P N D
ENGINEERS, INC.

# MEMORANDUM

To: Mark Epstein
Cc:
From: Steve Robert, Project Manager
Jon Keiser, Principal in Charge, Vice President

Date: July 20th, 2015
Project No: 154022

Subject: City Dock Design Criteria

## PURPOSE

The purpose of this document is to present the design criteria used to develop the 60% PS&E and confirm the aforementioned criteria for finalizing the design.

## INTRODUCTION

The site consists of an existing boat ramp, abutment and floating dock. The guide piles and floating dock segments are to be replaced due to age. Regulatory requirements and permitting led the City of Bainbridge Island to plan a renovation that closely follows the existing plan view footprint of the existing facility. Meetings with citizens and different user groups The City was asked to provide moorage for larger, dinner cruise type vessels which come over from Seattle throughout the summer months .These ships will bring a larger number of passengers, the end float was sized at 12 feet wide to accommodate these embarking/disembarking passengers.

### Design Criteria

Following are a set of draft design criteria for use in the layout and design of the redeveloped floating dock facility. The elements described in this memo include the floats and guide piles.

### Vessel Size

The assumed vessels are as follows:

| Overall Length (feet) | Beam (feet) | Avg. Sail Height (feet) | Weight (lbs) |
|---|---|---|---|
| 30 | 12 | 5.2 | 20,000 |
| 50 | 17.5 | 10.6 | 63,000 |
| Virginia V, 70 | 21 | 13 | 123,000 |

50' vessels moored along the floats are used to size the guide piles. 30-foot vessels are used to determine the spacing of utility service connections

### Float Widths

- 8' wide low freeboard
- 10' wide mooring floats

### Dead Load

The dead load shall consist of the float's framing, rub-boards, attachment hardware, utilities, miscellaneous connection devices including pile attachment hardware, gangways, and all other equipment permanently attached to the float as well as the weight due to water absorption.

### Live Load

Floats: 20 psf uniform load with single concentrated load of 400 lb. at critical locations to check freeboard

### Level Tolerances

The deck of the float system shall be within the following level tolerances for the life of the system (adopted from current ADA standards):

- Maximum cross slope of the deck: 2% (1:50) slope
- Maximum longitudinal slope of the deck: 8.33% (1:12) slope
- Maximum change in level: ¼-inch

**Wind Load**
Apply wind load on exposed over-water vessel profiles (reference vessel list). Consider both end and side loading conditions and sheltering effects.

- 77 mph basic wind speed
- 2-minute average
- ASCE 7-10, exposure D

**Design Waves**
Preliminary wave fetch calculations arrive at a significant wave height of 2.1 feet over a 2.5-second period.

**Load Combinations**
Load combinations shall include but not be limited to:

- Dead load + Uniform live load with float unsupported span length equal to the wavelength of the design wave.
- Dead load + Point live load + Wind load + Wave load
- Dead load + Point live load + Current Dead load
- Dead load + Point live load + + Vessel impact.

List all other load combination checked in the Contractor's design.

**Impact Load**

- 63,,000 lbs. vessel traveling at the speed of the current but not less than a 1-knot speed, striking float at 10-degree angle from float edge

**Design Current**

- 1.5 knots (tidal current estimated)

**Float Freeboard**

- 18 inches of freeboard for all boarding and mooring floats under dead loads.
- 12 inches of freeboard for all low profile floats
- The freeboard under all dead loads shall not be more than ½-inch below or more than one-inch above the specified freeboard after one year of operation.
- Minimum freeboard under Dead Load + Future Dead Load + Live Load shall be 10 inches for boarding and mooring floats, 4inches for low profile floats.

**Tides:**

- Highest Recorded Tide: +15.00
- Mean Higher High Water (MHHW): +11.50 ft
- Mean High Water (MHW): +10.60 ft
- Mean Low Water (MLW): +2.80 ft
- Mean Lower Low Water (MLLW): 0.00 ft
- Lowest Observed Water Level: -4.5 ft

**Electrical Design**

- (16) Offshore power pedestals serving (32) slips. Based on the 30 ft minimum vessel length.
- 50% of pedestals will be 50-amp/240-volt (one side of each pedestal).
- 800-amp service to accommodate some future buildout. 600-amp is currently required by the loading calculations.
- No fire alarm (can be included if desired)
- No navigation lights (can be included if desired)

If you have any questions or require clarification regarding our submittal, please do not hesitate to contact either of the undersigned at 206-624-1387, or at mhuggins@pndengineers.com and rjohnson@pndengineers.com.

Sincerely,

PND Engineers, Inc. | Seattle Office

Steven M Robert

Steve Roberts, P.E.
*Senior Engineer*