House District 51
Senate District 25

THE TWENTY-EIGHTH LEGISLATURE
APPLICATION FOR GRANTS
CHAPTER 42F, HAWAII REVISED STATUTES

Log No:

For Legislature's Use Only

Type of Grant Request:

GRANT REQUEST – OPERATING GRANT REQUEST X CAPITAL

"Grant" means an award of state funds by the legislature, by an appropriation to a specified recipient, to support the activities of the recipient and permit the community to benefit from those activities.

"Recipient" means any organization or person receiving a grant.

STATE DEPARTMENT OR AGENCY RELATED TO THIS REQUEST (LEAVE BLANK IF UNKNOWN):

STATE PROGRAM I.D. NO. (LEAVE BLANK IF UNKNOWN): _____

1. APPLICANT INFORMATION:

Legal Name of Requesting Organization or Individual: Oceanic Institute of Hawai`i Pacific University

Street Address:
41-202 Kalaniana`ole Hwy

Mailing Address:
Oceanic Institute of Hawai`i Pacific University
41-202 Kalaniana`ole Hwy.
Waimanalo, HI 96795-1820

2. CONTACT PERSON FOR MATTERS INVOLVING THIS APPLICATION:

Name Shaun Moss, Ph.D.

Title: Executive Director

Phone # (808) 259-3110

Fax # (808) 259-9762

3. TYPE OF BUSINESS ENTITY:

X NON PROFIT CORPORATION INCORPORATED IN HAWAII

FOR PROFIT CORPORATION INCORPORATED IN HAWAII

LIMITED LIABILITY COMPANY

SOLE PROPRIETORSHIP/INDIVIDUAL

OTHER

4. FEDERAL TAX ID #: [redacted]

5. STATE TAX ID #: [redacted]

6. DESCRIPTIVE TITLE OF APPLICANT'S REQUEST:

Feeds Research and Pilot Production Facility
(Research Feed Mill)

7. AMOUNT OF STATE FUNDS REQUESTED:

FISCAL YEAR 2017: $ 500,000

8. STATUS OF SERVICE DESCRIBED IN THIS REQUEST:

X NEW SERVICE (PRESENTLY DOES NOT EXIST)
EXISTING SERVICE (PRESENTLY IN OPERATION)

SPECIFY THE AMOUNT BY SOURCES OF FUNDS AVAILABLE AT THE TIME OF THIS REQUEST:

STATE $ 1,2454,000
FEDERAL $ 1,719,162
COUNTY $ 0
PRIVATE/OTHER $ 2,062,538

TYPE NAME & TITLE OF AUTHORIZED REPRESENTATIVE:

[redacted]

Shaun Moss, Executive Director, Oceanic Institute
NAME & TITLE

1/22/16
DATE SIGNED

RECEIVED
1-22-16 VS

Towards Food Security for Hawaii: Feeds Research and Pilot Production Facility (Research Feed Mill)

Grant-In-Aid

Oceanic Institute of Hawai'i Pacific University
41-202 Kalaniana'ole Hwy.
Waimanalo, HI 96795-1820

Table of Contents

I. Background and Summary

1. Applicant's Background

Founded in 1960, Oceanic Institute of Hawaii Pacific University (OI) is a nonprofit research and development organization dedicated to marine aquaculture, biotechnology, and coastal resource management. OI's mission is to develop and transfer environmentally responsible technologies to increase aquatic food production while promoting the sustainable use of ocean resources. OI works with community, industry, government and academic partners, and non-governmental organizations to benefit the state, the nation, and the world. In 2014, OI merged with Hawaii Pacific University, the largest private university in Hawaii, to become the University's first directed research unit.

OI is located on 56 acres in Waimanalo, Hawaii and employs a team of about 45 scientists, professionals, and support personnel. OI conducts applied research which is integrated across the technical programs including marine fish and shrimp aquaculture, stock enhancement, applied marine biotechnology, and aquatic feeds development. OI's Aquatic Feeds and Nutrition Department has been conducting aquatic feeds research for over 30 years and has extensive laboratory facilities with a wide range of analytical capabilities, as well as support infrastructure to assess the nutritional requirements of a variety of aquatic organisms. OI is seeking funding to build a Feeds Research and Pilot Production Facility and the proposed construction work will be managed by OI's licensed mechanical engineer and in-house architect, both of whom have extensive experience managing construction projects in Hawaii.

2. Goals and Objectives Related to the Request

In an effort to help catalyze Hawaii's livestock and aquaculture industries, OI plans to construct and operate a Feeds Research and Pilot Production Facility (aka research feed mill) which is designed to produce commercial quantities of terrestrial (e.g. cattle, hogs, chickens) and aquatic (e.g. fish, shrimp) animal feed using locally sourced ingredients. Importantly, many of these ingredients will come from dedicated supply chains from local agriculture businesses, as well as from co-products or waste streams from this sector. One example that shows promise is the recycling of unmarketable papaya grown in the State. Surprisingly, as much as 40% of the papaya grown in Hawaii are culled at the packing shed and cannot be sold due to bruising of the fruit. OI researchers have used proteins produced from these culled papaya to make fish and shrimp feed and we hope to source this ingredient from local papaya producers for our feed mill in the future. This activity not only benefits the end users of the feed but creates value-added, co-products for the papaya growers, plus it recycles nutrients. This type of integration and synergy can also occur with tomato and banana growers, for example, as well as the emerging biofuels industry which produces co-products from algae, kukui nut, coconut, and other seed plants. Stakeholders involved in a new, diversified agribusiness model, to be implemented on Maui in the aftermath of Alexander & Baldwin's decision to shut down their Hawaiian Commercial & Sugar (HC&S) mill in Puunene, also could benefit from OI's Feeds Research and Pilot Production Facility by supplying co-products from their operations. In addition, there are

substantial amounts of slaughterhouse and seafood processing waste currently being discarded in overburdened landfills which could be converted into potential feed ingredients.

OI's Feeds Research and Pilot Production Facility will be located on a 1-acre parcel of land at the Panaewa Agricultural Park in Hilo, Hawaii. The land is leased to OI from the University of Hawaii at Hilo under an agreement which terminates in December, 2036. The research feed mill will occupy 5,700 ft^2 and will contain a hammer mill, mixer, pellet mill, wet extruder, dryer, and fat coater, all of which have been donated to OI from the private sector. The feed mill will have the capacity to produce several tons of animal feed per hour and this high-level capacity will allow OI researchers to develop animal feeds which can then be evaluated on a commercial scale to determine if the ingredients and novel feed formulations promote good animal health and growth. The magnitude of processing capacity and the scale of testing cannot be understated. Our ability to produce large quantities of test diets and evaluate them on a commercial scale makes OI's Feeds Research and Pilot Production Facility unique in the region and will serve as an invaluable resource both for the suppliers of potential feed ingredients, as well as the end users of the feed. Although the research feed mill will be owned and operated by OI, we view this facility as an important community resource. We have met with members of the Hawaii Farm Bureau Federation, Hawaii Crop Improvement Association, Hawaii Cattlemen's Council, and Hawaii Aquaculture and Aquaponics Association, as well as representatives of local and State government, and all are highly supportive of our efforts to build and operate the mill. In addition, we have received support from Ulupono Initiative, a Hawaii-focused impact investment firm, who provided construction funds for the feed mill. They also plan to provide operating capital for OI researchers to produce novel feeds for their on-going partnerships, including the Paniolo Cattle Company. Importantly, we have met with faculty from the College of Tropical Agriculture and Human Resources, University of Hawaii at Manoa, as well as from the University of Hawaii at Hilo, and they too are eager to work with us to secure research grants to evaluate locally sourced ingredients for a variety of terrestrial and aquatic animals. The enhanced capacity of the feed mill will allow Hawaii's agriculture and aquaculture researchers to conduct experiments they previously were unable to execute, as well as allow them to partner with farmers in the private sector to evaluate novel feed formulations on a meaningful scale. This opportunity could translate into millions of research dollars for Hawaii through federal, state, and private grants and contracts. Ultimately, we believe these collective efforts will allow us to use locally sourced ingredients to produce feeds which promote healthy, fast-growing animals, and this will revitalize various agriculture sectors here in Hawaii and help move us towards greater food self-sufficiency and enhanced food security in the future.

In light of the information above, key project objectives include:

- Provide research feed for terrestrial and aquatic animals grown in Hawaii using locally sourced ingredients
- Provide research feed and technical assistance to support grow-out trials with terrestrial and aquatic animals on commercially relevant scales
- Provide experimental feed for terrestrial and aquatic animals for use in genetic, nutritional, or other focused research
- Expand feed product development, research, equipment evaluation, and testing

- Demonstrate, promote, and display U.S. feed milling technology, goods, and services to the countries of the Pacific Rim and beyond
- Assist in market development and increasing the demand for American feed commodities, manufacturing equipment, computer software, and other products related to aquatic feed production
- Offer short courses in nutrition and feed processing in cooperation with universities, private research organizations, and commercial companies
- Enable Oceanic Institute of Hawaii Pacific University (OI) to become a leader in aquatic nutrition and feeds production research

3. Public Purpose and Needs to be Served

Hawaii's agriculture industry plays a critical role in addressing food security in our State. However, because more than 85% of our food is imported, our communities are extremely vulnerable if food supply chains become disrupted. Disruptions can arise from a number of causes including dock strikes at major ports, farm production fluctuations on the U.S. mainland due to global climate change, and the destructive forces of a tsunami. Because of this vulnerability, it is imperative that we invest in ways to increase local food production. In addition to enhancing food security, local food production would provide enormous economic benefits to our State. The economic impact of food import replacement is significant and replacing just 10% of the food we currently import would amount to more than $313 million which would remain in Hawaii. Also, local food production would allow for access to cheaper, high-quality foods and would help create jobs in the agriculture and aquaculture sectors. In addition, there are significant environmental benefits to local food production. Producing foods locally would decrease the number of "food miles" associated with shipping across the Pacific Ocean, thereby conserving energy and reducing the carbon footprint associated with food distribution. Also, by producing more foods locally, we would mitigate the accidental introduction of harmful, invasive pests which can disrupt the local agriculture economy and adversely impact our island ecosystems.

Although Hawaii is self-sufficient in some fruits and vegetables, there has been a dramatic decline in the local chicken broiler industry, and now the egg layer, swine, dairy, and beef cattle sectors are threatened. A major factor impacting these sectors is the high cost of animal feed which must be imported because there are no commercial feed mills operating in Hawaii. Feed represents the single largest operating cost of any livestock or aquaculture operation, accounting for up to 70% of total production cost, and importing animal feed into Hawaii adds considerable expense to the farmer. In fact, feed costs are so expensive in Hawaii that most cattle ranchers in the State ship their calves to the mainland, after they are weaned, to be grown out and then sold back to Hawaii as finished product. In addition, feed costs for aquatic animals (e.g. fish and shrimp) are so high in Hawaii that they pose a significant barrier to entry into the aquaculture sector. As a result, the vast majority of our seafood is imported despite the fact that we are surrounded by water.

The benefits of producing more food locally are unequivocal. In addition to enhancing food security in our State, there are tremendous economic multiplier effects of increasing food self-

sufficiency. However, unless innovative solutions are sought to stimulate local food production, Hawaii residents will continue to be highly dependent on imported food and unable to reap these benefits

4. Target Populations to be Served

OI's Feeds Research and Pilot Production Facility will serve five (5) targeted populations in Hawaii, as described below.

End-users of animal feed: OI's feed mill will produce commercial quantities of terrestrial and aquatic animal feed which will be provided directly to local livestock farmers growing cattle, hogs, and chickens, as well as aquaculture farmers growing fish, shrimp, and other aquatic animals. Hawaii's livestock and aquaculture farmers will work with OI and University of Hawaii (UH) researchers, as well as representatives from State government and local NGOs, to evaluate these feeds and identify those diets which promote good animal performance. The inherent flexibility of OI's feed mill will allow local farmers to evaluate a wide variety of potential feed ingredients (e.g. papaya waste, cassava flour, fish trimmings) for a number of different target species (e.g. cattle, hogs, chickens, fish, shrimp), with the expectation that some of these ingredients, when used in a proper formulation, will promote good animal health and growth. When operating at full capacity, OI's feed mill should produce more than 450 tons of aquatic animal feed per year and more than 900 tons of terrestrial animal feed per year, all of which can be evaluated on a commercially relevant scale. This large supply of diverse animal feed will provide an immediate and direct benefit to Hawaii's livestock and aquaculture farmers, as well as create a pathway for future, substantial economic benefits. In addition, OI's feed mill could be used to develop specialty research feeds for the Honolulu Zoo, Waikiki Aquarium, Sea Life Park, and other public and private zoos and aquariums worldwide.

Suppliers of feed ingredients: OI's feed mill will produce animal feed using locally sourced ingredients. These ingredients will come from local agriculture businesses, typically as co-products or waste streams, as well as from the emerging biofuels industry and from slaughterhouses and fish processing plants. By converting co-products and waste streams from these sectors into value-added feed ingredients, famers and operators supplying these ingredients may generate additional income and will not have to pay to dispose of their wastes.

Local research community: The commercial-scale capacity of OI's feed mill will allow Hawaii's agriculture and aquaculture researchers to conduct large-scale feeding trials to evaluate the efficacy of specific animal diets. Researchers at OI and UH (both at Manoa and Hilo) are ready to take advantage of this unique resource and will seek funding to support their work. To date, Hawaii's researchers rely on small-scale, laboratory based, feed-processing capabilities for their research and have been unable to ask research questions at a meaningful scale. OI's feed mill will provide a new opportunity for the research community which could translate into millions of research dollars for Hawaii through federal, state, and private grants and contracts.

Students and those seeking job training: OI's Feeds Research and Pilot Production Facility will be used as a platform to train college-level students enrolled at HPU, UH, or other institution of higher learning in an effort to produce the next generation of feed mill operators. The facility

also will be used to hold training workshops, international training programs, and short courses related to feed processing, as well as to showcase next generation feed mill technology.

Hawaii residents and visitors: Ultimately, OI's Feeds Research and Pilot Production Facility will be used to generate valuable information about the economic viability of a commercial feed mill to serve the needs of Hawaii's livestock and aquafarmers. If this can be accomplished, and if a commercial feed mill is built here, we will have moved Hawaii towards greater food self-sufficiency and enhanced food security. This will serve both Hawaii residents and our visitors by providing high-quality food at affordable prices without having to depend on imported products to meet market demand.

5. Geographic Coverage

Although OI's Feeds Research and Pilot Production Facility will be built at the Panaewa Agricultural Park in Hilo, Hawaii, the feed mill will have important and broad impacts throughout the State of Hawaii, as well as the U.S.-affiliated Pacific Islands and the U.S. mainland.

Livestock and aquaculture farmers throughout the State will participate in evaluating novel feeds for a variety of target animals (e.g. cattle, hogs, chickens, fish, shrimp), and fruit and vegetable growers throughout the State will supply potential feed ingredients as co-products or wastes from their operations. Representatives from the biofuels industry and slaughterhouse and fish processing plant operators are located throughout the State as well, and can contribute to the ingredient supply chain.

Importantly, OI's feed mill will be unique, as no similar facility exists in the U.S. Pacific region which targets the use of tropical and sub-tropical ingredients. This feature makes OI's feed mill a valuable resource to those living in U.S.-affiliated Pacific Islands. Effective feed formulations that are developed with tropical and sub-tropical ingredients can be used in U.S.-affiliated Pacific Islands to make animal feeds to support greater food self-sufficiency and enhanced food security in the region. Additionally, OI's feed mill will be unique, as no similar facility exists in the U.S. for research on aquaculture ingredients and aquatic feed development. Thus, effective feed formulations that are developed for aquatic animals, such as tilapia and shrimp, can be used on the U.S. mainland where these species are cultured. Finally, the feed mill will be used to hold training workshops, international training programs, and short courses related to feed processing, and these learning opportunities will be available to a global audience.

II. Service Summary and Outcomes

1. Scope of Work, Tasks and Responsibilities

OI's Feeds Research and Pilot Production Facility will consist of a 5,700-ft^2 building to be located on a 1-acre parcel of land at the Panaewa Agricultural Park in Hilo, Hawaii. The land is leased to HPU from the University of Hawaii at Hilo under an agreement which terminates in December, 2036 and for a nominal rent of one dollar per year. All design, permitting, and

Environmental Assessment requirements for the project, as well as bidding and award of the construction contract, are completed. Agencies and departments that provided approval include:

Hawaii County Planning Department Review
Hawaii County Engineering Section Review
Hawaii County Wastewater Section Review
Hawaii County Electrical Code Review
Hawaii County Plumbing Code Review
State of Hawaii Department of Health Wastewater Review
Hawaii County Solid Waste Review
State of Hawaii Department of Health Sanitation Review
Hawaii County Fire Review

The research feed mill currently is under construction and there is a scheduled completion date of September 2016. OI staff will supervise and administer construction of the facility.

OI is committed to the construction of the Feeds Research and Pilot Production Facility and is committed to raising the final required funds. To ensure that the project will remain on schedule, OI can temporarily draw on funds from OI's research endowment. However, this would be a temporary solution as OI's research endowment is essential for OI researchers to maintain their long-term research activities and technology development, given the ebb and flow of grant funding. We are seeking approval of this grant-in-aid from the Hawaii State Legislature, which will enable OI to complete this important food security project without compromising the accompanying research and technology development.

Important on-going research and technology development activities include the production of striped mullet ('ama'ama) fingerlings to stock in Hawaiian fishponds, the production and out-planting of collector urchins (hawa'e maoli) in an effort to combat invasive algae in Kaneohe Bay, and the continuation of yellow tang aquaculture research to provide an alternative source of these valuable coral reef fish for the aquarium trade.

Grant-in-aid funds will supplement other funds already received by OI to build this important community resource. Other funding sources include the U.S. Department of Agriculture, funds previously provided by the State of Hawaii through the Department of Land and Natural Resources and the Department of Agriculture, and private funding sources.

2. Project Timeline

Construction of OI's Feeds Research and Pilot Production Facility began in October 2015 with a scheduled completion date of September 2016.

Major milestones for construction include:

Building Foundation	February 2016
Start erection of Pre-Engineered Metal Building	March 2016
Complete erection of Pre-Engineered Metal Bldg	May 2016
Installation of Feed Mill Equipment	May – Jul 2016

Substantial Completion of Project	August 2016
Project completion	September 2016

Start-up of the research feed mill, training of staff, and working out equipment and operational bugs are to be completed by the end of December 2016.

3. Quality Assurance and Evaluation Plan

OI will implement a rigorous quality assurance program to ensure the highest standards are maintained throughout construction of the Feeds Research and Pilot Production Facility. Key quality assurance procedures will include:

1. A Hawaii-based architectural and engineering team prepared the construction plans for the research feed mill.

   The engineering team was competitively selected using federal procurement guidelines approved by the U.S. Department of Agriculture.

2. Parsons Brinckerhoff prepared the final contract documents for construction of the research feed mill.

3. Construction will be managed by OI's Randall Honke, a licensed mechanical engineer in the State of Hawaii who has extensive experience in the operation and design of agriculture-related facilities.

   A second member of the team, Mr. Harry Ho, is an architect who has extensive construction inspection experience, having overseen the construction of hundreds of residential and commercial facilities within the state of Hawaii.

   This team will approve all contract change orders and field orders, and monitor all construction activities to ensure that the terms and requirements of the contract documents are met. Certain specialized inspection requirements will be performed by the design consultant or, in some cases, the equipment manufacturer.

   The construction team will work closely with OI's research staff to ensure that the feed mill is constructed to meet research and operational requirements.

4. Once completed, program effectiveness will be continually monitored by scientific peers through the review of research proposals and technical reports.

   In practical terms, program feedback will also be provided by Hawaii's farmers who will have the opportunity to participate in the research programs through industry forums and will provide feedback through testing and evaluation of research products and technologies.

4. Measure of effectiveness

The key measure of effectiveness of the project is construction progress culminating in project completion. At the point when the grant funds would be provided to OI, the only measure that would be appropriate is project completion. The project is scheduled for completion in September 2016.

III. Financial

1. Project Budget:

The projected cost to build OI's Feeds Research and Pilot Production Facility is $6,550,328, and these costs are allocated as indicated below.

Site Work	510,000
Treatment Plant Work	120,000
Office Trailer	160,000
Feed Building	4,459,389
Equipment and Installation Allowance	1,000,000
Value Engineering	(711,000)
Construction Total	$5,538,389
Design	323,761
Environmental Assessment	224,640
Permitting	48,619
A/E Value Engineering Change Order	73,000
A/E Services During Construction	65,000
Construction Contingency (5%)	276,619
Total	$6,550,328

2. Anticipated quarterly funding requests for FY2017

Quarter 1	Quarter 2	Quarter 3	Quarter 4	Total Grant
$500,000				$500,000

3. All Federal, State, and County Tax Credits Granted in Past 3 Years

Not applicable

4. Balance of Unrestricted Current Assets as of 12/31/2015

For Oceanic Institute and Hawaii Pacific University = $15,691.169

BUDGET REQUEST BY SOURCE OF FUNDS

Period: July 1, 2016 to June 30, 2017

Applicant: Oceanic Institute of Hawaii Pacific University

BUDGET CATEGORIES	Total State Funds Requested (a)	Total Federal Funds (b)	Total State Funds (c)	Total Private/Other Funds Requested (d)
A. PERSONNEL COST				
1. Salaries				
2. Payroll Taxes & Assessments				
3. Fringe Benefits				
TOTAL PERSONNEL COST				
B. OTHER CURRENT EXPENSES				
1. Airfare, Inter-Island				
2. Insurance				
3. Lease/Rental of Equipment				
4. Lease/Rental of Space				
5. Staff Training				
6. Supplies				
7. Telecommunication				
8. Utilities				
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19				
20				
TOTAL OTHER CURRENT EXPENSES				
C. EQUIPMENT PURCHASES				
D. MOTOR VEHICLE PURCHASES				
E. CAPITAL	500,000	1,719,162	1,254,000	3,077,166
TOTAL (A+B+C+D+E)	500,000	1,719,162	1,254,000	3,077,166

Budget Prepared By:
Randall Honke

808 259-3189

Name (Please type or print) | Phone

SOURCES OF FUNDING

(a) Total State Funds Requested	500,000
(b) Total Federal Funds	1,719,162
(c) Total State Funds	1,254,000
(d) Total Private/Other Funds Requested	3,077,166
TOTAL BUDGET	6,550,328

Signature of Authorized Official [redacted] Date 1/22/16

Name and Title (Please type or print)
Sharon Moss, Executive Director

BUDGET JUSTIFICATION - PERSONNEL SALARIES AND WAGES

Period: July 1, 2016 to June 30, 2017

Applicant: Oceanic Institute of Hawaii Pacific University

POSITION TITLE	FULL TIME EQUIVALENT	ANNUAL SALARY A	% OF TIME ALLOCATED TO GRANT REQUEST B	TOTAL STATE FUNDS REQUESTED (A x B)
				$ -
				$ -
				$ -
				$ -
				$ -
				$ -
				$ -
				$ -
				$ -
				$ -
				$ -
				$ -
				$ -
				$ -
TOTAL:				

JUSTIFICATION/COMMENTS:

BUDGET JUSTIFICATION - EQUIPMENT AND MOTOR VEHICLES

Period: July 1, 2016 to June 30, 2017

Applicant: Oceanic Institute of Hawaii Pacific University

DESCRIPTION EQUIPMENT	NO. OF ITEMS	COST PER ITEM	TOTAL COST	TOTAL BUDGETED
			$ -	
			$ -	
			$ -	
			$ -	
			$ -	
TOTAL:				

JUSTIFICATION/COMMENTS:

DESCRIPTION OF MOTOR VEHICLE	NO. OF VEHICLES	COST PER VEHICLE	TOTAL COST	TOTAL BUDGETED
			$ -	
			$ -	
			$ -	
			$ -	
			$ -	
TOTAL:				

JUSTIFICATION/COMMENTS:

BUDGET JUSTIFICATION - CAPITAL PROJECT DETAILS

Period: July 1, 2016 to June 30, 2017

Applicant: Oceanic Institute of Hawaii Pacific University

FUNDING AMOUNT REQUESTED						
TOTAL PROJECT COST	ALL SOURCES OF FUNDS RECEIVED IN PRIOR YEARS		STATE FUNDS REQUESTED	OTHER FUNDS REQUESTED	FUNDING REQUIRED IN SUCCEEDING YEARS	
	FY: 2013-2014	FY: 2015-2016	FY:2016-2017	FY:2016-2017	FY:2017-2018	FY:2018-2019
PLANS						
LAND ACQUISITION						
DESIGN and ENVIRONMENTAL ASSESSMENT	450,000	285,020				
CONSTRUCTION		5,265,308	500,000	200,000		
EQUIPMENT						
TOTAL:	450,000	5,400,328	500,000	200,000		
JUSTIFICATION/COMMENTS:						

GOVERNMENT CONTRACTS AND / OR GRANTS

Applicant: Oceanic Institute of Hawaii Pacific University

Contracts Total: $2,973,162

	CONTRACT DESCRIPTION	EFFECTIVE DATES	AGENCY	GOVERNMENT ENTITY (U.S. / State / Haw / Hon / Kau / Mau)	CONTRACT VALUE
1	Federal Funds to construct Research Feed Mill (RFM)	Expires Dec 31, 2016	Department of Agriculture	U.S.	$1,719,162
2	State funds to construct RFM	Expires Dec 31, 2016	DLNR	State	$804,000
3	State funds for planning, design, construction of RFM	Ended June 30, 2014	Department of Agriculture	State	$450,000
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IV. Experience and Capability

A. Necessary Skills and Experience

The construction project will be managed by the team of Mr. Randall Honke and Mr. Harry Ho, both employees of OI. Mr. Honke is OI's Senior Mechanical Engineer and serves as the Project Manager. Mr. Honke is a licensed mechanical engineer in the State of Hawaii and has over 20 years of design and construction-related experience. Mr. Ho is OI's Director of Facilities and serves as Construction Manager. Mr. Ho also is in charge of planning for all OI construction projects. Mr. Ho is an architect with over 45 years of design and construction related experience. This team has successfully managed the construction of over $10 million of federal government funded construction projects at OI over the past 15 years. These projects include three U.S. Department of Commerce, Economic Development Administration (EDA) funded projects, one U.S. Department of Commerce National Oceanographic and Atmospheric Administration (NOAA) funded project, and five facilities funded by the United States Department of Agriculture, National Institute of Food and Agriculture.

B. Facilities

Existing Facilities. Oceanic Institute of Hawaii Pacific University is located on a narrow coastline approximately 56 acres in area, on Kalanianaole Highway in Waimanalo, HI. Research and training are conducted in several of the 25+ separate buildings, ponds, tanks, and laboratories that constitute the existing campus.

Infrastructure used to support OI's aquatic feeds and nutrition research includes four separate buildings for aquatic animal feed production and five separate facilities for feed testing. The four facilities used for feed production include: 1) a 97-m^2 building containing two offices, two air-conditioned dry feed ingredient storage rooms, three dry feed processing laboratories, and a small boiler room; 2) a 93-m^2 laboratory containing a cooking extruder, steam dryer, moisture tester, and steam boiler; 3) a 39-m^2 lab containing an oil press, pulverizer, and a fixed blade hammer mill; and 4) an 11-m^2 lab to test the physical quality of the finished feeds.

The five facilities used for feed testing include: 1) an Indoor Clean Laboratory containing 75 52-liter glass aquaria with flow-through seawater; 2) an Industry Support Module with 56 1,500-liter fiberglass tanks located outdoors and 52 115-liter plastic tanks located indoors; 3) a Digestibility & Attractability Laboratory equipped with 24 675-liter digestibility tanks and 36 55-liter attractant tanks; 4) an Outdoor Microcosm Laboratory equipped with 56 1,500-liter fiberglass tanks supplied with air and seawater; and 5) a 150-m^2 Analytical Feeds Quality Control Laboratory used to analyze feed ingredients, feeds, and animal tissue and containing an HPLC amino acid analyzer, elemental nitrogen analyzer, gas chromatograph - fatty acid & pesticide analyzer, UV spectrophotometer, and near infrared spectrophotometer, among other standard analytical laboratory equipment.

OI scientists have been conducting aquatic feeds research for over 30 years and have developed defined diets for a variety of marine organisms. More recently, through USDA funding, OI scientists are identifying, characterizing, and evaluating locally based plant and animal co-products as potential ingredients for aquatic feeds in an effort to reduce the use of fish meal and fish oil in animal diets.

Requirement for New Feed Mill: The proposed Feeds Research and Pilot Production Facility will expand OI's feed processing and manufacturing capabilities to support changing research and industry needs. Construction of the new facility will result in 5,700 ft^2 of processing area, compared to the 2,570 ft^2 that is currently available at OI's Makapu'u facility. Without facility expansion, OI

will be unable to effectively support the evolving needs of animal nutrition and feed development, or the technology development and training needs of Hawaii's farmers. The new facility is required if Hawaii wants to become more self-sufficient in our food supply.

The new facility will significantly enhance OI's aquatic feeds production research potential, as shown in the following table.

Table 1. Feed Milling Capabilities of the (current) Oahu Mill and (future) Hilo Mill

Processing Capability	Current (Oahu Mill)	Future (Hilo Mill)
Hammer mill	75 kg/hr	3,000 kg/hr @ 420 microns
Mixer	300 kg/hr @ 20 min mixing time	4,000 kg/hr @ 3 min mixing time
Pellet mill	5–10 kg/hr	1,500–4,000 kg/hr
Meat grinder	1-2 kg/hr	
Wet extruder	100-500 kg/hr	100–500 kg/hr
Dryer	1,500-4,000 kg/hr	1,500–4,000 kg/hr
Fat coater	N/A	2,000 kg/hr @ 6 min coating time

Scope of Construction: The intent of this project is to construct an aquatic feed mill and include all required infrastructure such as access roads, parking areas, and site utilities. Major infrastructure requirements include a short access road from the public highway and an acceptable method of disposing of wastewater generated during processing and equipment cleaning. The project includes the planning, design, procurement, installation, and testing of specialized feed mill equipment, including:

- *Wenger* X-20 cooking extruder and 360 dryer/cooler;
- *CPM* series 1112-2 pellet mill with double pass conditioners;
- *Bliss Hammer mill* with product filter collector;
- *Forberg* high-mixer;
- *Forberg* high speed fat coater;
- *Abel* micro ingredient bins, liquid scale, and dispenser;
- *Rotex* screens and scalpers;
- *Clever-Brooks* 100 hp boiler;
- *Ingersoll-Rand* air compressor.

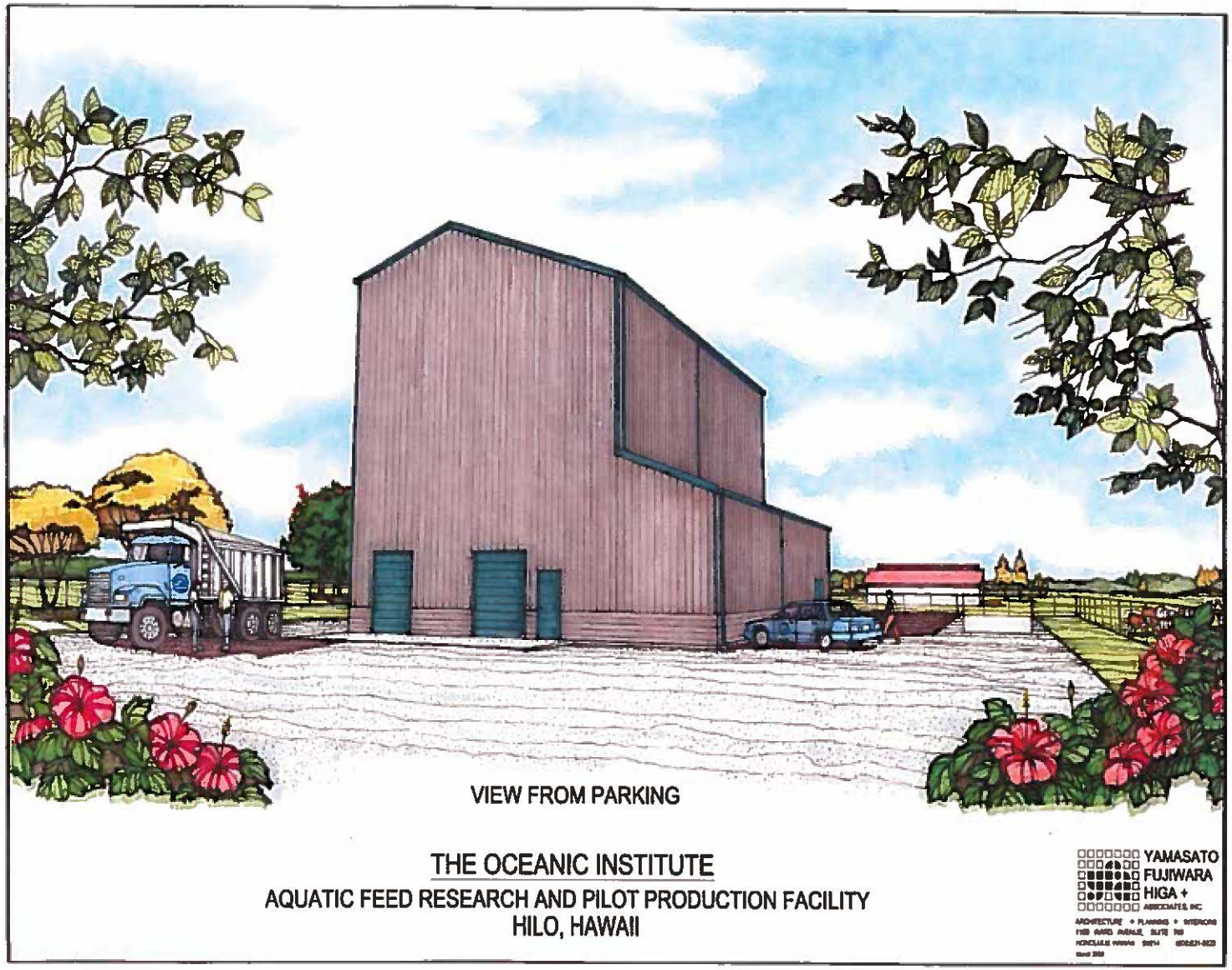
Facility Concept: The Feeds Research and Pilot Production Facility will consist of a single steel-framed structure complete with utilities, parking area, truck off-loading and turn-around, and a short access road from the public highway. The facility will include:

- Feed processing area
- Electric utility room
- Feeds/ingredient storage rooms

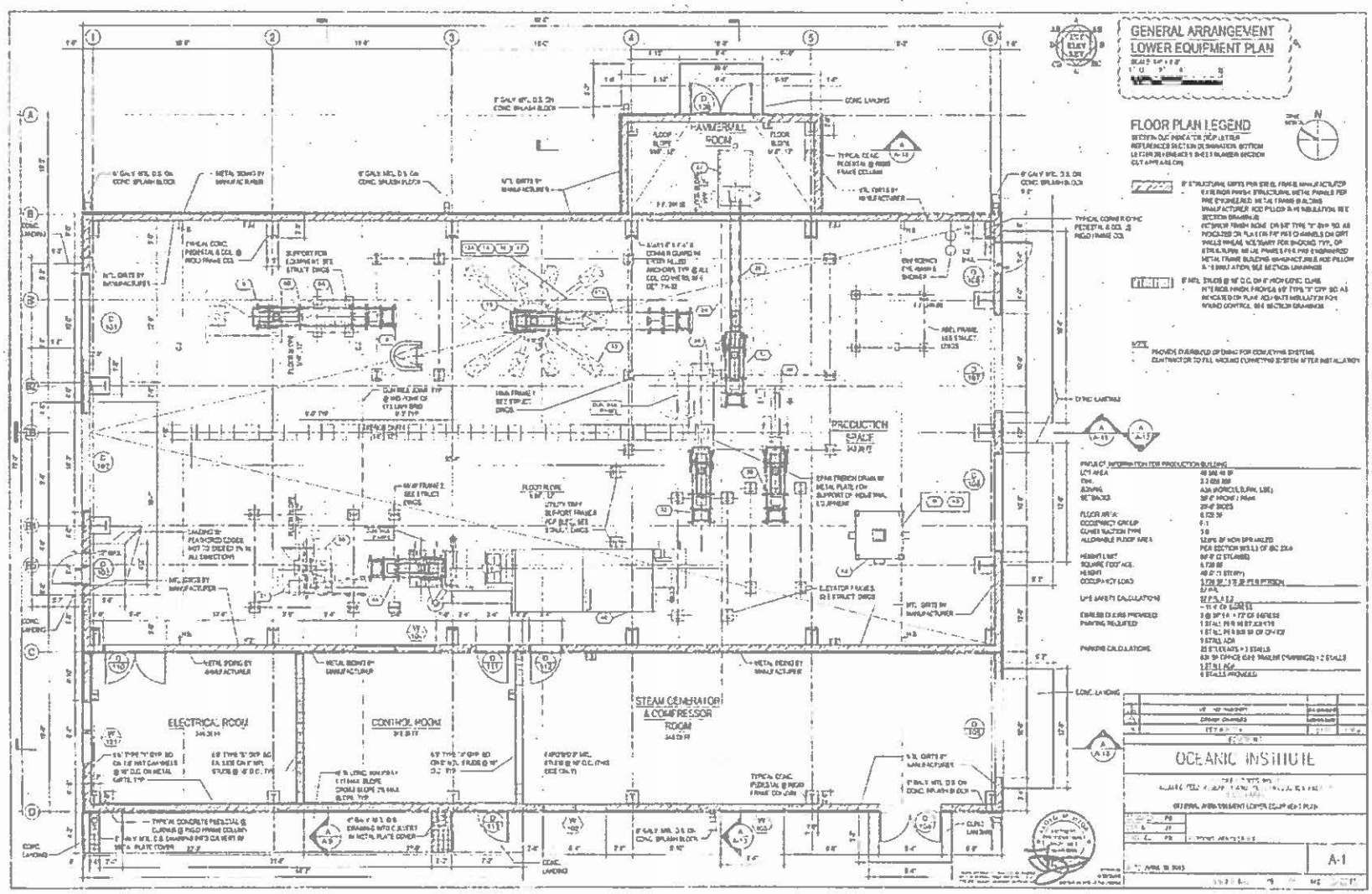
Exterior facilities will include:

- Short access road from the public highway/agricultural farm gate to the facility
- Parking/off-loading/truck turn-around area
- Fresh water supply lines
- Power, telephone lines
- Security Fencing
- Wastewater disposal system

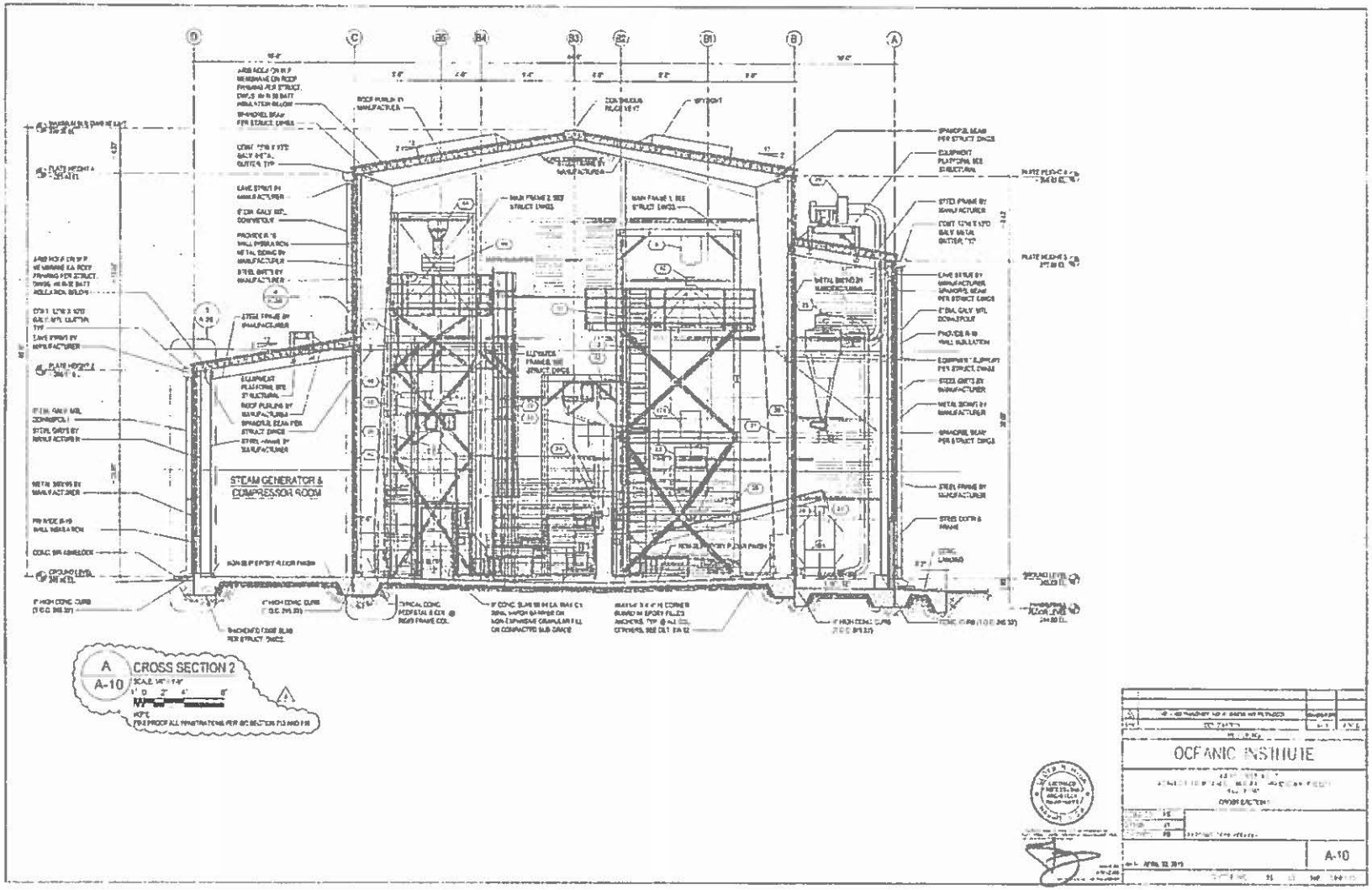
Research Feed Mill – Artist Rendering



Floor Plan of the Research Feed Mill



Section of Research Feed Mill



V. Personnel: Project Organization and Staffing

A. Proposed Staffing, Staff Qualifications, Supervision and Training

Finance team

The finance team consists of Mr. Bruce Edwards, HPU Vice President and Chief Financial Officer, and Ms. Marina Ong, Associate Controller for Business Affairs at OI. A grants office is also part of the finance team, where Annette Gurule ensures that procurement and compliance requirements of the project are met. Also, Mr. Sam Moku and Dr. Cassie Carter, HPU Alumni and University Relations, are involved in on-going capital campaign activities in support of feed mill construction.

Engineering team

The engineering team includes Mr. John Russell, HPU Director of Facilities, Mr. Randall Honke, and Mr. Harry Ho. Mr. Honke is OI's Senior Mechanical Engineer and serves as the Project Manager. Mr. Honke is a licensed mechanical engineer in the State of Hawaii and has over 20 years of design and construction-related experience. Mr. Ho is OI's Director of Facilities and serves as Construction Manager. Mr. Ho also is in charge of planning for all OI construction projects. Mr. Ho is an architect with over 45 years of design and construction related experience. Outside engineering groups participating in this project include: Parsons, Brinckerhoff engineers and feed mill consultant Professor Charles Stark, Ph. D. from the Grain Science and Industry Department at Kansas State University.

Scientific and technical team

The strength of OI lies in its professional staff and employs a team of about 45 scientists, professionals, and support personnel. OI conducts applied research which is integrated across it technical programs including marine fish and shrimp aquaculture, stock enhancement, applied marine biotechnology and aquatic feeds development. OI's Aquatic Feeds and Nutrition Department has been conducting aquatic feeds research for over 30 years and has extensive laboratory facilities with a wide range of analytical capabilities, as well as support infrastructure to assess the nutritional requirements of a variety of aquatic organisms.

Key members of the OI staff who will play important roles in the operation of the Feeds Research and Pilot Production Facility include:

Dr. Shaun Moss, Executive Director of OI, received his Ph.D. in Zoology from the University of Hawaii in 1993

Dr. Zhi Yong Ju, Interim Director of OI's Aquatic Feeds & Nutrition Department, received his Ph.D. in Animal Sciences from Northwest A&F University in P.R. China

Dr. Dustin Moss, Director of OI's Shrimp Department, received his Ph.D. in Molecular Biology and Bioengineering from the University of Hawaii in 2013

Dr. Chad Callan, Director of OI's Finfish Department, received his Ph.D. in Fisheries from the University of Maine in 2008

Dr. Cheng-Sheng Lee, Executive Director of the Center for Tropical and Subtropical Aquaculture, received his Ph.D. in Aquaculture from the University of Tokyo, Japan, in 1979

OI is in the process of hiring a new Director for the Aquatic Feed and Nutrition Department and has received applications from several highly qualified candidates. This new hire will have expertise in aquatic animal nutrition and will be responsible for managing all personnel and facilities at the Makapu`u site, as well as at the Feeds Research and Pilot Production Facility in Hilo. In addition, OI is in the process of hiring an expert in feed processing who will manage the day-to-day operations of the Feeds Research and Pilot Production Facility in Hilo.

Currently, OI's Aquatic Feed and Nutrition Department is managed by Dr. Zhi Yong Ju. Dr Ju has over 10 years of experience as a Research Scientist at OI where he specializes in biochemical analysis of animal feeds, feed ingredients, and animal tissue. Below is a sample listing of Dr. Ju's recent publications.

Ju, Zhi Yong, Cecilia Viljoen, Peter Hutchinson, Justin Reinicke, F. David Horgen, Luke Howard & Cheng-Sheng Lee. 2015. Effects of diets on the growth performance and shell pigmentation of Pacific abalone. Aquaculture Research (accepted).

Deng. D.F., Z.Y. Ju, W.G. Dominy, L. Conquest, S. Smiley & P.J. Bechtel. 2014. Effect of replacing dietary menhaden oil with pollock or soybean oil on muscle fatty acid composition and growth performance of juvenile Pacific threadfin (*Polydactylus sexfilis*). Aquaculture 422–423, 91–97.

Ju, Zhi Yong, Ian P. Forster, Dong-Fang Deng, Warren G. Dominy, Scott Smiley & Peter J. Bechtel. 2013. Evaluation of skate meal and sablefish viscera meal as fish meal replacement in diets for Pacific threadfin (*Polydactylus sexfilis*). Aquaculture Research 44, 1438-1446.

Deng. D.F., Z.Y. Ju, W.G. Dominy, P.J. Bechtel & S. Smiley. 2013. An evaluation of pink salmon (*Oncorhynchus gorbuscha*) testes meal in diets for pacific white shrimp (*Litopenaeus vannamei*): effect on palatability, digestibility and growth performance. Aquaculture Nutrition 19, 908–916.

Ju, Zhi Yong, Deng, Dong-Fang, Dominy, Warren. 2012. A defatted microalgae (*Haematococcus pluvialis*) meal as a protein ingredient to partially replace fishmeal in diets of Pacific white shrimp (*Litopenaeus vannamei*). Aquaculture 354–355, 50–55.

Ju, Zhi Yong, Frank Castille, Dong-Fang Deng, Warren G. Dominy, Addison L. Lawrence, Ian P. Forster. 2012. Effects of replacing fish oil with stearine as main lipid source in diet on growth and survival of Pacific White Shrimp, *Litopenaeus vannamei*. Aquaculture Research 43, 1528–1535.

Ju, Zhi Yong, Deng, Dong-Fang, Dominy, Warren, Forster, Ian. 2011. Pigmentation of Pacific White Shrimp (*Litopenaeus vannamei*) by Dietary Astaxanthin Extracted from Haematococcus pluvialis. Journal of the World Aquaculture Society 42, 633-644.

Forster, I. P., Bechtel, W.G. Dominy, R. Avena, Z.Y. Ju, L. Conquest. 2011. Use of fish hydrolysates and fishmeal by-products of the Alaskan fishing industry in diets for Pacific White Shrimp, Litopenaeus vannamei. North American Journal of Aquaculture 73:288-295.

Dong Fang Deng, Zhi Yong Ju, W. Dominy, Ryan Murashige, Robert Wilson. 2011. Optimal dietary protein levels for juvenile Pacific threadfin (*Polydactylus sexfilis*) fed diets with two levels of lipid. Aquaculture 316, 25-30.

Ju, Zhi Yong, Forster, Ian, Dominy, Warren, Lawrence, Addison. 2011. Classification and quantification of phospholipids and dietary effects on lipid composition in shrimp (*Litopenaeus vannamei*). North American Journal of Aquaculture 73: 221-229.

Dong Fang Deng, Zhi Yong Ju, W. Dominy, Ryan Murashige, Robert Wilson. 2011. Optimal dietary protein levels for juvenile Pacific threadfin (*Polydactylus sexfilis*) fed diets with two levels of lipid. Aquaculture 316, 25-30.

D.F. Deng, W.G. Dominy, Z.Y. Ju, S. Koshio, R. Murashige, R. Wilson. 2010. Dietary lysine requirement of juvenile Pacific threadfin. (*Polydactylus sexfilis*). Aquaculture 308, 44-48.

Ju, Zhi Yong, Forster, I., and Dominy, W.G. 2010. Effects of supplementing bioactive compounds to a formulated diet on sensory compounds and growth of shrimp, (*Litopenaeus vannamei*) (Boone, 1931). Aquaculture Research 41, 1421-1431.

B. Organization Chart

See included chart on page 25

C. Compensation

Annual salaries paid to the three highest employees of Hawaii Pacific University include:

- Geoffrey Bannister, Ph.D., President - $548,223
- Janet Kloenhamer, Executive Vice President and General Counsel- $320,866
- Deborah Crown, Ph.D., Dean of the College of Business - $295,851

VI. Other

A. Litigation

Hawaii Pacific University and the Oceanic Institute do not currently have any pending litigation.

B. Licensure or Accreditation

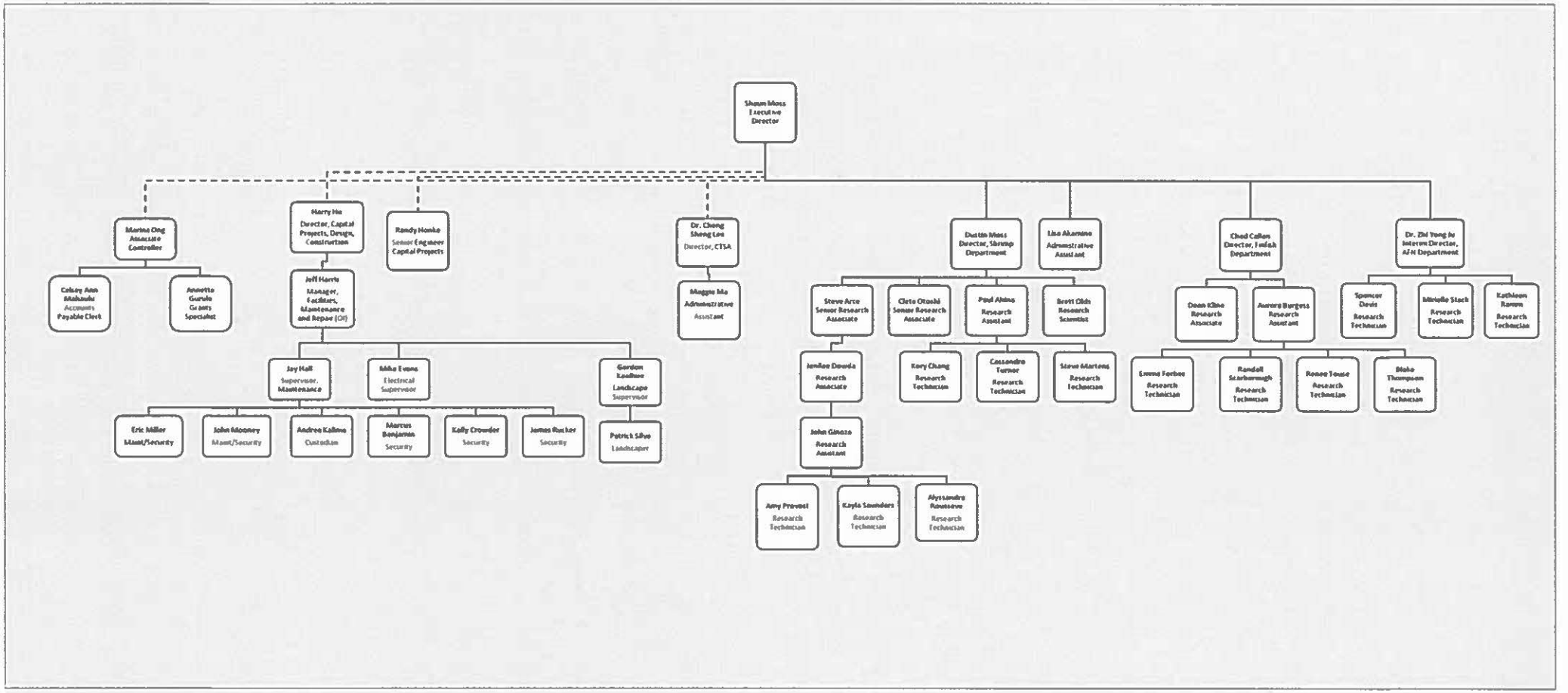
OI is licensed and accredited in accordance with federal, state, county statutes, rules, or ordinances, to conduct the activities and provide the services for which this grant is requested. OI possesses the State of Hawai'i Aquaculture Facility Licenses numbers 18051 and 18052.

Hawai'i Pacific University is accredited by the Accrediting Commission for Senior Colleges and Universities of the Western Association of Schools and Colleges (WASC).

The School of Education has received accreditation for its education programs (B.Ed. and M.Ed. degrees) by the Council for the Accreditation of Educator Preparation (CAEP).
The Nursing Program (BSN and MSN degrees) is approved by the Hawai'i Board of Nursing and is accredited by the Commission on Collegiate Nursing Education (CCNE).

The Social Work program (BSW and MSW degrees) is accredited by the Council on Social Work Education (CSWE).

Oceanic Institute of Hawaii Pacific University



The University is a member of:

- Hawaii Public Health Association
- The American Association of Colleges of Nursing

C. Private Educational Institutions

Hawaii Pacific University is a private, non-sectarian, non-profit educational organization.

D. Future Sustainability Plan

The project is scheduled to be completed in September 2016, thus no capital funds will be required after fiscal year 2016-2017.

The Feeds Research and Pilot Production Facility will be used to support research activities at OI and the University of Hawai`i's Manoa and Hilo aquaculture and animal science programs. Funding to support feeds research will come from federal, state, and private sources, such as U.S. Department of Agriculture, Agriculture and Food Research Initiative (AFRI) Program, U.S. Department of Commerce, NOAA, Saltonstall-Kennedy Program, and the U.S. Department of Agriculture, Center for Tropical and Subtropical Aquaculture (CTSA). Additional support for feeds research and the production of research feeds could come from collaborators at academic institutions in the U.S.-affiliated Pacific Islands (e.g. University of Guam, Northern Marians College, Palau Community College) and on the U.S. mainland (e.g. Texas A&M University, Kansas State University). Importantly, several academic institutions in the U.S.-affiliated Pacific Islands have access to formula grants (e.g. Hatch funds) and these funds may be used to produce research feeds and support OI's feed mill.

The Feeds Research and Pilot Production Facility also will be used for research for private-sector companies through direct contracts or SBIR collaborative government grants in the following areas:

- New feed ingredients from agricultural & biofuel by-products
- New feed product development (abalone, opihi, sea urchin)
- Equipment optimization and efficacy for producing specific feeds
- Processing effects on nutritional value of ingredients
- Pharmaceutical additives for the aquatic feed industry
- Note: UH-Hilo has a Pharmacy School and collaboration on aquatic and terrestrial animal feed pharmaceutical additives trials can be developed.

Commercial partners who have participated in OI-sponsored research include:

- Diamond Head Seafood Wholesale, Inc. (fish processing by-products)
- Kona Blue (Longfin amberjack growout and broodstock feeds development)
- Big Island Abalone (abalone growout feeds development)
- Pacific Biodiesel, Inc. (new feedstock's from biofuel processing by-products)

These, and other, companies may be interested in contract work using OI's feed mill.

Commercial feed and feed ingredient companies who also may be interested in contract work include:

- Monsanto / Bunge / Solea / General Atomics
- Novus / Degussa-Evonik
- Cargill / Land-O-Lakes / Rangen / Zeigler / Burris
- U.S. Soybean Board / American Soybean Association
- EWOS Innovation
- Skretting / Nutreco

Importantly, OI has already secured a committed, long-term contract from a private-sector company to produce research feeds at the Feeds Research and Pilot Production Facility.

The Feeds Research and Pilot Production Facility will support several new training initiatives including:

1. Certificate Program with short and intensive extension courses by OI in:
    - Aquatic nutrition and aquatic feed formulations
    - Aquatic feed manufacturing and equipment processing parameters
    - Quality control (nutritional and physical characteristics) on ingredients and finished feeds.
    - Terrestrial feeds manufacturing (formulations, processing equipment,)
2. Undergraduate- and graduate-level courses in aquatic nutrition and feeds processing technology conducted by OI researchers with Hawaii Pacific University and the University of Hawaii Manoa and Hilo.

Finally, the Feeds Research and Pilot Production Facility will allow OI researchers to expand their nutrition and feeds technology consultant services to include subject matter expertise in formulations, processing technology, plant retrofitting, and planning of new commercial and research plants.

1. Consulting contracts with commercial companies will include:

    - Biofuel companies in utilization of co-products in aquatic and terrestrial feeds.
    - In-plant design processing and QC training
    - Co-product utilization in aquatic and terrestrial animal feeds

E. Certificate of Good Standing

Please see included

Department of Commerce and Consumer Affairs

CERTIFICATE OF GOOD STANDING

I, the undersigned Director of Commerce and Consumer Affairs of the State of Hawaii, do hereby certify that

HAWAI`I PACIFIC UNIVERSITY

was incorporated under the laws of Hawaii on 09/22/1965 ; that it is an existing nonprofit corporation; and that, as far as the records of this Department reveal, has complied with all of the provisions of the Hawaii Nonprofit Corporations Act, regulating domestic nonprofit corporations.

IN WITNESS WHEREOF, I have hereunto set my hand and affixed the seal of the Department of Commerce and Consumer Affairs, at Honolulu, Hawaii.

Dated: January 20, 2016

[redacted]

Director of Commerce and Consumer Affairs

To check the authenticity of this certificate, please visit: http://hbe.ehawaii.gov/documents/authenticate.html
Authentication Code: 246722-COGS_PDF-13419D2

DECLARATION STATEMENT OF APPLICANTS FOR GRANTS PURSUANT TO CHAPTER 42F, HAWAI'I REVISED STATUTES

The undersigned authorized representative of the applicant certifies the following:

1) The applicant meets and will comply with all of the following standards for the award of grants pursuant to Section 42F-103, Hawai'i Revised Statutes:

   a) Is licensed or accredited, in accordance with federal, state, or county statutes, rules, or ordinances, to conduct the activities or provide the services for which a grant is awarded;

   b) Complies with all applicable federal and state laws prohibiting discrimination against any person on the basis of race, color, national origin, religion, creed, sex, age, sexual orientation, or disability;

   c) Agrees not to use state funds for entertainment or lobbying activities; and

   d) Allows the state agency to which funds for the grant were appropriated for expenditure, legislative committees and their staff, and the auditor full access to their records, reports, files, and other related documents and information for purposes of monitoring, measuring the effectiveness, and ensuring the proper expenditure of the grant.

2) If the applicant is an organization, the applicant meets the following requirements pursuant to Section 42F-103, Hawai'i Revised Statutes:

   a) Is incorporated under the laws of the State; and

   b) Has bylaws or policies that describe the manner in which the activities or services for which a grant is awarded shall be conducted or provided.

3) If the applicant is a non-profit organization, it meets the following requirements pursuant to Section 42F-103, Hawai'i Revised Statutes:

   a) Is determined and designated to be a non-profit organization by the Internal Revenue Service; and

   b) Has a governing board whose members have no material conflict of interest and serve without compensation.

Pursuant to Section 42F-103, Hawai'i Revised Statutes, for grants used for the acquisition of land, when the organization discontinues the activities or services on the land acquired for which the grant was awarded and disposes of the land in fee simple or by lease, the organization shall negotiate with the expending agency for a lump sum or installment repayment to the State of the amount of the grant used for the acquisition of the land.

Further, the undersigned authorized representative certifies that this statement is true and correct to the best of the applicant's knowledge.

Oceanic Institute of Hawaii Pacific University

(Typed Name of Individual or Organization)

[redacted] 1/22/16

(Signature) Shaun Moss (Date)

Executive Director

(Typed Name) (Title)