



**REQUEST FOR PROPOSAL
No. TB157896**

Umbilical Cable System

PROPOSAL DUE DATE AND TIME:
February 24, 2012 (2:00 PM, PST)

OSU Procurement and Contract Services Offices are open from 8:00 am – 12:00 noon and 1:00 pm – 5:00 pm.
Offices are closed during the 12:00 noon – 1:00 pm lunch hour.

SUBMITTAL LOCATION:

Oregon State University
Procurement and Contract Services
644 SW 13th Avenue
Corvallis, Oregon 97333

1.0 GENERAL

1.01 SCHEDULE OF EVENTS:

- Request for Proposal Issue Date February 3, 2012
- Deadline for Request for Clarification or Change February 10, 2012 (5:00 pm, PST)
- Proposal Due Date and Time February 24, 2012 (2:00 pm, PST)

This Schedule of Events is subject to change. Any changes will be made through the issuance of Written Addenda.

1.02 PRE-PROPOSAL CONFERENCE:

A Pre-Proposal Conference will not be held.

1.03 ISSUING OFFICE:

The Procurement and Contract Services (PaCS) department of Oregon State University (OSU) is the issuing office and is the sole point of contact for this Request for Proposal. Address all concerns or questions regarding this Request for Proposal to the Administrative Contact identified below:

1.04 ADMINISTRATIVE CONTACT:

Name: Tamara Bronson
Title: Procurement Supervisor
Telephone: (541) 737-8044
Fax: (541) 737-2170
E-Mail: tamara.bronson@oregonstate.edu

1.05 DEFINITIONS:

As used in this Request for Proposal, the terms set forth below are defined as follows:

- a. "Addenda" means an addition to, deletion from, a material change in, or general interest explanation of the Request for Proposal.
- b. "Exhibits" means those documents which are attached to and incorporated as part of the Request for Proposal.
- c. "Proposal" means an offer, binding on the Proposer and submitted in response to a Request for Proposal.
- d. "Proposer" means an entity that submits a Proposal in response to a Request for Proposal.
- e. "Proposal Due Date and Time" means the date and time specified in the Request for Proposal as the deadline for submitting Proposals.
- f. "Request for Proposal" (RFP) means a Solicitation Document to obtain Written, competitive Proposals to be used as a basis for making an acquisition or entering into a Contract when price will not necessarily be the predominant award criteria.
- g. "Responsible" means an entity that demonstrates their ability to perform satisfactorily under a Contract by meeting the applicable standards of responsibility outlined in OAR 580-061-0130.
- h. "Responsive" means a Proposal that has substantially complied in all material respects with the criteria outlined in the Request for Proposal.
- i. "Written or Writing" means letters, characters, and symbols inscribed on paper by hand, print, type, or other method of impression intended to represent or convey particular ideas or meanings.

2.0 INTRODUCTION AND BACKGROUND

2.01 INTRODUCTION

Oregon State University (OSU) Procurement and Contract Services (PaCS) is seeking Responsive Responsible Proposers to submit Proposals for the provision of an umbilical cable system that will be used with the Ocean Sentinel instrumentation buoy that is used by Northwest National Marine Renewable Energy Center (NNMREC) to test scaled wave energy converters (WECs) off the coast of Newport, Oregon.

2.02 BACKGROUND:

NNMREC is a Department of Energy sponsored partnership between Oregon State University (OSU) and the University of Washington (UW), with UW focusing on tidal energy and OSU focusing on wave energy. The Ocean Sentinel instrumentation buoy (Ocean Sentinel), to be completed in the spring of 2012, will be a surface buoy that will provide both a stand-alone electrical load and instrumentation to monitor WECs under test. WECs designed by different commercial developers will be moored close by the Ocean Sentinel at a NNMREC test site. The umbilical cable system will connect the WEC under test with the Ocean Sentinel. Additional background information is included in Section 3 of Exhibit A.

2.03 OREGON STATE UNIVERSITY:

Founded in 1868, Oregon State University is a comprehensive, research-extensive, public university located in Corvallis. OSU is a member of the Oregon University System and one of only two American universities to hold the Land Grant, Sea Grant, Space Grant and Sun Grant designations. OSU is also the only Oregon institution to hold the Carnegie Foundation's top ranking for research universities, a recognition of the depth and quality of OSU's graduate education and research programs.

Through its centers, institutes, Extension offices and Experiment Stations, OSU has a presence in almost every one of Oregon's 36 counties, including its main campus in Corvallis, the Hatfield Marine Sciences Center in Newport and OSU-Cascades Campus in Bend. OSU offers undergraduate, masters and doctoral degrees through 12 academic colleges enrolling more than 20,000 students from every county in Oregon, every state in the country and more than 90 nations.

3.0 SPECIFICATIONS AND REQUIREMENTS

3.01 SPECIFICATIONS AND REQUIREMENTS:

Proposers need to offer Proposals that meet the specifications identified in Exhibit A.

3.02 TERMS AND CONDITIONS:

OSU's terms and conditions governing the purchase resulting from this RFP are included at Exhibit B.

4.0 PROPOSER QUALIFICATIONS

THIS SECTION NOT USED IN RFP TB 157896.

5.0 REQUIRED SUBMITTALS

5.01 QUANTITY OF PROPOSAL:

Submit one (1) original Proposal and four (4) duplicate copies. Mark original Proposal as "ORIGINAL". Original should contain original signatures on any pages where a signature is required. Proposals should contain the submittals listed in this section below:

5.02 REQUIRED SUBMITTALS:

It is the Proposer's sole responsibility to submit information in fulfillment of the requirements of this Request for Proposal. If pertinent information or required submittals are not included within the Proposal, it may cause the Proposal to be rejected or have an adverse impact on evaluation.

Proposers should submit the following information:

- A submittal letter detailing the Proposer's history and experience, including experience with similar projects of equivalent size and scope.
- Information required in section 2 titled "Proposal Submittals" contained in Exhibit A.
- Exhibit C, Certifications, fully completed.
- Exhibit D, References, fully completed.

6.0 EVALUATION AND AWARD

6.01 EVALUATION:

The stages of review and evaluation are as follows:

a. Determination of Responsiveness:

OSU will first review all Proposals to determine Responsiveness. Proposals that do not comply with the instructions or are incomplete may be deemed non-Responsive. Written notice will be sent to Proposers whose Proposal is deemed non-Responsive identifying the reason. A proposer has the right to appeal the decision pursuant to OAR 580-061-130(5)(a).

b. First Stage Evaluation:

Those Proposals determined to be Responsive will be evaluated using the required submittals. Proposals will be scored based on the evaluation criteria listed below in section 6.03. Scores will be used to determine Proposer's within a competitive range. The competitive range will be made of Proposers whose individual scores, when viewed together, form a group of the highest ranked Proposers above a natural break in the scores.

OSU may award after the first stage evaluation to the highest ranked Proposer without moving on to the second stage evaluation. If this option is selected, Written notice of intent to award the Contract to the highest ranked Proposer will be provided to all Responsive Proposers.

c. Second Stage Evaluation:

If award is not made after the first stage evaluation, OSU may choose any of the following methods in which to proceed:

- i. Issue a Written invitation to Proposers within the competitive range requesting an interview, presentation, site visit or any other evaluative method that is relevant to the goods or services solicited in the Request for Proposal. Written invitations will contain the evaluation criteria and scoring that will be used by the evaluation committee.

- ii. Engage in oral or Written discussions with and receive best and final Proposals from all Proposers in the Competitive Range or all Proposers submitting Responsive Proposals. Discussions may be conducted for the following purposes:
 - Informing Proposers of deficiencies in their initial Proposals;
 - Notifying Proposers of parts of their Proposals for which OSU would like additional information; or
 - Otherwise allowing Proposers to develop revised Proposals that will allow OSU to obtain the best Proposal based on the requirements set forth in this Request for Proposal.

The conditions, terms, or price of the Proposal may be altered or otherwise changed during the course of the discussions provided the changes are within the scope of the Request for Proposal. Best and final Proposals will be scored based on the evaluation criteria listed below in section 6.03.

Points awarded in the first stage evaluation will not be carried to the second stage evaluation. Contract will be awarded to the Proposer who in OSU's opinion, best meets the requirements and qualifications of the RFP and OSU's needs.

d. Additional Stages of Evaluation:

If after completion of the second stage of evaluation, an award is not made, OSU may add another stage of evaluation using any of the methods outlined in the second stage evaluation above.

6.02 NEGOTIATIONS:

OSU may commence serial negotiations with the highest-ranked Proposer or commence simultaneous negotiations with all eligible Proposers. OSU may negotiate:

- a. The statement of work;
- b. The Contract price as it is affected by negotiating the statement of work; and
- c. Any other terms and conditions determined by OSU in its sole discretion to be reasonably related to those expressly authorized for negotiation. Accordingly, Proposers will not submit and OSU will not accept for negotiation, any alternative terms and conditions that are not reasonably related to those expressly authorized for negotiation.

Terms and conditions within the sample contract that are unrelated to the statement of work or Contract price may be negotiated after award, but before legal sufficiency review or execution of the Contract.

6.03 EVALUATION CRITERIA:

Points will be given in each criteria and a total score will be determined. The maximum points available for each criteria are identified below.

<u>Evaluation Criteria:</u>	<u>Points:</u>
Experience	200
Design Plan and Sketches	300
Cost Proposal	200
Timeline	<u>300</u>
Total	1000

6.04 INVESTIGATION OF REFERENCES:

OSU reserves the right to investigate and to consider the references and the past performance of any Proposer with respect to such things as its performance or provision of similar goods or services, compliance with specifications and contractual obligations, and its lawful payment of suppliers, subcontractors, and workers. OSU further reserves the right to consider past performance, historical information and facts, whether

gained from the Proposal, Proposer interviews, references, OSU or any other source in the evaluation process. OSU may postpone the award or execution of the Contract after the announcement of the notice of intent to award in order to complete its investigation.

7.0 INSTRUCTIONS TO PROPOSERS

7.01 APPLICABLE STATUTES AND RULES:

This RFP is subject to the applicable provisions and requirements of the Oregon Revised Statutes, Oregon Administrative Rules, and OSU Policies and Procedures.

7.02 REQUEST FOR CLARIFICATION OR CHANGE:

Requests for clarification or change of the Request for Proposal must be in Writing and received by the Administrative Contact no later than the Deadline for Request for Clarification or Change as specified in the Schedule of Events. Such requests for clarification or change must include the reason for the Proposer's request. OSU will consider all timely requests and, if acceptable to OSU, amend the Request for Proposal by issuing an Addendum. Envelopes, e-mails or faxes containing requests should be clearly marked as a Request for Clarification or Change and include the RFP Number and Title.

7.03 ADDENDA:

Only documents issued as Written Addenda by PaCS serve to change the Request for Proposal in any way. No other direction received by the Proposer, written or verbal, serves to change the Request for Proposal. PaCS will notify potential Proposers through publication of the Addenda on the OUS procurement website. If you have received a Request for Proposal you should consult the OUS procurement website, prior to Proposal submittal, to assure that you have not missed any Addenda. Proposers are not required to return Addenda with their Proposal. However, Proposers are responsible for obtaining and incorporating any changes made by the Addendum into their Proposal. Failure to do so may, in effect, make the Proposal non-Responsive, which may cause the Proposal to be rejected.

7.04 PREPARATION AND SIGNATURE:

All Required Submittals must be Written or prepared in ink and signed in ink by an authorized representative with authority to bind the Proposer. Signature certifies that the Proposer has read, fully understands, and agrees to be bound by the Request for Proposal and all Exhibits and Addenda to the Request for Proposal.

7.05 PUBLIC RECORD:

Upon completion of the Request for Proposal process, information in your Proposal will become subject records under the Oregon Public Records Law. Only those items considered a "trade secret" under ORS 192.501(2), may be exempt from disclosure. If a Proposal contains what the Proposer considers a "trade secret" the Proposer must mark each sheet of information as such. Only bona fide trade secrets may be exempt and only if public interest does not require disclosure.

7.06 SUBMISSION:

Proposals must be submitted in a sealed envelope and be delivered to the submittal location listed on the Request for Proposal cover sheet no later than the Proposal Due Date and Time. Proposer must specify on the outside of the envelope the Request for Proposal number, the Request for Proposal title and the Proposal Due Date and Time. **E-MAIL OR FACSIMILE PROPOSALS WILL NOT BE ACCEPTED.**

7.07 MODIFICATION:

Prior to submittal, Proposers should initial modifications or erasures in ink by the person signing the Proposal. After submittal but prior to the Proposal Due Date and Time, Proposals may be modified by submitting a Written notice indicating the modifications and a statement that the modification amends and supersedes the prior Proposal. After the Proposal Due Date and Time, Proposers may not modify their Proposal.

7.08 WITHDRAWALS:

A Proposer may withdraw their Proposal by submitting a Written notice to the Administrative Contact identified in this Request for Proposal prior to the Proposal Due Date and Time. The Written notice must be on the Proposer's letterhead and signed by an authorized representative of the Proposer. The Proposer, or authorized representative of the Proposer, may also withdraw their Proposal in person prior to the Proposal Due Date and Time, upon presentation of appropriate identification and evidence of authority to withdraw the Proposal satisfactory to OSU.

7.09 LATE SUBMITTALS:

Proposals and Written notices of modification or withdrawal must be received no later than the Proposal Due Date and Time. OSU may not accept or consider late Proposals, modifications, or withdrawals except as permitted in OAR 580-061-0120.

7.10 PROPOSAL OPENING:

Proposals will be opened immediately following the Proposal Due Date and Time at the Submittal Location. Proposer may attend the Proposal opening. Only the names of the Proposers submitting Proposals will be announced. No other information regarding the content of the Proposals will be available.

7.11 PROPOSALS ARE OFFERS:

The Proposal is the Proposer's offer to enter into a Contract pursuant to the terms and conditions specified in the Request for Proposal, its Exhibits, and Addenda. The offer is binding on the Proposer for one hundred twenty (120) days. OSU's award of the Contract constitutes acceptance of the offer and binds the Proposer. The Proposal must be a complete offer and fully Responsive to the Request for Proposal.

7.12 CONTINGENT PROPOSALS:

Proposer shall not make its Proposal contingent upon OSU's acceptance of specifications or contract terms that conflict with or are in addition to those in the Request for Proposal, its Exhibits, or Addenda.

7.13 RIGHT TO REJECT:

OSU may reject, in whole or in part, any Proposal not in compliance with the Request for Proposal, Exhibits, or Addenda, if upon OSU's Written finding that it is in the public interest to do so. OSU may reject all Proposals for good cause, if upon OSU's Written finding that it is in the public interest to do so. Notification of rejection of all Proposals, along with the good cause justification and finding of public interest, will be sent to all who submitted a Proposal.

7.14 AWARDS:

OSU reserves the right to make award(s) by individual item, group of items, all or none, or any combination thereof. OSU reserves the right to delete any item from the award when deemed to be in the best interest of OSU.

7.15 LEGAL SUFFICIENCY REVIEW:

Prior to execution of any Contract resulting from this Request for Proposal, the Contract may be reviewed for legal sufficiency by a qualified attorney for OSU pursuant to the applicable Oregon Revised Statutes and Oregon Administrative Rules. Legal sufficiency review may result in changes to the terms and conditions specified in the Request for Proposal, Exhibits, and Addenda.

7.16 PROPOSAL RESULTS:

A notice of intent to award containing the Proposal results will be issued to all Proposers. The Proposal file will be available for Proposer's review during the protest period at the PaCS Department. Proposers must make an appointment with the Administrative Contact to view the Proposal file. After the protest period, the file will be available by making a Public Records Request to OSU.

7.17 PROPOSAL PREPARATION COST:

OSU is not liable for costs incurred by the Proposer during the Request for Proposal process.

7.18 PROPOSAL CANCELLATION:

If a Request for Proposal is cancelled prior to the Proposal Due Date and Time, all Proposals that may have already been received will be returned to the Proposers. If a Request for Proposal is cancelled after the Proposal Due Date and Time or all Proposals are rejected, the Proposals received will be retained and become part of OSU's permanent Proposal file.

7.19 PROTEST OF CONTRACTOR SELECTION, CONTRACT AWARD:

Any Proposer who feels adversely affected or aggrieved may submit a protest within seven (7) calendar days after OSU issues a notice of intent to award a Contract. The protest must be clearly identified as a protest, identify the type and nature of the protest, and include the Request for Proposal number and title. The rules governing protests are at OAR 580-061-0145.



Exhibit A

Specification and Requirements

Umbilical Cable System

Ocean Sentinel Instrumentation Buoy

Northwest National Marine Renewable Energy Center
(NNMREC)

Revision 0

Revisions

Revisions

Rev	Description	Date	By
0	Initial Release	1/3/2012	TML

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1. Scope

These specifications define the requirements for an umbilical cable system that will be used with the Ocean Sentinel instrumentation buoy that NNMREC will use to test scaled wave energy converters (WECs) off the coast of Newport, Oregon. NNMREC is a Department of Energy sponsored partnership between Oregon State University (OSU) and the University of Washington (UW), with UW focusing on tidal energy and OSU focusing on wave energy. The Ocean Sentinel buoy, to be completed in the spring of 2012, will be a surface buoy that will provide both a stand-alone electrical load and instrumentation to monitor WECs under test. The instrumentation buoy system is shown in Figure 1-1. WECs designed by different commercial developers will be moored close by the Ocean Sentinel at a NNMREC test site. The umbilical cable will connect the WEC under test with the instrumentation buoy. Power generated by the WEC will be dissipated in a load bank on-board the instrumentation buoy. Switchgear and power conversion equipment, located in the forward compartment of the instrumentation buoy, will provide control of the load bank. WECs tested with the Ocean Sentinel will have power output capability of 100 kW or less.

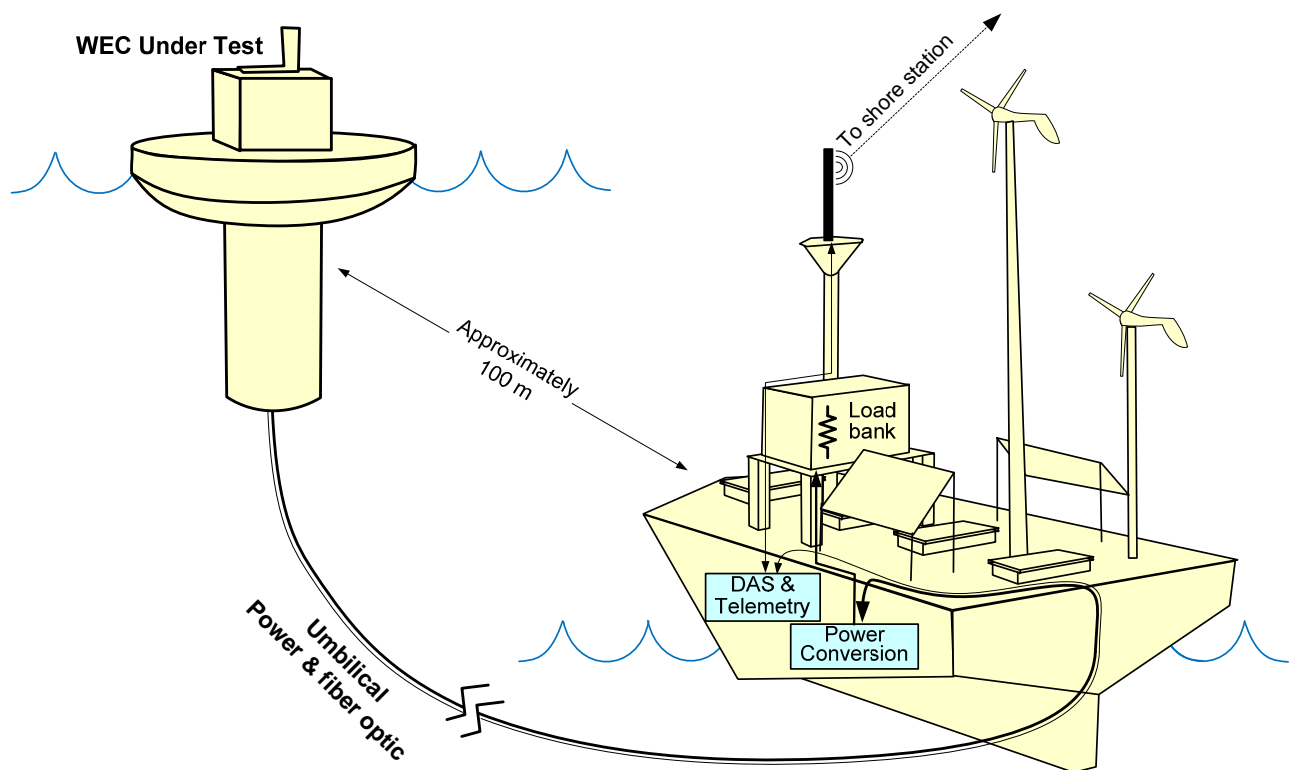


Figure 1-1 Ocean Sentinel Testing a WEC

NNMREC requires a Contractor who has experience with similar underwater cable designs to design and supply a complete umbilical cable system that includes the cable support and termination on board the Ocean Sentinel and the WEC under test, and all equipment needed for deployment. NNMREC plans to have two umbilical cables built; one cable will have capability to test 100 kW, 480 V WECs, and the other, smaller cable will be for testing lower power devices, e.g., 6 kW average (20 kW peak) WECs if the full size cable is too large for this purpose. A 6 kW, 230 V WEC will be tested during the initial 2012 deployment of the Ocean Sentinel. NNMREC

anticipates awarding the Contract for design and supply of the umbilical cable system by March 9, 2012. The timeline for this project is very critical. NNMREC would like to take delivery of fully functioning version of the smaller cable identified above no later than June 15, 2012, if possible.

2. Proposal Submittals

NNMREC requests that Proposers submit Proposals to design and supply a complete umbilical cable system for the Ocean Sentinel. Proposals should include, at a minimum, the following information in accordance with the requirements listed in Section 4:

1. Draft design of a 100 kW/480V umbilical cable between the Ocean Sentinel and WEC.
2. Draft design of the 100 kW umbilical cable support and termination on board the Ocean Sentinel, and draft design of the strain relief and bend restrictor at point of entry into the water, all to be implemented in cooperation with NNMREC and AXYS Technologies, who is designing and building the Ocean Sentinel for NNMREC.
3. Draft design of a 6 kW continuous, 20 kW peak, 230V umbilical cable between the Ocean Sentinel and WEC, to be used for testing lower power WECs, that is compatible with the support and termination system described in item (2) for the larger cable.
4. Detailed information about how Proposer will create an umbilical cable deployment and recovery plan, to be written in cooperation with NNMREC and AXYS Technologies, that describes how the cable will be deployed and removed from the test site using vessels and equipment at NNMREC's disposal. This plan should also describe a method to leave the cable in place when the Ocean Sentinel is taken off station for servicing.
5. Draft design of any additional equipment which may be identified in the deployment plan, that NNMREC will require to deploy/remove the umbilical cable, including spools, winches, marker buoys, and cable end covers as necessary.
6. Cost proposal for supplying the 100 kW umbilical cable, described in item (1) and (2), along with all items needed for deployment/removal of this cable.
7. Cost proposal for supplying the 6 kW continuous, 20 kW peak umbilical cable, described in item (3), along with all items needed for deployment/removal of this cable.
8. Cost proposal for supplying an umbilical cable deployment and recovery plan described in item (4).
9. Cost proposal for any additional equipment described in item 5.
10. Cost proposal for supply of mating connectors and/or terminals for both the electrical and fiber conductors that are compatible with both the 6 kW and 100 kW cables, to be installed on board the Ocean Sentinel by AXYS Technologies or NNMREC. Mating connectors for WECs under test shall be specified and shall be commercially available for purchase separately by WEC developers.
11. Timelines for the final design and supply of all of the items required under this Proposal, including at a minimum, 1) the design/documentation of both the 100 kW and 6/20 kW cables per items 1-5 above, 2) supplying the 6 kW cable and associated equipment, and 3) supplying the 100 kW cable and associated equipment 4) supplying the umbilical cable deployment and recovery plan.

Proposals should include a brief description of the draft designs proposed by the Proposer, sketches that illustrate the proposed draft design, and a description of the method of analysis that the Proposer would use to develop the final design including the specific analysis software used by the Proposer.

3. Additional Background Information

Information related to the Ocean Sentinel, WEC under test, and NNMREC test site that is relevant to the umbilical cable is included in the following subsections.

3.1 Ocean Sentinel Buoy

AXYS Technologies, Inc. (www.axystechnologies.com) is designing and building the Ocean Sentinel for NNMREC, based on a six meter NOMAD hull design. The Ocean Sentinel will be a modified version of similar buoys that AXYS has built for other purposes. See the following brochure for more information about similar AXYS buoy designs that will be the basis for the Ocean Sentinel design:

<http://www.axystechnologies.com/Portals/0/Brochures/WindSentinel%20digital%20Data%20Sheet.pdf>

AXYS expects to complete the Ocean Sentinel design by early 2012 and deliver the buoy to NNMREC in May 2012.

The umbilical cable will enter the Ocean Sentinel over the stern. Power conversion and communications equipment which connects to the umbilical cable will be located in the forward of four compartments on the Ocean Sentinel. A concept drawing of how the umbilical cable might enter the Ocean Sentinel and connect to equipment in the forward compartment is shown in Appendix A. The umbilical cable system Contractor will be expected to work cooperatively with NNMREC and AXYS Technologies to revise this concept drawing as necessary for compatibility with the umbilical cable design.

The preliminary mooring design for the Ocean Sentinel is shown in Appendix B. A three point mooring system will be used to avoid cable twist. The watch circle radius will be approximately 50 meters.

Further Ocean Sentinel and mooring design information can be provided to the Contractor by AXYS Technologies during the final umbilical design process after Contract award, as requested by the Contractor.

3.2 WEC Under Test

NNMREC expects to provide test facilities and services to commercial developers, and will operate the Ocean Sentinel with a wide range of WEC designs. Most of the WECs under test are expected to be early prototype, scale models of larger WECs, and the summer conditions at the NNMREC test site will represent a scaled wave climate relative to year-around conditions. The Ocean Sentinel is being designed to accommodate WECs with continuous power outputs of up to 100 kW, but NNMREC also expects to test some very low power WECs, with power outputs of 1 kW (average) or less.

The first WEC that will be tested with the Ocean Sentinel during the summer of 2012 has the output power, voltage, and currents listed in Table 3-1.

Table 3-1 Output power, voltage, and current for initial WEC to be deployed in 2012

Continuous output power (three phase)	6 kW
Peak output power (10 sec or less)	20 kW
Maximum voltage (rms)	220 V
Continuous output current (rms)	16 A
Peak output current (rms)	52 A

NNMREC plans to initially provide an umbilical cable termination and support at the WEC end of the cable that is a duplicate of that designed for the Ocean Sentinel end. Modification of the WEC end of the cable may be required later for some WEC tests per developer requirements.

The WEC developers will normally provide mooring systems that are customized for their own devices. These mooring systems are all expected to maintain a small watch circle radius that will not exceed approximately 25 m for the different WECs under test.

3.3 WEC – Ocean Sentinel Electrical Interface

The electrical interface between the WEC under test and Ocean Sentinel, through the umbilical cable, is shown in Figure 3-1. NNMREC expects to test prototype WECs that do not include the necessary power conversion and switchgear equipment for a connection to the utility grid. For this reason, the electrical generator on board the WEC will connect directly to a power converter on board the Ocean Sentinel through the umbilical cable. The power converter will control the torque and output power of the WEC generator, and dissipate the output power in a load bank on the deck of the Ocean Sentinel.

Some WEC generators may have a neutral connection that will be measured by the data acquisition system (DAS) on board the Ocean Sentinel, via a conductor included in the umbilical cable for that purpose. The neutral will be connected to a high impedance DAS input so that current will be very low and a small neutral conductor can be used.

Up to 150W of 120V instrument power may be sourced from the Ocean Sentinel to the WEC under test to operate instrumentation on board WECs that do not have their own instrument power source.

See Section 4 for detailed umbilical cable requirements.

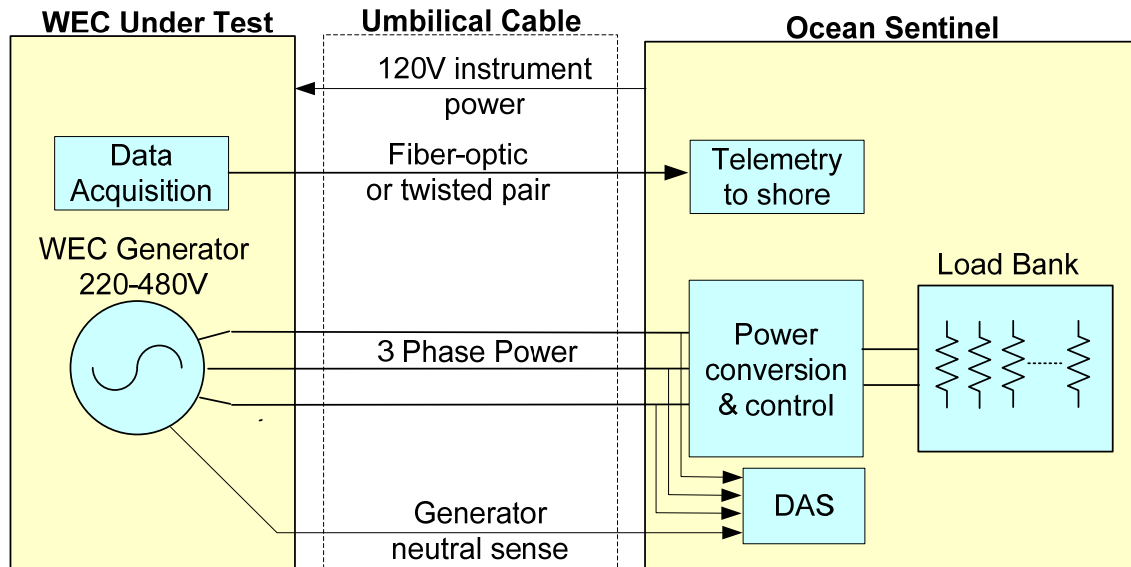


Figure 3-1 Interface of WEC to Ocean Sentinel through Umbilical Cable

3.4 Test Site Location and Climatology

The location of the NNMREC test site, shown in Appendix C, will be approximately 2.5 nautical miles offshore from Yaquina Head, north of Newport, Oregon. The deployment window for WEC testing with the Ocean Sentinel will be between May 1 and October 31; the umbilical cable will not be in use during other times. The water depth at the test site is approximately 50 meters, and the maximum significant wave height for May-October is approximately 10 meters.

The wave, wind, and current climatology information for the test site is provided in Appendix D. Included in Appendix D is an earlier mooring climatology analysis that was performed to analyze a 12 month deployment at this test site. Note, upon review of that mooring climatology analysis, OSU researchers responded that the correct shoaling coefficient between NDBC and MOTB would be 1.01. Hence, the waves would be expected to increase slightly between those two points (neglecting wind effects, bottom friction and refraction). Thus it is estimated that the analysis underestimated the design wave by 7% (e.g., should be 16.2 m not 15.2 m). Regarding the currents, OSU researchers believe that wind driven currents near the surface can hit 1 knot easily during a normal winter storm (40 knot wind). Extreme events can drive even stronger currents, thus the 0.6 knot current for the 50-year storm is a low estimate.

3.5 Deployment Vessels

NNMREC prefers to use a vessel equivalent to the 54 foot R/V Elakha, described at <http://www.shipops.oregonstate.edu/ops/elakha/>, or alternately the 84 foot R/V Pacific Storm, described at <http://mmi.oregonstate.edu/research-vessels>, for deployment of the umbilical cable. In some cases, NNMREC may want to use similar vessels from the local commercial fishing fleet for deployment as well.

4. Umbilical Cable Requirements

The umbilical cable may either run on the sea floor, float on the surface, or be partially submerged; Proposers are asked to recommend the best alternative. NNMREC is open to any design that will survive the sea conditions expected at the test site, described in Appendix D. A concept sketch of a partially submerged umbilical cable is included in Figure 4-1 for reference.

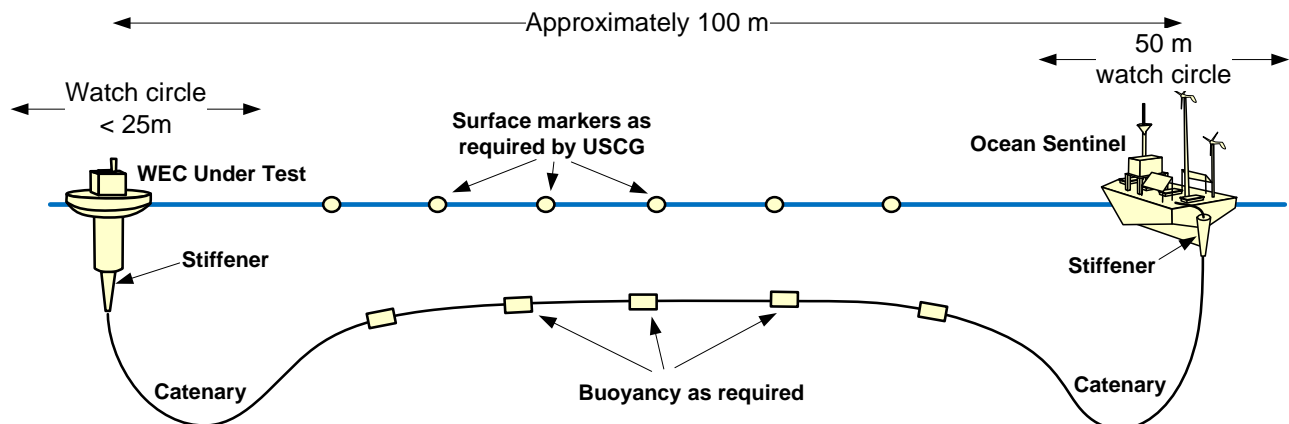


Figure 4-1 Subsurface umbilical cable concept; alternatives are a sea floor or surface umbilical cable

The conductor requirements for the 100 kW, 480 V cable and the 6 kW cable are listed in Table 4-1. The specified power conductor currents for the 6 kW cable are based on the requirements of a 220 V WEC that will have a peak power output of 20 kW; the duration of the peaks is not known. This cable will also be capable of testing 480 V WECs with the same current ratings, resulting in a power rating of 12 kW at the higher voltage

Table 4-1 Conductor requirements for 100 kW @ 480V and 6 kW umbilical cables

Description	Number of Conductors	Conductor Size	
		100 kW cable	6 kW cable
Three phase power ¹	3	2 AWG (120 A avg)	8 AWG (15 A avg, 50 A pk)
Neutral sense ¹	1	14 AWG	
120 Vac instrumentation power (150W) ¹	2	14 AWG	
Fiber-optic	2 pairs	Single mode	
Twisted signal pair	2 pairs	24 AWG	

¹Three phase power, neutral sense, and 120 V conductors to have 1000 V insulation in both cables

The specific requirements for the umbilical cables, connectors, terminations, strain reliefs and other associated components are listed in Table 4-2.

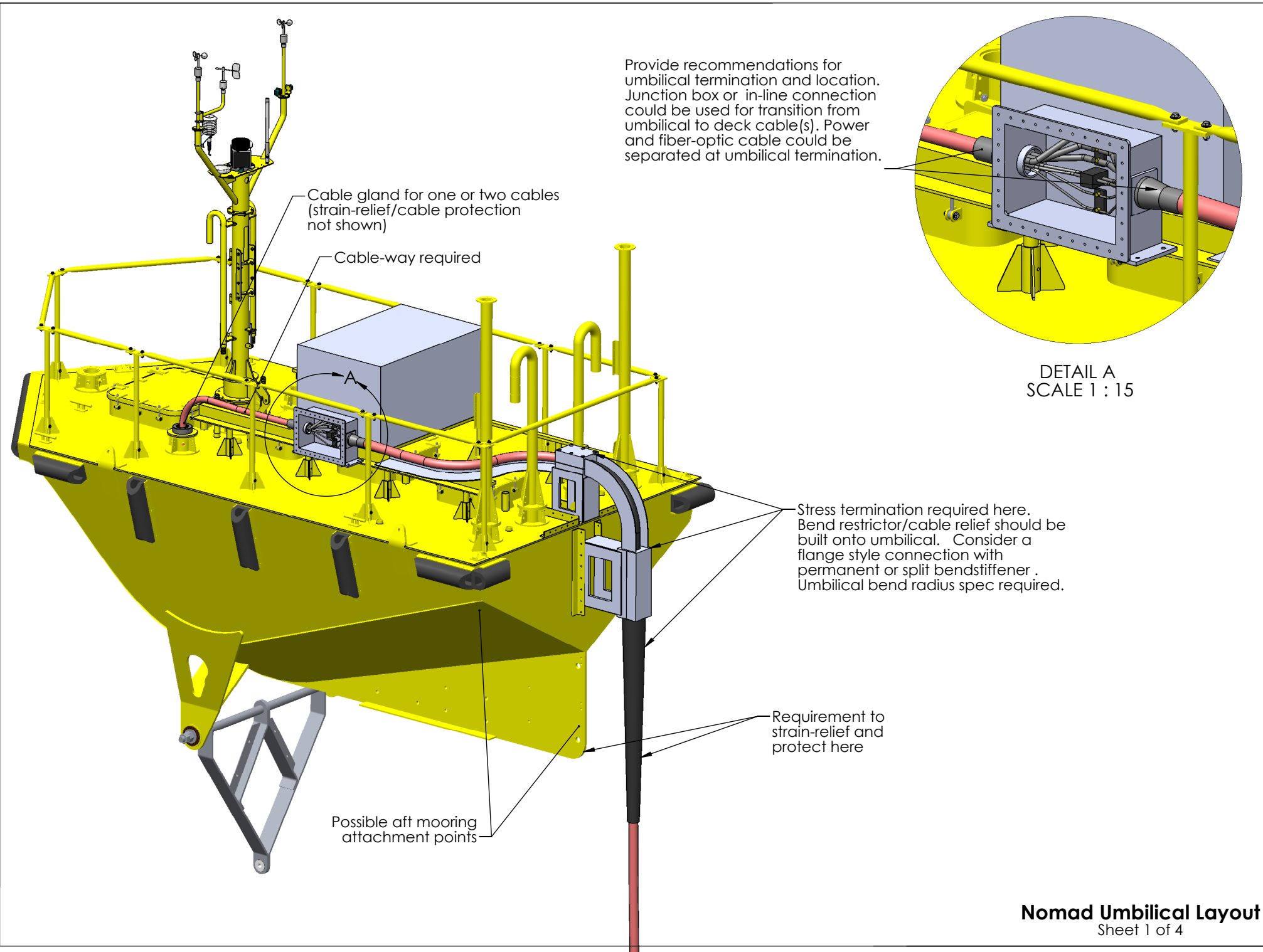
Table 4-2 Umbilical Cable Requirements

Requirement	Specification
General	
Sea conditions	Design for 10 year return period, significant wave height for May-October deployments. See Appendix D for site information.
Design analysis	As proposed by Contractor. NNMREC prefers that the Contractor build a coupled model of the WEC, Ocean Sentinel, subsea cable, and mooring system using OrcaFlex software or equivalent to design the cables, support, and strain relief.
Conductors	Per Table 4-1.
Voltage insulation	1000 V for three phase power, neutral, and 120 Vac conductors.
Armoring	As proposed by Contractor.
Marker floats	Surface marker floats as required per USCG requirements; none required if cable on sea floor.
Sea floor chafe protection	As proposed by Contractor if cable to lay on sea floor.
Cable length	As proposed by Contractor for nominal distance of 100 m Ocean Sentinel to WEC, watch circle radius of 50m for Ocean Sentinel, and watch circle radius of 25 m for WEC.
Deployment/Recovery	
General	Umbilical cables should be designed to be easily disconnected from either the Ocean Sentinel or WEC, and left in place at the test site while the Ocean Sentinel or WEC is temporarily taken to harbor for servicing and repair. A means shall be developed to hold the end of the cable on or below the surface when the Ocean Sentinel is off station, perhaps with a docking/storage buoy.
Protection of cable end	A protective cap or other means shall be provided to protect the ends of the cable when not in use, both on shore or when cable is left on station without Ocean Sentinel.
Spool	A cable spool shall be provided consistent with the deployment plan that the Contractor will assist NNMREC to write.
Other equipment	All other specialty equipment necessary to deploy and retrieve the cable, and leave the cable in place at test site when the Ocean Sentinel is removed from station, shall be provided by the Contractor, consistent with the deployment plan.

Requirement	Specification
Support, termination, and strain relief design on board Ocean Sentinel	
General	Proposer to propose modifications to the concept shown in Appendix A. Entry must be over the stern of the Ocean Sentinel. Depending on the armoring and bend radius of the cable, the armoring may be terminated at the cable support on the stern. The junction box shown for the cable termination in Appendix A may be moved to another location closer to the stern of the Ocean Sentinel if necessary.
Connectors	Contractor to install connectors on ends of all conductors and fiber optics at both Ocean Sentinel and WEC end of cables; connectors to be proposed by Contractor. Single or multiple conductor connectors may be used. Connection system shall be designed for frequent connection/disconnection of umbilical cable from Ocean Sentinel.
Mating connectors	Contractor shall provide all mating connectors for installation on the Ocean Sentinel, along with any required hardware and specialty tools required for installation by NNMREC or AXYS technologies. NNMREC prefers that both the 20 kW and 6 kW cables use the same connectors at the Ocean Sentinel end of the cable if possible.
WEC cable support and termination	WEC end cable to have same support and termination design as used at Ocean Sentinel end of cable

Appendix A

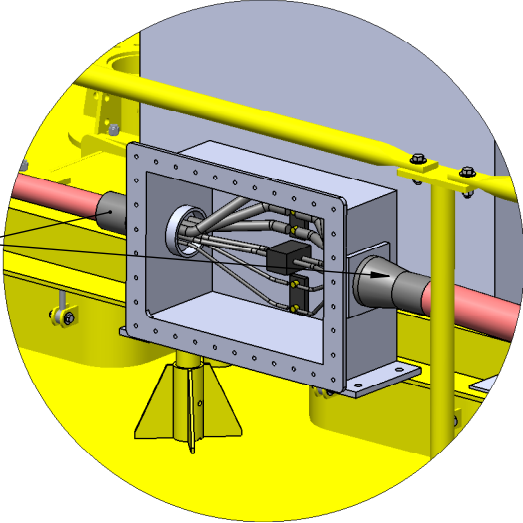
Concept Drawing, Umbilical Entry on Ocean Sentinel



Provide recommendations for umbilical termination and location. Junction box or in-line connection could be used for transition from umbilical to deck cable(s). Power and fiber-optic cable could be separated at umbilical termination.

Cable gland for one or two cables (strain-relief/cable protection not shown)

Cable-way required

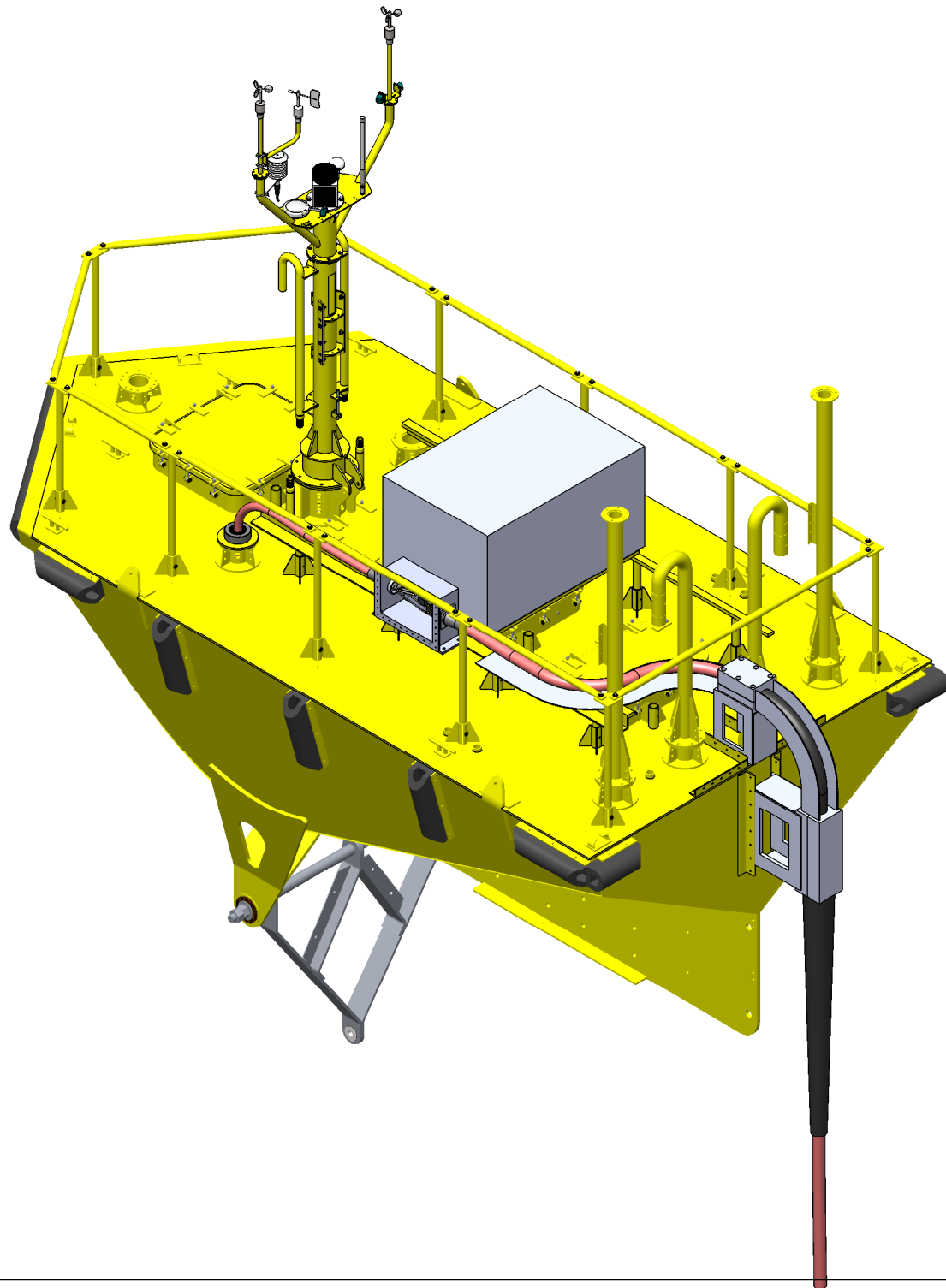


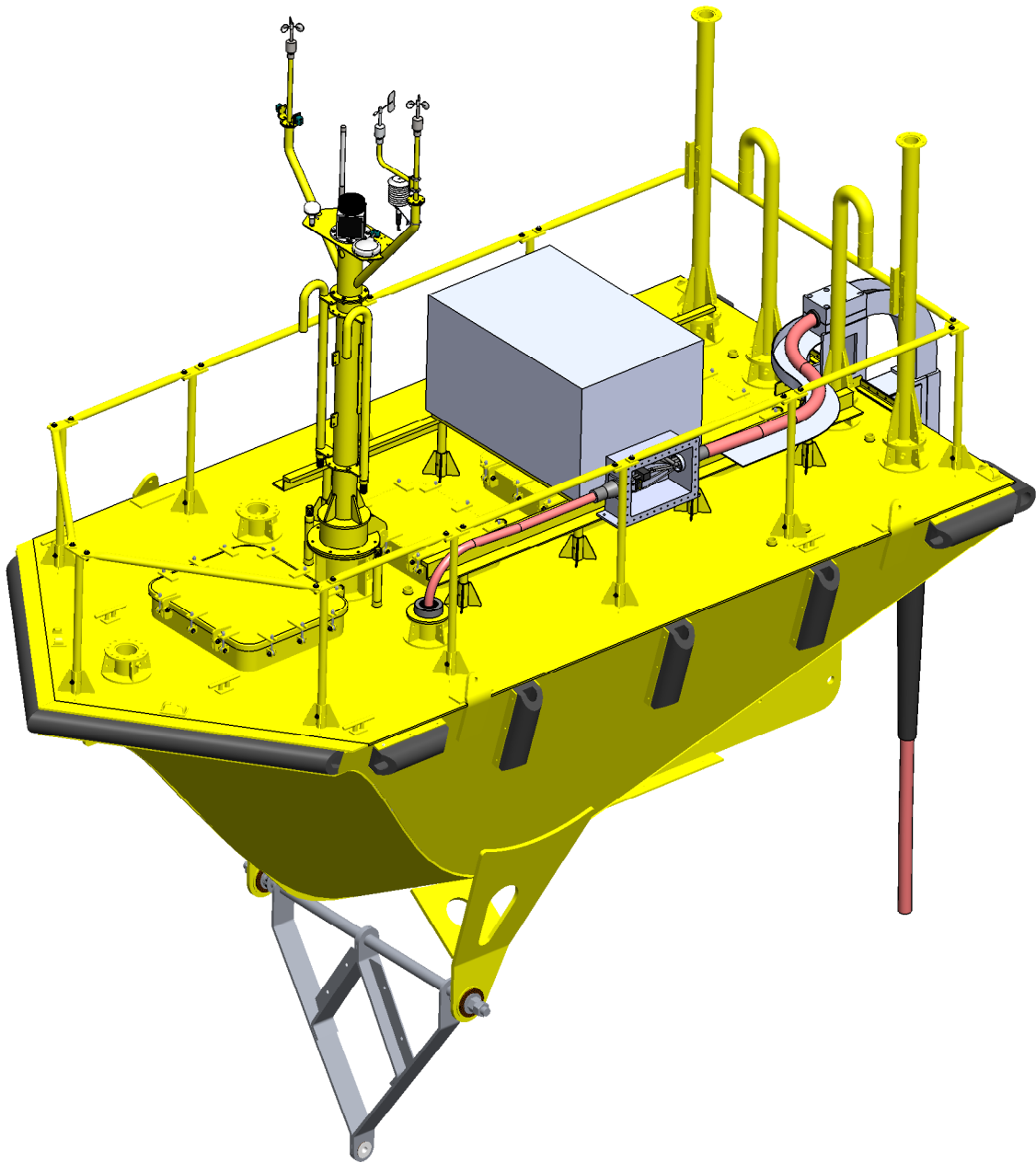
DETAIL A
SCALE 1 : 15

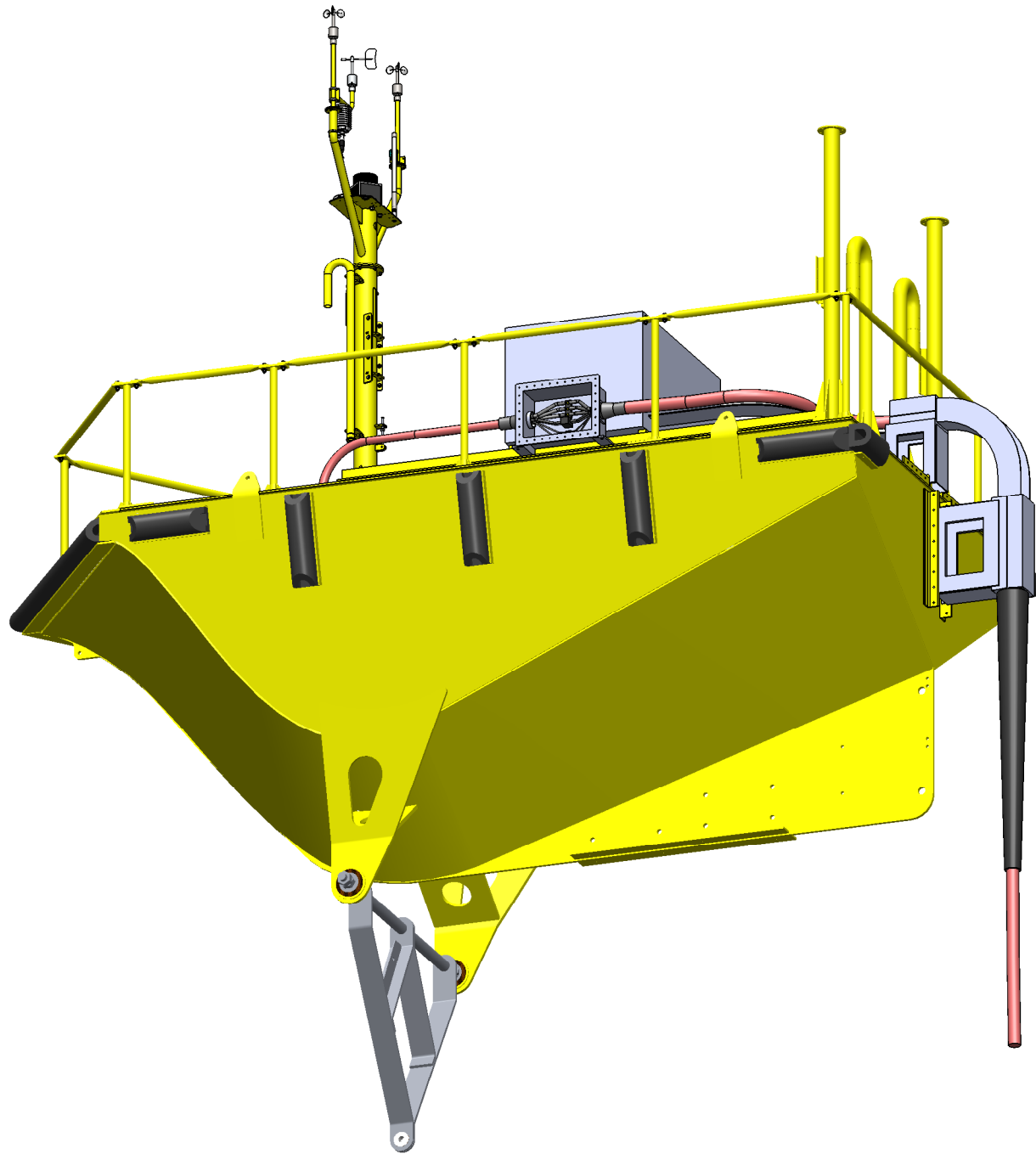
Stress termination required here. Bend restrictor/cable relief should be built onto umbilical. Consider a flange style connection with permanent or split bendstiffener. Umbilical bend radius spec required.

Requirement to strain-relief and protect here

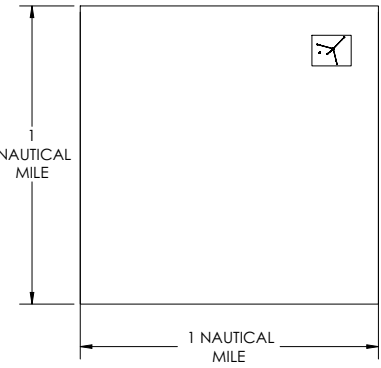
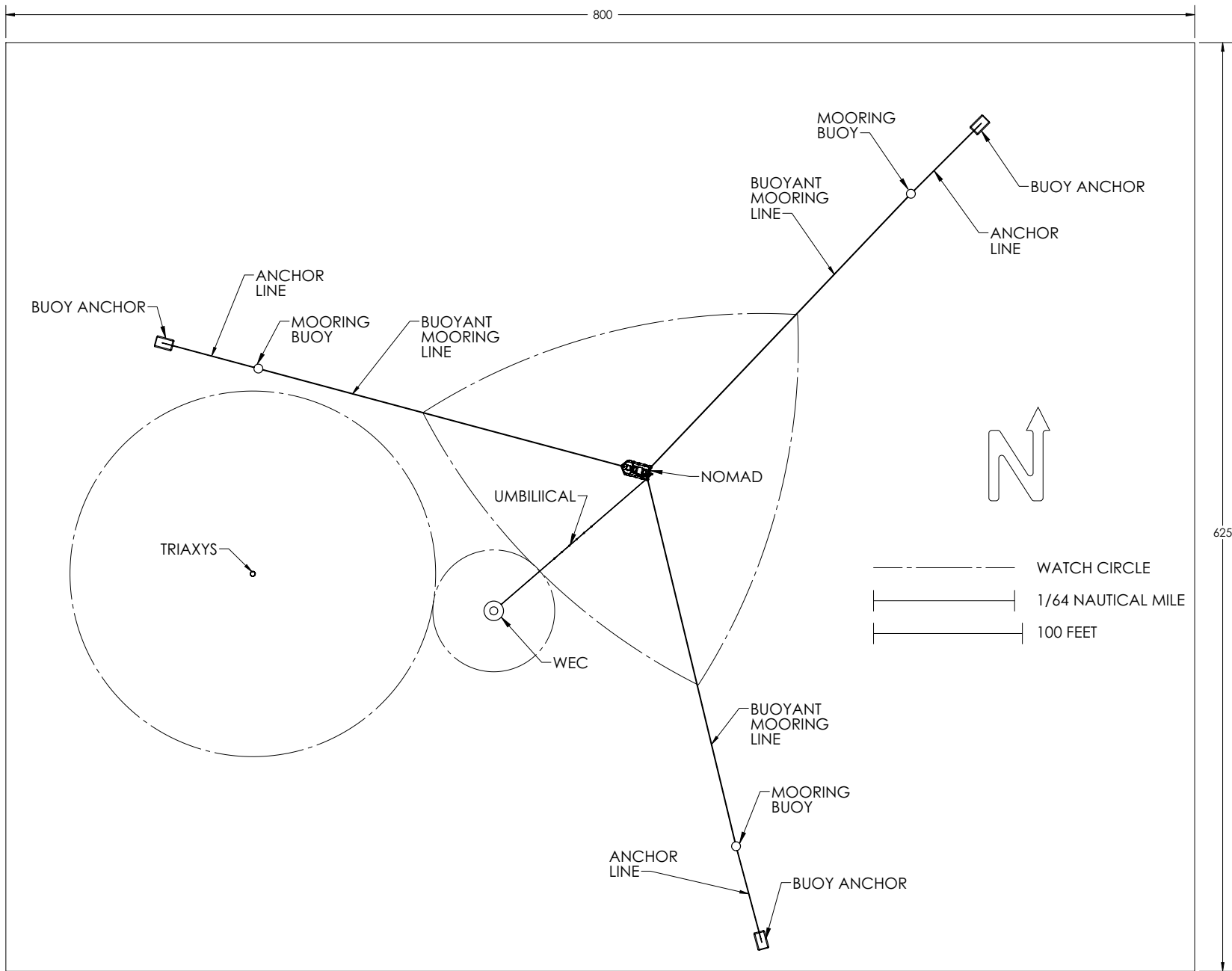
Possible aft mooring attachment points



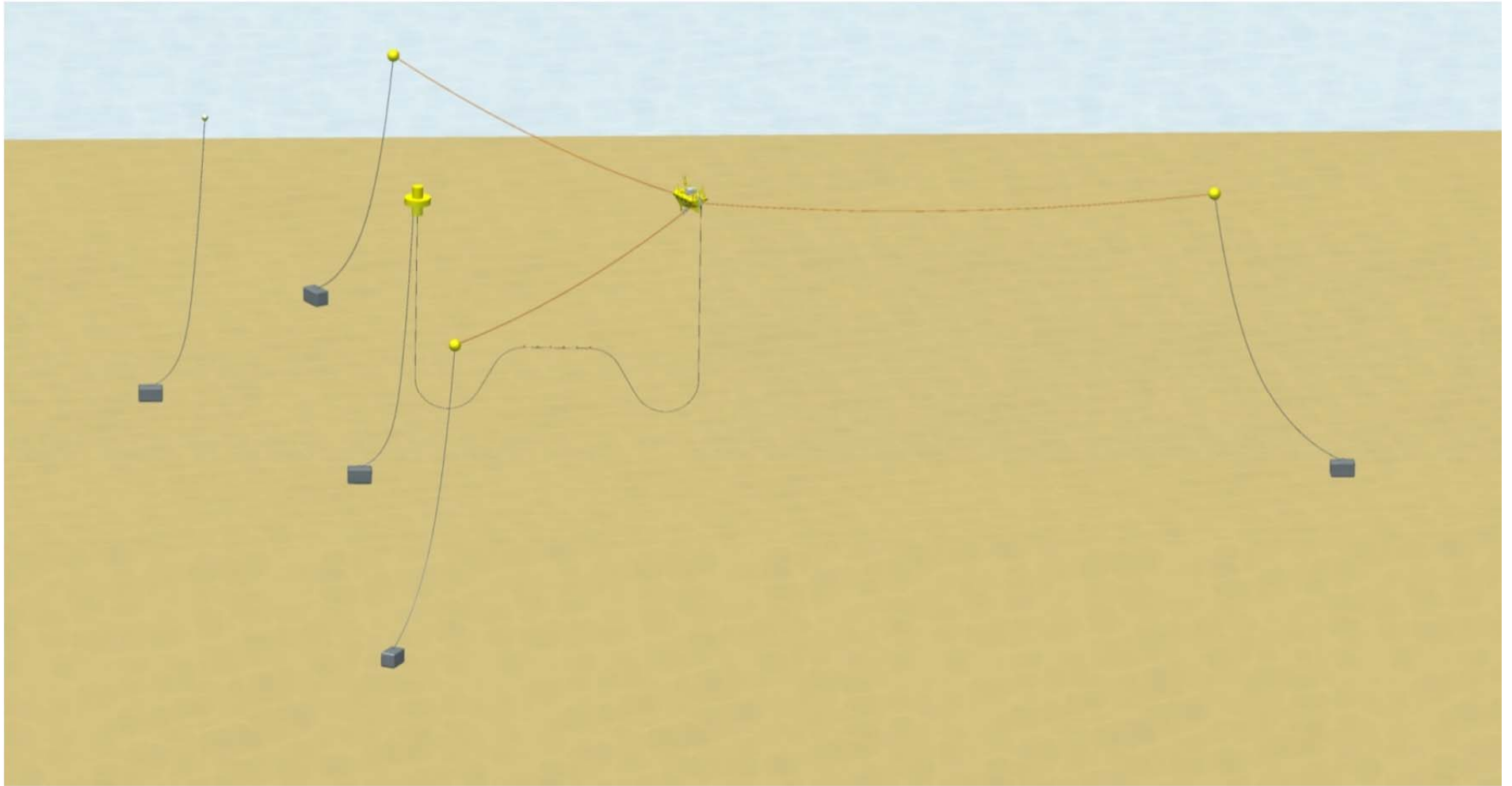




Appendix B
Preliminary Mooring Design for Ocean Sentinel



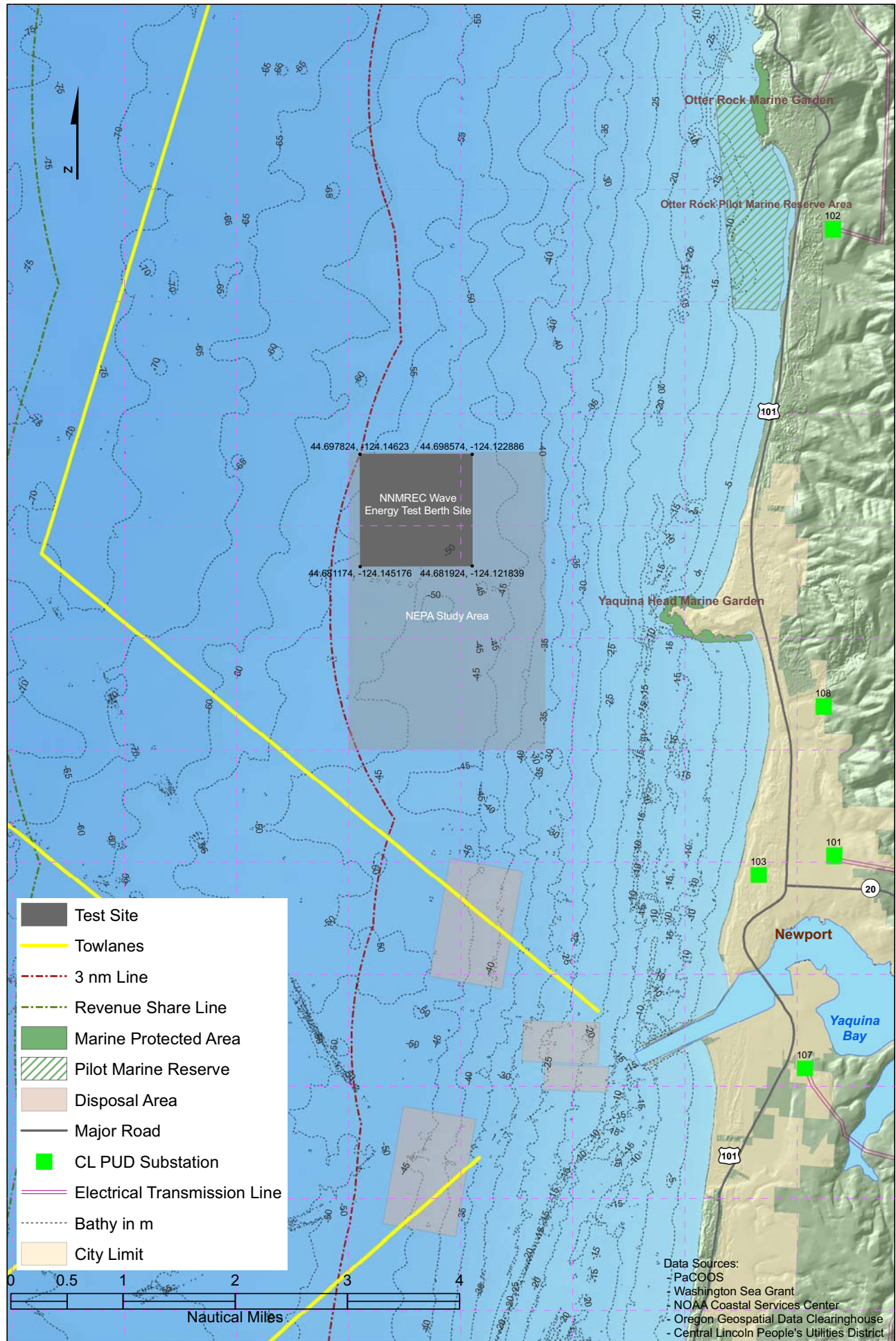
625



Preliminary model of three point mooring for the Ocean Sentinel.

Appendix C
Test Site Map

NNMREC Wave Energy Test Berth Site Map



Appendix D

Test Site Climatology Information

The data below shows May-Oct maximum SWH for buoy 46050, 17.5 nautical miles from test site.

Table A-1 Monthly maximum SWH at Buoy 46050 (from Table 2 in Glostn report, see following pages)

Month	1992	1993	1994	1995	1996	1997	1998	1999	2000	2001	2002	2003	2004	2005	2006	2007	2008	2009
January	7.5	6.8		6.0	7.8	5.4	7.5	9.0	12.1	6.1	2.9	8.7	6.4		7.8	6.8		7.3
February	6.1	4.7		6.2	7.6			10.1	7.0	7.4	5.9	4.4	6.7		12.4	7.8		6.7
March	3.9	6.4	7.5	7.9	6.1			14.1	6.6	6.9	8.0	9.8	6.5		7.9	6.9	6.9	6.3
April	4.4	6.0	5.6	4.7	7.9		2.5	7.9	5.4	5.1	5.5	5.2	6.3	3.4	5.9	4.8	5.4	5.9
May	3.1	5.2	4.1	3.8	4.0		4.6	3.8	5.6	5.8	4.3	3.2	3.2	7.6	4.6	4.1	3.6	5.1
June	3.1	3.2	5.8	4.1	2.7		4.2	4.0	4.5	4.6	3.8	4.2	4.0	5.8	3.4	3.9	4.9	3.9
July	2.5	3.3	3.3	2.7	3.6		3.1	4.0	2.6	2.8	2.9	2.9	3.2	3.3	2.9	3.6	3.4	3.0
August	2.7	3.7	2.7	3.5	2.4	1.9	2.7	2.4	2.9	5.1	3.2	3.2	3.5	2.9	2.9	2.5	4.0	3.3
September	4.2	3.0	3.1	4.7		7.4	4.0	5.0	3.9	4.9	3.4	3.2	4.1	4.1	3.8	4.0	3.9	4.6
October	5.6	4.7		5.0		7.7	5.0	8.7	8.5	9.2	3.6	9.2	5.4	6.2	7.0	9.4	5.5	5.2
November	7.0	6.4		7.2		10.5	10.8	7.2	6.3	10.7	8.5	8.1	6.1	6.4	10.8	9.9	6.1	9.4
December	8.0	7.7	7.8	9.2		7.9	8.0	7.0	8.6		11.1	7.9	5.5	8.4	10.7	12.1	9.0	6.7
Annual Max	8.0	7.7	7.8	9.2	7.9	10.5	10.8	14.1	12.1	10.7	11.1	9.8	6.7	8.4	12.4	12.1	9.0	9.4
May-Oct Max	5.6	5.2	5.8	5.0	4.0	7.7	5.0	8.7	8.5	9.2	4.3	9.2	5.4	7.6	7.0	9.4	5.5	5.2

OSU MOBILE OCEAN TEST BERTH

Climatology for MOTB Mooring Analysis

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DOC: 0906-40-004	REV: B	FILE: 10009.01	DATE: 8 June 2010	

Revision History

Rev	Description	Date	Approved
B	Changed document number at client's request.	06/08/2010	CJN
A	Rev. — was stamped and signed by David L. Gray PE, Washington Registration No. 24362, on 12 May 2010. Added water depth information. Revised annual maximum SWH extrapolation for Buoys 46050 and 46005. Corrected error in number of years with winters having fewer than 40% of possible data entries. Added discussion of retention of data sets for years where any month has fewer than 40% of possible entries. Added shoaling calculation. Added annual maximum wind speed extrapolation. Added Figures 6 and 7. Replaced Figures 1, 2, and 4, and 1-1, 1-2, and 1-3.	06/01/2010	DLG

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2. National Data Buoy Center (NDBC), National Weather Service, National Oceanic and Atmospheric Administration (NOAA), US Department of Commerce, Station 46005 - Washington 315 n.m. West of Aberdeen, WA.
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4. Ruggiero, Peter, Paul D. Komar, and Jonathan C. Allan, "Increasing wave heights and extreme value projections: The wave climate of the US Pacific Northwest," *Coastal Engineering*, 57, 2010, pp 539-552.
5. US Army Corps of Engineers and Coastal Engineering Research Center, Shore Protection Manual, US Government Printing Office: Washington, 1984.
6. SWAN, "Simulating Waves Nearshore," The SWAN team, Delft University of Technology, Faculty of Civil Engineering and Geosciences, Environmental Fluid Mechanics Section, Delft, The Netherlands, swan-info-citg@tudelft.nl, <http://www.fluidmechanics.tudelft.nl/swan/index.htm>, Copyright (c) 2008.
7. Microsoft Excel 2007, version (12.0.6524.5003) SP 2.

Summary

Eighteen years of significant wave height (SWH) measurements at NDBC Station 46050 have been analyzed with the objective of determining the 50-year return period (50-YRP) SWH and most probable wave period at the site of the Mobile Ocean Test Berth (MOTB). The 50-year return period wave height and period will be used for the design and analysis of the MOTB mooring system. Buoy 46050 was chosen because of its close proximity to the proposed MOTB location. The buoy is approximately 17.5 n.m. from the MOTB site. The water depth at the buoy is 123 m. The MOTB site is located in approximately 46 meters of water.

The annual maximum extrapolation of the 50-YRP extreme SWH using EV-I (Gumbel) method predicts a SWH for the 50-YRP of 16.1 m. A peak-over-threshold (POT) extrapolated extreme value was also computed; the extrapolated value using the POT method predicts a SWH for the 50-YRP of 15.2 m. The annual increase found in the measured data has not been incorporated into the extrapolated extreme values.

The 50-YRP SWH at the MOTB site is determined by adjusting the 50-YRP SWH predicted at the NDBC buoy location using the *shoaling coefficient* from Reference 5. The resulting 50-YRP SWH at the MOTB site is 15.2 m.

The mooring design is being developed for a 50-YRP SWH of 15.2 m and a modal wave period of 18 s.

An extrapolation to the 50-YRP wind speed was also calculated. The 50-YRP 8-minute average wind speed for Buoy 46050 is predicted to be 27.0 m/s using the annual maximum method. The wind speed used in mooring calculations is adjusted to the 1-hour average at 10 m elevation. The adjusted value used in the mooring design analysis is 28.1 m/s (63 mph).

Methodology

The determination of annual maximum and the calculations of the histograms and joint probability tables were done using Microsoft Excel (Reference 7). The Excel database functions DMAX and DCOUNT are extensively used.

Annual maximum significant wave heights and wind speeds were identified in the measured data for each of the years from 1992 through 2009, those years where fewer than 40% of the possible winter SWH entries have been omitted from the trend and extrapolation analysis. The alternative of eliminating the years where any of the winter months contained fewer than 40% of the

possible monthly entries was also considered. However, too many of the available annual maxima were eliminated, which resulted in a very poor regression and extrapolation. The loss of the buoy for so many winter months reduces the validity of the extrapolated value; however, the quality of the regression to the remaining annual maxima increases confidence in the return period prediction. Winter months (Oct, Nov, Dec, Jan, Feb, Mar, and Apr) were chosen to match those of Ref. 4.

Data Completeness

Table 1 on the following page shows the percent completeness of the data entries for significant wave height (WVHT) for the years 1992 through 2009 for NDBC Buoy 46050. The winter months are highlighted in blue.

Histograms of METOCEAN Parameters

Histograms of the data from Buoy 46050 have been calculated for wind speed (WSPD), wind direction (WD), significant wave height (WVHT), mean wave direction (MWD), average wave period (APD), dominant wave period (DPD), wind-wave direction and swell wave direction. A modal wave period is computed for each hourly observation (for which an APD is available) from a trimmed average of the ratios of the dominant wave period to the average wave period. A histogram of the synthesized modal wave period is also calculated.

The data used are those recorded in the archived hourly record. Those years where there are a significant number of records missing are also included in the histograms. This inclusion may distort the histograms, since the winter months are often the months when the hourly records are missing.

The histograms are shown in Appendix 2.

Joint Probability Diagrams of METOCEAN Parameters

Diagrams have been prepared showing the joint probabilities of significant wave height and the computed modal wave period, significant wave height and wind speed, significant wave height and mean wave direction, wind direction and mean wave direction, and wind speed and wind direction. The SWH vs. Modal Period diagram was used to identify the wave period used in the mooring design analysis.

The mean wave direction vs. wind direction shows that the winds are predominately from the N to NW and from SW to S. The waves are generally from the W to NW directions. The wave direction is reasonably correlated with the wind direction.

The joint probability diagrams are shown in Appendix 1.

Table 1: Percent completeness of the WVHT data entries for Buoy 46050 (1992 – 2009)

Month	1992	1993	1994	1995	1996	1997	1998	1999	2000	2001	2002	2003	2004	2005	2006	2007	2008	2009
January	97%	94%	0%	99%	100%	46%	51%	100%	99%	100%	4%	100%	100%	0%	100%	100%	0%	99%
February	93%	94%	0%	99%	100%	0%	0%	98%	100%	100%	100%	100%	100%	0%	100%	100%	0%	99%
March	99%	94%	73%	99%	100%	0%	0%	97%	100%	100%	100%	100%	100%	0%	100%	99%	83%	100%
April	99%	94%	100%	95%	100%	0%	6%	100%	99%	100%	98%	100%	100%	53%	99%	99%	99%	100%
May	99%	95%	99%	100%	99%	0%	97%	100%	99%	100%	100%	100%	100%	100%	100%	99%	99%	100%
June	97%	84%	98%	99%	100%	0%	97%	88%	100%	100%	100%	100%	100%	100%	100%	99%	100%	100%
July	99%	93%	93%	100%	100%	0%	100%	98%	100%	100%	100%	100%	99%	100%	100%	99%	100%	99%
August	99%	88%	99%	99%	74%	1%	106%	97%	100%	99%	100%	100%	100%	100%	78%	100%	100%	98%
September	97%	86%	62%	99%	0%	76%	96%	84%	100%	100%	100%	99%	100%	100%	73%	100%	100%	100%
October	96%	95%	0%	99%	0%	99%	100%	71%	99%	100%	100%	100%	100%	100%	100%	100%	100%	100%
November	96%	91%	0%	99%	0%	98%	100%	98%	100%	100%	100%	100%	98%	100%	100%	99%	100%	98%
December	95%	22%	64%	99%	0%	100%	99%	100%	100%	0%	100%	100%	22%	100%	100%	7%	97%	99%

Table 2: Monthly and annual maximum SWH at Buoy 46050 (1992 – 2009)

Month	1992	1993	1994	1995	1996	1997	1998	1999	2000	2001	2002	2003	2004	2005	2006	2007	2008	2009
January	7.5	6.8	0.0	6.0	7.8	5.4	7.5	9.0	12.1	6.1	2.9	8.7	6.4	0.0	7.8	6.8	0.0	7.3
February	6.1	4.7	0.0	6.2	7.6	0.0	0.0	10.1	7.0	7.4	5.9	4.4	6.7	0.0	12.4	7.8	0.0	6.7
March	3.9	6.4	7.5	7.9	6.1	0.0	0.0	14.1	6.6	6.9	8.0	9.8	6.5	0.0	7.9	6.9	6.9	6.3
April	4.4	6.0	5.6	4.7	7.9	0.0	2.5	7.9	5.4	5.1	5.5	5.2	6.3	3.4	5.9	4.8	5.4	5.9
May	3.1	5.2	4.1	3.8	4.0	0.0	4.6	3.8	5.6	5.8	4.3	3.2	3.2	7.6	4.6	4.1	3.6	5.1
June	3.1	3.2	5.8	4.1	2.7	0.0	4.2	4.0	4.5	4.6	3.8	4.2	4.0	5.8	3.4	3.9	4.9	3.9
July	2.5	3.3	3.3	2.7	3.6	0.0	3.1	4.0	2.6	2.8	2.9	2.9	3.2	3.3	2.9	3.6	3.4	3.0
August	2.7	3.7	2.7	3.5	2.4	1.9	2.7	2.4	2.9	5.1	3.2	3.2	3.5	2.9	2.9	2.5	4.0	3.3
September	4.2	3.0	3.1	4.7	0.0	7.4	4.0	5.0	3.9	4.9	3.4	3.2	4.1	4.1	3.8	4.0	3.9	4.6
October	5.6	4.7	0.0	5.0	0.0	7.7	5.0	8.7	8.5	9.2	3.6	9.2	5.4	6.2	7.0	8.4	5.5	5.2
November	7.0	6.4	0.0	7.2	0.0	10.5	10.8	7.2	6.3	10.7	8.5	8.1	6.1	6.4	10.8	9.9	6.1	9.4
December	8.0	7.7	7.8	9.2	0.0	7.9	8.0	7.0	8.6	0.0	11.1	7.9	5.5	8.4	10.7	12.1	9.0	6.7
Annual Max	8.0	7.7	7.8	9.2	7.9	10.5	10.8	14.1	12.1	10.7	11.1	9.8	6.7	8.4	12.4	12.1	9.0	9.4

Annual Maxima

Monthly and annual maximum SWHs in meters are given in Table 2 on the preceding page. The winter months are highlighted in blue. Months where there are no SWH data are entered as 0.0 in light grey text. The annual maxima for each year are highlighted in red and listed in the bottom row.

The trend in the annual maxima is shown in Figure 1. Years where more than 40% of the winter observations are recorded are shown as filled circles. These points are used in the trend line analysis. The other data years are shown as open circles. These points are not used in the trend line analysis. It is noted that the annual extreme for 1996 is included in the trend analysis and the extreme value analysis, even though data for October, November, and December are missing. This is because there was nearly 100% coverage in January, February, March, and April of that year.

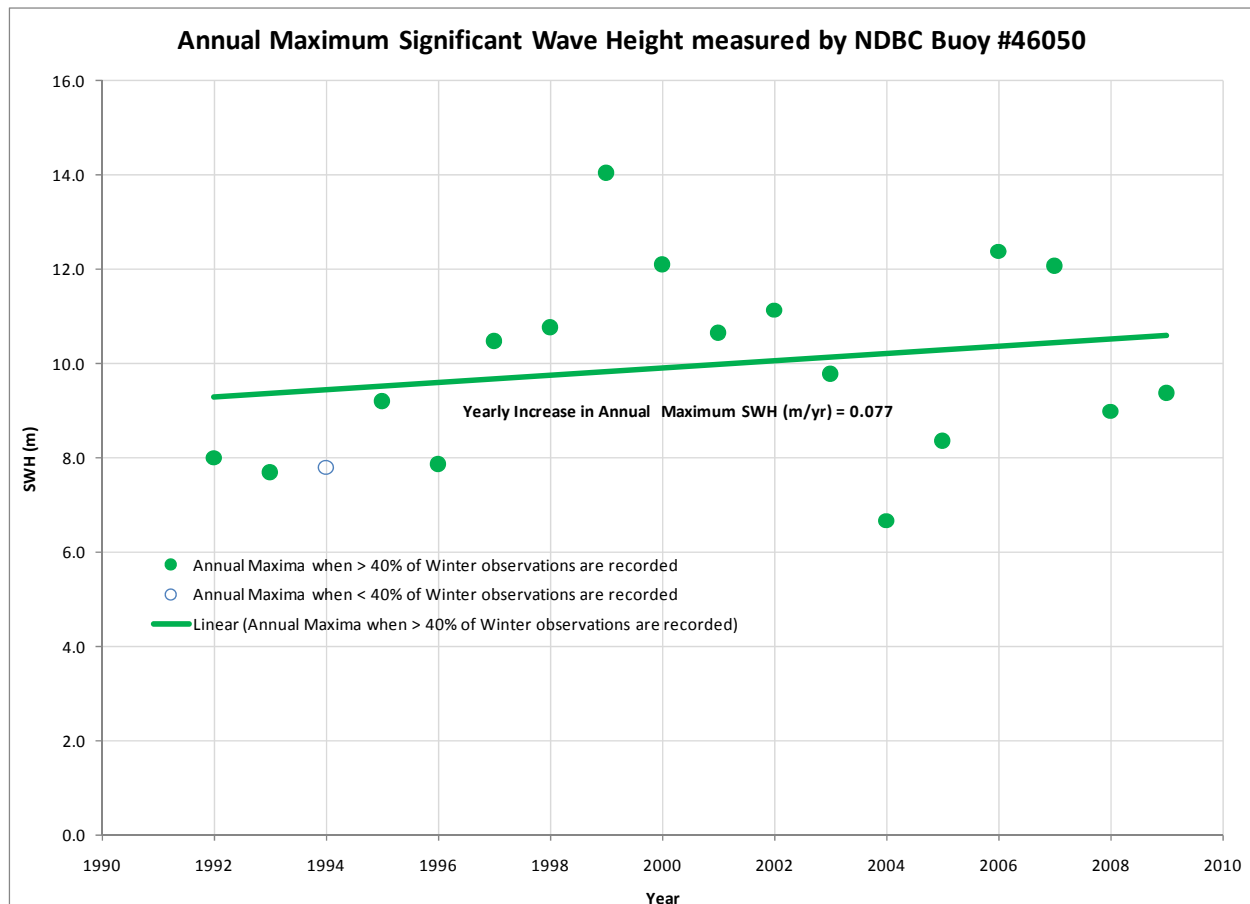


Figure 1: Trend in annual maximum SWH at NDBC Buoy 46050

The annual increase in the annual extremes for the years 1992 through 2009 is found to be 0.077 m/yr. Thus in 50 years, the annual maximum significant wave height could be expected to increase by 3.9 meters. This does not imply that the 50-YRP SWH, which may occur any time in the next 50 years, will be 3.9 meters higher than the generalized extreme value (GEV) prediction.

Return Period Extrapolations - SWH

Diagrams of the extreme value extrapolations are shown in Figures 2 and 3. Figure 2 uses the annual extreme values for the extrapolation, not including those years for which there are fewer than 40% entries for the winter months. The most probable 50-YRP SWH is projected to be 16.1 m, with a 90% prediction interval from a low of 14.6 m to a high of 17.5 m.

The range of modal (peak) wave periods for a 16.1 m SWH is estimated from the limiting conditions for waves of extreme steepness, e.g., waves with periods where $H_s/(gT^2) > 0.00776$, giving a limiting lower period of approximately 14.6 seconds, and a fully developed sea with a modal wave period of 25.6 seconds. A modal wave period of 18 seconds was chosen for this analysis by visually projecting the low period edge of the joint probability scatter diagram of significant wave height and peak wave periods (shown in Appendix 2).

Figure 3 uses all events with a significant wave height above the 99.5 percentile SWH of all entries. The threshold is 7.01 m. These peak-over-threshold events (POT) are sorted so that only independent events are included. The independence period is assumed to be 72 hours, after Ruggiero *et al* (Ref. 4). There are 87 events in this 18-year record. The 50-YRP SWH is projected to be 15.2 m. The higher SWH from the AMM extrapolation was chosen for the design analysis.

Figures 4 and 5 show the extreme value extrapolation for NDBC Buoy 46005 for comparison with Ruggiero *et al* (Ref. 4). The AMM method is shown in Figure 4. The POT method is shown in Figure 5. The 99.5 percentile SWH used in the POT method was found to be 8.12 m, essentially the same value used in Ref. 4.

The annual increase and the 50-YRP found in this analysis for Buoy 46050 compare reasonably well with the values found by Ruggiero *et al* (Ref. 4) for Buoy 40005. Buoy 46005 is approximately 300 n.m. further offshore than Buoy 46050. Their SWH annual rate of increase is 0.095 m/yr based on the annual maxima. Their 50-YRP SWH, also based on the annual maxima, is 13.6 m. They also estimated the 50-YRP using r-largest ($r=5$) and peak-over-threshold (at 99.5 percentile level), to be 13.6 m and 13.9 m, respectively.

The estimate of the 50-YRP SWH for Buoy 46005 was also calculated by Glostén in order to compare and verify the methodology. Glostén's predictions for the 50-YRP SWH from data at Buoy 46005 are 14.8 m using the annual maximum method (AMM); and 15.3 m using the POT method. The r-largest extreme value extrapolation has not been calculated for this project.

The Glostén extrapolations contain only the data years 1987 to 2008 (2005 is missing). Ruggiero *et al* used data from 1976 to 2007. Glostén's predictions of the 50-YRP SWH are more conservative with respect to the MOTB mooring design, but not unreasonably large.

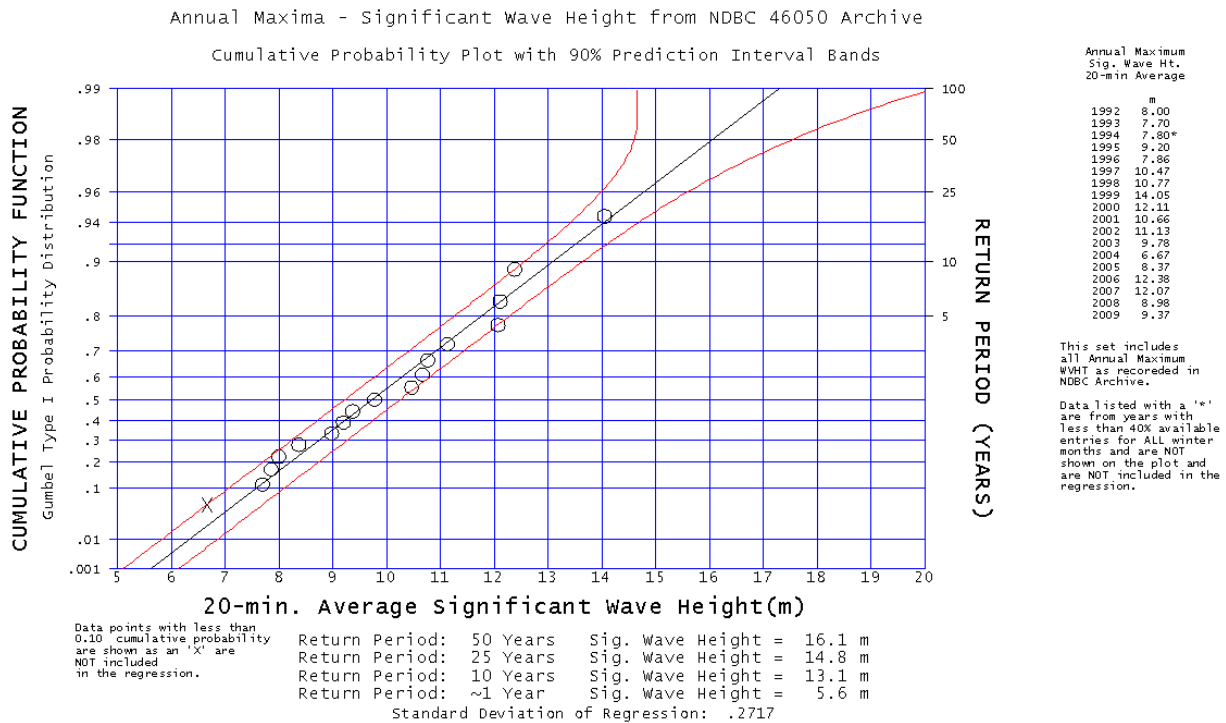


Figure 2: Extreme value extrapolation of annual maximum SWHs at NDBC Buoy 46050

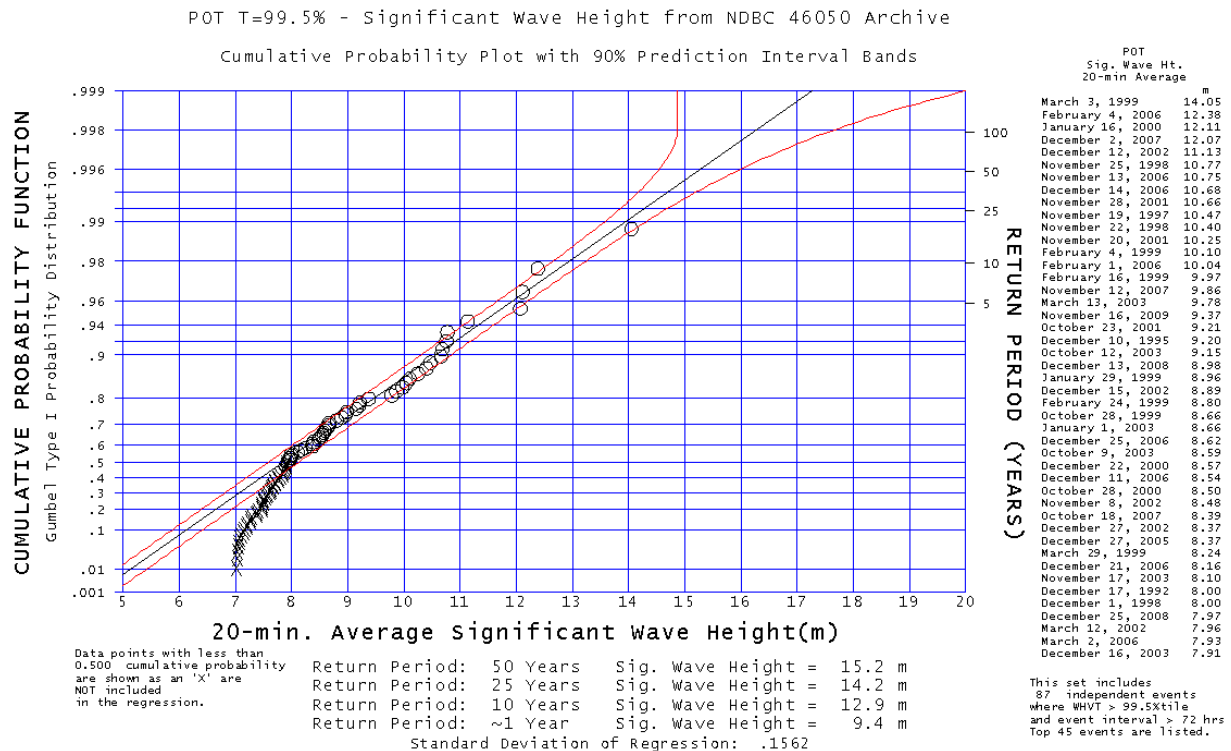


Figure 3: Extreme value extrapolation of POT SWHs at NDBC Buoy 46050

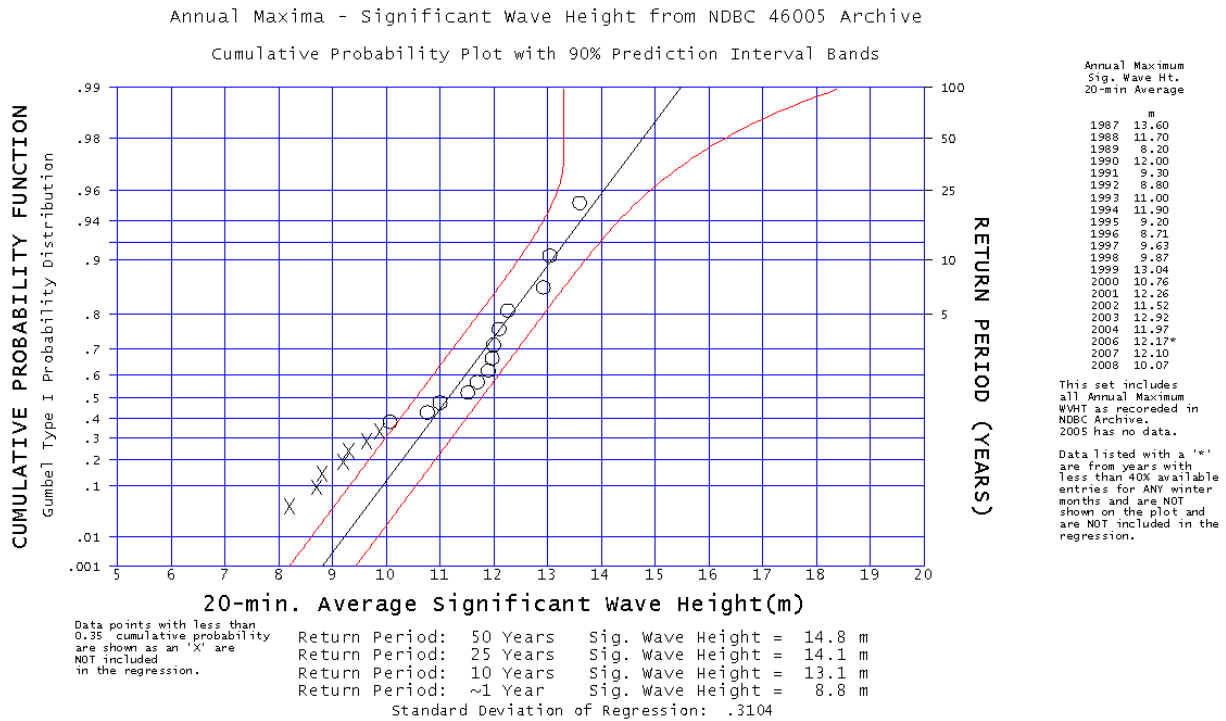


Figure 4: Extreme value extrapolation of annual maximum SWHs at NDBC Buoy 46005

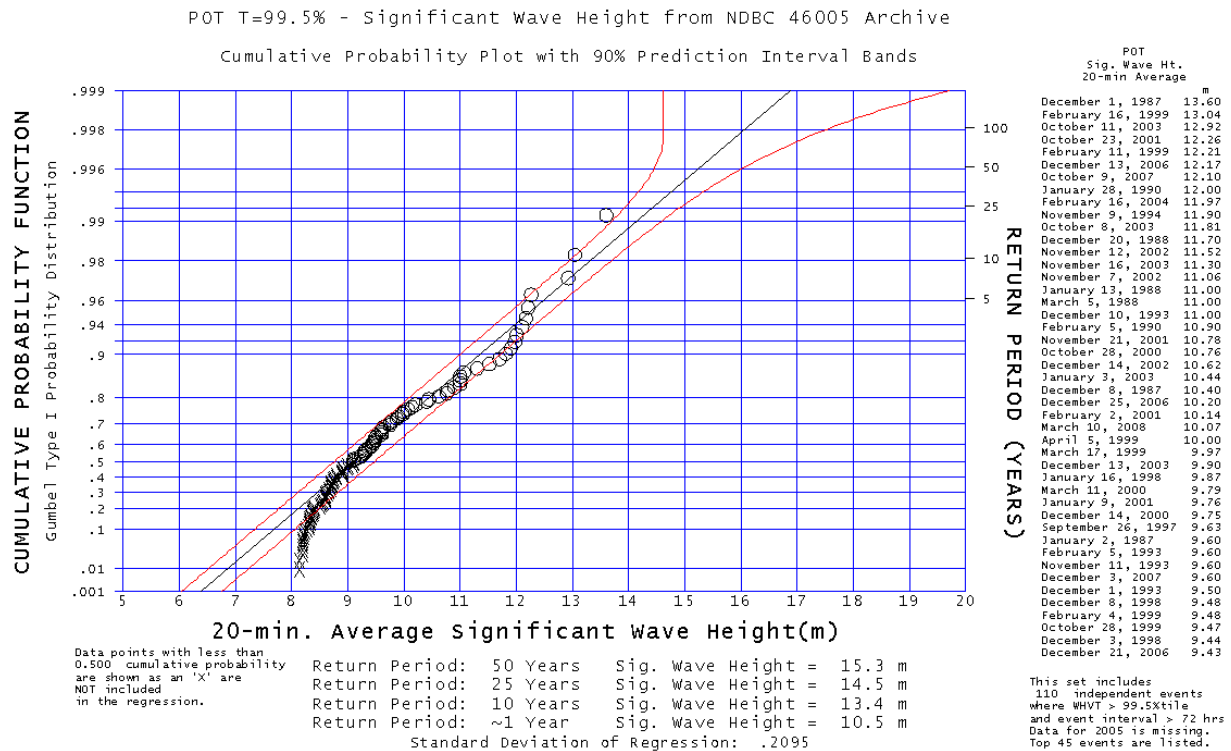


Figure 5: Extreme value extrapolation of POT SWHs at NDBC Buoy 46005

Shoaling

The 50-YRP SWH at the MOTB site is determined by adjusting the AMM 50-YRP SWH predicted at the NDBC buoy location using the *shoaling coefficient* from Reference 5. The shoaling coefficient is calculated to be 0.942. The resulting 50-YRP SWH at the MOTB site is 15.2 m. The shoaling calculation was also checked using a constant slope bathymetry SWAN model (Reference 6). The SWAN model also predicts a SWH at the MOTB site of 15.2 m.

Return Period Extrapolations – Wind Speed

An extrapolation to the 50-YRP wind speed was also calculated. The extrapolations are shown in Figures 6 and 7.

The 50-YRP 8-minute average wind speed for Buoy 46050 is predicted to be 27.0 m/s using the annual maximum method. The 50-YRP wind speed using the POT method predicts an 8-minute average wind speed of 26.9 m/s. The anemometer on the buoy is at 5 m elevation. The wind speed used in mooring calculations is adjusted to the 1-hour average at 10 m elevation. The adjusted value that is used in the mooring design analysis is 28.1 m/s (63 mph).

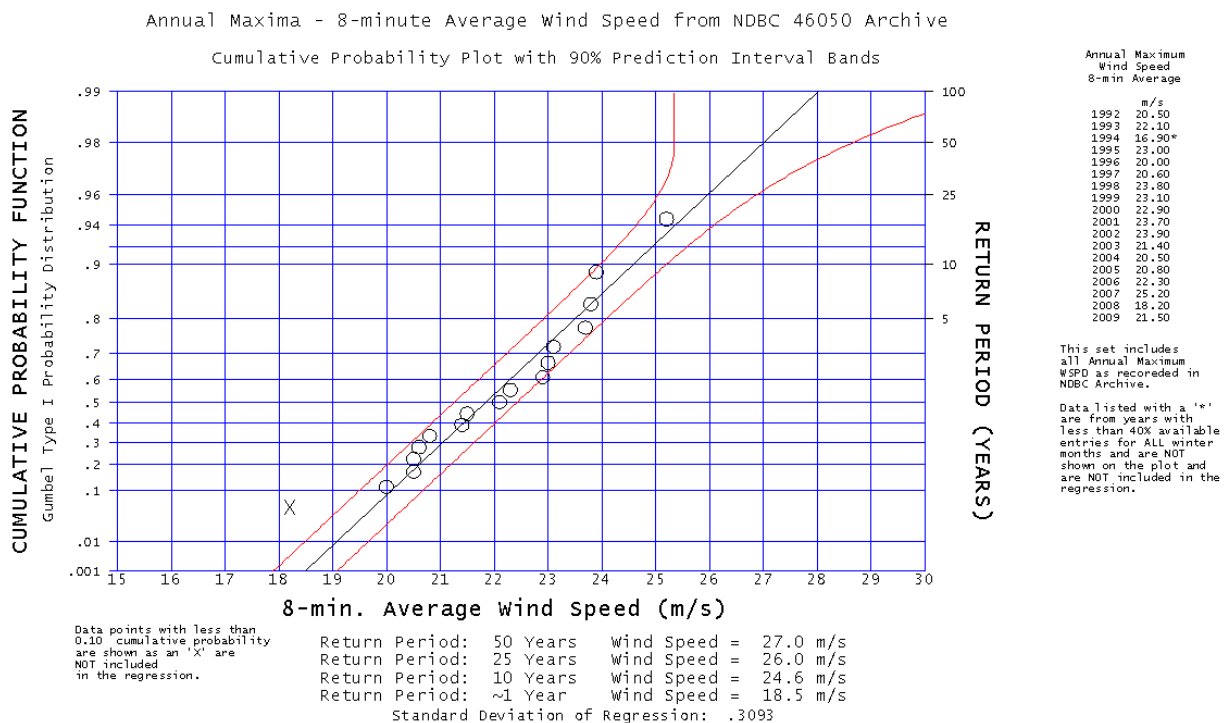


Figure 6: Extreme value extrapolation of annual maximum 8-minute average wind speed at NDBC Buoy 46005

POT T=99.5% - 8-minute Average Wind Speed from NDBC 46050 Archive

Cumulative Probability Plot with 90% Prediction Interval Bands

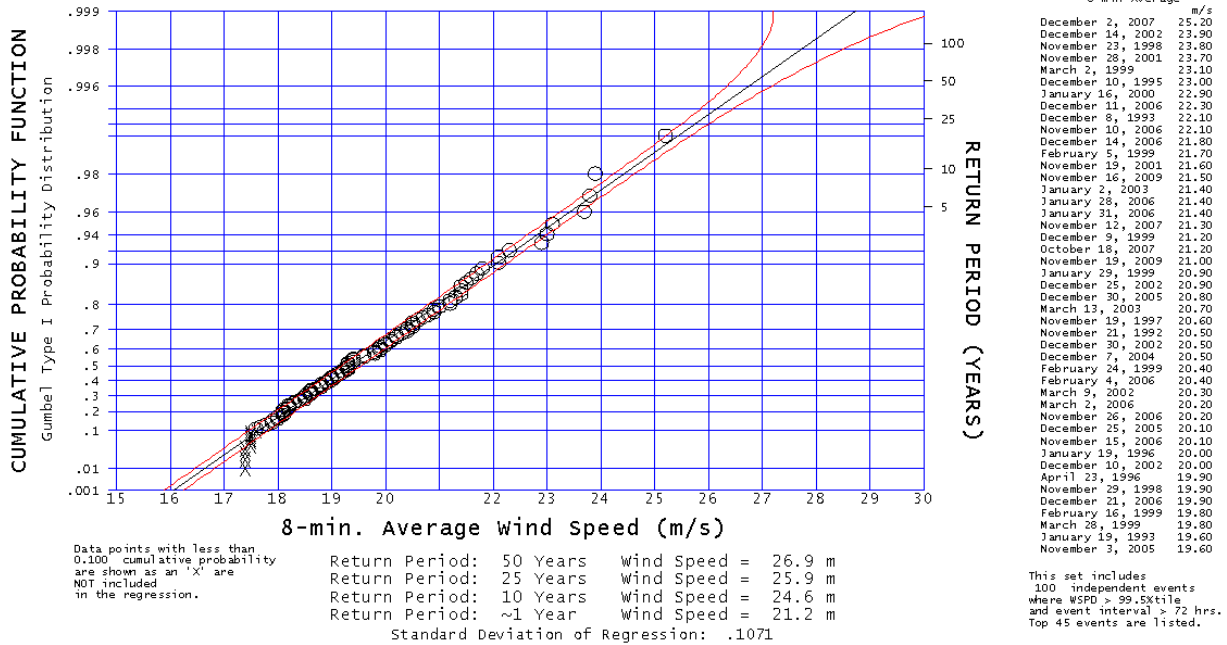


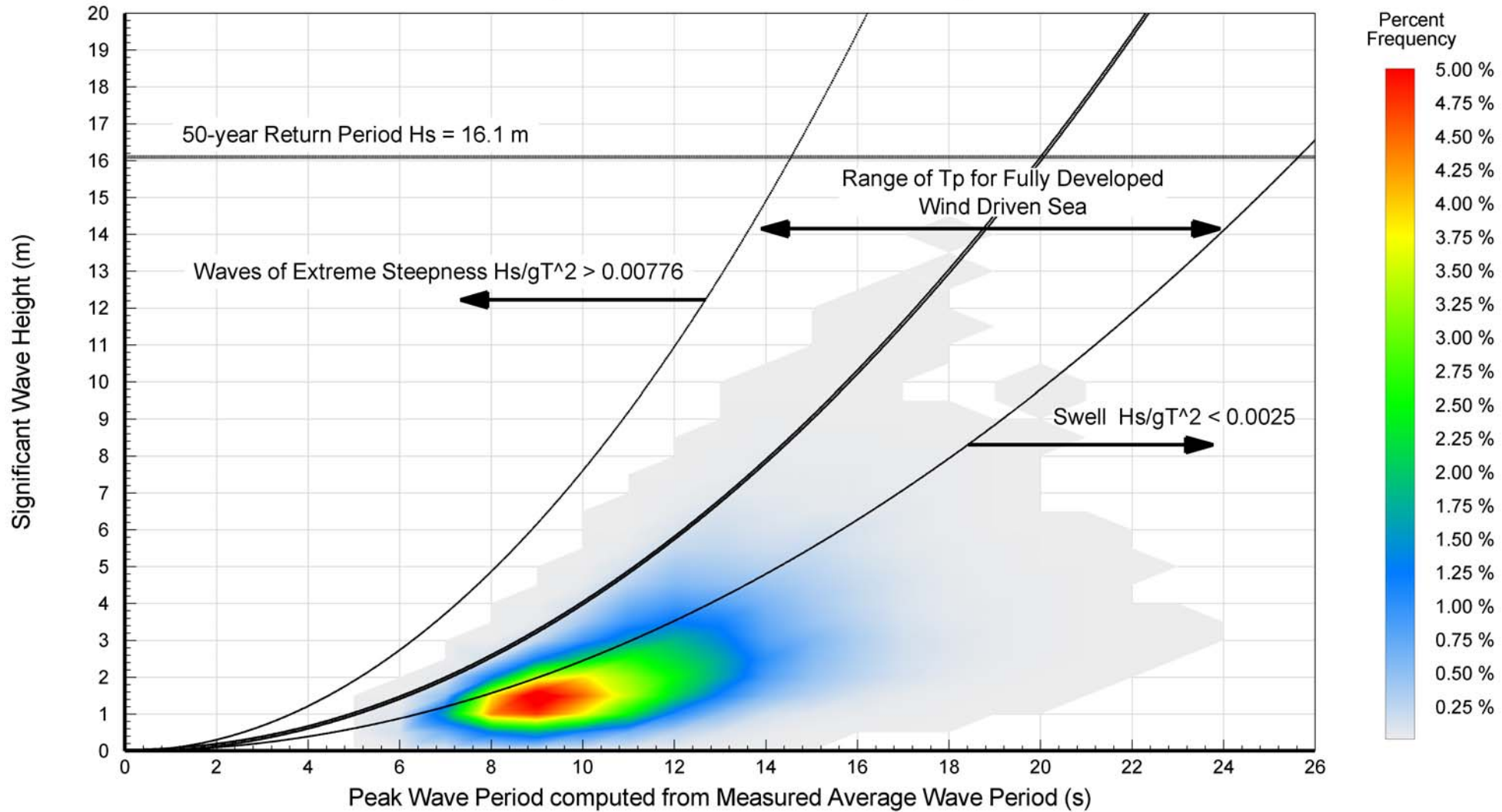
Figure 7: Extreme value extrapolation of POT 8-minute average wind speeds at NDBC Buoy 46005

Appendices

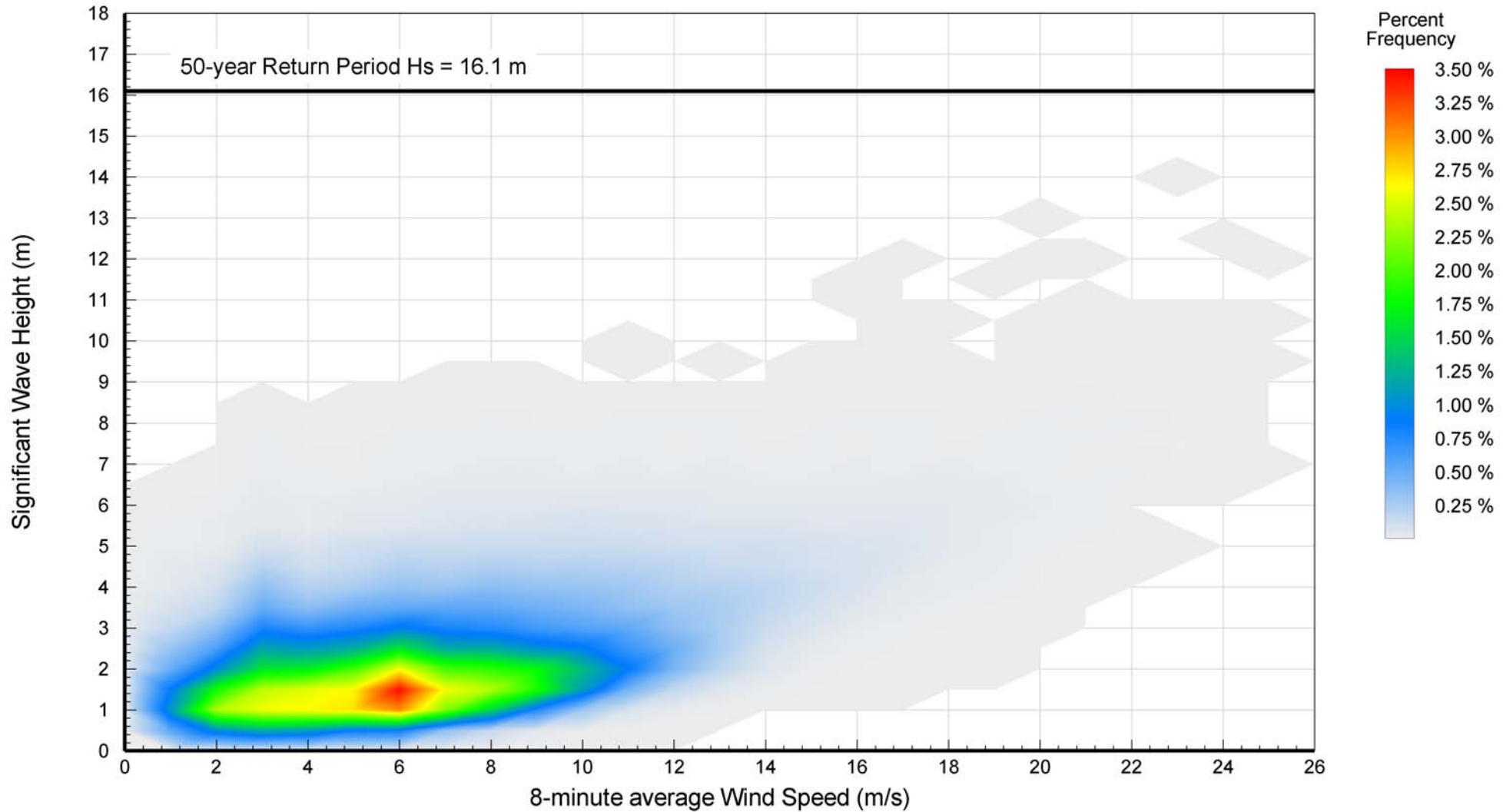
- Appendix 1 Joint Probability Diagrams of METOCEAN Data from NDBC Buoy 46050
- Appendix 2 Histograms of METOCEAN Data from NDBC Buoy 46050

**Appendix 1 Joint Probability Diagrams of METOCEAN Data from
NDBC Buoy 46050**

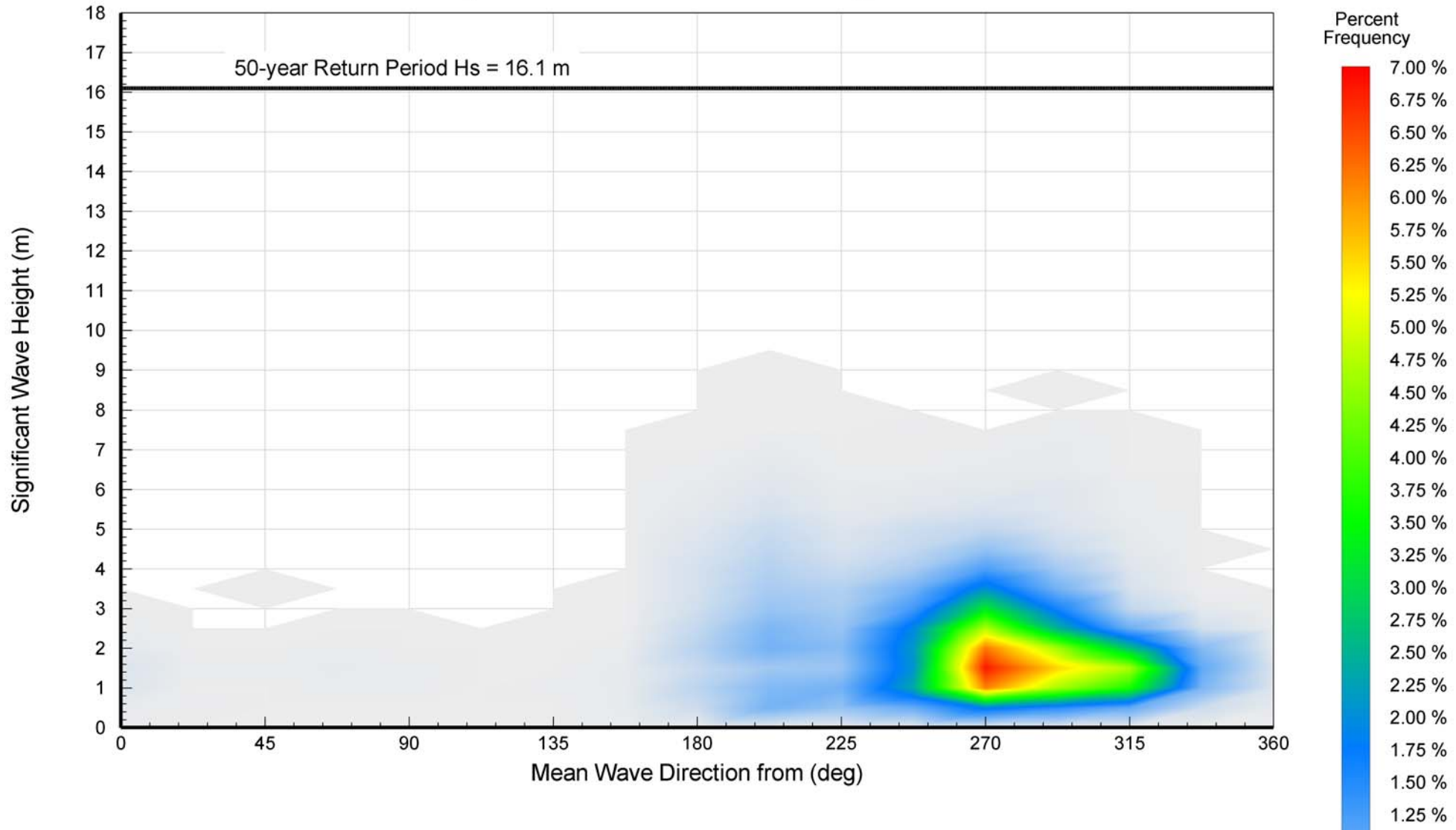
Station 46050 (LLNR 641) - STONEWALL BANKS - 20NM West of Newport, OR Annual - Joint Probability Distribution - Wave Height vs Wave Period



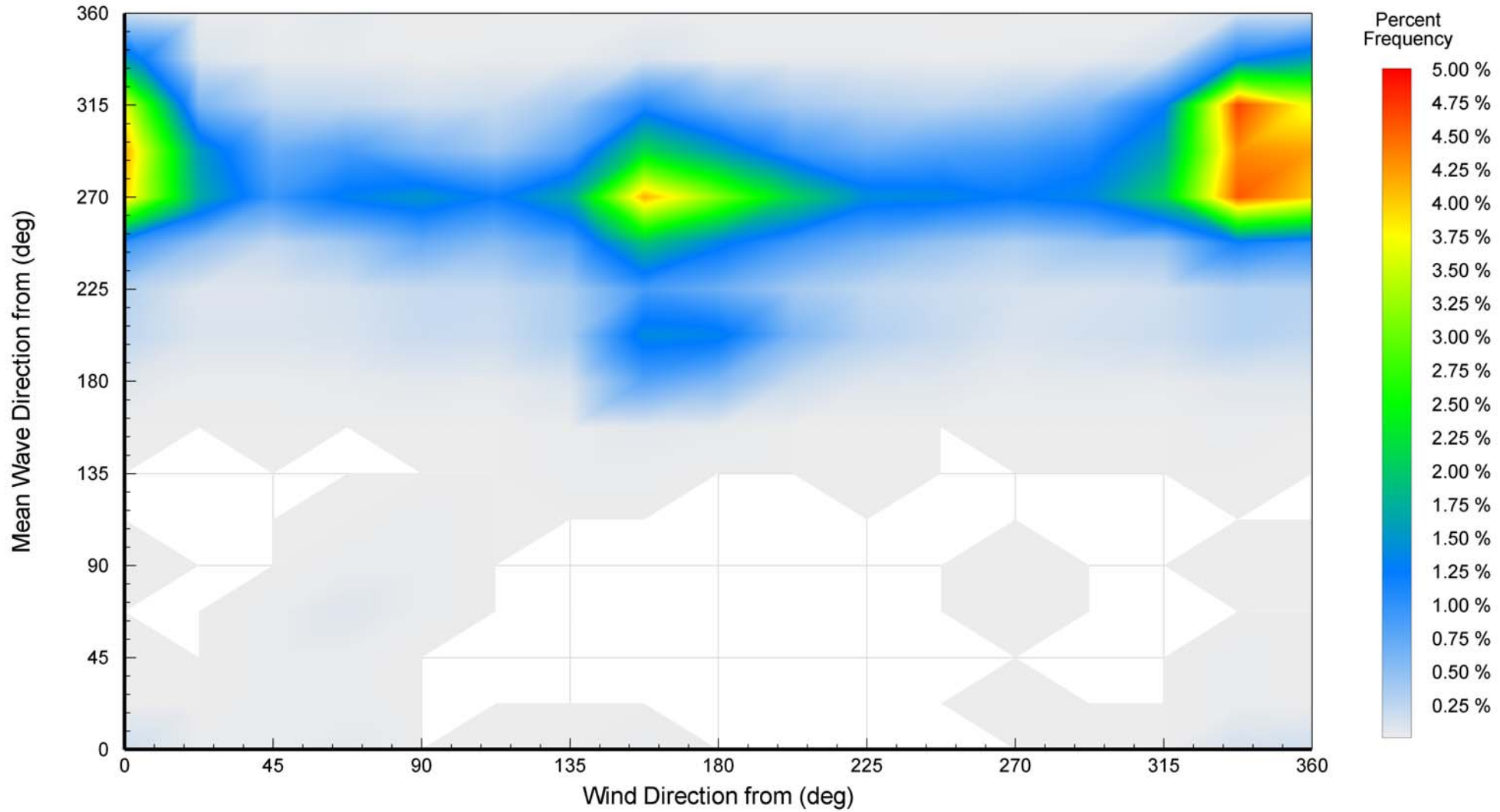
Station 46050 (LLNR 641) - STONEWALL BANKS - 20NM West of Newport, OR Annual - Joint Probability Distribution - Wave Height vs Wind Speed



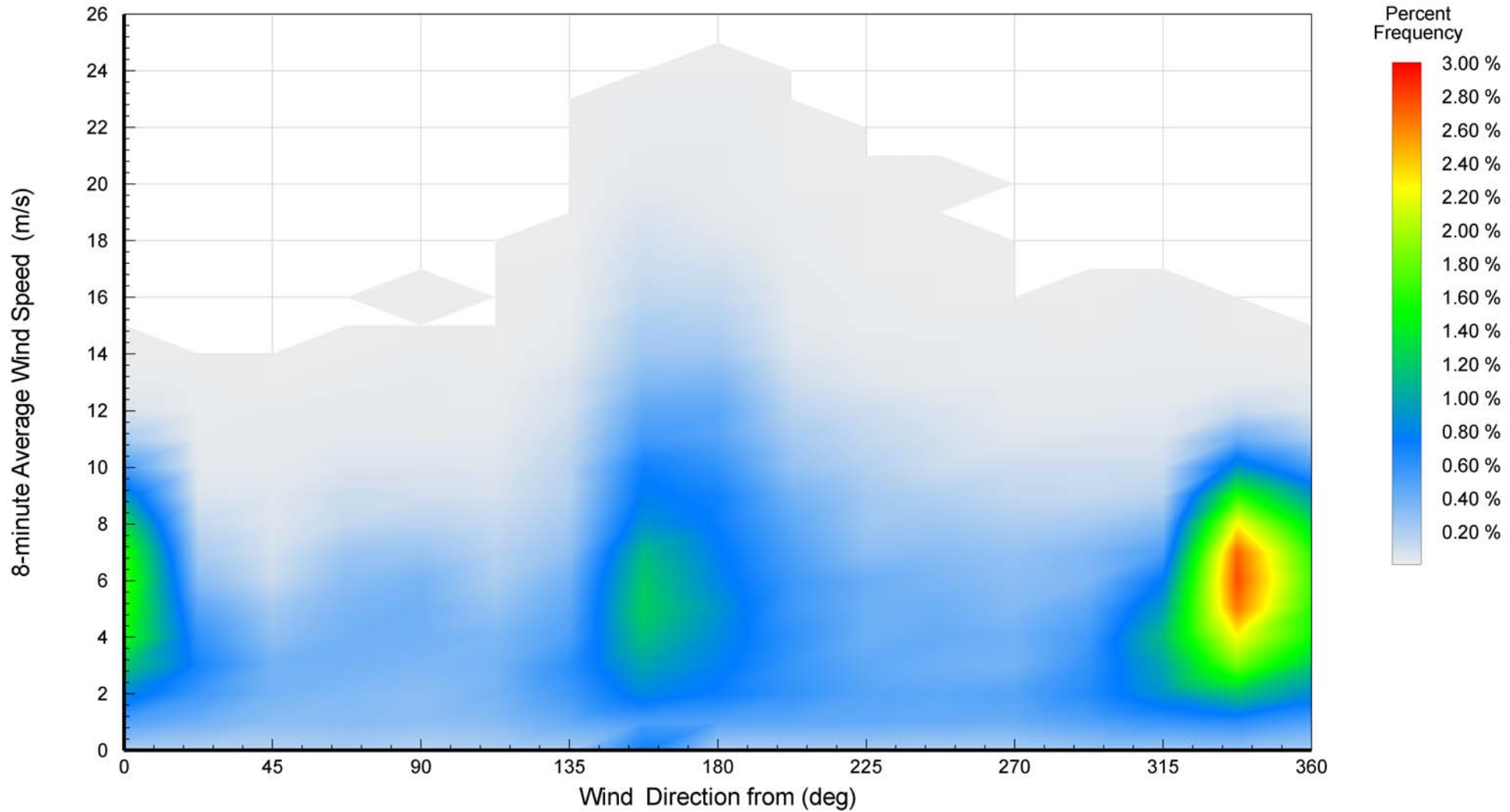
Station 46050 (LLNR 641) - STONEWALL BANKS - 20NM West of Newport, OR Annual - Joint Probability Distribution - Wave Height vs Mean Wave Direction



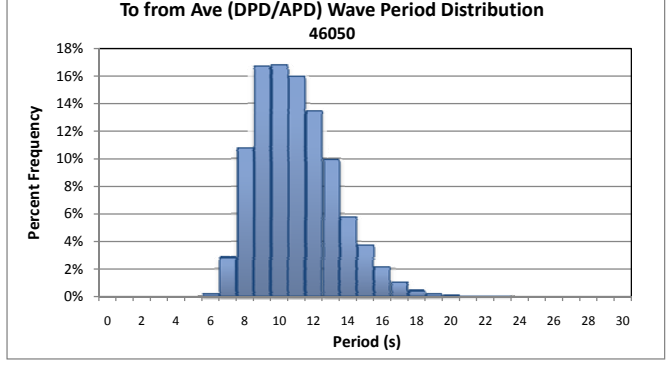
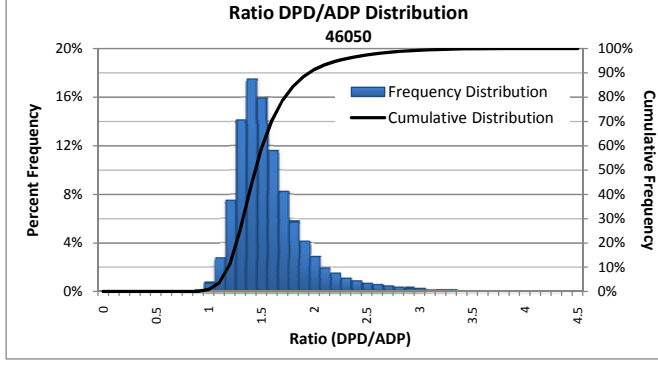
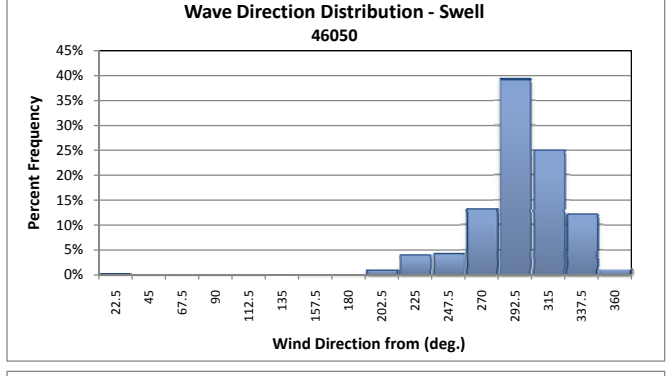
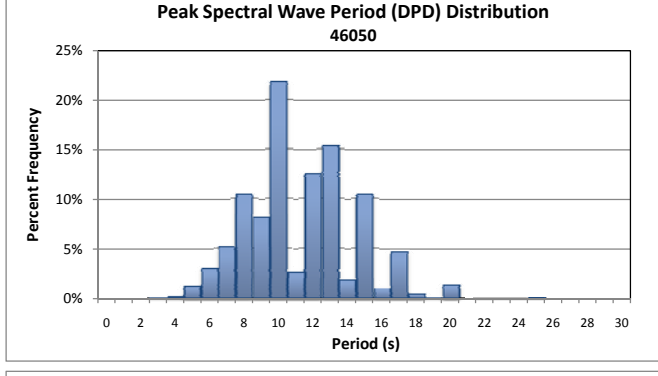
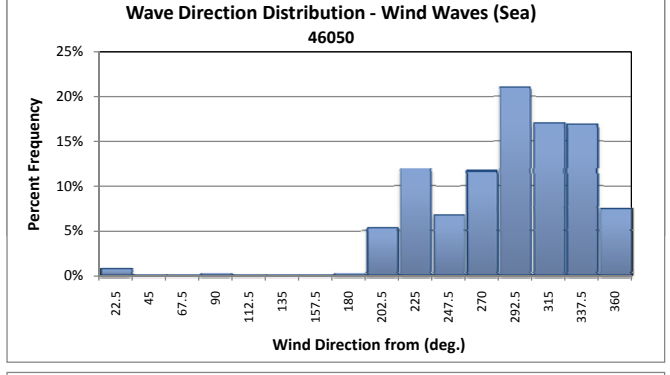
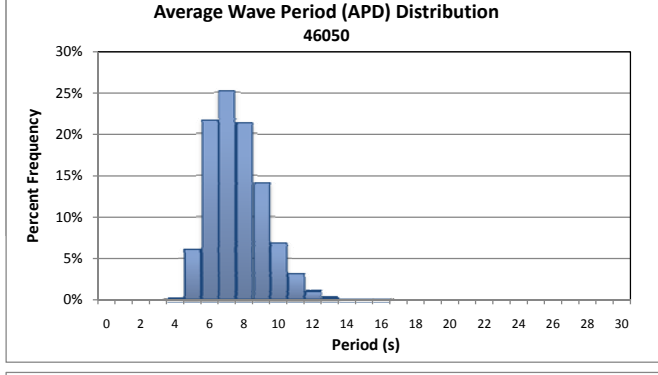
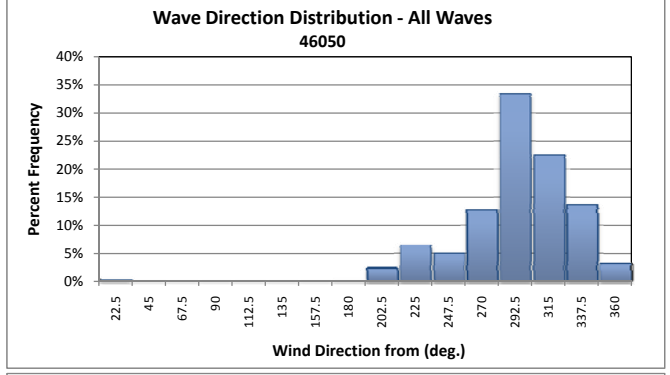
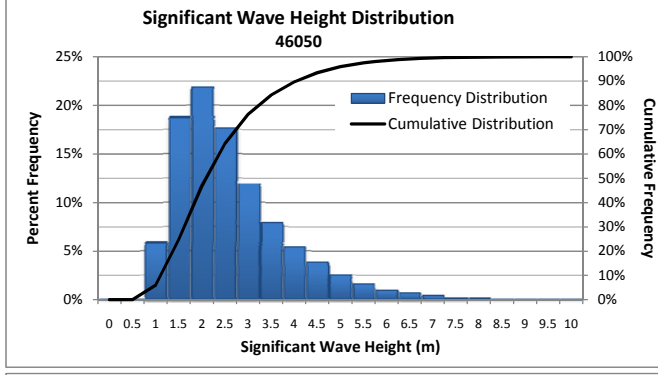
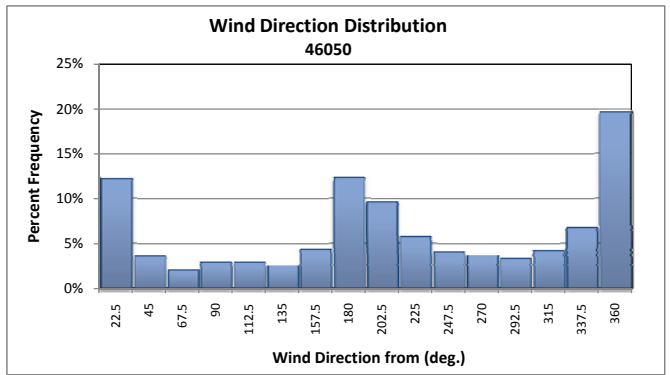
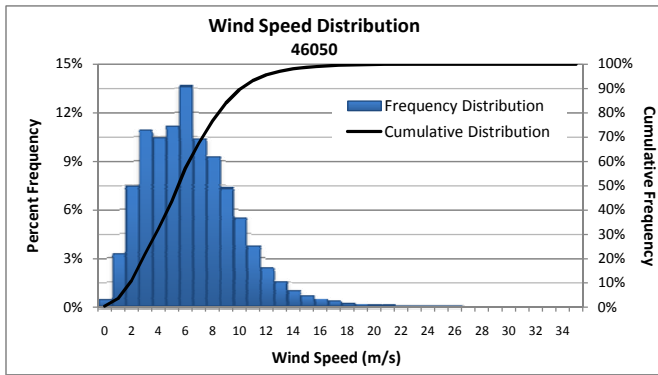
Station 46050 (LLNR 641) - STONEWALL BANKS - 20NM West of Newport, OR Annual - Joint Probability Distribution - Mean Wave Direction vs Wind Direction



Station 46050 (LLNR 641) - STONEWALL BANKS - 20NM West of Newport, OR Annual - Joint Probability Distribution - Wind Speed vs Wind Direction



Appendix 2 Histograms of METOCEAN Data from NDBC Buoy 46050



Figures A-1 through A-6 calculated from hourly 2-D wave spectra at NDBC Station #46050, 1996-2008. Each monthly histogram table represents the percent occurrence of binned Hm0 and Te values for the most recent 8 months for which there are at least 25 days of available buoy data.

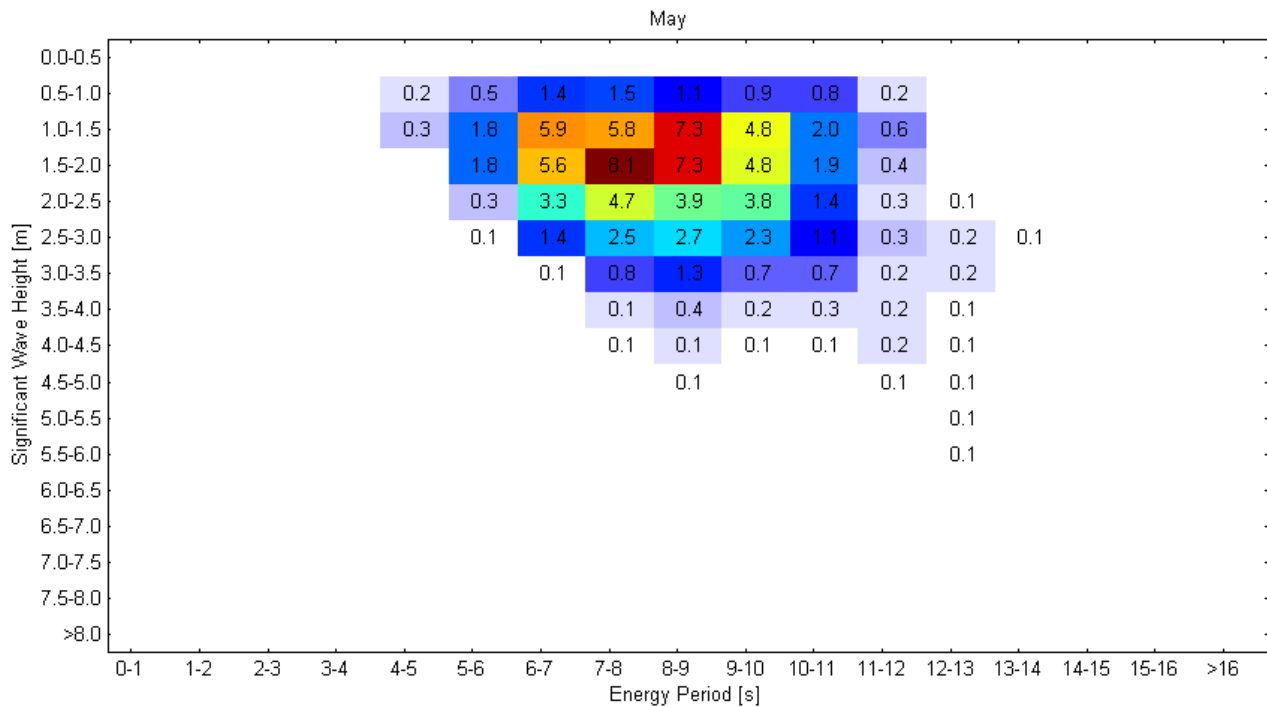


Figure A-1 Histogram of SWH vs. Energy Period for May

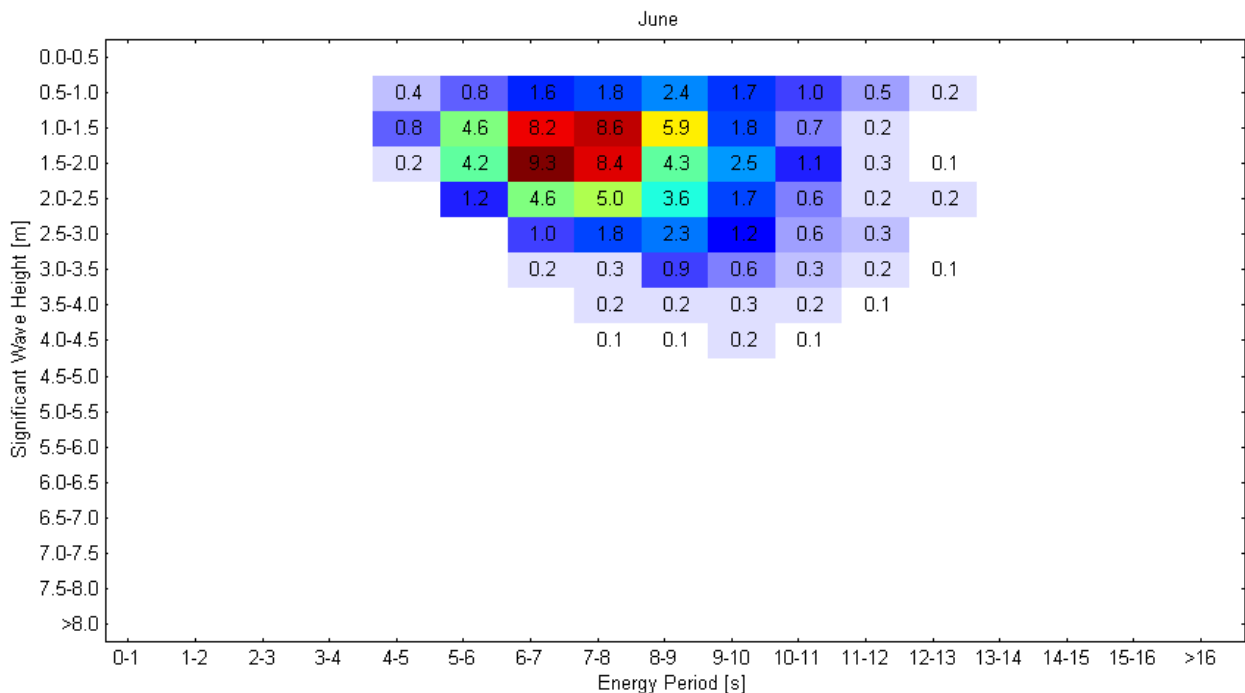


Figure A-2 Histogram of SWH vs. Energy Period for June

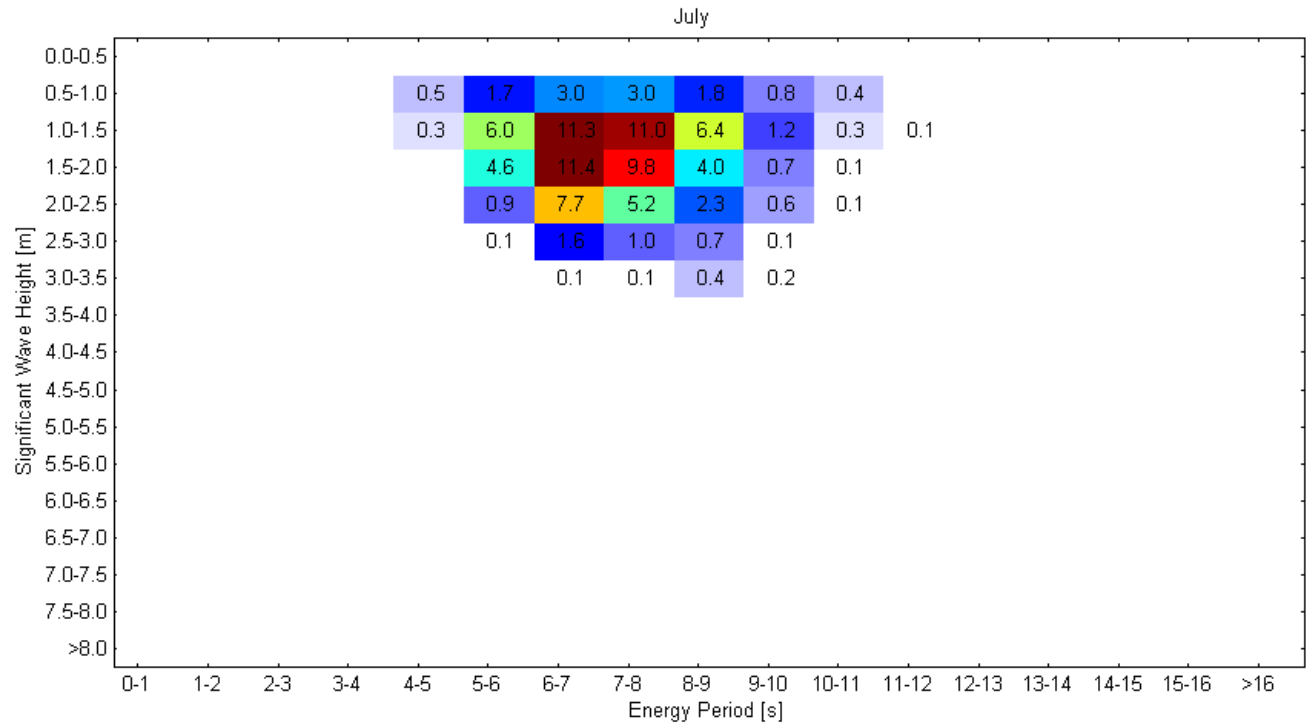


Figure A-3 Histogram of SWH vs. Energy Period for July

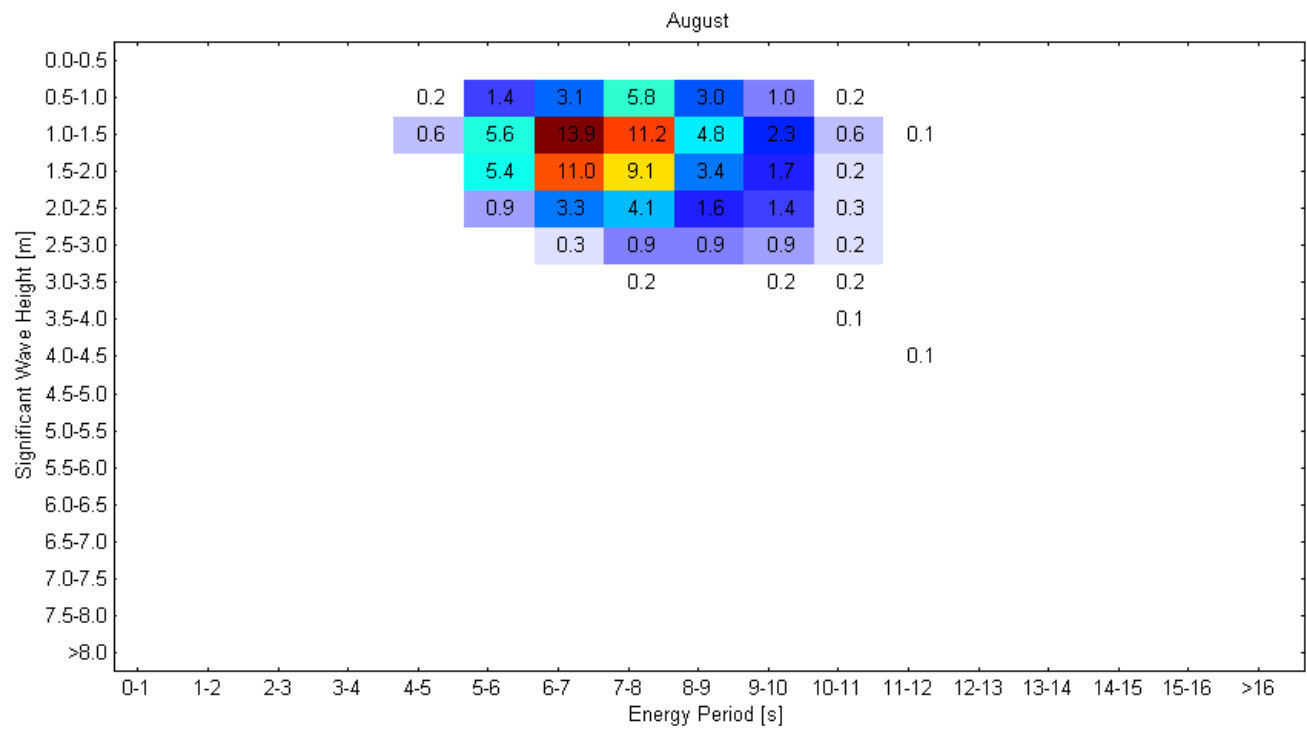


Figure A-4 Histogram of SWH vs. Energy Period for August

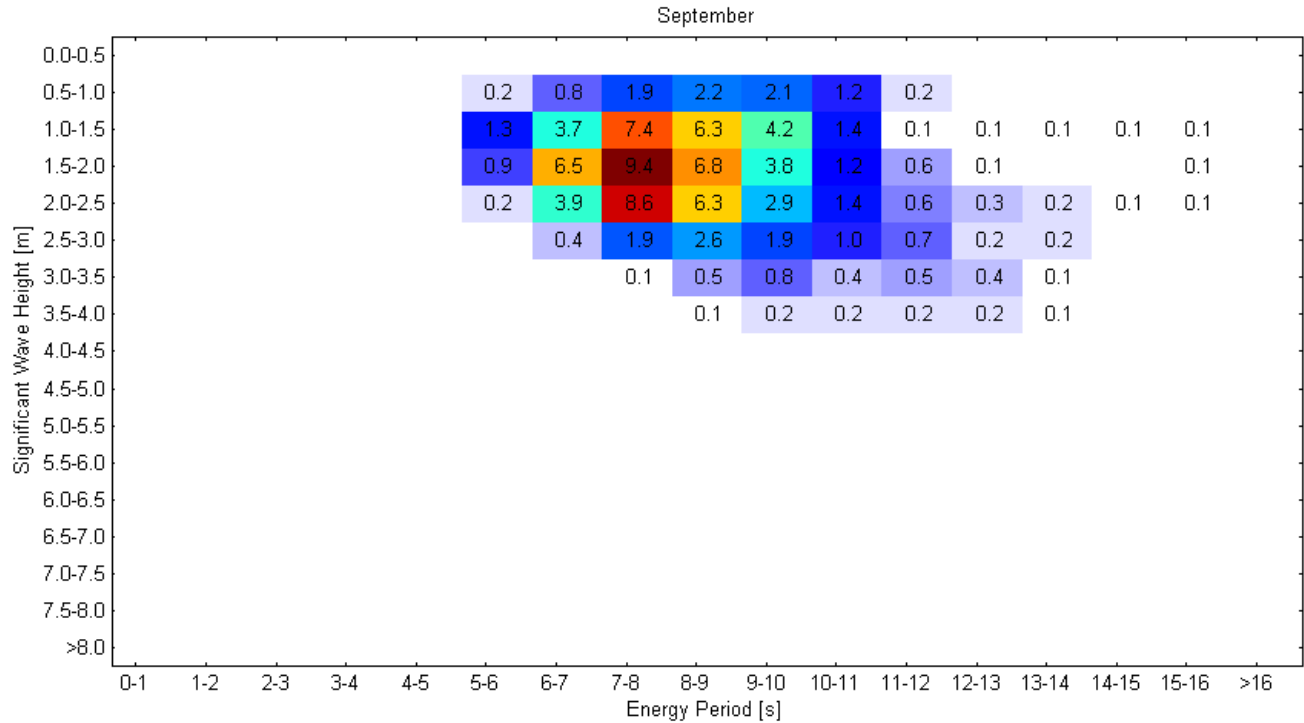


Figure A-5 Histogram of SWH vs. Energy Period for September

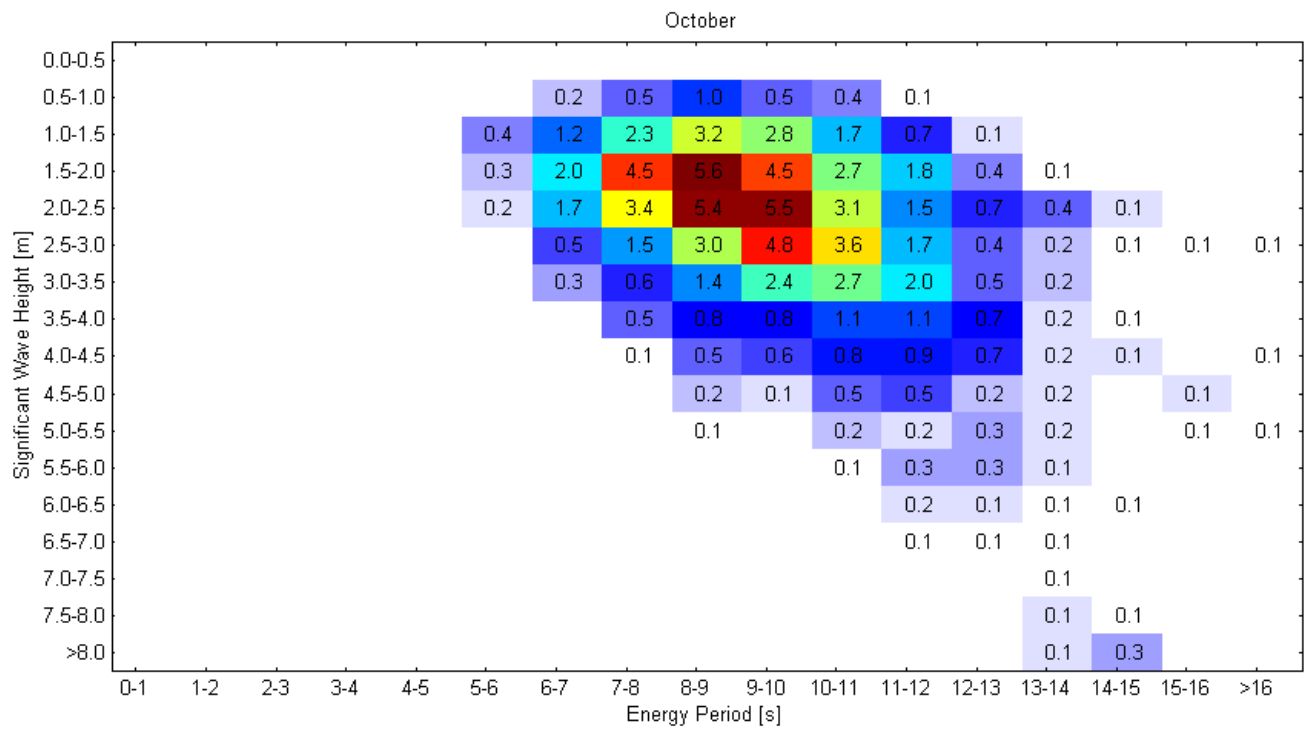


Figure A-6 Histogram of SWH vs. Energy Period for October

EXHIBIT B
TERMS AND CONDITIONS

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OREGON STATE UNIVERSITY
STANDARD TERMS AND CONDITIONS FOR GOODS
Revised November 2010
MODIFIED FOR RFP TB157896B (Modifications in italics)

These Standard Terms and Conditions for Goods shall govern the purchase by OSU from the Contractor and shall replace and supersede any terms and conditions presented by Contractor or any sales quotations, order acknowledgements, or similar forms unless otherwise specified in the Solicitation Documents or on the face of the Purchase Order issued by OSU.

1. DEFINITIONS:

As used in this Contract, the terms set forth below are defined as follows:

- a. "Contract" means only the documents listed below, which, in the event of any conflicts among them, must be interpreted in the following order of precedence:
 - i. The Solicitation Document and its Attachments and Addenda, if any; and
 - ii. The Purchase Order Issued by OSU
- b. "Contractor" means a person or organization with whom OSU has contracted for the provision of goods pursuant to this Contract;
- c. "Contractor Intellectual Property" means any intellectual property owned by Contractor and developed independently from Contractor's performance of this Contract;
- d. "OAR" means the Oregon Administrative Rules;
- e. "ORS" means the Oregon Revised Statutes;
- f. "OSU" means the State of Oregon, acting by and through the State Board of Higher Education, on behalf of Oregon State University.
- g. "Solicitation Document" means the Request for Quotes, Invitation to Bid, Request for Proposals, or any other written document issued by OSU that outlines the required specifications necessary to submit a responsive quote, bid, proposal, or any other response;

2. ACCESS TO RECORDS:

Contractor shall maintain books, records, documents, and other evidence and accounting procedures and practices sufficient to reflect properly all costs of whatever nature claimed to have been incurred and anticipated to be incurred in the performance of this Contract. OSU, the Oregon State Board of Higher Education, Oregon Secretary of State, federal government, and their duly authorized representatives shall have access to the books, documents, papers, and records of Contractor which are directly pertinent to this Contract for the purpose of making audit, examination, excerpts, and transcripts. Contractor shall maintain such books and records for OSU's review for at least six years beyond the Term of the Contract unless OSU authorizes a shorter period in writing. Contractor shall promptly remedy any discrepancies involving deviation from the terms of this Contract and shall promptly reimburse OSU for any commitments or expenditures found by OSU to have been in excess of amounts authorized by OSU.

3. AFFIRMATIVE ACTION:

Pursuant to OAR 580-061-0030, Contractor certifies that Contractor has not discriminated against Minority, Women or Emerging Small Business Enterprises in obtaining any required subcontracts.

4. APPLICABLE LAW; JURISDICTION AND VENUE.

- a. This Contract is governed and shall be construed in accordance with the laws of the State of Oregon, without resort to any other jurisdiction's conflict of law rules or doctrines. Any claim, action, or suit between OSU and Contractor that arises out of or relates to performance of this Contract must be brought and conducted solely and exclusively within the Circuit Court for Marion County, for the State of Oregon.
- b. Notwithstanding the foregoing paragraph, if a claim must be brought in federal forum, it must be brought and adjudicated solely and exclusively in the United States District Court for the District of Oregon. This paragraph applies to a claim brought against OSU only to the extent Congress has validly abrogated OSU's sovereign immunity and is not consent by OSU to be sued in federal court. This paragraph is also not a waiver by OSU of any form of immunity, including without limitation sovereign immunity and immunity based on the Eleventh Amendment to the United States Constitution.
- c. Except as set forth in the paragraph above, the parties consent to in personam jurisdiction in the above courts and waive any objection to venue and any objection that the forum is inconvenient.

5. ASSIGNMENT/SUBCONTRACT/SUCCESSORS:

Contractor shall not assign, sell, transfer, or subcontract rights, or delegate responsibilities under this Contract, in whole or in part, without the prior written approval of the OSU Procurement and Contract Services Department, and any attempt by Contractor to assign, sell, transfer, or subcontract rights or delegate responsibilities under this Contract, without first acquiring written approval of the OSU Procurement and Contract Services Department, is void. No such written approval

from OSU relieves Contractor of any obligations of this Contract, however, and any assignee, new owner, transferee or subcontractor will be considered an agent of Contractor. Contractor shall remain liable to OSU under the Contract as if no such assignment, sale, transfer, or subcontract had occurred. The provisions of this Contract are binding upon and will inure to the benefit of the parties to the Contract and their respective permitted successors and assigns.

6. COMPLIANCE WITH APPLICABLE LAW:

Contractor shall comply with all federal, state and local laws, regulations, executive orders and ordinances applicable to the Contract. Without limiting the generality of the foregoing, Contractor expressly agrees to comply with the following laws, regulations and executive orders to the extent they are applicable to the Contract: (i) Titles VI and VII of the Civil Rights Act of 1964, as amended; (ii) Sections 503 and 504 of the Rehabilitation Act of 1973, as amended; (iii) the Americans with Disabilities Act of 1990, as amended; (iv) Executive Order 11246, as amended; (v) the Health Insurance Portability and Accountability Act of 1996; (vi) the Age Discrimination in Employment Act of 1967, as amended, and the Age Discrimination Act of 1975, as amended; (vii) the Vietnam Era Veterans' Readjustment Assistance Act of 1974, as amended; (viii) ORS Chapter 659, as amended; (ix) all regulations and administrative rules established pursuant to the foregoing laws; and (x) all other applicable requirements of federal and state civil rights and rehabilitation statutes, rules and regulations. These laws, regulations and executive orders are incorporated by reference herein to the extent that they are applicable to the Contract and required by law to be so incorporated.

7. CONFIDENTIALITY:

This Contract is subject to the limitations and conditions of the Oregon Public Records Law, ORS 192.410-192.505.

8. DELIVERY:

All deliveries are F.O.B. destination with all transportation and handling charges paid by the Contractor, unless specified otherwise in the Solicitation Documents or on the face of the Purchase Order issued by OSU. Responsibility and liability for loss or damage remain with the Contractor until final inspection and acceptance, when responsibility passes to OSU except as to latent defects, fraud and Contractor's warranty obligations.

9. EXPORT CONTROL:

Contractor acknowledges that OSU has students and faculty who are foreign nationals who may work with the services, product or technology received from Contractor pursuant to this Contract. Contractor represents that it has informed OSU in writing, prior to executing this Contract if it is providing OSU any product or technology subject to the U.S. Export Administration Act of 1979, the Export Administration Regulations and the International Traffic in Arms Regulations, and if so, under what Commerce Control List number(s) or U.S. Munitions List number(s) it is controlled.

10. FORCE MAJEURE:

Neither OSU nor Contractor shall be held responsible for delay or default caused by fire, riot, act of nature, terrorist acts, or other acts of political sabotage, or war where such cause was beyond, respectively, OSU's or Contractor's reasonable control. Contractor shall make all reasonable efforts to remove or eliminate such a cause of delay or default and shall, upon cessation of the cause, diligently pursue performance of its obligations under this Contract. However, if a default or delay due to a force majeure event continues for an unreasonable time, as determined by OSU, then OSU is entitled to terminate the Contract. *No later than two working days after becoming aware of the occurrence of a force majeure event, Contractor shall furnish OSU with a written report describing the particulars of the occurrence, including an estimate of its expected duration and probable impact on the performance of the nonperforming party's obligations under this Contract. During the continuation of the force majeure event, Contractor shall furnish timely, regular written reports, updating the information required by this paragraph and providing any other information that OSU reasonably requests.*

11. GOVERNMENT EMPLOYMENT STATUS:

Contractor certifies that it is not currently employed by the federal government and not an employee of OSU.

12. INDEMNITY, RESPONSIBILITY FOR DAMAGES:

- a. Contractor shall be responsible for all damage to property, injury to persons, and loss, expense, inconvenience, and delay which may be caused by, or result from, any willful or negligent act or omission of Contractor, its subcontractors, or employees under this Contract. Contractor shall save, defend, indemnify, and hold harmless OSU, the Oregon State Board of Higher Education, the State of Oregon and their agencies, subdivisions, officers, directors, agents, members, and employees from all claims, suits, and actions resulting from or arising out of the willful or negligent acts or omissions of Contractor or its subcontractors, officers, agents, or employees acting under this Contract.
- b. Without limiting the generality of this section a., Contractor expressly agrees to defend, indemnify, and hold OSU, the Oregon State Board of Higher Education, the State of Oregon and their agencies, subdivisions, officers, directors, agents, members, and employees harmless from any and all claims, suits, actions, losses, liabilities,

costs, expenses and damages arising out of or related to any claims that the services or any other tangible or intangible goods delivered to OSU by Contractor that may be the subject of protection under any state or federal intellectual property law or doctrine, or OSU's use thereof infringes any patent, copyright, trade secret, trademark, trade dress, mask work, utility design, or other proprietary right of any third party; provided, that OSU shall provide Contractor with prompt written notice of any infringement claim.

- c. Contractor shall have control of the defense and settlement of any claim that is subject to a. or b.; however, neither Contractor nor any attorney engaged by Contractor shall defend the claim in the name of the State of Oregon or any agency of the State of Oregon, nor purport to act as legal representative of the State of Oregon or any of its agencies, without first receiving from the Oregon Attorney General, in a form and manner determined appropriate by the Attorney General, authority to act as legal counsel for the State of Oregon, nor shall Contractor settle any claim on behalf of the State of Oregon without the approval of the Attorney General. The State of Oregon may, at its election and expense, assume its own defense and settlement in the event that the State of Oregon determines that Contractor is prohibited from defending the State of Oregon, or is not adequately defending the State of Oregon's interests, or that an important governmental principle is at issue and the State of Oregon desires to assume its own defense.

13. INSPECTIONS:

Goods furnished under this Contract are subject to inspection and test by OSU at times and places determined by OSU. If OSU finds goods furnished to be incomplete or not in compliance with the Contract, OSU, at its sole discretion, may either reject the goods, require Contractor to correct any defects without charge, or negotiate with Contractor to sell the goods to OSU at a reduced price, whichever OSU deems appropriate under the circumstances. If Contractor is unable or refuses to cure any defects within a time deemed reasonable by OSU, OSU may reject the goods and cancel the Contract in whole or in part. Nothing in this paragraph is to in any way affect or limit OSU's rights as a Buyer, including the rights and remedies relating to rejection under ORS 72.6020 and revocation of acceptance under ORS 72.6080.

14. INSURANCE:

Contractor shall secure at its own expense and keep in effect during the term of this Contract general liability or professional liability insurance as deemed applicable by OSU with limits of not less than four million dollars (\$4,000,000) aggregate, unless otherwise specified in writing by OSU. Insurance policies are to be issued by an insurance company authorized to do business in the State of Oregon with a rating of A or better, or as deemed acceptable by OSU. If requested, Contractor shall provide proof of insurance of said insurance policy. If any of the liability insurance is arranged on "claims made basis, tail" coverage will be required at the completion of this Contract for a duration commiserate with the statute of limitations for tort claims in Oregon.

15. INVOICES:

Contractor shall send invoices to OSU for goods and services accepted by OSU to OSU's Department at the address specified in the Purchase Order. Contractor shall include in each invoice:

- a. The Purchase Order number;
- b. The quantity of goods ordered, the quantity of goods delivered, the date goods were delivered, the price per unit;
- c. A detailed description of any services performed, the dates services were performed, the rate or rates for services performed, and the total cost of services; and
- d. The total amount due and the payment address.

OSU shall pay Contractor for services performed at the prices and rates specified herein. Contractor shall look solely to OSU for payment of all amounts OSU owes to Contractor. Payment of OSU contracts is normally made within 30-45 days following the date the invoice is received. After 45 days, Contractor may assess overdue account charges up to a maximum of two-thirds of one percent (2/3 of 1%) per month or eight percent (8%) per annum on the outstanding balance (ORS 293.462).

16. NECESSARY COMPONENTS:

Unless specified otherwise, Contractor shall include all components, hardware and parts necessary for complete and proper assembly, installation and operation of goods.

17. NON-COMPLIANCE:

If any goods or component parts are recalled by a regulatory body or the manufacturer, or discovered by Contractor not to comply with applicable regulatory standards or the Specifications, Contractor shall immediately notify OSU of the recall or non-compliance, and shall provide copies of the recall notice or notice of non-compliance, as applicable, and all other supporting documentation for the recall or non-compliance determination. OSU may elect to (a) reject goods in whole or in part, or (b) revoke its acceptance of goods in whole or in part. If OSU rejects goods or revokes its acceptance of goods, Contractor shall remove the particular goods from OSU's possession at no cost to OSU and shall reimburse OSU for all payments made for those goods.

18. NOTICE:

Unless otherwise specified, any notice pursuant to this Contract shall be validly given if in writing and delivered to the other party via e-mail, fax, or by registered or certified mail, postage prepaid, to the respective addressees of Contractor and OSU.

19. OSU NAME AND TRADEMARK:

Contractor's shall not use names, marks or trademarks identifying OSU, or any department or office of OSU, or in any other way identify OSU without prior written approval from OSU's Office of University Advancement.

20. PARKING:

Contractors doing business on the OSU campus may be required to have a permit to park, if utilizing restricted street parking or parking lots. Contractor parking permits may be picked up from OSU's Office of Transit & Parking Services.

21. RECYCLABLE PRODUCTS:

Contractors will use recyclable products to the maximum extent economically feasible in the performance of the Contract. *Contractor shall not use recyclable products when using the recyclable products reasonably conflicts with the provisions of Exhibit A or any other provisions of the Contract.*

22. RETIREMENT SYSTEM STATUS:

Contractor is not a contributing member of the Public Employees' Retirement System and will be responsible for any federal or state taxes applicable to payment under this Contract. Contractor will not, by virtue of this Contract, be eligible for federal Social Security, employment insurance, workers' compensation or the Public Employees' Retirement System, except as a self-employed individual.

23. SAFETY AND HEALTH REQUIREMENTS/HAZARD COMMUNICATION:

Goods supplied under this Contract shall comply with all federal Occupational Safety and Health Administration (OSHA) requirements and with all Oregon safety and health requirements, including those of the State of Oregon Workers' Compensation Division. Contractor shall notify OSU prior to using products containing hazardous chemicals to which OSU employees may be exposed. Products containing hazardous chemicals are those products defined by Oregon Administrative Rules, Chapter 437. Upon OSU's request, Contractor shall immediately provide Material Safety Data Sheets, as required by OAR 437-155-025, for the products subject to this provision.

24. SEVERABILITY:

The invalidity, illegality or enforceability of any provision of this Contract shall not affect the validity, legality or enforceability of any other provision of this Contract, which shall remain in full force and effect and shall be liberally construed in order to effectuate the purpose and intent of this Contract.

25. SEXUAL HARASSMENT:

The State Board of Higher Education has adopted policies applicable to Contractors that prohibit sexual harassment, and Contractor's company and employees are required to adhere to OSU's policy prohibiting sexual harassment in their interactions with members of the OSU community.

26. STANDARD COMPONENTS:

Unless specified, Contractor shall provide goods with all components and accessories that the manufacturer lists as "standard" for goods.

27. SURVIVAL:

The terms and conditions of this Contract that by their sense and context are intended to survive termination or expiration hereof shall so survive.

28. TAX COMPLIANCE CERTIFICATION:

Contractor certifies under penalty of perjury that Contractor is, to the best of the undersigned's knowledge, not in violation of any Oregon Tax Laws. For purposes of this certification, "Oregon Tax Laws" means a state tax imposed by ORS 320.005 to 320.150 and 403.200 to 403.250 and ORS chapters 118, 314, 316, 317, 318, 321 and 323 and the elderly rental assistance program under ORS 310.630 to 310.706 and local taxes administered by the Department of Revenue under ORS 305.620.

29. TERMINATION:

This Contract may be terminated at any time by mutual consent of both parties or by OSU upon thirty (30) days' notice in

writing and delivered by certified mail or in person to the other party. In addition, OSU may terminate this Contract at any time by written notice to Contractor if (a) Federal or state statutes, regulations or guidelines are modified or interpreted in such a way that the services are no longer allowable or appropriate for purchase under this Contract; (b) any license or certificate required by law or regulation to be held by the Contractor to provide the services required by this Contract is for any reason denied, revoked, or not renewed; or (c) OSU fails to receive sufficient legislative appropriations (or from applicable federal, state, or other sources) to permit OSU, in the exercise of its reasonable administrative discretion, to fulfill its obligations under this Contract, or if the OSU program for which this Contract was executed is abolished. This Contract may also be terminated by OSU for default (including breach of contract) if (a) Contractor fails to timely provide services or materials called for by this Contract; or (b) Contractor fails to perform any of the other provisions of this Contract, or so fails to pursue the work as to endanger performance of this Contract in accordance with its terms and conditions, and after receipt of written notice from OSU, fails to correct such failures within ten (10) days. The rights and remedies of OSU provided in the above clause related to defaults (including breach of contract) by Contractor shall not be exclusive and are in addition to any other rights and remedies provided by law or under this Contract.

30. THIRD PARTY BENEFICIARY:

OSU and Contractor are the only parties to this Contract and are the only parties entitled to enforce its terms. Nothing in this Contract gives, is intended to give, or shall be construed to give or provide any benefit or right, whether directly, indirectly, or otherwise, to third parties.

31. TIME IS OF THE ESSENCE:

Time is of the essence for the completion of the work described in this Contract. It is anticipated by the parties that all work described herein will be completed by the dates specified, and that any delay in the completion of the work described herein shall constitute a material breach of this contract.

32. WAIVER:

Failure of OSU to enforce any provision of this Contract will not constitute a waiver or relinquishment by OSU of the right to such performance in the future nor of the right to enforce any other provision of this Contract.

33. WARRANTIES:

Unless specified, Contractor shall deliver goods that are new, unused and produced from current production inventory. Contractor shall provide goods manufactured from only those components that the manufacturer offers in the manufacturer's current parts catalogue for goods and carry full manufacturer warranties. Contractor warrants all goods delivered to be free from defects in labor, material, and manufacture and to be in compliance with specifications in the Solicitation Document. All implied or expressed warranty provisions of the Uniform Commercial Code, at ORS Chapter 72, are incorporated into this Contract. All warranties run to OSU.

34. WARRANTIES ON FABRICATED EQUIPMENT:

Contractor warrants to OSU that:

- i) Deliverables furnished and their production, conform to the Specifications.*
- ii) Deliverables furnished are free from defects in material and workmanship under normal use and operation for a period of 36 months from the delivery date. This warranty does not apply to defects which are the result of the Specifications, normal wear and tear, mishandling, misuse, neglect or improper testing or repair by other than Contractor or its authorized representative.*
- iii) As used in this section, "Specifications" means the requirements stated in Exhibit A and any modifications to those requirements that have been approved in writing by OSU in accordance with the process specified in Exhibit A.*

35. WORKERS' COMPENSATION:

The Contractor, its subcontractors, if any, and all employers providing work, labor or materials under this Contract are subject employers under the Oregon Workers' Compensation law and shall comply with ORS 656.017, which requires them to provide workers' compensation coverage that satisfies Oregon law for all their subject workers, unless such employees are exempt under ORS 656.126.

36. MERGER:

THIS CONTRACT CONSTITUTES THE ENTIRE CONTRACT BETWEEN THE PARTIES. THERE ARE NO UNDERSTANDINGS, ORAL OR WRITTEN, NOT SPECIFIED HEREIN REGARDING THIS CONTRACT. NO AMENDMENT, CONSENT, OR WAIVER OF TERMS OF THIS CONTRACT SHALL BIND EITHER PARTY UNLESS IN WRITING AND SIGNED BY ALL PARTIES. ANY SUCH AMENDMENT, CONSENT, OR WAIVER IS EFFECTIVE ONLY IN THE SPECIFIC INSTANCE AND FOR THE SPECIFIC PURPOSE GIVEN.

**EXHIBIT C
CERTIFICATIONS**

By signature on this certification the undersigned certifies that they are authorized to act on behalf of the Proposer and that under penalty of perjury the undersigned will comply with the following:

SECTION I. OREGON TAX LAWS

The undersigned hereby certifies under penalty of perjury that the undersigned is authorized to act on behalf of Proposer and that Proposer is, to the best of the undersigned's knowledge, not in violation of any Oregon Tax Laws. For purposes of this certification, "Oregon Tax Laws" means a state tax imposed by ORS 320.005 to 320.150 and 403.200 to 403.250 and ORS chapters 118, 314, 316, 317, 318, 321 and 323 and the elderly rental assistance program under ORS 310.630 to 310.706 and local taxes administered by the Department of Revenue under ORS 305.620.

SECTION II. AFFIRMATIVE ACTION

The undersigned hereby certifies that they have not discriminated against Minority, Women or Emerging Small Business Enterprises in obtaining any required subcontracts, pursuant to OAR 580-061-0030 (3).

SECTION III. COMPLIANCE WITH SOLICITATION

The undersigned agrees and certifies that they:

1. Have read, fully understands and agrees to be bound by the Request for Proposal and all Exhibits and Addenda to the Request for Proposal; and
2. Are an authorized representative of the Proposer, that the information provided is true and accurate, and that providing incorrect or incomplete information may be cause for rejection of the Proposal or Contract termination; and
3. Will furnish the designated item(s) and/or service(s) in accordance with the Request for Proposal and the Contract; and
4. Has provided a correct Federal Employer Identification Number or Social Security Number with the Proposal.

SECTION IV. PERMISSIVE COOPERATIVE PROCUREMENTS

If Proposer is awarded a contract from this Request for Proposal, Proposer hereby (check one)

- agrees
 disagrees

to offer the resulting contractual terms and prices to other public institutions.

Authorized Signature: _____

Date: _____

Name (Type or Print): _____

Telephone:(_____)_____

Title: _____

Fax:(_____)_____

FEIN ID# or SSN# (required): _____

Email: _____

Company: _____

Address, City, State, Zip: _____

Construction Contractors Board (CCB) License Number (if applicable): _____

Business Designation (check one):

- Corporation Partnership LLC Sole Proprietorship Non-Profit

Minority, Women & Emerging Small Business (MWESB) Certified Firm: Yes No

If yes, Minority, Women & Emerging Small Business (MWESB) Certification Number: _____

**EXHIBIT D
REFERENCES**

REFERENCE 1

COMPANY: _____ CONTACT NAME: _____
ADDRESS: _____ PHONE NUMBER: _____
CITY, STATE ZIP: _____ FAX NUMBER: _____
WEBSITE: _____ E-MAIL: _____
GOODS OR SERVICES PROVIDED: _____

REFERENCE 2

COMPANY: _____ CONTACT NAME: _____
ADDRESS: _____ PHONE NUMBER: _____
CITY, STATE ZIP: _____ FAX NUMBER: _____
WEBSITE: _____ E-MAIL: _____
GOODS OR SERVICES PROVIDED: _____

REFERENCE 3

COMPANY: _____ CONTACT NAME: _____
ADDRESS: _____ PHONE NUMBER: _____
CITY, STATE ZIP: _____ FAX NUMBER: _____
WEBSITE: _____ E-MAIL: _____
GOODS OR SERVICES PROVIDED: _____
