

# **Oregon State University**

## **Marine Studies Initiative**

### **Overview Report of the Finance, Facilities, and Infrastructure Work Group**

Section A: Infrastructure Overview & Planning

Section B: Financial Modeling



Marine Studies Initiative – Finance, Facilities, and Infrastructure Work Group

March 5, 2015 Version

### **Section A: Infrastructure Overview & Planning**

**How do we define infrastructure?  
What is it that the MSI infrastructure will  
need to support?  
What does infrastructure success look  
like?  
Where are we now?**

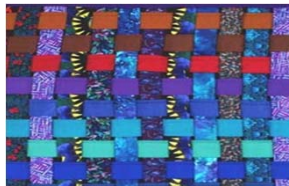


Marine Studies Initiative – Finance, Facilities, and Infrastructure Work Group

March 5, 2015

## Infrastructure:

the physical fabric that binds the natural, built and virtual environments that support the diverse communities engaged in our academic, service, and research missions



## Envisioning MSI Infrastructure



- **Environmentally Sustainable**
  - Design inspiration from natural systems
  - Design response to local physical environments – HMSC and Corvallis
- **Financially Sustainable**
  - Long term life cycle cost, not lowest first cost, is the infrastructure design criteria
- **Unique/Special Opportunities**
  - Create and test laboratory and learning environments both physical and virtual
  - Utilize the local physical setting for learning and research
  - Maximize existing resources including research vessels and community
- **Collaborative & Inclusive**
  - Involve all OSU people and programs
  - Interact with other educational institutions and activities
  - Work with community, industry, federal, state and global partners
- **Beneficial**
  - Develop local, regional, global solutions to human and natural challenges
  - Address the needs and questions of our local and statewide, national, and global communities
- **Inspiration**
  - Inspired place making which inspires the daily work and social lives of students, faculty, staff, and visitors





## Elements of MSI Place

- **Supportive environment**
  - Encourages life and work balance
  - Serves graduate and undergraduate students, staff, faculty, partners, and visitors
  - Enhances the FLOW & EXCHANGE of ideas and people
- **Robust virtual infrastructure**
- **Immediate access to marine and estuarine ecosystems**
- **Accessible and inclusive for all students, faculty, staff, visitors**



## MSI Infrastructure Guiding Principles

- **Support** experiential learning through deep engagement with place, people and inquiry
- **Demonstrate** that learning is social and transformative
- **Involve** all audiences in marine studies through the MSI infrastructure
- **Develop** a functional and resilient infrastructure through
- **Integrate** environmentally sustainable practices with innovative strategies
- **Embrace** collaboration
- **Create** a transformative and inspired experience for all learners
- **Enable** and motivate partners



## Ideal Infrastructure for Students - Summary

- **Immersion in the coastal environments**
  - Scientifically
  - Educationally
  - Collaboratively
- **Learn to understand and engage**
  - As stewards
  - As scientists
  - As educators
  - As citizens
- **Build and Support Community**
  - Design a collaborative social life infrastructure
  - Support food, short and longer-term student and faculty housing (with pets!), and identify transportation needs (within and beyond the MSI space)
  - Support health and wellness, childcare, and recreational (indoor and outdoor) infrastructure for students, staff, and faculty
- **Access to Key Educational Tools**
  - Student access to facilities
  - Wired classrooms to bring experiments/experiential learning opportunities to the classroom to limit environmental impacts.
  - Research Equipment Availability for independent projects
  - Tank space that can access soft water systems
  - Enhanced flexibility in laboratories to support access to soft water systems.
  - Create E-campus courses to offer full schedules to prevent students from traveling to Corvallis
  - More opportunities/courses/certificate for Leadership in Integrative Marine Science and Studies



## Ideal Infrastructure for Faculty and Staff - Summary

- **Physical access to coastal environments**
  - Seawater labs
  - Estuaries
  - Communities
  - Beaches
  - Nearshore
  - Offshore
- **Virtual access to data and information**
  - Local data
  - Telepresence
  - Big data
  - Historic record
  - Library
- **Participants in vital communities**
  - Design a collaborative social life infrastructure
  - Support food, short and longer-term staff and faculty housing (with pets!), and identify transportation needs (within and beyond the MSI spaces)
  - Support health and wellness, childcare, and recreational (indoor and outdoor) infrastructure for faculty and staff



## Ideal Infrastructure for Our Communities and Partners - Summary

- **Common Ground - Collaborative**
  - Experts to work with
  - Students to train and mentor
- **Common Spaces**
  - Meeting areas
  - Social spaces
  - Virtual spaces
  - Sharing and preparing food spaces
  - Health and wellness spaces
- **Affordable and Innovative Residential Life Solutions**
- **Seismic Resilient Planning, Response and Recovery**



## KEY CHALLENGES – MSI Infrastructure



- ✓ Create a home for all students
- ✓ Interdisciplinary faculty and staff learning environments
- ✓ Clarification/agreements/partnerships for shared space, facilities, and infrastructure
- ✓ High performing cost-efficient infrastructure systems
- ✓ Modern and extremely flexible (non-specialized) facilities
- ✓ Integration of natural, virtual, and physical human-developed infrastructure
- ✓ Seismic expected-event response planning
- ✓ Seismic expected-event recovery planning



## Seismic Resilient Hatfield Marine Science Center - Comprehensive Approach

- Existing and new **resilient infrastructure** and building systems in place to respond to and recover from seismic event
- Continuous human and financial resource investment **in emergency response and recovery** planning
- Identification of **capital investment** strategies for community response and recovery planning – state, federal, and local sources
- Establish key measures and **OSU resilience outcomes**



## Seismic Resilient Hatfield Marine Science Center - Comprehensive Approach

### OSU Facilities Types around which to cluster Resilience Planning

#### Research Laboratories

Research facilities with ongoing experiments and depend on a specially conditioned environments.

#### Essential Facilities

Emergency operations center, police and fire services, hospital, shelters and temporary administrative quarters.

#### IT Facilities and Networks

Offices, data centers, distributed hubs, and infrastructure to support connectivity.

#### Instructional Facilities

Classrooms, auditoriums, faculty offices, teaching laboratories, and sports facilities.

#### Housing

Residential complexes that include dining facilities.

#### Administrative Offices

Offices of the Director and Administrative Services



## MSI Infrastructure Success is Creating And Sustaining Places that:



- Inspire us to teach and learn
- Inspire us to become leaders
- Celebrate the diversity of the oceans
- Invite Oregon and the world to join us and work in partnership with us



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## MSI Infrastructure – Where are we now?



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## MSI Infrastructure – Potential Tasks and Time

Feasibility Design Workshops and Report – 3 months  
 Solicit Request for Proposal of Design and Contractor Teams – 2 months  
 Design and Contractor Teams Selection and Contract Execution – 2 months  
 Pre-Design Phase Documents/Budget – 3 months  
 Pre-Design Documents/Budget Review – 1 month  
 Schematic Design Phase – 4 months  
 Schematic Design Phase - OSU Review – 1 month  
 Design Development Phase – 3 months  
 Design Development Phase – OSU Review – 1 month  
 Construction Document Phase – 4 months  
 Construction Document Phase Review & Entitlement Application & Construction Bidding – 2 months  
 Construction – 18 months  
 Building and Site Move-In Duration – 2 months



## HMSC Site Infrastructure Elements

**Vegetation Management** protects the environmental quality and character of the center. This includes vegetation relocations, infill planting, estuarine restorations, and other landscape improvements.

**Pedestrian / Bicycle Pathway Program** will improve and maintain pedestrian and bicycle routes to promote safety, encourage sustainable transportation modes, and enhance educational, community, and research programs.

**Outdoor Lighting** purchases, installs, salvages, and relocates light fixtures to ensure center safety while promoting conservation of energy.

**Outdoor Furnishings** serves, purchases and installs new trash & recycling receptacles, picnic tables, benches, and dumpster enclosures.

**Outdoor Art** sites and installs art pieces that are site appropriate and meaningful to their location, both in terms of the physical environment and the interpretation of the artists' concept.

**Signage** designs and implements installation of signage ranging from pedestrian focused regulatory signs to street scaled vehicular directional signs. The program provides consistent and aesthetically appropriate signs to aid visitors, faculty, students, visitors, & staff in navigating the center campus environment.

**Bollards / Vehicle Control** protects pedestrian and landscaped zones and controls vehicular and service traffic.

**Bike Parking** design for new or improved existing bike parking areas while maintaining the consistent, uncluttered character of the Center landscape.

**Small Craft Storage and Dock Design** to support functional and efficient management of logistics and material distribution at the water's edge.





## Section B: Financial Modeling

A short summary of major assumptions and projections is presented here. Report materials – noted in the Supplemental Materials Section - include an Excel workbook with a working version of the financial projection and a document discussing the model assumptions in more detail.



## Core Assumptions

- 500 students (400 undergraduates, 100 graduates) taking a full credit load during the academic year while in residence or studying in Newport (45 SCH per academic year for each undergraduate and delivery of 36 SCH for each graduate student). We have used this assumption as the principal boundary condition in assessing the costs of staffing and course delivery, which are the largest costs in the Initiative.
- If there are 500 students at a time at HMSC, there must be some number of students studying in Corvallis or Cascades who were preparing to spend time at HMSC. We assumed there were 1600 undergraduates at a time involved in marine studies broadly (450 students currently involved in programs, 400 new students at HMSC, and 750 other new students studying in various programs in Corvallis). We assumed 350 graduate students, 250 of which are currently studying in programs in Corvallis and 100 new students studying at Newport.
- It was also assumed that the completion and operation of a 100,000 gsf Marine Studies Building in Newport would happen and the building would be operational in Fall of 2017. The completion of a 120,000 gsf Earth Systems Science building in Corvallis, opening in Fall, 2022, was included as an option.



## Key Variables

The financial analysis depends greatly on some key ratios, including:

- Overall student to faculty ratio (15 in the example graph following)
- Average size of graduate classes at Newport (12 in the example)
- Average size of undergraduate classes at Newport (20 in the example)
- Proportion of professorial faculty to instructors (4:1 in the example)

These variables drive other important factors for cost estimates including:

- Number of faculty and instructors
- Number of graduate teaching assistants
- Proportion of credit hours delivered at Newport through Ecampus (which is important because that tuition goes to the delivering unit)



## Key Variables in the Financial Analysis

Variables are shaded green

Fixed assumptions or values calculated from the variables shaded brown

### Key Assumptions

Undergraduates* at HMSC in 2025	400
Graduates at HMSC in 2025	100
Newport MSI building operational Fall, 2017	
Average graduate class size	12
Average undergraduate class size	20
Credit hours at HMSC delivered online	50%
3.5 graduate students per tenure rank faculty	
Addition to current HMSC O&M	
All graduate students on assistantships	
Support staffing analogous to Cascades currently	

### Settings

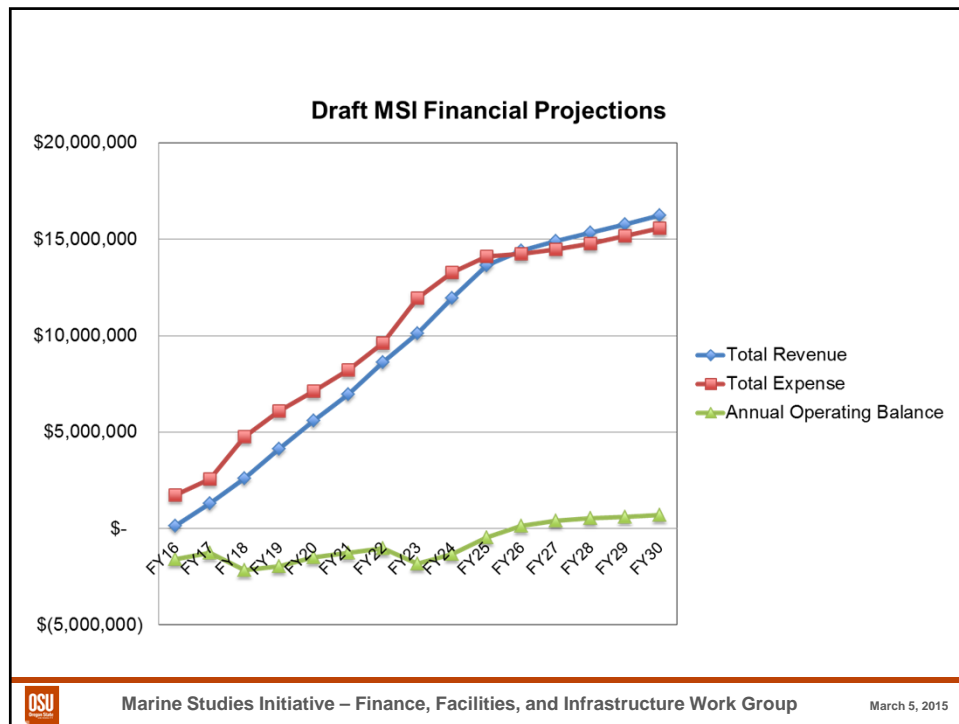
Average student/faculty ratio	15
Ratio of tenure track/instructors	80%
Average graduate class size	12
Average undergrad class size	20
Include current O&M shortfall? (\$250K)	yes
Corvallis ESS building Fall, 2022	yes
Include depreciation of new buildings?	no

\*We have assumed 500 students means 500 students receiving a full course load at HMSC in an academic year (45 SCH for undergraduates, 36 SCH for graduates)

### Key Measures

Tenure-track faculty	27
Instructors	6
GTAs	33
% Undergrad SCH online	50.2%





## APPENDIX

### Meeting Notes & Detailed Discussion Slides

### Guiding Principles – Create a New Model for Education and Neighborhood

Infrastructure is organized to support first and foremost the experiential learning experience, by engagement with “place” to become “researchers” through nurturing and maximizing exploration opportunities of the diverse natural, social, and local community environments.



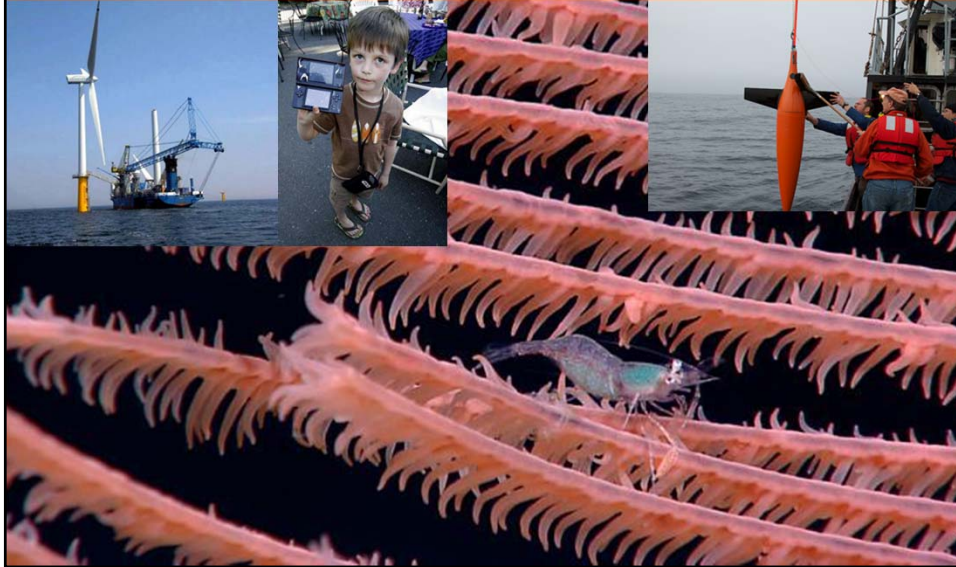
### Guiding Principles – Learning is Social at HMSC

Learning is social. MSI is a work environment where one wall of the classroom is the ocean and the environment around us is a demonstration of faculty and staff commitment to a transformative experience for all learners.





**Guiding Principles – Celebrate the Marine Sciences in the HMSC Built Environment**  
 Visually  
 Demonstratively  
 Innovatively

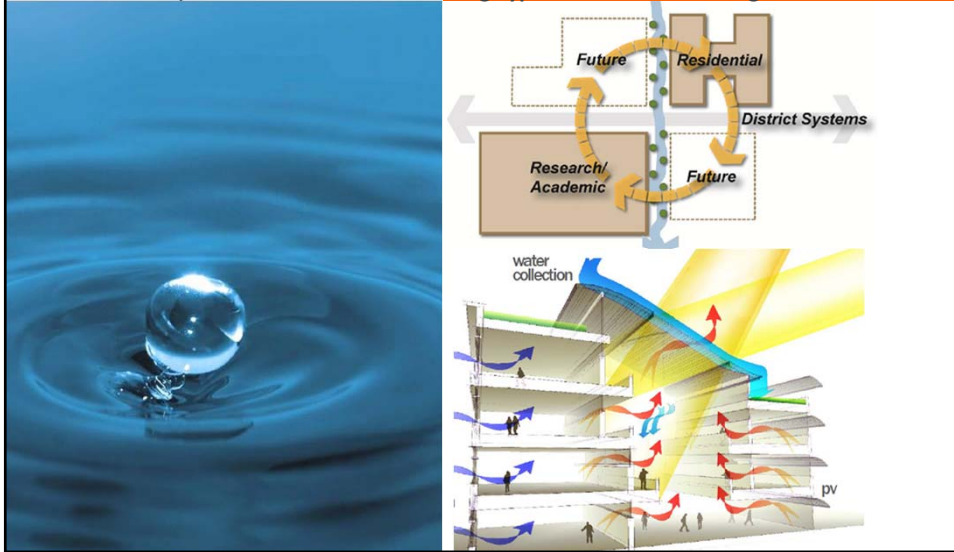


**Guiding Principles – Functional & Environmental Sustainability and Community Resilience**  
 Integrated Financial/Operational and Environmental Sustainability  
 Demonstration of Durable Performance for Unique Coastal Climate Conditions  
 Unique Integration of Architectural Design Excellence with Local Life Cycle Operations



### Guiding Principles – Devise Innovative Infrastructure Strategies

- Reuse and Repurpose if Possible
- Eco District Scale Development
- Identify Potential Development Partners to Leverage Investments
- Identify High Value/Low Cost Options
- Use Repeatable and Common Building Types for “Future Proofing”



### Guiding Principles – Embrace Collaboration

- No Silos – Vertical nor Horizontal
- Interdisciplinary
- A Forum for Local, State, National, Global Affiliations + Resources
- Leverage Connections + Geographic Location



### Guiding Principles – Create A Vibrant Experience

For Undergraduate Students

For Faculty + Staff

For Federal, State, Local Business and Industry, and Consortium Partners

For Policy Makers and Community Leaders

Create the Infrastructure to Live, Learn, and Recreate!



### Guiding Principles – Enable and Motivate Partners

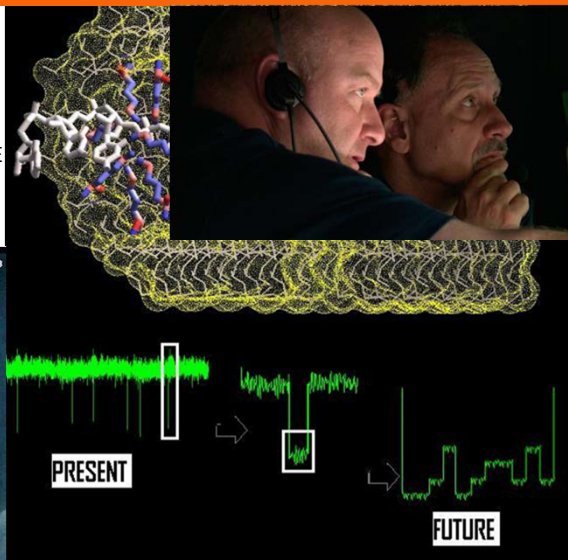
Engage the Real World

Relentless Inquiry and Innovation

Transform our Future Collaborations

- LOW-COST START UPS
- CONFERENCE
- CORE LABS
- PROGRAM COLLABORATION
- CREATE SHARED INFRASTRUCTURE  
PLATFORM OF ENTERPRISE +  
EDUCATION

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**APPENDIX I****Work Group - November 2014****Summary Discussion Notes:**

**Lower the Barriers for industry, community, public and private research and university collaboration** - through creation of inspired, functional, and flexible infrastructure that 1) attract people to HMSC unique to other existing OSU learning centers, 2) create place that welcomes and supports a sense of family with balanced life-work, including a range of support services for students/staff/faculty/visitors including access to healthful food, health and daycare services, and robust living/learning residential programs unique to HMSC's and future MSI Corvallis educational experiences.

**Access to the Sea** – immediate proximity to and emersion in the saltwater ecosystems of the sea - is the fundamental reason for bringing all of OSU's current research strength to this initiative and making HMSC an integral part of OSU's teaching, research, and community engagement missions. "Access to the sea" is a fundamental design principle in developing the MSI.

**Flow and Testing of ideas, people, and places** – as a dynamic force to the sea and back, as an ebb and flow, representative of the cycle of life and learning, the testing of hypotheses, creating human and scientific connections in place and via resilient/state of the art virtual information technology "collaboration hosting" infrastructure in an environmentally and financially sustainable development model unique to OSU.

**APPENDIX II****Work Group – December 2014****Summary Discussion Notes:**

**Draw inspiration** from natural systems (successful designs, processes, and patterns found in the ecosystems of the larger natural world) including climate, energy, materials, nutrients, and communications to provide a fresh opportunity to re-think and re-imagine how to solve design challenges in the built and virtual environments that will serve MSI.

**Create and test** new/unique "laboratory environments" which serve as flexible and sustainable infrastructure to inspire experiential learning – buildings, informal and formal open spaces, pathways which enhance the flow of people and human interactions, infrastructure, materiel; research vessels with significant telepresence capabilities, inland boats, wetlands, tidelands, information technologies and "virtual utilities".

**Showcase and bind together** Oregon's coastal environments and ocean, and OSU Colleges of Earth Ocean & Atmospheric Sciences, Business, Engineering, Liberal Arts, Sciences, Public Health and Human Sciences, and key industry, community, and federal and state environmental policy partners.

**Inspire** Marine Studies research at Oregon State University with excellent place making and infrastructure (exhibition, integrated learning and research experiences, places, spaces, virtual infrastructures, small boats, research vessels and other and tools/equipment) that supercharge inspiration from the oceans and coastal environments for local, regional, global solutions to the great human challenges of the 21<sup>st</sup> Century.





**APPENDIX III****Work Group Notes - Ideal Infrastructure for Students**

**Scientific, educational, working collaboration** and full emersion in the marine environment.

**Envision and experience** and test our understanding of the beauty, the businesses, the health, and future of the sea as future stewards of the oceans, citizens in our communities, and lifetime learners.

**Learn how to best share** useful knowledge, test hypotheses, and discuss marine sciences policy issues both within the academic setting and within our future communities as advocates, stewards, business owners, voters, active global and local citizens, and parents of future generations.

**Space and programs to support** variety of our living needs and life stages with a focus on building a strong "HMSC" community, through social collaboration, connection, services (healthcare, recreation, childcare) to mitigate everyday pressures and enhance effective work-life-study balance.

**APPENDIX IV****Work Group Notes - Ideal Infrastructure for Faculty and Staff**

The OSU marine studies teaching and research missions - with uniquely diverse partners - at the edge of sea is why we are here and the foundational principal for all future infrastructure design.

Emersion in the marine environment is the life force of our work together – with our boots and gear on and with a fully accessible "curriculum" and work environment creating a 24/7 intensity: "We are not in Oklahoma!"

Our marine environment is the anchor to our work: getting into the field, diving or sampling, the full flow of preparing for the work, departing and conducting the work, and returning to review and evaluate the work.

Provide access to the services, community, and programs that support the family needs of faculty/staff in varied Stages of their lives – what makes Newport a home? How can we contribute to enhancing community vitality?



**APPENDIX V****Work Group Notes - Ideal Infrastructure for Our Communities and Partners****Common Ground**

Shared space, infrastructure, and human resources is a formidable program opportunity for MSI and OSU's current and future partners – including NOAA, EPA, ODFW, ODFW, the Port and City of Newport, local businesses, PISCO, OOI, NSF, and many others.

**"Collaboratory" Placemaking**

Meeting areas and collaborative information technologies can be foundational in creating effective infrastructure to support sharing information, serve as test bed for evaluating information, and provide dynamic opportunities to build future leaders and policy makers in the marine, life, and health sciences.

**Global, National, Local Presence**

Supportive environment to ensure getting everyone "in the room" as we change lives thorough global health improvements through a unique 'shared Infrastructure' model among partners.



## Supplemental Materials

- A. MSI Financial Analysis v4 – March 2015 Draft.xlsx
- B. MSI Financial Subcommittee Report v5 Draft
- C. Oregon State University Marine Studies Building –  
Newport, Oregon – Building Principles – Version February  
3, 2015

