 2. Framed Opening Finish and Material: Brushed stainless steel.
 3. Car Door Material: Front Door: Stainless steel, with rigid sandwich panel construction.
Elev 2 Rear Door: Glass
 4. Hoistway Door Material: Front Door: Stainless steel, with rigid sandwich panel construction.
Elev 2 Rear Door: Glass
 5. Door Type: Double leaf.
 6. Door Operation: Center opening, single speed.
 7. Door Width: 48 inch (1.219 m).
 8. Door Height: 84 inch (2.134 m).

9. Sills: Extruded aluminum.

2.10 CAR EQUIPMENT AND MATERIALS

A. Elevator Car:

1. Car Operating Panel: Provide main; flush-mounted applied face plate, with illuminated call buttons corresponding to floors served with "Door Open/Door Close" buttons, "Door Open" button, "Door Close" button, and alarm button.
 - a. Panel Material: Integral with front return; one per car.
 - b. Locate alarm button where it is unlikely to be accidentally actuated; not more than 54 inch (1372 mm) above car finished floor.
 - c. Provide matching service cabinet integral with front return panel, with hinged door and keyed lock in each car.
 - d. Provide following within service cabinet as part of car operating panel:
 - (1) Switch for each auxiliary operational control.
 - (2) Switches for fan, light, and inspection control.
 - (3) Emergency light.
 - (4) Telephone cabinet and hard-wired connection with telephone.
2. Flooring: Resilient vinyl tile.
3. Wall Base: Recessed stainless steel, 4 inch (102 mm) high.
4. Front and Rear Return Panel: Satin Stainless Steel.
- ~~5. Door Wall: Stainless steel.~~
6. Side Walls: Stainless steel.
7. Tempered Glass at Rear Wall: Elev 1: Provide glazing as indicated on drawings.
8. Hand Rail: Stainless steel, at side walls and rear on Elev 1. Provide open clearance space 1-1/2 inch (38 mm) wide to face of wall.
 - a. Round, Metal Tube: 1-1/2 inch (38 mm) diameter.
 - b. Stainless Steel Finish: No. 4 Brushed.

- 9. Ceiling:
 - a. Canopy Ceiling: Stainless steel.
 - b. Lighting: Four LED lights.
- 10. Provide emergency access panel for egress from car at ceiling.

B. Car Accessories:

- 1. Certificate Frame: Stainless steel frame glazed with clear tempered glass, and attached with tamper-proof screws.

PART 3 EXECUTION

3.01 EXAMINATION

- A. Verify existing conditions before starting this work.
- B. Verify that hoistway and pit are ready for work of this section.
- C. Verify hoistway shaft and openings are of correct size and within tolerance.
- D. Verify location and size of machine foundation and position of machine foundation bolts.
- E. Verify that electrical power is available and of correct characteristics.

3.02 PREPARATION

- A. Arrange for temporary electrical power for installation work and testing of elevator components. Conform to requirements of Section 01 5000 - Temporary Facilities and Controls.
- B. Maintain elevator pit excavation free of water.

3.03 INSTALLATION

- A. Coordinate this work with installation of hoistway wall construction.
- B. Install system components, and connect equipment to building utilities.
- C. Provide conduit, electrical boxes, wiring, and accessories. Refer to Sections 26 0533.13 and 26 0583.
- D. Mount machines and motors on vibration and acoustic isolators.

1. Place on structural supports and bearing plates.
 2. Securely fasten to building supports.
 3. Prevent lateral displacement.
- E. Install hoistway, elevator equipment, and components in accordance with approved shop drawings.
- F. Install guide rails to allow for expansion and contraction movement of guide rails.
- G. Accurately machine and align guide rails, forming smooth joints with machined splice plates.
- H. Install hoistway door sills, frames, and headers in hoistway walls; grout sills in place, set hoistway floor entrances in alignment with car openings, and align plumb with hoistway.
- I. Structural Metal Surfaces: Clean surfaces of rust, oil or grease; wipe clean with solvent; prime with two coats.
- J. Wood Surfaces not Exposed to Public View: Finish with one coat primer; one coat enamel.
- K. Adjust equipment for smooth and quiet operation.

3.04 TOLERANCES

- A. Guide Rail Alignment: Plumb and parallel to each other in accordance with ASME A17.1 and ASME A17.2.
- B. Car Movement on Aligned Guide Rails: Smooth movement, without any objectionable lateral or oscillating movement or vibration.

3.05 FIELD QUALITY CONTROL

- A. See Section 01 4000 - Quality Requirements, for additional requirements.
- B. Testing and inspection by regulatory agencies certified in accordance with ASME QEI-1 will be performed at their discretion.
1. Schedule tests with agencies and notify Owner and Architect.
 2. Obtain permits as required to perform tests.

3. Document regulatory agency tests and inspections in accordance with requirements.
 4. Perform tests required by regulatory agencies.
 5. Furnish test and approval certificates issued by authorities having jurisdiction.
- C. Perform testing and inspection in accordance with requirements.
1. Inspectors shall be certified in accordance with ASME QEI-1.
 2. Perform tests in accordance with ASME A17.2.
 3. Provide at least two weeks written notice of date and time of tests and inspections.
 4. Supply instruments and execute specific tests.

3.06 ADJUSTING

- A. Adjust for smooth acceleration and deceleration of car to minimize passenger discomfort.
- B. Adjust with automatic floor leveling feature at each floor landing to reach 1/4 inch (6.4 mm) maximum from flush with sill.

3.07 CLEANING

- A. Remove protective coverings from finished surfaces.
- B. Clean surfaces and components in accordance with manufacturers written instructions.

3.08 CLOSEOUT ACTIVITIES

- A. Demonstrate proper operation of equipment to Owner's designated representative.
- B. Demonstration: Demonstrate operation of system to Owner's personnel.
 1. Use operation and maintenance data as reference during demonstration.
 2. Briefly describe function, operation, cleaning and maintenance of each component.

- C. Training: Train Owner's personnel on cleaning and operation and maintenance of system.
 - 1. Use operation and maintenance manual as training reference, supplemented with additional training materials as required.
 - 2. Provide minimum of two hours of training.
 - 3. Instructor: Manufacturer's training personnel.
 - 4. Location: At project site, unless otherwise indicated.

3.09 PROTECTION

- A. Do not permit construction traffic within car after cleaning.
- B. Protect installed products until Date of Substantial Completion.
- C. Touch-up, repair, or replace damaged products and materials before Date of Substantial Completion.

3.10 MAINTENANCE

- A. Refer to Section 01 7000 - Execution and Closeout Requirements, for additional requirements relating to initial maintenance service.
- B. Provide Initial Maintenance Contract of elevator system and components in accordance with ASME A17.1 and requirements as indicated for twelve months from Date of Substantial Completion.
- C. Submit proposal for continuation of Maintenance Contract in accordance with ASME A17.1 and requirements as indicated for installed elevator equipment.
- D. Perform maintenance contract services using competent and qualified personnel under the supervision and direct employ of the elevator manufacturer or installer.
- E. Maintenance contract services shall not be assigned or transferred to any agent or other entity without prior written consent of Owner.
- F. Examine system components periodically.
- G. Include systematic examination, adjustment, and lubrication of elevator equipment.
- H. Maintain and repair or replace parts, whenever required, using parts produced by original equipment manufacturer.

- I. Perform work without removing cars from use during peak traffic periods.
- J. Provide emergency call back service during regular working hours throughout period of this maintenance contract.
- K. Maintain an adequate stock of parts for replacement or emergency purposes, and have personnel available to ensure the fulfillment of this maintenance contract without unreasonable loss of time.

END OF SECTION

SECTION 21 1313

WET-PIPE FIRE-SUPPRESSION SPRINKLERS

PART 1 - GENERAL

1.01 RELATED DOCUMENTS

- A. Drawings and general provisions of the Contract, including General and Supplementary Conditions and Division 01 Specification Sections, apply to this Section.

1.02 SUMMARY

- A. Section Includes:
 - 1. Pipes, fittings, and specialties.
 - 2. Fire-protection valves.
 - 3. Fire-department connections.
 - 4. Sprinklers.
 - 5. Alarm devices.
 - 6. Manual control stations.
 - 7. Control panels.

1.03 DEFINITIONS

- A. High-Pressure Sprinkler Piping: Wet-pipe sprinkler system piping designed to operate at working pressure higher than standard 175 psig, but not higher than 300 psig.
- B. Standard-Pressure Sprinkler Piping: Wet-pipe sprinkler system piping designed to operate at working pressure of 175 psig maximum.

1.04 SYSTEM DESCRIPTIONS

- A. Wet-Pipe Sprinkler System: Automatic sprinklers are attached to piping containing water and that is connected to water supply through alarm valve. Water discharges immediately from sprinklers when they are opened. Sprinklers open when heat melts fusible link or destroys frangible device. Hose connections are included if indicated.

1.05 PERFORMANCE REQUIREMENTS

- A. Standard-Pressure Piping System Component: Listed for 175-psig minimum working pressure.
- B. High-Pressure Piping System Component: Listed for 300-psig working pressure.
- C. Sprinkler system design shall be approved by authorities having jurisdiction.
 - 1. Margin of Safety for Available Water Flow and Pressure: 20 percent, including losses through water-service piping, valves, and backflow preventers.
 - 2. Sprinkler Occupancy Hazard Classifications:
 - a. Automobile Parking Areas: Ordinary Hazard, Group 1.
 - b. Building Service Areas: Ordinary Hazard, Group 1.
 - c. Mercantile: Ordinary Hazard, Group 2.
 - d. Electrical Equipment Rooms: Ordinary Hazard, Group 1.
 - e. General Storage Areas: Ordinary Hazard, Group 1.
 - f. Mechanical Equipment Rooms: Ordinary Hazard, Group 1.
 - g. Office and Public Areas: Light Hazard.
 - h. Repair Garages: Ordinary Hazard, Group 2.
 - 3. Minimum Density for Automatic-Sprinkler Piping Design:
 - a. Light-Hazard Occupancy: 0.10 gpm over 1500-sq. ft. area.
 - b. Ordinary-Hazard, Group 1 Occupancy: 0.15 gpm over 1500-sq. ft. area.
 - c. Ordinary-Hazard, Group 2 Occupancy: 0.20 gpm over 1500-sq. ft. area.
 - d. Special Occupancy Hazard: As determined by authorities having jurisdiction.
 - 4. Maximum Protection Area per Sprinkler: Per UL listing.
 - 5. Maximum Protection Area per Sprinkler:
 - a. Office Spaces: 225 sq. ft.
 - b. Storage Areas: 130 sq. ft.
 - c. Mechanical Equipment Rooms: 130 sq. ft.
 - d. Electrical Equipment Rooms: 130 sq. ft.
 - e. Other Areas: According to NFPA 13 recommendations unless otherwise indicated.

6. Total Combined Hose-Stream Demand Requirement: According to NFPA 13 unless otherwise indicated:

- a. Light-Hazard Occupancies: 100 gpm for 30 minutes
- b. Ordinary-Hazard Occupancies: 250 gpm for 60 to 90 minutes
- c. Extra-Hazard Occupancies: 500 gpm for 90 to 120 minutes

D. Seismic Performance: Sprinkler piping shall withstand the effects of earthquake motions determined according to NFPA 13 and ASCE/SEI 7.

1.06 ACTION SUBMITTALS

A. Product Data: For each type of product indicated. Include rated capacities, operating characteristics, electrical characteristics, and furnished specialties and accessories.

1.07 INFORMATIONAL SUBMITTALS

A. Coordination Drawings: Sprinkler systems, drawn to scale, on which the following items are shown and coordinated with each other, using input from installers of the items involved:

1. Work from all other trades.

B. Qualification Data: For qualified Installer and professional engineer.

C. Approved Sprinkler Piping Drawings: Working plans, prepared according to NFPA 13, that have been approved by authorities having jurisdiction, including hydraulic calculations if applicable.

D. Field quality-control reports.

1.08 CLOSEOUT SUBMITTALS

A. Operation and Maintenance Data: For sprinkler specialties to include in emergency, operation, and maintenance manuals.

1.09 QUALITY ASSURANCE

A. Installer Qualifications:

1. Installer's responsibilities include designing, fabricating, and installing sprinkler systems and providing professional engineering services needed to assume engineering responsibility. Base calculations on results of fire-hydrant flow test.

a. Engineering Responsibility: Preparation of working plans, calculations, and field test reports by a qualified professional engineer.

B. Electrical Components, Devices, and Accessories: Listed and labeled as defined in NFPA 70, by a qualified testing agency, and marked for intended location and application.

C. NFPA Standards: Sprinkler system equipment, specialties, accessories, installation, and testing shall comply with the following:

1. NFPA 13, "Installation of Sprinkler Systems."
2. NFPA 24, "Installation of Private Fire Service Mains and Their Appurtenances."
3. NFPA 70, "National Electrical Code".

1.10 PROJECT CONDITIONS

A. Interruption of Existing Sprinkler Service: Do not interrupt sprinkler service to facilities occupied by Owner or others unless permitted under the following conditions and then only after arranging to provide temporary sprinkler service according to requirements indicated:

1. Notify Owner no fewer than two days in advance of proposed interruption of sprinkler service.
2. Do not proceed with interruption of sprinkler service without Owner's written permission.

1.11 COORDINATION

A. Coordinate layout and installation of sprinklers with other construction that penetrates ceilings, including light fixtures, HVAC equipment, and partition assemblies.

1.12 EXTRA MATERIALS

A. Furnish extra materials that match products installed and that are packaged with protective covering for storage and identified with labels describing contents.

1. Sprinkler Cabinets: Finished, wall-mounted, steel cabinet with hinged cover, and with space for minimum of six spare sprinklers plus sprinkler wrench. Include number of sprinklers required by NFPA 13 and sprinkler wrench. Include separate cabinet with sprinklers and wrench for each type of sprinkler used on Project.

PART 2 - PRODUCTS

2.01 PIPING MATERIALS

A. Comply with requirements in "Piping Schedule" Article for applications of pipe, tube, and fitting materials, and for joining methods for specific services, service locations, and pipe sizes.

2.02 STEEL PIPE AND FITTINGS

A. Standard Weight, Galvanized- and Black-Steel Pipe: ASTM A 53/A 53M, Type E, Grade B. Pipe ends may be factory or field formed to match joining method.

- B. Galvanized- and Black-Steel Pipe Nipples: ASTM A 733, made of ASTM A 53/A 53M, standard-weight, seamless steel pipe with threaded ends.
- C. Galvanized, Steel Couplings: ASTM A 865, threaded.
- D. Galvanized, Gray-Iron Threaded Fittings: ASME B16.4, Class 125, standard pattern.
- E. Cast-Iron Flanges: ASME 16.1, Class 125.
- F. Steel Flanges and Flanged Fittings: ASME B16.5, Class 150.

2.03 ENCASUREMENT FOR UNDERGROUND METAL PIPING

- A. Standard: ASTM A 674 or AWWA C105/A 21.5.
- B. Material: Linear low-density polyethylene film of 0.008-inch minimum thickness.
- C. Form: Sheet or tube.
- D. Color: Black or natural.

2.04 COPPER TUBE AND FITTINGS

- A. Hard Copper Tube: ASTM B 88, Type L water tube, drawn temper.
- B. Wrought-Copper, Solder-Joint Fittings: ASME B16.22, pressure fittings.
- C. Copper Pressure-Seal Fittings:
 1. Standard: UL 213.
 2. NPS 2 and Smaller: Wrought-copper fitting with EPDM-rubber O-ring seal in each end.
 3. NPS 2-1/2 to NPS 4: Cast-bronze fitting with EPDM-rubber O-ring seal in each end.

2.05 PIPING JOINING MATERIALS

- A. Pipe-Flange Gasket Materials: AWWA C110, rubber, flat face, 1/8 inch thick or ASME B16.21, nonmetallic and asbestos free.
 1. Class 125, Cast-Iron Flanges and Class 150, Bronze Flat-Face Flanges: Full-face gaskets.
 2. Class 250, Cast-Iron Flanges and Class 300, Steel Raised-Face Flanges: Ring-type gaskets.
- B. Metal, Pipe-Flange Bolts and Nuts: ASME B18.2.1, carbon steel unless otherwise indicated.
- C. Brazing Filler Metals: AWS A5.8/A5.8M, BCuP Series, copper-phosphorus alloys for general-duty brazing unless otherwise indicated.

2.06 COVER SYSTEM FOR SPRINKLER PIPING

- A. Description: System of support brackets and covers made to protect sprinkler piping.
- B. Brackets: Glass-reinforced nylon.
- C. Covers: Extruded PVC sections of length, shape, and size required for size and routing of CPVC piping.

2.07 LISTED FIRE-PROTECTION VALVES

- A. General Requirements:
 - 1. Valves shall be UL listed or FM approved.
 - 2. Minimum Pressure Rating for Standard-Pressure Piping: 175 psig.
 - 3. Minimum Pressure Rating for High-Pressure Piping: 300 psig.
- B. Ball Valves:
 - 1. Standard: UL 1091 except with ball instead of disc.
 - 2. Valves NPS 1-1/2 and Smaller: Bronze body with threaded ends.
 - 3. Valves NPS 2 and NPS 2-1/2: Bronze body with threaded ends or ductile-iron body with grooved ends.
 - 4. Valves NPS 3: Ductile-iron body with grooved ends.
- C. Bronze Butterfly Valves:
 - 1. Standard: UL 1091.
 - 2. Pressure Rating: 175 psig.
 - 3. Body Material: Bronze.
 - 4. End Connections: Threaded.
- D. Iron Butterfly Valves:
 - 1. Standard: UL 1091.
 - 2. Pressure Rating: 175 psig.
 - 3. Body Material: Cast or ductile iron.
 - 4. Style: Lug or wafer.
 - 5. End Connections: Grooved.
- E. Check Valves:

1. Standard: UL 312.
2. Pressure Rating: 300 psig.
3. Type: Swing check.
4. Body Material: Cast iron.
5. End Connections: Flanged or grooved.

F. Bronze OS&Y Gate Valves:

1. Standard: UL 262.
2. Pressure Rating: 175 psig.
3. Body Material: Bronze.
4. End Connections: Threaded.

G. Iron OS&Y Gate Valves:

1. Standard: UL 262.
2. Pressure Rating: 300 psig.
3. Body Material: Cast or ductile iron.
4. End Connections: Flanged or grooved.

H. Indicating-Type Butterfly Valves:

1. Standard: UL 1091.
2. Pressure Rating: 175 psig minimum.
3. Valves NPS 2 and Smaller:
 - a. Valve Type: Ball or butterfly.
 - b. Body Material: Bronze.
 - c. End Connections: Threaded.
4. Valves NPS 2-1/2 and Larger:
 - a. Valve Type: Butterfly.
 - b. Body Material: Cast or ductile iron.
 - c. End Connections: Flanged, grooved, or wafer.
5. Valve Operation: Integral electrical, 115-V ac, prewired, single-circuit, supervisory switch or visual indicating device.

I. NRS Gate Valves:

1. Standard: UL 262.
2. Pressure Rating: 300 psig.
3. Body Material: Cast iron with indicator post flange.
4. Stem: Nonrising.
5. End Connections: Flanged or grooved.

J. Indicator Posts:

1. Standard: UL 789.
2. Type: Horizontal for wall mounting.
3. Body Material: Cast iron with extension rod and locking device.
4. Operation: Wrench or Hand wheel.

2.08 TRIM AND DRAIN VALVES

A. General Requirements:

1. Standard: UL's "Fire Protection Equipment Directory" listing or "Approval Guide," published by FM Global, listing.
2. Pressure Rating: 175 psig minimum.

B. Angle Valves:

C. Ball Valves:

D. Globe Valves:

E. Plug Valves:

2.09 SPECIALTY VALVES

A. General Requirements:

1. Standard: UL's "Fire Protection Equipment Directory" listing or "Approval Guide," published by FM Global, listing.
2. Pressure Rating:
 - a. Standard-Pressure Piping Specialty Valves: 175 psig minimum.
 - b. High-Pressure Piping Specialty Valves: 300 psig.
3. Body Material: Cast or ductile iron.
4. Size: Same as connected piping.

5. End Connections: Flanged or grooved.

B. Alarm Valves:

1. Standard: UL 193.
2. Design: For horizontal or vertical installation.
3. Include trim sets for bypass, drain, electrical sprinkler alarm switch, pressure gages, retarding chamber, and fill-line attachment with strainer.
4. Drip Cup Assembly: Pipe drain without valves and separate from main drain piping.
5. Drip Cup Assembly: Pipe drain with check valve to main drain piping.

C. Automatic (Ball Drip) Drain Valves:

1. Standard: UL 1726.
2. Pressure Rating: 175 psig minimum.
3. Type: Automatic draining, ball check.
4. Size: NPS 3/4 .
5. End Connections: Threaded.

2.10 FIRE-DEPARTMENT CONNECTIONS

A. Flush-Type, Fire-Department Connection:

1. Standard: UL 405.
2. Type: Flush, for wall mounting.
3. Pressure Rating: 175 psig minimum.
4. Body Material: Corrosion-resistant metal.
5. Inlets: Brass with threads according to NFPA 1963 and matching local fire-department sizes and threads. Include extension pipe nipples, brass lugged swivel connections, and check devices or clappers.
6. Caps: Brass, lugged type, with gasket and chain.
7. Escutcheon Plate: Rectangular, brass, wall type.
8. Outlet: With pipe threads.
9. Body Style: Horizontal.
10. Number of Inlets for automatic fire sprinkler service: Three.

11. Number of Inlets for manual wet standpipe service: Two.
12. Outlet Location: Back.
13. Escutcheon Plate Marking for automatic fire sprinkler service: "AUTOMATIC FIRE SPRINKLER – PARKING STRUCTURE" and shall meet the local authorities having jurisdiction requirements
14. Escutcheon Plate Marking for manual wet standpipe service: "MANUAL WET STANDPIPE – PARKING STRUCTURE" and shall meet the local authorities having jurisdiction requirements
15. Finish: Polished chrome plated.
16. Outlet Size for automatic fire sprinkler service: NPS 6.
17. Outlet Size for manual wet standpipe service: NPS 8.

B. Yard-Type, Fire-Department Connection:

1. Standard: UL 405.
2. Type: Exposed, freestanding.
3. Pressure Rating: 175 psig minimum, 300 psig.
4. Body Material: Corrosion-resistant metal.
5. Inlets: Brass with threads according to NFPA 1963 and matching local fire-department sizes and threads. Include extension pipe nipples, brass lugged swivel connections, and check devices or clappers.
6. Caps: Brass, lugged type, with gasket and chain.
7. Escutcheon Plate: Round, brass, floor type.
8. Outlet: Bottom, with pipe threads.
9. Number of Inlets: Two.
10. Sleeve Height: 18 inches .
11. Outlet Size: NPS 4.

2.11 SPRINKLER SPECIALTY PIPE FITTINGS

A. Branch Outlet Fittings:

1. Standard: UL 213.
2. Pressure Rating: 175 psig minimum, 300 psig.
3. Body Material: Ductile-iron housing with EPDM seals and bolts and nuts.

4. Type: Mechanical-T and -cross fittings.
5. Configurations: Snap-on and strapless, ductile-iron housing with branch outlets.
6. Size: Of dimension to fit onto sprinkler main and with outlet connections as required to match connected branch piping.
7. Branch Outlets: Grooved, plain-end pipe, or threaded.

B. Flow Detection and Test Assemblies:

1. Standard: UL's "Fire Protection Equipment Directory" listing or "Approval Guide," published by FM Global, listing.
2. Pressure Rating: 175 psig minimum, 300 psig.
3. Body Material: Cast- or ductile-iron housing with orifice, sight glass, and integral test valve.
4. Size: Same as connected piping.
5. Inlet and Outlet: Threaded.

C. Branch Line Testers:

1. Standard: UL 199.
2. Pressure Rating: 175 psig.
3. Body Material: Brass.
4. Size: Same as connected piping.
5. Inlet: Threaded.
6. Drain Outlet: Threaded and capped.
7. Branch Outlet: Threaded, for sprinkler.

D. Sprinkler Inspector's Test Fittings:

1. Standard: UL's "Fire Protection Equipment Directory" listing or "Approval Guide," published by FM Global, listing.
2. Pressure Rating: 175 psig minimum, 300 psig.
3. Body Material: Cast- or ductile-iron housing with sight glass.
4. Size: Same as connected piping.
5. Inlet and Outlet: Threaded.

E. Adjustable Drop Nipples:

1. Standard: UL 1474.
2. Pressure Rating: 250 psig minimum, 300 psig.
3. Body Material: Steel pipe with EPDM-rubber O-ring seals.
4. Size: Same as connected piping.
5. Length: Adjustable.
6. Inlet and Outlet: Threaded.

2.12 SPRINKLERS

A. General Requirements:

1. Standard: UL's "Fire Protection Equipment Directory" listing or "Approval Guide," published by FM Global, listing.
2. Pressure Rating for Automatic Sprinklers: 175 psig minimum.
3. Pressure Rating for High-Pressure Automatic Sprinklers: 300 psig.

B. Automatic Sprinklers with Heat-Responsive Element:

1. Early-Suppression, Fast-Response Applications: UL 1767
2. Nonresidential Applications: UL 199
3. Characteristics: Nominal 1/2-inch orifice with Discharge Coefficient K of 5.6, and for "Ordinary" temperature classification rating unless otherwise indicated or required by application.

C. Sprinkler Finishes:

1. Bronze.
2. Electroless Nickel PTFE (ENT) plated

D. Special Coatings:

1. Corrosion-resistant paint.
2. Electroless Nickel PTFE (ENT) plated

E. Sprinkler Escutcheons: Materials, types, and finishes for the following sprinkler mounting applications. Escutcheons for concealed, flush, and recessed-type sprinklers are specified with sprinklers.

1. Sidewall Mounting: Chrome-plated steel, one piece, flat and painted with 2 coats of exterior rated corrosion resistant paint

F. Sprinkler Guards:

1. Standard: UL 199.
2. Type: Wire cage with fastening device for attaching to sprinkler.

2.13 ALARM DEVICES

A. Alarm-device types shall match piping and equipment connections.

B. Water-Motor-Operated Alarm:

1. Standard: UL 753.
2. Type: Mechanically operated, with Pelton wheel.
3. Alarm Gong: Cast aluminum with red-enamel factory finish.
4. Size: 10-inch diameter.
5. Components: Shaft length, bearings, and sleeve to suit wall construction.
6. Inlet: NPS 3/4 .
7. Outlet: NPS 1 drain connection.

C. Electrically Operated Alarm Bell:

1. Standard: UL 464.
2. Type: Vibrating, metal alarm bell.
3. Size: 6-inch minimum, 8-inch minimum, 10-inch diameter.
4. Finish: Red-enamel factory finish, suitable for outdoor use.

D. Water-Flow Indicators:

1. Standard: UL 346.
2. Water-Flow Detector: Electrically supervised.
3. Components: Two single-pole, double-throw circuit switches for isolated alarm and auxiliary contacts, 7 A, 125-V ac and 0.25 A, 24-V dc; complete with factory-set, field-adjustable retard element to prevent false signals and tamperproof cover that sends signal if removed.
4. Type: Paddle operated.
5. Pressure Rating: 250 psig.
6. Design Installation: Horizontal or vertical.

E. Pressure Switches:

1. Standard: UL 346.

2. Type: Electrically supervised water-flow switch with retard feature.
3. Components: Single-pole, double-throw switch with normally closed contacts.
4. Design Operation: Rising pressure signals water flow.

F. Valve Supervisory Switches:

1. Standard: UL 346.
2. Type: Electrically supervised.
3. Components: Single-pole, double-throw switch with normally closed contacts.
4. Design: Signals that controlled valve is in other than fully open position.

G. Indicator-Post Supervisory Switches:

1. Standard: UL 346.
2. Type: Electrically supervised.
3. Components: Single-pole, double-throw switch with normally closed contacts.
4. Design: Signals that controlled indicator-post valve is in other than fully open position.

2.14 MANUAL CONTROL STATIONS

- A. Description: UL listed or FM approved, hydraulic operation, with union, NPS 1/2 pipe nipple, and bronze ball valve. Include metal enclosure labeled "MANUAL CONTROL STATION" with operating instructions and cover held closed by breakable strut to prevent accidental opening.

2.15 CONTROL PANELS

- A. Description: Single-area, two-area, or single-area cross-zoned control panel as indicated, including NEMA ICS 6, Type 1 enclosure, detector, alarm, and solenoid-valve circuitry for operation of deluge valves. Panels contain power supply; battery charger; standby batteries; field-wiring terminal strip; electrically supervised solenoid valves and polarized fire-alarm bell; lamp test facility; single-pole, double-throw auxiliary alarm contacts; and rectifier.
1. Panels: UL listed and FM approved when used with thermal detectors and Class A detector circuit wiring. Electrical characteristics are 120-V ac, 60 Hz, with 24-V dc rechargeable batteries.
 2. Manual Control Stations: Electric operation, metal enclosure, labeled "MANUAL CONTROL STATION" with operating instructions and cover held closed by breakable strut to prevent accidental opening.
 3. Manual Control Stations: Hydraulic operation, with union, NPS 1/2 pipe nipple, and bronze ball valve. Include metal enclosure labeled "MANUAL

CONTROL STATION" with operating instructions and cover held closed by breakable strut to prevent accidental opening.

PART 3 - EXECUTION

3.01 PREPARATION

- A. Perform fire-hydrant flow test according to NFPA 13 and NFPA 291. Use results for system design calculations required in "Quality Assurance" Article.
- B. Report test results promptly and in writing.

3.02 SERVICE-ENTRANCE PIPING

- A. Connect sprinkler piping to water-service piping for service entrance to building. Comply with requirements for exterior piping in Section 02515 "Facility Fire-Suppression Water-Service Piping."
- B. Install shutoff valve, backflow preventer, pressure gage, drain, and other accessories indicated at connection to water-service piping. Comply with requirements for backflow preventers in Section 02515 "Facility Fire-Suppression Water-Service Piping."
- C. Install shutoff valve, check valve, pressure gage, and drain at connection to water service.

3.03 WATER-SUPPLY CONNECTIONS

- A. Connect sprinkler piping to building's interior water-distribution piping. Comply with requirements for interior piping in Section 15140 "Domestic Water Piping."
- B. Install shutoff valve, backflow preventer, pressure gage, drain, and other accessories indicated at connection to water-distribution piping. Comply with requirements for backflow preventers in Section 15145 "Domestic Water Piping Specialties."
- C. Install shutoff valve, check valve, pressure gage, and drain at connection to water supply.

3.04 PIPING INSTALLATION

- A. Locations and Arrangements: Drawing plans, schematics, and diagrams indicate general location and arrangement of piping. Install piping as indicated, as far as practical.
 - 1. Deviations from approved working plans for piping require written approval from authorities having jurisdiction. File written approval with Architect before deviating from approved working plans.
- B. Piping Standard: Comply with requirements for installation of sprinkler piping in NFPA 13.

- C. Install seismic restraints on piping. Comply with requirements for seismic-restraint device materials and installation in NFPA 13.
- D. Use listed fittings to make changes in direction, branch takeoffs from mains, and reductions in pipe sizes.
- E. Install unions adjacent to each valve in pipes NPS 2 and smaller.
- F. Install flanges, flange adapters, or couplings for grooved-end piping on valves, apparatus, and equipment having NPS 2-1/2 and larger end connections.
- G. Install "Inspector's Test Connections" in sprinkler system piping, complete with shutoff valve, and sized and located according to NFPA 13.
- H. Install sprinkler piping with drains for complete system drainage.
- I. Install sprinkler control valves, test assemblies, and drain risers adjacent to standpipes when sprinkler piping is connected to standpipes.
- J. Install automatic (ball drip) drain valve at each check valve for fire-department connection, to drain piping between fire-department connection and check valve. Install drain piping to and spill over floor drain or to outside building.
- K. Install alarm devices in piping systems.
- L. Install hangers and supports for sprinkler system piping according to NFPA 13. Comply with requirements for hanger materials in NFPA 13.
- M. Install pressure gages on riser or feed main, at each sprinkler test connection, and at top of each standpipe. Include pressure gages with connection not less than NPS 1/4 and with soft metal seated globe valve, arranged for draining pipe between gage and valve. Install gages to permit removal, and install where they will not be subject to freezing.
- N. Pressurize and check pre-action sprinkler system piping and air-pressure maintenance devices or air compressors.
- O. Fill sprinkler system piping with water.
- P. Install electric heating cables and pipe insulation on sprinkler piping in areas subject to freezing.
- Q. Install sleeves for piping penetrations of walls, ceilings, and floors.
- R. Install sleeve seals for piping penetrations of concrete walls and slabs.
- S. Install escutcheons for piping penetrations of walls, ceilings, and floors.

3.05 JOINT CONSTRUCTION

- A. Install couplings, flanges, flanged fittings, unions, nipples, and transition and special fittings that have finish and pressure ratings same as or higher than

system's pressure rating for aboveground applications unless otherwise indicated.

- B. Install unions adjacent to each valve in pipes NPS 2 and smaller.
- C. Install flanges, flange adapters, or couplings for grooved-end piping on valves, apparatus, and equipment having NPS 2-1/2 and larger end connections.
- D. Ream ends of pipes and tubes and remove burrs. Bevel plain ends of steel pipe.
- E. Remove scale, slag, dirt, and debris from inside and outside of pipes, tubes, and fittings before assembly.
- F. Flanged Joints: Select appropriate gasket material in size, type, and thickness suitable for water service. Join flanges with gasket and bolts according to ASME B31.9.
- G. Threaded Joints: Thread pipe with tapered pipe threads according to ASME B1.20.1. Cut threads full and clean using sharp dies. Ream threaded pipe ends to remove burrs and restore full ID. Join pipe fittings and valves as follows:
 - 1. Apply appropriate tape or thread compound to external pipe threads.
 - 2. Damaged Threads: Do not use pipe or pipe fittings with threads that are corroded or damaged.
- H. Twist-Locked Joints: Insert plain end of steel pipe into plain-end-pipe fitting. Rotate retainer lugs one-quarter turn or tighten retainer pin.
- I. Steel-Piping, Cut-Grooved Joints: Cut square-edge groove in end of pipe according to AWWA C606. Assemble coupling with housing, gasket, lubricant, and bolts. Join steel pipe and grooved-end fittings according to AWWA C606 for steel-pipe joints.
- J. Steel-Piping, Roll-Grooved Joints: Roll rounded-edge groove in end of pipe according to AWWA C606. Assemble coupling with housing, gasket, lubricant, and bolts. Join steel pipe and grooved-end fittings according to AWWA C606 for steel-pipe grooved joints.
- K. Steel-Piping, Pressure-Sealed Joints: Join Schedule 5 steel pipe and steel pressure-seal fittings with tools recommended by fitting manufacturer.
- L. Brazed Joints: Join copper tube and fittings according to CDA's "Copper Tube Handbook," "Brazed Joints" Chapter.
- M. Copper-Tubing Grooved Joints: Roll rounded-edge groove in end of tube according to AWWA C606. Assemble coupling with housing, gasket, lubricant, and bolts. Join copper tube and grooved-end fittings according to AWWA C606 for steel-pipe grooved joints.
- N. Copper-Tubing, Pressure-Sealed Joints: Join copper tube and copper pressure-seal fittings with tools recommended by fitting manufacturer.

- O. Extruded-Tee Connections: Form tee in copper tube according to ASTM F 2014. Use tool designed for copper tube; drill pilot hole, form collar for outlet, dimple tube to form seating stop, and braze branch tube into collar.
- P. Dissimilar-Material Piping Joints: Make joints using adapters compatible with materials of both piping systems.
- Q. Plastic-Piping, Solvent-Cement Joints: Clean and dry joining surfaces. Join pipe and fittings according to the following:
 - 1. Comply with ASTM F 402 for safe-handling practice of cleaners, primers, and solvent cements. Apply primer.

3.06 INSTALLATION OF COVER SYSTEM FOR SPRINKLER PIPING

- A. Install cover system, brackets, and cover components for sprinkler piping according to manufacturer's "Installation Manual" and with NFPA 13 or NFPA 13R for supports.

3.07 VALVE AND SPECIALTIES INSTALLATION

- A. Install listed fire-protection valves, trim and drain valves, specialty valves and trim, controls, and specialties according to NFPA 13 and authorities having jurisdiction.
- B. Install listed fire-protection shutoff valves supervised open, located to control sources of water supply except from fire-department connections. Install permanent identification signs indicating portion of system controlled by each valve.
- C. Install check valve in each water-supply connection. Install backflow preventers instead of check valves in potable-water-supply sources.
- D. Specialty Valves:
 - 1. General Requirements: Install in vertical position for proper direction of flow, in main supply to system.
 - 2. Alarm Valves: Include bypass check valve and retarding chamber drain-line connection.

3.08 SPRINKLER INSTALLATION

- A. Install sprinklers symmetrically within structural beams.

3.09 FIRE-DEPARTMENT CONNECTION INSTALLATION

- A. Install yard-type, fire-department connections in concrete slab support.
 - 1. Install two protective pipe bollards around on sides of each fire-department connection.

- B. Install automatic (ball drip) drain valve at each check valve for fire-department connection.

3.10 IDENTIFICATION

- A. Install labeling and pipe markers on equipment and piping according to requirements in NFPA 13.
- B. Identify system components, wiring, cabling, and terminals. Comply with requirements for identification specified in Section 16075 "Electrical Identification."

3.11 FIELD QUALITY CONTROL

- A. Perform tests and inspections.
- B. Tests and Inspections:
 - 1. Leak Test: After installation, charge systems and test for leaks. Repair leaks and retest until no leaks exist.
 - 2. Test and adjust controls and safeties. Replace damaged and malfunctioning controls and equipment.
 - 3. Flush, test, and inspect sprinkler systems according to NFPA 13, "Systems Acceptance" Chapter.
 - 4. Energize circuits to electrical equipment and devices.
 - 5. Coordinate with fire-alarm tests. Operate as required.
 - 6. Verify that equipment hose threads are same as local fire-department equipment.
- C. Sprinkler piping system will be considered defective if it does not pass tests and inspections.
- D. Prepare test and inspection reports.

3.12 CLEANING

- A. Clean dirt and debris from sprinklers.
- B. Remove and replace sprinklers with paint other than factory finish.

3.13 DEMONSTRATION

- A. Engage a factory-authorized service representative to train Owner's maintenance personnel to adjust, operate, and maintain specialty valves and pressure-maintenance pumps.

3.14 PIPING SCHEDULE

- A. Piping between Fire-Department Connections and Check Valves and piping exposed to elements outside: Galvanized, standard-weight steel pipe with threaded ends; cast-iron threaded fittings; and threaded grooved ends; grooved-end fittings; grooved-end-pipe couplings; and grooved joints.
- B. Sprinkler specialty fittings may be used, downstream of control valves, instead of specified fittings.
- C. Copper-tube, extruded-tee connections may be used for tee branches in copper tubing instead of specified copper fittings. Branch-connection joints must be brazed.
- D. Standard-pressure, wet-pipe sprinkler system shall be one of the following:
 - 1. Standard-weight, schedule 40 black-steel pipe with threaded ends; uncoated, gray-iron threaded fittings; and threaded joints.
 - 2. Standard-weight, schedule 40 black-steel pipe with cut- or roll-grooved ends; uncoated, grooved-end fittings for steel piping; grooved-end-pipe couplings for steel piping; and grooved joints.
 - 3. Standard-weight, schedule 40 galvanized-steel pipe with cut-grooved ends; galvanized, grooved-end fittings for steel piping; grooved-end-pipe couplings for steel piping; and grooved joints.
 - 4. Type L, hard copper tube with plain ends; wrought-copper solder-joint fittings; and brazed joints.
 - 5. Provide all standard-weight, schedule 40 black-steel fire sprinkler piping with 2 coats of exterior-rated, corrosion resistant paint to match adjacent/surrounding color/finish per each level. Coordinate exact color with architect.

3.15 SPRINKLER SCHEDULE

- A. Use sprinkler types in subparagraphs below for the following applications:
 - 1. Special Applications: Extended-coverage, flow-control, and quick-response sprinklers where indicated.
 - 2. Parking Garage: Upright and pendant sprinklers with electroless nickel PTFE corrosion coating or equivalent.
- B. Provide sprinkler types in subparagraphs below with finishes indicated.
 - 1. Upright, Sidewall and Pendent Sprinklers: Electroless nickel PTFE corrosion coating or equivalent in finished spaces exposed to view, in unfinished spaces not exposed to view, and areas where exposed to acids, chemicals, or other corrosive fumes.

END OF SECTION

SECTION 22 0523

GENERAL-DUTY VALVES FOR PLUMBING PIPING

PART 1 - GENERAL

1.01 RELATED DOCUMENTS

- A. Drawings and general provisions of the Contract, including General and Supplementary Conditions and Division 01 Specification Sections, apply to this Section.

1.02 SUMMARY

- A. Section Includes:
 - 1. Bronze angle valves.
 - 2. Bronze ball valves.
 - 3. Iron, single-flange butterfly valves.
 - 4. Iron, grooved-end butterfly valves.
 - 5. Bronze swing check valves.

1.03 DEFINITIONS

- A. CWP: Cold working pressure.
- B. EPDM: Ethylene propylene copolymer rubber.
- C. NBR: Acrylonitrile-butadiene, Buna-N, or nitrile rubber.
- D. NRS: Nonrising stem.
- E. OS&Y: Outside screw and yoke.
- F. RS: Rising stem.

1.04 ACTION SUBMITTALS

- A. Product Data: For each type of valve indicated.

1.05 QUALITY ASSURANCE

- A. Source Limitations for Valves: Obtain each type of valve from single source from single manufacturer.

- B. ASME Compliance:
 - 1. ASME B16.10 and ASME B16.34 for ferrous valve dimensions and design criteria.
 - 2. ASME B31.1 for power piping valves.
 - 3. ASME B31.9 for building services piping valves.
- C. NSF Compliance: NSF 61 for valve materials for potable-water service.

1.06 DELIVERY, STORAGE, AND HANDLING

- A. Prepare valves for shipping as follows:
 - 1. Protect internal parts against rust and corrosion.
 - 2. Protect threads, flange faces, grooves, and weld ends.
 - 3. Set angle, gate, and globe valves closed to prevent rattling.
 - 4. Set ball and plug valves open to minimize exposure of functional surfaces.
 - 5. Set butterfly valves closed or slightly open.
 - 6. Block check valves in either closed or open position.
- B. Use the following precautions during storage:
 - 1. Maintain valve end protection.
 - 2. Store valves indoors and maintain at higher than ambient dew point temperature. If outdoor storage is necessary, store valves off the ground in watertight enclosures.
- C. Use sling to handle large valves; rig sling to avoid damage to exposed parts. Do not use handwheels or stems as lifting or rigging points.

PART 2 - PRODUCTS

2.01 GENERAL REQUIREMENTS FOR VALVES

- A. Refer to valve schedule articles for applications of valves.
- B. Valve Pressure and Temperature Ratings: Not less than indicated and as required for system pressures and temperatures.
- C. Valve Sizes: Same as upstream piping unless otherwise indicated.
- D. Valve Actuator Types:
 - 1. Gear Actuator: For quarter-turn valves NPS 8 and larger.

2. Handwheel: For valves other than quarter-turn types.
 3. Handlever: For quarter-turn valves NPS 6 and smaller (except plug valves).
 4. Wrench: For plug valves with square heads. Furnish Owner with 1 wrench for every 10 plug valves, for each size square plug-valve head.
 5. Chainwheel: Device for attachment to valve handwheel, stem, or other actuator; of size and with chain for mounting height, as indicated in the "Valve Installation" Article.
- E. Valves in Insulated Piping: With 2-inch stem extensions and the following features:
1. Gate Valves: With rising stem.
 2. Ball Valves: With extended operating handle of non-thermal-conductive material, and protective sleeve that allows operation of valve without breaking the vapor seal or disturbing insulation.
 3. Butterfly Valves: With extended neck.
- F. Valve-End Connections:
1. Flanged: With flanges according to ASME B16.1 for iron valves.
 2. Grooved: With grooves according to AWWA C606.
 3. Solder Joint: With sockets according to ASME B16.18.
 4. Threaded: With threads according to ASME B1.20.1.
- G. Valve Bypass and Drain Connections: MSS SP-45.

2.02 BRONZE ANGLE VALVES

- A. Class 150, Bronze Angle Valves with Bronze Disc:
1. Description:
 - a. Standard: MSS SP-80, Type 1.
 - b. CWP Rating: 300 psig.
 - c. Body Material: ASTM B 62, bronze with integral seat and union-ring bonnet.
 - d. Ends: Threaded.
 - e. Stem and Disc: Bronze.

- f. Packing: Asbestos free.
- g. Handwheel: Malleable iron, bronze or aluminum.

2.03 BRONZE BALL VALVES

A. Two-Piece, Full-Port, Bronze Ball Valves with Bronze Trim:

1. Description:

- a. Standard: MSS SP-110.
- b. SWP Rating: 150 psig.
- c. CWP Rating: 600 psig.
- d. Body Design: Two piece.
- e. Body Material: Bronze.
- f. Ends: Threaded.
- g. Seats: PTFE or TFE.
- h. Stem: Bronze.
- i. Ball: Chrome-plated brass.
- j. Port: Full.

2.04 IRON, SINGLE-FLANGE BUTTERFLY VALVES

A. 200 CWP, Iron, Single-Flange Butterfly Valves with EPDM Seat and Stainless-Steel Disc:

1. Description:

- a. Standard: MSS SP-67, Type I.
- b. CWP Rating: 200 psig.
- c. Body Design: Lug type; suitable for bidirectional dead-end service at rated pressure without use of downstream flange.
- d. Body Material: ASTM A 126, cast iron or ASTM A 536, ductile iron.
- e. Seat: EPDM.
- f. Stem: One- or two-piece stainless steel.
- g. Disc: Stainless steel.

B. 200 CWP, Iron, Single-Flange Butterfly Valves with NBR Seat and Stainless-Steel Disc:

1. Description:

- a. Standard: MSS SP-67, Type I.
- b. CWP Rating: 200 psig.
- c. Body Design: Lug type; suitable for bidirectional dead-end service at rated pressure without use of downstream flange.
- d. Body Material: ASTM A 126, cast iron or ASTM A 536, ductile iron.
- e. Seat: NBR.
- f. Stem: One- or two-piece stainless steel.
- g. Disc: Stainless steel.

2.05 IRON, GROOVED-END BUTTERFLY VALVES

A. 175 CWP, Iron, Grooved-End Butterfly Valves:

1. Description:

- a. Standard: MSS SP-67, Type I.
- b. CWP Rating: 175 psig.
- c. Body Material: Coated, ductile iron.
- d. Stem: Two-piece stainless steel.
- e. Disc: Coated, ductile iron.
- f. Seal: EPDM.

B. 300 CWP, Iron, Grooved-End Butterfly Valves:

1. Description:

- a. Standard: MSS SP-67, Type I.
- b. NPS 8 and Smaller CWP Rating: 300 psig.
- c. NPS 10 and Larger CWP Rating: 200 psig.
- d. Body Material: Coated, ductile iron.
- e. Stem: Two-piece stainless steel.

- f. Disc: Coated, ductile iron.
- g. Seal: EPDM.

2.06 BRONZE SWING CHECK VALVES

A. Class 150, Bronze Swing Check Valves with Bronze Disc:

1. Description:

- a. Standard: MSS SP-80, Type 3.
- b. CWP Rating: 300 psig.
- c. Body Design: Horizontal flow.
- d. Body Material: ASTM B 62, bronze.
- e. Ends: Threaded.
- f. Disc: Bronze.

PART 3 - EXECUTION

3.01 EXAMINATION

- A. Examine valve interior for cleanliness, freedom from foreign matter, and corrosion. Remove special packing materials, such as blocks, used to prevent disc movement during shipping and handling.
- B. Operate valves in positions from fully open to fully closed. Examine guides and seats made accessible by such operations.
- C. Examine threads on valve and mating pipe for form and cleanliness.
- D. Examine mating flange faces for conditions that might cause leakage. Check bolting for proper size, length, and material. Verify that gasket is of proper size, that its material composition is suitable for service, and that it is free from defects and damage.
- E. Do not attempt to repair defective valves; replace with new valves.

3.02 VALVE INSTALLATION

- A. Install valves with unions or flanges at each piece of equipment arranged to allow service, maintenance, and equipment removal without system shutdown.
- B. Locate valves for easy access and provide separate support where necessary.
- C. Install valves in horizontal piping with stem at or above center of pipe.

- D. Install valves in position to allow full stem movement.
- E. Install chainwheels on operators for ball, butterfly, gate, globe, and plug valves NPS 4 and larger and more than 96 inches above floor. Extend chains to 60 inches above finished floor.
- F. Install check valves for proper direction of flow and as follows:
 - 1. Swing Check Valves: In horizontal position with hinge pin level.
 - 2. Center-Guided and Plate-Type Check Valves: In horizontal or vertical position, between flanges.
 - 3. Lift Check Valves: With stem upright and plumb.

3.03 ADJUSTING

- A. Adjust or replace valve packing after piping systems have been tested and put into service but before final adjusting and balancing. Replace valves if persistent leaking occurs.

3.04 GENERAL REQUIREMENTS FOR VALVE APPLICATIONS

- A. If valve applications are not indicated, use the following:
 - 1. Shutoff Service: Ball, butterfly, or gate valves.
 - 2. Butterfly Valve Dead-End Service: Single-flange (lug) type.
 - 3. Throttling Service: Globe or angle, ball or butterfly, ball or butterfly valves.
 - 4. Pump-Discharge Check Valves:
 - a. NPS 2 and Smaller: Bronze swing check valves with bronze or nonmetallic disc.
 - b. NPS 2-1/2 and Larger for Domestic Water: Iron swing check valves with lever and weight or with spring or iron, center-guided, metal or resilient-seat check valves.
 - c. NPS 2-1/2 and Larger for Sanitary Waste and Storm Drainage: Iron swing check valves with lever and weight or spring.
- B. If valves with specified SWP classes or CWP ratings are not available, the same types of valves with higher SWP classes or CWP ratings may be substituted.
- C. Select valves, except wafer types, with the following end connections:
 - 1. For Copper Tubing, NPS 2 and Smaller: Threaded ends except where solder-joint valve-end option is indicated in valve schedules below.

2. For Copper Tubing, NPS 2-1/2 to NPS 4 : Flanged ends except where threaded valve-end option is indicated in valve schedules below.
3. For Copper Tubing, NPS 5 and Larger: Flanged ends.
4. For Steel Piping, NPS 2 and Smaller: Threaded ends.
5. For Steel Piping, NPS 2-1/2 to NPS 4 : Flanged ends except where threaded valve-end option is indicated in valve schedules below.
6. For Steel Piping, NPS 5 and Larger: Flanged ends.
7. For Grooved-End Copper Tubing and Steel Piping: Valve ends may be grooved.

3.05 DOMESTIC COLD-WATER VALVE SCHEDULE

A. Pipe NPS 2 and Smaller:

1. Bronze Angle Valves: Class 125, Class 150, bronze nonmetallic disc.
2. Ball Valves: One, Two, Three piece, full or regular reduced port, brass or bronze with brass bronze, stainless-steel trim.
3. Bronze Swing Check Valves: Class 125, Class 150, bronze nonmetallic disc.

B. Pipe NPS 2-1/2 and Larger:

1. Iron, Single-Flange Butterfly Valves: 200 CWP, EPDM NBR seat, aluminum-bronze ductile-iron stainless-steel disc.
2. Iron, Grooved-End Butterfly Valves: 175, 300 CWP.
3. Iron Swing Check Valves: Class 125, Class 250, metal, nonmetallic-to-metal seats.
4. Iron Swing Check Valves with Closure Control: Class 125, lever and spring.
5. Iron, Grooved-End Swing Check Valves: 300 CWP.

END OF SECTION

SECTION 22 0550

IDENTIFICATION FOR HVAC, PLUMBING AND FIRE PROTECTION PIPING AND EQUIPMENT

PART 1 - GENERAL

1.01 RELATED DOCUMENTS

- A. Drawings and general provisions of the Contract, including General and Supplementary Conditions and Division 1 Specification Sections, apply to this Section.

1.02 SUMMARY

- A. Section Includes:
 - 1. Equipment labels.
 - 2. Warning signs and labels.
 - 3. Pipe labels.
 - 4. Valve tags.
 - 5. Warning tags.

1.03 ACTION SUBMITTALS

- A. Product Data: For each type of product indicated.
- B. Samples: For color, letter style, and graphic representation required for each identification material and device.
- C. Equipment Label Schedule: Include a listing of all equipment to be labeled with the proposed content for each label.
- D. Valve Schedules: For each piping system to include in maintenance manuals.

1.04 COORDINATION

- A. Coordinate installation of identifying devices with completion of covering and painting of surfaces where devices are to be applied.
- B. Coordinate installation of identifying devices with locations of access panels and doors.
- C. Install identifying devices before installing acoustical ceilings and similar concealment.

PART 2 - PRODUCTS

2.01 EQUIPMENT LABELS

A. Plastic Labels for Equipment:

1. Material and Thickness: Multilayer, multicolor, plastic labels for mechanical engraving, 1/16 inch thick, and having predrilled holes for attachment hardware.
2. Letter Color: White.
3. Background Color: Black.
4. Maximum Temperature: Able to withstand temperatures up to 160 deg F .
5. Minimum Label Size: Length and width vary for required label content, but not less than 2-1/2 by 3/4 inch .
6. Minimum Letter Size: 1/4 inch for name of units if viewing distance is less than 24 inches , 1/2 inch for viewing distances up to 72 inches , and proportionately larger lettering for greater viewing distances. Include secondary lettering two-thirds to three-fourths the size of principal lettering.
7. Fasteners: Stainless-steel rivets or self-tapping screws.
8. Adhesive: Contact-type permanent adhesive, compatible with label and with substrate.

B. Label Content: Include equipment's Drawing designation or unique equipment number, Drawing numbers where equipment is indicated (plans, details, and schedules), plus the Specification Section number and title where equipment is specified.

C. Equipment Label Schedule: For each item of equipment to be labeled, on 8-1/2-by-11-inch bond paper. Tabulate equipment identification number and identify Drawing numbers where equipment is indicated (plans, details, and schedules), plus the Specification Section number and title where equipment is specified. Equipment schedule shall be included in operation and maintenance data.

2.02 WARNING SIGNS AND LABELS

A. Material and Thickness: Multilayer, multicolor, plastic labels for mechanical engraving, 1/16 inch thick, and having predrilled holes for attachment hardware.

B. Letter Color: Black.

C. Background Color: Yellow.

D. Maximum Temperature: Able to withstand temperatures up to 160 deg F .

E. Minimum Label Size: Length and width vary for required label content, but not less than 2-1/2 by 3/4 inch .

F. Minimum Letter Size: 1/4 inch for name of units if viewing distance is less than 24 inches , 1/2 inch for viewing distances up to 72 inches , and proportionately