DIVISION OF STATE PARKS

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

BOARD OF LAND AND NATURAL RESOURCES

Suzanne D. Case
Chairperson

CONTRACT SPECIFICATIONS AND PLANS

Job No. F93C817E
CENTRAL MAUI REGIONAL SPORTS COMPLEX
PHASE 4
Wailuku, Maui, Hawaii

Design Team

Prime Consultant & Civil Engineer:	R.M. Towill Corporation
Architect:	GYA Architects, Inc.
Structural Engineer:	KAI Hawaii, Inc.
Mechanical Engineer:	Randolph Murayama & Associates
Electrical Engineer (Site):	Morikawa & Associates
Electrical Engineer (Well Site):	Ronald Ho & Associates
Landscape Architect:	PBR Hawaii
Soils Engineer:	Geolabs Inc.
Irrigation Consultant:	Irrigation Hawaii, Ltd.

August 2016

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

CONTRACT SPECIFICATIONS AND PLANS

Job No. F93C817E
CENTRAL MAUI REGIONAL SPORTS COMPLEX
PHASE 4
Wailuku, Maui, Hawaii

Approved: _____
CURT A. COTTRELL
Administrator
Division of State Parks

Approved: _____
CARTY S. CHANG, P.E.
Chief Engineer
Engineering Division

August 2016

NOTICE TO BIDDERS
(Chapter 103D, HRS)

COMPETITIVE BIDS for Job No. F93C817E, Central Maui Regional Sports Complex Phase 4, Wailuku, Maui, Hawaii shall be submitted to the Department of Land and Natural Resources, Engineering Division on the specified date and time through the Hawaii State e-Procurement (HIePRO). HIePRO is accessible through the State Procurement Office website at www.spo.hawaii.gov.

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

The project is located at TMK (2) 3-8-007: Portion of 101, Wailuku, Maui, Hawaii.

The work shall generally consist of general site work, constructing softball fields, little league baseball fields, comfort stations, access road, detention basin, utility installation, and landscaping.

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

A voluntary pre-bid conference will be held at the Engineering Division Conference Room, located at the Kalanimoku Building, 1151 Punchbowl Street, Room 221, Honolulu, HI 96813 on August 23, 2016, at 10 A.M.

The estimated cost of construction is $1,700,000.00.

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

This project is subject to preference to Hawaii Products established by Section 103D, Hawaii Revised Statutes. The Hawaii Product List may be examined at the State Procurement Office website.

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

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

INFORMATION AND INSTRUCTIONS TO BIDDERS

CONTENTS

INFORMATION AND INSTRUCTIONS TO BIDDERS

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

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

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

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

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

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

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

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

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

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

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

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

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

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

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

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

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

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

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

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

O. PERMITS: The State will process permit applications whenever possible, and the Contractor shall procure the pre-processed permits and pay the required fees. If permit applications are not processed by the State, the Contractor shall process the permit applications, permits and

licenses, and pay all charges and fees. In all cases, the Contractor shall give all notices necessary and incident to the due and lawful prosecution of the work.

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

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

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

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

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

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

R. BIDDER'S RESPONSIBILITY TO PROVIDE PROPER SUPERINTENDENCE: The successful low bidder shall designate in writing to the Engineer the name of its authorized superintendent (Superintendent), who will be present at the job site whenever any work is in progress. The Superintendent shall be responsible for all work, receiving and implementing instructions from the Engineer in a timely manner. The cost for superintendence shall be considered incidental to the project.

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

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

T. HIRING OF HAWAII RESIDENTS: The Contractor shall comply with Act 68, SLH 2010, in the performance and for the duration of this contract. The Contractor shall ensure that Hawaii residents compose not less than eighty percent of the workforce employed to perform the contract work on the project. The eighty percent requirement shall be determined by

dividing the total number of hours worked on the contract by Hawaii residents, by the total number of hours worked on the contract by all employees of the Contractor in the performance of the contract. The hours worked by any Subcontractor of the Contractor shall count towards the calculation for this section. The hours worked by employees with shortage trades, as determined by the Department of Labor and Industrial Relations (DLIR), shall not be included in the calculation for this section.

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

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

V. PUBLIC CONVENIENCE AND SAFETY: The Contractor shall conduct construction operations with due regard to the convenience and safety of the public at all times. No materials or equipment shall be stored where it will interfere with the safe passage of public traffic. The Contractor shall provide, install, and maintain in satisfactory condition, all necessary signs, flares and other protective facilities and shall take all necessary precautions for the protection of the work and the convenience and safety of the public. The Engineer shall have the right to suspend the performance of the work in accordance with sub-section 7.20 - Suspension of Work of the General Conditions.

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

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

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

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

General Conditions.

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

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

When indicated in the Proposal, the Contractor shall provide a project sign, size 4'-0" x 7'-0" to be placed as directed by the Engineer. The sign shall be constructed in accordance with Section 01581 - Project Sign of these specifications and approved by the Engineer. All wording, type and size of lettering and color selection shall be as specified in these specifications or as approved by the Engineer.

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

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

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

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

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

GG. COMPLIANCE WITH §3-122-112 HAR:

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

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

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

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

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

P R O P O S A L

FOR

DEPARTMENT OF LAND AND NATURAL RESOURCES
ENGINEERING DIVISION
State of Hawaii

JOB NO. F93C817E
CENTRAL MAUI REGIONAL SPORTS COMPLEX
PHASE 4
Wailuku, Maui, Hawaii

_____, 2016

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

Dear Sir:

The undersigned, having carefully examined the local conditions and all available records and information covering conditions which may affect the cost of the work to be performed, and having carefully examined the Plans and Specifications, and other contract documents, hereby proposes to furnish and pay for all materials, tools, equipment, labor and other incidental work necessary to construct and install in place the complete Central Maui Regional Sports Complex, Phase 4, as required or called for in this Proposal, all according to the true intent and meaning of the Notice to Bidders, Information and Instructions to Bidders, Proposal, Detailed Specifications, Interim General Conditions, Plans, and any and all addenda for:

JOB NO. F93C817E
CENTRAL MAUI REGIONAL SPORTS COMPLEX
PHASE 4
Wailuku, Maui, Hawaii

on file in the office of the Engineering Division for the TOTAL BASE BID (Items 1 to 34) of:

_____

_____Dollars ($_____)

and will fully complete all work under this contract within 180 consecutive calendar days from the date of written notice to proceed, including date of said order, said total sum being itemized on the following pages.

CENTRAL MAUI REGIONAL SPORTS COMPLEX
JOB NO. F93C817E
PHASE 4

ITEM NO.	QUANTITY	DESCRIPTION	UNIT PRICE	TOTAL
		A. GRADING AND SITE CONSTRUCTION		
1.	10	Acres, Clearing and grubbing, in place complete.		
2.	1	L.S., Excavation and Embankment to balance the earthwork onsite, in place complete		
3.	10	Acres, Fine Grading, in place complete.		
4.	1,270	Lin. Ft., Dust Fence		
5.	2	Ea., Inlet Protection Device, in place complete.		
6.	1	Ea., Vehicle wash down area		
7.	1	Ea., Conc. Wash Basin		
8.	10	Acres, Dust Control, in place complete		
9.	5,042	Sq. Ft., Plain Class "B" concrete 4" sidewalk, in place complete.		
10.	1	Ea., Restroom #2, in place complete.		
11.	1,050	Lin. Ft., 6' High perimeter chain link fence & gates, in place complete.		
12.	1	Ea., Cattle gate with padlock, in place complete.		
13.	1	Allowance, Internet and long distance fees use in the Field Office.	Allowance	$ 10,000.00
14.	1	Lump Sum, Preparation of planning documents inclusive of the Work Plan.		
15.	1	Lump Sum, UXO monitor.		
16.	1	Lump Sum, Environmental Qualified Consultant.		
17.	500	Cu Yds., Solid waste disposal including loading, hauling, and disposal.		
18.	500	Cu Yds., Contaminated soil disposal including loading, hauling, and disposal.		
19.	1	Allowance, Loading, hauling, and disposal of MEC not removed by the Army.		
20.	1	Lump Sum, Ambient air monitoring.		

ITEM NO.	QUANTITY	DESCRIPTION	UNIT PRICE	TOTAL
		B. SANITARY SEWER SYSTEM		
21.	1	Ea., Sewer Pump Station, in place complete		
22.	1	Ea., Sewer COTG, in place complete		
		C. UNDERGROUND ELECTRICAL, TELEPHONE, CATV AND STREET LIGHTING SYSTEMS		
		Stations		
23.	1	Ea., Sewage Lift Station		
		Building Electrical		
24.	1	Ea., Restroom #2 including plumbing fixtures and connections, roof vent, hose bibbs, floor drains, wall hydrant, 2" shut off valve & box, exterior concrete slab, tubular skylight, painting, gutters and downspouts, doors, gates, shelves, counters, accessories, and all necessary appurtenances, in place complete.		
		D. LANDSCAPE		
25.	27	Ea. Rainbow Shower (25 gallons)		
		New Planting		
26.	15	Ea., True Kamani (25 Gallon)		
27.	196	Ea., Beach Naupaka (1 Gallon)		
28.	448,291	Sq. Ft., Riviera Bermuda (Hydrosprig)		
29.	1,653	Cu. Yds., Imported / Screened Topsoil (2" depth)		
30.	448,291	Sq. Ft., Amendments 2" Layer (All Areas)		
31.	1	Ea. Milo (25 gallons)		
		Maintenance		
32.	448,291	Sq. Ft., Formal Maintenance Period (90 Days)		
		E. IRRIGATION SYSTEM		
33.	10	Acres, Automatic irrigation system, includes pipes, heads, backflow preventer, control valves, irrigation controller, wires & incidentals, in place complete.		
		Subtotal Bid (Items 1 to 33, inclusive)		
34.	1	Lump Sum, Mobilization and Demobilization (not to exceed 10% of the Subtotal Base Bid)		
		TOTAL BID (Items 1 to 34, inclusive)		

HAWAII PRODUCTS PREFERENCE AND/OR USE OF HAWAII PRODUCTS

In accordance with Act 175, SLH 2009, the Hawaii products preference is applicable to this solicitation. Bidders offering a Hawaii product ("HP") shall identify the HP in the table below.

Persons desiring to qualify their product(s) not currently on the Hawaii Product List, shall complete Form SPO-38, *Certification for Hawaii Product Preference*, and submit the completed form no later than the deadline specified in the procurement notice and solicitation. The responsibility for certification and qualification shall rest upon the person requesting the preference. One form shall be completed and submitted for each product. Form SPO-38 is available at http://hawaii.gov/spo/

For the purpose of selecting the low bid when a solicitation contains both HP and non-HP, the price offered for a HP item shall be decreased by subtracting 10% for the class I or 15% for the class II HP item(s) offered. 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.

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

Item No.	Pre-Approved Hawaii Product Description & Manufacturer	Class (I or II)	Quantity	Unit Measure	Unit Price	Total Price
1.	**Aggregates and Sand – Basal, Rock, Cinder, Limestorne and Coral:** Ameron International Corporation Goodfellow Bros., Inc. Hawaiian Cement Tileco, Inc.	I				
2.	**Cement and Concrete Products:** Ameron International Corporation BOMAT, Ltd. Hawaiian Cement Tileco, Inc.	I				
3.	**Precast Concrete Products:** Aloha Precast, Inc. GPRM Prestress, LLC Hawaii Precast, Inc. Ramteck Fabrication Co., Inc. Walker Industries, Ltd.	I				
4.	**Metal Roofing and Flashing:** HPM Building Supply	I				

Item No.	Pre-Approved Hawaii Product Description & Manufacturer	Class (I or II)	Quantity	Unit Measure	Unit Price	Total Price
5.	**Soil Amendments, Mulch, Compost:** Kauai Nursery & Landscaping, Inc. Molokai Seed Company	I				

RECYCLED PRODUCTS PREFERENCE

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

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

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

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

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

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

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

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

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

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

APPRENTICESHIP AGREEMENT PREFERENCE

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

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

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

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

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

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

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

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

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

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

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

4. If the bidder is certified to participate in an apprenticeship program for each trade which will be employed by the bidder for the project, a preference will be applied to decrease the bidder's bid amount by five percent (5%) for evaluation purposes.

5. Should the bidder qualify for other preferences (e.g. Hawaii Products), all applicable preferences shall be applied to the bid price.

CONTRIBUTIONS BY STATE AND COUNTY CONTRACTORS PROHIBITED

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

CONDITION OF AWARD

It is understood that the award of the contract will be made on the basis of the lowest responsible Total Base Bid (Items 1 to 34) selected by the Board of Land and Natural Resources. Write the total of bid items 1 to 34 on page P-1.

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

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

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

It is also understood and agreed that the award of the contract shall be conditioned upon funds being made available for this project and further upon the right of the Board of Land and Natural Resources to hold all bids received for a period of sixty (60) days from the date of the opening thereof, unless otherwise required by law, during which time no bid may be withdrawn.

It is also understood that Notice to Proceed may be delayed up to one (1) year after the bid opening date, and that no additional compensation will be provided for any claim for escalation or delay for issuance of Notice to Proceed on or before that date.

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

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

After the proposals are opened and read, the figures will be extended and/or totaled in accordance with the bid prices of the acceptable proposals and the totals will be compared. In the comparison of bids, words written in the proposal shall govern over figures and unit prices will govern over totals. Until the award of the contract, however, the right will be reserved to reject any and all proposals and to waive any defects or technicalities as may be deemed best for the interest of the State.

It is also understood and agreed that liquidated damages in the amount of THREE HUNDRED DOLLARS and 00/100 ($300.00) for each and every calendar day in excess thereof prior to completion of the contract shall be withheld from payments due to the Contractor.

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

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

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

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

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

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

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

RECEIPT OF ADDENDA

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

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

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

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

JOINT CONTRACTORS OR SUBCONTRACTORS TO BE ENGAGED ON THIS PROJECT

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

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

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

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

In completing the Joint Contractors or Subcontractors List, describe the specialty contractor's nature and scope of work to be performed for this project and provide the complete firm name of the joint contractor or subcontractor in the respective columns. If the Bidder is a general contractor providing the work of a required specialty contractor, whose license is not automatically held pursuant to HAR 16-77-32, fill in the Bidder's (general contractor's) name and nature and scope of work to be performed on this project.

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

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

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

Enclosed herewith is a:

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

(Cross Out Those Not Applicable)

_____

_____Dollars ($_____)

as required by law.

Respectfully submitted,

_____
Name of Company, Joint Venture
or Partnership

_____
Contractor's License No.

By _____
Signature (*4)

Title _____
Print Name _____
Date _____
Address _____
_____
Telephone No. _____

E-Mail Address _____

NOTES:

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

2. Legal tender; or

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

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

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

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

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

End of Proposal

SPECIAL PROVISIONS

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

Section 2 – Proposal Requirements and Conditions

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

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

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

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

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

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

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

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

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

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

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

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

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

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

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

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

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

Section 3 – Award and Execution of Contract

1. **AMEND** Section 3.3, Award of Contract, by deleting "sixty (60)" and replacing with "ninety (90)" in the first paragraph.

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

"If the contract is not awarded within the ninety (90) days, the Department may request the successful Bidder to extend the time for the acceptance of its bid. The Bidder may reject such a request without penalty; and in such case, the Department may at its sole discretion make a similar offer to the next lowest responsive and responsible bidder and so on until a bid is duly accepted or until the Department elects to stop making such requests."

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

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

"**3.10 PROTESTS**—Pursuant to Section 103D-701, Hawaii Revised Statutes, an actual or prospective offeror who is aggrieved in connection with the solicitation or award may submit a protest. Any protest

shall be submitting in writing to the Chairperson, Department of Land and Natural Resources, 1151 Punchbowl Street, Honolulu, Hawaii 96813, or designee as specified in the solicitation.

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

The notice of award, if any, resulting from this solicitation shall be posted on the Procurement System on the SPO website: http://hawaii.gov/spo2/.

Section 5 – Control of Work

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

Section 6 – Substitution of Materials and Equipment

ADD the following to Section 6.3 Sub-paragraph b:

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

Section 7 – Prosecution and Progress

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

"d. Insurance Requirements

1. Obligation of Contractor

The Contractor shall not commence any work until it obtains, at its own expense, all required insurance. Such insurance must have the approval of the Department as to limit, form and amount and must be maintained with a company authorized by law to issue such insurance in the State of Hawaii.

All insurance described herein will be maintained by the Contractor for the full period of the contract and in no event will be terminated or otherwise allowed to lapse prior to written certification of final acceptance of the work by the Department.

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

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

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

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

2. Types of Insurance

The Contractor shall purchase and maintain insurance described below which shall provide coverage against claims arising out of the Contractor's operations under the contract, whether such operations be by the Contractor itself or by the subcontractor or by anyone directly or indirectly employed by any of them or by anyone for whose acts any of them may be liable.

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

(b) Commercial General Liability Insurance and Automobile Insurance. Contractor's commercial general liability insurance and automobile liability insurance shall both be obtained in a combined, single limit of not less than $1,000,000 per occurrence that shall include coverage for bodily injury, sickness, disease or death of any person, arising directly or indirectly out of, or in connection with, the performance of work under this contract.

The Contractor's property damage liability insurance shall provide for a single combined limit of not less than $1,000,000 for all damages arising out of injury to or destruction of property of others including the Department's, arising directly or indirectly out of or in connection with the performance of the work under this contract including explosion or collapse.

The Contractor shall either:

i. Require each of its subcontractors to procure and to maintain during the life of its subcontract, subcontractors' comprehensive general liability, automobile liability

and property damage liability insurance of the type and in the same amounts specified herein; or

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

The Contractor will be permitted, in cooperation with insurers, to maintain a self insured retention for up to 25% of the per occurrence combined single limits of the commercial general liability and the automobile liability policies. The existence of the self insured retention must be noted on the certificate of insurance coverage submitted to the Department or else it will be understood that the insurer is providing first dollar coverage for all claims. For all claims within the self-insured retention amount, the rights, duties and obligations between the Contractor and the Department shall be identical to that between a liability insurer and the Department, as an additional insured, as if there was no self-insured retention.

(c) Builder's Risk Insurance. Unless included in the Specifications of this project, the Contractor shall not be required to provide builder's risk insurance. If required as noted in the Specifications, builder's risk insurance shall be provided during the progress of work and until final acceptance by the Department upon completion of the contract. It shall be "All Risk" (including but not limited to earthquake, windstorm and flood damage) completed value insurance coverage on all completed work and work in progress to the full replacement value thereof. Such insurance shall include the Department as additional name insured. The Contractor shall submit to the Engineer for its approval all items deemed to be uninsurable. The policy may provide for a deductible in an amount of up to 25% of the amount insured by the policy. With respect to all losses up to any deductible amount, the relationship between the Contractor and the Department shall be that of insurer and additional insured as if no deductible existed".

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

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

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

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

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

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

Section 8 – Measurement and Payment

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

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

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

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

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

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

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

DETAILED SPECIFICATIONS

TABLE OF CONTENTS

SECTION 01019 - GENERAL SPECIFICATIONS

PART 1 - GENERAL

1.1 GENERAL REQUIREMENTS

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

1.2 DESCRIPTION OF WORK

1.3 GENERAL

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

B. Right-of-Entry: Access to the site is located on private property. The Contractor shall be responsible for obtaining a right-of-entry agreement with Alexander and Baldwin and all other right-of-entry needed to access the project site. Provide a copy of the executed agreements to the Engineer at least three (3) working days before starting any work.

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

D. Notices: The Contractor shall notify the Engineer and A&B at least three (3) working days before starting any work.

E. Environmental Hazard: The Contractor shall comply with the requirements stated in the environmental hazard management plan.

F. Permits and Regulations: The Contractor shall obtain and pay for all permits and licenses, give all notices and comply with all laws, ordinances, rules and regulations bearing on the conduct of the work as drawn and specified.

G. Existing Utilities

The Contractor shall be responsible for the protection of existing surface and subsurface utilities and poles within and abutting the project site, trench excavations, borrow sites, and other work areas. Any utility that the Contractor encounters during the progress of the work, such as telephone poles, electric poles, water lines, sewer lines, electric lines, and drainage pipes, whether or not shown on the plans, shall not be disturbed or damaged unless otherwise instructed in the plans and specifications. The Contractor shall notify the Engineer and the affected utility company immediately of any damaged or disturbed utility.

In the event utilities which are not shown on the plans and specifications, not located and exposed on the job as it progressed or not pointed out to the Contractor in the field are damaged or disturbed by the Contractor, the Contractor shall not be held liable but shall notify the Engineer and the affected utility company.

H. Contractor's Operations

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

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

I. Standard Specifications

1. The work embraced herein shall be done in accordance with:

   a. "DLNR INTERIM GENERAL CONDITIONS" October 1994

   b. "STANDARD SPECIFICATIONS FOR PUBLIC WORKS CONSTRUCTION" County of Maui, 1986;

   c. "2005 STANDARD SPECIFICATIONS FOR ROAD AND BRIDGE CONSTRUCTION", Department Of Transportation, Highways Division.

2. The terms used hereinafter are as follows:

   a. "GENERAL CONDITIONS" shall refer to the "DLNR INTERIM GENERAL CONDITIONS, October 1994"

   b. "STANDARD SPECIFICATIONS" shall refer to the "STANDARD SPECIFICATIONS FOR PUBLIC WORKS CONSTRUCTION" of the State of Hawaii, 1986.

   c. "2005 STANDARD SPECIFICATIONS" shall refer to the "2005 STANDARD SPECIFICATIONS FOR ROAD AND BRIDGE CONSTRUCTION."

3. These DETAILED SPECIFICATIONS supplement and modify the STANDARD SPECIFICATIONS.

J. Conditions at Site

1. EXISTING CONDITIONS: Every person bidding upon the work is expected to visit the site and examine the conditions of same and satisfy himself as to the character and amount of work to be performed as indicated on the plans and called for by these specifications. No additional payment will be granted because of the lack of knowledge of such conditions.

2. WATER AND ELECTRICITY: The Contractor shall make all necessary arrangement and connections for temporary use of water and electricity for construction and shall pay all expenses.

K. Toilet Accommodations: The Contractor shall be responsible for providing and maintaining his own toilet facilities for his use.

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

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

N. Clean Up Premises: The Contractor shall throughout the duration of the project keep all streets, sidewalks and driveways free from all debris produced from the project. The Contractor shall keep the project and surrounding area neat and free from dust nuisance. The Contractor shall clean up and remove from premises all debris accumulated from operations as necessary or as directed. See also Section 7.25 of the General Conditions.

O. Completion of Work: Upon completion of the work, the Contractor shall remove all equipment, signs and unused materials provided for the work and shall restore the project site to a neat and clean condition

P. Responsibility

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

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

Q. Cooperation With Other Contractors: The State reserves the right at any time to contract for or otherwise perform other or additional work within the contract zone limits of this Contract. The Contractor of this project shall, to the extent ordered by the State, conduct its work so as not to interfere with or hinder the progress or completion of the work performed by other contractors.

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

S. Drawings and Specifications

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

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

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

T. Phases 1, 2 & 3 Improvements

1. The Contractor shall maintain, protect, and keep clean the existing facilities that have been or are currently being constructed in Phases 1, 2 and 3. These facilities are as follows but not limited to Restroom #1, Concession Stand #1 and #2, softball fields #1, #2, #3 and #4 including field appurtenances, baseball fields #1, #2, #3, #4 including field appurtenances, sidewalks/walkways, park lighting structures, paved roadway and parking areas, landscaping, underground utilities, irrigation system, concrete curbs, all mechanical equipment including booster pump, irrigation tank and irrigation well facility including pump and appurtenances.

2. Portions of the park may be open for public use during construction. The Contractor shall consider the impacts of this on his operations and plan accordingly. Construction operations shall not conflict with the public park use. The work zone shall be adequately secured to prevent public access. Barricades, fencing, etc. shall be used as needed to provide a safe buffer between park users and the work zone. No additional compensation will be allowed for any costs associated with these requirements.

END OF SECTION

SECTION 01090 - STANDARD REFERENCES

PART 1 - GENERAL

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

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

Abbreviation	Company
AMCA	Air Moving and Conditioning Association, Inc. 30 West University Drive Arlington Heights, IL 60004
ANSI	American National Standards Institute, Inc. 1430 Broadway New York, NY 10018
APA	American Plywood Association 1119 A Street Tacoma, WA 98401
API	American Petroleum Institute 1801 K Street N.W. Washington, DC 20006
ARI	Air-Conditioning and Refrigeration Institute 1814 North Fort Myer Drive Arlington, VA 22209
ASCE	American Society of Civil Engineers 345 East 47th Street New York, NY 10017
ASCII	American Standard Code for Information Interchange United States of America Standards Institute 1430 Broadway New York, NY 10018
ASE Code	American Standard Safety Code for Elevators, Dumbwaiter and Escalators American National Standards Institute 1430 Broadway New York, NY 10018
ASHRAE	American Society of Heating, Refrigeration and Air Conditioning Engineers United Engineering Center 345 East 47th Street New York, NY 10017
ASME	American Society of Mechanical Engineers 345 East 47th Street New York, NY 10017
ASTM	American Society for Testing and Materials 1916 Race Street Philadelphia, PA 19103

Abbreviation	Company
AWPA	American Wood Preservers Association 1625 Eye Street Washington, DC 20006
AWS	American Welding Society 2501 N.W. 7th Street Miami, FL 33125
AWWA	American Water Works Association 6666 West Quincy Avenue Denver, CO 80235
CBM	Certified Ballast Manufacturers 2120 Keith Building Cleveland, OH 44115
CMAA	Crane Manufacturers Association of America, Inc. (Formerly called: Overhead Electrical Crane Institute - OECI) 1326 Freeport Road Pittsburgh, PA 15238
CRSI	Concrete Reinforcing Steel Institute 180 North La Salle Street Chicago, IL 60601
CSA	Canadian Standards Association 178 Rexdale Boulevard Rexdale, Ontario, M9W IR3, Canada
DEMA	Diesel Engine Manufacturer's Association 122 East 42nd Street New York, NY 10017
DIS	Division of Industrial Safety California Department of Industrial Relations 2422 Arden Way Sacramento, CA 95825
EEI	Edison Electric Institute 90 Park Avenue New York, NY 10016
EIA	Electronic Industries Association 2001 Eye Street N.W. Washington, DC 20006

Abbreviation	Company
EJMA	Expansion Joint Manufacturer's Association 331 Madison Avenue New York, NY 10017
ESO	Electrical Safety Orders, California Administrative Code, Title 8, Chap. 4, Subarticle 5 Office of Procurement, Publications Section P.O. Box 20191 8141 Elder Creek Road Sacramento, CA 95820
FEDSPEC	Federal Specifications General Services Administration Specification and Consumer Information Distribution Branch Washington Navy Yard, Bldg. 197 Washington, DC 20407
FEDSTDS	Federal Standards (see FEDSPECS)
FM	Factory Mutual Research 1151 Boston-Providence Turnpike Norwood, MA 02062
HEI	Heat Exchange Institute 122 East 42nd Street New York, NY 10017
HI	Hydraulic Institute 1230 Keith Building Cleveland, OH 44115
IAPMO	International Association of Plumbing and Mechanical Officials 5032 Alhambra Avenue Los Angeles, CA 90032
ICBO	International Conference of Building Officials 5360 South Workman Mill Road Whittier, CA 90601
ICEA	Insulated Cable Engineers Association P.O. Box P South Yarmouth, MA 02664
IEEE	Institute of Electrical and Electronics Engineers, Inc. 345 East 47th Street New York, NY 10017

Abbreviation	Company
IES	Illuminating Engineering Society C/O United Engineering Center 345 East 47th Street New York, NY 10017
ISA	Instrument Society of America 400 Stanwix Street Pittsburgh, PA 15222
JIC	Joint Industrial Council 7901 Westpark Drive McLean, VA 22101
MILSPEC	Military Specifications Naval Publications and Forms Center 5801 Tabor Avenue Philadelphia, PA 19120
MSS	Manufacturers Standardization Society of the Valve and Fittings Industry, Inc. 127 Park Street, N.E. Vienna, VA 22180
NAAMM	National Association of Architectural Metal Manufacturers 100 South Marion Street Oak Park, IL 60302
NACE	National Association of Corrosion Engineers P.O. Box 986 Katy, TX 77450
NEC	National Electric Code National Fire Protection Association 470 Atlantic Avenue Boston, MA 02210
NEMA	National Electrical Manufacturer's Association 155 East 44th Street New York, NY 10017
NESC	National Electric Safety Code American National Standards Institute 1430 Broadway New York, NY 10018
NFPA	National Forest Products Association (Formerly called: National Lumber Manufacturer's Association) 1619 Massachusetts Avenue, N.W. Washington, DC 20036

Abbreviation	Company
OSHA	Occupational Safety and Health Act U.S. Department of Labor San Francisco Regional Office 450 Golden Gate Avenue, Box 36017 San Francisco, CA 94102
PPIC	The Plumbing & Piping Industry Council, Inc. Suite 402 510 Shatto Place Los Angeles, CA 90020
SAE	Society of Automotive Engineers 2 Pennsylvania Street New York, NY 10001
SAMA	Scientific Apparatus Makers Association One Thomas Circle Washington, DC 20005
SBCC	Southern Building Code Congress 1116 Brown-Marx Building Birmingham, AL 35203
SMACNA	Sheet Metal and Air Conditioning Contractors National Association, Inc. 8224 Old Courthouse Road Tysons Corner Vienna, VA 22180
SSPWC	Standard Specifications for Public Works Construction Building News, Inc. 3055 Overland Avenue Los Angeles, CA 90034
TEMA	Tubular Exchanger Manufacturer's Association 331 Madison Avenue New York, NY 10017
UBC	Uniform Building Code Published by ICBO
UL	Underwriters Laboratories Inc. 207 East Ohio Street Chicago, IL 60611
UMC	Uniform Mechanical Code Published by ICBO
UPC	Uniform Plumbing Code Published by IAPMO

Abbreviation	Company
USBR	Bureau of Reclamation U.S. Department of Interior Engineering and Research Center Denver Federal Center, Building 67 Denver, CO 80225
WWPA	Western Wood Products Association (Formerly called: West Coast Lumberman's Association - WCLA) Yeon Building Portland, CA 97204

PART 2 - PRODUCTS (NOT USED)

PART 3 - EXECUTION (NOT USED)

END OF SECTION

SECTION 01100 - ARCHAEOLOGICAL PROTECTION

PART 1 - GENERAL

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

PART 2 - PRODUCTS (NOT USED)

PART 3 - EXECUTION

3.1 CONSTRUCTION METHOD: The Contractor shall comply with the requirements of the archaeological monitoring plan prepared by SCS, Inc. The Contractor shall be responsible for providing an archaeological monitor to be present during all ground disturbing work associated with this contract. If historical values are noted, the State may order a halt to the work in the vicinity of the historical values until the State can examine further. The Contractor shall notify the State if he finds anything he suspects to be of historic significance and shall discontinue further work in the vicinity of the find until the State can examine the area. In either case, further work in the vicinity of such historical or suspected historical values may proceed only upon approval by the State. Such approval can be normally expected within one week and shall in no case require more than one month.

3.2 PAYMENT

Payment for archaeological protection shall not be made separately but shall be considered incidental and included in the prices bid for the various items of work.

END OF SECTION

SECTION 01400 - QUALITY REQUIREMENTS

PART 1 GENERAL

1.1 SECTION INCLUDES

A. Quality control and control of installation.

B. Tolerances

C. References.

D. Testing and inspection services.

E. Manufacturers' field services.

F. Examination.

G. Preparation.

1.2 QUALITY CONTROL AND 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. When manufacturers' instructions conflict with Contract Documents, request clarification from Architect/Engineer 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. Perform Work by persons qualified to produce required and specified quality.

F. Verify field measurements are as indicated on Shop Drawings or as instructed by manufacturer.

G. Secure products in place with positive anchorage devices designed and sized to withstand stresses, vibration, physical distortion, or disfigurement.

1.3 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. When manufacturers' tolerances conflict with Contract Documents, request clarification from Architect/Engineer before proceeding.

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

1.4 REFERENCES

A. For products or workmanship specified by association, trade, or other consensus standards, comply with requirements of standard, except when more rigid requirements are specified or are required by applicable codes.

B. Conform to reference standard by date of issue current on date of Contract Documents, except where specific date is established by code.

C. Obtain copies of standards where required by product specification sections.

D. When specified reference standards conflict with Contract Documents, request clarification from Architect/Engineer before proceeding.

E. Neither contractual relationships, duties, nor responsibilities of parties in Contract nor those of Architect/Engineer shall be altered from Contract Documents by mention or inference otherwise in reference documents.

1.5 TESTING AND INSPECTION SERVICES

A. Employ and pay for services of an independent testing agency or laboratory acceptable to Owner to perform specified testing.

1. Prior to start of Work, submit testing laboratory name, address, and telephone number, and names of full time specialist and responsible officer.

2. Submit copy of report of laboratory facilities inspection made by Materials Reference Laboratory of National Bureau of Standards during most recent inspection, with memorandum of remedies of deficiencies reported by inspection.

B. The independent firm will perform tests, inspections and other services specified in individual specification sections and as required by Architect/Engineer.

1. Laboratory: Authorized to operate in State of Hawaii.

2. Laboratory Staff: Maintain full time specialist on staff to review services.

3. Testing Equipment: Calibrated at reasonable intervals with devices of an accuracy traceable to National Bureau of Standards or accepted values of natural physical constants.

C. Testing, inspections and source quality control may occur on or off project site. Perform off-site testing as required by Architect/Engineer or Owner.

D. Reports will be submitted by independent firm to Architect/Engineer indicating observations and results of tests and indicating compliance or non-compliance with Contract Documents.

E. Cooperate with independent firm; furnish samples of materials, design mix, equipment, tools, storage, safe access, and assistance by incidental labor as requested.

1. Notify Architect/Engineer and independent firm 24 hours prior to expected time for operations requiring services.

2. Make arrangements with independent firm and pay for additional samples and tests required for Contractor's use.

F. Testing and employment of testing agency or laboratory shall not relieve Contractor of obligation to perform Work in accordance with requirements of Contract Documents.

G. Re-testing or re-inspection required because of non-conformance to specified requirements shall be performed by same independent firm on instructions by Architect/Engineer. Payment for re-testing or re-inspection will be charged to Contractor by deducting testing charges from Contract Sum/Price.

H. Agency Responsibilities:

1. Test samples of mixes submitted by Contractor.

2. Provide qualified personnel at site. Cooperate with Architect/Engineer and Contractor in performance of services.

3. Perform specified sampling and testing of products in accordance with specified standards.

4. Ascertain compliance of materials and mixes with requirements of Contract Documents.

5. Promptly notify Architect/Engineer and Contractor of observed irregularities or non-conformance of Work or products.

6. Perform additional tests required by Architect/Engineer.

7. Attend preconstruction meetings and progress meetings.

I. Agency Reports: After each test, promptly submit two copies of report to Architect/Engineer and to Contractor. When requested by Architect/Engineer, provide interpretation of test results. Include the following:

1. Date issued.

2. Project title and number.

3. Name of inspector.

4. Date and time of sampling or inspection.

5. Identification of product and specifications section.

6. Location in Project.

7. Type of inspection or test.

8. Date of test.

9. Results of tests.

10. Conformance with Contract Documents.

J. Limits On Testing Authority:

1. Agency or laboratory may not release, revoke, alter, or enlarge on requirements of Contract Documents.
2. Agency or laboratory may not approve or accept any portion of the Work.
3. Agency or laboratory may not assume duties of Contractor.
4. Agency or laboratory has no authority to stop the Work.

1.6 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, and to initiate instructions when necessary.

B. Report observations and site decisions or instructions given to applicators or installers that are supplemental or contrary to manufacturers' written instructions.

PART 2 PRODUCTS

Not Used.

PART 3 EXECUTION

3.1 EXAMINATION

A. Verify existing site conditions and substrate surfaces are acceptable for subsequent Work. Beginning new Work means acceptance of existing conditions.

B. Verify 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. Verify utility services are available, of correct characteristics, and in correct locations.

3.2 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 new material or substance in contact or bond.

END OF SECTION

SECTION 01567 - POLLUTION CONTROL

PART 1 - GENERAL

1.1 GENERAL REQUIREMENTS

A. Rubbish Disposal

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

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

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

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

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

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

B. Dust

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

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

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

C. Noise

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

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

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

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

D. Erosion

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

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

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

E. Others

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

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

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

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

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

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

F. Suspension of Work

1. Violations of any of the above requirements or any other pollution control requirements which may be specified in the Technical Specifications herein shall be cause for suspension of the work creating such violation. No additional compensation shall be due

the Contractor for remedial measures to correct the offense. Also, no extension of time will be granted for delays caused by such suspensions.

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

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

PART 2 - PRODUCTS (NOT USED)

PART 3 - EXECUTION (NOT USED)

END OF SECTION

SECTION 01600 - PRODUCT REQUIREMENTS

PART 1 - GENERAL

1.1 SECTION INCLUDES

A. Products.

B. Product delivery requirements.

C. Product storage and handling requirements.

D. Product options.

E. Product substitution procedures.

F. Equipment electrical characteristics and components.

1.2 PRODUCTS

A. Furnish products of qualified manufacturers suitable for intended use. Furnish products of each type by single manufacturer unless specified otherwise.

B. Do not use materials and equipment removed from existing premises, except as specifically permitted by Contract Documents.

C. Furnish interchangeable components from same manufacturer for components being replaced.

1.3 PRODUCT DELIVERY REQUIREMENTS

A. Transport and handle products in accordance with manufacturer's instructions.

B. Promptly inspect shipments to ensure products comply with requirements, quantities are correct, and products are undamaged.

C. Provide equipment and personnel to handle products by methods to prevent soiling, disfigurement, or damage.

1.4 PRODUCT STORAGE AND HANDLING REQUIREMENTS

A. Store and protect products in accordance with manufacturers' instructions.

B. Store with seals and labels intact and legible.

C. Store sensitive products in weather tight, climate controlled, enclosures in an environment favorable to product.

D. For exterior storage of fabricated products, place on sloped supports above ground.

E. Provide off-site storage and protection when site does not permit on-site storage or protection.

F. Cover products subject to deterioration with impervious sheet covering. Provide ventilation to prevent condensation and degradation of products.

G. Store loose granular materials on solid flat surfaces in well-drained area. Prevent mixing with foreign matter.

H. Provide equipment and personnel to store products by methods to prevent soiling, disfigurement, or damage.

I. Arrange storage of products to permit access for inspection. Periodically inspect to verify products are undamaged and are maintained in acceptable condition.

1.5 PRODUCT OPTIONS

A. Products Specified by Reference Standards or by Description Only: Any product meeting those standards or description.

B. Products Specified by Naming One or More Manufacturers: Products of one of manufacturers named and meeting specifications, no options or substitutions allowed.

C. Products Specified by Naming One or More Manufacturers with Provision for Substitutions: Submit request for substitution for any manufacturer not named in accordance with the following article.

1.6 PRODUCT SUBSTITUTION PROCEDURES

A. Instructions to Bidders specify time restrictions for submitting requests for Substitutions during bidding period to requirements specified in this section.

B. Substitutions may be considered when a product becomes unavailable through no fault of Contractor.

C. Document each request with complete data substantiating compliance of proposed Substitution with Contract Documents.

D. A request constitutes a representation that Bidder:

1. Has investigated proposed product and determined that it meets or exceeds quality level of specified product.
2. Will provide same warranty for Substitution as for specified product.
3. Will coordinate installation and make changes to other Work which may be required for the Work to be complete with no additional cost to Owner.
4. Waives claims for additional costs or time extension which may subsequently become apparent.

E. Substitutions will not be considered when they are indicated or implied on Shop Drawing or Product Data submittals, without separate written request, or when acceptance will require revision to Contract Documents.

PART 2 - PRODUCTS

2.1 EQUIPMENT ELECTRICAL CHARACTERISTICS AND COMPONENTS

A. Wiring Terminations: Furnish terminal lugs to match branch circuit conductor quantities, sizes, and materials indicated. Include lugs for terminal box.

B. Cord and Plug: Furnish minimum 6 foot cord and plug including grounding connector for connection to electric wiring system. Cord of longer length is specified in individual specification sections.

PART 3 - EXECUTION

Not Used.

END OF SECTION

DIVISION 2 - SITE WORK

SECTION 02050 - DEMOLITION AND REMOVAL

PART 1 - GENERAL

1.1 WORK SPECIFIED

A. Accomplish all demolition, removal, and related work indicated on or required by the drawings, and as specified herein.

B. Work shall include, but is not limited to removal of existing fencing, vegetation, and berms.

1.2 GENERAL REQUIREMENTS

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

B. Obvious conditions which exist on the site shall be accepted as part of the work, even though they may not be clearly indicated on the drawings and/or described herein, or may vary therefrom.

C. All debris of any kind accumulated from the work of this section shall be disposed of off the site.

D. Burning of any debris on-site will not be permitted.

E. Permits, Notice, Etc.

1. The Contractor shall procure and pay for all necessary permits of certificate that may be required in connection with this work.

2. The Contract shall serve proper notice and consult with the Engineer regarding any temporary disconnections of electrical or other utility lines in the area which may interfere with the removal work, and all such lines where necessary shall be properly disconnected before commencing with the work.

F. Protection: Throughout the work, protection shall be provided for all roads, walks, property, etc., scheduled to remain. Safe working conditions shall be maintained at all times for all personnel, and temporary lights and barricades shall be provided and maintained.

G. Comply with requirements of environmental hazard plan.

PART 2 - PRODUCTS (NOT USED)

PART 3 - EXECUTION

3.1 DEMOLITION AND REMOVAL

A. Cutting: All concrete, when required, shall be cut with a carborundum saw prior to removal, with water applied to control dusting.

B. All work shall be executed in an orderly and careful manner, with due consideration for all items to remain, and the Contractor shall be strictly responsible for any damage thereto.

C. Water facilities shall be available and in operating condition at all times. All dust, shall be suppressed by a fog spray or other approved method.

D. Demolish and remove existing fencing, vegetation, and berms, as indicated.

3.2 DUST CONTROL

The amount of dust resulting from demolition shall be controlled to prevent the spread of dust and to avoid creation of a nuisance in the surrounding area. Use of water will not be permitted when it will result in, or create, a hazardous condition such as flooding or pollution.

3.3 CONTRACT ZONE LIMIT

The Contract Zone Limit shall be the limit of grading or work outside the Zone Limits necessary to complete the project shall be included.

3.4 BARRICADE

Erect temporary barricade as required and/or as shown on the plans, to prevent people from entering into project area to the extent as approved by the Engineer. Such barricade shall not be less than 6'-0" in height. The extent of barricade may be adjusted as necessary with the approval of the Engineer. This work shall be accomplished at no extra cost to the Owner.

3.5 CLEAN-UP

Debris and rubbish shall be removed from the site daily. Debris and rubbish shall not be allowed to accumulate in the building or on site. Debris shall be removed and transported in a manner that will prevent spillage on streets or adjacent areas.

END OF SECTION

SECTION 02100 - CLEARING

PART 1 - GENERAL

1.1 GENERAL REQUIREMENTS

A. Furnish materials, labor and equipment necessary to clear and grub the entire construction area within the limit of grading, to accumulate and dispose of all debris and waste materials, to lay out the entire work, as shown on the drawings and as specified herein.

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

C. Obvious conditions which exist on the site shall be accepted as part of the work, even though they may not be clearly indicated on the drawings and/or described herein, or may vary therefrom.

D. All debris of any kind accumulated from the work of this section shall be disposed of from the site.

E. Burning on site will not be permitted.

F. All aboveground vegetation, rubbish, existing abandoned structures, stockpiles of organics and construction debris and other deleterious materials should be removed and wasted off-site.

1.2 STANDARDS

Except as modified herein, all earthwork shall meet the requirements of Chapter 20.08 of the Maui County code and Section 10 of the Standard Specifications for Public Works Construction dated September 1986 and Subsurface Investigation Report by Geolabs, Inc. entitled "Geotechnical Engineering Exploration Central Maui Regional Park", Wailuku, Hawaii dated October 1, 2013.

PART 2 - PRODUCTS

2.1 MATERIALS

Weed Killer:

Trade Name	Manufacturer
RAD-E-Cate 25	Vineland Chemical Co., Vineland, New Jersey
Weed-B-Gon	Chevron Chemical Co., Ortho Division Richmond, California
Amitrol - 7	Amchem Products, Inc., Fremont, California

PART 3 – EXECUTION

3.1 CLEARING AND GRUBBING

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

B. Within the limit of grading indicated on the drawings, grub the entire ground surface of all weeds and plants to a depth of 12 inches. For excavated areas, treat all roots remaining in the soil with weed killer applied in full strength and in accordance with the manufacturer's instructions. All debris accumulated from this operation shall be completely removed from the premises by the Contractor. 12-inches of unsuitable material shall be accounted for within the Contractor's price for clearing and grubbing. No additional cost will be given to the Contractor for material required to replace unsuitable material with suitable material for construction.

C. Soft and yielding areas encountered during clearing and grubbing work should be over-excavated to expose firm natural material, and the resulting excavation should be backfilled with well-compacted engineered fill. The excavated soil may be used as fill, provided that it meets the requirements for fill material.

D. No excavation or filling shall be undertaken until area has been cleared and grubbed.

E. The Contractor shall protect from injury and damage all surrounding plants, pavements, buildings, utilities, rock walls, etc., and shall leave all in as good a condition as at present. Any damage to existing improvements shall be repaired or replaced by the Contractor to the satisfaction of the Engineer.

F. The Contractor shall confine his construction operations to the immediate area of work or as directed by the Engineer.

3.2 CLEAN-UP OF PREMISES

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

3.3 VERIFICATION OF EXISTING GRADES

Prior to the start of construction, the Contractor shall hire a Hawaii licensed surveyor to prepare a topographic survey of the project site. The topographic survey shall be provided to the State for verification of existing conditions.

Existing grades, inverts and improvements shall be verified by the Contractor before any clearing and grubbing work is done. Any discrepancy shall be immediately brought to the attention of the Engineer and any changes shall be made in accordance with his instructions. Starting of clearing and grubbing operations shall be construed to mean that the Contractor agrees that the existing grades, inverts and improvements are essentially correct as shown. No extra compensation will be allowed the Contractor if existing grades, inverts and improvements are in error after his verification thereof or if he fails to report the discrepancies before proceeding with the work.

END OF SECTION

SECTION 02200 - EXCAVATION, TRENCHING AND BACKFILLING

PART 1 - GENERAL

1.1 GENERAL REQUIREMENTS

A. Furnish all materials, labor and equipment required to accomplish all excavation, filling, grading, and excavating and backfilling for utilities as indicated on the drawings and specified herein.

B. During excavation, if any archaeological significant items, such as artifacts, shell, bone, or charcoal deposits are found, stop work and notify the Engineer. The Owner shall pay for any investigation.

C. Contractor shall comply with the requirements of the Action Plan dated prepared by Element Environmental.

D. Permits, Notice, Etc.:

1. The Contractor shall procure and pay for all necessary permits or certificates that may be required in connection with this work.

2. The Contractor shall serve proper notices and consult with the Engineer regarding any temporary disconnections of electrical or other utility lines in the area which may interfere with the removal work, and all such lines where necessary shall be properly disconnected before commencing with the work.

E. Protection: Throughout the work, protection shall be provided for all roads, etc., along the excavation. Safe working conditions shall be maintained at all times for all personnel, and temporary lights and barricades shall be provided and maintained.

1.2 REFERENCE SPECIFICATIONS

Except as modified herein, all excavation, trenching and backfilling shall conform to the following specifications.

1. Excavation, Grading, Embankment:

Chapter 20.08 of the Maui County code and the following sections of the Standard Specifications for Public Works Construction dated September 1986:

Section 11 ..... Trench Excavation and Backfill
Section 12 ..... Roadway Excavation
Section 13 ..... Structure Excavation and Backfill
Section 15 ..... Crushed Rock
Section 16 ..... Borrow
Section 17 ..... Embankment
Section 38 ..... Restoring Pavements and Other Improvements

2. Trench Excavation and Backfill:

Standard Specifications for Public Works Construction, September 1986.

1.3 APPLICABLE PUBLICATIONS

The following publications listed below form a part of this specification to the extent referenced. The publications are referred to in the text by the basic designation only. Copies of the soil reports and addendums are available for review at the Engineer's office.

1. Subsurface Investigation Report by Geolabs, Inc. entitled "Geotechnical Engineering Exploration Central Maui Regional Park", Wailuku, Hawaii dated October 1, 2013.

American Society for Testing and Materials (ASTM) Publications

D1557-78 Moisture-Density Relations of Soils and Soil-Aggregate Mixtures Using 10-lb (4.54-kg) Rammer and 18-in. (457mm) Drop

1.4 DEGREE OF COMPACTION

Degree of compaction is a percentage of the maximum density obtained by the test procedure presented in ASTM D 1557, Method D, abbreviated hereinafter as a percent of laboratory maximum density.

1.5 OPTIMUM MOISTURE

Optimum moisture is the water content (percentage by weight) corresponding to the maximum dry density.

PART 2 - PRODUCTS

2.1 PIPE TRENCH BACKFILL MATERIALS

A. Pipe cushion shall consist of 3B Fine gravel (ASTM C33, No. 67 gradation) from 6 inches below the pipe to 12 inches above the pipe.

B. Onsite granular soils less than 3-inch in size to the top of the subgrade or finish grade.

PART 3 - EXECUTION

3.1 EXCAVATION

A. All excavation of every description and of whatever substances encountered shall be performed to the depths indicated or as otherwise specified. During excavation, material suitable for backfilling shall be piled in an orderly manner a sufficient distance from the banks of the trench to avoid overloading and to prevent slides or cave-ins. All excavated materials not required or suitable for backfill shall be removed and wasted as indicated or as directed. Grading shall be done as may be necessary to prevent surface water from flowing into trenches or other excavations, and any water accumulating therein shall be removed by pumping or by other approved methods. Unless otherwise indicated, excavation shall be by open cut.

B. Soft and yielding areas encountered should be overexcavated to expose firm natural material and the resulting excavation should be backfilled with well-compacted engineered fill.

C. Adequate shoring and bracing should be provided by the Contractor in accordance with DOSH and other governmental regulations for the utility trenches and other similar deep excavations.

D. Trench Excavation: Trenches shall be of the necessary width for proper laying of pipes and ducts. The banks of trenches shall be as nearly vertical as practicable. Care shall be taken not to over-excavate. The bottom of the trenches shall be accurately graded to provide uniform bearing and support for each section of the ducts on undisturbed soil at every point along its entire length. Stones shall be removed as necessary to avoid point bearing. The rock shall be excavated to a minimum overdepth of 6 inches below the trench depths indicated or specified. Overdepths shall be backfilled with materials specified for backfilling the lower portion of trenches. Whenever wet or otherwise unstable material that is incapable of properly supporting the pipe, as determined by the Engineer, is encountered in the bottom of the trench, such material shall be removed to the depth required and the trench backfilled to the proper grade with structural fill material. Structural fill materials shall be moisture conditioned to about 2 percent above the optimum moisture, placed in level lifts not exceeding 8 inches in loose thickness, and compacted to minimum of 90 percent relative compaction. 95% compaction is needed for the upper 3 feet under the paved areas.

E. Excavation for Appurtenances: Excavation for structures and appurtenances shall be sufficient to leave at least 12 inches in the clear between the outer surfaces and the embankment or timber that may be used to hold and protect the banks. Any overdepth excavation below such appurtenances that has not been directed by the Engineer will be considered unauthorized and shall be refilled with sand, gravel, or concrete, as directed, at no additional cost to the Owner.

F. Construction materials and excavated materials shall be covered during high winds to mitigate dust problem.

3.2 PROTECTIVE MEASURES

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

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

C. All excavations shall be kept free from standing water. The Contractor shall pump and drain as necessary to remove water to the extent required in carrying on work. Grading shall be controlled so that the ground surface is properly sloped to prevent water runoff into structural foundation, open trenching excavations and adjacent buildings.

D. The Contractor shall conduct operations with minimum interference to traffic. The Contractor shall confine all work equipment, materials and personnel as much as possible to the work area as indicated, so as not to interfere with the normal function of the adjacent roadway. The Contractor shall schedule all work that involves excessive noise, dust, dirt, or any other detrimental aspect of this work in order that there will be minimum disruption in normal roadway functions.

E. When necessary and when directed by the Engineer, the Contractor shall provide and erect barriers, etc., with special attention to protection of personnel.

F. Existing utilities are shown on the drawings in approximate locations for the convenience of the Contractor. The fact that any utility is not shown on the drawings shall not relieve the Contractor of his responsibility under this section. It shall be the Contractor's responsibility to ascertain the location of all existing utilities which may be subject to damage by reason of his operations.

The Contractor shall:

1. Support and protect all utilities during construction;

2. Notify the Engineer immediately of any damage to existing utilities caused by construction under this Contract; and

3. Reconstruct, at his expense, damaged portions of the utility system in accordance with the requirements and specifications of the Owner.

3.3 LAYING OUT

A. The laying out of base lines, establishment of grades and staking out the entire work shall be done by a surveyor (licensed in the State of Hawaii) at the expense of the Contractor and he shall be solely responsible for their accuracy. The Contractor shall erect and maintain substantial batter boards showing construction lines and levels.

B. Should any discrepancies be discovered in the dimensions given on the drawings, the Contractor shall immediately notify the Engineer before proceeding any further with the work; otherwise he will be held responsible for any costs involved in correction of construction placed due to such discrepancies.

3.4 BACKFILLING

The trenches shall not be backfilled until approved by the utility company or the Engineer. Where, in the opinion of the Engineer, damage is likely to result from withdrawing sheeting, the sheeting shall be cut one foot below top of trench and left in place and the contract price will be adjusted accordingly.

Except as otherwise specified for special conditions of overdepths, trenches shall be backfilled to the ground surface with selected excavated material or other material that is suitable for the specified compaction and as hereinafter specified. Trenches improperly backfilled shall be reopened to the depth required for proper compaction, then refilled and compacted as specified, or the condition shall be otherwise corrected as permitted by the Engineer. In areas to be paved, the upper 2 feet of the trench backfill shall be compacted to not less than 95 percent relative compaction.

The surface shall be restored to its original condition as near as practicable and as hereinafter specified. Pavement and base course disturbed by trenching operations shall be replaced in an acceptable manner with materials equal to the adjacent base course and pavement for a minimum distance of 6 inches on each side of the trench.

3.5 FILL TESTING

All fill shall be tested by an independent testing agency and all test results submitted to the Engineer for approval. All costs of testing shall be borne by the Contractor. Testing shall be made throughout the area for each 6-inch compacted layer at locations determined by the Engineer. All test results must be approved before the Contractor can proceed with placing of topsoil, or base course.

END OF SECTION

SECTION 02210 - GRADING AND EARTHWORK

PART 1 - GENERAL

1.1 APPLICABLE PUBLICATIONS

The following publications listed below form a part of this specification to the extent referenced. The publications are referred to in the text by the basic designation only. Copies of the soil reports and addendums are available for review at R.M. Towill Corporation's office, Phone No. (808) 842-1133.

1. Subsurface Investigation Report by Geolabs, Inc. entitled "Geotechnical Engineering Exploration Central Maui Regional Park" Waikapu, Maui, Hawaii dated October 1, 2013.

American Society for Testing and Materials (ASTM) Publications

D1557-78 Moisture-Density Relations of Soils and Soil-Aggregate Mixtures Using 10-lb (4.54-kg) Rammer and 18-in. (457mm) Drop

1.2 DEGREE OF COMPACTION

Degree of compaction is a percentage of the maximum density obtained by the test procedure presented in ASTM D 1557, Method D, abbreviated hereinafter as a percent of laboratory maximum density.

1.3 OPTIMUM MOISTURE

Optimum moisture is the water content (percentage by weight) corresponding to the maximum dry density.

1.4 FIELD TESTING CONTROL

Testing shall be the responsibility of the Contractor and shall be performed by an approved commercial testing laboratory or by the Contractor subject to approval. Field density and moisture content tests shall be performed on every 10,000 square feet of each 6-inch compacted lift placed. Density tests shall be performed in accordance with ASTM D1557.

1.5 GRADING WORK

All grading work shall be done in accordance with Chapter 20.08 of the Maui County code and soils report, as amended and as specified herein.

PART 2 - PRODUCTS

2.1 ONSITE FILL MATERIAL

Onsite fill material shall be defined as onsite soil less than 3-inches in size that is not contaminated with organic matter; or contaminated with other deleterious materials.

2.2 TOPSOIL

Natural, fertile, friable soil free from stones, noxious seeds, weeds (especially nut grass), roots, subsoil or other material detrimental to normal plant growth obtained from on-site excavations and suitable for topsoil. Material required for topsoil in excess of that produced by on-site excavation shall be imported.

PART 3 - EXECUTION

3.1 SITE PREPARATION

A. Prior to the start of actual grading operations, the site should be cleared in accordance with Section 02100 - CLEARING.

B. Areas to receive fill which are steeper than 5H:1V shall be benched with a series of horizontal terraces prior to fill placement. A keyway shall be excavated into the in-situ material at the toe of the fill. The key shall be a minimum of 2 feet deep at the toe of the fill and a minimum of 8 feet wide extending back under the toe of the fill. To bond the fill into the existing slope, the floor of the key should be sloped back under the base of the fill at approximately 10H:1V.

C. To bond the mass of the fill into the existing ground as fill placement progresses up the existing slope, benches shall be cut into the existing slope. These benches should be a minimum of 3 feet in height and approximately 10 feet wide.

D. Prior to placement of fill, proof-roll the keys and benches with a vibratory sheepsfoot compactor or similar heavy equipment for a minimum of 6 passes. Yielding areas, loose areas, or cavities discovered during clearing and proof-rolling operations shall be backfilled with compacted fill materials.

3.2 SITE GRADING

A. Once the site has been properly prepared, grading operations may begin to generate the finished grades.

B. Fill and backfill using onsite soils should be placed in maximum loose lifts of 8 inches in thickness, moisture conditioned to 2 percent above the optimum moisture and uniformly compacted to 90 percent relative compaction as determined by ASTM D1557. Compaction should be accomplished by sheepsfoot rollers, vibratory rollers, or other types of acceptable compaction equipment. Fill placed within 2 feet of the road and parking lot subgrades should be compacted to at least 95 percent relative compaction in accordance with ASTM D1557.

C. Fill slopes may be constructed as steep as 2H:1V. Fills shall be keyed and benched into the existing slope. Filling operations shall start at the lowest point and continue up in level horizontal compacted layers. Fill slopes shall be constructed by overfilling and cutting back to the design slope. If a slope is over-cut, keying and benching shall be implemented.

D. Subgrade for concrete walkways and slabs on grade should be scarified to a depth of at least 8 inches, moisture-conditioned to at least 2 percent above the optimum moisture, and compacted to not less than 90 percent relative compaction. Areas adjacent to walkway slabs should be backfilled tightly against the edges of the slabs with low expansion, relatively impervious soils.

3.3 FINISHED EXCAVATION, FILLS, AND EMBANKMENTS

A. All areas covered by the project, including excavated and filled sections and adjacent transition areas, shall be uniformly smooth-graded. The finished surface shall be reasonably smooth, compacted, and free from irregular surface changes. The degree of finish shall be that ordinarily obtainable from blade-grader operations, except as otherwise specified. Swales shall be finished to permit adequate drainage. The surface of areas to be turfed shall be finished to a smoothness suitable for the application of turfing materials.

B. The finish grade in areas to be landscaped shall be reduced by 6-inches to accommodate the topsoil layer. The surface of embankments or excavated areas for road construction or other

areas on which a base course or pavement is to be placed shall vary not more than 0.05 foot from the established grade and approved cross section. Surfaces other than those that are to be paved shall be finished not more than 0.04 foot above or below the established grade or approved cross section.

3.4 FOUNDATIONS

A. Remove uncompacted fill material and replace with low expansion imported fill material.

B. Footings on slopes or within 5 feet of the top of slopes shall be embedded such that there is a minimum of 6 feet of horizontal set back between the lower, outside edge of the foundation and the compacted slope face.

Footings shall be founded on the very stiff to hard residual soils, properly compacted fill, or the moderately weathered basalt.

C. Any soft spots encountered in the foundation excavations shall be removed down to very stiff to hard natural ground or compacted fill, and the resulting depression backfilled in accordance with this section. Soil filled holes or cavities encountered in the moderately weathered basalt, should be cleaned out and backfilled with concrete.

D. Boulders encountered in the foundation or building pad subgrade excavations shall be removed from beneath the footings and the resulting depression backfilled in accordance with this section. Boulders and intact basalt which are too large to remove shall be broken out in-place to a depth of at least 8 inches below the bottom of the foundation bearing level, and a sufficient depth below the bottom of the concrete slab to allow the placement of the slab cushion. The resulting over-excavation should be backfilled in accordance with applicable sections noted herein.

3.5 PLACING TOPSOIL

Topsoil shall be spread evenly to a thickness of 4 inches and graded to the elevations and slopes shown. Topsoil shall not be spread when excessively wet or dry.

3.6 PROTECTION

Newly graded areas shall be protected from traffic and from erosion. Any settlement or washing away that may occur from any cause, prior to acceptance, shall be repaired and grades reestablished to the required elevations and slopes. All work shall be conducted in accordance with the environmental protection requirements of the contract.

END OF SECTION

SECTION 02232 - AGGREGATE BASE COURSE

PART 1 - GENERAL

1.1 SUMMARY

This work shall consist of furnishing, spreading and compacting aggregate base course on the prepared subgrade (Section 02210 – Grading and Earthwork), or on existing improved surfaces in accordance with the requirements of these specifications.

1.2 STANDARD CODES AND SPECIFICATIONS

The "Standard Details for Public Works Construction" September 1984 and the "Standard Specifications for Public Works Construction," September 1986, of the Department of Public Works, except as amended in the drawings and specifications herewith, shall govern work covered under this section.

1.3 SUBMITTALS

A. Before installation, submit to the Engineer, affidavits from the manufacturers or suppliers of the aggregate base course proposed to be furnished and installed under this section certifying that such materials delivered to the project conform to the requirements of these specifications.

PART 2 - PRODUCTS

2.1 MATERIALS

A. Asbestos Prohibition: No asbestos containing materials or equipment shall be used under this section. The Contractor shall ensure that all materials and equipment incorporated in the project are asbestos-free.

B. The aggregate base course shall consist of crushed basalt aggregates. Base course consisting of crushed coral aggregates will not be accepted.

C. Materials shall be in accordance with Sections 31 and 32 of the referenced Standard Specifications, except as amended in the drawings and specifications herewith.

PART 3 - EXECUTION

3.1 FOUNDATION PREPARATION

The new compacted subgrade upon which the aggregate base is to be placed shall be prepared as specified under Section 02210 – Grading and Earthwork of these specifications.

3.2 PLACING AND COMPACTING

A. Spreading: The base material shall be delivered to the site and spread on the approved prepared foundation by means of vehicles equipped with spreading devices. The material

when spread shall be uniform in gradation and free from large pockets of segregated particles. Segregated material shall be remixed until uniform.

B. Material shall not be stockpiled nor dumped in piles but shall be spread longitudinally and only in such quantity to obtain the required thickness. After watering and compacting, the completed base shall conform to the required grade and cross section within the tolerances specified herein below.

C. Lift Thickness: When the specified thickness of the base is 6 inches, the base shall be constructed in one lift. When the specified thickness is greater than 6 inches, the base shall be constructed in two or more equal lifts. The maximum thickness of each lift shall not exceed 6 inches.

D. Compacting: The base course shall be compacted until it does not creep or weave in front of the roller or compacting vehicle. When tested, the base course shall have a minimum density of 95% of its maximum dry density.

E. Filler Material: Wherever necessary, filler material shall be added to the surface. It shall be spread in one or more uniform thin layers. Each layer shall be rolled dry until additional filler cannot be forced into the voids. The surface shall then be sprinkled with water and again thoroughly rolled. All excess filler shall be removed. The sprinkling and rolling shall be continued to secure a thoroughly bonded surface.

F. Multiple Lifts: Where the aggregate base course is constructed in more than one layer, each layer shall be constructed as specified above except that sprinkling will be required only in the top layer. Each layer shall be compacted to a minimum of 95% of its maximum dry density.

3.3 ROLLING

A. Shaping: After spreading and blading, the aggregate base course shall be rolled lightly to obtain initial compaction to bring out any irregularities. The surface of the base shall then be carefully shaped and all high and low spots eliminated. When smooth and true, the material shall be rolled until it does not creep or move under the weight of the roller.

B. Rolling Direction: All rolling shall be longitudinal and shall commence at the outer edges. Rolling shall progress from each site toward the center of the road with an overlap of at least one-half of the rear wheel tracks on successive trips. Under no circumstances shall the center of the road be rolled first.

3.4 TOLERANCES

A. The finished surface shall be checked for accuracy with a 10-foot straightedge. If the surface at any point varies more than 1/4 inch from the lower edge of the straight-edge laid in any direction, it shall again be shaped and re-rolled. This process shall be repeated until the surface meets the required tolerance.

B. The finished subgrade upon which the final wearing surface is placed shall not vary more than 0.05 foot above or below the theoretical grade.

END OF SECTION

SECTION 02270 - TEMPORARY SOIL EROSION CONTROL

PART 1 - GENERAL

1.1 WORK INCLUDED: Furnish all labor, materials, services, equipment and related items necessary to implement the temporary erosion control measures as shown on the drawings, as required by these specifications and as ordered by the Engineer during the life of the contract to control water pollution though the use of berms, dikes, dams, sediment basins, fiber mats, netting, gravel, mulches, grasses, slope drains, and other erosion devices of methods.

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

B. The Contractor shall be responsible for providing the necessary erosion control measures which are shown on the plans or which may be ordered by the Engineer. All grading operations shall be performed in conformance with the applicable provisions of the "Water Pollution Control and Water Quality Standards" contained in the "Public Health Regulations," Owner Department of Health.

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

1.2 RELATED WORK IN OTHER SECTIONS

Grading and Earthwork - Section 02210

PART 2 - PRODUCTS

2.1 MATERIALS

A. Mulches: To be bagasse, hay, stray, fiber mats, netting, wood cellulose, bark, wood chips, or other suitable material acceptable to the Engineer and shall be reasonably clean and free of noxious weeds and deleterious materials.

B. Slope Drains: To be constructed of pipe, fiber mats, rubble, Portland cement concrete, bituminous concrete, plastic sheets, or other materials acceptable to the Engineer.

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

D. Fertilizer and Soil Conditioners: To be a standard commercial grade acceptable to the Engineer.

PART 3 - EXECUTION

3.1 INSTALLATION

TEMPORARY EROSION CONTROL

A. The Engineer has the authority to limit the surface area exposed by clearing and grubbing and to limit the surface area exposed by excavation, borrow and fill operations. The Engineer may also direct the Contractor to provide immediate, permanent, or temporary pollution control measures to prevent contamination of streams, lakes, ponds, drainage channels and pipes, roads, neighboring lands, and other areas.

Except for specified measures which may be shown on the plans the Contractor shall determine the appropriate erosion control measures to use. Such work may involve the construction of temporary berms, dikes, dams, sediment basins, and slope drains, and the use of temporary mulches, mats, and grassing, or the construction and use of other control devices or methods as necessary to control erosion.

B. The Contractor shall incorporate all erosion control measures shown in the plans. The plans may be modified as necessary to adjust to conditions that develop during construction.

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

The grubbing of the vegetative root mat and stumps and the stripping of topsoil shall be confined within the limits of grading which can be actively and continuously prosecuted within 15 calendar days. The area to be graded shall be limited to the minimum area necessary to accommodate the Contractor's equipment and work force and shall not at any time exceed 15 acres without prior approval of the Engineer.

Any area remaining bared or cleared for more than 10 calendar days and which is not within the limits of active construction shall be immediately hydro-mulch seeded or remedied as directed by the Engineer at the Contractor's expense without cost to the State. All areas where finish grading has been completed shall be grassed within 3 calendar days after the completion of grading for that area.

The maintenance of these grassed areas shall include the following:

1. Grass germination in all areas specified with 80% coverage required by the end of the maintenance period. Any area of one foot square or more in which grass has failed to grow after 30 days of maintenance shall be regrassed.
2. All germinated areas shall be healthy and living at the end of maintenance period.
3. Weeds shall not exceed an area greater than 10 percent in any grass area.
4. All depressions and erosion fills shall be filled to proper grade and area regrassed as required.

5. Contractor shall provide temporary irrigation to maintain all grassed areas until the landscape maintenance period have ended or until Engineer have accepted the work.

Acceptance of the ground cover planting after the maintenance period shall be contingent upon an 80 percent coverage.

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

E. Cut slopes shall be shaped, topsoil added if necessary, and planted as the work progresses. In no case shall the exposed surface be greater than 15 feet in height. Whenever major excavation is suspended or halted and the slope is bared for more than 15 consecutive days, the exposed surfaces shall be hydro-mulch seeded or protected as directed by the Engineer at the Contractor's expense without cost to the State.

Fill slopes shall be finished as specified and in accordance with the requirements outlined for cut slopes above.

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

G. The temporary erosion and siltation control measures outlined in these specifications are minimum requirements and shall not preclude the provision of any additional measures which the Contractor may deem necessary. Damages caused by the erosion of soils and the pollution of downstream areas shall be the responsibility of the Contractor and all costs for repairing, correcting, replacing, and cleaning damaged or polluted facilities shall be borne by the Contractor.

END OF SECTION

SECTION 02281

SOIL TREATMENT FOR TERMITE CONTROL

PART 1 – GENERAL

1.1 SUMMARY

A. Soil shall be treated against subterranean termites by a pest control operator licensed by the Hawaii State Pest Control Board in Branch #3 and certified as a commercial applicator under the Hawaii Pesticide Law by the Hawaii State Department of Agriculture in category 7b.

B. The Contractor shall notify the State at least one day before application of chemicals.

C. A totalizing meter shall be provided to determine application rates and to indicate the total volume of pesticide applied in U.S. gallons. The meter shall be no more than five feet from the applicator at all times.

D. Pumping equipment shall be type normally used and be capable of pumping the working solution in a manner accepted and practiced by the pest control industry.

E. Provide soil treatment in ground under new structures, walkways, etc.

1.2 SUBMITTALS

A. The Contractor shall submit to the State for approval copies of the label for the chemical he proposes to use.

B. Submit manufacturer's technical data for each product indicated including recommendations for their application and use. Include test reports and certifications substantiating that products comply with requirements.

C. Submit most current copy of Hawaii State Product Report for each product to be used with EPA registration numbers.

1.3 GUARANTEE

A. The Contractor shall furnish a written warranty in 3 copies to the State stating that:
   1. The chemical concentration, rates and method of application complied with these specifications;
   2. The effectiveness of the treatment is guaranteed for a period of not less than two (2) years from the date of final application of the treatment;

3. All necessary repairs of damages resulting from subterranean termite infestation within a period of one (1) year from the date of project acceptance will be made at the Contractor's own expense.

4. If subterranean termite infestation should occur through the treated area within the two (2) year guarantee period, the soil shall be retreated to exterminate all infestation without cost to the State. The application rate shall be as given by the label of the chemical being used. All corrective treatments shall be performed to at least 10 feet around each visible subterranean termite activity.
   a. Working pressure while applying treating solution shall be held to that which is applicable to and safe under the conditions at the site being treated.
   b. Drill one hole per block along one course above adjacent grade of hollow tile walls which extend below grade, and treat at a rate consistent with the pesticide label.
   c. Drill and treat through all interior concrete floors, along both side s of all partitions and walls, and all cracks and expansion joints according to label directions. Drill holes through concrete slab shall be ½" or 9/16" dia. and spaced not more than 18 inches apart.
   d. Drill one hole at each plumbing or utility penetration through ground floor slab and treat according to label instructions.
   e. Patch drill holes with cement/concrete to full depth of slab thickness and refinish walls/floors as necessary to prevent any backflow and to restore original appearance.
   f. Replace any finish/finish materials which are contaminated by spilled chemicals.
5. The above-ground areas infested with subterranean termites shall be treated as appropriate with a proven, effective insecticide to eliminate those termites.

PART 2 – PRODUCTS

2.1 MATERIALS

A. Products shall be aqueous solutions of Type I repellant termiticides and shall be used in accordance with the labels and provisions related to the use of those pesticides as adopted by all County of Maui, State of Hawaii and Federal laws and regulations. Products shall be licensed and registered in the State of Hawaii.

B. Type II non-repellant termitcides such as Dursban TC shall not be used.

PART 3 – EXECUTION

3.1 APPLICATION AND RATES

A. Use of products shall be in accordance to the instructions on the labels of the products. Treatment shall be applied to only areas allowed according to the product labels.

B. Whenever possible, the solution shall be applied not more than 24 hours before the pouring of concrete over the affected area.
   1. Where a treated area that is not scheduled to be covered with a moisture barrier in the finished construction (e.g. lanai area) cannot be covered with a poured concrete slab the same day, the area shall be protected with a waterproof covering such as polyethylene sheeting.

C. The solution under slabs shall be applied after backfill has been completed and rough plumbing and other utility lines have been installed and just prior to the placement of the moisture barrier. The treatment shall be applied to dry material whenever possible, but in any case shall not be applied under conditions during which the soil does not readily absorb the solution.

D. The solution shall be applied uniformly and at the rates indicated on the label for the chemical being used. This shall include treatment to provide vertical barriers as stated on the product label.

END OF SECTION

SECTION 02282 - SOIL TREATMENT FOR VEGETATION CONTROL

PART 1 - GENERAL

1.1 SUMMARY

This work shall consist of spraying weed killer on the prepared pavement subgrade prior to the installation of the base course and where called for on plans.

1.2 SUBMITTALS

A. Before installation, submit to the Engineer, affidavits from the manufacturers or suppliers of the aggregate base course proposed to be furnished and installed under this section certifying that such materials delivered to the project conform to the requirements of these specifications.

PART 2 - PRODUCTS

2.1 MATERIALS

A. Asbestos Prohibition: No asbestos containing materials or equipment shall be used under this section. The Contractor shall ensure that all materials incorporated in the project are asbestos-free.

B. Weed Killer shall be "Casoron 4G", "Norosac 4G", or an approved equal for under asphalt application on new or rebuilt pavement, and shall be "Hyvar X", "Roundup" or approved equal for application to existing weeds for resurfacing jobs.

PART 3 - EXECUTION

3.1 APPLICATION

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

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

C. The Contractor shall notify the Contracting Officer 24 hours before application of weed killer.

END OF SECTION

SECTION 02450 – WALKWAYS

PART 1 - GENERAL

1.1 WORK INCLUDED: Furnish all labor, materials and equipment and related items necessary to complete, in place, concrete sidewalks and walkways, in conformity with the dimensions and details shown on the drawings.

PART 2 - PRODUCTS

2.1 MATERIALS: Materials shall be in accordance with of the "Hawaii Standard Specifications for Road and Bridge Construction," dated 2006; and the State of Hawaii, Department of Transportation, "Standard Plans," dated 2008, except as amended on the drawings and/or in the specifications herewith.

PART 3 - EXECUTION

3.1 INSTALLATION: Installation of walkways shall be in accordance with Section 634 Portland Cement Concrete Sidewalks of the "Hawaii Standard Specifications for Road and Bridge Construction," dated 2006; and the State of Hawaii, Department of Transportation, "Standard Plans," dated 2008, except as amended on the drawings and/or in the specifications herewith.

END OF SECTION

SECTION 02720 - SEWER SYSTEM

PART 1 - GENERAL

1.1 SUMMARY

Furnish all labor, materials, equipment and tools to construct the exterior sewer system as indicated on the drawings and herein specified.

1.2 SUBMITTALS

A. Before installation, submit to the Engineer, shop drawings, affidavits from the manufacturers or suppliers of the pipe materials proposed to be furnished and installed under this section certifying that such materials delivered to the project conform to the requirements of these specifications.

PART 2 - PRODUCTS

2.1 MATERIALS

A. Asbestos Prohibition: No asbestos containing materials or equipment shall be used under this section. The Contractor shall ensure that all materials and equipment incorporated in the project are asbestos-free.

B. Materials for exterior sewer system shall be constructed in accordance with the following publications. The Standard Specifications for Public Works Construction, dated September 1986, and Standard Details for Public Works, dated September 1984, as revised, except as amended in the plans and/or specifications. (Paragraphs concerning Measurements and Payments in the sections are not applicable to this project).

1. PVC Sewer Pipe and Appurtenances ..... Section 21

2. Connection to Existing Sewer and Connecting Cesspool in Direct Line of Sewer..... Section 22

3. Sewer Manholes..... Section 23

PART 3 - EXECUTION

3.1 INSTALLATION

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

B. In performing all work, the Contractor shall exercise due care and caution necessary to avoid any damage to and impairment in the use of any existing utility lines. Any damage

inflicted on existing lines resulting from the Contractor's operations shall be immediately repaired and restored as directed by the Engineer at the Contractor's expense.

END OF SECTION

SECTION 02810 - IRRIGATION SYSTEM

PART 1 – GENERAL

1.1 DESCRIPTION OF WORK

A. All the applicable requirements of the General Requirements and Covenants and the General Conditions apply to the Work of this Section.

B. Work Included: Provide complete landscape irrigation system including, but not limited to, the following:

1. Removal of existing system found above grade.
2. Excavation and backfilling with S4C or suitable bedding
3. Pipe, conduits, sleeves, fittings, and sprinkler heads.
4. Valves, valve boxes, splice boxes.
5. Automatic controllers, remote control valves, and control wire.
6. Restoration of landscape disturbed as a result of the work.

C. If due to changes in the location of the structures, hardscape and/or other changes after the original design of the house lot, these performance specifications shall apply to any alternations as needed.

1.2 CODES AND STANDARDS

A. Perform work in accordance with all applicable laws, codes, and regulations required by authorities having jurisdiction over such work. Nothing in these Drawings or Specifications is to be construed as permitting work not conforming to these codes.

B. When the Specifications call for materials or construction of a better quality or larger size than required by the aforementioned rules and regulations, the Specifications take precedence over the requirements of the said rules and regulations.

1.3 SUBMITTALS

A. Materials List:

1. Submit a complete list of materials proposed for installation.

2. List all materials by manufacturer's name and model number.

3. Attach copies of supportive data in the form of catalog sheets, manufacturer's specifications, or brochures.

   Once the Materials List has been accepted, items other than those listed will not be allowed, unless otherwise directed by written approval from the Landscape Architect.

4. The client is very specific on the products they want and no substitutions will be allowed unless a product is no longer available and only with the approval of the landscape architect, irrigation consultant and Owner.

B. Construction Schedule: At the pre-construction meeting, provide a written copy of the projected construction schedule noting the estimated completion date, number of working days required, and any special coordination requirements.

C. Manuals: A minimum of Forty-eight (48) hours Prior to the final inspection of the irrigation systems, the contractor shall furnish to the landscape architect 3 individually bound Service Manuals in 3-ring, hard cover type binders containing the following items. If found acceptable by the Landscape Architect, they will be turned over to the Owner for his use and records. Anything missing shall be provided and approved by the landscape architect prior to the final inspection.

1. Index sheet indicating Contractor's name, address, and telephone number.

2. Copies of equipment and material warranties and certificates.

3. List of equipment and materials with names, addresses and telephone numbers of local manufacturer's representatives.

4. Complete exploded drawings and diagrams.

5. Spare parts lists of equipment, showing components and catalog numbers.

6. Complete operating and maintenance instructions in sufficient detail to permit operating personnel to understand, operate and maintain all equipment.

D. As-Built Drawings:

1. During Construction, the Contractor shall maintain an as-built drawing on a print of the Irrigation Plan(s) showing deviations and changes in the layout with accurately dimensioned locations of mains, points of connection, valves, control wires, electrical boxes, controllers, earth ground electrodes, sprinkler heads, and caps for future connections.

2. Update as-built drawing daily and maintain on the site at all times. Dimension the revised locations from a permanent point of reference (e.g. building, sidewalk, curb, pavement, monuments, etc.) Take dimensions prior to backfill. Indicate all changes in red.

3. Upon completion of the irrigation systems, submit both the marked-up as-built print(s) and a redrafted final plan showing the changes on either a mylar or vellum reproducible sheet(s) to the Landscape Architect for review. When approved by the Landscape Architect, these plans will be turned over to the Owner.

E. Controller Chart: Prepare a map diagram showing the location and identifying all valves, mainlines and control wiring. Identify control valves as to size, station number and type of planting irrigated. Submit a copy of each controller diagram to the Landscape Architect.

1. Provide one chart for each automatic controller installed, showing the zone covered by the controller. Provide maximum size that will fit inside of controller door. Use a reduced drawing of the actual as-built systems for the chart. However, in the event

the controller sequence is not legible when the drawing is reduced, enlarge it to a size that will be readable.

2. Use a blackline print for chart and a different color to show area of coverage for each valve circuit. When completed and approved, hermetically seal the chart between 2 pieces of minimum 10 mil thick clear plastic. Chart must be completed and approved prior to final inspection of the irrigation systems.

F. Certificates of Warranty: Provide all certificates of warranty from the irrigation equipment manufacturers to the Landscape Architect prior to the final inspection. When approved by the Landscape Architect, they will be provided to the Owner.

1.4 QUALITY ASSURANCE

A. Supervision Certification: The Contractor shall provide a document or resume including at least the following items to the landscape architect for his approval;

1. The Supervisor has been installing irrigation systems on commercial projects for five (5) previous consecutive years.

2. The Supervisor shall be a current Certified Irrigation Contractor in good standing as set forth by the Irrigation Association (IA), American Landscape Contractors Association (ALCA), Landscape Industry Council of Hawaii (LICH) or other similar organization.

3. Submit evidence that all workers engaged in handling, assembling and solvent welding PVC pipe shall carry on a Project Site a Certificate of Training from IPS, PW Pipe, ALCA, LICH or approved equal Factory representative authorizing said worker to prime and solvent weld PVC Pipe.

4. Submit evidence that all workers engaged in the handling and installation of buried power wires, remote control valve wires, wire connections, controllers and grounding equipment or communication wiring shall carry on Project site a Certificate of Training from Paige or approved equal factory representative authorizing said worker to install wire, wire connectors or grounding equipment.

B. During the progress of the work, maintain a competent certified superintendent and any assistants necessary on site, all satisfactory to both the Landscape Architect and Owner.

C. Do not change this superintendent, except with the consent of the Landscape Architect, unless he proves unsatisfactory and ceases to be employed. All directions given to or by the Superintendent are binding to the Contractor.

D. The Contractor shall provide potable water on site for workers to both drink and washing hands and face. Where bottled water is provided, the water shall be in separate boldly labeled, contamination-proof containers protected from reclaimed water and dust.

1.5 PRODUCT DELIVERY, STORAGE, AND HANDLING

A. Deliver materials in timely manner to ensure uninterrupted progress of the work. Store in a manner to preclude damage, and permit ready access for inspection and identification of each shipment.

B. Deliver manufactured materials in original containers with brand and maker's names marked thereon. Materials in broken containers or showing evidence of damage will be rejected and must be immediately removed from the site.

C. Store plastic pipe on flat pallets and protect from sunlight.

1.6 VERIFICATION OF LINES AND LEVELS

A. Scaled dimensions are approximate. Before proceeding with any work, carefully check and verify all dimensions on the site. The drawings are diagrammatic in that swing joints, offsets and all fittings are not shown.

B. Space sprinkler heads, stake out, and locate valves as indicated on the Drawings and specified herein. For any deviation from drawings or Specifications, it is desired that the contractor obtain written approval. If prior approval cannot be obtained, the contractor shall follow the guidelines in these specifications and shall be totally responsible to maintain complete coverage within the irrigated areas.

C. Check grades to determine that work may safely proceed, keeping within the specified material depths. The irrigation layout plan is based on horizontal plane dimensions, and therefore measurements taken on the surface of slopes will differ from those indicated.

1.7 JOB CONDITIONS

A. Acceptance of Previous Work: Inspect and accept the condition of the site relative to this work before commencing. If not acceptable, notify the Landscape Architect in writing. By proceeding with the work, the Contractor indicates his acceptance of all previous related work.

B. Meet on Site: Prior to commencing work, meet with the Landscape Architect, the Owner's representative, and other concerned parties on the site to review the work. Request this meeting one week prior to desired meeting time.

C. Underground Utilities and Obstructions: Verify the location of underground utilities and other obstructions that may affect the work. Report any obstructions encountered to the Landscape Architect. Repair all damage to any known utility line or other underground obstruction at Contractor's expense. Report damage to any unknown utilities to the Landscape Architect and Owner immediately.

D. Protection:

1. Comply with all governing safety regulations.

2. Provide necessary safeguards and exercise caution against injury or defacement of existing site improvements. Prevent vehicles of any kind from passing over

sidewalks, curbs, and similar items, unless adequate protection is provided. Do not store materials or equipment, or operate equipment near or under the branches of any existing plants that are to remain, except as actually required for construction in those areas.

3. Be responsible for damages caused by leaks in the piping systems being installed or during the Warranty period due to failure of workmanship or materials. Repair all damage to return the area to the previous condition.

4. Securely cover openings into the system and cover apparatus, equipment and appliances, both before and after being set in place, to prevent breakage, misuse, or disfigurement, and also prevent obstruction of pipes

1.8 COORDINATION

A. Schedule and coordinate the work to facilitate the most expeditious completion of the project in a workmanlike manner.

B. Consult all other relevant Specification sections to determine the extent and character of related work specified elsewhere.

C. Schedule and coordinate required irrigation utility connections with other project trades and utility companies.

D. Obtain information pertaining to location of existing and proposed lines and appurtenances prior to irrigation installation.

E. Verify static pressure at irrigation point of connection prior to any irrigation installation. Report to the Landscape Architect any discrepancies from that listed on the Drawings.

F. Coordinate with appropriate associated trade the placement of pipe, sleeves, and conduit in, through or under structures, walls, and paving.

G. Give at least 72 hours' notice to the Landscape Architect prior to inspections and observations.

1.9 GUARANTEE

A. Guarantee the entire irrigation system for 1 year from the date of final acceptance against defects in materials, equipment and workmanship, including repair of damage to any part of the premises resulting from defects, leaks, or settling of trenches. Promptly repair defects and damage, including the restoration of planting, paving, structures, and other improvements.

B. Manufacturer's warranties will not relieve liability under the guarantee. Such warranties only supplement the guarantee.

C. The Owner reserves the right to make temporary repairs as necessary to keep equipment in operating condition without voiding the Contractor's guarantee or bond.

D. If any changes are made to the plans due to conditions not shown on the plans and/or due to field adjustments by the contractor, the contractor shall guarantee 100% coverage to the satisfaction of the owner, landscape architect, irrigation consultant and client and shall maintain the same efficiency as the overall efficiency of the irrigation system or circuit adjusted.

PART 2 - PRODUCTS

2.1 GENERAL

Materials incorporated in the system shall be new, without flaws or defects and of quality and performance specified. Material overages at the completion of the installation are the property of the Contractor and shall be removed from the site.

2.2 PIPE

A. If Effluent Reuse water is to be used, all piping shall conform to the State of Hawaii, Department of Health's Guidelines for the Treatment and use of Reclaimed Water. All piping shall be Color Index 77742, violet #16, Pantone 512 or equal and shall be embossed or integrally stamped or marked "Caution: Reclaimed Water – Do Not Drink."

B. Pressure Mains: 2" or smaller shall be Sch 40 PVC, ASTM D-1784, Sizes noted on plans. Pipe shall be belled-end, solvent weld. All 2½" or larger Pressure Mains shall be CL 200 PVC ASTM D-1785 with integral Gasketed joint bell ends.

C. Laterals: Sch 40 PVC, ASTM D-1784 3/4" minimum size, with integral solvent weld bell end, ASTM D-2672; solvent weld coupling, ASTM D-2466.

D. Visible Pipe and Fittings:

1. General: Integral gray color for schedule 80, or white for schedule 40 and class pipes.

2. Threaded Risers and Nipples: Schedule 80 PVC.

3. Main line piping 2½" or larger shall utilize Harco or Leemco brand ductile iron fittings for use with PVC Irrigation Main. All main line fittings 2" or smaller shall utilize Schedule 80 PVC, Type 1, solvent weld fittings.

4. All lateral pipe fittings shall utilize Schedule 40 PVC, Type 1, solvent weld fittings.

5. Cement: ASTM D-2564 or as recommended by the manufacturer. Use IPS Weld On 725 for solvent welded fittings on main line piping and ISP Weld-on 705 for lateral pipe and fittings.

6. Flexible Tubing: Toro 850-01, Rain Bird Swing-Pipe, or equal thick wall pipe or equal for flexible swing joints as specified.

7. Polyethylene tubing: 1/4" spaghetti vinyl for multi-outlet emitters.

E. Sleeves: Schedule 40 PVC.

F. Conduit: Schedule 40 PVC UL listed.

2.3 VALVE BOXES

Plastic box with locking lid. Ametek, Brooks, Carson or equal. Rectangular for remote control valves. 10" Round for gate or ball valves, 6" Round for Quick Coupler valves. If effluent reuse water is to be used, all valve box covers shall be Color Index 77742, violet #16, Pantone 512 or equal and shall be embossed or integrally stamped or marked "Caution: Reclaimed Water – Do Not Drink."

2.4 ISOLATION VALVES

A. Gate Valves: American Made, NIBCO T-113, Class 125 Bronze, 200# WOG, Non-Rising Stems, MSS-SP-80 or acceptable equal. 2" or smaller or American Flow Control Series 500 or AVK equal, American made, resilient wedge fully encapsulated, with EPDM Rubber, Stainless Steel stem and bolts, completely epoxy coated inside and out or acceptable equal 2½" or larger.

B. Ball Valves: 150 psi Bronze, 2" or smaller, 600# WOG American Made, full port, NIBCO T-585-70 or acceptable equal, IPS Threaded Ends.

C. All manual valves shall be tagged with a Christy's Valve Identification Tag ID-STD-X2 or equal purple warning Tags identifying the type and size of valve, along with the Warning that the valve controls "Reclaimed Water Do Not Drink."

2.5 SWING JOINTS

LASCO, Spears, Dura, Rain Bird or acceptable equal for 1" or larger, KBI for ¾".

2.6 STAKES

#4 rebar - length as noted, V.I.T. Products, Inc. Model SS24 Sprinkler stabilizers, or PS18 Pipe stabilizers as noted on plans and details.

2.7 CLAMPS

All stainless steel screw clamps, V.I.T. Products, Inc. Model ST-9 or ST-12 Sprinkler ties as noted on plans and details.

2.8 CONTROL WIRE

A. Specifically designed for direct burial use, Type UF with copper conductor, #14 minimum size for control wire and #12 minimum size for common wire.

B. Use yellow jacket for common and different color coded wires (as available) for individual control lines.

C. Size of conductor shall meet all the requirements of the installation instructions of the manufacturer of the valves and controllers.

D. Install three spare wires of a different color extreme end or the piping system from the controller.

2.9 SPRINKLERS

A. Sprinkler heads shall be as indicated on the plans or approved equal. Location of the sprinklers shall be as shown or where otherwise directed by the landscape architect. Sprinkler heads shall be located 6 inches away from sidewalks, walls and paved areas and 12" away from curbs, driveways and roadways. Set all sprinklers to finished grade. All sprinkler heads shall be installed on swing joints unless otherwise noted on the plans or details. If effluent re-use water is to be used, all sprinklers shall have a purple cover labeled "Reclaimed Water – Do not Drink".

B. Shall any sprinkler location need to be adjusted by the contractor due to unanticipated field changes, the contractor shall ensure that full coverage within the system is maintained. The final decision on if the coverage and efficiency is adequate will be determined by the landscape architect, owner and client.

C. All sprinklers located within turf areas shall have a minimum pop-up height of 4".

D. All sprinklers located within ground cover areas shall have a minimum pop-up height of 12". When the plant material is taller than 12 inches, the contractor shall mount the high-pop (12") sprinkler on a riser so when at rest, the sprinkler is 6" below the top of the plant material upon the end of the plant establishment period, and to allow it to pop-up above the plant material when in use. Stake riser and sprinklers per details.

2.10 CONTROLLERS

Controller(s) shall be as indicated on the plans or approved equal. Location of Controllers shall be as shown and shall be installed indoors or within a stainless steel NEMA 3R pedestal mounted top opening enclosure.

2.11 REMOTE CONTROL VALVES

A. Remote Control valves shall be as shown on the plans and shall be pressure regulating.

B. Adjust remote control valve pressure using the pressure regulating module only.

2.12 WIRE CONNECTORS

3-M DBY-6, or acceptable UL listed equal suitable for underground installation in wet conditions.

2.13 THRUST BLOCKS

Minimum two cu. ft. of redi-mix concrete or minimum two cu. ft. of 2,500 psi/28-day concrete for all main line piping 2½" or larger. Size of thrust block shall be based on the type of soil and expected thrust at each given point.

2.14 CONCRETE

All concrete shall be Class "B" or better and in accordance with the Standard Specifications for Public Works Construction, of the Department of Public Works, County of Maui.

PART 3 - EXECUTION

3.1 GENERAL

A. Install all equipment and material where indicated, as noted and detailed, and in accordance with the manufacturer's published instructions.

B. Wherever the term "as per manufacturer's specifications and/or instructions" is used, it means in strict accordance with the manufacturer's printed directions. If these directions conflict with this Specification, bring the matter to the Landscape Architect's attention and obtain his instructions before proceeding with the work.

3.2 LAYOUT

A. Stake out the locations of all pipe, valves and sprinkler heads as accurately as possible in accordance with the Drawings. Coordinate irrigation plan with intent of construction detailing sheets.

B. Where site conditions do not permit locating piping, valves, and heads where indicated, notify the Landscape Architect immediately and determine relocation in joint conference. Any adjustments made by the contractor without the approval of the landscape architect shall be made in a manner that insures complete coverage and maintains an efficiency similar to the rest of the circuit and/or system. The Landscape Architect, Irrigation Consultant, owner and client shall have the final approval of any such adjustments. Contractor to correct immediately at the Contractor's sole expense unacceptable revision work carried out without prior approval of the Landscape Architect.

C. Do not install the sprinkler systems as indicated on the drawings when it is obvious in the field that previously unknown obstructions or grade differences exist, or if discrepancies in construction details, legend, or specific note are discovered. Bring all obstructions or discrepancies to the attention of the Landscape Architect, or the Contractor assumes full responsibility for any revisions that may be necessary.

D. When discrepancies exist between drawings and specifications, and no specific interpretation is issued prior to bidding, the decision regarding this interpretation rests with the Landscape Architect. The discrepancy must be clarified before proceeding, and the Contractor will be compelled to act on the clarification as directed.

3.3 CONNECTION TO PROJECT UTILITIES

A. Connect to water source(s) as noted on the Drawings.

B. Make connections to electric power supply as noted on the drawings. Provide all conduit and boxes as required by codes governing this work.

3.4 EXCAVATION

A. Do all necessary excavation for the proper installation of the irrigation system.

B. Trenches shall be of adequate width to lay pipe easily, with extra working space provided where necessary to make joints. Trench depth shall be:

1. 14" minimum cover over mains 4" or less,
2. 8" minimum cover over laterals.
3. 14" minimum cover over sleeves under paving.
4. 14" minimum cover over conduit.

C. Boulders, roots and other obstructions shall be entirely removed or cut out to the width of the trench and a depth of 6" below the trench bottom. Such debris shall be disposed of off-site.

D. Any rock over 2" in largest dimension excavated during trenching shall be removed and disposed of off-site.

E. Over-excavation shall be backfilled and carefully tamped to provide a smooth and firm bearing surface for laying the pipe.

F. Barricade and/or light the excavated area to prevent undue hazard to the public.

G. Where possible, main line and lateral piping may occupy the same trench provided minimum clearances are maintained.

H. Pipe cushion material shall be S4C, imported screened cinder soil or fine sand fine enough to pass 1/4 inch sieve. This process shall be required in rocky soil, and the cushion material shall be placed 2" below and 2" above pipe.

I. Contractor shall backfill in 6" lifts and tamp each lift using a mechanical tamper to compact the backfilled soil.

3.5 PIPE FITTINGS AND ASSEMBLY

A. All pipes shall be installed as dimensioned or approximately in the location shown and shall be of the sizes indicated.

B. Parallel piping shown on the Drawings may be installed in the same trench with all pipe at the same depth and 4" (minimum) horizontal separation between pipes. Parallel piping shall not cross in the trench. Piping shall be laid accurately to the line and grade required, with full bearing on the trench bottom. No pipe shall be laid on soft fill or other unstable material.

C. At no time shall potable and effluent reuse piping be installed within the same trench. When both potable and effluent reuse systems are within the same area, they must conform to State of Hawaii, Dept. of Health Guideline regarding the requirements for separation of trenches.

D Crossing pipes shall have 4" (minimum) vertical separation. No direct contact between other pipes or structures will be permitted.

E. Work shall be performed in strict accordance with the manufacturer's installation instructions for the various types of pipe herein specified.

F. Pipes shall be flushed out thoroughly to remove all debris and foreign matter prior to the installation of the sprinklers, emitters, or other downstream equipment.

G. Prior to backfilling, pipes shall be inspected for leaks at the joints and fittings and repaired or replaced as required.

H. Any adjustments to the irrigation layout and piping or any pipe segment not sized on the plans shall be sized per the Lateral sizing chart shown on the plans. All main line piping unless otherwise indicated shall be 1-1/4" in size.

I. Any long lateral shall be sized to insure there is no greater than 5 psi differential between the sprinkler closest to the valve and the sprinkler the furthest away from the valve.

3.6 SPRINKLER HEADS

A. Set heads plumb and level at the locations indicated on the Drawings.

B. Thoroughly clean, adjust and inspect all heads for proper operation and performance.

C. In turf areas heads shall be initially installed on swing pipe or swing joints ½" above grade level. Prior to final inspection of the landscape planting adjust all heads as necessary.

D. Adjust the spray or rotary arc of coverage and radius of the sprinklers to eliminate overspray onto buildings, walks or roadways. See testing section.

E. Sprinklers installed within parking areas shall be protected with a sleeve as per details.

F. The use of Variable Arc Nozzles (VAN) shall not be used unless approved by the landscape architect.

3.7 EQUIPMENT INSTALLATION

A. Valves:

1. Thoroughly flush the mainline prior to installing valves.

2. Valves connected directly to the main line shall be plumb with sufficient clearance for service and operation. Install valves no farther than 12" away from mainline unless landscape architect approves installation at a greater distance prior to construction.

3. Manual control valves or gate valves shall be installed in the location shown on the Drawings and shall be accessible for proper use. These isolation valves shall be the same size as the largest downstream piping, the downstream control valve, or as noted on the plans, whichever is greater.

4. Remote control valves shall be as centrally located among the sprinklers as practical, In accordance with the Drawings. Adjust the pressure regulation control to insure the downstream pressure is 5 psi greater than the optimum pressure listed in the sprinkler equipment schedule. Use the flow control only for proper operation of the opening and closure of the valve.

5. Thoroughly clean, adjust and inspect all valves for operation and performance.

6. Locate valves so the valve box edges are no closer than 12 inches away from walkways, buildings, walls or header boards. Where possible, locate valve boxes within ground cover areas unless otherwise directed by landscape architect.

7. The irrigation system is circuited to maintain turf areas separate from other landscape plant material and to maintain similar solar and wind exposures. Any adjustments in the system shall be done maintaining the same concept. The contractor may not mix turf and plantings on the same circuit.

8. The maximum flow through any one circuit or valve is 16 gpm.

B. Valve Boxes:

1. Where feasible, several valves shall be grouped together in a single manifold with 12" minimum clearance between valves. Install only one valve per box, according to details.

2. Position the valves so all parts can be reached for service.

3. Install a 3"deep gravel sump below the bottom of the valve for drainage. The box shall be reasonably free from dirt and debris. Where soil is unstable, install red bricks at each corner of the box for stabilization. Install a filter fabric under gravel sump to minimize soil below from seeping upwards into the gravel yet allow for drainage.

4. The top of the valve box shall be level or following the adjacent finish grade as detailed and parallel with adjacent paving or walls.

5. Use valve box extensions as necessary to keep soil away from valves and solenoids.

C. Control Wire:

1. All work shall conform with the NEC. Wires shall be installed at a minimum depth of 18" within landscaped areas and 24" under paved areas unless installed within a conduit.

2. A minimum loop of 24" shall be left at each valve; at each splice; at each change in direction; at every 200 feet of straight run; and at each controller for expansion and/or servicing.

3. Wire shall be placed under the pipe in the trench and bundled and tied at 10-foot intervals. Provide slack within the wires between ties to allow for contraction.

4. Splices and connections shall be watertight using 3-M DBY-6, or acceptable equal UL-listed water-proof connections.

5. Wire shall be within a protective conduit or sleeve at pavement crossings, through walls or where other conditions make it necessary.

6. Splicing will be permitted only on runs exceeding 2,500 feet. Locate splices within valve boxes or within separate electrical splice boxes. Accurately and clearly label splice box and all wires within the splice box with the controller station number on both sides of the splice.

7. Contractor shall install two spare control wires from the controller to the two valves furthest away from the controllers at both ends of the main line piping to allow for future expansion or repair.

D. Automatic Controllers:

1. Install and mount as detailed or recommended by the manufacturer. All outdoor mounted controllers shall be installed within a NEMA 3R stainless steel enclosure or as noted on plans.

2. All controllers shall be grounded and tested. Provide landscape architect with a copy of the megger test results prior to pre-maintenance inspection. Approved methods of earth grounding include the use of the following methods:

a. Copper clad steel ground rods of 5/8" minimum diameter x 8 feet minimum length installed vertically within the ground. Horizontal installation is not acceptable.

b. Solid copper ground plate as manufactured by Paige Electric or acceptable equal.

c. All controllers shall be labeled "Reclaimed Water – Do not Drink" on the outside of the Controller.

3. The earth-to-ground resistance of these grounded circuits need to be measured using a Megger or similar instrument and the readings is to be no more than 5 ohms.

4. Install a rain/wind sensor for each controller as recommended by the manufacturer.

5. Connect control wiring to the controller in sequential arrangement according to the assigned identification numbers of the valves shown on the plans. Label each wire with the controller station number.

3.8 FLUSHING

A. Thoroughly flush out all main line piping before installing valves, lateral piping, swing joints and sprinklers before the installation of any nozzles. After flushing, the piping may be partially backfilled. Keep butt joints, fittings and connections free and visible.

B. Water expelled during flushing shall be disposed of properly within a sanitary sewer system and shall not be allowed to seep into storm drains or puddle on site. If possible, flush the system with Potable Water. If non-potable water is used, the Contractor shall notify all workers that the discharge water is effluent reuse and instruct them in the proper care should they come in contact with discharged water.

3.9 TESTING

A. Center load pipe with sufficient backfill in accordance with paragraph 3.11 to anchor pipe before testing. Do not cover fittings or joints.

B. Notify the Landscape Architect at least 3 days in advance of testing.

C. Purge air from lines prior to applying test procedures.

D. Perform testing and furnish necessary equipment.

E. Apply the following tests after solvent weld plastic pipe joints have cured for at least 24 hours.

1. Test mainlines hydrostatically at 150 psi minimum. Lines will be approved if test pressure is maintained for 6 hours. Make tests and repairs as necessary until test conditions are met. Install valves prior to pressure testing.

2. During the test, stop detectable leaks and correct defects regardless of the amount of leakage. Use materials and installation procedure identical to those specified herein for making corrections.

3. Perform tests and repairs before paving is installed and while pipes are still accessible.

F. Apply the following coverage tests after solvent weld plastic pipe joints have cured for at least 24 hours and section E above has been fully complied with:

1. Perform a coverage test in the presence of the Landscape Architect and/or owner's representative to determine if coverage of water afforded to planting areas is complete.

2. Change heads, nozzles, orifices, or arcs as may be required to provide satisfactory coverage.

3. Prior to any recommendation of final acceptance of the irrigation system, test the automatic sprinkler controllers through all their cycles in the presence of the Landscape Architect and the Owner's representative.

3.10 BACKFILLING AND COMPACTION

A. Do not backfill until pipe has been tested and results reported to the Landscape Architect.

B. Place S4C bedding material around main lines and cinder soil around lateral lines as detailed on the Drawing.

C. Compact backfill for trenching to dry density equal to the adjacent undisturbed soil, and conform to adjacent grades without dips, sunken areas, humps, or other irregularities. Adequately compact installations above structural slabs to support the piping being installed.

D. Truck, trencher, backhoe or other types of equipment wheels are not permitted for compacting soil.

E. Restore surfaces, existing underground installations, and other items damaged or cut as a result of excavation, to original conditions in manner consistent with these Specifications and as approved by the Landscape Architect.

F. Resod, or replant the trenched areas as needed. Should the soil level of the trenches settle during the Warranty period, the contractor shall lift the existing sod or plant material, refill the trenches as needed and restore the plantings within the disturbed areas.

3.11 ADJUSTING THE SYSTEM

A. If it is determined that adjustmen4ts in the irrigation equipment will provide proper and more adequate coverage, including changes to the nozzle, make such changes, or make arrangements with the manufacturer to have adjustments made, prior to any planting. Pay all additional costs associated with these changes or adjustments.

B. The entire system in a given phased construction area shall be operating properly before any lawn or ground cover planting operations begin in that area.

C. Periodically check operation of the system and adjust it as necessary for the duration of the Contract, including the guarantee period.

3.12 SIGNAGE

All systems where effluent reuse water is being used for the irrigation water, the Contractor to shall provide Eight (8) signs with posts labeled "R-1Relcaimed Water Used in Spray Irrigation – Do not Drink" and install as directed by the owner are edge of area irrigated with reclaimed water.

3.13 CONTROLLER CHARTS

Affix an approved non-fading copy of the irrigation diagram on the inside cabinet door of the controller showing valve locations, numbers, and wire routing.

3.14 REPAIR OF LEAKS

Remake leaking joints using new materials, whether discovered at time of installation or at any time during the Warranty period. Use of caulking or cement to repair leaks is prohibited.

3.15 CLEAN UP

Keep all areas of work clean, neat, and orderly at all times. Clean construction areas at the end of each day. Remove surplus material and other debris generated from this work form the site. Neatly return to proper grade all disturbed areas. Flush all paving, walks, and similar areas to achieve a "broom clean" appearance.

3.16 FINAL INSPECTION

A. At the completion of all irrigation work request a final inspection. Notify the Landscape Architect 5 working days prior to the inspection, so a mutually agreeable time for inspection may be arranged.

B. The Contractor shall provide the Landscape Architect with a final copy of the Irrigation As-Built Drawing of Record at the start of this final inspection.

C The Landscape Architect, Landscape Planting and Irrigation Contractor, and the Owner, or their representatives, shall be present at the inspection. If, after the inspection, the Landscape Architect and the Owner are of the opinion all work has been performed in accordance with the Drawings and Specifications, written notice of acceptance and completion of the Project will be given.

D. If portions of the work are not acceptable, a reasonable amount will be retained form the final payment until the defects are corrected and the work is accepted by the Landscape Architect and the Owner.

END OF SECTION

SECTION 02950 - LANDSCAPE PLANTING

PART 1 – GENERAL

1.1 DESCRIPTION OF WORK

A. Provide landscape plantings in the areas shown on the Drawings with plants in a healthy, vigorous growing condition. All work indicated on the Drawings by notes shall be provided whether or not specifically mentioned in this Standard or the Specifications. Any items not specifically shown in the Drawings or specified, but normally required to conform with such intent, are considered part of the work.

B. The work of this Section includes but is not limited to the following:
   1. Screening and placement of imported screened topsoil.
   2. Pre-planting weed control.
   3. Soil preparation.
   4. Fine grading.
   5. Planting operations.
   6. Maintenance.
   7. Warranty.

1.2 CODES AND STANDARDS

A. Perform work in accordance with all applicable laws, codes and regulations required by authorities having jurisdiction over such work and provide for all inspections and permits required by Federal, State and local authorities in furnishing, transporting and installing materials.

1.3 SUBMITTALS

A. Substitutions:
   1. If any plant specified is not obtainable, submit a written substitution request to the Owner during the bidding period. This request may present either a different size of the same species or a similar alternate species with the proposed adjustments to the Contract price for each.
   2. Substitutions of plant materials will not be permitted unless authorized in writing by the Owner.

B. Construction Schedule: At the preconstruction meeting, provide a written projected planting schedule noting the estimated completion date, number of working days required and any special coordination requirements.

C. Selection, Tagging and Ordering Plant Material:
   1. Submit a request for inspection and documentation to Owner at least one month prior to start of work under this section that all plant material has been ordered.

   2. Plants shall be subject to inspection and rejection by Owner at place of growth and after delivery for conformity to specifications.

3. Plants identified as specimen, field grown, or field stock will be inspected at place of growth by the Owner.

D. Imported Screened Soil Material:

1. The Contractor shall provide an even 2" or 4" layer of screened soil material over all planting areas. The Contractor shall be responsible for screening, amending, hauling and installing the screened soil material over all planting areas on the project site.

2. The Contractor shall be responsible for submitting a soils analysis of the imported screened soil material at the beginning of the project for review and approval by the Owner.

E. Samples and Producers Specifications: Various samples, certificates, and specifications of seed, fertilizer, sand, compost, soil amendments, and other material shall be submitted for approval.

F. Certificate Submittal: Prior to hydroseeding operations, provide the Landscape Architect and Owner with the State Certificate stating analysis of purity of the seed material.

G. Delivery Receipts and Invoices: Delivery receipts and copies of invoices for material used will be subject to checking by the Owner and subsequently delivered to the Owner.

1.4 JOB CONDITIONS

A. Acceptance of Previous Work: Inspect and accept the condition of the site relative to this section before commencing with the work covered herein. If not acceptable, notify the Owner in writing. By proceeding with the work under this section, the Contractor indicates his acceptance of all previous related work.

B. Meet on Site: Prior to commencing work, meet with the Owner and all other concerned parties on the site to review the work under this section. Request this meeting one week prior to the desired meeting time.

C. Underground Utilities and Obstructions: Verify the location of all underground utilities and other obstructions that may affect the work. Any obstructions encountered shall be reported to the Owner. Repair all damage to any known utility line or other underground obstruction at Contractor's expense. Report damage to any unknown utilities to the Owner.

D. Protection:

1. Provide necessary safeguards and exercise caution against injury or defacement of existing site improvements. Prevent vehicles of any kind from passing over sidewalk, curbs, etc., unless adequate protection is provided. Do not store materials or equipment, or operate equipment near or under the branches of any existing plants that are to remain, except as actually required for construction in those areas.

2. Be responsible for any damage resulting from landscape planting operations. Repair all damage to return the area to the previous condition at Contractor's expense.

E. Clean Up: Keep all areas of work clean, neat and orderly at all times during the period of Contract. Clean all construction areas at the end of each day.

F. Samples and Test: Owner reserves the right to take and evaluate samples of materials for conformity to Specifications at any time. Furnish samples upon request by the Owner. Rejected materials shall be immediately removed from the site at Contractor's expense.

G. Premaintenance Inspection and Final Inspection:

1. At the completion of all landscape planting operations and prior to the beginning of the formal maintenance period, the premaintenance inspection shall be held. At the completion of the formal maintenance period, the final inspection shall be held.
2. Request these inspections of the Owner ten (10) working days prior to the completion of work in order that a mutually agreeable time for inspection may be arranged.
3. The Owner shall be present at the inspection.
4. At the time of inspection, the Contractor shall have all the areas under the contract free of weeds, dead leaves and trash, neatly cultivated and raked. All stakes guys and plant basins shall be in good order. At the final inspection, lawns shall be neatly cut and all clipping removed.
5. If, after the premaintenance inspection, the Owner is of the opinion that all work has been performed in accordance with the drawings and specifications, written notice of preliminary acceptance will be given. This report will note any items which must be corrected and state the date of commencement and completion of the formal maintenance period.
6. If, after the final inspection, the Owner is of the opinion that all work has been performed in accordance with the drawings and specifications, written notice of acceptance and completion of the project will be given. If all or certain portions of the work are not acceptable under the terms and intent of the drawings and specifications, a reasonable amount will be retained and the final payment and the formal maintenance period for the unaccepted work and any related items shall be extended at no cost to the Owner until the defects in the work have been corrected and the work is accepted by the Owner.

1.5 WARRANTY

A. Plant Material:

1. Plant materials furnished or relocated under this section shall be warranted in writing, for a period of one (1) year from the date of final acceptance against improper installation, defective, unsound or diseased conditions that may appear.
2. Upon receipt of written notice from the Owner of the death of any warranted plant materials shall be promptly replaced with same species as originally planted, and shall be of a size closely approximating the size of the plant if

normal growth had occurred since the original planting. Replacement shall be subject to all requirements of the specifications.

3. When plants are replaced, advise the Owner, in writing, of the necessary establishment maintenance which must be performed. If this information is not provided, the Contractor will be liable for total cost of replacement should the replaced plant die.
4. The expense of replacement shall be borne by the Contractor if replacement is necessary during the maintenance period, or shall be evenly shared by the Owner and the Contractor if replacement is necessary after the maintenance period but during the remainder of the warranty period.
5. Contractor shall not be held liable for loss of plant materials after final acceptance due to lack of care, vandalism, acts of God, or accident. The Owner must show that the plants have been maintained properly.

B. Special Warranty:

1. All plant materials furnished under this section shall be warranted as to the species, hybrid, flower color and/or variety specified.
2. If after acceptance of the project, any warranted plant material proves to be of a different species, hybrid, flower color and/or variety not initially determinable, replace that plant with a new plant of the originally specified species, hybrid, flower color and/or variety. The new plant shall be equal in size to that of the incorrect plant at the time of its removal. The new plant shall meet the quality standards, be subject to the warranty, and be installed according to the specifications.
3. There is no time limit to this warranty, although it does not include plants reverting to the general species. The Owner will determine the nonconformance of plant materials, and notify the Owner in writing of the required replacement work. All materials and work shall be at the expense of the Owner. All work shall be completed within 15 working days from the date of the Owner's letter.

C. Liability: The liability under the warranty shall include the repair of damage to the work of other contractors, or damage to the Owner's property caused by the failure of the work performed under this section. All of the provisions of this section apply to work performed to satisfy the requirements of the warranty.

D. Other Work: All other work shall be warranted for a period of one year from the date of preliminary acceptance.

PART 2 - PRODUCTS

2.1 SOURCE OF SOIL MATERIAL

A. Contractor shall provide imported screened soil as source of soil material for this project.

B. Contractor responsible for providing a 2" or 4" layer of imported screened soil over all planting areas.

2.2 SCREENED SOIL MATERIAL

A. Natural, fertile, friable soil free from stones, noxious seeds, weeds (especially nut grass), roots, subsoil or other material detrimental to normal plant growth.

B. Physical Properties:

1. Designation: Loam or silt loam, USDA classification of fraction passing sieves.

Class	Particle Size Range	Maximum Percentage	Minimum Percentage
Coarse Sand	0.5-2.0 mm	40	0
Clay	<0.05 mm	20	10
Silt	<0.05 mm	40	10
Gravel	2-13 mm	20	0
Rock	1/2-1 inch		10% volume
Organic		15	0

C. Chemistry:

1. Salinity: Saturation Extract Conductivity (ECe), less than 3.0 mm hos. Cm at 25 degrees C.
2. Sodium: Sodium Absorption Ratio (SAR), optimum range is 3-5.
3. Boron: Saturation Extraction Concentration, less than 1.0 ppm.
4. Reaction: pH of saturated paste: 6.0 - 7.0.

D. Imported screened soil shall contain sufficient quantities of available nitrogen, phosphorus, potassium, calcium and magnesium to support normal plant growth in accordance to the soil analysis recommendations.

E. Red Humic latasol soils, or types known as "Palolo Clay" or "Lualualei Clay" or similar materials will be not accepted.

F. Screened to pass through 1/2" screen.

G. Soils shall have minimum 5% OM as Humus content. Utilize Walkley-Black soil testing method for determining percent OM as humus.

H. Backfill Mix for Trees and Shrubs: Mix thoroughly prior to placing:
2 parts 50% screened soil
1 part 25% 3/8" minus black cinder
1 part 25% "Menehune Magic"/organic soil amendment
15 lbs. Gro-Power per cubic yard of mix

I. Planting Area Soil Mixture, 2" or 4" layer: Mix thoroughly prior to placing
2 parts 50% screened soil
1 part 25% 3/8" minus black cinder
1 part 25% "Menehune Magic"/organic soil amendment
15 lbs. Gro-Power per cubic yard of mix.

Sixty (60) days prior to placement, Contractor shall submit 1 cubic foot of the specified pre-mixed soil mixes to the Owner. Contractor shall not place any soil mix on the project site until the Owner has given the Contractor written notification to proceed.

2.3 FERTILIZER

A. General: N-P-K as recommended by soil analysis, uniform in composition, free-flowing and suitable for application with approved equipment, delivered to the site in unopened containers, each fully labeled, conforming to the applicable fertilizer laws, and bearing the name or mark or the manufacturer.

B. Plant Tablet: Agriform 21 gram tablet, Woodace 15 gram size or approved equal.

C. Maintenance Period: 15-15-15 or 16-16-16.

2.4 ORGANIC SOIL AMENDMENT

A. Soil Amendment: Organic non-nutrient soil conditioner shall be "Menehune Magic" as manufactured by Hawaiian Earth Products, (Ewa, Oahu), "Kellogg's Nitrohumus Soil Conditioner" or approved equal.

B. Organic nutrient soil conditioners (humus) shall be Gro-Power Plus (5-3-1), Ferto (6-4-2) or approved equal.

C. Peat Moss: Partially decomposed stems and leaves of moss, free from dirt, salt, coarse roots and other deleterious materials.

2.5 PRE-PLANTING HERBICIDE

A. Round-Up or equal.

2.6 PRE-EMERGENT WEED CONTROL

A. Rontar-G, Treflan, Eptam, Vegitex or equal.

2.7 PLANT MATERIAL

A. Quantities: Provide sufficient quantities of plant materials needed to complete the work as shown on the planting plans and indicated in the drawings. Quantities indicated on the plant list are approximate only and are provided for the convenience of the Contractor. The planting plans shall have precedence over the plant list.

B. Nomenclature: Names of plants shall conform with names generally accepted in the local nursery trade, and as interpreted by the Contractor.

C. Condition:

1. All trees, palms, shrubs, vines and groundcovers shall have a normal habit of growth and shall be sound, healthy, vigorous and free from insect infestations.
2. The minimum acceptable size of all trees and shrubs measures after pruning, with branches in normal positions, shall conform to the measurements specified on the plant list.
3. Caliper measurement shall be taken at a point on the trunk 6" above natural ground line for trees up to 4" in caliper and at a point 12" above the natural ground line for trees over 4" in caliper.
4. Plants that meet the measurements specified, but do not possess a normal configuration or balance of height and spread will be rejected.
5. Trees and shrubs shall have been grown in containers of the size stated on drawings, and shall have sufficient roots to hold the rootball together after removal from containers without being rootbound.
6. Specimen, field grown and field stock trees and palms shall have a rootball of sufficient size to support the plant's recovery from transplanting. Trees delivered with small or inadequate rootballs will be rejected.
7. Any tree, palm or shrub with weak, thin trunk not capable of supporting itself when planted in the open will be rejected.
8. Trees will be straight and of uniform shape without damaged, crooked, or multiple leaders, unless specified. Trees with abrasions of the bark, sunscalds, disfiguring knots, or fresh cuts of limbs over 1/2" which have not been pruned and painted or completely calloused will be rejected.
9. Divisions shall be healthy, vegetative material with well-established roots at one or more nodes.

2.8 MISCELLANEOUS MATERIALS

A. Unless noted otherwise, potable water will be readily available to the Owner at no expense to the Owner.

B. Hose and Wire Ties: 1/2" diameter hose with #12 ga. galvanized iron wire.

C. Guy Wire: #12 ga. galvanized iron for 15 and 25 gallon trees. #9 ga. galvanized iron for field grown trees.

D. Rebar: #4 24" minimum length for 15 and 25 gallon trees. #7 36" minimum length for larger trees.

E. Marker: Plastic surveyor tape. Bright color, minimum 18" long. Use same color throughout project.

F. Plastic Header: Slim Edge or approved equal.

G. Root Barriers: Deep Root Barrier UB-24" depth or approved equal.

2.9 HYDROMULCH

A. Mulch: Mulch shall be (paper or virgin wood cellulose fiber mulch) specifically processed fiber containing no growth or germination inhibiting factors. It shall be such that after addition and agitation in the hydraulic equipment with seeds, fertilizer, water and other additives not detrimental to plant growth, the fibers will form a homogeneous slurry. The Hydromulch equipment shall be capable of mixing all the necessary ingredients to a uniform mixture and to apply the slurry to provide uniform coverage. Fertilizer and mulch mix shall be applied in one operation by approved hydraulic equipment. The equipment shall have a built-in agitation system with an operating capacity sufficient to keep the mix in uniform distribution until pumped from the tank. Distribution and discharge lines shall be large enough to prevent stoppage and shall be equipped with hydraulic discharge spray nozzles, which provide a uniform distribution of the slurry.

PART 3 - EXECUTION

3.1 CLEARING

A. Clear all planting areas of existing vegetation not specified to remain and all other debris and foreign material considered a hindrance to planting operations and/or unsightly in appearance.

B. Maintain previously established grades and swales.

3.2 PRE-PLANTING WEED CONTROL

A. Apply preplanting herbicide to all visible weeds, before and after soil placement.

3.3 SCREENED SOIL

A. Provide and place an even 2" or 4" layer of imported screened soil over all planting areas. Screened soil material shall be amended and uniformly blended.

B. Transport screened and amended soil materials to project site. Coordinate all work with the General Contractor to insure proper placement of screened soil material and fine grading in relation to the sites overall grading and drainage plan.

3.4 SOIL PREPARATION

A. Uniformly distribute and blend screened soil, black cinder, organic soil conditioner and the fertilizer specified by the soil analysis over all planting areas.

B. Blend the soil mix uniformly to evenly incorporate the amendments into the soil.

3.5 FINE GRADING

A. Adjust finish grading with screened soil as necessary. Grades shall be smooth and even on a uniform plane with no abrupt changes or pockets, and shall slope away from all buildings. Verify the surface drainage of all planting areas, and notify the Owner of any discrepancies, obstructions, or other conditions considered detrimental to proper execution of the work.

B. Landscape work shall be tied to existing conditions and controls such as existing trees and landscape features, utility lines, pavement and curbs, etc. Finished grades shall bear proper relationship to such controls. Adjust all new work as necessary to meet the conditions and fulfill the intention of the drawings.

C. After initial settlement, the finish grade shall be lower than adjacent walks, curbs and headers:
   1. Grass: 1/2" through 3/4".
   2. Shrubs and Groundcovers: 1" through 1-1/2".

D. Immediately prior to planting operations, all planting areas shall be cleaned of weeds, debris, rocks over 1" in diameter, and clumps of earth that will not break up.

3.6 HYDROMULCH CAPPING

A. On the same day and immediately following sprigging operations, indicated field areas are to be capped with wood fiber using conventional "Hydromulch" equipment as manufactured by the Bowie Machine Works, or approved equal. When hydraulically sprayed on the soil, the fibers shall form a blotter-like ground cover, which readily absorbs water and allows infiltration to the underlying soil. In every application, complete coverage of the soil shall be attained. Mulch shall be applied at the minimum rate of 40 pounds per 1,000 square feet (1700 pounds per acre) using water at the rate of 25 gallons per 1,000 square feet (1,000 gallons per acre).

B. Hydromulching of turf areas shall consist of mixing the hydromulch slurry, pre-plant fertilizer product, and spraying the mixture over the newly installed grass sprigs and soil.

3.7 FIELD TOP DRESSING

A. Six Months after grass establishment, contractor shall top dress all grassed areas within all play fields with a 1" even layer of sand and rolled to maintain an even and level play field. Nine months after grass establishment, contractor shall top dress all grassed areas within all play fields with an additional 1" even layer of sand and rolled to maintain an even and level play field.

3.8 SOIL AND DRAINAGE CONDITIONS

A. Apply soil retention material on all slopes greater than 2:1 after planting operations. Assure that mulching machinery used to apply soil retainer is sterile and free of all seed.

B. Notify Owner in writing of all soil or drainage conditions encountered during planting operations which the Contractor considers detrimental to growth of plant material. Include a cost proposal for the correction of the problem for approval before proceeding with work.

C. If drainage conditions of plant pits appear unsatisfactory, test drainage by filling with water. Conditions permitting the retention of water in planting pit for an excessive period of time shall be brought to the attention of Owner.

3.9 ROCK HEADERS

A. Install headers between all groundcover and grass areas where shown. The header shall smoothly follow the finish grade with even radii and straight runs. Headers shall meet walkway edges or other features at a 90 degree angle unless otherwise directed by the Owner. Local weathered Field rock, concrete footing 2500 psi at 28 days, #4 rebar in footing.

3.10 PLANTING OPERATIONS

A. Handling Plants:
1. Handle plants in a manner to avoid any damage to the plant.
2. Protect plants at all times from sun or drying winds. Plants that cannot be planted immediately on delivery shall be kept in the shade, well protected and adequately watered.
3. All specimen, field grown and field stock trees and palms shall be planted the same day they are delivered to the site.

B. Plant Pits: All trees, palms and shrubs shall be installed in round pits with vertical sides, twice the diameter and 1-1/2 times the depth of the rootball or container.

C. Setting Container and Larger Plant:
1. Plants shall be centered and set on the appropriate compacted backfill mix that has been puddled and settled.
2. Plants shall be set with the soil level even with the finish grade and planted to give the best appearance in relationship to adjacent structure or surroundings.
3. Use appropriate backfill mix to continue filling plant pits. Set plant plumb and brace rigidly in position until backfill mix has been tamped solidly around rootball. When three-fourths of the pit is backfilled, water thoroughly, saturating the rootball.
4. Evenly distribute planting tablets per manufacturer's instructions. Continue filling pit to finish grade with backfill mix.
5. When the plant pit is filled, form saucer berm around plants as noted on details.
6. Water all plants immediately after planting.

D. Staking and Guying: Immediately after planting, stake all 15 gallon and smaller trees. Guy all larger trees as detailed.

3.11 GROUNDCOVER

A. Install plant material in moist soil in the areas and at the spacings shown, in neat rows, ensuring complete coverage of all planting areas including under and around trees and shrubs. Spacings shown in the plant list or on the drawings are triangular spacing, unless otherwise noted.

3.12 PRE-EMERGENT WEED CONTROL

A. Immediately after planting, apply pre-emergent weed control materials to all planted areas which will not be seeded.

3.13 PLANTING MAINTENANCE

A. Maintain all plants and planted areas in optimum growing condition and appearance.

B. Maintenance, as specified below, shall coincide with the delivery of the first plant materials to the site and shall continue 90 days after commencement of the formal maintenance period or until the approval of the final inspection. Care of plant materials during installation is not considered part of the formal maintenance period.

C. Maintenance shall include, but is not limited to:

1. Protect areas susceptible to traffic by erecting barricades immediately after planting.
2. Irrigate planting areas as required to insure active growth keeping areas moist but not saturated. Regulate irrigation as necessary to avoid erosion and gullying.
3. Fertilize as needed in accordance with the manufacturer's recommendations and five (5) days prior to final inspection. Exercise proper caution and take measures necessary to avoid plant burn.
4. Keep planting areas free of weeds and undesirable grasses through daily weeding, if required. Remove the entire root system. Dispose of all weeds in appropriate trash containers.
5. Inspect all plants, including lawn, for disease or insect damage weekly. Treat affected material immediately.
6. Remove damaged or diseased growth from trees and shrubs. Treat cuts larger than 1/2" diameter with specified tree paint.
7. Immediately remove any dead or dying plants not in a vigorous thriving condition. Replacement shall be the same species and size as originally planted.
8. Restake, tighten, repair guys and reset to proper grades or upright position any plants that are not in their proper growing position.
9. As it becomes evident that certain groundcovers have not uniformly or properly established, replant the areas immediately with the same plants and quantity as specified for the initial planting and maintain as specified for 90% coverage of healthy, actively growing grass and groundcovers for approval during the final inspection.

END OF SECTION

SECTION 03300 - CAST-IN-PLACE CONCRETE

PART 1 - GENERAL

1.1 SUMMARY

Section includes cast-in-place concrete, including reinforcement, concrete materials, mixture design, placement procedures, and finishes.

1.2 UNIT PRICE - MEASUREMENT AND PAYMENT

A. Basis of Measurement: Lump Sum.

B. Basis of Payment: Includes preparation of subgrade, formwork, reinforcement, concrete, and finishing.

1.3 SUBMITTALS

A. Product Data: For each type of product indicated.

B. Other Action Submittal:

1. Design Mixtures: For each concrete mixture.

1.4 QUALITY ASSURANCE

A. Ready-Mix-Concrete Manufacturer Qualifications: A firm experienced in manufacturing ready-mixed concrete products and that complies with ASTM C 94/C 94M requirements for production facilities and equipment.

B. Comply with the following sections of ACI 301, unless modified by requirements in the Contract Documents:

1. "General Requirements."

2. "Formwork and Formwork Accessories."

3. "Reinforcement and Reinforcement Supports."

4. "Concrete Mixtures."

5. "Handling, Placing, and Constructing."

C. Comply with ACI 117, "Specifications for Tolerances for Concrete Construction and Materials."

PART 2 - PRODUCTS

2.1 FORMWORK

Furnish formwork and formwork accessories according to ACI 301.

2.2 STEEL REINFORCEMENT

A. Reinforcing Bars: ASTM A 615/A 615M, Grade 60, deformed.

B. Plain-Steel Wire: ASTM A 82/A 82M, as drawn.

2.3 CONCRETE MATERIALS

A. Cementitious Material: Use the following cementitious materials, of the same type, brand, and source throughout Project:

1. Portland Cement: ASTM C 150, Type I/II:

B. Normal-Weight Aggregate: ASTM C 33, graded, 1-1/2-inch nominal maximum aggregate size.

C. Water: ASTM C 94/C 94M.

2.4 ADMIXTURES

A. Chemical Admixtures: Provide admixtures certified by manufacturer to be compatible with other admixtures and that will not contribute water-soluble chloride ions exceeding those permitted in hardened concrete. Do not use calcium chloride or admixtures containing calcium chloride.

1. Water-Reducing Admixture: ASTM C 494/C 494M, Type A.

2. Water-Reducing and Retarding Admixture: ASTM C 494/C 494M, Type D.

3. High-Range, Water-Reducing Admixture: ASTM C 494/C 494M, Type F.

2.5 RELATED MATERIALS

Joint-Filler Strips: ASTM D 1751, asphalt-saturated cellulosic fiber, or ASTM D 1752, cork or self-expanding cork.

2.6 CURING MATERIALS

A. Evaporation Retarder: Waterborne, monomolecular film forming; manufactured for application to fresh concrete.

B. Absorptive Cover: AASHTO M 182, Class 3, burlap cloth or cotton mats.

C. Moisture-Retaining Cover: ASTM C 171, polyethylene film or white burlap-polyethylene sheet.

D. Water: Potable.

E. Clear, Waterborne, Membrane-Forming Curing Compound: ASTM C 309, Type 1, Class B.

2.7 CONCRETE MIXTURES

A. Comply with ACI 301 requirements for concrete mixtures.

B. Normal-Weight Concrete: Prepare design mixes, proportioned according to ACI 301, as follows:

1. Minimum Compressive Strength: 3000 psi at 28 days.

2. Maximum Water-Cementitious Materials Ratio: 0.50.

3. Slump Limit: 4 inches, plus or minus 1 inch.

C. Normal-Weight Concrete for Drain Inlet Structures: Prepare design mixes, proportioned according to ACI 301, as follows:

1. Minimum Compressive Strength: 4000 psi at 28 days.

2. Maximum Water-Cementitious Materials Ratio: 0.45.

3. Slump Limit: 4 inches, plus or minus 1 inch.

2.8 CONCRETE MIXING

A. Ready-Mixed Concrete: Measure, batch, mix, and deliver concrete according to ASTM C 94/C 94], and furnish batch ticket information.

1. When air temperature is above 90 deg F, reduce mixing and delivery time to 60 minutes.

B. Project-Site Mixing: Measure, batch, and mix concrete materials and concrete according to ASTM C 94/C 94M. Mix concrete materials in appropriate drum-type batch machine mixer.

1. For mixer capacity of 1 cu. yd. or smaller, continue mixing at least 1-1/2 minutes, but not more than 5 minutes after ingredients are in mixer, before any part of batch is released.

2. For mixer capacity larger than 1 cu. yd., increase mixing time by 15 seconds for each additional 1 cu. yd.

3. Provide batch ticket for each batch discharged and used in the Work, indicating Project identification name and number, date, mix type, mix time, quantity, and amount of water added. Record approximate location of final deposit in structure.

PART 3 - EXECUTION

3.1 FORMWORK

Design, construct, erect, brace, and maintain formwork according to ACI 301.

3.2 EMBEDDED ITEMS

Place and secure anchorage devices and other embedded items required for adjoining work attached to or supported by cast-in-place concrete. Use setting drawings, templates, diagrams, instructions, and directions furnished with items to be embedded.

3.3 STEEL REINFORCEMENT

Comply with CRSI's "Manual of Standard Practice" for fabricating, placing, and supporting reinforcement.

3.4 JOINTS

A. General: Construct joints true to line with faces perpendicular to surface plane of concrete.

B. Contraction Joints in Slabs-on-Grade: Form weakened-plane contraction joints, sectioning concrete into areas as indicated. Construct contraction joints for a depth equal to at least one-fourth of concrete thickness, as follows:

1. Sawed Joints: Form contraction joints with power saws equipped with shatterproof abrasive or diamond-rimmed blades. Cut 1/8-inch- wide joints into concrete when cutting action will not tear, abrade, or otherwise damage surface and before concrete develops random contraction cracks.

C. Isolation Joints: Install joint-filler strips at junctions with slabs-on-grade and vertical surfaces, such as column pedestals, foundation walls, grade beams, and other locations, as indicated.

1. Extend joint fillers full width and depth of joint, terminating flush with finished concrete surface, unless otherwise indicated.

3.5 CONCRETE PLACEMENT

A. Comply with ACI 301 for placing concrete.

B. Before test sampling and placing concrete, water may be added at Project site, subject to limitations of ACI 301.

C. Consolidate concrete with mechanical vibrating equipment.

3.6 FINISHING FORMED SURFACES

A. Rough-Formed Finish: As-cast concrete texture imparted by form-facing material with tie holes and defective areas repaired and patched. Remove fins and other projections exceeding 1/2 inch.

1. Apply to concrete surfaces not exposed to public view.

B. Smooth-Formed Finish: As-cast concrete texture imparted by form-facing material, arranged in an orderly and symmetrical manner with a minimum of seams. Repair and

patch tie holes and defective areas. Remove fins and other projections exceeding 1/8 inch.

1. Apply to concrete surfaces exposed to public view or to receive a rubbed finish.

C. Rubbed Finish: Apply the following rubbed finish, defined in ACI 301, to smooth-formed finished as-cast concrete where indicated:

1. Smooth-rubbed finish.

D. Related Unformed Surfaces: At tops of walls, horizontal offsets, and similar unformed surfaces adjacent to formed surfaces, strike off smooth and finish with a texture matching adjacent formed surfaces. Continue final surface treatment of formed surfaces uniformly across adjacent unformed surfaces, unless otherwise indicated.

3.7 FINISHING UNFORMED SURFACES

A. General: Comply with ACI 302.1R for screeding, restraightening, and finishing operations for concrete surfaces. Do not wet concrete surfaces.

B. Screed surfaces with a straightedge and strike off. Begin initial floating using bull floats or darbies to form a uniform and open-textured surface plane before excess moisture or bleedwater appears on surface.

1. Do not further disturb surfaces before starting finishing operations.

C. Scratch Finish: Apply scratch finish to surfaces indicated and surfaces to receive concrete floor topping or mortar setting beds for ceramic or quarry tile, portland cement terrazzo, and other bonded cementitious floor finishes, unless otherwise indicated.

D. Float Finish: Apply float finish to surfaces indicated, to surfaces to receive trowel finish, and to floor and slab surfaces to be covered with fluid-applied or sheet waterproofing, fluid-applied or direct-to-deck-applied membrane roofing, or sand-bed terrazzo.

E. Trowel Finish: Apply a hard trowel finish to surfaces indicated and to floor and slab surfaces exposed to view or to be covered with resilient flooring, carpet, ceramic or quarry tile set over a cleavage membrane, paint, or another thin film-finish coating system.

F. Trowel and Fine-Broom Finish: Apply a partial trowel finish, stopping after second troweling, to surfaces indicated and to surfaces where ceramic or quarry tile is to be installed by either thickset or thin-set methods. Immediately after second troweling, and when concrete is still plastic, slightly scarify surface with a fine broom.

G. Medium Broom Finish: Apply a medium broom finish to surfaces indicated and to exterior slabs. Immediately after float finishing, slightly roughen trafficked surface by brooming with fiber-bristle broom perpendicular to main traffic route.

3.8 CONCRETE PROTECTING AND CURING

A. General: Protect freshly placed concrete from premature drying and excessive cold or hot temperatures. Comply with ACI 306.1 for cold-weather protection and with ACI 301 for hot-weather protection during curing.

B. Evaporation Retarder: Apply evaporation retarder to concrete surfaces if hot, dry, or windy conditions cause moisture loss approaching 0.2 lb/sq. ft. x h before and during finishing operations. Apply according to manufacturer's written instructions after placing, screeding, and bull floating or darbying concrete, but before float finishing.

C. Begin curing after finishing concrete but not before free water has disappeared from concrete surface.

D. Curing Methods: Cure formed and unformed concrete for at least seven days by one or a combination of the following methods:

1. Moisture Curing: Keep surfaces continuously moist for not less than seven days with the following materials:

   a. Water.

   b. Continuous water-fog spray.

   c. Absorptive cover, water saturated and kept continuously wet. Cover concrete surfaces and edges with 12-inch lap over adjacent absorptive covers.

2. Moisture-Retaining-Cover Curing: Cover concrete surfaces with moisture-retaining cover for curing concrete, placed in widest practicable width, with sides and ends lapped at least 12 inches, and sealed by waterproof tape or adhesive. Cure for not less than seven days. Immediately repair any holes or tears during curing period using cover material and waterproof tape.

3. Curing Compound: Apply uniformly in continuous operation by power spray or roller according to manufacturer's written instructions. Recoat areas subjected to heavy rainfall within three hours after initial application. Maintain continuity of coating and repair damage during curing period.

4. Curing and Sealing Compound: Apply uniformly to floors and slabs indicated in a continuous operation by power spray or roller according to manufacturer's written instructions. Recoat areas subjected to heavy rainfall within three hours after initial application. Repeat process 24 hours later and apply a second coat. Maintain continuity of coating and repair damage during curing period.

3.9 FIELD QUALITY CONTROL

A. Testing Agency: The Contractor shall engage a qualified testing agency to perform tests and inspections. All costs of sampling and testing shall be borne by the contractor.

B. Tests: Perform according to ACI 301.

1. Testing Frequency: One composite sample shall be obtained for each day's pour of each concrete mix exceeding 5 cu. yd. but less than 25 cu. yd., plus one set for each additional 50 cu. yd. or fraction thereof.

2. Testing Frequency: One composite sample shall be obtained for each 100 cu. yd. or fraction thereof of each concrete mix placed each day.

3.10 REPAIRS

Remove and replace concrete that does not comply with requirements in this Section.

END OF SECTION

SECTION 04816

CONCRETE UNIT MASONRY ASSEMBLIES

PART 1 GENERAL

1.1 SUMMARY

A. Section Includes:
1. Concrete masonry units.
2. Decorative concrete masonry units.
3. Mortar and grout.
4. Steel reinforcing bars.
5. Ties and anchors.
6. Miscellaneous masonry accessories.

1.2 UNIT PRICE - MEASUREMENT AND PAYMENT

A. Basis of Measurement: Lump Sum.

B. Basis of Payment: Includes placement of reinforcement, grout, concrete masonry units.

1.3 DEFINITIONS

A. CMU(s): Concrete masonry unit(s).

B. Reinforced Masonry: Masonry containing reinforcing steel in grouted cells.

1.4 SUBMITTALS

A. Product Data: For each type of product indicated.

B. Material Certificates: For each type and size of the following:
1. Masonry units.
a. Include data on material properties.
2. Cementitious materials. Include brand, type, and name of manufacturer.
3. Preblended, dry mortar mixes. Include description of type and proportions of ingredients.
4. Grout mixes. Include description of type and proportions of ingredients.
5. Reinforcing bars.
6. 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/C 109M 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.

1.5 QUALITY ASSURANCE

A. Testing Agency Qualifications: Qualified according to ASTM C 1093 for testing indicated.

B. 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.

C. 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.

D. Masonry Standard: Comply with ACI 530.1/ASCE 6/TMS 602 unless modified by requirements in the Contract Documents.

1.6 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 designed for use with dispensing silos. Store preblended, dry mortar mix in delivery containers on elevated platforms, under cover, and 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.

1.7 PROJECT CONDITIONS

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.
   1. Extend cover a minimum of 24 inches down both sides of walls and hold cover securely in place.

B. Do not apply uniform floor or 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 ACI 530.1/ASCE 6/TMS 602.

PART 2 PRODUCTS

2.1 MASONRY UNITS, GENERAL

A. Defective Units: Referenced masonry unit standards may allow a certain percentage of units to contain chips, cracks, or other defects exceeding limits stated in the standard. Do not use units where such defects will be exposed in the completed Work.

2.2 CONCRETE MASONRY UNITS

A. Shapes: Provide shapes indicated and as follows, with exposed surfaces matching exposed faces of adjacent units unless otherwise indicated. Locations of different shapes as indicated on the drawings.
1. Provide special shapes for lintels, corners, jambs, sashes, movement joints, headers, bonding, and other special conditions.
2. Provide square-edge units for outside corners unless otherwise indicated.
3. 8x8x16; 8x8x8 split block one face.
4. 8x8x16; 8x8x8 plain or smooth face.
5. 4x8x16 plain or smooth face.
6. 8x8x16; 8x8x8 fluted, split block.
7. 4x8x16 screen block.

B. CMUs: ASTM C 90.
1. Unit Compressive Strength: Provide units with minimum average net-area compressive strength of 1900 psi.
2. Density Classification: Medium weight.
3. Size (Width): Manufactured to dimensions 3/8 inch less than nominal dimensions.

2.3 MORTAR AND GROUT MATERIALS

A. Portland Cement: ASTM C 150, Type I or II. Provide natural color or white cement as required to produce mortar color indicated.

B. Hydrated Lime: ASTM C 207, Type S.

C. Portland Cement-Lime Mix: Packaged blend of portland cement and hydrated lime containing no other ingredients.

D. Masonry Cement: ASTM C 91.

E. Mortar Cement: ASTM C 1329.

F. Aggregate for Mortar: ASTM C 144.
   1. For mortar that is exposed to view, use washed aggregate consisting of natural sand or crushed stone.

G. Aggregate for Grout: ASTM C 404.

H. Water: Potable.

2.4 REINFORCEMENT

A. Uncoated Steel Reinforcing Bars: ASTM A 615/A 615M, Grade 60.

2.5 TIES AND ANCHORS

A. 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/A 82M; with ASTM A 641/A 641M, Class 1 coating.

2.6 MISCELLANEOUS ANCHORS

A. Anchor Bolts: L-shaped steel bolts complying with ASTM A 307, Grade A; with ASTM A 563 hex nuts and, where indicated, flat washers; hot-dip galvanized to comply with ASTM A 153/A 153M, Class C; of dimensions indicated.

B. Postinstalled Anchors: Torque-controlled expansion anchors or chemical anchors.
   1. Material for Interior Locations: Carbon-steel components zinc plated to comply with ASTM B 633 or ASTM F 1941, Class Fe/Zn 5 unless otherwise indicated.
   2. Material for Exterior Locations and Where Stainless Steel Is Indicated: Stainless-steel bolts, ASTM F 593, and nuts, ASTM F 594.

2.7 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 or PVC.

B. Preformed Control-Joint Gaskets: Made from styrene-butadiene-rubber compound, complying with ASTM D 2000, Designation M2AA-805 and designed to fit standard sash block and to maintain lateral stability in masonry wall; size and configuration as indicated.

C. Bond-Breaker Strips: Asphalt-saturated, organic roofing felt complying with ASTM D 226, Type I (No. 15 asphalt felt).

D. Reinforcing Bar Positioners: Wire units designed to fit into mortar bed joints spanning masonry unit cells and 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.

2.8 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.

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.
   1. For reinforced masonry, use Type S.

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 Table 1.15.1 in ACI 530.1/ASCE 6/TMS 602 for dimensions of grout spaces and pour height.
   2. Proportion grout in accordance with ASTM C 476, Table 1.
   3. Provide grout with a slump of 8 to 11 inches as measured according to ASTM C 143/C 143M.

PART 3 EXECUTION

3.1 EXAMINATION

A. 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 work.
   2. Verify that foundations are within tolerances specified.
   3. Verify that reinforcing dowels are properly placed.

B. Before installation, examine rough-in and built-in construction for piping systems to verify actual locations of piping connections.

C. 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 the 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.

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: Unless otherwise indicated, 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 racking back units in each course from those in course below; do not tooth. When resuming work, clean masonry surfaces that are to receive mortar 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. 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.

3.5 MORTAR BEDDING AND JOINTING

A. Lay hollow CMUs as follows:
   1. With face shells fully bedded in mortar and with head joints of depth equal to bed joints.
   2. With webs fully bedded in mortar in all courses of piers, columns, and pilasters.
   3. With webs fully bedded in mortar in grouted masonry, including starting course on footings.
   4. With entire units, including areas under cells, fully bedded in mortar at starting course on footings where cells are not grouted.

B. Tool exposed joints slightly concave when thumbprint hard, using a jointer larger than joint thickness unless otherwise indicated.

3.6 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 as follows:
   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.

3.7 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 ACI 530.1/ASCE 6/TMS 602.

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 ACI 530.1/ASCE 6/TMS 602 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.

3.8 FIELD QUALITY CONTROL

A. Testing and Inspecting: The Contractor shall 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 meet specified requirements shall be done at Contractor's expense.

B. Inspections: Level 1 special inspections according to the "International Building Code."
   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. Grout Test (Compressive Strength): For each mix provided, according to ASTM C 1019.

3.9 PARGING

A. Parge exterior faces of below-grade masonry walls, where indicated, in 2 uniform coats to a total thickness of 3/4 inch. Dampen wall before applying first coat and scarify first coat to ensure full bond to subsequent coat.

B. Use a steel-trowel finish to produce a smooth, flat, dense surface with a maximum surface variation of 1/8 inch per foot. Form a wash at top of parging and a cove at bottom.

C. Damp-cure parging for at least 24 hours and protect parging until cured.

3.10 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 Engineer'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 cleaning method indicated in NCMA TEK 8-2A applicable to type of stain on exposed surfaces.

3.11 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. Excess Masonry Waste: Remove excess clean masonry waste that cannot be used as fill, as described above, and other masonry waste, and legally dispose of off Owner's property.

END OF SECTION

SECTION 05120 - STRUCTURAL STEEL

PART 1 - GENERAL

1.1 RELATED DOCUMENTS

A. Drawings and general provisions of the Contract, including General and Supplementary Conditions and Division 1 Specification Sections, apply to this Section.

1.2 SUMMARY

A. Section Includes:
   1. Structural Steel.

B. Related Sections:
   1. Division 1 Section "Quality Requirements" for independent testing agency procedures and administrative requirements Steel.
   2. Division 5 Section "Metal Fabrications" for steel lintels and shelf angles not attached to structural-steel frame, miscellaneous steel fabrications and other metal items not defined as structural steel Structural Steel.

1.3 DEFINITIONS

A. Structural Steel: Elements of structural-steel frame, as classified by AISC 303, "Code of Standard Practice for Steel Buildings and Bridges."

1.4 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. Show backing bars that are to be removed and supplemental fillet welds where backing bars are to remain.

C. Welding Procedure Specifications (WPSs) and Procedure Qualification Records (PQRs): Provide according to AWS D1.1/D1.1M, "Structural Welding Code - Steel," for each welded joint whether prequalified or qualified by testing, including the following:
   1. Power source (constant current or constant voltage).
   2. Electrode manufacturer and trade name, for demand critical welds.

D. Qualification Data: For qualified testing agency.

E. Welding certificates.

F. Paint Compatibility Certificates: From manufactures of topcoats applied over shop primers, certifying that shop primers are compatible with topcoats.

G. Mill test reports for structural steel, including chemical and physical properties..

H. Product Test Reports: For the following:

1. Bolts, nuts, and washers including mechanical properties and chemical analysis.

2. Shop primers.

1.5 QUALITY ASSURANCE

A. Fabricator Qualifications: A qualified fabricator that participates in the AISC Quality Certification Program and is designated an AISC-Certified Plant, Category STD.

B. Welding Qualifications: Qualify procedures and personnel according to AWS D1.1/D1.1M, "Structural Welding Code – Steel."

1. Welders and welding operators performing work on bottom-flange, demand-critical welds shall pass the supplemental welder qualification testing, as required by AWS D1.8. FCAW-S and FCAW-G shall be considered separate processes for welding personnel qualification.

C. Comply with applicable provisions of the following specifications and documents:

1. AISC 303.

2. AISC 341 and AISC 341s1.

3. AISC 360.

4. RCSC's "Specification for Structural Joints Using ASTM A 325 or A 490 Bolts."

1.6 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 corrosion and deterioration.

1. 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.

B. Store fasteners in a protected place in sealed containers with manufacturer's labels intact.

1. Fasteners may be repackaged provided Owner's testing and inspecting agency observes repackaging and seals containers.

2. Clean and relubricate bolts and nuts that become dry or rusty before use.

3. Comply with manufacturers' written recommendations for cleaning and lubricating ASTM F 1852 fasteners and for retesting fasteners after lubrication.

1.7 COORDINATION

A. Coordinate selection of shop primers with topcoats to be applied over them. Comply with paint and coating manufacturers' recommendations to ensure that shop primers and topcoats are compatible with one another.

B. Coordinate installation of 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

2.1 STRUCTURAL-STEEL MATERIALS

A. Channels, Angles-Shapes: ASTM A 36/A 36M.

B. Plate and Bar: ASTM A 36/A 36M.

C. Steel Pipe: ASTM A 53/A 53M, Type E or S, Grade B.

1. Weight Class: Standard.
2. Finish: Galvanized.

D. Welding Electrodes: Comply with AWS requirements.

2.2 BOLTS, CONNECTORS, AND ANCHORS

A. Unheaded Anchor Rods: ASTM F 1554, Grade 55, weldable.

1. Configuration: Hooked.
2. Nuts: ASTM A 563 (ASTM A 563M) hex carbon steel.
3. Plate Washers: ASTM A 36/A 36M carbon steel.
4. Washers: ASTM F 436 (ASTM F 436M), Type 1, hardened carbon steel.
5. Finish: Hot-dip zinc coating, ASTM A 153/A 153M, Class C.

B. Threaded Rods: ASTM A 36/A 36M.

1. Nuts: ASTM A 563 (ASTM A 563M) heavy-hex carbon steel.
2. Washers: ASTM F 436 (ASTM F 436M), Type 1, hardened carbon steel.
3. Finish: Hot-dip zinc coating, ASTM A 153/A 153M, Class C.

C. Clevises and Turnbuckles: Made from cold-finished carbon steel bars, ASTM A 108, Grade 1035.

D. Eye Bolts and Nuts: Made from cold-finished carbon steel bars, ASTM A 108, Grade 1030.

E. Sleeve Nuts: Made from cold-finished carbon steel bars, ASTM A 108, Grade 1018.

2.3 PRIMER

A. Primer: SSPC-Paint 25, Type II, zinc oxide, alkyd, linseed oil primer.

B. Galvanizing Repair Paint: ASTM A 780.

2.4 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 360.

1. Fabricate beams with rolling camber up.

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/D1.1M.

C. Finishing: Accurately finish ends of columns and other members transmitting bearing loads.

D. Holes: Provide holes required for securing other work to structural steel and for other work to pass 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. Weld threaded nuts to framing and other specialty items indicated to receive other work.

2.5 SHOP CONNECTIONS

A. Weld Connections: Comply with AWS D1.1/D1.1M and AWS D1.8/D1.8M for tolerances, appearances, welding procedure specifications, weld quality, and methods used in correcting welding work.

2.6 SHOP PRIMING

A. Shop prime steel surfaces except the following:

1. Surfaces to be field welded.

2. Galvanized surfaces.

B. Painting: Prepare steel and apply a one-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 (0.038 mm).

2.7 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 and drain holes that will be exposed in the finished Work unless they will function as weep holes, by plugging with zinc solder and filing off smooth.

2.8 SOURCE QUALITY CONTROL

A. Testing Agency: The 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. Welded Connections: In addition to visual inspection, shop-welded connections will be tested and inspected according to AWS D1.1/D1.1M 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

3.1 EXAMINATION

A. Verify, with steel Erector present, elevations of concrete- and masonry-bearing surfaces and locations of anchor rods, bearing plates, and other embedments for compliance with requirements.

1. Prepare a certified survey of bearing surfaces, anchor rods, bearing plates, and other embedments showing dimensions, locations, angles, and elevations.

B. Proceed with installation only after unsatisfactory conditions have been corrected.

3.2 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.

1. Do not remove temporary shoring supporting composite deck construction until cast-in-place concrete has attained its design compressive strength.

3.3 ERECTION

A. Set structural steel accurately in locations and to elevations indicated and according to AISC 303 and AISC 360.

B. Maintain erection tolerances of structural steel within AISC's "Code of Standard Practice for Steel Buildings and Bridges."

C. Align and adjust various members that form 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.

2. Make allowances for difference between temperature at time of erection and mean temperature when structure is completed and in service

D. Splice members only where indicated.

E. Do not use thermal cutting during erection unless approved by Architect. Finish thermally cut sections within smoothness limits in AWS D1.1/D1.1M.

F. Do not enlarge unfair holes in members by burning or using drift pins. Ream holes that must be enlarged to admit bolts.

3.4 FIELD CONNECTIONS

A. Weld Connections: Comply with AWS D1.1/D1.1M and AWS D1.8/D1.8M for tolerances, appearances, welding procedure specifications, weld quality, and methods used in correcting welding work.

1. Comply with AISC 303 and AISC 360 for bearing, alignment, adequacy of temporary connections, and removal of paint on surfaces adjacent to field welds.

2. Remove backing bars or runoff tabs where indicated, back gouge, and grind steel smooth.

3.5 FIELD QUALITY CONTROL

A. Testing Agency: The Contractor shall engage a qualified independent testing and inspecting agency to inspect field welds.

B. Welded Connections: Field welds will be visually inspected according to AWS D1.1/D1.1M.

1. In addition to visual inspection, field welds will be tested and inspected according to AWS D1.1/D1.1M 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.

C. Correct deficiencies in Work that test reports and inspections indicate does not comply with the Contract Documents. Select one of three options in subparagraph below. SDI allows lapped or butted ends for roof deck. FMG recommends ends lap a minimum of 2 inches (51 mm).

3.6 REPAIRS AND PROTECTION

A. Galvanized Surfaces: Clean areas where galvanizing is damaged or missing and repair galvanizing to comply with ASTM A 780.

B. Touchup Painting: Immediately after erection, clean exposed areas where primer is damaged or missing and paint with the same material as used for shop painting to comply with SSPC-PA 1 for touching up shop-painted surfaces.

1. Clean and prepare surfaces by SSPC-SP 2 hand-tool cleaning or SSPC-SP 3 power-tool cleaning.

END OF SECTION

SECTION 05310

STEEL DECK

PART 1 GENERAL

1.1 SUMMARY

A. This Section includes the following:
   1. Roof deck.

B. Related Sections include the following:
   1. Section 05400 – Cold Formed Metal Framing.

1.2 UNIT PRICE - MEASUREMENT AND PAYMENT

A. Basis of Measurement: Lump Sum.

B. Basis of Payment: Includes preparation of substrate, deck placement and installation.

1.3 SUBMITTALS

A. Product Data: For each type of deck, accessory, and product indicated.

B. Shop Drawings: Show layout and types of deck panels, anchorage details, reinforcing channels, pans, cut deck openings, special jointing, accessories, and attachments to other construction.

C. Product Certificates: For each type of steel deck, signed by product manufacturer.

D. Research/Evaluation Reports: For steel deck.

1.4 DELIVERY, STORAGE, AND HANDLING

A. Protect steel deck from corrosion, deformation, and other damage during delivery, storage, and handling.

B. Stack steel deck on platforms or pallets and slope to provide drainage. Protect with a waterproof covering and ventilate to avoid condensation.

PART 2 PRODUCTS

2.1 MANUFACTURERS

A. Manufacturers: Subject to compliance with requirements, provide products by the following:
   1. Steel Deck:
      a. Verco Manufacturing Co.
      b. ASC Profiles, Inc.
      c. Nucor Corp.; Vulcraft Division.

2.2 ROOF DECK

A. Steel Roof Deck: Fabricate panels, without top-flange stiffening grooves, to comply with "SDI Specifications and Commentary for Steel Roof Deck," in SDI Publication No. 30, and with the following:
   1. Galvanized Steel Sheet: ASTM A 653/A 653M, Structural Steel (SS), Grade 40, G90 zinc coating.
   2. Deck Profile: As indicated.
   3. Profile Depth: As indicated.
   4. Design Uncoated-Steel Thickness: As indicated.
   5. Side Laps: Overlapped.

2.3 ACCESSORIES

A. General: Provide manufacturer's standard accessory materials for deck that comply with requirements indicated.

B. Mechanical Fasteners: Corrosion-resistant, self-drilling, self-threading screws.

C. Side-Lap Fasteners: Corrosion-resistant, hexagonal washer head; self-drilling, carbon-steel screws.

D. Miscellaneous Sheet Metal Deck Accessories: Steel sheet, minimum yield strength of 33,000 psi, not less than 0.0359-inch design uncoated thickness, of same material and finish as deck; of profile indicated or required for application.

E. Galvanizing Repair Paint: ASTM A 780.

PART 3 EXECUTION

3.1 EXAMINATION

A. Examine supporting frame and field conditions for compliance with requirements for installation tolerances and other conditions affecting performance.

3.2 INSTALLATION, GENERAL

A. Install deck panels and accessories according to applicable specifications and commentary in SDI Publication No. 30, manufacturer's written instructions, and requirements in this Section.

B. Locate deck bundles to prevent overloading of supporting members.

C. Place deck panels on supporting frame and adjust to final position with ends accurately aligned and bearing on supporting frame before being permanently fastened. Do not stretch or contract side-lap interlocks.

D. Place deck panels flat and square and fasten to supporting frame without warp or deflection.

E. Cut and neatly fit deck panels and accessories around openings and other work projecting through or adjacent to deck.

F. Locate mechanical fasteners and install according to deck manufacturer's written instructions.

3.3 ROOF-DECK INSTALLATION

A. Fasten roof-deck panels to steel supporting members with mechanical fasteners.

B. Side-Lap and Perimeter Edge Fastening: Fasten side laps and perimeter edges of panels between supports, at intervals not exceeding 12, and as follows:
   1. Mechanically fasten with self-drilling, carbon-steel screws.

C. End Bearing: Install deck ends over supporting frame with a minimum end bearing of 1-1/2 inches, with end joints as follows:
   1. End Joints: Lapped 2 inches minimum.

D. Miscellaneous Roof-Deck Accessories: Install ridge and valley plates, finish strips, end closures, and reinforcing channels according to deck manufacturer's written instructions. Mechanically fasten to substrate to provide a complete deck installation.

3.4 REPAIRS AND PROTECTION

A. Galvanizing Repairs: Prepare and repair damaged galvanized coatings on both surfaces of deck with galvanized repair paint according to ASTM A 780 and manufacturer's written instructions.

B. Provide final protection and maintain conditions to ensure that steel deck is without damage or deterioration at time of Substantial Completion.

END OF SECTION

SECTION 05400

COLD-FORMED METAL FRAMING

PART 1 GENERAL

1.1 SUMMARY

A. This Section includes the following:
   1. Roof trusses.

1.2 UNIT PRICE - MEASUREMENT AND PAYMENT

A. Basis of Measurement: Lump Sum

B. Basis of Payment: Includes fabrication and installation of roof trusses and associated framing.

1.3 PERFORMANCE REQUIREMENTS

A. Structural Performance: Provide cold-formed metal framing capable of withstanding design loads within limits and under conditions indicated.
   1. Design Loads: As indicated.
   2. Deflection Limits: Design framing systems to withstand design loads without deflections greater than the following:
      a. Roof Trusses: Vertical deflection of 1/240 of the span under dead and live loads and. 1/360 of the span under wind or live load only.
   3. Design framing systems to provide for movement of framing members without damage or overstressing, sheathing failure, connection failure, undue strain on fasteners and anchors, or other detrimental effects when subject to a maximum ambient temperature change of 120 deg F.

B. Cold-Formed Steel Framing, General: Design according to AISI's "Standard for Cold-Formed Steel Framing - General Provisions."
   1. Roof Trusses: Design according to AISI's "Standard for Cold-Formed Steel Framing - Truss Design."

1.4 SUBMITTALS

A. Product Data: For each type of cold-formed metal framing product and accessory indicated.

B. Shop Drawings: Show layout, spacings, sizes, thicknesses, and types of cold-formed metal framing; fabrication; and fastening and anchorage details, including mechanical fasteners. Show reinforcing channels, opening framing, supplemental framing, strapping, bracing, bridging, splices, accessories, connection details, and attachment to adjoining work.
   1. For cold-formed metal framing indicated to comply with design loads, include structural analysis data signed and sealed by the qualified professional engineer responsible for their preparation.

C. Product Test Reports: From a qualified testing agency, unless otherwise stated, indicating that each of the following complies with requirements, based on evaluation of comprehensive tests for current products:
   1. Steel sheet.
   2. Expansion anchors.
   3. Mechanical fasteners.
   4. Miscellaneous structural clips and accessories.

D. Research/Evaluation Reports: For cold-formed metal framing.

1.5 QUALITY ASSURANCE

A. Engineering Responsibility: Preparation of Shop Drawings, design calculations, and other structural data by a qualified professional engineer.

B. Professional Engineer Qualifications: A professional engineer who is legally qualified to practice in jurisdiction where Project is located and who is experienced in providing engineering services of the kind indicated. Engineering services are defined as those performed for installations of cold-formed metal framing that are similar to those indicated for this Project in material, design, and extent.

C. Testing Agency Qualifications: An independent testing agency, acceptable to authorities having jurisdiction, qualified according to ASTM E 329 to conduct the testing indicated.

D. Product Tests: Mill certificates or data from a qualified independent testing agency indicating steel sheet complies with requirements, including base-metal thickness, yield strength, tensile strength, total elongation, chemical requirements, and metallic-coating thickness.

E. AISI Specifications and Standards: Comply with AISI's "North American Specification for the Design of Cold-Formed Steel Structural Members" and its "Standard for Cold-Formed Steel Framing - General Provisions."
   1. Comply with AISI's "Standard for Cold-Formed Steel Framing - Truss Design."

1.6 DELIVERY, STORAGE, AND HANDLING

A. Protect cold-formed metal framing from corrosion, deformation, and other damage during delivery, storage, and handling.

B. Store cold-formed metal framing, protect with a waterproof covering, and ventilate to avoid condensation.

PART 2 PRODUCTS

2.1 MANUFACTURERS

A. Available Manufacturers: Subject to compliance with requirements, manufacturers offering cold-formed metal framing that may be incorporated into the Work include, but are not limited to, the following:

B. Manufacturers: Subject to compliance with requirements, provide cold-formed metal framing by one of the following:
   1. California Expanded Metal Products Company.
   2. Clark Steel Framing.
   3. Dietrich Metal Framing; a Worthington Industries Company.

2.2 MATERIALS

A. Steel Sheet: ASTM A 1003/A 1003M, Structural Grade, Type H, metallic coated, of grade and coating weight as follows:
   1. Grade: Grade 33 for members 0.0329 or 0.0428 inches thick and Grade 50 for members 0.0538, 0.0677 or 0.0966 inches thick.
   2. Coating: G60.

2.3 ROOF TRUSSES

A. Roof Truss Members: Manufacturer's standard-C-shaped steel sections, of web depths indicated, unpunched, with stiffened flanges.
   1. Minimum Base-Metal Thickness: 0.0329 inch.
   2. Flange Width: 1-5/8 inches, minimum.

2.4 FRAMING ACCESSORIES

A. Fabricate steel-framing accessories from steel sheet, ASTM A 1003/A 1003M, Structural Grade, Type H, metallic coated, of same grade and coating weight used for framing members.

B. Provide accessories of manufacturer's standard thickness and configuration, unless otherwise indicated, as follows:
   1. Supplementary framing.
   2. Bracing, bridging, and solid blocking.
   3. Web stiffeners.
   4. Gusset plates.

2.5 ANCHORS, CLIPS, AND FASTENERS

A. Steel Shapes and Clips: ASTM A 36/A 36M, zinc coated by hot-dip process according to ASTM A 123/A 123M.

B. Anchor Bolts: ASTM F 1554, Grade 55, threaded carbon-headless, hooked bolts and carbon-steel nuts; and flat, hardened-steel washers; zinc coated by hot-dip process according to ASTM A 153/A 153M, Class C.

C. Expansion Anchors: Fabricated from corrosion-resistant materials, with capability to sustain, without failure, a load equal to 5 times design load, as determined by testing per ASTM E 488 conducted by a qualified independent testing agency.

D. Mechanical Fasteners: ASTM C 1513, corrosion-resistant-coated, self-drilling, self-tapping steel drill screws.
   1. Head Type: Low-profile head beneath sheathing, manufacturer's standard elsewhere.

2.6 MISCELLANEOUS MATERIALS

A. Galvanizing Repair Paint: SSPC-Paint 20 or DOD-P-21035.

B. Cement Grout: Portland cement, ASTM C 150, Type I; and clean, natural sand, ASTM C 404. Mix at ratio of 1 part cement to 2-1/2 parts sand, by volume, with minimum water required for placement and hydration.

C. Nonmetallic, Nonshrink Grout: Premixed, nonmetallic, noncorrosive, nonstaining grout containing selected silica sands, portland cement, shrinkage-compensating agents, and plasticizing and water-reducing agents, complying with ASTM C 1107, with fluid consistency and 30-minute working time.

D. Shims: Load bearing, high-density multimonomer plastic, nonleaching.

E. Sealer Gaskets: Closed-cell neoprene foam, 1/4 inch thick, selected from manufacturer's standard widths to match width of bottom track or rim track members.

2.7 FABRICATION

A. Fabricate cold-formed metal framing and accessories plumb, square, and true to line, and with connections securely fastened, according to referenced AISI's specifications and standards, manufacturer's written instructions, and requirements in this Section.
   1. Fabricate framing assemblies using jigs or templates.
   2. Cut framing members by sawing or shearing; do not torch cut.
   3. Fasten cold-formed metal framing members by screw fastening. Wire tying of framing members is not permitted.
      a. Locate mechanical fasteners and install according to Shop Drawings, with screw penetrating joined members by not less than three exposed screw threads.
   4. Fasten other materials to cold-formed metal framing by screw fastening according to Shop Drawings.

B. Reinforce, stiffen, and brace framing assemblies to withstand handling, delivery, and erection stresses. Lift fabricated assemblies to prevent damage or permanent distortion.

C. Fabrication Tolerances: Fabricate assemblies level, plumb, and true to line to a maximum allowable tolerance variation of 1/8 inch in 10 feet and as follows:
   1. Spacing: Space individual framing members no more than plus or minus 1/8 inch from plan location. Cumulative error shall not exceed minimum fastening requirements of sheathing or other finishing materials.
   2. Squareness: Fabricate each cold-formed metal framing assembly to a maximum out-of-square tolerance of 1/8 inch.

PART 3 EXECUTION

3.1 EXAMINATION

A. Examine supporting substrates and abutting structural framing for compliance with requirements for installation tolerances and other conditions affecting performance.

1. Proceed with installation only after unsatisfactory conditions have been corrected.

3.2 INSTALLATION, GENERAL

A. Cold-formed metal framing may be shop or field fabricated for installation, or it may be field assembled.

B. Install cold-formed metal framing according to AISI's "Standard for Cold-Formed Steel Framing - General Provisions" and to manufacturer's written instructions unless more stringent requirements are indicated.

C. Install shop- or field-fabricated, cold-formed framing and securely anchor to supporting structure.

D. Install cold-formed metal framing and accessories plumb, square, and true to line, and with connections securely fastened.
1. Cut framing members by sawing or shearing; do not torch cut.
2. Fasten cold-formed metal framing members by screw fastening. Wire tying of framing members is not permitted.
a. Locate mechanical fasteners and install according to Shop Drawings, and complying with requirements for spacing, edge distances, and screw penetration.

E. Install framing members in one-piece lengths unless splice connections are indicated for track or tension members.

F. Install temporary bracing and supports to secure framing and support loads comparable in intensity to those for which structure was designed. Maintain braces and supports in place, undisturbed, until entire integrated supporting structure has been completed and permanent connections to framing are secured.

G. Do not bridge building expansion and control joints with cold-formed metal framing. Independently frame both sides of joints.

H. Erection Tolerances: Install cold-formed metal framing level, plumb, and true to line to a maximum allowable tolerance variation of 1/8 inch in 10 feet and as follows:
1. Space individual framing members no more than plus or minus 1/8 inch from plan location. Cumulative error shall not exceed minimum fastening requirements of sheathing or other finishing materials.

3.3 TRUSS INSTALLATION

A. Install, bridge, and brace trusses according to Shop Drawings and requirements in this Section.

B. Truss Spacing: 24 inches.

C. Do not alter, cut, or remove framing members or connections of trusses.

D. Erect trusses with plane of truss webs plumb and parallel to each other, align, and accurately position at spacings indicated.

E. Erect trusses without damaging framing members or connections.

F. Align webs of bottom chords and load-bearing studs or continuously reinforce track to transfer loads to structure. Anchor trusses securely at all bearing points.

G. Install continuous bridging and permanently brace trusses as indicated on Shop Drawings and designed according to LGSEA's Technical Note 551e, "Design Guide for Permanent Bracing of Cold-Formed Steel Trusses."

3.4 FIELD QUALITY CONTROL

A. Testing: The Contractor shall engage a qualified independent testing and inspecting agency to perform field tests and inspections and prepare test reports.

B. Testing agency will report test results promptly and in writing to Contractor and Engineer.

C. Remove and replace work where test results indicate that it does not comply with specified requirements.

D. Additional testing and inspecting, at Contractor's expense, will be performed to determine compliance of replaced or additional work with specified requirements.

3.5 REPAIRS AND PROTECTION

A. Galvanizing Repairs: Prepare and repair damaged galvanized coatings on fabricated and installed cold-formed metal framing with galvanized repair paint according to ASTM A 780 and manufacturer's written instructions.

B. Provide final protection and maintain conditions, in a manner acceptable to manufacturer and Installer, that ensure that cold-formed metal framing is without damage or deterioration at time of Substantial Completion.

END OF SECTION

SECTION 05500

MISCELLANEOUS METALS

PART 1 - GENERAL

1.1 SUMMARY

A. Provide all miscellaneous metal fabrication work, including but not limited to the following:

1. All miscellaneous steel attachments, brackets, supports, plates, angles, anchors, bolts, expansion shields, grout, etc. for all items in this and other sections, and other accessories shown in details and/or required for the complete installation of all work.

2. Hot-dip galvanize all items provided in this section including all anchors, inserts and bolts.

1.2 RELATED SECTIONS

A. Section 03300 Cast In Place Concrete.

B. Section 04816 Concrete Masonry Assemblies.

1.3 QUALITY ASSURANCE

A. Fabricator Qualifications: Firms experienced in successfully producing metal fabrications similar to that indicated for this Project, with sufficient production capacity to produce required units without causing delay in the Work.

B. Qualify welding processes and welding operators in accordance with AWS D1.1 "Structural Welding Code - Steel," D1.3 "Structural Welding Code - Sheet Steel", and D1.2 "Structural Welding Code - Aluminum."

1.4 SUBMITTALS

A. Shop drawings detailing fabrication and erection of each metal fabrication indicated. Include plans, elevations, sections, and details of metal fabrications and their connections. Show anchorage and accessory items, Provide templates for anchors and bolts specified for installation under other sections.

1. Where installed metal fabrications are indicated to comply with certain design loadings, include structural computations, material properties, and other information needed for structural analysis that has been signed and sealed by the qualified professional engineer who was responsible for their preparation.

B. Welder certificates signed by Contractor certifying that welders comply with requirements specified under "Quality Assurance" article.

C. Product Data: Submit manufacturer's product data for miscellaneous metal fabrications, including anchors and grouts required for this installation.

D. Coordination Drawings: For formed-metal fabrications housing items specified in other Sections. Show dimensions of housed items, including locations of housing penetrations and attachments, and necessary clearances.

E. Mill Certificates: Signed by manufacturers of stainless steel sheet certifying that products furnished comply with requirements.

1.5 PROJECT CONDITIONS

A. Field Measurements: Check actual locations of walls and other construction to which metal fabrications must fit, by accurate field measurements before fabrication; show recorded measurements on shop drawings. Coordinate fabrication schedule with construction progress to avoid delay of Work.

1. Where field measurements cannot be made without delaying the Work, guarantee dimensions and proceed with fabrication of products without field measurements. Coordinate construction to ensure that actual opening dimensions correspond to guaranteed dimensions. Allow for trimming and fitting.

1.6 DELIVERY, STORAGE AND HANDLING

A. Deliver metal fabrications wrapped in protective coverings and strapped together in suitable packs or in heavy-duty cartons. Remove protective coverings before they stain or bond to finished surfaces.

B. Store products on elevated platforms in a dry location.

PART 2 - PRODUCTS

2.1 MATERIALS

A. Sheet Metal: Provide sheet metal without pitting, seam marks, roller marks, stains, discolorations, or other imperfections where exposed to view on finished units.

1. Stainless-Steel Sheet: ASTM A 666, Type 304, stretcher-leveled standard of flatness.

B. Steel Bars, Angles, Plates, Rolled Shapes: ASTM A 36 and ASTM A 758T.

C. Rolled Steel Floor Plates: ASTM A 786.

D. Steel Bars of Gratings: ASTM A 569 or ASTM A36.

E. Wire Rod for Grating Cross Bars: ASTM A 510.

F. Steel Pipe: ASTM A53, Type S, Grade A, Schedule 40, Galvanized.

G. Steel Tubes and Pipes: ASTM A 501. Pipes to be Schedule 40.

H. Fasteners: Use fasteners fabricated from same basic metal and alloy as fastened metal, unless otherwise indicated. Do not use metals that are corrosive or incompatible with materials joined.

1. Provide concealed fasteners for interconnecting formed-metal fabrications and for attaching them to other work, unless otherwise indicated.
2. Provide Phillips flat-head machine screws for exposed fasteners, unless otherwise indicated.

I. Bolts, Nuts, and Washers: ASTM A 307, Grade A. High strength bolts; ASTM A 325; hot-dip galvanized. Type 304 stainless steel to match materials being fastened.

J. Expansion Shields: ICBO approved, hot-dip galvanized.

K. Toggle Bolts: ICBO approved, tumble-wing type of class, style, and type as required; hot-dip galvanized in accordance with ASTM A 153, cadmium plated, or otherwise treated for corrosion resistance.

L. Concrete Inserts: Threaded or wedge type; galvanized ferrous castings, either malleable iron, ASTM A 47, or cast steel, ASTM A 27. Provide bolts, washers, and shims as required, hot-dip galvanized per ASTM A 153.

M. Welding Rods and Bare Electrodes: Select in accordance with AWS specifications for the metal alloy to be welded.

N. Shop Paint:

1. Metal Primer Paint: Clean galvanized metal surfaces as recommended by paint manufacturer and apply one coat of Rust-Oleum Galvinoleum or ZRC to all welded or abraded areas.
2. Primer selected must be compatible with finish coats of paint. Coordinate selection of metal primer with finish paint requirements specified in Division 9.
3. Bituminous Paint: Cold-applied asphalt mastic complying with SSPC-Paint 12 except containing no asbestos fibers.

O. Galvanizing Repair Paint: High zinc dust content paint for regalvanizing welds in galvanized steel, with dry film containing not less than 95 percent zinc dust by weight, and passing Preece Test, ASTM A 239-41. Clean metal surfaces as recommended by paint manufacturer and apply a minimum coating thickness of 0.003 inches.

P. Grout:

1. Nonshrink Nonmetallic Grout: Waterproof, premixed, factory-packaged, nonstaining, noncorrosive, nongaseous grout complying with ASTM C 1107. Provide grout specifically recommended by manufacturer for interior and exterior applications of type specified in this Section.
2. Subject to compliance with requirements, provide one of the following or approved equal.
   a. "Euco N-S Grout"; Euclid Chemical Co.
   b. "Masterflow 713"; Master Builders.
   c. "Sonogrout"; Sonneborn Building Products Div., ChemRex, Inc.

2.2 FABRICATION

A. Workmanship:

1. Form metal fabrications from materials of size and thickness shown or, if not shown, of required size and thickness to comply with performance requirements. Work to dimensions shown or accepted on shop drawings, using proven details of fabrication and support. Use type of materials shown or specified for various components of each metal fabrication.
2. Form exposed work true to line and level with accurate angles and surfaces and straight sharp edges, in maximum lengths to minimize joints. Ease exposed edges to a radius of approximately 1/32" unless otherwise shown. Form bent-metal corners to smallest radius possible without causing grain separation or otherwise impairing work. Fold back exposed edges of unsupported sheet metal to form a 1/2 inch wide hem on the concealed side, or ease edges to a radius of approximately 1/32 inch and support with concealed stiffeners.
3. Increase metal thickness or reinforce with concealed stiffeners, backing materials, or both, as needed to provide surface flatness specified for stretcher-leveled sheet metal and sufficient strength for indicated use.
   a. Support joints with concealed stiffeners as needed to hold exposed faces of adjoining sheets in flush alignment.
4. Provide for anchorage of type shown or required, coordinated with supporting structure. Fabricate and space anchoring devices to provide adequate support for intended use.

5. Provide support framing, mounting and attachment clips, splice sleeves, fasteners, and accessories needed to install formed-metal fabrications.
6. Cut, reinforce, drill and tap miscellaneous metal work as indicated to receive finish hardware and similar items.
7. Shear and punch metals cleanly and accurately. Remove burrs.
8. Remove sharp or rough areas on exposed traffic surfaces.
9. Weld or braze corners and seams continuously to comply with AWS recommendations and the following:
    a. Use materials and methods that minimize distortion and develop strength and corrosion resistance of base metals.
    b. Obtain fusion without undercut or overla
    c. At exposed connections, finish exposed welds and surfaces smooth and blended so that no roughness shows after finishing and contour of welded surface matches those adjacent.
    d. Use welding and brazing procedures that will blend with and not cause discoloration of metal being joined.

B. Shop Assembly: Preassemble items in shop to greatest extent possible to minimize field splicing and assembly. Disassemble units only as necessary for shipping and handling limitations. Use connections that maintain structural value of joined pieces. Clearly mark units for reassembly and coordinated installation.

C. Loose Bearing and Leveling Plates:
1. Provide loose bearing and leveling plates for steel items bearing on masonry or concrete construction, made flat, free from warps or twists, and of required thickness and bearing area. Drill plates to receive anchor bolts and for grouting as required. Galvanize after fabrication.

D. Miscellaneous Framing and Supports:
1. General: Provide miscellaneous steel framing and supports for applications indicated or which are not a part of structural steel framework, as required to complete work.
2. Fabricate miscellaneous units to sizes, shapes, and profiles indicated or, if not indicated, of required dimension to receive adjacent other construction to be retained by framing and supports. Fabricate from structural steel shapes, plates, and steel bars as required. Cut, drill, and tap units to receive hardware, hangers, and similar items.
    a. Equip units with integrally welded anchors for casting into concrete or building into masonry. Furnish inserts if units must be installed after concrete is placed.

2.3 FINISHES, GENERAL

A. Comply with NAAMM "Metal Finishes Manual" for recommendations relative to application and designations of finishes.

B. Finish metal fabrications after assembly.

2.4 STEEL AND IRON FINISHES

A. Galvanizing: Galvanize all metal fabrication items by applying zinc-coating by the hot-dip process in compliance with the following requirements:
   1. ASTM A 153 for galvanizing iron and steel hardware.
   2. ASTM A 123 for galvanizing both fabricated and unfabricated iron and steel products made of uncoated rolled, pressed, and forged shapes, plates, bars, and strip 0.0299 inch thick and heavier.

B. Shop Painting:
   1. Shop paint all miscellaneous metal work and galvanized surfaces, unless otherwise specified.
   2. Immediately after surface preparation, brush or spray on primer in accordance with manufacturer's instructions, and at a rate to provide uniform dry film thickness of 2.0 mils for each coat. Use painting methods which will result in full coverage of joints, corners, edges and exposed surfaces.

PART 3 - EXECUTION

3.1 INSTALLATION

A. Fastening to In-Place Construction: Provide anchorage devices and fasteners where necessary for securing miscellaneous metal fabrications to in-place construction; including, toggle bolts, through-bolts, lag bolts, wood screws and other connectors as required.

B. Cutting, Fitting and Placement: Perform cutting, drilling, and fitting required for installation of miscellaneous metal fabrications. Set work accurately in location, alignment and elevation, plumb, level, true and free of rack, measured from established lines and levels. Form tight joints with exposed connections accurately fitted together.

C. Provide temporary bracing or anchors in formwork for items that are built into concrete masonry or similar construction.

D. Fit exposed connections accurately together to form hairline joints. Weld connections that are not to be left as exposed joints, but cannot be shop welded because of shipping size limitations. Do not weld, cut, or abrade

the surfaces of exterior units which have been hot-dip galvanized after fabrication, and are intended for bolted or screwed field connections.

E. Field Welding: Comply with AWS Code for procedures of manual shielded metal-arc welding, appearance and quality of welds made, methods used in correcting welding work, and the following;
   1. Use materials and methods that minimize distortion and develop strength and corrosion resistance of base metals.
   2. Obtain fusion without undercut or overlap.
   3. Remove welding flux immediately.
   4. At exposed connections, finish exposed welds and surfaces smooth and blended so that no roughness shows after finishing and contour of welded surface matches those adjacent.

3.2 SETTING LOOSE PLATES

A. Clean concrete and masonry bearing surfaces of any bond-reducing materials, and roughen to improve bond to surfaces. Clean bottom surface of bearing plates.

B. Set loose leveling and bearing plates on wedges, or other adjustable devices. After the bearing members have been positioned and plumbed, tighten the anchor bolts. Do not remove wedges or shims, but if protruding, cut off flush with the edge of the bearing plate before packing with grout.
   1. Use nonmetallic nonshrink grout, unless otherwise indicated.
   2. Pack grout solidly between bearing surfaces and plates to ensure that no voids remain.

3.3 ADJUST AND CLEAN:

A. Touch-Up Painting: Immediately after erection, clean bolted connection and abraded areas of shop paint, and paint exposed areas with same material as used for shop painting. Apply by brush or spray to provide a minimum dry film thickness of 2.0 mils.

B. For galvanized surfaces clean welds, bolted connections and abraded areas and apply galvanizing repair paint to comply with ASTM A 780.

C. Restore finishes damaged during installation and construction period so no evidence remains of correction work. Return items that cannot be refinished in the field to the shop; make required alterations and refinish entire unit or provide new units.

3.4 PROTECTION

A. Protect finishes for metal fabrications from damage during construction period. Remove temporary protective coverings at time of Substantial Completion.

END OF SECTION

SECTION-05580

FORMED SHEET METAL

PART 1 – GENERAL

1.1 SUMMARY

A. This Section includes food service equipment indicated on Drawings.
   1. Provide stainless steel sheet metal finish on countertops as indicated on drawings.
   2. Coordinate work for plumbing fittings and drains.

1.2 RELATED SECTIONS

A. Section 06200 – Finish Carpentry

1.3 SUBMITTALS

A. Shop Drawings: Include plans, elevations, sections, roughing-in dimensions, fabrication details, service requirements, and attachments to other work.

1.4 QUALITY ASSURANCE

A. Installer Qualifications: Engage an experienced installer to perform work of this Section who has specialized in installing sheet metal on countertops.

B. SMACNA Standard: Where applicable, fabricate sheet metal to comply with the Sheet Metal and Air Conditioning Contractors National Association's (SMACNA) "Kitchen Equipment Fabrication Guideline," unless otherwise indicated.

1.5 PROJECT CONDITIONS

A. Field Measurements: Verify dimensions of sheet metal installation areas by field measurements before fabrication and indicate measurements on Shop Drawings and Coordination Drawings. Coordinate fabricate schedule with construction progress to avoid delaying the Work.

1.8 COORDINATION

A. Coordinate sheet metal layout and installation with other work, including plumbing fixtures.

PART 2 – PRODUCTS

2.1 MATERIALS

A. Stainless-Steel Sheet, Strip, Plate, and Flat Bar: ASTM A 666, Type 304, stretcher leveled, and in finish specified in "Stainless-Steel Finishes" Article.

2.2 FABRICATION, GENERAL

A. Factory assemble equipment to greatest extent possible.

B. Welding: Weld stainless steel sheet where required.. Use welding rod of same composition as metal being welded. Use methods that minimize distortion and develop strength and corrosion resistance of base metal. Provide ductile welds free of mechanical imperfections such as gas holes, pits, or cracks.

1. Welded Butt Joints: Provide full-penetration welds for full-joint length. Make joints flat, continuous, and homogenous with sheet metal without relying on straps under seams, filling in with solder, or spot welding.
2. Grind exposed welded joints flush with adjoining material and polish to match adjoining surfaces.
3. Coat unexposed stainless-steel welded joints with suitable metallic-based paint to prevent corrosion.
5. After zinc-coated steel is welded, clean welds and abraded areas and apply SSPC-Paint 20, high-zinc-dust-content, galvanizing repair paint to comply with ASTM A 780.

C. Fabricate field-assembled equipment prepared for field-joining methods indicated. For metal butt joints, comply with referenced SMACNA standard, unless otherwise indicated.

D. Form metal with break bends that are not flaky, scaly, or cracked in appearance; where breaks mar uniform surface appearance of material, remove marks by grinding, polishing, and finishing.

E. Sheared Metal Edges: Finish free of burrs, fins, and irregular projections.

F. Provide surfaces in food zone, as defined in NSF 2, free from exposed fasteners.

2.3 STAINLESS-STEEL COUNTERS

A. Edges and Backsplashes: Provide equipment edges indicated complying with referenced SMACNA standard, unless otherwise indicated.

B. Counters: Fabricate as follows:
   1. Tops: Minimum 0.0781-inch- (1.984-mm-) thick stainless steel, unless otherwise indicated.

2.4 STAINLESS-STEEL FINISHES

A. General: Comply with NAAMM's "Metal Finishes Manual for Architectural and Metal Products" for recommendations relative to applying and designating finishes.
   1. Remove or blend tool and die marks and stretch lines into finish.
   2. Grind and polish surface to produce uniform, directional textured, polished finish indicated, free of cross scratches. Run grain with long dimension of each piece.

B. Exposed Surfaces: No.4 finish (bright, directional polished).

C. When polishing is completed, passivate and rinse surfaces. Remove embedded foreign matter and leave surfaces chemically clean.

D. Protect mechanical finishes on exposed surfaces from damage by applying a strippable, temporary protective covering before shipment.

PART 3 – EXECUTION

3.1 EXAMINATION

A. Examine areas and conditions, with Installer present, for compliance with requirements for installation tolerances, service-utility connections, and other conditions affecting installation and performance of food service equipment. Do not proceed with installation until unsatisfactory conditions have been corrected.

3.2 INSTALLATION, GENERAL

A. Provide Counters: Level and plumb, according to manufacture's written instructions, original design, and referenced standards.

B. Complete countertop sheet field assembly, where required, using methods indicated.
   1. Provide closed butt and contact joints that do not require a filler.
   2. Grind field welds on stainless-steel equipment smooth, and polish to match adjacent finish. Comply with welding requirements in Fabrication, General Article.

3.3 PROTECTING

A. Provide final protection of stainless steel sheets over countertops. Protect against damage or deterioration at the time of Substantial Completion.

END OF SECTION