

November 2009
Sixteenth Edition

- ◆ **Design and Construction of RV5**
- ◆ **Beach Nourishment Update**
- ◆ **RV5 Vessel Performance and Wake Impact Studies**
- ◆ **Recent Technical Papers and Presentations**
- ◆ **Historical Shoreline Assessment**
- ◆ **Environmental Impact Study**

Upcoming Property Owner Meetings

We invite you to attend one of the three property owner meetings:

- **Port Orchard**
Elim Lutheran Church
November 12th, 6-8 PM
- **East Bremerton**
East Kitsap Regional Library, Sylvan Way
November 16th, 6-8 PM
- **Bainbridge Island**
Kitsap Regional Library
November 19th, 6-8 PM

The purpose of the meetings is to present the design and construction of RV5, present the plan and schedule for vessel performance and impact studies, and provide an update on beach nourishment. We encourage your participation to provide input, questions, and feedback.

Introduction: The primary objective of the Rich Passage Passenger Only Fast Ferry (POFF) Study is to develop the scientific basis to identify and minimize the potential impacts of candidate POFF vessels on the shorelines of the Seattle-to-Bremerton ferry route. This includes the collection of data and development of predictive tools that can be applied prior to implementing a POFF operation. Not only is the study of relevance to Rich Passage, but the results and methodologies developed have application in any environmentally sensitive area where high-speed passenger ferry or commercial-scale vessel operation is being evaluated. This newsletter shares current results and progress of the study with Rich Passage waterfront property owners.

Design and Construction of Research Vessel

The design of the 78-foot 118-passenger foil-assisted catamaran was completed on June 1, 2009 by All American Marine and Teknikraft Design, Ltd, in cooperation with the Rich Passage Passenger Only Fast Ferry research team.

Construction of the new research vessel, RV5, is in progress and on schedule for completion by April 2010. Fabrication of the hull and roll over represented the first significant milestone and was completed on September 16. On the next page is a series of photographs showing the progression of the hull from skeleton to an upright position. The superstructure of RV5 forming the passenger cabin and pilot house is being fabricated with composite materials by James Betts Enterprises (JBE), Anacortes, WA. Replacing aluminum on the superstructure with glass fiber-reinforced composites will result in significant weight saving that is anticipated to further improve the wake performance of the vessel. The photos shown on the next page were taken on October 2 during an inspection of RV5 construction progress by the MTAK board of directors and members of the research team at All American Marine.

RV5 will be equipped with an on-board hull and foil monitoring system to log vessel performance data including speed, direction, trim, list, draft, pressure distribution on the hull and foils, stress and strain on the composite foil, and fuel consumption and engine data.



The principal dimensions and performance will be approximately as follows:

- ◆ Registered length: 78'-4"
- ◆ Beam (molded): 28'
- ◆ Draft M/S (laden): 3'-4"
- ◆ Service speed: 34-37 kn at 90% MCR
- ◆ Passengers: 118
- ◆ Crew: Up to 4
- ◆ Power: (4) 873 bhp at 2200 rpm
- ◆ Fuel capacity: 800 gallons
- ◆ Classification: USCG, Subchapter T
- ◆ Wake wash/wave height at 30-40 kn <0.10 m @ 6 sec, 300 m dist. (deep water)
- ◆ Wake wash /wave energy at 30-40 kn < 630 J/m @ 6 sec, 300 m dist. (deep water)



Photos of RV5 hull construction progress including skeleton (above), rollover (right), and upright (below) at All American Marine.



Photo of fabrication of composite main deck (above) by James Betts Enterprises.

Beach Nourishment

An earlier phase of the POFF Study introduced a proposal for an experimental beach nourishment program designed to evaluate the performance of beach nourishment in improving and protecting area beaches in the context of both existing conditions and potential POFF operations.

The research team has devoted considerable effort in working with the Washington Department of Fish and Wildlife and other regulatory agencies to establish a sound basis for permitting the experimental program. The goal of this effort has been to obtain the needed permits for placement of the material on beaches in late fall to winter 2009-2010. This schedule would have allowed the material to be placed during the approved in-water work window. It would also have allowed the material to be re-worked by natural processes, reaching a state of dynamic equilibrium, before the start of the new research vessel trials in May 2010.

In early May of this year, some final issues surrounding federal funding for the work were resolved and permit applications were readied for submittal, pending approval by the owners of the beach nourishment properties. Obtaining permit application signatures from property owners extended

much longer than anticipated. Although the majority of property owners promptly returned signed applications, a few owners did not sign and return the applications up until late October. Unfortunately, the delays in gaining federal approval and obtaining property owner signatures caused the permitting schedule to be pushed back. Placing the material later in 2010 after the re-opening of the work window would not have yielded usable technical data because the vessel trials would have already been underway for several months. Therefore, the project team made the decision not to move forward with the demonstration project. Beach nourishment remains a viable “soft” shoreline protection solution and will be thoroughly evaluated as part of the environmental impact study described on the back page.

In lieu of beach nourishment, the research team is proposing to conduct a second gravel tracer program to increase our understanding of transport of pebble, gravel, and cobble in response to wakes, waves, tides, and currents.

RV5 Vessel Performance and Wake Impact Studies in 2010

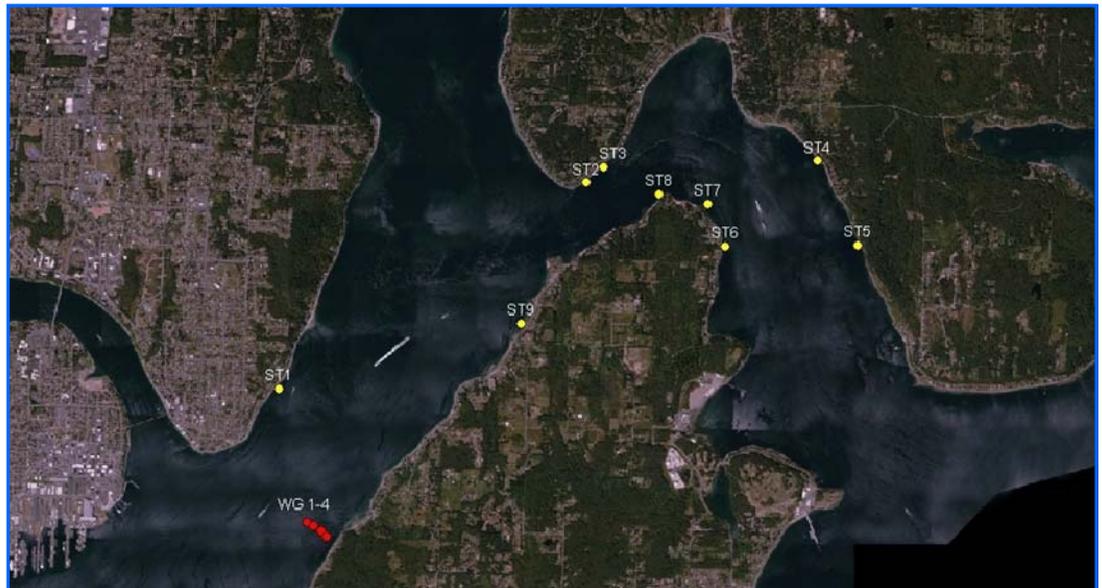
A series of full-scale tests to evaluate RV5 performance is proposed beginning in May 2010. The proposed testing is to be conducted in two phases: 1) vessel wake and performance trials along Port Orchard Reach in May and 2) shore response studies in Rich Passage conducted from June through November.

Vessel wake and performance data will provide calibration and validation of the computational fluid dynamics (CFD) models that were used for the optimization and design of RV5 and boundary conditions (wake signature) for the wake transformation models used for wake impact prediction and assessment. Data are also needed for optimizing and tuning the computer-controlled hydraulics system to adjust the foil and interceptors to maintain optimum vessel trim for low wake operations. The hydrofoil and interceptors will be automatically controlled with a custom-designed system developed by NAIAD Dynamics US, Inc.

The shore response studies will provide data to quantify wake effects and to understand wake behavior from RV5 near the shoreline by simulating a high-speed passenger-only ferry service. The studies will also provide an indication of passenger demand for high-speed passenger-only ferry service on the Seattle-Bremerton route.

Both phases involve extensive field data collection programs to measure wakes, waves, and water levels at multiple locations in the testing area and throughout the wake sensitive areas along the ferry route. Effects on the shorelines of Rich Passage will be measured and analyzed based on geo-referenced beach photo observations, extensive beach profile surveys, direct measurements of gravel transport, and ground-based LiDAR surveys.

Pacific International Engineering is currently preparing environmental permit applications for the temporary installation of the wave, tide, and wind gages. All of the instrumentation will be deployed by methods that are sensitive to the environment and will minimize the potential for impacts to the surrounding sediments and habitat. The wave gages will be deployed at depths greater than 0 ft MLLW. Many of the gage sites are owned by the State of Washington and administered by the Department of Natural Resources. However, certain sites are private property and we have requested permission from those property owners to obtain the necessary permits to conduct measurements on their properties.



Recent Technical Papers and Presentations

Team members have presented findings from the research program at several workshops and technical conferences over the last year. Six of the most recent publications are listed below and full text can be downloaded from the website, www.pugetsoundfastferry.com:

- ♦ Workshop on Puget Sound Shorelines and the Impacts of Armoring (in review): *Gravel transport and morphological response on a supply-limited beach, Point White, Bainbridge Island.*
- ♦ Journal of Coastal Research, Special Issue (in review): *Measurements and modeling of gravel transport under wind waves, vessel-generated waves and tidal currents.*
- ♦ Fast 2009, 10th International Conference on Fast Sea Transportation:
 1. *Full-scale measurements and impact studies with high-speed foil-assisted catamarans in a wake sensitive area.*
 2. *CFD validation studies for a high-speed foil-assisted semi-planning catamaran.*
 3. *URANS based optimization of a high-speed foil-assisted semi-planning catamaran for a low wake.*
 4. *Potential flow based optimization of a high speed, foil-assisted, semi-planning catamaran for low wake.*

Historical Shoreline Assessment

A qualitative assessment of shoreline change, shoreline modification, historic sediment supply, and beach volume change for four sites along Point Glover within the Rich Passage Study Area has been conducted. The sites were selected based on the lack of site-specific quantitative beach profile data to assess the potential for changes to historic and current biological habitat. A combination of images from ground/boat-based photo surveys and aerial photographs were used to complete the analysis. The analysis was conducted in response to multiple comments received from waterfront property owners in the area regarding anecdotal evidence for historic changes in the character of beaches in this area.

This work provides an assessment of coastal morphological change and beach sediment distributions at sites along Point Glover representative of the range of shore types observed along the shoreline in this part of the Study Area. The sites are located in a zone of no appreciable alongshore drift and are generally considered independent of each other in terms of sediment supply, transport, and beach response. The shoreline is supply-limited because of shoreline modifications and a lack of feeder bluffs.

Photo time series indicate both long- and short-term changes in shoreline features, sediment cover, and volume at each site.



Oblique aerial photographs of waterfront property at the northern tip of Point Glover showing longshore variability in sediment cover and distribution between 2000 and 2009.

For example, long-term changes in sediment cover are observed most clearly off the northern end of the Point (bottom). The timing of these changes may correspond with POFF operations from 1998 to 2001. The sites are located in close proximity to each other and are situated along the ferry route such that they may be highly susceptible to changes in wake energy. The complete report detailing the historical shoreline assessment using photographic surveys is available for download from the website.

Environmental Impact Study

Preliminary work is underway on an environmental impact study on fast ferry operations on the Seattle-Bremerton route. Pacific International Engineering is beginning this work with a review of the available existing environmental data for the Study Area and identification of gaps in the data that will need to be filled in order to thoroughly characterize baseline and historical conditions in the area and to analyze the potential effects of regular POFF service. The study will include analyses of environmental conditions and effects at the dock sites in Bremerton and Seattle and in the open waters of Puget Sound along the ferry route, as well as within Rich Passage. Much is already known about environmental and habitat conditions in the Study Area and the species that use it. Nonetheless, there are likely to be some areas that need additional investigation.

The environmental impact study is expected to cover a wide range of topics, from potential impacts on threatened and endangered species to the benefits of reducing automobile trips in the region. A series of public scoping meetings, currently scheduled for early summer 2010, will be held at several locations in the Study Area. At these meetings we will present information on the proposed study. The public, governmental agencies, and Tribes will have an opportunity to comment on the study and the scope of the environmental analyses.

Website, Project Information & Feedback

Property owner participation is essential to the success of our research program and we encourage your input regarding this study and the plans for future work. Further information on the study can be obtained from the project website: www.pugetsoundfastferry.com or by sending e-mail to Marie Garrett at marieg@pie-pllc.com or Pamela Bacha at pamelab@pie-pllc.com.